State of Oregon
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Annual Report

ODOT's MS4 Phase I Permit

National Pollutant Discharge Elimination System
MS4 Stormwater Discharge Permit

2023
Monitoring Year

Oregon Department of Transportation
June 1, 2024

DEQ File Number 101822

1.0 Certification and Signature
1. Permit Registrant(s): Oregon Department of Transportation
2. Legally Authorized Representative: Rebecca Burrow
3. Title: Maintenance Services Manager
4. Email: rebecca.burrow@odot.oregon.gov
5. Phone: 503.951.9333
I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations (40 CFR 122.22(d)). Signature: Rebecca BURROW (Jun 25, 2024 07:14 PDT) Date: 06/25/2024

Created by M. Riedel-Bash
Date: 12/27/2018
Edited for ODOT by Anna D. Roller
Date: 6/30/2021

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Instructions

At least once per year, the permit registrant must evaluate compliance with the requirements of the MS4 Phase I general permit using this Annual Report template. This self-evaluation includes assessment of progress made towards implementing the SWMP control measures in Schedule A, and implementation of actions to comply with any additional requirements identified pursuant to Schedule D.1 (Requirements for Discharges to Impaired Waterbodies).

For each SWMP control measure or activity listed below, please answer all the questions and in the comments field cite any relevant information and/or statistics that helps to illustrate implementation or compliance. If your answer is “No,” in the comments field explain the reasons and outline the anticipated implementation timeline. If the requirement does not apply, explain why it is not applicable in the comments field.

No later than June 1 each year, beginning in 2021, the permit registrant must submit an Annual Report to DEQ. One signed copy and one electronic copy must be submitted to DEQ using the address provided in permit. DEQ can provide an FTP site for submittal of the electronic copy, upon request.

2.0 General Information

2.1 Registrant Information

6. Permit Registrant(s): Oregon Department of Transportation		
7. Type(s): ☐ City / ☐ County / ☐ Special District / ☒ Other: Transportation Agency		
8. Registrant Type: Existing Registrant: ☒ New Registrant: ☐		
9. MS4 Type: Large Community: ☐ Small Community: ☐ Statewide: ☒		
10. DEQ Permit No: 101822		
11. EPA File No: 110870		
12. Physical Address: 355 Capitol Street NE, MS11		
City: Salem	State: Oregon	Zip: 97301
13. Point of Contact: Anna Roller		
Title: Clean Water Coordinator	Email: anna.roller@odot.oregon.gov	Phone: 503-991-9367
14. Mailing Address (*if different*): 455 Airport Road SE		
City: Salem	State: OR	Zip: 97301

2.2 Municipal Separate Storm Sewer System (MS4) Information

15. Estimate the area served by the MS4: This statewide permit applies to the geographic area encompassing the municipal separate storm sewer system associated with ODOT owned and/or operated roads, maintenance yards, rest areas, and other facilities located in ODOT highway right-of-way that discharge stormwater to surface waters of the state.

2.3 MS4 Stormwater Discharge Information

Identify the names of all known waters that receive a discharge from your MS4.

16. This permit applies to discharges to receiving waters statewide.

2.4 Coordination Among Registrants and Joint Agreements

Required for permit registrants relying on another entity to satisfy one or more of the requirements of the permit.

17. Is there a joint agreement in place for the implementation of one or more stormwater management program control measures? *Schedule A.2* Yes ☐ No ☒

18. If yes, has there been any change to the joint agreement(s) submitted previously? Yes ☐ No ☒
If yes, include, as an attachment, a summary of the changes.

2.5 Stormwater Management Program Information

19. Discuss the status and overall progress of establishing legal authority to control pollutant discharges into and discharges from the MS4 and to implement and enforce the conditions of this permit. *Schedule A.2.b*
ODOT utilizes relevant regulatory mechanisms as allowed pursuant to applicable state law. These mechanisms are discussed in detail in Section 1.2 of ODOT's Stormwater Management Program Document (SMPD).

2.6 Stormwater Management Program Information

20. Is an updated SMP Document (SMPD) attached? *Schedule A.2.d*
    Yes ☒ No ☐
    If necessary, provide an explanation:
    A summary of SMPD changes is included on the final page of the updated SMPD, Attachment 1.

21. Identify the publicly accessible website where the SWMP Document is posted. *Schedule 2.c & A.3.b.ii*
    ODOT completed additional updates to its website in 2023. The MS4 materials are located on ODOT's Storwmater Permits page.
    If necessary, provide an explanation:
    N/A

22. Does the SMPD include an implementation schedule for control measures that have yet to be or are partially implemented? *Schedule A.2.c*
    Yes ☐ No ☒
    If necessary, provide an explanation: All applicable minimum control measures have been implemented.

23. Describe the method used to gather, track, and use SMPD information to set priorities or assess compliance: *Schedule A.2.d*
    ODOT's stormwater program requires participation and involvement from multiple sections and business lines within the agency. The Maintenance and Operations Branch (MOB), the Hydraulics Engineering Section (HES), the Environmental Section and the Regions work together to ensure technical programs are aligned. MOB is responsible for administration of the permit, which includes tracking progress toward implementation of the minimum control measures and reporting compliance activities. The Clean Water Coordinator in MOB gathers the reporting information and works with other program leads within ODOT to assess compliance, set goals and update the SMPD.

24. Have adequate finances, staff, equipment and other support capabilities been provided to implement the permit? *Schedule A.2.e*
    Yes ☒ No ☐
    If necessary, provide an explanation: N/A

25. During this monitoring year was compliance with the requirements of this permit evaluated? *Schedule B.1*
    Yes ☒ No ☐
    If necessary, provide an explanation: ODOT staff reviewed its MS4 permit requirements to confirm implementation deadlines for each of the minimum control measures have been met within the applicable deadlines in preparation for submission of this report.

26. During this monitoring year was it determined or reported that discharge from the MS4 caused or contributed to an exceedance of an applicable water quality standard? *Schedule A.1.b*
    Yes ☐ No ☒
    If necessary, provide an explanation: N/A

3.0 Stormwater Management Program Control Measures

3.1 Public Education and Outreach

27. Provide a brief summary of the ongoing public education and outreach program. *Schedule A.3.a*

This minimum control measure has been fully implemented. ODOT provides educational messages through formal trainings and informal field training opportunities as well as at public meetings. ODOT's education and outreach program targets the general public, contractors and ODOT employees responsible for inspecting construction project activities and other ODOT employees, such as maintenance staff, about the potential impacts of stormwater on water quality around the state.

ODOT staff assisted in development of an Interstate Technology Regulatory Council (ITRC) Tire Anti-Degradants (6PPD) Team's recently published focus sheet, What We Know: 6PPD and 6PPD-quinone, in the Summer of 2023, offering a first look and overview of the subject of their forthcoming guidance document. A print version of the focus sheet is included as Attachment 2.

The education and outreach activities for 2023 are detailed in number 29 below.

In the Willamette Basin, Maintenance and Operations Branch staff arranged in-person training for Portland maintenance staff with Contech representatives on proper maintenance of a proprietary stormwater structure. An evaluation of this activity is included in Number 36 below.

ODOT also hosted the Pacific Northwest Snowfighters (PNS) Conference on June 6-7 in Portland. The PNS is an association of transportation agencies from Washington, Oregon, Idaho, Colorado, Montana and Canada that plan a biennial winter maintenance conference to share knowledge about best practices, materials, innovations, current research results, and to network with peers. 433 people attended the conference, 92 from ODOT. There were 18 educational sessions and opportunities to network with other winter maintenance professionals, researchers and other state, county and local transportation agencies. The conference presentations are available on the PNS website.

28. Were the required components in place by the implementation date? *Schedule A.3.a.i*
    Yes ☒ No ☐ *(Implementation date: June 1, 2022)*

29. Provide the number of education and outreach activities conducted: *Schedule A.3.a.iii*
    10 Pesticide trainings (ODOT employees);
    3 Winter maintenance training sessions (ODOT employees);
    2 Environmental Construction Inspector (ODOT employees);
    2 Erosion & Sediment Control Manager (contractors);
    3 Blue Book training classes (ODOT employees);
    21 Online open houses providing an opportunity for public input on ODOT projects (general public)

30. Indicate target audiences addressed during this reporting year: *Schedule A.3.a.iv(A)*
    ☒ General public, including freeway commuters
    ☒ Contractors and/or ODOT employees responsible for inspecting construction project activities
    ☒ Other ODOT employees, as appropriate

31. Have each target audience been addressed during the permit term? *Schedule A.3.a.iv*
    Yes ☒ No ☐

32. Indicate target topics addressed during this reporting year: *Schedule A.3.a.iv(B)*
    ☒ Illicit Discharge identification and reporting procedures
    ☐ Impacts of illicit discharges on Oregon's waterways
    ☒ Impacts from roads and appropriate techniques to avoid adverse impacts
    ☒ Research opportunities related to stormwater
    ☒ Best management practices for litter and trash control
    ☐ Best management practices for recycling programs

☒ Low-impact development/green infrastructure
☐ Watershed awareness and how storm drains lead to local creeks and rivers, and potential impacts to fish and other wildlife
☒ Other: Culturally Modified Tree Training video

33. Describe the types of educational messages or activities distributed and/or offered during this reporting year. *Schedule A.3.a.iii*
    ☒ Printed materials
    ☒ Electronic materials
    ☒ Social media
    ☒ Targeted workshops
    ☐ Other:

34. Was outreach offered in the Willamette Basin during this reporting year? *Schedule A.3.a.iii*
    Yes ☒ No ☐

35. Total number during the permit term: ODOT provides multiple training opportunities, project open houses, and public meetings regarding the target topics for each of ODOT's target audiences annually. ODOT has met the implementation requirement to distribute at least 2 messages annually, reaching all target audiences, including at least 1 message in the Willamette Basin each year.

36. Identify and describe the assessment/evaluation of, at least, one education and outreach activity that occurred during this reporting year. Include the assessment process or metric for evaluation, and why this activity was considered successful. *Schedule A.3.a.v*

    ODOT is piloting a district water quality maintenance crew due to the increased water quality specific demands on the maintenance staff in the Portland metro area. MOB staff provided in person training on the stormwater facility standard maintenance tables and Blue Book to the water quality maintenance crew in early 2023. During that training, a question regarding maintenance of a specific proprietary facility was raised. MOB staff reached out to a Contech representative who agreed to a site visit to provide guidance for the maintenance crew as to recommended inspection and maintenance activities. On May 22, 2023, MOB staff and two Contech representatives provided an all day, hands-on training directly to the water quality maintenance crew. The activity was considered a success because it provided an opportunity for the staff responsible for the operation, inspection, and maintenance of the facility to ask questions to the manufacturer. The Contech representatives were also able to witness the work involved in carrying out the recommended maintenance in the field in real time.

37. Will the assessment be used to inform future stormwater education and outreach efforts? *Schedule A.3.a.v*
    Yes ☒ No ☐

38. Provide an explanation: ODOT leveraged its existing relationship with the facility manufacturer to provide facility specific training free of charge directly to maintenance staff. It was a cost-effective opportunity to provide training in a high priority area. The maintenance staff obtained hands-on experience with the recommended maintenance under direct supervision of a representative of the manufacturer. If a maintenance issue with a proprietary facility arises in the future, or if maintenance staff request training specific to a type of proprietary structure, ODOT will use this experience as a template for providing training in a similar fashion when circumstances allow.

3.2 Public Involvement and Participation

39. Provide a brief summary of the overall progress towards implementation of this control measure. *Schedule A.3.b*

ODOT exceeded its requirement to create or partner in the development of two public involvement opportunities during the permit term. The stormwater page was updated in 2023 to provide a more streamlined approach to delivering its program information.

In 2023, ODOT continued its participation in a working group with west coast state DOTs and their regulatory partners, along with FHWA and EPA, to share information and brainstorm strategies for permitting and permit compliance related to tire particles/6PPD-quinone. Three meetings were held in 2023.

40. Were the required components in place by the implementation date? *Schedule A.3.b.i*

Yes ☒ No ☐ *(Implementation date: June 1, 2022)*

41. Is the SMP Document (SMPD) posted on a publicly accessible website? *Schedule A.3.b.ii*

Yes ☒ No ☐

42. Was the publicly accessible website updated during this reporting year? *Schedule A.3.b.ii*

Yes ☒ No ☐

If necessary, provide an explanation:

ODOT's Stormwater Management page was updated in 2023 to include current documents and updated contact information.

43. Does the publicly accessible website include illicit discharge complaint/reporting information or procedures? *Schedule A.3.b.ii.A*

Yes ☒ No ☐

If necessary, provide an explanation:

N/A

44. Does the publicly accessible website include links to official SMPD documents and relevant technical information? *Schedule A.3.b.ii.B*

Yes ☒ No ☐

If necessary, provide an explanation:

N/A

45. Does the publicly accessible website include links to all policies and/or guidance documents related to the construction and post-construction stormwater management control programs? *Schedule A.3.b.ii.C*

Yes ☒ No ☐

If necessary, provide an explanation:

N/A

46. Does the publicly accessible website include contact information for relevant staff, including phone numbers, mailing addresses and email addresses? *Schedule A.3.b.ii.D*

Yes ☒ No ☐

If necessary, provide an explanation:

N/A

47. Describe the public involvement opportunities offered during this reporting year. *Schedule A.3.b.iii*

☒ Public input through project planning and implementation process
☐ Provide technical assistance to local watershed groups
☒ Adopt-A-Highway
☒ Other: Multiple opportunities to provide input on the Oregon Transportation Plan Update

3.3 Illicit Discharge Detection and Elimination

48. Provide a brief summary of the overall progress towards implementation of this control measure. *Schedule A.3.c*

    This control measure has been fully implemented. The number of illicit discharge reports vary from year to year, but the average number of reports from 2020-2023 has increased to 10.5 in comparison to an average of 3.5 in the previous 4 years. Many of the illicit discharge reports in the last 4 years have come directly from public. Specific IDDE activities are described in Section 2.3 of the SMPD.

49. Were the required components in place by the implementation date? *Schedule A.3.c.i*

    Yes ☒ No ☐ (Implementation date: June 1, 2022)

    If necessary, provide an explanation: N/A

50. Have non-stormwater discharges into the MS4 been prohibited to the extent allowable under state law? *Schedule A.3.c.ii*

    Yes ☒ No ☐

    If necessary, provide an explanation: Section 1.2 of the SMPD provides information on ODOT's legal authority to oversee its storm system.

51. Describe the written response procedures and process for referring illicit discharges to DEQ. The procedures must include timelines for initial compliance actions and subsequent referrals to DEQ. *Schedule A.3.c.iii*

    Illicit discharges to the ODOT drainage system are identified through Road Patrols, Roadside Feature Inspections and reports from citizens or other public agencies.

52. Is there a phone number, webpage, and/or other communication channel publicized for the public use to report illicit discharges? *Schedule A.3.c.iv.A*

    ☒ Phone number(s)
    ☒ Webpage(s)
    ☒ Other communication channels

    If necessary, provide an explanation:

    ODOT's Report a Hazard page includes the following information regarding reporting an illicit discharge:
    How do I report an illicit discharge into a storm water runoff or drain?
    An illicit discharge occurs when anything other than storm water enters our storm water facilities. Dumping chemicals into storm drains, roadways, curb and butter sidewalks, driveways and yards are all sources of illicit discharges. Report and illicit discharge on Oregon's highways by contacting our Clean Water Program coordinator at 503-991-9367, by email or using form 734-5297.

53. Provide the number of illicit discharge reports received during this reporting year. Schedule A.3.c.iv.E

    Number: 15 reports related to IDDE, tracking spreadsheet is included as Attachment 3

54. On average, how long did it take to respond to reports? *Schedule A.3.c.iv.B*

    In working days: 1

55. Provide the number of complaints that included notification of the Oregon Emergency Response System during this reporting year. *Schedule A.3.c.iv.B*

    Number of notification: 0

56. Provide the number of reports where staff performed an investigation during this reporting year. *Schedule A.3.c.iv*

    Number: 15 reports

57. On average, how long did it take to conduct an initial investigation? *Schedule A.3.c.iv.B*

    In working days: 2

58. Provide the number of illicit discharges that were referred to another entity during this reporting year. *Schedule A.3.c.iv.C*

    Number: 3

59. On average, how long did it take to notify the entity(s)?

    In working days: 1

    If necessary, provide an explanation:

60. Provide the number of spills reported to the ODOT Transportation Operations Center System.
    Number: 22
    The TOCS Spill Report is included as Attachment 4

61. Indicate which of the following are included in the complaints or reports tracking documentation: *Schedule A.3.c.iv.E*
    - ☒ Date the complaint was received and, if available, the complainant's name and contact information
    - ☒ Name of staff responding to the complaint
    - ☒ Date the investigation was initiated
    - ☒ The outcome of the staff investigation
    - ☒ Corrective action(s) taken to eliminate the illicit discharge
    - ☒ The responsible party for the corrective action(s)
    - ☐ The status of enforcement procedure(s), when necessary
    - ☒ The date the corrective action(s) was completed and staff who evaluated final compliance

    If necessary, provide an explanation:
    After referring an illicit discharge to a jurisdictional authority, ODOT is not typically notified of the status of the enforcement, as ODOT is not the enforcing authority.

62. Briefly describe Routine Maintenance Inspection activities. *Schedule A.3.c.v.(A)*
    ODOT inspects its facilities for non-stormwater or illicit discharges during routine maintenance, including but not limited to routine road patrol, catch basin cleaning and annual water quality facility inspections. Inspections are further described in the Post-Construction Stormwater Management section of this report. ODOT's Blue Book provides guidance for maintenance to include stormwater management in every activity performed by maintenance crews to prevent non-stormwater discharges during routine maintenance and to contact MOB if illicit discharges are identified. See Section 2.4.3 of ODOT's SMPD.

63. Briefly describe Routine Road Patrol activities. *Schedule A.3.c.v.(B)*
    Road patrols are conducted by ODOT maintenance workers as drive by inspections of highway features to ensure there are no immediate problems or concerns impacting highway operations. See Section 2.3.4 of ODOT's SMPD.

64. Were any illicit discharges identified during routine maintenance inspections?
    Yes ☐ No ☒

65. Indicate which of the following dry-weather field screening activities have been performed in the last year: *Schedule A.3.c.v*
    - ☒ General observation
    - ☒ Inspection during routine maintenance activities
    - ☒ Routine Road Patrol
    - ☒ Water Quality Facilities Inspections

    If necessary, provide an explanation:
    ODOT conducts road patrols to observe stormwater-related facilities. Road patrols are conducted more frequently in areas of high traffic or of resource concern. Issues are addressed immediately or scheduled appropriately. Screenings occur through routine maintenance inspections, and general observations and road patrols allowing ODOT to be more efficient with time. These screenings allow staff to quickly determine whether an illicit discharge is present at a given site.

66. If flow is observed and the source is unknown, provide a brief description of the field investigation and analysis process. *Schedule A.3.c.v.C,D*
    ODOT's Blue Book instructs maintenance crews to contact the Maintenance and Operations Branch if impacts from adjacent landowners are observed. In most cases, ODOT will not be the jurisdictional authority for illicit discharges entering its system. The investigation process includes research into potential sources of flow, determination of the jurisdictional authority, notification and cooperation with that agency, city or county.

67. Are all persons responsible for investigating and eliminating illicit discharges and illicit connections into the MS4 appropriately trained to conduct such activities? *Schedule A.3.c.vi*

    Yes ☒ No ☐

    If necessary, provide an explanation:

    Illicit discharge training is included with the annual Blue Book training offered to ODOT employees.

3.4 Construction Site Runoff Control

68. Provide a brief summary of the overall progress towards implementation of this control measure. *Schedule A.3.d*

    This control measure has been fully implemented. ODOT reduces the discharge of pollutants from construction sites having one or more acres of ground disturbance through its Regional 1200-CA permits. ODOT Technical Advisory GE 12-01(A) outlines the process to provide appropriate erosion control for all construction projects having the potential to cause erosion, including those construction projects not subject to the 1200-CA. The Blue Book, developed and maintained by ODOT in consultation with NMFS, ODFW, and DEQ, specifies BMPs to be used when carrying out maintenance activities that could otherwise have an adverse effect on water quality and other environmental resources. The maintenance activities described in the Blue Book include both maintenance of installed post-construction stormwater BMPs, as well as stormwater management principles generally. Construction site runoff is also regulated managed by adhering to requirements set by other permits, including the Clean Water Act (CWA) Section 404 permits; CWA Section 401 water quality certifications (WQCs); and Oregon Department of State Land's (DSL's) Oregon Removal/Fill Permit. See Section 2.4 of ODOT's SMPD.

69. Were the required components in place by the implementation date? *Schedule A.3.d.i*

    Yes ☒ No ☐ *(Implementation date: June 1, 2022)*

70. Did ODOT require erosion controls, sediment controls, and waste materials management controls to be used and maintained at all ground-disturbing projects from initial clearing through final stabilization to reduce pollutants in stormwater discharges to the MS4 from construction sites? *Schedule A.3.d.ii*

    Yes ☒ No ☐ NA ☐

    If necessary, provide an explanation: ODOT's Standard Specifications, Section 00280, detail the ESCP's minimum requirements for all Project Sites and conditions. The Blue Book includes stormwater BMPs that apply to maintenance activities.

71. Did ODOT require contractors to complete and implement an Erosion and Sediment Control Plan (ESCP) for all constructions sites? *Schedule A.3.d.ii*

    Yes ☒ No ☐ NA ☐

    If necessary, provide an explanation: ODOT Technical Advisory GE 12-01(A) outlines a process to provide appropriate erosion control for all construction projects having the potential to cause erosion, including those construction projects not subject to the 1200-CA.

    Plans for construction projects subject to the 1200-CA are required to include an Erosion and Sediment Control Plan (ESCP). The updated 1200-CA permit contains new ESCP requirements for the DEQ submittal include a Cover Sheet that provides an overview of the project, its schedule and contractor. The DEQ-provided cover sheet template was incompatible with ODOT drafting standards and Plans format, so it was reconfigured into 3 sheets, two of which were filled out by the Professional of Record (POR) and the third filled out by the contractor after the project was awarded. The ESCP must now also include sheets for each phase of the project. Phases of work for ODOT project follow areas of disturbance, rather than the land development model anticipated by DEQ. ODOT continues to work toward a solution to meet the intent of DEQ's expectations regarding phase of work submittals. Other updates to ODOT's Erosion and Sediment Control Program include:

    - Edits to the Erosion and Sediment Control Manual to provide guidance on the revised Permit requirements.
    - Edits to the Scoping Templates to capture the new Permit requirements for consultant designers.
    - Development of a Contract Change Order (CCO) template to streamline contract changes for projects that were already under construction prior to the effective date of the permit update.

72. Describe ODOT's response procedure and actions to ensure compliance with its ground-disturbing construction site runoff program:

    ODOT includes erosion and sediment control requirements as contract requirements. If conditions are not satisfied, ODOT will require the work be performed or payment will not be provided. ODOT's Standard Specifications, Section 00140, Scope of Work, detail the remedies available to ODOT if the contract requirements are not met. Egregious violations will result in stop-work orders that can last until the failures that cause the violations are repaired and cleanup is completed and may result in enforcement action by DEQ. Construction personnel who disregard construction directives may be removed from projects at ODOT's discretion. Section 00280 was updated in 2023 to include corrective action timelines. See Section 2.4 of the SMPD.

73. Does ODOT have NPDES Construction Stormwater Permit coverage under the NPDES Construction Stormwater General Permit (1200-CA or equivalent). *Schedule A.3.d.ii*

    Yes ☒ No ☐ NA ☐

    If necessary, provide an explanation: ODOT's Regional 1200-CA permits were updated in 2023. The Permit update required revisions to the Oregon Standard Specifications for Construction, Section 00280, erosion and sediment control. Subsections of the 00280s that are revised are as follows:

    - 00280.00 – Scope
    - 00280.04 – Erosion and Sediment Control Plan on Agency Controlled Lands
    - 00280.05 – Erosion and Sediment Control Plan on Non-Agency Controlled Lands
    - 00280.16(h) – Temporary Sediment Trap
    - 00280.16(k) – Active Treatment System
    - 00280.30 – Erosion and Sediment Control Manager
    - 00280.41 – Work Restrictions
        - (a) Disturbance Limits
        - (e) Buffers
        - (f) Hauling Material
        - (g) Underground Injection Controls (UIC)
    - 00280.42 – Stabilization
        - (a) Soil Exposure Limitations
        - (b) Temporary Stabilization
        - (c) Permanent Stabilization
    - 00280.46(h) – Temporary Sediment Trap
    - 00280.46(j) – Access Routes
    - 00280.62 – Inspection & Monitoring
        - (a) Inspection
        - (b) Rainfall
        - (c) Monitoring Receiving Stream
    - 00280.64 – Corrective Actions
        - (a) Corrective Action Timelines
        - (b) Corrective Action Documentation
    - 00280.90 - Payment

74. Provide the written specifications that address the proper installation and maintenance of such controls during all phases of construction activity occurring in its coverage area. *Schedule A.3.d.iii*

    The Oregon Standard Specifications for Construction, Section 00280 address installation and maintenance of erosion and sediment controls during all phases of construction.

    If necessary, provide an explanation: Section 00280 of ODOT's Standard Specification for Construction have been revised. The redline comparison between 2021 and 2024 can be found here: Standard Specifications

75. Explain ODOT's process for reviewing Erosion and Sediment Control Plans (ESCP) from every construction project to ensure the plan is appropriate for the site, and determining if implemented as designed will effectively control construction site.

    Plans for construction are reviewed for content and appropriateness by subject matter experts at each submittal milestone. ODOT's Erosion Control Manual details Contractor Responsibilities and provides guidance regarding revisions to the ESCP in the plan and on the ground, to meet conditions of construction.

76. Describe the conditions under which an inspection is conducted, the frequency of such inspections, how inspections are documented, and how follow-up actions are determined and implemented. *Schedule A.3.d.v*

    Inspections are conducted according to the frequency required by the 1200-CA permit and/or ODOT guidance.

77. Provide the written escalating enforcement and response procedure to address violations, through progressively stricter responses supported by contracts held with contractors, to achieve compliance. The procedure must include ODOT's criteria for self-reporting illicit discharges, and timelines for compliance. *Schedule A.3.d.vi*

    ODOT's Standard Specifications, Section 00140, Scope of Work, detail the remedies available to ODOT if the contract requirements are not met.

78. Were all persons responsible for ESCP reviews, site inspections, and enforcement appropriately trained to conduct such activities? *Schedule A.3.d.vii*

    Yes ☒ No ☐

    If necessary, provide an explanation:

    ODOT's Environmental Construction Inspector Certification is valid for five years. ODOT's Erosion and Sediment Control Manager Certification is required to perform ESCP reviews and inspections. The ESCM is valid for five years, ensuring training will occur at least once during the permit term. Both ESCM and Environmental Construction Inspector training content was revised to reflect the changes to the 1200-CA Permit requirements which became effective on April 1, 2023.

    Introductory presentations were provided to technical staff in each of the ODOT's Regions to provide guidance on both the development of ESCPs that are Permit compliant and to introduce Construction staff to the expectations they are now presented with the more stringent Permit. A presentation was provided at the annual conference of the Association of General Contractors.

    ODOT provided certification training for 55 Contractor's Erosion and Sediment Control Managers as follows:

    - 2/14/23; 11 participants
    - 3/7/23; 33 participants

    ODOT provided certification training for 106 Certified Environmental Construction Inspectors as follows:

    - 2/15 & 2/16/23; 37 participants
    - 3/8 & 3/9/23; 37 participants

3.5 Post-Construction Site Runoff

79. Provide a brief summary of the overall progress towards implementation of this control measure. *Schedule A.3.e*

    This control measure has been fully implemented. The ODOT Hydraulics Manual (HM) provides guidance for designing hydraulic features related to ODOT's transportation system including stormwater management guidance. Specifically, chapters 12 and 14 presents guidance on a) water quantity standard, b) water quality standard, c) structural stormwater control design and specifications, and d) the stormwater selection process (i.e., stormwater mitigation options). The hydraulic/stormwater design deviation, Requirement E (allowance for alternative compliance) is covered in chapter 3 of the HM.

    ODOT has also developed guidance documents to supplement the HM that provides technical direction and communicate project delivery policies to staff and consultants working on ODOT projects including:

    - PD-05 Post-construction Stormwater Management for Environmental Compliance (updated 2023),
    - HE24-01(B) Underground Injection Control Systems (UIC),
    - GE16-01(B) Stormwater Control Facility Operation and Maintenance Plan Development Drafting Guidance, and
    - GE16-02(B) Stormwater Operation and Maintenance (O&M) Manuals – Update.

Stormwater technical standards and specifications include several boiler plate specials provisions for structural stormwater BMPs: Water Quality Structures (SP01010), Ponds (SP01011), Biofiltration Swale (SP01012), Bioslope (SP01013) and Filter Strip (01014).

These documents are available on the ODOT Oregon.gov webpage:
https://www.oregon.gov/odot/hydraulics/Pages/Hydraulics-Manual.aspx
https://www.oregon.gov/odot/hydraulics/Pages/Technical-Guidance.aspx
https://www.oregon.gov/odot/hydraulics/Pages/Specs.aspx
https://www.oregon.gov/odot/hydraulics/Pages/Standards.aspx

80. Were the required components in place by the implementation date? *Schedule A.3.e.i*
Yes ☒ No ☐ *(Implementation date: June 1, 2023)*

81. Describe efforts to identify, minimize or eliminate barriers within ODOT's legal authority that inhibit design and implementation techniques intended to minimize impervious surfaces and reduce stormwater runoff (Low Impact Development and Green Infrastructure). *Schedule A.3.e.iii*

ODOT design procedures strongly prefer LID techniques (see HM Chapter 14, Appendix A) because they tend to result in superior environmental outcomes, are preferred by regulatory agencies, are usually easier to maintain in proper working order, and sometimes require no special maintenance. As a result, most ODOT projects required to manage post-construction stormwater runoff successfully employ LID techniques. When ODOT satisfies its stormwater management obligations using non-LID techniques, it's almost always due to physical constraints, singularly or in combination, that are not practicable to overcome. Examples of such constraints include:

- Insufficient distance between the impervious surface and the receiving water;
- Native soils that aren't conducive to infiltration;
- Competing environmental resources such as wetlands, streams, and cultural resources that would have increased impacts as a result of LID implementation that would either be legally unpermittable or would render the LID treatment counterproductive;
- Inadequate groundwater separation;
- Vertical head or drop limitations that physically prevent conveying water to LID facilities; and
- Right of way limitations (in cases where the potential benefits of treatment are too small to outweigh the high costs of obtaining right of way, rendering right of way impracticable)

ODOT works within these constraints to achieve the reduction of pollutants to the maximum extent practicable.

An internal evaluation was conducted in 2023 to review ODOT policies and practices to determine if barriers existed to the implementation of Low Impact Development (LID) practices and Green Infrastructure (GI) stormwater management facilities. Interviews were carried out with representatives across different departments/section/areas within the agency to gain insight into the types of barriers that may exist within ODOT. The findings from that evaluation confirmed the constraints discussed above.

82. Describe any modifications to standards resulting from those efforts.

ODOT continues to look for opportunities to improve the implementation of LID and GI on ODOT projects. The 2023 internal evaluation also looked at opportunities for improving ODOT's implementation of LID and GI for adoption or incorporation into the HM, training and guidance documents. If new effective LID techniques are developed that allow ability to overcome described barriers ODOT will consider adding them to its range of potential BMP solutions.

83. Indicate which technical standards are included in the Post-Construction Stormwater Management Program, include links and highlight any changes made in the reporting year: *Schedule A.3.e.iv*

☒ Flow Control Standards (to address hydromodification impacts)
- HDM Chapter 12, Section 12.5 Flow Control design criteria, Section 12.5.1.1 Channel Processes Design Storms page 12-12 (Hydromodification)
- Federal Aid Highway Program (FAHP) in the State of Oregon, Section 29,a,b,c,d.vii-viii

☒ Water Quality Standard
- HDM Chapter 14, Section 14.8

- Federal Aid Highway Program (FAHP) in the State of Oregon, Section 29,a,b,d.vi

☒ Structural Stormwater Control Design and Specification

- Flow Control: HDM Chapter 12 Sections 12.5.2-12.5.4, 12.9
- Water Quality: HDM Chapter 14 Appendix A-F
- SP01010, Stormwater Control WQ Structures
- SP01011, Stormwater Control Ponds
- SP01012, Stormwater Control WQ Biofiltration Swale
- SP01013, Stormwater WQ Bioslope
- SP01014, Stormwater WQ Filter Strip
- ODOT 2024 Standard Specifications
- ODOT Qualified Products List, Category: Stormwater Control Facilities, Spec # 01010.03
- Operations & Maintenance Manual Templates
- Stormwater/hydraulic facility drafting guidance
    - ODOT CAD Manual, Section 513 Major Category "H" – Hydraulic
    - GHE CAD Manual, Part 400
    - GE16-01(B) Stormwater Control Facility Operation and Maintenance Plan Development Drafting Guidance

☒ Allowance for Alternative Compliance (Deviation)

- HDM Chapter 3, Appendix A – Hydraulic Design Deviation Form (Note, open link with Internet Explorer)

☒ Stormwater Mitigation Options

- HDM Chapter 14, Section 14.9.1

If necessary, provide an explanation:
N/A

84. Describe how ODOT reviews and approves project-specific documents and plans for sites that require an engineered stormwater control facility. *Schedule A.3.e.v*

Before initiating construction, ODOT reviews and approves project-specific documents and plans for sites that require an engineered stormwater control facility as part of the ODOT Project Development phase. These documents include Hydraulic Reports, Stormwater Reports, Stormwater Management Plans, FAHP Stormwater documentation, and Plans, Specifications and Estimates (PS&E).

The Project Development phase includes the Design Acceptance, Preliminary Plans, Advance Plans, Final Plans, Plans, Specification and Estimates (PSE), Advertisement and Contract Award, including review of documents and deliverables at each milestone. The Plan Development Phase follows after Design Acceptance and provides detailed information about the expectations, requirements and deliverables for Preliminary Plans, Advanced Plans and Final Plans milestones of project development. Final Plans includes hydraulics/stormwater reports that documents the design of engineered stormwater control facilities. The PS&E phase prepares the project documents for contracting, including stormwater management facility O&M manuals (if applicable).

After the project contract award, the project transitions to the Construction Management phase for construction. Environmental studies including stormwater management plans, hydraulic reports, stormwater reports, and FAHP stormwater documentation are completed during the Project Development to capture stormwater design documentation. ODOT has a template for Stormwater Management Plans and a typical Stormwater Design Report and Hydraulic Report layout in the Chapter 4 of the HM.

These documents are available on the ODOT Oregon.gov webpage.

- Stormwater Management Plan Template
- SWMP QC Process
- Project Delivery Guide
- Hydraulics Manual Chapter 4 Documentation

85. Briefly describe the Long-Term Operation and Maintenance (O&M) strategy for water quality facilities (WQFs): *Schedule A.3.e.v*i

ODOT's Hydraulics and Engineering Section (HES) maintains an inventory of water quality facilities using assigned drainage facility identification (DFI) numbers. The Maintenance and Operations Branch (MOB) has a water quality facility database that is regularly updated to include newly assigned DFI numbers. MOB uses the inventory information from HES to create inspection forms that are provided to maintenance district staff at the beginning of each year. Maintenance district staff are responsible for completing the inspection and maintenance of the facilities. Water quality facilities are typically inspected annually and maintained as needed. Maintenance district staff document inspection and maintenance activities and return the forms to MOB. The inspection and maintenance information are entered into the water quality facility database and the electronic copies of the returned forms are retained.

ODOT has developed Standard Maintenance Tables and O&M Manual templates for its water quality facilities. The Standard Maintenance Tables include information regarding recommended maintenance actions for each type of stormwater facility. The Standard Maintenance Tables are located on ODOT's Stormwater Facility Maintenance webpage. Operation and Maintenance Manuals are required by the MS4 Permit and the FAHP. Project Delivery staff prepare O&M Manuals with site-specific information on facility operation and maintenance for newly constructed water quality facilities. The manuals are provided to maintenance upon completion of construction. ODOT is retroactively creating O&M manuals for existing facilities.

86. Does the strategy provide the following elements?

☒ Inspection procedures and an inspection schedule that comply with O&M requirements for each WQF
☒ A tracking mechanism for documenting inspections and the O&M requirements, including
☒ Maintenance documentation
☒ Requirements to maintain and/or replace vegetation to ensure functionality
☒ Locations of all stormwater controls installed, viewable through ODOT's public GIS interface

If necessary, provide an explanation:

N/A

87. Describe how ODOT ensures that the ODOT employees or contractors responsible for performing post-construction runoff site plan reviews, administrating the alternative compliance program, or performing O&M practices, or evaluating compliance with long-term O&M requirements are trained at least once during the permit term to conduct such activities:

ODOT's Environmental Construction Inspector Certification and Erosion and Sediment Control Manager Certification are valid for 5 years and include post-construction stormwater best management practices. ODOT's Blue Book training is offered annually to maintenance districts and includes a review of the standard maintenance tables and other tools available to maintenance to assist in the operation and maintenance of water quality facilities.

88. Were all persons responsible for performing post-construction runoff site plan reviews, administrating the alternative compliance program, or performing O&M practices or evaluating compliance with long-term O&M requirements appropriately trained to conduct such activities? *Schedule A.3.e.vii*

Yes ☒ No ☐

If necessary, provide an explanation:

N/A

3.6 Pollution Prevention and Good Housekeeping for Municipal Operations

89. Provide a brief summary of the overall progress towards implementation of this control measure. *Schedule A.3.f*

    This control measure has been fully implemented. ODOT continues to adaptively manage its Environmental Management System (EMS) Program, Spill Prevention Control and Countermeasure (SPCC) Program and other relevant programs to minimize potential impacts to stormwater generated on ODOT-owned facilities.

90. Were the required components in place by the implementation date? *Schedule A.3.f.i*

    Yes ☒ No ☐ *(Implementation date: June 1, 2021)*

91. Were O&M strategies for existing controls implemented? *Schedule A.3.f.ii*

92. Yes ☒ No ☐ N/A ☐

    If necessary, provide an explanation:

    N/A

93. Provide a brief summary of the EMS program activities implemented:

    The EMS Manual is ODOT's written stormwater management plan for the maintenance yards. The EMS program provides guidance for pollutant source identification in addition to consistent, practical, BMPs for source control and pollutant removal. Program updates were completed in 2009, 2013 and 2019. The program defines best management practices and benchmarks for managing products and wastes. 35 Regional EMS Audits were completed in 2023.

94. Is the EMS Annual Report included with this Report?

    Yes ☐ No ☒

    If necessary, provide an explanation: The EMS goals that were included in ODOT's Sustainability Plan have been met and the updated Sustainability Plan does not have new EMS-related goals. There are two decades of data showing ODOT met 90% plus of the BMPs for materials management for the 7 priority procedures. Yards continue to be audited and the records are maintained. A summary of ODOT's hazardous waste generation is included as Attachment 5. In 2024, ODOT will further reduce hazardous waste generation by replacing solvent-based parts washers with washers that are non-toxic, non-hazardous, and non-flammable.

95. Provide a brief summary of the catch basin cleaning activities implemented:

    Catch basin inspection and cleaning is typically performed on an annual basis. Some areas require more frequent cleanings. District crews are responsible for identifying maintenance requirements.

96. Provide a brief summary of the Integrated Vegetation Management Plan activities implemented:

    The ODOT Integrated Vegetation Management (IVM) program is required under Oregon statute ORS 634.660. The program develops agency guidance for managing noxious weeds, landscape plantings, roadside timber, and other vegetation issues associated with ODOT rights-of-way. Goals of the ODOT IVM program include encouraging self-sustaining vegetation and reducing the need for herbicides, fertilizers, and irrigation. ODOT continually explores new vegetation management practices, technologies, and partnerships to improve its IVM program. Primary IVM management tasks completed by ODOT in 2023 include:

    - Provided guidance to maintenance on vegetation management techniques and meeting applicable laws.
    - Ensured compliance with ODOT's NPDES 2300-A Pesticide General Permit and submitted the required annual report to DEQ.
    - Updated ODOT's Pesticide Discharge Management Plan.
    - Conducted 10 pesticide trainings for 56 attendees.
    - Hosted ODOT Statewide IVM meeting in October with 100 attendees.
    - Updated USFS Pesticide Use Proposals (PUPs) for 3 districts.
    - Performed multiple pesticide safety presentations for Oregon State University PSEP program, Oregon Ag Expo and the Oregon Agriculture Chemical Fertilizer Association.
    - Hosted 8 Regional spring Vegetation Management Refresher Trainings for 92 ODOT applicators.

97. Provide a brief summary of Litter Control activities implemented:
ODOT cleans up litter and debris found along state highways using its own employees (permanent or temps), contractors, and volunteers. The litter control work is managed individually by District. The Youth Litter Program involves youth in the clean-up and prevention of litter along state highways. Crews usually have a crew leader and two or more crew members and are based in various locations in the state. Crews work primarily during the summer months. ODOT's districts individually manage the Adopt-A-Highway activities. In 2023, 45 permits for Adopt-A-Highway activities were issued.

98. Provide a brief summary of the Appropriate Materials Disposal activities implemented:
The EMS program coordinator provided guidance on managing materials used in the day-to-day maintenance of the highway system.
- Researched bioremedial parts washers to determine suitability for ODOT field technicians who service ODOT vehicles and equipment.

99. Were all persons responsible for evaluating O&M practices, evaluating compliance with long-term O&M requirements or ensuring pollution prevention at facilities and during operations appropriately trained to conduct such activities? *Schedule A.3.f.v*
Yes ☒ No ☐
If necessary, provide an explanation: N/A

4.0 Winter Maintenance Program

100. Provide a brief summary of the overall progress towards implementation of this control measure. *Schedule A.3.e*
The control measure has been fully implemented. ODOT's Winter Maintenance Program was developed to limit water quality impacts from winter maintenance activities. Winter maintenance materials are stored and applied in conformance with BMPs outlined in the ODOT EMS Manual and Maintenance Guide. Application BMPs are outlined in the Maintenance Guide. EMS audits visually inspect storage areas. Additional details are provided in the Winter Maintenance Annual Report.

101. Were the required components in place by the implementation date? *Schedule A.3.g.i*
Yes ☒ No ☐ *(Implementation date: June 1, 2022)*

102. Describe how ODOT utilizes its EMS program to ensure that winter materials (including solid salt, deicers including but not limited to magnesium chloride [MgCl2], and abrasives) are stored properly:
Winter maintenance materials are stored and applied in conformance with BMPs outlined in the ODOT EMS Manual and Maintenance Guide. EMS audits visually inspect storage areas.

103. Describe how ODOT utilizes the Blue Book to ensure proper use of these materials:
Winter maintenance BMPs are outlined in the Blue Book, and address plowing practices, application BMPs, recordkeeping, calibration, and material purchasing.

104. Was the Winter Maintenance Strategy updated during the permit term?
Yes ☐ No ☒

105. Is a copy included with this Report?
Yes ☐ No ☒
If necessary, provide an explanation: The Winter Maintenance Strategy was not updated in 2023.

106. Is the Winter Maintenance Annual Report included with this report?
Yes ☒ No ☐
If necessary, provide an explanation: The Winter Maintenance Annual Report is included as Attachment 6.

107. Has ODOT implemented research of best management practices related to the management and application of winter maintenance materials?
Yes ☒ No ☐
If necessary, provide an explanation: N/A

5.0 Stormwater Retrofit Strategy

108. Provide a brief summary of the overall progress towards implementation of this control measure. *Schedule A.3.h*

ODOT established a Stormwater Retrofit Strategy Advisory Committee to recommend goals and considerations for ODOT's retrofit strategy. Following Committee meetings in 2023 and 2024, Management staff from HES and MOB worked with ODOT Communications staff to create ODOT's Stormwater Retrofit Strategy Document.

109. Were the required components in place by the implementation date? *Schedule A.3.h.i*

Yes ☒ No ☐ *(Implementation date: June 1, 2024)*

If necessary, provide an explanation: N/A

110. Describe the progress toward developing ODOT-defined set of stormwater quality retrofit objectives and range of retrofit control measures:

ODOT developed its retrofit strategy objectives to include identification of retrofit opportunities in designated priority areas using ODOT's established guidance to evaluate stormwater best management practices for target pollutants.

111. Describe how these objectives prioritize progress toward improving water quality:

ODOT's retrofit strategy document prioritizes progress toward improving water quality by continuing to implement its existing policy for project-triggered retrofits to address all contributing impervious area in post construction stormwater treatment and by prioritizing future projects in the Lower Willamette River Watershed, including a large retrofit project in progress in the Portland Harbor. ODOT will continue to look for opportunities to leverage funding to prioritize progress toward water quality improvements as resources allow.

112. Is the Stormwater Retrofit Strategy Document included with this Report?

Yes ☒ No ☐

If necessary, provide an explanation:

The Stormwater Retrofit Strategy Document is included as Attachment 7.

6.0 Monitoring

113. Was monitoring completed in accordance with the most recent Monitoring Plan? *Schedule B.2*

Yes ☒ No ☐

If necessary, provide an explanation: N/A

114. Is the monitoring data for submitted with this report? *Schedule B.2*

Yes ☐ No ☒

If necessary, provide an explanation: In 2023, ODOT continued monitoring efforts in the Portland Harbor and Columbia Slough. Lab results include approximately 700 pages of data and were provided to DEQ using a file sharing program.

7.0 MS4 Data Compilation

115. Provide a brief summary of the overall progress towards implementation of this control measure. *Schedule D.1*

A summary of ODOT's MS4 data compilation and a description of the digital inventory and a gap analysis is included as Attachment 8.

116. Were the required components in place by the implementation date? *Schedule D.2.i*

Yes ☒ No ☐ *(Implementation date: June 1, 2024)*

If necessary, provide an explanation: N/A

117. Does the digital inventory include:

☒ Location and physical characterization of all available outfalls, conveyance systems, and stormwater control locations collected by ODOT or consultants contracted by ODOT since 1999?

☒ Any and all available monitoring data collected by ODOT or consultants contracted by ODOT since 1999?

☒ Tracking information related to water quality control measures in this digital inventory?

☒ Any additional data for characterizing the ODOT MS4?

If necessary, provide an explanation: N/A

118. Are the priority locations identified in ODOT's Retrofit Program Strategy Document included in the digital data?

Yes ☒ No ☐

If necessary, provide an explanation: N/A

119. Describe ODOT's work to identify where geographic or subject-area gaps in data exist: During the permit term, ODOT staff have compiled and reviewed all of the location data, monitoring data, tracking information and research data.

120. Is the summary included with this Report? *(Due with the fourth MS4 Annual Report or June 1, 2024)*

Yes ☒ No ☐

If necessary, provide an explanation: N/A

121. Has ODOT consulted with DEQ to prioritize how to address the identified geographic-, subject-, or pollutant-specific gaps in information?

Yes ☒ No ☐

If necessary, provide an explanation: ODOT has had informal conversations with DEQ regarding the data compilation results. ODOT has suggested completion of a literature review of existing ODOT research to evaluate and summarize the findings of this research as it relates to characterizing highway stormwater runoff and evaluation of different BMPs. Literature reviews are typically completed by the ODOT librarian. Maintenance and Operations Branch will work with ODOT Research staff and the ODOT Librarian to complete a comprehensive literature review to identify trends in ODOT research and reports to provide a more complete history and make recommendations for future efforts. ODOT's MS4 permit renewal is due in 2025. Discussions with DEQ regarding the permit renewal are expected to include prioritization of the gaps identified in the Data Compilation and Summary Gap Analysis included with this report.

122. Has the following winter maintenance data, where possible, pertaining to winter maintenance been included in the digital data?

☒ Location of maintenance yards and structures containing winter maintenance materials;

☒ Locations of use of winter maintenance materials;

☒ Quantities used in relation to distance (e.g., pounds per mile);

☒ Other potentially useful information found through research topics that will help improve water quality related to Oregon's transportation system?

123. Describe any research topics ODOT has implemented that will help improve water quality related to Oregon's transportation system:

In July 2023 ODOT initiated the solicitation for pooled funding from the FHWA for the project titled "Stormwater Management to Address Highway Runoff Toxicity due to 6PPD-Q from Tire Rubber." Once the solicitation received the matching funds request from CA, WA, and PA DOTs the FHWA activated the project as Transportation Pooled Fund TPF-5(524) in October 2023. This pooled fund now has a project budget of $960K and the RFP is under development with a goal start date of June 2024. This research aims to equip DOTs with a targeted and cost effective approach for effectively managing 6PPD-q in highway runoff by 1) developing a better understanding of the fate and transport of 6PPD and 6PPD-q in highway runoff and influential site specific parameters, 2) developing cost-effective design guidance for stormwater treatment and management techniques with a focus on reducing the effects of 6PPD-q on receiving waters, 3) evaluating the degree of 6PPD-q release from pavement products made from recycled tire materials, and 4) developing methods/criteria for identifying locations that may need focused treatment. This research also aims to provide regulatory agencies with a better understanding of DOT management options including the feasibility, limitations, and effectiveness of treatment methods.

8.0 Index of Attachments

1. **Stormwater Management Program Document (SMPD)**
2. **What We Know: 6PPD and 6PPD-quinone, ITRC**
3. **IDDE Spreadsheet**
4. **TOC Spills Report**
5. **2023 Hazardous Materials and Custodial Chemicals Used in Facilities**
6. **2023 Winter Maintenance Report**
7. **Stormwater Retrofit Strategy Document**
8. **Data Compilation Summary and Gap Analysis**

Attachment 1

Municipal Separate Stormwater System (MS4)
Stormwater Management Program Document

Prepared for the Oregon Department of Environmental Quality
Submitted by the Oregon Department of Transportation
June 1, 2024

ABOUT THIS DOCUMENT

The Stormwater Management Program Document ("SMPD") was drafted as a requirement of ODOT's MS4 permit, DEQ File No. 101822, issued on August 11, 2020. The SMPD outlines how ODOT meets the requirements of the MS4 permit through project development, construction, and maintenance.

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1.0 ODOT's Responsibilities

1.1 Coordinate With Other Public Entities

ODOT may, at its discretion, elect to work with or delegate implementation of one or more SMP control measures to another entity. Under such an agreement, ODOT would be responsible for compliance with any permit conditions that another entity fails to implement.

1.2 Maintain Adequate Legal Authority

This section provides information on ODOT's legal authority to oversee its storm system. ODOT has also included in this section spending restrictions as defined in the Oregon State Constitution, which may limit some of ODOT's MS4 program activities.

- State statutes and regulations that give ODOT the legal authority to control illicit discharges to its storm system are identified in Section 2.3.1.
- The following is a summary of MS4 legal authority requirements as stated in 40 CFR 122.26 (d)(2)(i) and the state statutes that enable ODOT to address them. ODOT has different legal authority as a state agency compared to a local municipality, but has addressed the 40 CFR municipal legal authority requirements as listed.

Control through ordinance, permit, contract, order or similar means, the contribution of pollutants to the municipal storm sewer by storm water discharges associated with industrial activity and the quality of storm water discharged from sites of industrial activity.

Primary authority to control introduction of pollutants to the ODOT storm sewer system and to control quality of storm water discharge is found in ORS 374.305 to 374.330. These statutes require written permission from the Oregon Department of Transportation to place or construct facilities on highway right of way. Facilities include any "approach road, structure, pipeline, ditch, cable or wire, or any other facility, thing or appurtenance." Written permission is also required prior to the substantial alteration of any such facility and prior to any change in the manner of its use. This requirement applies to any storm sewer or storm connection on ODOT right of way.

ORS 374.305 to 374.330 also reference ODOT's ability to issue a facility permit. A facility permit can be conditioned upon compliance and have attached applicable standards for storm water quality and requirements for control or removal of pollutants. The current administrative rules adopted to regulate permits for miscellaneous utility connections are found in Oregon Administrative Rules (OAR) Chapter 734, Division 55.

The contracting authority set forth above and ORS 283.110 allows ODOT to enter into an interagency agreement with the Department of Environmental Quality to exercise its authorities under ORS 468B.

Prohibit through ordinance, order or similar means, illicit discharges to the municipal separate storm sewer.

ODOT has limited legal authority to prohibit illicit discharges and may only prohibit these discharges if they originate on ODOT property. This authority can be exercised through the permitting regulations of ORS 374.305 to 374.330. ORS 374.320 allows ODOT to take action if permit requirements are not met. This includes removal, repair or elimination of hazards if necessary, and billing the permit holder for the cost. ORS 374.307 allows ODOT to remove facilities constructed without permit authority. Violation of these statutes and the administrative rules under OAR 734-55, constitute citable offenses as a misdemeanor under ORS 374.990.

ORS 377.650 to 377.655 provide for removal actions if personal property is left or displayed on state highway. Such personal property is found to be a public nuisance under ORS 377.650. Discharge into the storm sewer system can be found to be a public nuisance and abated or enjoined by ODOT through this rule.

Control through ordinance, order or similar means the discharge to a municipal separate storm sewer of spills, dumping or disposal of materials other than storm water.

Many discharge actions on highway rights of way are regulated through administrative rules. Prohibited activities on highway right of way are covered under OAR 734-20-095. OAR 734-20-145 covers removal of spilled loads and wrecked vehicles and OAR 734-20-150 addresses closure of highways.

Runoff that originates from property abutting ODOT right of way and then flows into the ODOT storm system is generally not regulated by ODOT due to its jurisdictional limitations. In such cases, ODOT's procedure is to first attempt to persuade the landowner or responsible party to stop the discharge, and if unsuccessful in that effort, refer the matter to DEQ or applicable MS4-permitted entity.

Control through interagency agreements among other public entities the contribution of pollutants from one portion of the municipal system to another portion of the municipal system.

ODOT has broad interagency contracting authority found under ORS 366.556 to 366.576, ORS 190.110 and 190.240 and ORS 283.110. Under these authorities, agreements may be executed under which ODOT and other public entities may coordinate stormwater management strategies and infrastructure.

Require compliance with conditions in ordinances, permits contracts or orders; and carry out all inspection, surveillance and monitoring procedures necessary to determine compliance and noncompliance with permit conditions including the prohibition on illicit discharges to the municipal separate storm sewer.

ODOT is able to exercise control over the permits it issues under ORS 374.305. Permits may be canceled if there is noncompliance with permit conditions. Permits may also require indemnification and public liability insurance from permit holders in order to cover any costs associated with permit non-compliance.

The above statutes allow ODOT the authority to carry out inspections, surveillance, or monitoring as needed to determine compliance with permit conditions (including locating pollutant discharges to the ODOT system).

ODOT has authority to regulate discharges originating within ODOT right of way. ODOT does not have legal authority to regulate illegal discharges that originate outside of its right of way or jurisdiction. ODOT must accept up-gradient stormwater discharges consistent with Oregon Drainage Law.

Article IX, Section 3A of the Oregon Constitution limits the use of revenue from gas and motor vehicle taxes.

> These taxes shall be used "…*exclusively for the construction, reconstruction, improvement, repair, maintenance, operation and use of public highways, roads, streets, and roadside rest areas in this state….*"

2.0 Stormwater Management Program (SMP) Control Measures

ODOT will continue to implement all existing SMP control measures, and will begin to revise its SMP control measures, as needed, in order to implement new control measure components.

2.1 Public Education and Outreach

ODOT will continue to implement an education and outreach program to inform agency staff and the public about the potential impacts of stormwater on water quality around the state. Additionally, ODOT will explore new pathways to disseminate stormwater information to a broader audience, including the use of social media platforms.

2.1.1 Education and Outreach Program

ODOT's public education and outreach program includes educational efforts targeting the three audiences listed in Schedule A.3.a.iv. The goal of the education and outreach program is to inform agency staff, stakeholders, and the public of the impact of stormwater on water resources and to identify potential pathways to reduce those impacts at work, while traveling on state highways, and at home.

2.1.2 Stormwater Education Activities

ODOT will continue to provide educational messages, trainings or activities through printed and/or electronic materials, social media platforms, or other relevant educational events or workshops at least twice per year.

Table 2.1: Public Education and Outreach Implementation Schedule

Program Deliverables	Target Implementation Date
Develop a Social Media Strategy to Disseminate Stormwater Information	June 1, 2024
Pursue opportunities to partner with local jurisdictions, as available	Ongoing

2.2 Public Involvement and Participation

ODOT will continue to implement the components described in Schedule A.3.b.ii-iii. New components will be implemented according to the dates identified in Table 2.2. If a component is deemed unfeasible, justification will be provided in the subsequent MS4 Annual Report and ODOT will consult with DEQ, as necessary.

2.2.1 Publicly Accessible Website

ODOT will continue to maintain a publicly accessible website with information on ODOT's stormwater programs. The website will include guidance and technical information, Illicit Discharge Detection and Elimination (IDDE) reporting, the SMPD, stormwater staff contact information, and educational materials.

2.2.2 Public Involvement Opportunities

Public involvement opportunities are often provided or engaged at the local level. ODOT provides the following statewide opportunities:

Table 2.2: Public Involvement and Participation Implementation Schedule

Program Deliverables	Target Implementation Date
Pursue opportunities to partner with local jurisdictions, as available	Ongoing
Update ODOT's Stormwater Website	June 1, 2023

2.3 Illicit Discharge Detection and Elimination (IDDE)

ODOT will continue to implement the agency's current IDDE program while exploring opportunities to improve reporting pathways. ODOT will develop a formalized internal IDDE tracking and reporting plan and will update the Stormwater website with information on how to identify and report an illicit discharge, as outlined in Table 2.3.

2.3.1 Regulatory Mechanisms

ODOT's general authority to maintain the state highway system is detailed in Section 1.2 above.

Regulations regarding the placement or construction of facilities (including pipes and ditches) on state highway right of way are defined under ORS 374.305 through 374.330. Criminal penalty for violation of these rules is defined under ORS 374.990. Removal, prevention and/or repair of these facilities are defined under ORS 374.307, 374.320, and 366.455.

Rules allowing ODOT to use its authority under ORS 374.305 for the placement or construction of facilities including pipes and ditches are provided in OAR 734-55. Additional authority is provided in ORS 377.650 to 377.655.

These regulations give ODOT the authority to control what facilities are placed within state-owned right of way. Any connection to ODOT's MS4 that has not received a permit could be subject to removal, per the statutes and rules outlined above; however, an illicit discharge may enter the system through a natural flow path for which ODOT does not have the authority to regulate. In these circumstances, ODOT relies on other local, state, and federal agencies with the statutory authority to regulate such discharges.

2.3.2 Spill Response and Abandoned Waste

Emergency spill response procedures, objectives, and policies are detailed in the ODOT First Responder Guide to Highway Incident Response.

Spill response requirements are also identified in other state and federal permits currently held by ODOT, including WCPF Permit #UIC-103167.

HazMat Groups in each Region have different spill response responsibilities. In Regions 1 and 3, Region HazMat staff provide on-call assistance that responds to highways spills around the clock. In Regions 2, 4, and 5, Region HazMat staff are called for assistance at the discretion of the District Manager if a large spill requires ongoing cleanup and the District needs technical assistance to determine whether cleanup is appropriate and protective of ODOT property and the environment.

ODOT maintenance workers, litter crews, and others who work within ODOT right-of-way occasionally find abandoned waste that may or may not be identifiable. Region HazMat staff provide technical assistance in these circumstances, including the facilitation of testing and proper disposal.

2.3.3 Response to Complaints or Reports

Illicit discharges to the ODOT's MS4 are identified through Road Patrols, Water Quality Facility Inspections or public complaints. Minor illicit discharges identified in the field can often be corrected upon discovery. ODOT investigates reports of illicit discharges as soon as practicable, but no later than 5 working days after notification, unless there is a threat to human health, welfare, or the environment. For discharges, including spills, that constitute a threat to human health, welfare, or the environment, ODOT will respond within 24 hours. Spills, or other illicit discharges, that may endanger human health or the environment are reported in accordance with all applicable federal and state laws, including notification to the Oregon Emergency Response System.

2.3.3.1 Notification of Other Authorities

ODOT does not have legal authority over activities outside of ODOT right of way. Correcting illicit discharges may involve jurisdictional authority issues. ODOT involves other agencies as appropriate to correct illicit discharges, often referring unauthorized discharges that enter ODOT's system to DEQ. ODOT will continue to work collaboratively with other MS4 permittees to identify opportunities to improve communication between agencies in regard to IDDE. If an illicit discharge originates outside the ODOT's right of way, ODOT will notify the appropriate jurisdictional authority within five working days of becoming aware of the illicit discharge.

2.3.3.2 Complaint Tracking

ODOT will maintain a complaint tracking system for all illicit discharge complaints received. The information will be kept according to the records retention requirements in the permit and is available for review upon request. The tracking system documents the following:

- Date the complaint was received;
- Staff responding to the complaint;
- Date the investigation was initiated;
- The jurisdictional authority to whom the complaint was referred to, as applicable;
- The outcome of any ODOT staff investigation; and,
- Corrective action(s) taken to eliminate the illicit discharge, as applicable.

Complaint tracking information will be summarized in each MS4 Annual Report.

2.3.4 ODOT Road Patrol

ODOT inspects ditches and other stormwater facilities through routine road patrols. Road patrols are conducted by ODOT maintenance workers as drive by inspections of highway features to ensure there are no immediate problems or concerns impacting highway operations. ODOT road patrol is conducted frequently; daily in high-traffic or resource concern areas. Drainage ditch and/or illicit discharge issues discovered during road patrols are either addressed immediately by maintenance staff or are reported to the IDDE coordinator (currently the Clean Water Program Coordinator in Maintenance and Operations).

2.3.5 Illicit Discharge Detection and Elimination Training and Education

HazMat and other ODOT staff responsible for responding to spills and other hazardous materials that may be encountered within the state highway right of way receive specialized training to maintain certifications. ODOT maintenance crews receive training about IDDE and how to respond to a complaint through internal stormwater training, including Blue Book and EMS training classes.

Table 2.3: Illicit Discharge Detection and Elimination Implementation Schedule

Program Deliverables	Target Implementation Date
Evaluate methods to track illicit discharges by basin	June 1, 2025

2.4 Construction Site Runoff Control

ODOT will continue to implement a construction site runoff control program to reduce the discharge of pollutants from construction sites. ODOT will continue to evaluate the existing training program to ensure ongoing compliance with all applicable standards. ODOT's Erosion Control Manual, updated in 2023, provides ODOT staff and contractors with best management practices in erosion and sediment control for personnel involved in the design and construction and maintenance of ODOT construction projects. The Construction Section's Environmental Construction Inspector Certification course, for Agency inspectors and Erosion and Sediment Control Manager Certification course, for contractor erosion and sediment control leads are detailed on ODOT's website.

2.4.1 Compliance with other NPDES permits

Stormwater discharges from ODOT construction sites is regulated through the requirements of the ODOT's five regional NPDES 1200-CA permit registrations. The Oregon Standard Specifications for Construction is a contract document and enforcement tool in requiring contractor compliance with the NPDES 1200-CA. The 00280 Section of the Specifications, regarding erosion and sediment control is written to support the 1200-CA Permit. Similarly, the ODOT Erosion Control Manual provides guidance on compliance with the Permit and ODOT's consultant Scope of Work template provides consultants an outline for developing Erosion and Sediment Control Plans that satisfy the Permit's requirements. These documents have been updated to reflect the requirements of the 1200-CA permit, issued September 15, 2022.

2.4.1.1 NPDES 1200-CA Compliance Strategy

ODOT construction projects having one or more acres of ground disturbance are currently controlled by regional 1200-CA permits. The 1200-CA permit was reissued by DEQ in 2022. ODOT has Standard Drawings and Details available in Environmental and Hydraulics Engineering Section's Erosion and Sediment Guidance Materials. ODOT's Standard Specifications, Section 00280, detail the ESCP's minimum requirements for all Project Sites and conditions.

Contractors are required to designate an Erosion and Sediment Control Manager (ESCM) who is trained and certified to lead the project's erosion and sediment control work. ODOT's specifications require that the contractor comply with the NPDES 1200-CA permit, all other applicable permits, and all federal, state and local laws, rules and regulations. If contractors are not compliant, ODOT will require the work be performed before payment will be provided. ODOT's Standard Specifications, Section 00140, Scope of Work, detail the remedies available to ODOT if the contract requirements are not met. Additionally, Section 00280 was updated in 2023 to include noncompliance corrective actions, timelines and documentation requirements.

ODOT is committed to maintaining a "trusted partner" relationship with all regulatory agencies. In that context, when permit violations occur, ODOT self-reports to the appropriate regulatory agency. In the event that a contractor's ESCM is not performing all required duties, that ESCM may be removed from the project. If the ESCM withholds information or falsifies a monitoring report, then their certification will be permanently revoked.

2.4.2 ODOT Erosion Control Policy in addition to 1200-CA Requirements

ODOT Technical Advisory GE 12-01(A) outlines a process to provide appropriate erosion control for all construction projects having the potential to cause erosion, including those construction projects not subject to the 1200-CA. This process utilizes Section 00280 of ODOT's Standard Specifications and Boilerplate Special Provisions to apply the appropriate erosion and sediment control requirements based on risk of erosion and quantity of ground disturbance. The Technical Advisory groups projects into three categories listed below:

1. No Risk – These are construction projects that do not involve any ground disturbance. Erosion control is not required.
2. Low Risk – These are projects that involve less than one acre of ground disturbance and do not exhibit high risk erosion factors such as:
    a. Proximity to a wetland or waterway within 100 feet;
    b. Erodible soils or disturbance of steep slopes;
    c. Wet season construction and soil disturbance;
    d. Multiple construction season schedule;
    e. Probability that the area of ground disturbance will increase to an area greater than one acre; and
    f. Stringent local requirements that affect the ESCP and monitoring requirements.

    These small projects still require that plans address erosion prevention, runoff control and sediment control but they do not require an Erosion and Sediment Control Manager certified by ODOT. ESC inspections are done by Agency inspectors. Frequency varies based on potential risk factors such as forecasted weather, proximity to water, etc.
3. High Risk – These are construction projects having one or more acres of ground disturbance – and thus subject to 1200-CA permit conditions – or construction projects having less than one acre of ground disturbance when high risk erosion factors (listed above) are present. Erosion and sediment control requirements of the 1200-CA are applied to these projects. Inspection frequency for high risk sites are mandated by

contract at once per week on active sites, every two weeks for inactive sites and within 24 hours of rainfall events of 1/2" in a 24 hour period.

2.4.3 Construction Runoff Control for Maintenance Activities

Routine maintenance activities that cause ground disturbance are guided by the Blue Book. Stormwater management best management practices (BMPs) that apply to all maintenance activities are described. BMPs related to specific maintenance activities are also included as appropriate in those sections.

2.4.4 Additional Permits

Construction site runoff is also managed by adhering to requirements set by other permits, including:

- Clean Water Act (CWA) Section 404 permits;
- CWA Section 401 water quality certifications (WQCs); and
- Oregon Department of State Land's (DSL's) Oregon Removal/Fill Permit.

These permits and certifications regulate in-water work and sediment entering Waters of the State and Waters of the United States. Conditioned biological opinions, including ODOT's Federal Aid Highway Programmatic biological opinions (FAHP).

The FAHP biological opinions issued by National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS) provide take coverage under the Endangered Species Act (ESA) and the Magnuson-Stevens Act for federally-funded projects. Protecting threatened or endangered fish requires that ODOT prevent pollution from our projects or facilities from impacting the aquatic habitats of these species. Most rivers in the state provide potential habitat for endangered species and sediment is considered a pollutant, so control of construction site runoff is integral with the FAHP.

2.4.5 Construction Runoff Control Training and Education

ODOT will ensure that all staff responsible for ESCP reviews, site inspections, and enforcement of ODOT's requirements are trained or otherwise qualified to conduct such activities.

ODOT's Environmental Construction Inspector Certification course provides inspectors with practical knowledge and standard industry practices for conducting inspections. Inspectors gain an understanding of their responsibilities to verify compliance with project requirements as well as mandates set forth by ODOT or the federal government, or both. The Inspector Certification is valid for five years.

ODOT's Erosion and Sediment Control Manager Certification course that provides contractor's ESC managers with an understanding of the 1200-CA permit requirements and practical knowledge of standard industry practices for performing erosion and sediment control management activities on ODOT projects. Participants must pass a test to receive ESCM

certification. Certification is required to perform ESCP reviews and inspections. The ESCM is valid for five years, ensuring training will occur at least once during the permit term.

Table 2.4: Construction Site Runoff Control Implementation Schedule

Program Deliverables	Target Implementation Date
Complete internal agency rollout of 1200-CA permit changes.	June 1, 2023

2.5 Post-Construction Site Runoff Control

ODOT will continue to implement a post-construction site runoff control program to reduce discharges of pollutants from existing transportation infrastructure. ODOT will continue to evaluate the existing training program to ensure ongoing compliance with all applicable standards.

2.5.1 Other Regulatory Mechanisms

In addition to the MS4 permit, post-construction stormwater management is required by the following regulatory mechanisms:

2.5.1.1 CWA Section 401 WQCs

Individual projects that entail discharges of fill material into waters of the United States frequently require WQCs under CWA Section 401. For most projects that involve the development or redevelopment of impervious surfaces, the WQC requires preparation of a stormwater management plan documenting that the project's design includes all available and reasonable BMPs necessary for the project to meet state water quality standards.

2.5.1.2 Endangered Species Act & Magnuson-Stevens Fishery Conservation & Management Act

Highway projects that are likely to affect listed species have take authorization under one or more biological opinions (BOs). The specific BO(s) applicable depends on whether the project conforms to the limits of programmatic BOs, the species affected, whether a US Army Corps of Engineers permit is required, and whether the project is federally funded. These regulatory mechanisms specify that projects with certain triggering features (including development and redevelopment of impervious surfaces) include all available and reasonable best management practices necessary to minimize impacts to protected species. These include:

- FAHP BO (NMFS);
- FAHP BO (USFWS);
- Programmatic BO to Standard Local Operating Procedures for Stormwater, Transportation or Utilities; and,
- Individual project BOs.

2.5.1.3 Routine Road Maintenance Water Quality and Habitat Guide ("The Blue Book")

The Blue Book, which is developed and maintained by ODOT in consultation with NMFS and DEQ, specifies BMPs to be used when carrying out myriad maintenance activities that could otherwise have a deleterious effect on water quality and other environmental resources. Use of the BMPs described in the Blue Book ensures that ODOT's Routine Road Maintenance Program is exempt from ESA take provisions, and that the Program is adequate to protect and conserve listed fish. The maintenance activities described in the Blue Book include both maintenance of installed post-construction stormwater BMPs, as well as stormwater management principles generally.

2.5.1.4 Local ordinances and permits

ODOT projects are subject to city, county, and special district ordinances and permits, which may impose additional post-construction stormwater management requirements.

2.5.1.5 CWA Section 404 and DSL's Oregon Removal/Fill permits

Typically, CWA Section 404 and state removal/fill permits do not directly regulate stormwater management. However, occasionally a project's stormwater management features are part of the range of activities proposed as mitigation for aquatic impacts. When approved by the issuance of a CWA Section 404 or removal/fill permit, implementation of the mitigation plan—including stormwater management BMPs—becomes a condition of the permit.

2.5.2 Prioritization of Low Impact Development Requirements

Preference of low-impact development (LID) stormwater management techniques is a core principle of ODOT's post-construction stormwater management program. LID techniques are required to be considered in the previously-described regulatory instruments, and has consequently been prioritized as part of ODOT's BMP selection practices since 2008. LID principles—including mimicking natural hydrology, preserving natural resources, and dispersing and infiltrating stormwater close to where it falls—are manifested not only in the referenced regulatory mechanisms, but also in the BMP selection tool first established by the Stormwater Action Team, an interagency cooperative through which ODOT's modern stormwater program was established. This principle continues to be propagated in internal guidance we use routinely:

- The Blue Book: The Blue Book requires promoting sheet flow for stormwater wherever appropriate through such actions as corrective blading or grading.
- Water Resources Specialist Manual: This manual is used by project environmental staff to ensure that project designs conform to regulatory requirements, and specifies that BMPs are preferred which rely on infiltration as a primary pollutant removal mechanism (e.g., natural dispersion, bioslopes, infiltration basins, permeable pavement, etc.).
- Hydraulics Manual: This manual is used by ODOT hydraulics engineers to choose and design stormwater management system elements as part of highway project design. It specifies that LID BMPs should be evaluated for feasibility on all projects, and includes a section providing guidance on LID elements, prioritization, site suitability evaluation, and LID options.

2.5.3 Post-Construction Stormwater Management Requirements

ODOT is unique among Oregon MS4 permittees in that it has no regulatory authority to impose or enforce stormwater management requirements or technical standards on private property owners. ODOT does engage in analogous activities however, including:

- Performing reviews of plans for private development projects adjacent to highways that involve expanding or reconstructing highway surfaces (for example, to add a turn lane into a newly-constructed parking lot) to ensure that they include highway stormwater management features where appropriate.
- Reporting to regulatory authorities any third parties who are discovered to be discharging suspected pollutants to the public waters via ODOT's drainage infrastructure.

Additionally, for ODOT's own projects, ODOT implements site performance and treatment standards specified by the regulatory mechanisms described above, implements structural stormwater control design specifications through the Hydraulics Design Manual, and implements stormwater mitigation options on- and off-site where necessary.

2.5.4 Post-Construction Site Runoff Plan Review

As a non-regulatory agency, ODOT does not review the runoff plans of other entities, except as described in 2.5.3 above. However, for projects that affect stormwater, post-construction runoff is documented primarily through four types of documents, each having their own purposes, audiences, and review mechanisms:

Table 2.5.a: Post-Construction Site Runoff Plan Review

Document (prepared by)	**Purpose**	**Audience**	**Review Mechanism**
Hydraulics report (hydraulics engineer)	Documents design goals, engineering calculations, and solutions for projects with engineered BMPs	Project development team (PDT; internal) and project files	Peer reviewed by another engineer; input provided by water resources specialist in ODOT region environmental unit
Post-construction stormwater management plan (SWMP) (water resources specialist / permit coordinator)	Documents how project design meets 401 stormwater criteria	DEQ[1]	Peer reviewed by region environmental staff and water resources program leader; SWMPs for projects covered by individually-permitted projects are reviewed by DEQ as part of its WQC process.
FAHP stormwater report (water resources specialist / biologist)	Documents compliance with FAHP BOs	NMFS	Peer reviewed, then submitted to NMFS liaison; take is reported annually
Project development and construction plan sheets (project designers)	Design and communication tool during project development, then a construction tool	PDT, construction office, and contractor	Reviewed by entire PDT at several stages, finalized by specification engineer

[1] Most SWMPs—for projects approved under nationwide permits—are reviewed by the water resources program coordinator to ensure 401 compliance, and may occasionally be reviewed by DEQ to support 401 certification. DEQ is therefore considered the audience for all SWMPs.

2.5.5 Long-Term Operation and Maintenance (O&M)

ODOT's Hydraulics Program tracks stormwater facility assets, the operations and maintenance (O&M) manuals for each facility, and related program data. As of 2020, ODOT maintains more than 1,200 facilities statewide. Stormwater facilities include:

- Stormwater treatment facilities such as swales, ponds, filter strips, sedimentation basins, bioslopes, proprietary structures that use vaults and oversized manholes or tanks, and pretreatment manholes;
- Stormwater storage facilities such as ponds, tanks, and vaults;
- LID BMPs; and,
- Underground Injection Control (UIC) systems.

Each stormwater facility is assigned a unique drainage facility identification (DFI) number. The DFI number is used to link the stormwater facility with an O&M manual and with ODOT's asset management systems. ODOT's stormwater inventory is available through TransGIS, a web-based program accessible to the public.

Each stormwater facility is required to have a dedicated O&M manual that provides information about facility maintenance and operation. Copies of the facility manuals are distributed to the maintenance district where the facility is situated. Each manual includes:

- The facility type;
- How the facility operates;
- The inspection schedule;
- A list of required maintenance work;
- Waste material handling and contacts;
- Appendix A: A facility operational plan, profile and details; and,
- Appendix B: As-constructed facility plans and details.

In addition to assigning a DFI number, field markers are also installed at each facility site to help locate and identify the stormwater facility, and support asset management data collection. DFI field marker guidance is provided in the ODOT Hydraulics Manual.

There are three types of markers used to identify ODOT facilities or alert maintenance crews of the location of stormwater facility maintenance areas. A Type S1 marker is used to indicate the start and end of stormwater facility maintenance areas. The purpose of the Type S2 marker is to display the facility drainage identification number.

Maintenance crews refer to the appropriate O&M manual using the ID number assigned to each facility. A Type S3 marker is used to stamp a drainage facility identification number onto the top of access covers of underground treatment and storage facilities that use vaults, oversized manholes, and tanks.

ODOT Maintenance Crews are generally responsible for the ongoing maintenance of these facilities as required in the facility O&M manuals and the maintenance tables provided in ODOT's Maintenance Guide. Facilities are inspected annually and necessary maintenance is completed as soon as practicable after discovery of a deficiency. These actions are documented on inspection forms which are entered into the Water Quality Facility Program database.

2.5.6 Training and Education

ODOT provides training and education as needed through a variety of means to employees who deal with post-construction stormwater management features.

Water resources specialists and biologists:

- Water resources specialist manual;
- Biology manual;
- FAHP User's guide;
- Direct organizational communication of urgent issues;
- Quarterly discipline meetings;
- Discipline leads providing formal training; and,
- Sharing information internally about additional training opportunities provided by outside providers.

Hydraulic engineers:

- Hydraulics Manual;
- ODOT Policies;
- Standard Construction Specifications;
- Standard Drawings;
- Standard Details;
- Qualified Products List;
- O&M manual templates;
- FAHP User's guide;
- Direct organizational communication of urgent issues;
- Monthly senior engineer discipline meetings;
- Quarterly statewide discipline meetings;
- Discipline leads providing formal training; and,
- Sharing information internally about additional training opportunities provided by outside providers.

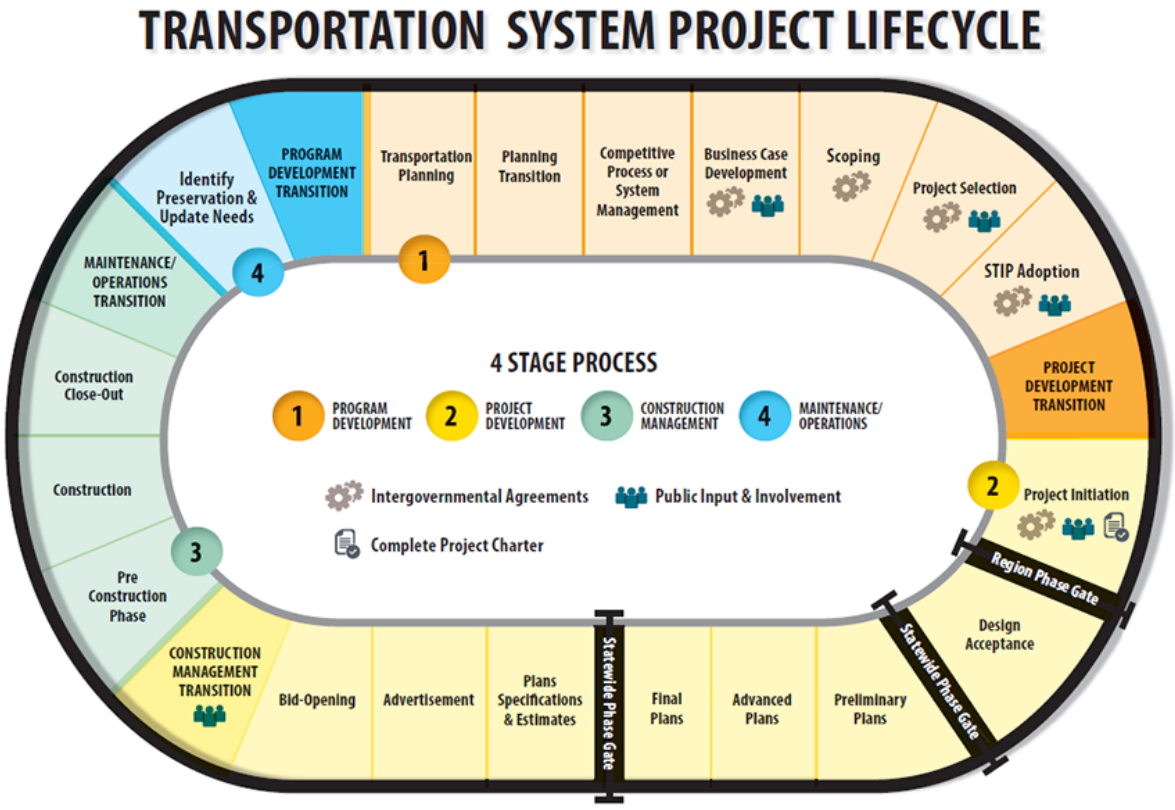
Maintenance:

- Blue Book Training: The maintenance activities described in the Blue Book include both maintenance of installed post-construction stormwater BMPs, as well as stormwater management principles generally.
- Water Quality Facility Work Group: Maintenance staff, technical experts, and statewide program leads are part of a work group that meets to discuss treatment facilities, maintenance strategies, and emerging technologies.

Table 2.5.b: Post Construction Program Implementation Schedule

Program Deliverables	Target Implementation Date
Continue to Evaluate Innovative Stormwater Mitigation Options	Ongoing
Explore Opportunities to Improve Stormwater Treatment through the Project Delivery Process	Ongoing

The Project Delivery Guidebook explains the Project Delivery Process in detail. Stormwater is addressed from scoping through design and construction and, ultimately, handoff of constructed facilities to maintenance



2.6 Pollution Prevention and Good Housekeeping

ODOT will continue to implement and adaptively manage the Environmental Management System (EMS) Program, Spill Prevention Control and Countermeasure (SPCC) Program, and other relevant programs to minimize potential impacts to stormwater generated on ODOT-owned facilities.

2.6.1 Operation and Maintenance Strategy for Existing Controls

Please see Section 2.5.5 above. The Operation and Maintenance Strategy for existing controls is the same as the Long-Term Operation and Maintenance Strategy for post-construction controls.

2.6.2 Environmental Management System Program

ODOT developed an Environmental Management System Program in 2004 to provide consistent direction and expectations for the storage, handling, and disposal of materials typically found at ODOT Maintenance Facilities. This program has continued to be implemented through Highway Policy MAI-31, Environmental Management and Operations of Maintenance Compounds, and is updated every 5 years.

2.6.2 Integrated Vegetation Management Program

The ODOT Integrated Vegetation Management (IVM) program is required under Oregon statute ORS 634.660. The program develops agency guidance for managing noxious weeds, landscape plantings, roadside timber, and other vegetation issues associated with ODOT rights-of-way. Goals of the ODOT IVM program include encouraging self-sustaining vegetation and reducing the need for herbicides, fertilizers, and irrigation. ODOT continually explores new vegetation management practices, technologies, and partnerships to improve its IVM program. Specific actions to meet this requirement will be included in the annual report.

2.6.3 Litter control, including Adopt-a-Highway

ODOT cleans up litter and debris found along state highways using its own employees (permanent or temps), contractors, and volunteers. The litter control work is managed individually by District. The Adopt-A-Highway program provides an opportunity for volunteers to clean up litter and remove noxious weeds along state highways. Activities may also include graffiti removal and maintenance of existing landscaped areas. ODOT will explore opportunities to encourage participation in the Adopt-A-Highway program.

2.6.4 Material and waste disposal

ODOT has developed guidance for appropriate materials disposal and documentation. The guidance is outlined in the EMS Manual. Hard copy tracking logs are available upon request.

2.6.5 Spill Prevention Control and Countermeasure Program

Program elements are written in site-specific SPCC Plans that describe controls and procedures that have been implemented to prevent oil from reaching nearby waterbodies if a spill occurs. ODOT Maintenance yards that have aggregate storage of more than 1,320 gallons of oil or fuel in containers that are 55 gallons or larger, provided the facility is sited where a potential spill could impact navigable waterways (as defined in the Oil Pollution Act) have fully implemented the elements of the Plans.

2.6.6 Training and Education

Training and yard audit details for ODOT Maintenance Facilities are provided in the EMS Program Manual. Other training requirements are completed as part of Blue Book training.

Table 2.6: Pollution Prevention and Good Housekeeping Implementation Schedule

Program Deliverables	Target Implementation Date
Submit EMS Annual Report as part of the MS4 Annual Report	Annually

2.7 Winter Maintenance Program

ODOT will continue to implement the existing Winter Maintenance Program components while exploring opportunities to improve efficiency and limit impacts to receiving waters.

2.7.1 Winter Materials Management

ODOT will continue to store all winter maintenance products in compliance with the guidelines detailed in the EMS Program. Details about storage and training requirements for winter materials can be found in the EMS Program document.

2.7.2 Winter Maintenance Strategy

ODOT's current Winter Maintenance Strategy includes phasing in the use of solid salt in keys areas, defining principles to guide further expansion, and evaluating and adaptively managing environmental best practices to reduce impacts to water quality. The 2019 Strategy and all subsequent Strategy updates can be found at http://www.oregon.gov/ODOT or by contacting ODOT's Maintenance and Operations Branch – Environmental Section at (503) 986-3008.

2.7.3 Winter Maintenance Annual Report

ODOT will continue to produce a Winter Maintenance Annual Report which will be included as an appendix to the MS4 Annual Report. Data metrics may change over time due to availability and reporting, but will generally include information about the type and quantity of materials used by geographic area.

2.7.4 Training and Education

ODOT provides Winter Maintenance Training through two primary venues:

- Winter Maintenance Training for operators/applicators; and,
- EMS annual training and auditing relating to proper storage of winter maintenance materials.

Table 2.7: Winter Maintenance Program Implementation Schedule

Program Deliverables	Target Implementation Date
Provide copies of SPR 812	June 1, 2023
Continue to participate in ODOT and/or other research projects	Ongoing
Submit Winter Maintenance Annual Report as part of the MS4 Annual Report	Annually

2.8 Stormwater Retrofit Strategy

ODOT will initiate the development a Stormwater Retrofit Strategy during this permit cycle. This program will include prioritization methodology, screening criteria, and funding options.[2] A list of prioritized projects may be completed, if practicable, during this permit cycle.

2.8.1 Stormwater Retrofit Strategy Components and Objectives

The Stormwater Retrofit Strategy may address, but is not limited to, the following stormwater components:

- ODOT's TMDL Implementation Plan;
- Existing Facility Maintenance and Replacement (including Flow Control Requirements);
- Inclusions of treatment of runoff emanating from contributing impervious areas that extend beyond a highway project's stormwater trigger areas; and,
- Innovative stormwater mitigation alternatives that extend beyond project-by-project mitigation.

The components included in the Stormwater Retrofit Strategy will be determined during the program's development. ODOT may solicit feedback from DEQ and other regulatory agencies during the development of the program, as appropriate.

2.8.2 Project Prioritization Methodology

ODOT will develop methodology to aid in the prioritization of projects that meet the objectives of the program. The resulting prioritized list will be used to assign funding, highlight potential cost-sharing opportunities with other MS4 permittees, and identify regional stormwater treatment needs.

2.8.3 Stormwater Retrofit Strategy Document

ODOT will develop a Stormwater Retrofit Strategy Document to capture the prioritization, rationale, and identification of project locations, including which program component(s) the project will address.

Table 2.8. Stormwater Retrofit Strategy Implementation Schedule

Program Deliverables	Implementation Date
Develop a statewide Stormwater Retrofit Strategy, including funding and prioritization methodology	June 1, 2024

[2] Some retrofit concepts may require review to determine consistency with the aforementioned Constitutional expenditure limits.

SCHEDULE B - MONITORING AND REPORTING REQUIREMENTS

1. Compliance Evaluation

ODOT will provide an annual evaluation of compliance as outlined in Schedule A and Schedule D as part of the MS4 Annual Report.

2. MS4 Annual Report

No later than June 1 each year, ODOT will submit an MS4 Annual Report to DEQ as specified in Table B.1 below. The reporting period for the MS4 Annual Report is from January 1 through December 31 of each year. Reporting periods for subsequent MS4 Annual Reports is specified in Table 2 below.

Table B.1. MS4 Annual Report Deadlines

MS4 Annual Report	Reporting Period	Due Date
1st Year Annual Report	January 1, 2020 - December 31, 2020	June 1, 2021
2nd Year Annual Report	January 1, 2021 - December 31, 2022	June 1, 2022
3rd Year Annual Report	January 1, 2022 - December 31, 2023	June 1, 2023
4th Year Annual Report	January 1, 2023 - December 31, 2024	June 1, 2024
5th Year Annual Report	January 1, 2024 - December 31, 2025	June 1, 2025

3. Monitoring Requirements

ODOT submitted its 2021 MS4 Monitoring Plan to DEQ on January 15, 2021. Results are provided to DEQ as they are received and reported on in each annual report.

4. Submissions

ODOT will provide DEQ with one hard copy of the MS4 Annual Report until e-reporting is initiated and any supplemental information required by the due date in Table B.1, above.

Additionally, all Annual Reports, attachments, and other required submittals will be sent to DEQ by email.

5. Recordkeeping/Records Retention

ODOT will retain records and copies of all information pertinent to the requirements of the MS4 permit for a period of at least five years after the permit's expiration date.

SCHEDULE D - SPECIAL CONDITIONS

1. MS4 Data Compilation

Since 1999, ODOT has collected an array of stormwater data for permit compliance, litigation, and other program-specific needs. These data collection efforts have often fulfilled a singular requirement or need and have not been compiled into one database for evaluation. The purpose and goal of this condition of the permit is to compile stormwater-related data to help ODOT and DEQ understand the ODOT MS4 on a jurisdiction-wide basis. ODOT will consolidate information on outfalls, conveyances, stormwater controls, and water quality facilities to one digital location for use in better understanding stormwater discharges from the ODOT system (PER Section 7.1.)

2. Stormwater Data Compilation

During this permit term, ODOT will compile all available data relevant to the MS4, including characterization, research, mapping, and other applicable data sets. This data may include, but is not limited to, the following:

- All available outfall inventories that are within Phase 1 and II Communities completed since 1999;
- All available highway stormwater runoff characterization data collected by ODOT or consultants contracted by ODOT since 1999;
- All available monitoring data collected by ODOT or consultants contracted by ODOT since 1999; and,
- Other Relevant Stormwater Data collected by ODOT or consultants contracted by ODOT since 1999
- Other sources of data may include:
- Water Quality Facility Program;
- Winter Maintenance Program;
- Integrated Vegetation Management Program;
- EMS Program; and,
- Data received from other MS4 permittees, DOTs, and state and federal agencies.

3. Stormwater Data Review and Gap Analysis

Upon completion of Schedule D.1.i., ODOT will develop a database (e.g., Excel spreadsheet or other), and/or GIS interface to be used to manage available ODOT stormwater data. This database will be used to conduct an evaluation and analysis of all known stormwater data to identify any data gaps. Data gaps may include geographic gaps (i.e., regional data needs) or subject area gaps (i.e., pollutant-specific data). A GIS interface may also be used to conduction spatial analyses and to display data points such as outfall locations. This analysis will be provided to DEQ no later than June 1, 2024.

4. Additional Data Collection

Upon completion of Schedule D.1.ii, ODOT may, in consultation with DEQ, elect to collect additional stormwater data necessary to close any identified data gaps. Data collection efforts may include, but are not limited to, the following:

- Research projects;
- Literature reviews;
- Partnerships with other permittees, DOTs, and/or other state and federal agencies;
- Computer modeling;
- Physical data collection; and,
- GIS analysis.

Table D.1: MS4 Data Compilation Implementation Schedule

Program Deliverables	Implementation Date
Identify Known Existing, Applicable Data Sets	June 1, 2022
Develop Database and/or GIS Platform for Data Management and Analysis	June 1, 2023
Input all Data into Database/Platform(s) and Conduct Data Gap Analysis	June 1, 2024

5. Total Maximum Daily Load (TMDL) Implementation Plan

ODOT and DEQ will work collaboratively to update ODOT's most current TMDL Implementation Plan. Work to update this plan will commence during this permit term. ODOT will submit a draft plan to DEQ by June 1, 2023.

Summary of Changes to SMPD

Date	Section	Summary of Changes
7/26/2021	2.4 Construction Site Runoff Control	Corrected information about certification courses
7/26/2021	2.4.1 Compliance with other NPDES permits	Corrected references to 1200-C permits
7/26/2021	2.4.1.1 NPDES 1200-CA Compliance Strategy	Clarified responsibility for ESCP
7/26/2021	2.4.2 (2) ODOT Erosion Control Policy in addition to 1200-CA Requirements	Corrected information regarding development of ESCPs on projects that are not covered under the 1200-CA (less than 1 acre of disturbance)
7/26/2021	2.4.2 (3) ODOT Erosion Control Policy in addition to 1200-CA Requirements	Provided more detailed information regarding the frequency of inspections of high risk projects
7/26/2021	Schedule D.5	Added language regarding TMDL Implementation Plan
5/16/2022	1.2	Deleted “is a state agency and not a municipality”
5/16/2022	Table 2.1	Changed Target Implementation date for Social Media Strategy to from 2022 to 2023
5/16/2022	Table 2.4	Corrected references to 1200-C permits Added program deliverable: Update Erosion and Sediment Control Program elements of SMDP upon issuance of 1200-CA permit
5/20/2022	2.4.1	Modified paragraph: Stormwater discharges from ODOT construction sites are regulated through the requirements of the ODOT’s five regional NPDES 1200-CA permit registrations. In 2021, ODOT has begun the process of negotiating conditions of the 1200-CA update for its construction sites. This document will be updated to reflect the 1200-CA permit requirements as soon as those permits are in effect. To: Stormwater discharges from ODOT construction sites is regulated through the requirements of the ODOT’s five regional

		NPDES 1200-CA permit registrations. The Oregon Standard Specifications for Construction is a contract document and enforcement tool in requiring contractor compliance with the NPDES 1200-CA. The 00280 Section of the Specifications, regarding erosion and sediment control is written to support the 1200-CA Permit. Similarly, the ODOT Erosion Control Manual provides guidance on compliance with the Permit and ODOT's consultant Scope Of Work template provides consultants an outline for developing Erosion and Sediment Control Plans that satisfy the Permit's requirements. These documents will be updated to reflect the revised 1200-CA permit requirements as soon as the Permit's final language is provided.
5/16/2022	2.4.3	Inserted "best management practices"
5/16/2022	2.4.4	Replaced "regulated" with "managed"
5/22/2022	2.4.5	Modified paragraph: ODOT's Environmental Construction Inspector Certification course provides inspectors with practical knowledge and standard industry practices for conducting inspections. Inspectors gain an understanding of their responsibilities to verify compliance with project requirements as well as mandates set forth by ODOT or the federal government, or both. The Inspector Certification is valid for five years To: ODOT's Erosion and Sediment Control Manager Certification course that provides contractor's ESC managers with an understanding of the 1200-CA permit requirements and practical knowledge of standard industry practices for performing erosion and sediment control management activities on ODOT projects. Participants must pass a test to receive ESCM certification. Certification is required to perform ESCP reviews and inspections. The ESCM is valid for five years, ensuring training will occur at least once during the permit term.

5/16/2022	2.5.1.1	Deleted “best management practices” replaced with “BMPs”
5/16/2022	2.5.1.4	Modified sentence: Occasionally, ODOT projects may be subject to city, county, and special district ordinances and permits, which impose additional post-construction stormwater management requirements. To: ODOT projects are subject to city, county, and special district ordinances and permits, which may impose additional post-construction stormwater management requirements.
5/16/2022	2.5.2	The last bullet referring to PD-05 was removed. PD-05 is being updated. The current draft directs project delivery teams to use the two manuals already referenced in this section.
5/16/2022	2.5.4	Deleted “e.iv”
5/16/2022	Table 2.5.a	In the cell: “Post-construction stormwater management plan (SWMP)” deleted “biologist” and added “permit coordinator”
5/16/2022	Page 14, footnote 1	Modified sentence: Most SWMPs—for projects approved under nationwide permits—are reviewed by the water resources program coordinator to ensure 401 compliance, and may be subject to DEQ review to support 401 certification. DEQ is therefore considered the audience for all SWMPs. Most SWMPs—for projects approved under nationwide permits—are reviewed by the water resources program coordinator to ensure 401 compliance, and may occasionally be reviewed by DEQ to support 401 certification. DEQ is therefore considered the audience for all SWMPs.
5/16/2022	2.5.5	Deleted “best management practices” with “LID BMPs”

5/16/2022	2.6	Modified deliverable from "Analyze participation in the Adopt-A-Highway program" to "Analyze effectiveness of EMS training"
8/9/22	1.2	Changed: • State statutes and regulations that give ODOT the legal authority to control illicit discharges to its storm system are identified in Section A.3.c.ii.A. to correct reference: • State statutes and regulations that give ODOT the legal authority to control illicit discharges to its storm system are identified in Section 2.3.1.
5/30/23	Table 2.1	Changed 2023 to 2024
5/30/23	2.2.1	Corrected misspelling of Publicly; removed "Update ODOT's Stormwater Website". This deliverable is complete.
5/30/23	Table 2.2	Deleted "Develop a Social Media Strategy to Disseminate Stormwater Information". Duplicative of Table 2.1.
5/30/23	Table 2.2	Deleted "Identify strategies for encouraging participation in ODOT's Adopt-A-Highway Program". This deliverable is complete.
5/30/23	Table 2.2	Changed implementation date in "Update ODOT's Stormwater Website" from 2022 to 2023. Another update was completed in 2023.
5/30/23	Table 2.3	Deleted completed deliverables and added "Evaluate methods to track illicit discharges by basin" and "June 1, 2025".
5/30/23	2.4.1.1	Deleted large portions of the text relating to the 1200-CA permit and added a link to the final 1200-CA permit for reference.
5/30/23	Table 2.4	Deleted completed deliverables and added "Complete internal agency rollout of 1200-CA permit changes" and "June 1, 2023".
5/30/23	Table 2.5b	Deleted completed deliverables and changed "June 1, 2023" to "Ongoing".
5/30/23	Table 2.6	Deleted completed deliverable.
5/30/23	Table 2.7	Changed "Upon Completion to "June 1, 2023".

5/30/23	Table 2.7	Deleted “Develop and implement a calibration manual for material application equipment”.
5/30/23	Schedule B.4.	Deleted “at MS4Stormwater@deq.state.or.us” and added “by email”.
5/29/24	2.3.2	Deleted reference to existing ODOT manuals such as the EMS Manual, HazMat Program Manual because those manuals reference the spill response procedure in the First Responder Guide.
5/29/24	2.4	Inserted “updated in 2023” regarding the Erosion Control Manual
5/29/24	2.4.1	Updated language to indicate the 1200-CA was reissued September 15, 2022
5/29/24	2.4.1	Inserted “Additionally, Section 00280 was updated in 2023 to include noncompliance corrective actions, timelines and documentation requirements.”
5/29/24	Schedule D.1	Inserted “The purpose and goal of this condition of the permit is to compile stormwater-related data to help ODOT and DEQ understand the ODOT MS4 on a jurisdiction-wide basis. ODOT will consolidate information on outfalls, conveyances, stormwater controls, and water quality facilities to one digital location for use in better understanding stormwater discharges from the ODOT system (PER Section 7.1.)”
5/29/24	Entire document	Updated links that were broken.

Attachment 2

What We Know: 6PPD and 6PPD-quinone

In the short time since 6PPD-quinone (6PPD-q) was isolated and characterized, scientists have been working to understand its prevalence and behaviors in the environment. This focus sheet provides environmental officials with a brief overview of the current understanding of 6PPD-q sources, exposure, fate, transport, toxicity, and mitigation strategies. In-depth ITRC guidance will be released in summer 2024.

In 2020, researchers in Washington State discovered and identified 6PPD-quinone (6PPD-q) as the stormwater chemical responsible for urban runoff mortality syndrome observed in coho salmon (*Oncorhynchus kisutch*) around Puget Sound over the last 25 years.[1,2] Research has demonstrated that 6PPD-q is also acutely lethal to brook trout[3] and rainbow trout/steelhead.[3–5] 6PPD is the primary anti-degradant in tires and has been in use since the 1960s. 6PPD-q is one of the products formed by the reaction of 6PPD and ozone (Figure 1). 6PPD-q may be present in many places impacted by tire use. 6PPD and 6PPD-q have been detected in stormwater and surface waters on many continents[1,6–10] and have been found in airborne particulates,[11–14] sediment,[15] soil,[11] rubber products other than tires,[16] and human urine.[17]

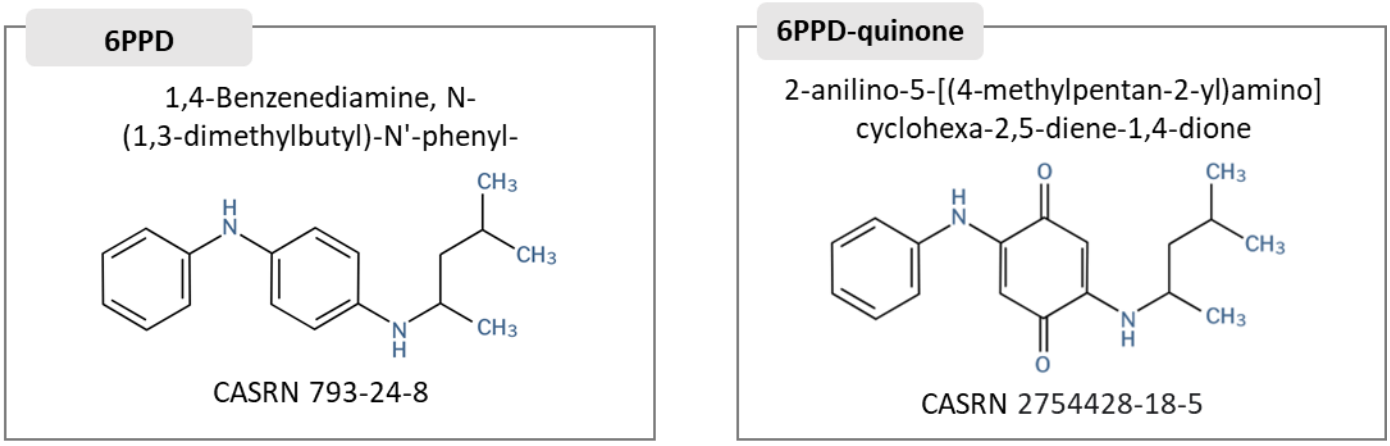


Figure 1. Chemical structures for 6PPD and 6PPD-quinone.

How Is 6PPD-q Entering Surface Waters?

Tire wear particles (TWPs) containing 6PPD-q are transported via stormwater to surface water (Figure 2). Many urban stormwater systems are designed to control flooding, not capture and treat contaminants. In separate storm sewer systems, rainwater is transported to natural receiving waters through a network of ditches and pipes without natural or engineered green spaces to remove pollutants prior to entering surface waters. Additionally, some areas with installed stormwater best management practices (BMPs) are failing to contain stormwater due to increased urbanization and storm events that are larger than the infrastructure was designed for, leading to direct conveyance of 6PPD-q to vulnerable aquatic ecosystems.

What We Know: 6PPD and 6PPD-quinone

Multiple aspects of the lifecycle of 6PPD-q are under investigation. This includes the factors that influence the formation of 6PPD-q in tires and tire wear particles (TWPs) in the environment, 6PPD-q's leaching rates from TWPs, and its persistence and bioaccumulation potential. Programs that divert scrap tires from landfills recycle the tires into crumb rubber materials used on sports fields, rubber-modified asphalt, tire-derived aggregate used in civil engineering projects, and more. The levels of 6PPD-q released from recycled tire products is also actively being researched.

Conceptual Transport and Exposure Model

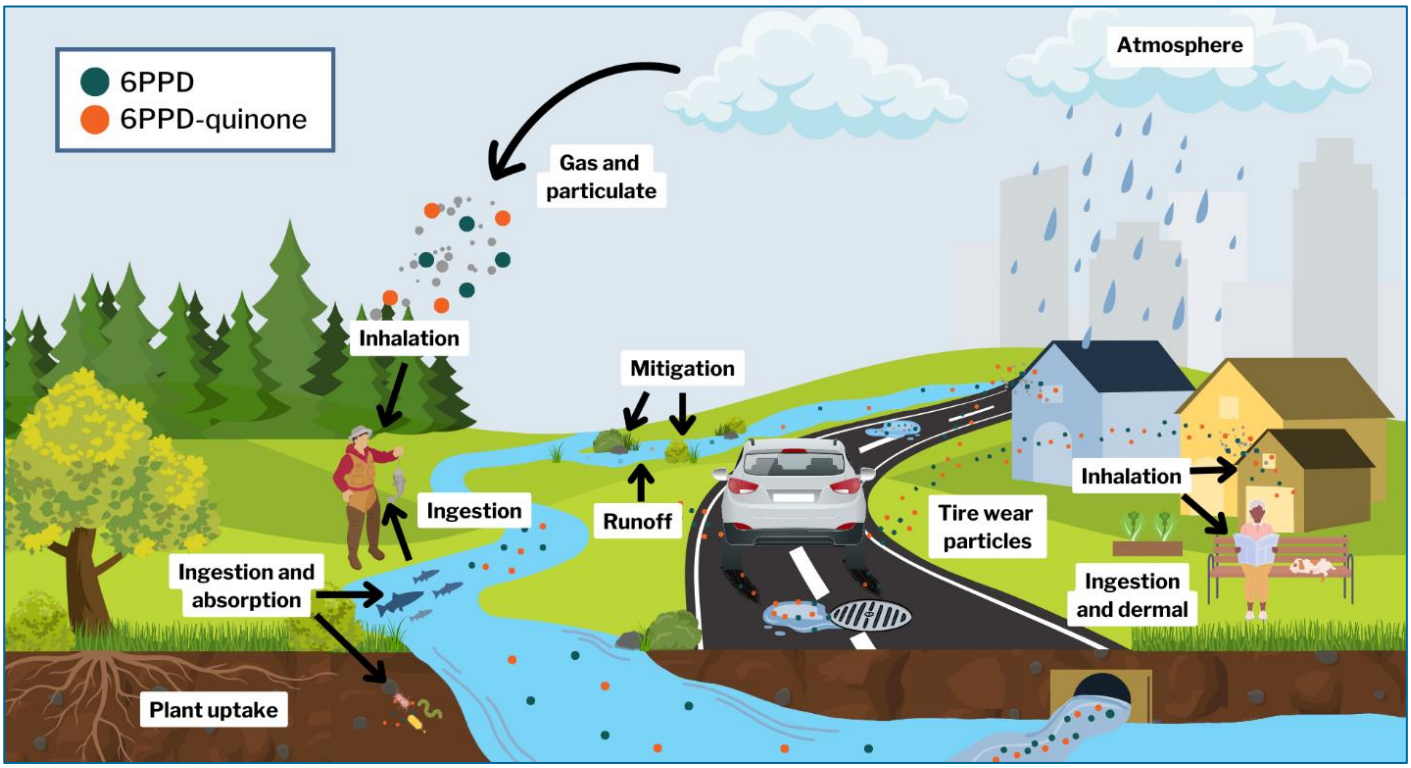


Figure 2. 6PPD in tires is converted to 6PPD-quinone (6PPD-q) when exposed to ozone. 6PPD-q is contained in tire wear particles that can be transported in the air and potentially inhaled by people. The particles can also be deposited on surfaces, soils, and plants, including foods, leading to potential plant uptake and human dermal exposure and ingestion. Tire wear particles can also stay near the roadway and be transported to surface waters through stormwater drains and runoff. 6PPD-q in surface waters can be ingested and absorbed by fishes. Exposed organisms can be ingested by humans and other species. 6PPD-q can potentially be mitigated by green stormwater infrastructure. Research is ongoing to further define 6PPD-q's environmental behaviors, exposures, and the potential development of adverse health outcomes. Figure credit: Hannah Vinyard, Washington State Department of Ecology.

Ecological Toxicity

Both 6PPD and 6PPD-q surpass the threshold for *very high* acute aquatic toxicity using the Globally Harmonised System of Classification and Labeling of Chemicals.[18] This section focuses on 6PPD-q, which ranks as one of the most potent acute aquatic toxicants when compared to chemicals with existing Clean Water Act[2] Aquatic Life Ambient Water Quality Criteria. Most of the ecological toxicity data generated thus far focuses on the acute freshwater aquatic toxicity of 6PPD-q. Two studies on the toxicity of 6PPD-q to marine organisms have been conducted,[19,20] but no studies have been done on the toxicity of 6PPD-q to the estuarine and marine stages of salmonids, which represents a significant data gap. Sublethal effects and chronic toxicity of

6PPD-q are being investigated. There is limited research regarding its toxicity to terrestrial species (e.g., *Caenorhabditis elegans*[21–23]).

Acute Toxicity. Research to date has demonstrated acute toxicity to 6PPD-q in only a few species within the salmonid family, which includes salmon, char, and trout (Table 1). Coho salmon are the most sensitive species documented, with a median LC_{50} concentration (50% mortality in lab tests) of 0.08 µg/L and death occurring within hours.[1,2,4,24] Toxicity to 6PPD-q does not follow a phylogenetic relationship. Species within the *Oncorhynchus* genus show radically different acute toxicities, from an LC_{50} as low as 0.040 µg/L in coho hatchlings[24] to no mortality observed in sockeye at 50 µg/L.[25] Some salmonids in the *Salvelinus* genus (white-spotted char[26] and brook trout[3]) are acutely sensitive at relatively low concentrations (see Table 1), while others are not.[3] *Oncorhynchus mykiss*, which encompasses rainbow trout (freshwater only) and steelhead (ocean-going), show mortality at higher doses and a slower onset of symptoms in response to 6PPD-q.[3] The LC_{50} for Chinook salmon is well above environmentally relevant concentrations[25]; however, Chinook had a low level of mortality when exposed to undiluted roadway runoff.[27] Salmonids that do not experience acute toxicity to 6PPD-q include sockeye salmon,[25] Arctic char,[3] Atlantic salmon, and brown trout,[28] as well as two varieties of Asiatic salmon: southern Dolly Varden and cherry salmon.[26]

Table 1. Reported 6PPD-quinone LC_{50} concentrations (50% observed mortality) of salmonids.

Species	LC_{50} (µg/L)	Test duration (h)
Coho salmon (*Oncorhynchus kisutch*)	0.04, [24] 0.08, [25] 0.095 [2]	24
White-spotted char (*Salvelinus leucomaenis pluvius*)	0.51 [26]	24
Brook trout (*Salvelinus fontinalis*)	0.59 [3]	24
Rainbow trout/steelhead (*Oncorhynchus mykiss*)	0.64,[29] 1.0,[3] 2.26 [5]	96
Chinook salmon (*Oncorhynchus tshawytscha*)	67.3 [24], 82.1 [25]	24
Sockeye salmon (*Oncorhynchus nerka*)	Not acutely toxic at 50 [25]	24
Atlantic salmon (*Salmo salar*)	Not acutely toxic at 12.2 [28]	48
Brown trout (*Salmo trutta*)	Not acutely toxic at 12.2 [28]	48
Arctic char (*Salvelinus alpinus*)	Not acutely toxic at 12.7 [3]	24
Southern Dolly Varden (*Salvelinus curilus*)	Not acutely toxic at 3.8 [26]	48
Cherry salmon (*Oncorhynchus masou masou*)	Not acutely toxic at 3.5 [26]	48

Toxicity Key: Higher / Lower

Note: Example species in the table are listed from very high to low across a toxicity gradient based on the LC_{50} value, with the following ratings: coho = very high; white-spotted char and brook trout = high; rainbow trout / steelhead = medium high; Chinook salmon = medium low; and sockeye salmon, Atlantic salmon, brown trout, Arctic char, southern Dolly Varden, and cherry salmon = low. Chinook salmon were assigned medium-low toxicity out of an abundance of caution. They have an LC_{50} above environmentally relevant concentrations and potentially above some of the salmonids listed below it in the table. Nevertheless, Chinook showed low levels of mortality in undiluted roadway runoff, which could be a result of 6PPD-q or another contaminant. Until further research clarifies whether any life stage of Chinook experiences acute mortality in response to 6PPD-q at potentially environmentally relevant exposures, they were assigned medium-low toxicity.

Chum salmon (*Oncorhynchus keta*) do not show toxicity to roadway runoff[27] or tire leachate[30] but have not been tested with 6PPD-q. Outside the salmonid family, environmentally relevant concentrations of 6PPD-q (up to 2.8 µg/L) are not fatal to several fishes (white sturgeon,[3] zebrafish, and medaka[31]) and aquatic invertebrates (*Daphnia* and the crustacean (*Hyalella azteca*).[31] Toxicity studies on 6PPD-q in marine invertebrates, *Brachionus koreanus*[19] and *Parhyale hawaiensis,*[20] indicated no acute toxicity.

Acute symptoms mimic respiratory distress and include gasping at the water's surface, fin splaying, and loss of equilibrium[32]; onset of symptoms can occur within 90 minutes.[1] Examples of the effects are shown in the Puget Soundkeeper — Longfellow Creek coho salmon video. Scientists are still working to determine how 6PPD-q causes mortality in fish. Researchers have demonstrated exposure to roadway runoff causes fluid to leak out of the blood vessels in the gills and brain of coho, demonstrating that the blood–brain barrier is compromised in coho.[33] Mahoney and colleagues provide evidence that energy production at the cellular level may be disrupted.[34] The researchers further suggest that the potential inability of sensitive species to metabolize 6PPD-q into a less toxic form may contribute to its selective toxicity.[34]

Sublethal toxicity. It is still unknown whether 6PPD-q causes sublethal toxicity in wild fish populations. Sublethal effects could impact growth and reproduction and make fishes susceptible to other stressors, such as pathogens, higher temperatures, or other poor water quality parameters. Additional studies are needed to determine the concentrations of 6PPD-q that could result in adverse effects to salmonids, particularly because some populations are protected under the Endangered Species Act.

Limited work has been done studying sublethal effects in zebrafish, where 6PPD-q influenced embryo movement and heart rate.[35] In addition, environmentally relevant concentrations of 6PPD-q have been shown to alter the central nervous system of zebrafish, changing their exploratory behavior, wake/sleep cycle, and heart rate.[36] Beyond fish, chronic toxicity of 6PPD-q has been studied in *C. elegans,* a soil-dwelling round worm. The worms have neurobehavioral changes and show symptoms of oxidative stress at concentrations starting as low as 0.1 µg/L.[21,22] At 1 µg/L the worms have diminished reproductive capacity.[23] How these results translate to salmonids that are more susceptible to acute toxicity and how these sublethal effects relate to survival of aquatic species require further research.

Human Health

This section provides the most salient (e.g., not comprehensive) toxicological information on 6PPD and 6PPD-q. The health effects of 6PPD are better characterized than 6PPD-q. The health hazards of other 6PPD transformation products remain another notable data gap.[37]

6PPD.6PPD is a well-documented skin sensitizer, resulting in allergic contact dermatitis in sensitized individuals.[38] 6PPD is also listed as a category 1B reproductive toxicant by the European Chemicals Agency (ECHA).[39] Exposed rats experienced prolonged and difficult birth, including some pregnant rats to the point of death.[39] The no adverse effect level for reproduction is 7 mg/kg body weight per day for females.[39] 6PPD increased fat accumulation in liver in mice that were given oral doses of 10 mg/kg body weight per day for 6 weeks.[40] Similarly, ECHA identified the liver and blood cells as targets of toxicity in a 28-day oral exposure rat study. Effects on the liver were reversible at 20 mg/kg body weight per day, and both sexes showed fat deposition in the liver and anemia at 100 mg/kg body weight per day.[39]

What We Know: 6PPD and 6PPD-quinone

6PPD-quinone. 6PPD-q is predicted to cause oxidative stress.[41] 6PPD-q increased lipid accumulation in the livers of mice that were given oral doses of 10 mg/kg body weight per day for 6 weeks.[40] In addition, 6PPD-q increased liver triglycerides at all doses tested (10, 30, and 100 mg/kg body weight per day).[40]

Human Exposure. 6PPD and 6PPD-q were detected in human urine in a Chinese study.[17] Pregnant women's urine had the highest levels of 6PPD and 6PPD-q out of all the demographic groups in the study.[17] One predicted route of exposure to these chemicals is inhalation of particulates, with the highest potential for exposure occurring near traffic (see Figure 2). Ingestion and incidental contact with rubber products or dust may be other sources of exposure to the chemicals.[42] 6PPD and 6PPD-q are present in tire crumb rubber, and these compounds have been identified in the bioaccessible fraction after extraction of crumb rubber with simulated gastrointestinal fluid, implying they may be absorbed after ingestion.[43] The risk of 6PPD and 6PPD-q to people who consume high levels of aquatic species has yet to be characterized. There are limited studies on the bioaccumulative properties of 6PPD and 6PPD-q. Fang and colleagues suggest that 6PPD and 6PPD-q may bioaccumulate in the livers of lab mice[40]; however, additional information regarding absorption, distribution, metabolism, and excretion by the exposed mice is needed to draw this conclusion. Contaminated sources for drinking water could potentially result in exposure depending on the source water and treatment method. Research is ongoing to address this question. Johannessen and colleagues reported negative findings in treated drinking water from two Canadian facilities.[44] No test results for U.S. drinking waters have been reported.

Environmental Justice and Tribal Government Considerations

The extent of 6PPD and 6PPD-q impacts on vulnerable populations and overburdened communities will be determined as knowledge advances. Communities near roadways are disproportionally comprised lower-income people and people of color, making the potential impacts of airborne 6PPD and 6PPD-q on these communities a notable environmental justice concern.[45,46] Environmental justice considerations include but are not limited to food safety of fish consumption, drinking and recreational water safety, use of recycled rubber products, traffic proximity and air particulate matter exposure, socioeconomic impacts to subsistence and commercial fishers, and cumulative impacts.

Salmonid mortality, which can be caused by 6PPD-q, other toxic chemicals, climate change, habitat loss, and additional factors,[18] disproportionately impacts tribal nations in North America by threatening tribal treaty rights, access to traditional foods, and the cultural and economic well-being of Indigenous peoples. Fishing rights for many tribal nations are guaranteed by treaties that have been signed, ratified, and reaffirmed by the U.S. government. Concerns for tribal nations around 6PPD-q include impaired salmon recovery and hatchery efforts, sublethal impacts to fishes, reduced ecosystem resilience, and cumulative impacts to fishes and peoples.

Fate and Transport

Stormwater is the primary transport mechanism for 6PPD-q to surface water. TWPs are generated as tires roll across the road, particularly during acceleration, braking, and turning. These particles, and the chemicals they contain, collect in road dust until stormwater transports them into the aquatic environment. In many cities in the United States, stormwater is diverted to wastewater treatment plants (WWTPs) through combined sewer and stormwater systems. Studies investigating 6PPD-q removal in WWTPs' have had mixed results. Several studies showed a strong reduction or removal of 6PPD-q to nondetect levels,[10,47,48] and another study showed an increase in mass in the effluent from the WWTP.[49] More research is needed to follow up on this. The presence of 6PPD and 6PPD-q in biosolids from WWTP remains a data gap.

The levels of 6PPD-q are highest during or following rain or snowmelt runoff[8,47] and have been measured in U.S. surface waters at concentrations above the LC_{50} values (see Table 1) for coho, brook trout, and potentially rainbow trout.[1,2] The levels of 6PPD-q in the water column can stay elevated for days[6,8]; the duration depends on the frequency of inputs, the site, and the characteristics of the receiving water. Fate and transport of the chemicals in estuaries and saltwater has not yet been characterized. 6PPD-q is expected to sorb to sediment or particles[18,50] and has been measured in sediment in China.[15] Additionally, TWPs may be airborne initially and could be transported long distances. The chemical and physical properties of 6PPD-q in the atmosphere are currently unknown. Notably, 6PPD-q has been measured in particulate matter, including in airborne particles less than 2.5 µm ($PM_{2.5}$),[14,51,52] road dust,[12,53] and household dust.[12] The highest detections and concentration ranges measured in various environmental media are provided in Table 2).Table 2Table 2. 6PPD-quinone concentrations measured in roadway runoff, surface water, sediment, and particulate matter-2.5.

Media	Concentration Range	Notes	References
Roadway runoff	ND – 2.43 µg/L	Highest detection was in China by Cao et al.	2,6,9,10,54
Surface water	ND – 2.8 µg/L*	Highest detection was in the Don River in Toronto, Canada, roughly 35× higher than median coho LC_{50}. Loading generally correlates with the amount of rainfall.	2,7,8,54–56
Sediment	ND – 18.2 ng/g	Highest in urban river sediment, present in deep sea sediment in China.	15
Particulate matter (up to $PM_{2.5}$)	0.1 – 7,250 pg/m^3	Highest detection alongside a road in Guangzhou, China.	14,51,52

*Median LC_{50} for coho (0.08 µg/L), brook trout (0.59 µg/L), and rainbow trout (1.0 µg/L) (see Table 1).
Notes: µg/L = microgram per liter, ng/g = nanogram per gram dry weight, ND = nondetect, pg/m^3 = picogram per cubic meter

Monitoring and Analytical Methods

Monitoring for 6PPD and 6PPD-q in air, soil, surfaces, and water is challenging because environmentally relevant concentrations may be low and presence may be intermittent. Sampling studies indicate that 6PPD-q is detected at higher concentrations during or following rain and snowmelt events that occur following an extended dry period.[8,56] The rate of transport of stormwater and exposure to aquatic life increase with percent impervious surface within a watershed.[8,56] Studies have shown that 6PPD-q can persist for days in urban areas during or following storm events.[8,57] Efforts are underway by the state of Washington to evaluate passive sampling technologies and effectiveness.

The U.S. Environmental Protection Agency is developing a 6PPD-q test method for surface water and stormwater that is projected to be available late in 2023. *Standard Operating Procedure (SOP): Extraction and Analysis of 6PPD-q* (Mel730136, Version 1.2)[58] contains procedures for the extraction and the qualitative and quantitative analysis of 6PPD-q by triple quadrupole mass spectrometry. The standard operating procedure recommends the sample collection, preservation, storage, and holding times. In addition, several commercial and research laboratories can test for 6PPD-q in water.

Other media. Standardized methods are currently in development for sediment and biological tissues. 6PPD-q has been measured in the air by academic researchers,[14,51,52] but there is not a verified method for regulatory testing.

Stormwater Best Management Practices

Stormwater research is focused on determining the effectiveness of existing and new BMPs at 6PPD-q removal, modifying stormwater systems to improve 6PPD-q removal, adding BMP retrofits to urban roadways that lack adequate space for green infrastructure, and refining green stormwater infrastructure to maximize 6PPD-q filtration.

Effective Stormwater Mitigation Technologies. A recent Washington State publication[59] evaluated stormwater BMP treatment mechanisms and rated their expected 6PPD and 6PPD-q removal effectiveness. Several source control, flow control, and runoff treatment stormwater control measures were found to be potentially effective solutions. Washington State is funding research to verify the efficacy of these BMPs and stormwater control measures.

Researchers have demonstrated that running stormwater through the bioretention soil mix (stormwater compost and sand) that is designed as a component of a bioretention system (Figure 3) prevents acute mortality in coho.[60,61] Research to optimize the depth and composition of the bioretention soil mix to maximize the effectiveness and longevity of the system is ongoing. Additionally, different media are being tested to reduce potential nutrient leaching from bioretention BMPs. Preliminary results of a study representing an accelerated timeline of 10 water years by passing water contaminated with 6PPD-q through a laboratory-managed bioretention soil mix shows prevention of coho mortality over the 18-month study period; the results of this study are being prepared by McIntyre and colleagues.

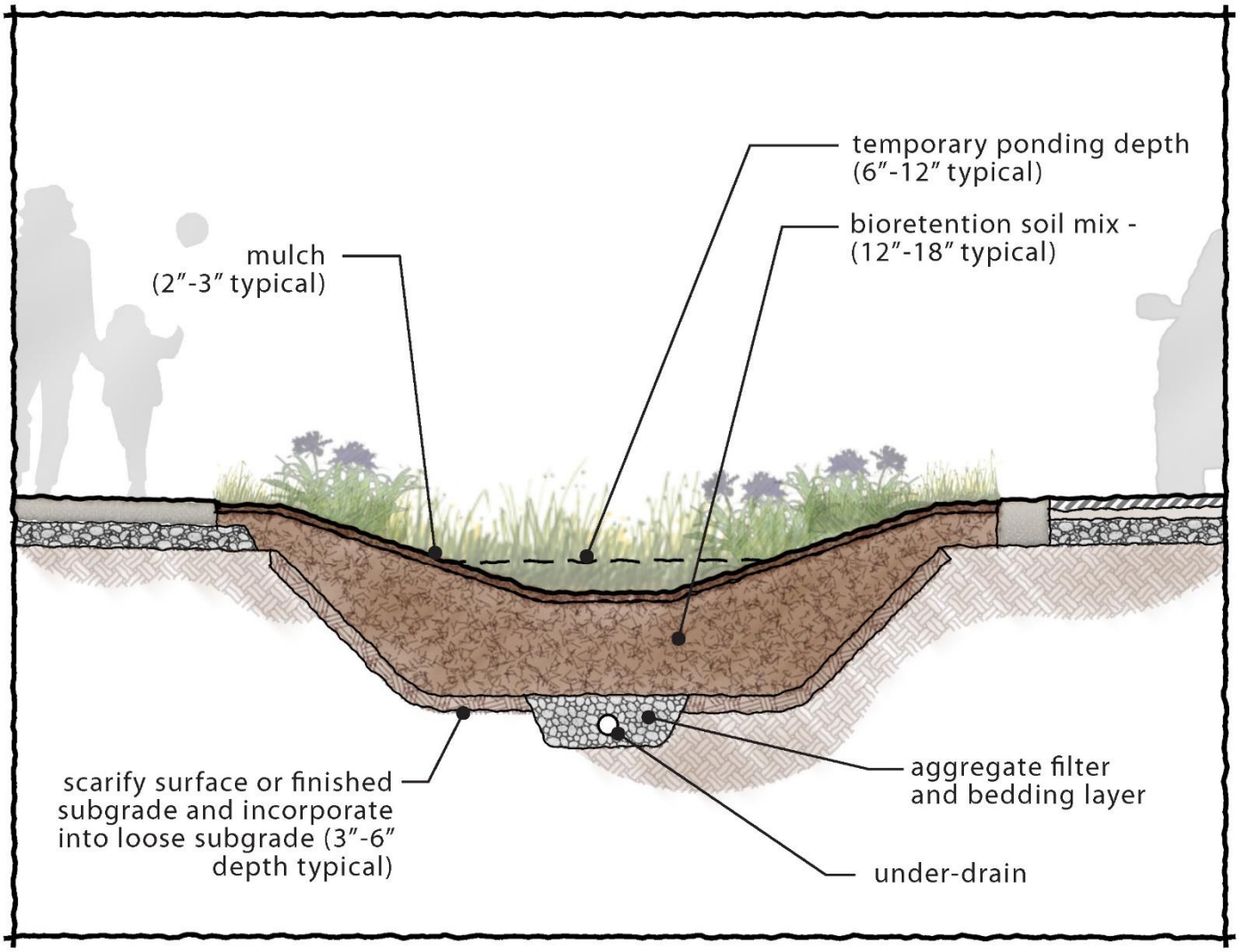


Figure 3. Typical bioretention system with design features. Current research is focused on optimizing the depth and composition of the bioretention soil mix. Courtesy of AHBL, Inc.

Researchers are also using compost-amended biofiltration swales comprising topsoil, compost, and vegetation (Figure 4) to determine the effectiveness of biofiltration systems alongside roadways; the results of this study are being prepared by Tian and colleagues. Preliminary results of the study show variability in compost-amended biofiltration swales performance across seasonal and storm specific parameters, with an efficiency of up to 80+% removal of 6PPD-q.

Identifying Vulnerable Aquatic Areas. Washington State is developing strategies to focus sampling and stormwater mitigation efforts in locations where 6PPD-q is having a critical environmental impact. The development of these strategies is based on collaboration with tribal governments, community engagement, and available GIS mapping tools containing parameters that are assumed to influence concentrations of 6PPD-q in surface waters.

Figure 4. Example of a compost-amended biofiltration swale. Stormwater is filtered as it flows along the grass in the swale and infiltrates into the topsoil and compost. Photo: Washington State Department of Transportation.

Factors used to identify these areas include, but are not limited to, level of traffic, impervious surfaces, precipitation, media composition that stormwater travels through to get to receiving water, size of the receiving water, and the presence of sensitive species.

Other ongoing research includes the effectiveness of permeable pavement to capture tire particles, analysis of different compost medias and biochar to determine the effectiveness of organic matter in bioretention systems, and evaluation of existing street-sweeping technologies and practices (timing and frequency) on removal of 6PPD and 6PPD-q from roadways.

Alternatives to the Use of 6PPD in Tires

Identifying and deploying alternatives to 6PPD in tires can ultimately reduce or eliminate 6PPD-q in the environment. Currently, 6PPD is necessary for tire safety and to extend the life of tires by preventing cracking and degradation caused by ozone. Discussions with tire manufacturers have revealed that an anti-degradant is not currently available to replace 6PPD. Tires are complex products with tire safety as a principal design priority, and a fully functional anti-degradant is a necessity. Research is ongoing to identify safer alternative chemicals that provide the functionality of 6PPD in tires.[62] Due to the complexity of identifying, testing, and implementing a suitable alternative to 6PPD, the U.S. Tire Manufacturers Association cannot estimate the time frame for the replacement at this stage of the process. The states of California and Washington are pursuing policies to promote the advancement of alternatives to 6PPD in tires.

State Policies and Regulations

Washington State is developing a statewide action plan, funding research to fill in data gaps, assessing other potential tire anti-degradants, and developing specific data requirements and standards to assess the hazards of the alternatives. Technical Memo: Assessment of Potential Hazards of 6PPD and Alternatives[63] provides an overview of known toxicological hazards of chemicals that are or have been used as anti-degradants in tires. Washington State is currently developing hazard criteria to define "safer" when looking at alternatives to 6PPD. There is currently no estimated timeline for completion of the action plan or alternatives assessment. The Safer Products for Washington program, which aims to reduce toxic chemicals in consumer products, identified 6PPD as a priority chemical. Washington and California supported

the Collaborative Innovation Forum: Functional substitutes to 6PPD in tires to develop a road map for identifying safer alternatives to 6PPD.[62]

California's Department of Toxic Substances Control will begin regulating 6PPD in motor vehicles through the Safer Consumer Products Program on October 1, 2023. These regulations require tire manufacturers to analyze the hazards and adverse environmental impacts of potential alternatives to 6PPD, as well as evaluate the benefits and tradeoffs of replacing 6PPD. This process leverages the technical expertise of the tire manufacturers and enables them to meet vehicle safety and consumer product safety requirements, while providing a rigorous, transparent, and scientific framework to evaluate and compare potential alternatives to 6PPD. The tire manufacturers' initial screening of potential alternatives is due on March 29, 2024.

6PPD is on Minnesota's Toxic Free Kids Act Chemicals of High Concern List,[64] and the state's legislature appropriated nearly half a million dollars for research on 6PPD-q and its effect on state fishes.[65] Maine also includes 6PPD on its Chemicals of Concern list.[66]

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This fact sheet incorporates data through July 2023.

The **Interstate Technology and Regulatory Council** (ITRC) is a state-led environmental coalition working to create innovative solutions and best management practices. ITRC produces documents and training that broaden and deepen technical knowledge and expedite quality regulatory decision-making while protecting human health and the environment. In January 2023, ITRC started the Tire Anti-degradants (6PPD) Team to provide guidance documents and tools on 6PPD and 6PPD-quinone for environmental officials.

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Attachment 3

Illicit Dishcarge Detection and Elimination												
Date	**Location**	**Material**	**Source**	**Complainant**	**Reporting Party**	**Phone**	**DEQ Report To**	**Report Date**	**Investigation Date**	**Business Days**	**Action Required**	**Comments**
1/4/2023	93114 Hwy 99, Junction City	motor oil	Island Fence	Anonymous	Lane County		N/A	N/A	1/4/2023	1	None. The responsible party is completing cleanup.	ODOT was notified by Lane County of an illicit discharge report at a business on Hwy 99. ODOT maintnenace staff investigated the site of the complaint and noted an oily substance in the ditch. ODOT staff contacted the nearby business and were told there was an accidental spill. ODOT maintenance worked with Hazmat and the business to complete cleanup of the affected area. The substance did not leave the ditch.
1/9/2023	Hwy 18 bridge McMinnville	trash	unhoused camp	[redacted]	Complainant	[redacted]	N/A	N/A	1/11/2023	2	None. OSP is coordinating cleanup.	ODOT received a call from a property owner indicating a camp of unhoused individuals in ODOT right of way was throwing trash over his fence and into the Yamhill River. ODOT maintenance staff investigated the site of the complaint and found it to be over 100 yards from the river. ODOT and OSP are coordinating removal and cleanup.
1/26/2023	Willamette River, West Linn	styrofoam	Unknown	Unknown	DEQ	[redacted]	[redacted]	1/26/2023	1/26/2023	1	None.	ODOT was notified by DEQ that there had been three complaints of styrofoam floating downriver of the Abernathy Bridge construction project. The environmnetal coordinator for the project completed an inspection of the site of the complaint and determined that the foam is generated from further up river and not project related. Reported findings to DEQ.
3/16/2023	North of Q-Street Floodway, near Hwy 126 Springfield	trash	illegal dumping	[redacted]	City of Springfield	[redacted]	N/A	N/A	N/A	N/A	None. Maintenance scheduled cleanup.	The City of Springfield contacted ODOT regarding illegal dumping in ODOT right of way. ODOT maintenance staff were notified and cleanup was scheduled for the following week. This is not regarding a discharge and did not affect drainage.
5/22/2023	City of Corvallis, Hwy 20/Philomath Blvd west of SW 53rd	oil	accident resultnig in spill	[redacted]	DEQ	[redacted]	[redacted]	5/23/2023	5/23/2023	1	None.	ODOT was notified that material from the spill made it to ODOT-owned catch basins. Maintenance staff went to the site and completed cleanup. Reported back to DEQ.

6/11/2023	150 yards North of the Bryant Street Walking Bridge on the East side of I-5	Fire	Illegal camping	[redacted]	Complainant	[redacted]	N/A	6/11/2023	6/12/2023	1	None.	Not an illicit discharge comlaint. Referred the complaint to PDX Reporter and emailed the complainant to let them know to follow up there if they have further questions or concerns
6/30/2023	SE Rhone between SE 16th and SE 17th	possible sewage	RV	[redacted]	Complainant	[redacted]	N/A	6/30/2023	6/30/2023	1	None.	Referred the complainant to PDX Reporter, RV is not in ODOT jurisdiction.
7/27/2023	2115 Pacific Blvd SE	shop drain	car wash	[redacted]	City of Albany	[redacted]	N/A	7/27/2023	7/28/2023	1	None.	AskODOT received a question from City of Albany employee about potential connection to ODOT system. ODOT staff checked with district permit staff and confirmed that no permit record for this area exists. Communicated that result to the City as well as jurisdictional limitations on 8/2.
9/7/2023	rain garden on Front Street by the on ramp for Marion Bridge	heavy vegetation clearing	ODOT maintenance	[redacted]	ODOT	[redacted]	N/A	9/7/2023	9/8/2023	1	None.	ODOT staff was notified of a complaint regarding maintenance of a rain garden in Salem. After an investigation into jurisdiction and discussions with maintenance about their activities in that area, it was determined that the work that was the subject of the complaint was not done by ODOT maintenance, but rather coordinated through AIC in relation to illegal camp cleanup. It was also determined that the facility in question was not an ODOT asset. That information was provided to the complainant on 9/13.
10/30/2023	Applegate and HWY 20 in Philomath	sediment is entering storm drains	Construction	[redacted]	DEQ	[redacted]	N/A	10/30/2023	10/30/2023	1	None.	Referred DEQ to the PE and copied Erosion & Sediment Control Program Lead as this is an active construction project. PE responded to DEQ on 10/30.
11/7/2023	City Road and Highway 101	Concentrated city and state storm-water	Runoff from Ebb Ave and HWY 101	[redacted]	DEQ	[redacted]	N/A	11/7/2023	11/8/2023	1	None.	DEQ notified ODOT that a complaint was received in their office, which they responded to and considered resolved. DEQ asked for information about stormwater assets in the area, ODOT provided that information on 11/8/2023.

11/13/2023	Under a Randy Pape Beltline onramp near the intersection of Delta Hwy and Green Acres Road	Garbage	Illegal camping	[redacted]	Citizen	[redacted]	N/A	11/13/2023	11/13/2023	1	None.	Citizen complaint received by ODOT staff via email. The message was provided to the maintenance district manager for follow up. The district placed the site on their list for cleanup.
11/13/2023	214 MP 38 at Cougar Road	Material in ditch	Construction	[redacted]	ODOT	[redacted]	N/A	11/13/2023	11/15/2023	2	None.	ODOT staff was notified of an erosion and potential slide concern about construction activities occuring on private property adjacent to ODOT's right of way causing safety and sediment concerns. ODOT contacted DEQ on 11/15 to report the concern and discuss potential solutions. DEQ looped in Marion County. ODOT and Marion County met on December 7 to discuss jurisdictional issues and potentional solutions. ODOT does not have jurisdictional authority to address activities adjancent to the right of way. Marion County and/or DEQ are the jurisdictional authorities. No further action is possible for ODOT.
12/1/2023	Under a Randy Pape Beltline onramp near the intersection of Delta Hwy and Green Acres Road	Garbage	Illegal camping	[redacted]	Citizen	[redacted]	N/A	12/1/2023	12/1/2023	0	None.	Citizen complaint was received via email regarding the same site in the 11/13/2032 complaint. ODOT staff followed up with the maintenance district, who indicated that the site was on their list and they would address it as soon as possible. This information was relayed to the complainant on 12/1/2023.
12/13/2023	OR99, Dundee near Duck Pond Cellars	Plugged culvert	Unknown	[redacted]	Citizen	[redacted]	N/A	12/13/2023	12/13/2023	0	None.	ODOT received a call from a citizen indicating a culvert on Highway 99 was plugged and flooding the road. ODOT maintenance staff were notified and dispacted to the area. A large rock was removed to allow waterflow through the culvert.

Attachment 4

TOCS Hazmat Involved Attributes - December 2023,November 2023,October 2023,September

Event ID	Highway	Event From MP No	GIS Latitude	GIS Longitude	Month	Hazmat Involved - Chemical	Hazmat Involved - Food Product	Hazmat Involved - Fuel	Hazmat Involved - Oil	Hazmat Involved - Other Material	Highway Ditch	Waterway Affected
23T000245	THE DALLES-CALIFORNIA	80.0000	44.75972	-120.98576	January 2023			1			1	
23T001509	THE DALLES-CALIFORNIA	174.0100	43.59382	-121.56640	January 2023			1			1	
23T009203	THE DALLES-CALIFORNIA	72.0000	44.85408	-120.92652	February 2023				1			1
23T009995	SANTIAM	34.0000	44.40762	-122.60555	February 2023			1			1	
23T018864	OLD OREGON TRAIL	332.0000	44.53334	-117.40937	March 2023			1			1	
23T028439	LAKE OF THE WOODS	21.5000	42.39140	-122.48392	April 2023			1			1	
23T031708	FLORENCE-EUGENE	52.5000	44.05394	-123.23668	April 2023				1		1	
23T031833	NORTH SANTIAM	48.5000	44.72989	-122.17613	April 2023			1			1	
23T037901	JOHN DAY-BURNS	57.0000	43.74809	-119.00218	May 2023				1		1	
23T048368	OREGON COAST	28.0000	45.90867	-123.95138	June 2023			1			1	
23T048413	PACIFIC HIGHWAY WEST	34.5000	45.23520	-123.15138	June 2023			1			1	
23T048642	OREGON COAST	28.0000	45.90867	-123.95138	June 2023			1			1	
23T056827	PACIFIC	68.1000	42.58779	-123.38822	July 2023				1		1	
23T059300		.0000			July 2023					1		1
23T059755	COLUMBIA RIVER	137.0000	45.71863	-120.22244	July 2023			1				1
23T068037	OLD OREGON TRAIL	324.0000	44.62372	-117.50562	August 2023			1			1	
23T069174	OLD OREGON TRAIL	259.0000	45.34631	-118.12603	August 2023			1				1
23T078781	OREGON COAST	.0000	46.23485	-123.87186	September 2023			1				1
23T087423	WILLAMETTE	13.0000	43.90790	-122.78284	October 2023			1			1	1
23T087666	COLUMBIA RIVER	100.0000	45.63557	-120.91159	October 2023			1	1	1		1
23T092216	I.O.N.	36.5000	42.90291	-117.32606	November 2023			1			1	
23T095429	OLD OREGON TRAIL	226.0000	45.58759	-118.56517	November 2023			1			1	
23T101708	PENDLETON-COLD SPRINGS	23.5000	45.77402	-118.80749	December 2023			1			1	

Attachment 5

HAZARDOUS MATERIALS AND CUSTODIAL CHEMICALS USED IN FACILITIES

Short-Run Goals

1. Continue to track the amount of hazardous waste generated at each maintenance yard and truck shop, with the goal of maintaining conditionally exempt status under federal laws.

Performance Measure:

1. Track the amount of hazardous waste generated at each maintenance yard and truck shop.

In 2023 all Maintenance yards were classified as Very Small Hazardous Waste Generators.

Hazardous waste generated by Maintenance crews and equipment shops (combined statewide)

- **2021: 0.92 tons**
- **2023: 0.54 tons**

Very Small Hazardous Waste Generators is the lowest category of hazardous waste generator. Generator status is determined by the amount of hazardous waste created each month in a calendar year and the amount of hazardous waste that is stored onsite.

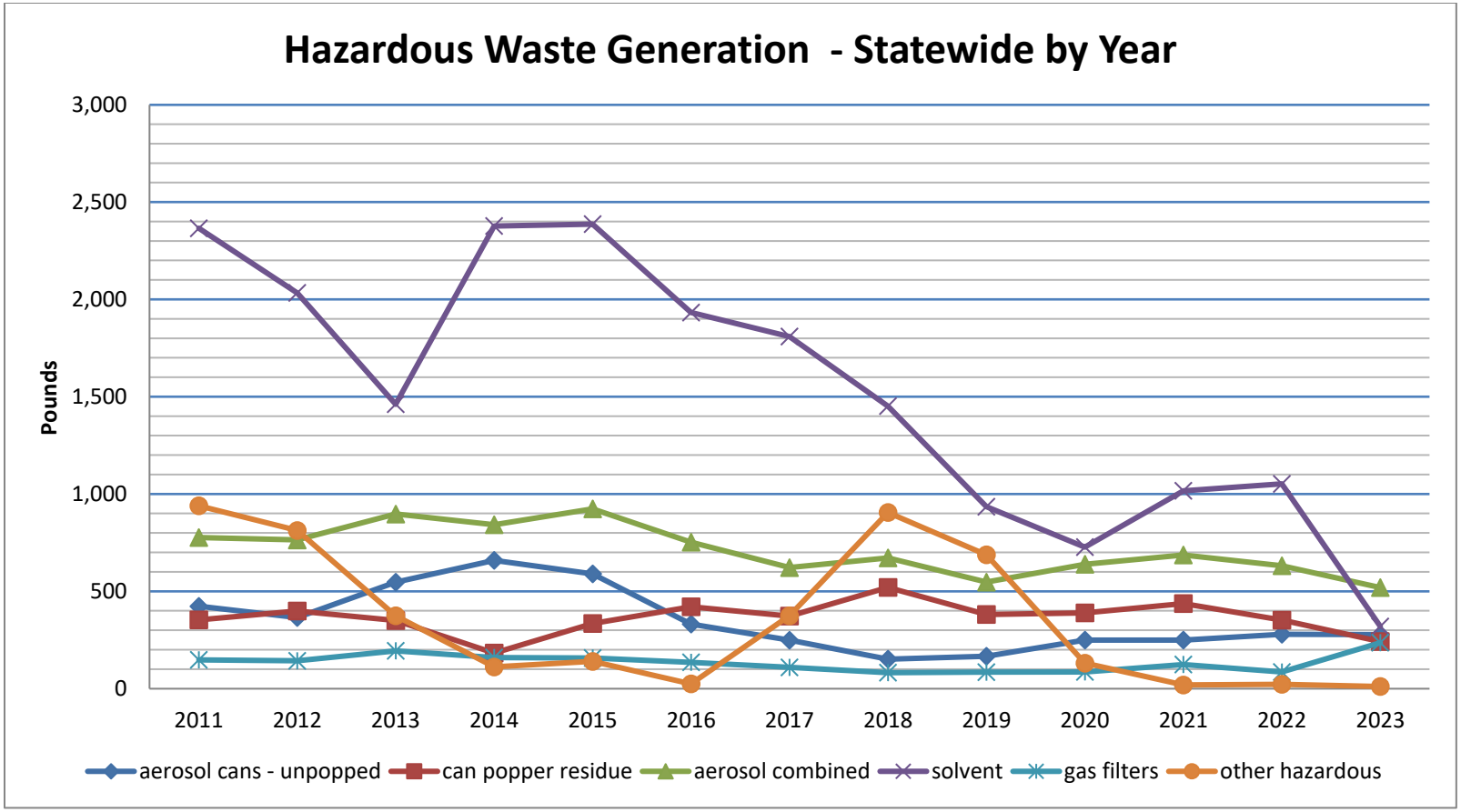
Information on hazardous waste generation is tracked by the crews and compiled biannually by the Maintenance and Operation Branch. Hazardous waste generation is tracked at 98 maintenance facilities.

Hazardous waste generation by Maintenance and Fleet through routine activities is minimal. Aerosol cans, solvents, and unleaded fuel filters are the most common hazardous wastes. The 'other hazardous' category includes wastes that are generated infrequently such as can popper filters and episodic events such as the disposal of unwanted/unusable materials.

In some cases, hazardous waste generation is influenced by issues outside the control of Maintenance. For example, heavy winter weather may increase the need for equipment maintenance increasing solvent usage and filter changes. Hazardous waste may also be created by spills, cleanup activities, and structure maintenance. Hazardous waste generation may appear to increase as Maintenance and Fleet employees become proficient at tracking and reporting.

Waste Generation by District: January - December 2023

		Hazardous Waste (pounds)					
		aerosol cans	**can popper residue**	**solvent**	**unleaded fuel filters**	**other hazardous**	**TOTAL**
R1	2B	34	20	90	25	0	**168**
	2C	8	25	118	0	0	**150**
R2	1	12	18	0	81	0	**111**
	3	10	8	112	0	0	**129**
	4	14	6	0	0	0	**20**
	5	12	13	0	0	0	**25**
R3	7	0	4	0	3	0	**6**
	8	54	2	0	38	0	**94**
R4	9	23	13	0	5	0	**41**
	10	11	21	0	0	0	**32**
	11	58	41	0	56	0	**155**
R5	12	11	12	0	0	0	**23**
	13	18	8	0	5	0	**32**
	14	14	52	0	24	11	**101**
TOTAL		278	242	320	236	11	1,086
(tons)		0.14	0.12	0.16	0.12	0.01	0.54



	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
aerosol cans-unpopped	423	365	547	659	589	332	249	152	166	250	249	279	278
can popper residue	353	399	350	183	335	421	373	520	381	389	437	352	242
aerosol combined	*777*	*764*	*897*	*842*	*924*	*752*	*622*	*672*	*547*	*639*	*687*	*632*	*520*
solvent	2,366	2,033	1,461	2,377	2,387	1,933	1,809	1,452	934	727	1,017	1,052	320
gas filters	148	143	194	160	158	135	109	82	85	86	124	85	236
other hazardous	939	813	374	111	140	24	375	905	688	131	19	22	11
pounds	**4,229**	**3,753**	**2,926**	**3,491**	**3,609**	**2,845**	**2,914**	**3,110**	**2,254**	**1,582**	**1,846**	**1,791**	**1,086**
tons	2.11	1.88	1.46	1.75	1.80	1.42	1.46	1.56	1.13	0.79	0.92	0.90	0.54

Attachment 6

Oregon Department of Transportation
Amended Winter Maintenance
Annual Report

Prepared by:
ODOT Maintenance and Operations Branch

Date:
June 2024

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Introduction

ODOT's winter maintenance program is continuously evolving as new technology, strategies and best management practices (BMPs) are evaluated and incorporated into ODOT's winter maintenance operations. Adaptive management allows program changes based on new data, research and real-world data and feedback from maintenance crews. ODOT participates in several winter maintenance research and peer groups dedicated to exchanging information and lessons learned, with a focus on performance and sustainability.

This report highlights ODOT's winter maintenance activities for the 2023-2024 winter season, and also satisfies various reporting commitments.

House Bill 2017 Implementation Status

Background

In 2017 the Legislature required ODOT to "develop a winter maintenance strategy that includes the use of solid salt or similar solid deicer, and consider environmental impacts." The Oregon Transportation Commission approved the strategy in December of 2017.

The Strategy outlines various winter maintenance materials and equipment as part of a "toolbox approach," which is a concept of using the right tool in the right place at the right time and in the right amount. The strategy includes guiding principles such as phasing the expansion of salt use areas, initially focusing on interstates and freeways and implementing winter maintenance best management practices that reflect ODOTs commitment to highway safety, cost effective use of materials/equipment/labor, and minimization of environmental impacts. ODOT's Winter Maintenance Strategy is available upon request. Since approval, there have not been any significant changes or updates to the strategy. Updates regarding salt use are included throughout this report.

Deicer Storage

2023 numbers: ODOT has established 105 liquid deicer and 29 solid salt storage locations, with statewide total storage capacities of 2.2 million gallons and 21,598 tons, respectively. ODOT has also established agreements to utilize one salt shed in California, owned by California Department of Transportation and one salt shed in Washington, owned by the Washington State Department of Transportation. Several maintenance sections along I-5 continue to store bulk salt in large 2,500-pound bags, which enable those sections to manage isolated trouble spots. As needed, ODOT adds liquid and solid storage capacity based on available capital improvement funds and operational analysis and prioritization performed by Maintenance Districts.

All deicer storage locations follow BMPs that minimize the risk of spills and migration out of storage and loading areas. The deicer storage BMPs can be found in the ODOT Environmental Management System (EMS) Manual. A list of all deicer storage locations is provided as Attachment A.

Crews reported safety concerns regarding the "loading under cover" BMP. Loading inside the first-generation salt sheds requires operators to back the 10-yard dump truck into the shed to load and unload to remain in compliance with the BMP. Conducting all salt handling activities in accordance with the BMP minimizes the risk of salt contamination at the salt shed sites; the MOB does not plan to modify the BMP, and all new second generation salt sheds are designed so that trucks do not need to back into the salt shed to be loaded.

Material Use and Tracking

ODOT continues to use liquid deicer in support of a proactive anti-icing strategy, which remains the most cost effective strategy in terms of achieving level of service goals faster with less effort and less winter maintenance material. Solid salt is most effective when applied during or after a storm, depending on pavement, traffic, and weather conditions. Under specific conditions, salt can also be effective at low application rates to anti-ice when magnesium chloride would be at risk to diluting and freezing.

Although maintenance crews apply liquid magnesium chloride deicer on all ODOT highways, salt use remains restricted in accordance with ODOT's Winter Maintenance Strategy. Some Districts within the salt use areas requested to expand salt use to secondary highways where crews were experiencing operational challenges switching between products and/or addressing trouble spots where liquid deicer is not cost effective to use. Requests that were approved by the State Maintenance and Operations Engineer are included on the list and map of approved salt application areas, provided as Attachment B.

Districts continued to experience good results when using salt to manage conditions where liquid deicer would not be cost effective, such as freezing rain, freezing fog, and to prevent and break up snow pack during snowstorms. As with previous years, the typical application rates range between 100-200 pounds per lane mile, with applications of up to 300 pounds per lane mile to treat specific pavement conditions. These application rates remain well below other state DOT salt application rates. ODOT and other state DOT annual winter maintenance material totals can be found on the Clear Roads Annual Survey of State Winter Maintenance Data. Based on the Clear Roads Survey results, ODOT's annual salt use remains amongst the lowest in the country. Winter maintenance material use for the 2023-2024 season was above the 5 year running average for all three materials as shown in Figure 1. Oregon experienced several Willamette Valley snow events, and Regions 4 and 5 experienced a very active winter, which accounts for the increase deicer use compared to previous seasons.

	Liquid Magnesium Chloride (gallons)	Solid Salt (tons)	Abrasives (cubic yards)
2019-2020	3,641,911	7,560	140,912
2020-2021	3,937,102	7,363	141,981
2021-2022	3,867,122	7,398	137,089
2022-2023	5,387,773	10,110	195,481
2023-2024	2,190,386*	8,950	106,488*
5 Year Average	3,804,858	8,276	144,390

Figure 1. Winter Maintenance Material Applied 2019 - 2024

*Did not receive District 8 amounts

Equipment

ODOT continues to purchase salt application equipment and make necessary modifications to existing trucks to apply salt in a more effective and efficient manner. New spreaders with pre-wet kits, combination spreaders (holds large quantities of both liquid and solid material), single and dual auger spreaders (allow for accurate and low salt application rates), stainless steel spreader boxes (resistant to salt corrosion), and tow plows (maximizes staffing resources).

In 2021, ODOT initiated a contract with GoFleet Corporation to provide an Automated Vehicle Location (AVL)/Telematics solution, which allows ODOT to automatically track truck activities such as where snow plowing and winter maintenance material application occurs. As of the writing of this report, approximately 134 AVL only and 184 full telematics solutions have been installed in heavy fleet across the state. The program has also expanded to include GPS/AVL for most light fleet. More than 1,423 vehicles have AVL/GPS installed statewide with approximately 993 installed in light fleet. ODOT is in the process of implementing the third phase of the project, which focuses on installing in the remainder of heavy fleet over the next biennium.

In 2022, the ODOT Calibration Guide was revised to include calibration and validation instructions for the new spreader controllers and AVL/Telematics system being delivered in new plow trucks.

Training

In the fall of 2023, ODOT held 3 sessions where 77 maintenance staff were trained in a variety of topics and BMPs related to the application of winter maintenance materials for winter maintenance.

ODOT hosted the 2023 Pacific Northwest Snowfighters Conference in Portland in June 2023. The conference provided ODOT winter maintenance managers and operators opportunities to attend educational sessions and to network and learn from winter maintenance professionals from around the country.

Crash and Mobility Data

ODOT continues to be interested in evaluating crash and mobility data to assess the effectiveness of our strategies. As formal data specific to areas where salt is being applied becomes available when new tracking tools become operational, ODOT anticipates being able to validate the effectiveness of specific strategies.

Sustainability

ODOT conducted a pilot with a salt brine maker during the 2023-24 winter in District 2B. Salt brine makers have the potential to reduce the cost of purchasing liquid deicer and may also reduce the overall amount of solid salt that is applied in areas of the state where solid salt is used. The full Salt Brine Pilot Plan and final report are in Attachment C.

As mentioned earlier in this report, new electronic spreader controller calibration guides were developed to ensure trucks applying winter maintenance materials are properly calibrated. Calibration is a critical step in the management of winter maintenance material applications by ensuring materials are used appropriately, which minimizes the cost and impacts associated with material use.

Lessons Learned

New lessons learned are shared during annual statewide training and during after action storm reviews. Guidelines, equipment, shed designs, and other program elements are reviewed and modified as needed to improve outcomes.

- Because salt use remains limited to certain highways, crews are required to switch between products transitioning between highway sections where salt use is not allowed. Switching between solid products (solid salt and abrasives) can be operationally challenging and time consuming. ODOT continues to work on strategies that minimize operational impacts by evaluating where salt can and should be used, and purchasing equipment that can mitigate operational impacts.
- With AVL/Telematics becoming operational, ODOT will need to implement processes for analyzing data that Districts can use to improve operations. A current gap in ODOT's analysis toolbox continues to be a lack of a winter storm severity index (WSSI) that normalizes storm data which will assist with assessing and identifying material use and performance trends over time.
- Some maintenance crews with the first generation salt shed designs have reported concerns regarding the BMP that requires salt loading under cover. Operators are required to back equipment into the salt sheds to load, which some believe to be a hazardous activity. Loading inside the salt shed minimizes the risk of long term contamination of the site, so the MOB has determined the BMP will not be modified.
- Crews that are storing bulk bagged salt in 1-ton totes are finding that long term storage is challenging. The salt begins to clump, requiring operators to find ways to break-up the clumps while loading, and the straps of the bags are becoming weak and are prone to breaking when

being lifted. The MOB will be recommending to maintenance crews to begin phasing out the use of this method of storing salt.

Research

ODOT is involved in the Clear Roads pooled fund research committee, which funds national winter maintenance research projects and is currently supporting research into various application techniques to better manage material use and improve application effectiveness. ODOT currently sits on several committees that are developing research, synthesis, and trainings.

- CR 21-04 Training Module Development for Evaluation of Storm Severity Indices and Winter Severity Indices Variables
- CR 21-01 Chloride Migration Through Soils
- CR 21-03 Efficacy, Cost, and Impacts of Non-Chloride Deicers
- CR 22-01 Comprehensive Guide to Pre-Wetting Application Rates and Methods

ODOT participated in a research project for NCHRP with a cohort of multiple other state DOTs. The purpose of the project was to develop winter maintenance performance measures within the state. The research highlighted the data that ODOT currently collects and gaps within the aggregation of data to observe winter maintenance. This research has provided future steps to include the data ODOT is already collecting and refocus it on winter maintenance to meet performance measure goals.

ODFW and DEQ

While DEQ and ODFW have in the past expressed concerns about the addition of solid salt to ODOTs winter maintenance toolbox, no new concerns were discussed during the reporting period.

Program Updates

ODOT continues to plan and build salt storage capacity as outlined by the Winter Maintenance Strategy presented to the Oregon Transportation Commission in December of 2017, track winter maintenance material use, provide up to date and relevant training to staff and managers, and investigate ways to evaluate and improve performance. Before the next winter season, the Maintenance & Operations branch plans to re-evaluate and update the Winter Maintenance Strategy to ensure it aligns with new budget realities and possible revisions to ODOT's Winter Level of Service Goals. It is anticipated updates will include long term salt storage build out planning, updated criteria for selecting highways where salt will be used, and possible salt brine expansion pending the results from the salt brine pilot.

Attachment A

Deicer Storage Locations

Liquid Deicer Storage Locations				
District	**Storage Location**	**Address**	**Total Capacity (gal)**	**District Total (gal)**
1	Clatskanie	21660 Hwy 30	30,000	
1	Deer Island	64185 Columbia River Hwy MP 34	20,000	
1	Humbug	36455 Highway 26	20,000	
1	Manning	48400 NW Sunset Hwy.	30,000	150,000
1	Mist	69281 Hwy 47	10,000	
1	Tillamook	3313 3rd Street	20,000	
1	Warrenton	1960 SE Dolphin Ave.	20,000	
2B	SW Portland MS	9637 SW 35th Dr	60,000	
2B	Sherwood	OR-99W Mp 15.72	5,000	
2B	Wilsonville	I-5 Mp 283.50	25,000	
2B	E Portland MS	5315 NE 101st Ave	50,000	
2B	Powell	I-205 Mp 19.10	30,000	
2B	Milwaukie MS	2440 SE Stubb St	40,000	
2B	Carus	OR-213 Mp 8.14	20,000	390,000
2B	Canemah	OR-99E Mp 14.20	20,000	
2B	N Portland MS	1100 N Columbia Blvd	30,000	
2B	Cornelius Pass	US-30 Mp 13.50	30,000	
2B	Jackson School	US-26 Mp 58.75	10,000	
2B	Campbell Bridge	OR-219 Mp 5.58	10,000	
2B	Fanno-Progress	OR-217 Mp 3.60	60,000	
2C	Barton	18951 SE Bakers Ferry Road Oregon City	15,000	190,000

2C	Cascade Locks	60 NE Forest Lane	40,000	
2C	Estacada	325 SW Second (& Wade) St.	14,000	
2C	Estacada	2125 NW Campus Drive	15,000	
2C	Govt Camp	US 30, Government Camp	36,000	
2C	Parkdale	7285 Hwy 35	40,000	
2C	Sandy	34250 SE Hwy. 26 -- MP 21.60	30,000	
3	Buell (OR Rt. 22, MP 4.64)	Hwy 22, 19.2 Miles West of Salem	10,000	
3	Polk County Fair Grounds	99W, MP 58, at the fairgrounds	17,000	
3	Detroit	600 N. Santiam Hwy.	10,000	
3	McMinnville	1502 N. Highway 99W	10,000	114,000
3	Mehama	Hwy 162, MP 21.7	20,000	
3	Newberg	730 Deskins	10,000	
3	Woodburn	1375 Blaine Street	37,000	
4	Albany	1100 SE Goldfish Farm Rd.	60,000	
4	Corvallis	3700 SW Philomath Hwy.	20,000	
4	Grande Ronde	28795 Salmon River Highway	20,000	130,000
4	Ona Beach	12735 NW Pacific Coast Hwy	10,000	
4	Rose Lodge	109 N. Rush Lane	10,000	
4	Sweet Home	205 Main Street	10,000	
5	Florence	15th St. E and HWY 101	10,000	
5	Glenwood	1920 Henderson Blvd.	60,000	
5	McKenzie Bridge (seasonal)	56377 North Bank Rd.	20,000	130,000
5	Oakridge (seasonal)	47828 Berry St	20,000	
5	Veneta	25171 Luther Way	20,000	
7	Boswell Springs	5443 Eagle Valley Rd.	21,000	
7	Davis Slough	5089 Highway 101 South	21,000	
7	Glendale (I-5 MP 83.29, Barton Rd.)	Glendale (I-5 MP 83.29, Barton Rd.)	21,000	147,000
7	Port Orford	1219 Arizona	21,000	
7	Reedsport	1200 Highway 101	21,000	

7	Shady (Roseburg)	3339 Old Hwy. 99S	21,000	
7	Sutherlin	Exit 135 - South end of Boswell	21,000	
8	Ashland	706 Tolman Creek Rd.	20,000	190,500
8	Cave Junction	202 Caves Hwy	10,000	
8	Central Point	4141 Hamrick Road	26,500	
8	Grants Pass	345 NE Agnes Ave.	25,000	
8	Hugo	Interstate 5, MP 66	10,000	
8	Lemolo (MP 73)	OR Route 138, MP 73	20,000	
8	Prospect	120 Mill Creek Drive	8,000	
8	Siskiyou (Upper Shed)	Interstate 5, Exit 6	30,000	
8	Slide Creek (MP 55)	OR Route 138, MP 55	20,000	
8	Wolf Creek	I-5 MP 75.6	21,000	
9	Arlington	1520 Highway 19	20,000	136,000
9	Condon	406 E. Frazer	10,000	
9	Maupin	MP 43 US 197	20,000	
9	Moro	68708 Hwy. 97	16,000	
9	Rufus (I-84, MP 109)	MP 109 Interstate 84	10,000	
9	Shaniko	US 97, City Limits	20,000	
9	The Dalles	3313 NE Bret Clodfelter Way	20,000	
9	Warm Springs	71739 Highway 216	20,000	
10	Bend	63055 N. Hwy. 97	40,000	160,000
10	Brothers	Hwy 20 MP 42.3	20,000	
10	Madras	201 NE Cherry Lane	20,000	
10	Mitchell	17655 Highway 26	10,000	
10	Prineville	3571 NE 3rd St (Hwy 26)	30,000	
10	Redmond	901 E Hwy 126	20,000	
10	Sisters	16415 HWY 126	20,000	
11	Chemult	11031 North Hwy 97	20,000	146,000
11	LaPine	51591 N Hwy 97	40,000	

11	Adel	20958 Hwy 140	8,000	
11	Alkali Lake	46331 Hwy 395 North	8,000	
11	Chiloquin	606 Chocktoot	10,000	
11	Klamath Falls	2557 Altamont Dr.	20,000	
11	Lake-of-the-Woods	37851 State Hwy 140 W	24,000	
11	Lakeview	1269 South G Street	16,000	
12	Heppner	273 Linden Way Hwy 207 MP 45	13,500	
12	Hermiston	1840 South Highway 395	30,000	
12	Meacham	64462 Old Oregon Trail Road	0	
12	Mission Sand Shed	I-84, Exit 216 (South Side)	32,000	
12	Poverty Flats	I-84, Exit 224	20,000	124,700
12	Spray	Highway 207, MP 93.7	9,200	
12	Spring Creek	I-84 Exit 248 (South Side)	10,000	
12	Ukiah	204 State Street	10,000	
13	Baker City	I-84 Exit 302 (East side)	35,000	
13	Elgin	1800 Division Street	21,000	
13	Enterprise	715 Golf Course Road	17,400	113,400
13	LaGrande	3014 Island Ave.	30,000	
13	Richland	1st and Walnut Street	10,000	
14	Basque	US Route 95, MP 91.48	20,000	
14	Burns	252 South Date	20,000	
14	Canyon City	305 John Day Burns Hwy	20,000	
14	Jordan Valley	701 Bassett Street	20,000	140,000
14	Juntura	5825 Fourth Street	20,000	
14	Ontario	541 Stanton Blvd.	20,000	
14	Vale	1077 Barkley Drive	20,000	
			Total	**2,261,600**

Solid Salt Storage Locations			
District	**Shed location**	**Address**	**Total Capacity (Tons)**
2B	*SW Portland Yard	9637 SW 35th Dr	63
2B	*SW Portland @I-205	205 SB MP 7.5	88
2B	*North Portland	1100 N Columbia	25
2B	Holman (East Portland)	101st and Simpson	750
2B	Fanno-Progress	OR 217 MP 3.60	800
2B	Lawnfield	9200 SE Lawnfield Rd.	600
2C	Cascade Locks	25 Wa Na Pa Street	2,800
3	*Salem	455 Airport Rd SE	75
4	Albany	1130 Goldfish Rd SE	1,200
5	*Springfield/Glenwood	1901 Henderson Ave	97.5
5	Coburg	I-5 Exit 199	900
7	Myrtle Creek (MP 112)	100 Ruckles Dr.	400
7	Boswell Springs	5443 Eagle Valley Rd.	550
8	Hugo	West side of I-5, Exit 66 (W1)	900
8	Hilt (CalTrans)	131 Hilt Rd Hornbrook, California	900
9	Goldendale (WSDOT)	I-84 Biggs Junction	450
9	The Dalles	3313 Bret Clodfelter Way	200
9	Arlington	1520 Hwy 19	900
12	Echo	South side of I-84, Exit 193	600
12	Irrigon	Soth side of I-84, Exit 168	600
12	Mission (Pendleton)	South side of I-84, Exit 216	600
12	Hermiston	1840 S Hwy 395	600
13	Meacham	64462 Old Oregon Trail Rd.	1,000
13	La Grande	3014 Island Ave	800
13	Ladd Canyon	I-84, Exit 268, 64100 Hot Lake Lane	800
13	Baker	19975 Hwy 86	800
14	Ontario	541 Stanton Blvd	650
14	Jordan Valley	701 Bassett Street	800
14	Basque	US Route 95, MP 91.48	800
	***Bagged salt 2,500 lb. each**	**Total Tons**	**19,749**

Attachment B

Approved Salt Use Areas

SALT USE
ODOT WINTER MAINTENANCE
DECEMBER 2022

HIGHWAY SECTIONS WHERE SALT MAY BE USED

INTERSTATE - US ROUTE - OR ROUTE

COUNTY LINE

ODOT REGIONS

0 10 20 30 Miles

WASHINGTON

IDAHO

CALIFORNIA

NEVADA

Pacific Ocean

CLATSOP · COLUMBIA · TILLAMOOK · WASHINGTON · MULTNOMAH · CLACKAMAS · HOOD RIVER · WASCO · SHERMAN · GILLIAM · MORROW · UMATILLA · WALLOWA · UNION · YAMHILL · POLK · MARION · JEFFERSON · WHEELER · CROOK · LINCOLN · BENTON · LINN · LANE · DESCHUTES · GRANT · BAKER · COOS · DOUGLAS · CURRY · JOSEPHINE · JACKSON · KLAMATH · LAKE · HARNEY · MALHEUR

1 2 3 4 5

ASTORIA · SAINT HELSINGS · PORTLAND · HILLSBORO · TILLAMOOK · MCMINNVILLE · OREGON CITY · SALEM · DALLAS · ALBANY · CORVALLIS · NEWPORT · EUGENE · SPRINGFIELD · COBURG · FLORENCE · REEDSPORT · COTTAGE GROVE · OAKRIDGE · WESTFIR · LOWELL · CRESWELL · DUNES CITY · YONCALLA · DRAIN · OAKLAND · SUTHERLIN · ROSEBURG · COQUILLE · BANDON · PORT ORFORD · GOLD BEACH · BROOKINGS · GRANTS PASS · MEDFORD · ASHLAND · KLAMATH FALLS · LAKEVIEW · PRINEVILLE · BEND · MADRAS · THE DALLES · HOOD RIVER · CONDON · FOSSIL · HEPPNER · PENDLETON · BOARDMAN · HERMISTON · UMATILLA · MILTON-FREEWATER · LA GRANDE · BAKER CITY · ENTERPRISE · JOSEPH · VALE · ONTARIO · BURNS · CANYON CITY

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Attachment C

Salt Brine Pilot Plan

Oregon Department of Transportation
Salt Brine Pilot Plan

Prepared by:
ODOT Maintenance and Operations Branch
Maintenance Services Section

January 2023

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Introduction

With ODOT's expanded use of solid salt and the associated construction of bulk salt storage sheds, salt brine production has become a real possibility for ODOT. Instead of purchasing corrosion inhibited magnesium chloride products from the Oregon Department of Administrative Services contracts, ODOT could produce its own corrosion-inhibited salt brine.

This plan outlines the goals and considerations to piloting a salt brine maker, and provides a framework for tracking the costs associated with installation and operation, evaluating the performance of salt brine and determining if salt brine production is a viable option for reducing the costs associated ODOT's winter maintenance program. At the conclusion of the first season of brine production (spring 2024), a final report will be published to validate assumptions provided in this plan and provide recommendations and best management practices for establishing new salt brine production sites.

Background

Many snow states are leveraging the benefits of brine for anti-icing and for direct liquid applications (liquid deicer applications during storms) in situations where they otherwise would have used a solid deicer. Liquid deicers tend to be more efficient because they offer immediate melting, lower application

rates and less waste. Some states purchase a pre-mixed brine at a higher cost, while other states utilize in-house brine makers to produce salt brine at a lower cost.

With cuts to the Maintenance budget becoming a reality in the 2023-2025 biennium, it makes sense to determine if ODOT can leverage salt brine makers to reduce the cost of ODOT's winter maintenance operations. In November of 2022, the Maintenance and Operations Branch Winter Maintenance (MOB) Program presented the concept to the Maintenance Leadership Team (MLT). MLT approved the pilot, which the MOB plans to facilitate during the 2023-2024 winter season. Additional background information can be found in the MLT Issue Brief, which is provided as Attachment 1.

Pilot Goals

The three main goals of the salt brine pilot are to determine:

1. The return on investment for installing salt brine equipment and cost of site improvements.
2. The cost of producing salt brine (i.e. cost per gallon).
3. If salt brine is a cost effective tool that can supplement or replace liquid magnesium chloride deicer.

Equipment Selection

Three automated salt brine makers were considered for the pilot. All were priced within $10k of each other, all with similar brining capabilities and features. Ultimately, the Cargill Accubrine NextGen brine maker was selected based on assumed lower maintenance requirements and feedback from ODOT maintenance staff that have salt brining experience. The Cargill salt brine tank is constructed of a non-corrosive material that shouldn't require frequent washing, which should reduce labor/maintenance requirements and the amount of wash water that would need to be managed. The Cargill Accubrine NextGen product sheet is provided as Attachment 2.

Location Selection

The MOB evaluated multiple locations in Regions 1, 2, 4 and 5, and narrowed the selection down to two locations: Albany salt shed in District 3 and Hwy 217 salt shed in District 2B. Ultimately, the Hwy 217 salt shed located in District 2B was selected.

- **Salt shed design (first generation vs. second generation):** It was determined that the second-generation salt shed provided the amount of space necessary to install the brining equipment in a manner that conforms to ODOT's solid salt storage and handling BMPs. The second-generation design also provides adequate salt storage capacity to support salt brine production without significantly diminishing the amount of solid salt available for deicing operations. Both the Albany and Hwy 217 sheds are second-generation salt sheds with a storage bunker and space to accommodate both salt handling and the installation of a salt brine maker under the covered paved area.
- **Water Supply:** Access to a high volume, reliable municipal water supply was determined to be necessary due to the cost and permit implications of installing a ground water well. Many of the

salt sheds have been constructed in remote areas where there isn't access to water. Both the Albany and Hwy 217 sheds have access to municipal water service. Installing a 1.5" water meter and water line to the brine maker is estimated to cost roughly $75k in both locations.

- **Liquid deicer tanks and containment:** Brine production would require a minimum of two deicer tanks to store the salt brine and corrosion inhibitor. While both locations have multiple 10k gallon tanks onsite, Albany's tanks require containment and the existing tanks are on the opposite side of the yard, so new tanks and containment would need to be constructed at an estimated cost of $95k – $120k. Hwy 217 has multiple 10K gallon tanks within close proximity to where the salt brine maker would be installed, and containment is not required.
- **Liquid Deicer Use:** Locations that have the highest average annual liquid deicer use would provide the best opportunity to determine the cost effectiveness of producing salt brine and salt brine performance, and evaluate how operations and level of service are affected. Both locations apply at least 100k gallons of deicer each year.

Installation Considerations

Although the Cargill Accubrine salt brine maker requires minimal infrastructure improvements for installation and operation, the basic installation requirements are provided below. At the conclusion of the pilot, any additional lessons learned related to the installation and commissioning of the equipment will be captured in the final report.

- Covered and paved loading area to comply with salt management BMPs.
- Single phase or three phase power source.
- A minimum water service of 1.5", preferably 2" to achieve a salt brine production of 6,000 gallons per hour.
- Small heated space/shed for fresh water pump and air compressor.
- (Optional) Concrete pedestal for salt brine tank (makes loading and washout easier).
- Two 10,000 gallons storage tanks (minimum) for salt brine and corrosion inhibitor.

Return on Investment Evaluation

One of the key goals of the pilot is to determine if ODOT can realize a positive return on the salt brine equipment to inform whether future salt brine maker installation projects are a good investment for ODOT. To complete this evaluation, the MOB will rely on ODOT District 2B and the Sylvan Maintenance Section to accurately track all costs in order to validate cost assumptions that were used to justify the pilot.

- Total salt brine production (gallons).
- Application rates (gallons per lane mile).
- FTE expended producing brine and maintaining the equipment.
- Cost associated with water, solid salt, power and corrosion inhibitor.
- Costs related to retrofitting equipment.
- Any other unforeseen costs.

Once this data is collected, the cost to produce salt brine can be calculated and compared to the cost of purchasing an equivalent amount of magnesium chloride. The cost savings will then be used to determine how many years it would take recoup the cost of the cost of brine equipment and site improvements. Example return on investment scenarios are provided in the attached MLT Issue Brief.

Application Guidelines

The MOB will coordinate with District 2B to develop application guidelines and training that are consistent with those developed by other western transportation agencies and research groups such as Clear Roads. At the end of the pilot, the guidelines will be evaluated and adjusted as necessary and included in the final report.

Application Tracking

Maintenance sections will track all winter maintenance application as they normally do, either via manual entries on application logs and AVL/Telematics (if equipped). The MOB will investigate the possibility of prioritizing AVL/Telematics installations on D2B equipment applying salt brine in order to automate data collection.

Brine Performance Evaluation

The MOB will work with D2B to schedule regular meetings and post storm after action reviews to capture information relevant to evaluating the performance of salt brine, especially as it compares to liquid magnesium chloride. The Clear Roads "Field Guide for Testing Deicing Chemicals" will be used as a reference to guide the evaluation, and is provided as Attachment 3.

- Initial and subsequent application rates for anti-icing and direct liquid application.
- Cycle Timing under various weather and pavement conditions.
- Operational impacts as they relate to application equipment capacities and route/cycle planning.
- Corrosion inhibitor effectiveness
- Quality Assurance testing to ensure compliance with Clear Roads Qualified Products List specifications for corrosion inhibited salt brine.

Brine Maker Evaluation

At the conclusion of the pilot, the Cargill Accubrine NexGen Brine maker will be evaluated in order to inform the development of specifications that may be required to draft an RFP/ITB to procure additional brine makers. The evaluation may include, but is not limited to:

- Equipment ease of use and maintenance
- Reliability
- Quality/durability of materials the brine maker is constructed of
- Production rates
- Quality control

- User interface
- Considerations for locating brine makers

Brine Application Equipment

Currently ODOT utilizes liquid deicer application equipment that is generally capable of applying deicer to single or multiple lanes at rates of 15-45 gallons per lane mile. Since there is a high likelihood that salt brine application rates will be higher (up to 60 gallons per lane mile), ODOT will need to modify or purchase equipment that is capable meeting that need. The MOB and District 2B will coordinate with Fleet services to identify equipment modification/replacement requirements.

Attachment 1: MLT Issue Brief

Attachment 2: Cargill Accubrine NextGen Product Sheet

Attachment 3: Clear Roads Field Guide for Testing Deicing Chemicals

Attachment 7

Oregon Department of Transportation

Stormwater Retrofit Strategy

2025-2030

Introduction

Rain that falls on roads and other hard surfaces creates stormwater runoff which can transport trash, metals such as copper and lead, oil and other pollutants. When untreated, pollutants wash into drains and are conveyed into nearby waterways potentially impacting water quality and habitat.

The Oregon Department of Transportation constructed most of Oregon's highways prior to implementation of the National Pollutant Discharge Elimination System (NPDES) permit program created by passage of the Clean Water Act in 1972. As a result, many highways were not specifically designed to remove pollutants from stormwater runoff.

ODOT works to meet current requirements with stormwater retrofit projects on a case-by-case basis. Retrofit projects are those which either:

- Add a stormwater best management practice method(s) where none previously existed.
- Enhance an existing stormwater best management practice method to improve water quality.
- Rehabilitate an existing stormwater best management practice method to sustain water quality or improve maintainability.

Through stormwater retrofit projects, ODOT can reduce pollutants of concern, support watershed restoration, and correct infrastructure issues and maintenance concerns.

The Oregon Department of Environmental Quality regulates ODOT's stormwater discharges to surface waters through the NPDES Municipal Separate Storm Sewer System (MS4) permit; ODOT's first permit was issued in 2000.

As part of our permit requirements, we developed this strategy to outline our priorities for stormwater retrofit work.

Goals & Strategy

The goal of ODOT's stormwater retrofit strategy is to deliver a safe and reliable multimodal transportation system that **complies with Oregon Department of Environmental Quality requirements** and **makes progress toward improving Oregon's water quality**.

Our agency mission along with our values of excellence, safety and integrity provide the foundation for our strategy.

To deliver on our goal, our stormwater retrofit strategy objectives include:

- Incorporate stormwater retrofit elements into planned federal aid highway construction projects.
- Identify and deliver retrofit opportunities in designated priority areas as resources allow.

To accomplish these objectives, we will employ best management practices that are fiscally responsible, technically sound, and can be effectively designed, implemented, and maintained.

Scope

This strategy applies to the coverage area outlined in our MS4 permit:

> *The geographic area encompassing the municipal separate stormwater system associated with ODOT-owned and or operated roads, maintenance yards, rest areas, and other facilities located in ODOT rights-of-way that discharge stormwater to surface waters of the state.*

Stormwater Control Measures

ODOT has established processes to identify, assess, develop, and implement stormwater best management practices.[1] Our documentation provides guidance and structure for staff as they scope, design and deliver stormwater retrofit projects.

Preferred Best Management Practices

ODOT's design standards include several best management practice options, allowing for right sizing to meet the specific location needs, with a preference for low impact development methods[2], such as dispersion, bioretention and soil amendments.

Additional best management practices are described in our guidance materials.

[1] Specific guidance is available through the following materials: Operational notice PD-05; Hydraulics Manual; Water Resources Specialist Manual

[2] Hydraulics Manual Appendix 14-A

Appendix A summarizes our retrofit approach, including target pollutants, project triggers, and evaluation prioritization. Appendix B details our preferred best management practices by target pollutant and treatment mechanism.

Consideration of New Control Measures

ODOT will remain open to assessing the feasibility and applicability of new stormwater technologies for our system, should they become available. Where appropriate, we may evaluate new technologies at the multi-agency supported Stormwater Technology Testing Center, operated by ODOT, to assess their pollutant removal performance and lifecycle cost.

ODOT will continue to seek competitive research opportunities to assess treatment options and techniques with the aim of improving water quality outcomes.

ODOT will continue to consider other opportunities to refine our processes, guidance, data quality, or other tools should they arise.

In all cases, our ability to consider new measures, tools, or support mechanisms is contingent on available funding.

Project Prioritization & Selection

ODOT has successfully integrated stormwater retrofit elements into larger highway construction projects across the state. Beyond highway construction projects, we will continue to look for opportunities to leverage funding to prioritize progress toward water quality improvements on a case-by-case basis, as resources allow.

Our focus includes:

- Priority locations.
- Underserved, non-functional, or difficult to maintain locations and facilities.

Assessments will also include considerations outlined in our project scoping materials.

Priority Locations

ODOT prioritizes stormwater retrofits in the Lower Willamette Watershed, where wasteload allocations for urban stormwater have been identified. The lower Willamette River extends roughly from the confluence of the Clackamas River to the confluence of the Columbia River. See Appendix D for a map of this area. It encompasses cleanup sites that are important for stormwater including the Portland Harbor, Columbia Slough, and the Downtown Reach.

Columbia Slough

The Columbia Slough Watershed includes land and waterways stretching from north Portland east to Troutdale. See Appendix C for a map of this area.

We are in discussions with area partners about the needs for the Columbia Slough Watershed. During the next 5-7 years, we will work with local jurisdictions to assess and establish potential action items for the area.

Portland Harbor

This area covers about 10 miles of river, extending from the Broadway Bridge north to the southern tip of Sauvie Island. The U.S. Environmental Protection Agency designated this area of the Willamette as a superfund site in 2000.

ODOT has funded a large project along U.S. 30 and two major bridges (St. Johns and Fremont) in north Portland to design and install stormwater treatment facilities. Through more than 20 new and enhanced facilities, we will reduce the pollutants entering the lower Willamette River.

The design for this multi-million dollar stormwater retrofit project is currently in progress.

See Appendix E for additional information about this project.

Appendix A – Summary of Approach

The following outlines ODOT's approach to stormwater retrofit work. For additional details, see the Hydraulics Manual, Chapter 14: Water Quality.

Construction Project Triggers

ODOT staff uses the following stormwater triggers to assess the need for retrofit.

- Changing the type, location, direction, length or endpoint of an existing stormwater conveyance system.
- Reconstructing a roadway from the subgrade.
- Producing new impervious surface area.
- Replacing or widening a stream crossing structure.

Target Pollutants

Target pollutants vary by location. Treatment is designed based on targeted pollutants as outlined in the Water Resources Specialist Manual.

Treatment Evaluation Prioritization

Evaluate treatment approach in the following order:

- Use the adjacent unaltered right-of-way as a treatment filter strip.[3]
- Modify the right-of-way (slopes, soils, vegetation) to provide treatment.
- Use small, distributed treatment facilities along the length of the project.
- Use of large, consolidated treatment facilities.

[3] Although relying on the unaltered roadside to provide stormwater treatment is not a retrofit mechanism, it is our preferred means of pollutant removal where appropriate. Stormwater retrofits are unnecessary at locations where the unaltered roadside is adequate to remove pollutants from runoff.

Appendix B – Best Management Practice Crosswalks

Table 1: Best Management Practice Crosswalk – Target Pollutants

Where: ● = High capability to remove target pollutant ○ = Moderate capability to remove target pollutant

-- = Low capability to remove target pollutant × = Not appropriate for use

Application	BMP	Sediment & Particulate	Nutrients	Oil & Grease	Polycyclic Aromatic Hydrocarbons	Metals (particulate)	Metals (dissolved)
Pre-treatment	Oil Control Structures	○	×	●	×	○	×
Pre-treatment	Sediment Control	●	×	○	×	○	×
Infiltration	Infiltration Facility	●	●	○	●	●	●
Infiltration	Bioretention Facility	●	●	○	●	●	●
Infiltration	Bioslope	●	●	○	●	●	●
Infiltration	Porous Pavement (not stand alone)	○	○	○	○	○	--
Filtration	Biofiltration Swale (soil amended)	●	○	○	○	●	●
Filtration	Filter Strip (soil amended)	●	○	○	○	●	●
Filtration	Biofiltration Swale (no soil amended)	●	○	○	○	●	○
Filtration	Filter Strip (no soil amended)	●	○	○	○	●	○
Pool Ponds	Constructed Wetlands	●	●	○	●	●	●
Pool Ponds	Extended Detention Dry Pond	●	○	○	○	●	○
Pool Ponds	Wet Ponds	●	○	○	○	●	○
Space-constrained or Urban Areas	Wet Vaults	○	×	○	×	○	×

Application	BMP	Sediment & Particulate	Nutrients	Oil & Grease	Polycyclic Aromatic Hydrocarbons	Metals (particulate)	Metals (dissolved)
Space-constrained or Urban Areas	Media Filters (non-proprietary)	●	--	○	○	●	○
Space-constrained or Urban Areas	Proprietary Separation	●	×	●	×	●	×
Space-constrained or Urban Areas	Proprietary Filtration	●	×	○	×	●	●

Table 2: Best Management Practice Crosswalk – Treatment Mechanism

Where: ■ = Primary treatment mechanism ◘ = Secondary treatment mechanism; dependent on plant species or microbes present

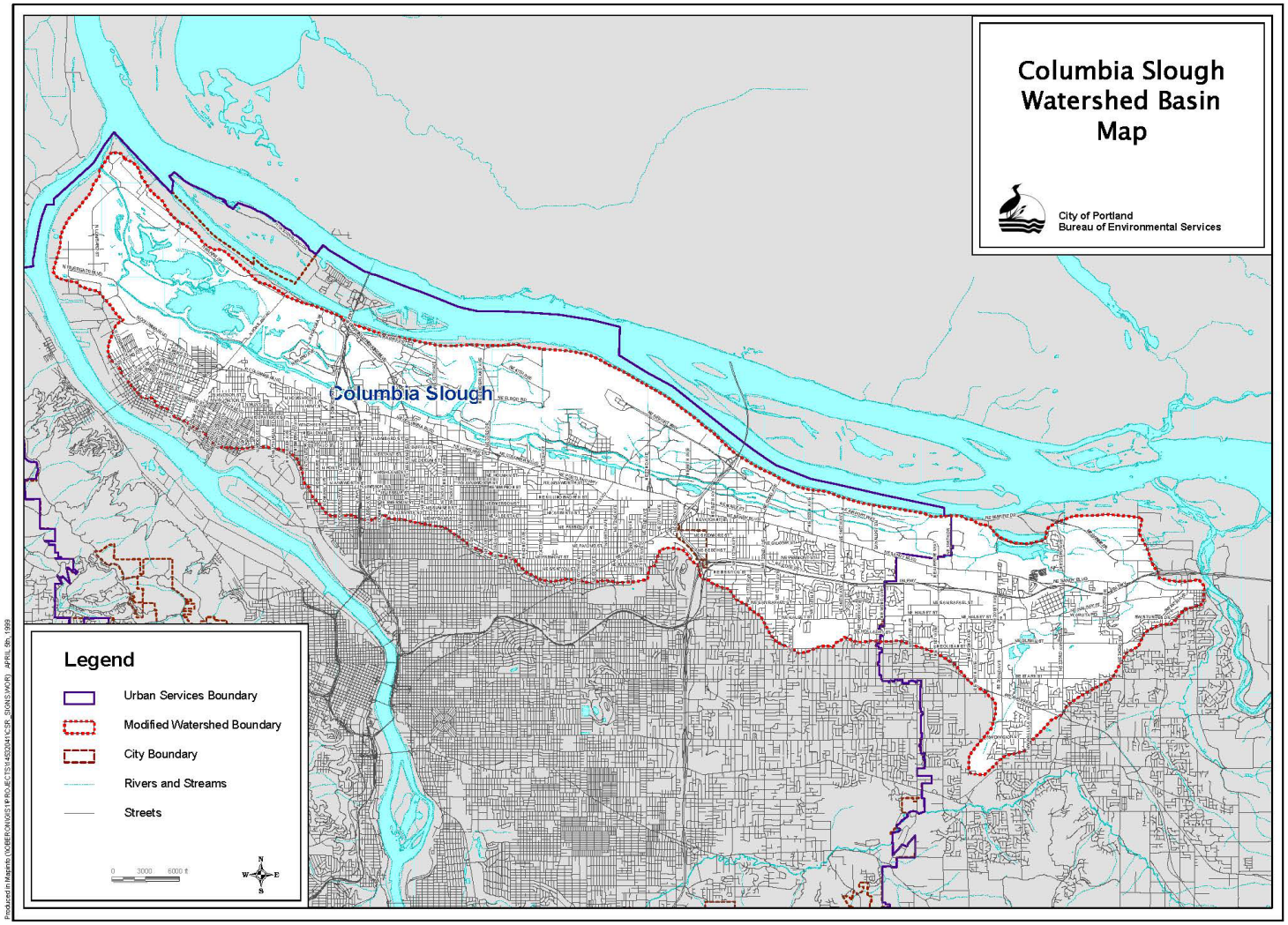
× = Not appropriate for use

Application	BMP	Hydraulic Attenuation	Density Separation (Sedimentation or Flotation)	Sorption	Filtration	Uptake & Storage	Microbial Transformation
Pre-treatment	Oil Control Structures	×	■	◘	◘	×	×
Pre-treatment	Sediment Control	×	■	×	◘	×	×
Infiltration	Infiltration Facility	■	◘	◘	■	◘	◘
Infiltration	Bioretention Facility	■	◘	■	■	■	■
Infiltration	Bioslope	■	◘	■	■	◘	◘
Infiltration	Porous Pavement (not stand alone)	■	×	×	×	×	×
Filtration	Biofiltration Swale (soil amended)	◘	◘	■	■	◘	◘
Filtration	Filter Strip (soil amended)	◘	◘	■	■	◘	◘
Filtration	Biofiltration Swale (no soil amended)	◘	◘	◘	■	◘	◘

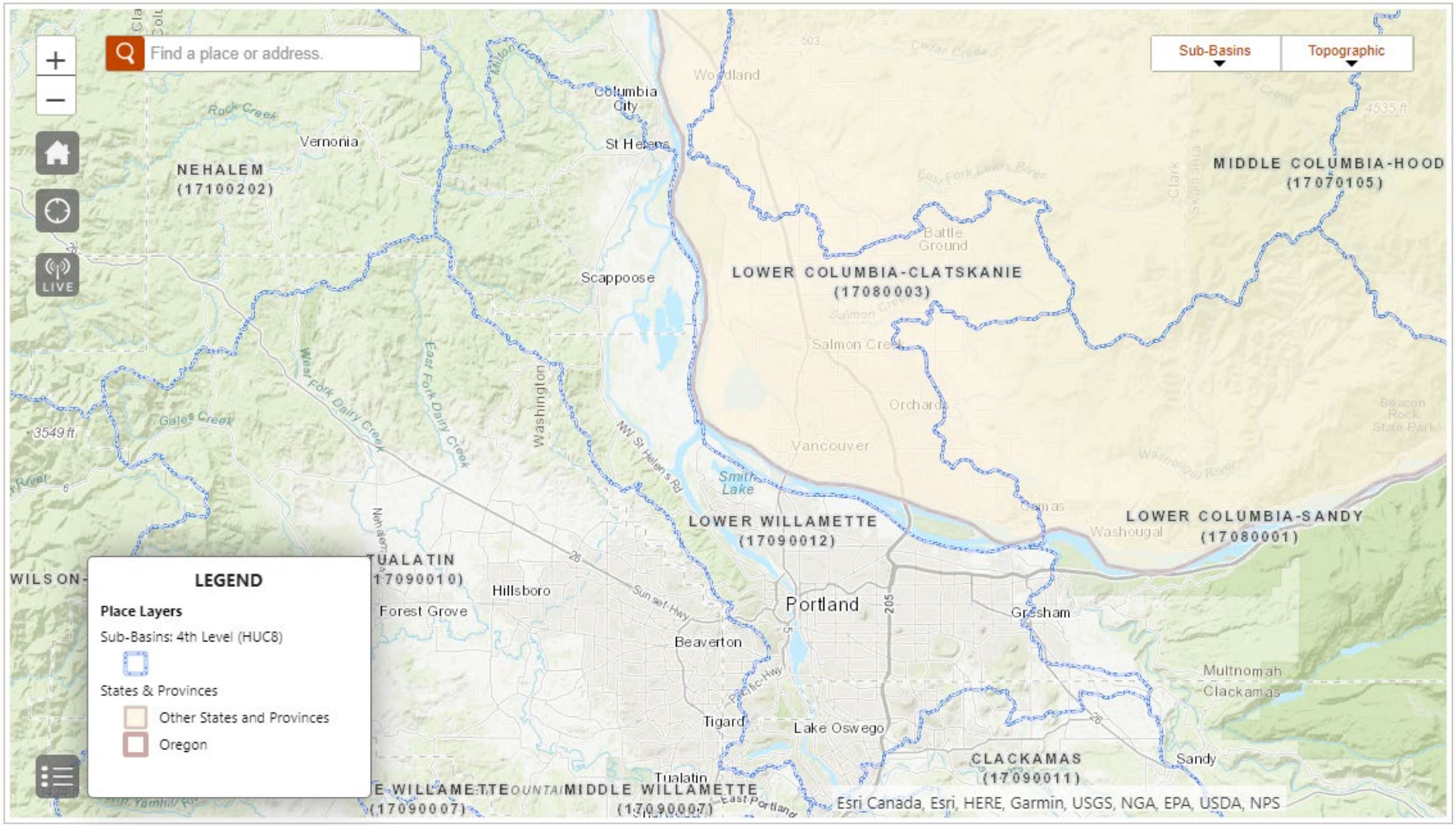
Application	BMP	Hydraulic Attenuation	Density Separation (Sedimentation or Flotation)	Sorption	Filtration	Uptake & Storage	Microbial Transformation
Filtration	Filter Strip (no soil amended)	□	□	□	■	□	□
Pool Ponds	Constructed Wetlands	□	■	■	□	■	■
Pool Ponds	Extended Detention Dry Pond	■	■	□	□	□	□
Pool Ponds	Wet Ponds	□	■	□	□	□	□
Space-constrained or Urban Areas	Wet Vaults	×	■	×	×	×	×
Space-constrained or Urban Areas	Media Filters (non-proprietary)	×	×	□	■	×	□
Space-constrained or Urban Areas	Proprietary Separation	×	■	□	□	×	×
Space-constrained or Urban Areas	Proprietary Filtration	×	×	■	■	×	□

Source: Hydraulics Manual, Chapter 14: Water Quality.

Appendix C – Columbia Slough Watershed Map



Appendix D – Lower Willamette River Sub-Basin


Find a place or address.
Sub-Basins
Topographic
NEHALEM
(17100202)
MIDDLE COLUMBIA-HOOD
(17070105)
LOWER COLUMBIA-CLATSKANIE
(17080003)
LOWER WILLAMETTE
(17090012)
LOWER COLUMBIA-SANDY
(17080001)
CLACKAMAS
(17090011)
MIDDLE WILLAMETTE
(17090007)
Columbia City
St Helens
Vernonia
Scappoose
Battle Ground
Salmon Creek
Orchards
Vancouver
Washougal
Camas
Hillsboro
Forest Grove
Beaverton
Portland
Gresham
Tigard
Lake Oswego
Tualatin
Sandy
Multnomah
Clackamas
Rock Creek
Gales Creek
West Fork Dairy Creek
East Fork Dairy Creek
Washington
Smith Lake
LEGEND
Place Layers
Sub-Basins: 4th Level (HUC8)
States & Provinces
Other States and Provinces
Oregon
Esri Canada, Esri, HERE, Garmin, USGS, NGA, EPA, USDA, NPS

Appendix E – Willamette River Stormwater Improvement Project, #22552

Project Synopsis

We are designing more than 20 stormwater treatment facilities near three highways in Portland to protect fish, wildlife, water quality and public health. The new facilities will connect to our existing stormwater network and treat approximately 100 acres of previously untreated impervious surface area.

Each facility will route stormwater from the highway and treat it before discharging to the Willamette River between Sauvie Island and downtown Portland. Once completed, the improvements will not be visible from the road or sidewalks because they will be underground or designed to resemble ditches with exposed rocks, mulch and plants. In total, this project intends to:

- Increase travel safety.
- Preserve roads and bridges.
- Build protections for our rivers.

Most of this work is on the U.S. 30 corridor, which carries an average of 30,000 vehicles daily and is a vital part of our transportation system. It connects communities and goods, and includes the St. Johns Bridge, a historic landmark.

Visit our website to learn more about this project.

Stormwater Features

- Along U.S. 30 – Mixture of rain gardens, swales and underground filtration systems.
- St. Johns Bridge, east and west – Two underground filtration tanks, one on each side of the bridge.
- Fremont Bridge, east – One aboveground filtration tank.
- Fremont Bridge, west – One underground filtration tank.
- Fremont Bridge, west ramps – One underground stormwater treatment system, with a control room and tank.

Schedule & Timing

Project design into 2025.

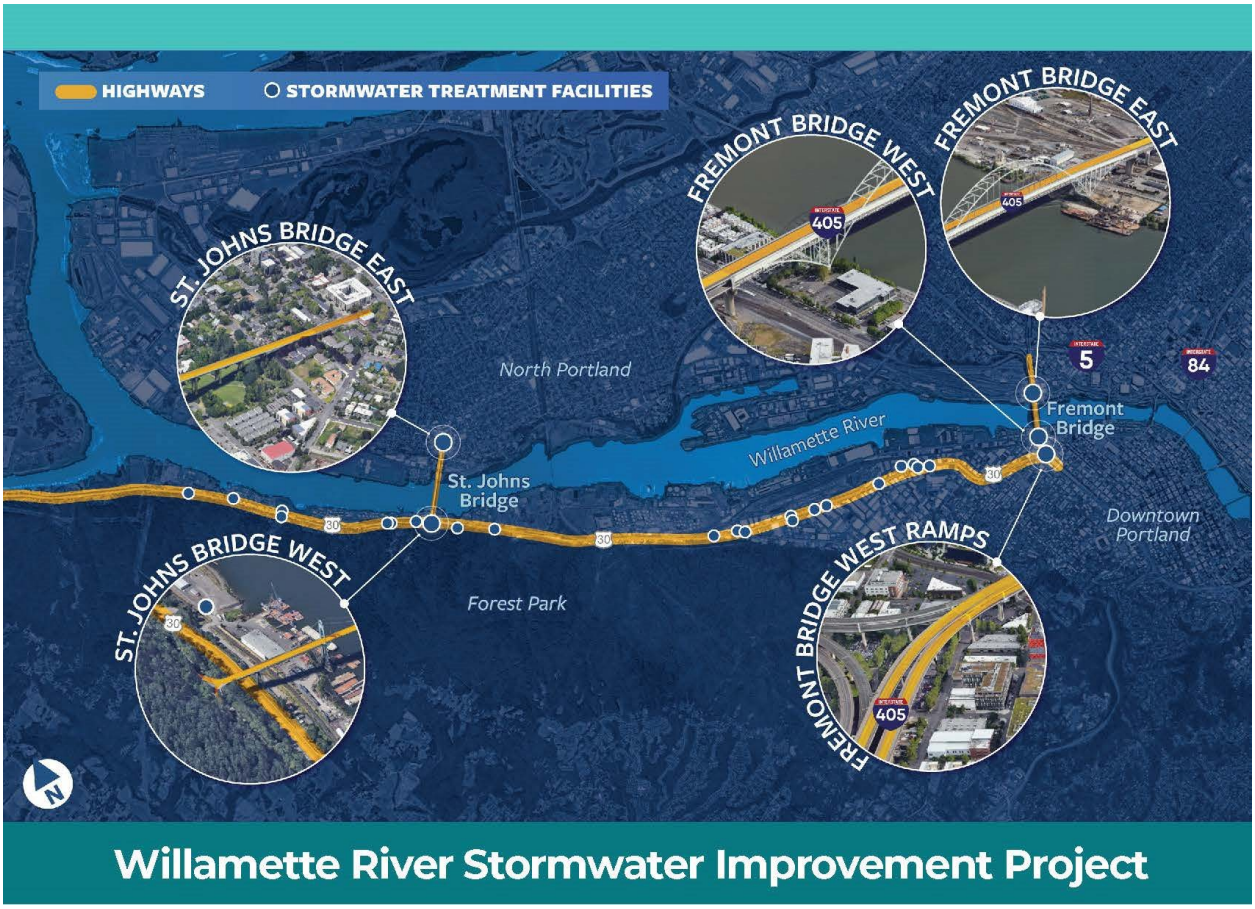
Construction expected to begin in late 2025.

Cost

At the time of this publication, the estimated total project cost is approximately $30 million.

Project Map

Figure 1: An aerial view of Portland and the Willamette River showing where the five bridge sites and 21 U.S. 30 sites are located.



Appendix F – References

ODOT's stormwater retrofit strategy references several documents. All materials included herein are valid at the time of this publication; however, their contents are subject to change over time.

Hydraulics Manual. April 2014. https://www.oregon.gov/odot/hydraulics/Pages/Hydraulics-Manual.aspx.

- Chapter 14: Water Quality
- Chapter 14 Appendix A: Water Quality

Water Resources Specialist Manual. May 2021. https://www.oregon.gov/odot/geoenvironmental/pages/water.aspx.

Project Delivery Operational Notice PD-05. September 2023. https://www.oregon.gov/odot/Engineering/Pages/Technical-Guidance.aspx.

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Attachment 8

Oregon Department of Transportation

Municipal Separate Storm Sewer System (MS4) Data Compilation Summary and Gap Analysis

Prepared For:
Oregon Department of Environmental Quality

Prepared By:
Oregon Department of Transportation
June 1, 2024

Introduction

ODOT's Phase I NPDES MS4 Permit, issued August 11, 2020, requires ODOT to compile its stormwater-related data to help ODOT and DEQ understand ODOT's MS4 on a jurisdiction-wide basis. Much of the inventory information is already available to the public on TransGIS, a web-based program ODOT uses to publish the locations of its stormwater facilities. Due to the large volume and size of the files required to be included in this data compilation, ODOT used Microsoft Teams as the database for DEQ to review the files on a shared platform. The data is described in the following report and is available to the public upon request.

MS4 Permit History and Overview

MS4 permits are typically issued for five-year periods with the expectation that each permit cycle will include more stringent requirements or program improvements that address identified gaps. ODOT's initial MS4 permit was issued on June 9, 2000, and expired on May 31, 2005. The permit was administratively extended from its expiration date through 2020. The first renewal of ODOT's Individual MS4 Phase I permit was issued on August 11, 2020. Although administrative extension of its permit prevented any changes to the original permit conditions, ODOT continued to make improvements to its stormwater program, adjusting its program in response to new information and lessons learned through implementation. A review of ODOT's previous MS4 annual reports was completed to determine whether any of the required data was included within the reports and to evaluate the progression of ODOT's stormwater program. Information from those reports is presented for each five-year period from 1999 to present.

1995-2000

When MS4 permits were initially issued in Oregon, ODOT participated as a co-permittee on multiple MS4 permits because each Oregon MS4 Permit (Phase I and II) required ODOT involvement. As more permits were issued, it became clear that that involvement for each permit issued would not be sustainable. In 1999 ODOT:

- Applied for its first individual MS4 permit.
- Implemented the Routine Road Maintenance Program, which led to creation of ODOT's Routine Road Maintenance Water Quality and Habitat Guide Best Management Practices (Blue Book).

2000 ODOT's MS4 permit

ODOT is not a municipality so not all of the typical municipal permit requirements made sense when applied to linear highway features. It was understood when the permit was issued that permit tasks may be adjusted over time. At this time ODOT also submitted a management strategy to DEQ proposing to meet TMDLs based on its NPDES permit and the Oregon Plan for Salmon and Watersheds requirements. ODOT's first individual MS4 permit:

- Incorporated implementation of specific tasks and minimum control measures for inventory, illicit discharge, characterization, BMPs and public education.
- Prioritized meeting the intent of the MS4 to protect water quality.

2000-2004

During this permit period, ODOT began implementing its individual permit:

- Hired more than two dozen new staff members statewide for new positions including, but not limited to, Region Environmental Coordinators, Permit Coordinators, Graphic Information Systems (GIS) specialists, Designers and Hydraulic Engineers.
- Completed a roadwaste management study that defined the types of roadwaste ODOT collects and examined the environmental risks associated with each.
- Created a Roadwaste Management Flowchart to provide guidance on materials management.
- Established Integrated Vegetation Management (IVM) plans each ODOT district and investigated new techniques for vegetation management.
- Continued to inventory stormwater treatment facilities.
- Submitted a Maintenance Yard Stormwater Pollutant Evaluation Plan to DEQ. In 2003, Executive Order 03-30 required ODOT to develop an Environmental Management System (EMS) for maintenance yards.
- Completed the EMS Policy and Procedures Manual and employee handbook, providing guidance for storage, use and handling, and disposal of materials typically found at ODOT Maintenance yards.
- NOAA Fisheries approved ODOT's Routine Road Maintenance Water Quality and Habitat Guide Best Management Practices for the five-year review of the guide, extending the 4(d) exemption through December 2009.

2004-2005

MS4 tasks were evaluated for efficiency, cost, and environmental benefit as ODOT prepared its MS4 permit renewal application. Modifications of some of the permit requirements were requested to improve the efficiency and effectiveness of the ODOT stormwater management program. ODOT proposed:

- Implementation of its EMS program as the mechanism to address stormwater at its maintenance yards.
- Integrating the water quality regulations of multiple regulatory programs outside of MS4 requirements, i.e. the Endangered Species Act, DSL permits, Section 401 water quality certifications, Coastal Zone Management Act, etc. into MS4 compliance.
- Incorporating TMDL monitoring requirements into the next MS4 permit.

2005-2009

ODOT submitted its MS4 renewal application in 2004, but an updated permit was not issued. The MS4 permit was administratively extended in 2005. ODOT continued to develop and implement programs to address MS4 permit requirements:

- Expanded stormwater characterization monitoring efforts.
- Published a research project to evaluate different BMPs.
- Continued GIS mapping efforts of stormwater facilities.

- Distributed a revised EMS Policy and Procedures Manual reflecting lessons learned, changes in law, input from Maintenance and a better understanding of waste management.
- Developed standardized EMS training.
- Implemented Spill Prevention Control and Countermeasure (SPCC) and Underground Injection Control (UIC) compliance plans.
- Continued incorporating related water quality regulatory requirements into its MS4 efforts and reporting, including Underground Injection Control systems, TMDLs, ESA activities, SPCC, etc.
- Worked with DEQ to develop a statewide TMDL management plan.
- Issued its renewal of the Routine Road Maintenance Water Quality and Habitat Guide Best Management Practices Revised 2009 (Blue Book).

In 2009, an agreement with Northwest Environmental Defense Center (NEDC) required ODOT to reinstate the permit requirements it had requested to modify or eliminate from the permit issued in 2000. Because ODOT's MS4 permit was in administrative extension, DEQ could not modify any of the original permit requirements. The NEDC agreement forced ODOT to reprioritize its efforts and focus on requirements the agency had previously determined did not add value to its stormwater management program, including, but not limited to, ditch inspections, stormwater monitoring and BMP effectiveness monitoring. Stand-alone stormwater retrofit requirements were also added as part of the agreement.

2010–2015

ODOT implemented activities required by the NEDC agreement and also began negotiations with DEQ to develop a new MS4 permit. ODOT was interested in streamlining its water quality efforts with a stormwater management plan that would address multiple regulatory requirements (UIC, MS4, TMDL, etc.) The permit negotiations did not result in the issuance of an updated permit, but ODOT continued implementation of the following:

- Initiated a rotation schedule for Regional audits to track EMS compliance and ensure that all yards and procedures were evaluated during a three (3) year implementation cycle.
- Concluded a monitoring project of wash water from representative maintenance yards in 2013.
- Competed a new edition of the ODOT Hydraulics manual that offered guidance on water quality, fish passage, and temporary water containment.
- Continued efforts to update inventory data and develop management plans for stormwater treatment facilities.
- Developed erosion and sediment control training to certify contractors to be an Erosion and Sediment Control Manager on ODOT projects.
- Maintenance coordinated with herbicide consultants and the Oregon Department of Agriculture (ODA) to develop an herbicide use compliance strategy for buffer zones near waterways.

- An Herbicide Reduction Taskforce was tasked with reviewing the ODOT herbicide program and make recommendations to reach a target 25% reduction in non-noxious weed herbicide applications over five years.
- Continued to conduct stormwater monitoring and published a characterization report.

2016-2020

An updated permit was not issued during this permit cycle, but MS4 permit renewal negotiations with DEQ resumed as a result of HB 2017, which included funding for a DEQ liaison for a limited time. Permit negotiations focused on updating DEQ on program improvements since 2000 and bringing the permit up to date with other Phase I MS4 permits. During this period, ODOT:

- Concluded a five-year 25% statewide herbicide use reduction effort and published the Herbicide Reduction Strategy Final Report indicating that ODOT exceeded its target, with a statewide average reduction of 44%.
- Coordinated with local jurisdictions in developing joint stormwater retrofit projects aimed at improving water quality in the Willamette watershed.
- Negotiated a UIC permit that would cover operation of all ODOT UICs statewide which was issued in 2017 for a 10-year period.
- Partnered with USGS on a research project that tested a pollutant contamination model (SELDM) for TMDL compliance.

2020-2024

DEQ issued the Phase I MS4 permit renewal on August 11, 2020. Minimum control measures required expansion of the programs ODOT had implemented to meet water quality regulations. During this time, ODOT:

- Updated its public website to include information regarding illicit discharge reporting.
- Implemented a tracking mechanism for illicit discharge reports.
- Updated and modified ODOT's TransGIS stormwater facility and outfall inventory.
- 1200-CA regional permits were reissued in 2023, requiring updates to:
    - ODOT's Standard Specifications,
    - Erosion and Sediment Control Manual,
    - Training certification courses, and
    - Scoping templates.
- Post-Construction Stormwater Management updates included:
    - PD-05 update: directs project teams (including local agency project teams using state or federal funds) to follow applicable regulatory instruments (e.g., 401 certifications, FAHP) as well as applicable guidance: ODOT Hydraulics Design and Water Resources Specialist Manuals, the FAHP Programmatic User's Guide, and the ODOT SWMP Template.
- Developed a Stormwater Retrofit Strategy.

Significant investments and effort have been made as ODOT's MS4 compliance strategies have evolved since the issuance of its first individual permit in 2000. Historically, it has been ODOT's goal to streamline related programs and regulatory instruments to meet its MS4 permit

requirements and reduce pollutants to the maximum extent practicable. ODOT continues to prioritize its efforts toward work that addresses impacts to water quality and meets the intent of state and federal water quality regulations while maintaining Oregon's public roads in a safe and cost-effective manner.

Stormwater Inventory

ODOT's MS4 inventory must include the location and physical characterization of all available outfalls, conveyance systems, and stormwater control locations collected by ODOT or consultants contracted by ODOT since 1999.

ODOT uses TransGIS for its web mapping tool. TransGIS was selected because ODOT saw a need to provide GIS data and mapping tools to non-GIS professionals. It was designed to try and meet every user's business needs for accessing spatial data and serves as the standard foundation for ODOT web mapping applications. Detailed information including transportation management system's data, asset inventory, Statewide Transportation Improvement Program (STIP) projects and environmental data are accessible for analysis, planning and research needs on TransGIS.

Outfalls

ODOT's GIS layer of outfall location information can be found on TransGIS under the Drainage layer category. Information regarding the runoff source and receiving stream can be viewed by selecting each outfall and viewing its associated table. The outfall inventory is focused specifically on outfalls located within MS4 permit areas because Oregon Department of Environmental Quality (DEQ) has identified these areas as high risk for stormwater impacts to receiving waters. Over 600 stormwater outfalls have been inventoried within MS4 boundaries in the areas listed below, pdf map files available here.

- Bend
- Corvallis/Philomath
- Eugene/Springfield
- Medford/Ashland
- Portland
- Salem/Keizer

Stormwater Controls

ODOT's stormwater inventory is available through TransGIS under the Drainage layer category. Detailed site-specific information for each stormwater facility can be found in the O&M manuals and standard maintenance tables are linked to those facilities' locations. The Stormwater Control Measures layer also includes UIC locations.

Monitoring Data

ODOT's MS4 map and digital inventory must include any and all available monitoring data collected by ODOT or consultants contracted by ODOT since 1999.

ODOT has participated in decades of stormwater monitoring and numerous research projects to characterize its stormwater and assess the effectiveness of control measures. All monitoring that has occurred has been reported with each year's annual MS4 reports since 1999. ODOT's previous MS4 annual reports, lab results and related spreadsheets are on the shared Teams site.

Stormwater Characterization

In 2017, ODOT compiled stormwater sample results for multiple years of stormwater characterization work and provided that information to the USGS for its Stormwater Database. A spreadsheet detailing the sample information provided to USGS is included in the "Monitoring Data" folder on the shared Teams site.

Maintenance Yard Stormwater Characterization

As part of its stormwater evaluation plan for ODOT maintenance yards, ODOT committed to collecting two stormwater grab samples from 16 ODOT maintenance yards and analyzing them for pollutants. A copy of the analysis could not be located, but the yard stormwater lab reports is available in the "Monitoring Data" folder on the shared Teams site. ODOT developed its EMS program to manage stormwater on maintenance yards.

Research

ODOT performs stormwater characterization monitoring through research projects designed to investigate specific stormwater management issues. ODOT submits research data and findings to DEQ through NPDES annual reports and the research project reports detailed above. These reports have been previously published and are available to the public online. A copy of each published report is available on the shared Teams site. ODOT focused its water quality related research projects on testing BMPs, stormwater characterization projects and developing guidance.

Year	Title	Objective	Partners/Sponsoring Agencies
1997	Analysis of Oregon Urban Runoff Water Quality Monitoring Data Collected from 1990-1996	Evaluate the data collected from land use based stormwater monitoring conducted in Oregon	Cities of Eugene, Gresham, Portland and Salem; ODOT, Clackamas County and the Unified Sewerage Agency
1998	Roadwaste: Issues and Options	Determine roadwaste management options, focusing on road sweepings and stormwater vactor residuals	ODOT, FHWA

2000	Evaluation of Infrared Treatments for Managing Roadside Vegetation	Evaluate the potential for infrared technology to address the need for alternatives to herbicides in controlling roadside vegetation	ODOT, FHWA
2000	Laboratory Comparison of Solvent-loaded and Solvent-Free Emulsions	Quantify the difference between conventional solvent-loaded and solvent-free emulsified asphalt concrete as measured by indirect tensile strength	ODOT, FHWA
2000	Roadwaste Management: A Tool for Developing District Plans	Examine roadwaste management options and provide guidance to ODOT maintenance personnel on effective management	ODOT, DEQ, FHWA
2001	Herbicide Use in the Management of Roadside Vegetation, Western Oregon 1999-2000: Effects on the Water Quality of Nearby Streams	Assess whether the use of herbicides in IVM programs could be a significant contributor to the load of herbicides carried by streams in Oregon	ODOT, US Dept of the Interior, US Geological Survey
2001	Roadside Management: Field Trials	Document findings of field trials of management options for street sweepings and stormwater system residuals	ODOT, City of Portland, DEQ, FHWA
2002	Roadway Applications of Vegetation and Riprap for Streambank Protection	Consider issues and options for streambank protection, literature analysis, consideration of roles for vegetation, give techniques for use of vegetation	ODOT, Oregon State University, FHWA
2003	Effects of Bromacil, Diuron, Glyphosate, and Sulfometuronmethyl on Periphyton Assemblages and Rainbow Trout	Documents the testing of several common herbicides used by the Oregon Department of Transportation in vegetation management	ODOT, Portland State University, FHWA
2005	Assessing the Effectiveness and Environmental Impacts of Using Natural Flocculants to Manage Turbidity	Determine the feasibility of using chitosan as a natural flocculant to control turbidity during in-stream construction work	ODOT, Oregon State University, FHWA
2006	Transportation and the Environment: A Research Agenda for Oregon	Preliminary description of the landscape of transportation and	ODOT, Oregon State University

		environment research needs and opportunities	
2006	Water Quality Facility Investigation	Evaluate the state of practice and available data regarding stormwater BMPs and monitoring to provide a streamlined and simplified approach to satisfy NPDES permit requirements	ODOT, GeoSyntec Consultants, Oregon State University, FHWA
2008	Regional Precipitation-Frequency Analysis and Spatial Mapping of 24-Hour Precipitation For Oregon	Regional frequency analyses for precipitation across Oregon	ODOT, MGS Engineering Consultants, Oregon Climate Service, Yale University, FHWA
2009	Drainage Facility Management System	Identify requirement for a drainage facility management system for ODOT, estimate personnel resources to collect the inventory to populate such a system	ODOT, FHWA
2011	Highway Runoff Characterization Monitoring Study	Documents the methods and results of a highway runoff quality characterization study conducted by Herrera environmental Consultants for ODOT between 2008 and 2010	ODOT, Herrera Environmental Consultants
2011	Copper Speciation in Highway Stormwater Runoff as Related to Bioavailability and Toxicity to ESA-listed Salmon	1) identify the effects of site location, storm hydrology, and water quality parameters on the concentration of dissolved copper (Cu2+diss) in Oregon highway runoff; 2) establish an analytical technique suitable for the determination of copper speciation in highway stormwater runoff; 3) compare analytically determined free ionic copper (Cu2+free) concentrations in highway stormwater runoff with modeled concentrations; and 4) develop a qualitative understanding of where and when copper toxicity has the	ODOT, Oregon State University, FHWA

		most potential to be problematic for receiving waters	
2012	Highway 126 Case Study	Describes BMP retrofit approach	ODOT, published by TRB
2013	Vehicle Wash Discharge Water Quality Investigation	Water quality investigation of vehicle wash water discharge to compare pollutant concentrations to benchmarks established in various State of Oregon Department of Environmental Quality (DEQ) permits	ODOT, Herrera Environmental Consultants
2014	Assessing Potential Effects on Highway Runoff on Receiving-Water Quality at Selected Sites in Oregon with the SELDM Model	Demonstrate use of SELDM for runoff-quality analyses in Oregon	ODOT, USGS, FHWA
2015	Assessment of Copper Removal From Highway Stormwater Runoff Using Apatite II™ and Compost: Laboratory and Field Testing	Evaluates Apatite II™, a biogenic fish bone-based adsorbent, for removing metal from stormwater.	ODOT, Oregon State University, FHWA
2016	Design Guide for Roadside Infiltration Strips in Western Oregon	Develop a new design equation and design chart to simplify and streamline the infiltration strip design process	ODOT, Oregon State University, FHWA
2016	ODOT Herbicide Reduction Strategy: Final Report	In 2010, ODOT committed to a 25% reduction in herbicide	ODOT
2018	Assessing Roadway Contributions to Stormwater Flows Concentrations and Loads with the StreamStats Application	Provide quantitative information about the percentages of different land cover categories above any given stream crossing in the state to assess and address roadway contributions to water-quality impairments and resulting TMDLs	ODOT, USGS, FHWA
2019	Assessing Potential Effects of Highway and Urban Runoff on Receiving Streams in	Research methods in which SELDM can be used to enhance the efficiency of ODOT's stormwater program	ODOT, USGS, FHWA

	TMDL Watersheds in Oregon using SELDM		
2022	Baseline Data for Assessing Climate Change and Future Enhanced Surface Water Passage Impacts on the Salmon River Estuary	Documents the water data ODOT collected from 2011-2021 from 20 stations in and around the Salmon River Estuary on the Pacific Coast of Oregon	ODOT, FHWA
2022	Assessing the Impact of Chloride Deicer Application in the Siskiyou Pass, Southern Oregon	Research the effects of chloride deicers in the Carter and Wall Creek watersheds that drain the vicinity of the Siskiyou Pass	ODOT, USGS, US Dept of Interior
2023	Assessing the Effects of Chloride Deicer Application in the Siskiyou Pass, Southern Oregon	Assess the water-quality effects from the application of chloride deicers at the Siskiyou Pass and inform decisions on how those chemicals are used	ODOT, USGS, US Dept of Interior

Maintenance and Lifecycle Cost Planning

In 2023, the Stormwater Technology Testing Center (STTC) began full-scale testing of proprietary technologies. The STTC, designed and constructed by ODOT in collaboration with numerous public stakeholders in Oregon and Washington, is a testing facility dedicated to evaluating the pollutant removal performance, maintenance requirements, and lifecycle costs of emerging stormwater treatment technologies. This research data will help ODOT estimate costs of maintenance through the lifecycle of a facility.

Tracking and Assessment Data

ODOT must include any tracking information related to water quality control measures in this digital inventory.

ODOT implemented a process to track the inspection and maintenance of its stormwater facilities using a combination of an Access database and inspection forms created using Excel in 2017. Copies of all inspection forms from 2017 through 2023 are included in the "Water Quality Facility Inspection Forms" folder on the shared Teams site.

Data Gaps

ODOT must start work to identify where geographic or subject-area gaps in data exist, and summarize the analysis in a final report included with the fourth MS4 Annual Report and permit reapplication, by June 1, 2024. If this analysis is completed within the permit term, ODOT must consult with DEQ to prioritize how to address the identified geographic-, subject-, or pollutant-specific gaps in information.

Outfall Inventory

ODOT's outfall inventory includes the MS4s that were permitted at that time the inventory was completed. Since then, the several MS4 permitted communities have been added. ODOT's current MS4 permit expires in 2025. It is anticipated that the MS4 permit renewal discussions with DEQ will include an evaluation of mapping priorities.

Pollutants

6PPD-q is an emerging stormwater pollutant that requires additional research. To address this gap, ODOT initiated the solicitation for pooled funding from the FHWA for the project titled "Stormwater Management to Address Highway Runoff Toxicity due to 6PPD-Q from Tire Rubber." This pooled fund now has a project budget of $960K and the RFP is under development with a goal start date of June 2024. This research aims to equip DOTs with a targeted and cost-effective approach for effectively managing 6PPD-q in highway runoff.

Electronic Data Collection

ODOT's permit requires a long-term operations and maintenance program for water quality facilities. ODOT has processes in place meet the permit requirements, but they could be improved. Developing an electronic data collection method to modernize and streamline tracking inspection and maintenance activities could provide opportunities to reduce costs and improve reporting. ODOT has spent considerable time during this permit period researching different software solutions and identified challenges in upgrading legacy systems as well as ensuring maintenance staff have the appropriate equipment to complete digital input of inspection and maintenance activities in the field. ODOT is continuing to work toward improving its tracking processes.

Gap Analysis

ODOT's strategy to negotiate statewide programmatic agreements that apply best management practices throughout its system has been effective in implementing change and improving practices. ODOT has done significant amounts of work to advance its stormwater management efforts, including substantial investments in stormwater characterization, researching stormwater pollutants and BMP performance. DEQ's inclusion of this MS4 data compilation requirement provided an opportunity for ODOT to compile the relevant data for analysis. ODOT believes a more comprehensive literature review would be helpful to identify trends in ODOT research and monitoring data. The Maintenance and Operations Branch will work with ODOT Research staff and the ODOT Librarian to complete the literature review and provide the results to DEQ upon completion.