City of Wilsonville, Oregon

NPDES MS4 Phase 1 Permit #101348

Annual Report

2022–2023 Reporting Year

Prepared for the
Oregon Department of Environmental Quality

December 1, 2023

CITY OF WILSONVILLE

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) PHASE 1
ANNUAL REPORT

JULY 1, 2022 – JUNE 30, 2023

The undersigned hereby submits this National Pollutant Discharge Elimination System (NPDES) Municipal Stormwater System Annual Report in accordance with NPDES Permit Number 101348. 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.

Chris Neamtzu, AICP
Community Development Director

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1.0 INTRODUCTION

The Oregon Department of Environmental Quality (DEQ) regulates stormwater runoff from the City of Wilsonville (City) through a Municipal Separate Storm Sewer System (MS4) National Pollutant Discharge Elimination System (NPDES) Permit 101348, issued to Clackamas County and its co-permittees, and through the total maximum daily load (TMDL) program.

This annual report fulfills the reporting requirement under the City's Phase 1 NPDES MS4 permit and the City's Willamette River TMDL Implementation Plan (TMDL Plan) for the reporting period of July 1, 2022 to June 30, 2023. The City implements a Stormwater Management Program (SWMP) to address specific regulatory obligations of its NPDES MS4 permit for point source pollutant parameters and the TMDL Plan to address elevated temperature in Willamette River tributaries (e.g., Boeckman Creek, Coffee Lake Creek).

1.1 Regulatory Background – NPDES MS4 Permit

The City's NPDES MS4 permit was originally issued in 1995 to Clackamas County co-permittees including the cities of Lake Oswego, Oregon City, West Linn, Milwaukie, Wilsonville, Happy Valley, Johnson City, and Rivergrove, the Oak Lodge Water Services District (formerly the Oak Lodge Sanitary District), and Clackamas County.

The City's MS4 NPDES permit was most recently renewed September 15, 2021, with an effective date of October 1, 2021. The permit was modified (Modification #1) to address the monitoring required for pesticides, with an effective date of May 5, 2023.The previous permit expired March 1, 2017, and had been administratively extended.

During the 2021-22 reporting period, the City prepared an updated SWMP to meet the requirements in the 2021 MS4 NPDES permit. Additionally, the City participated in updating the Comprehensive Clackamas County Stormwater Monitoring Plan (CCCSMP) to reflect the changes to the monitoring requirements as outlined in the 2021 MS4 NPDES permit. The updated SWMP and CCCSMP were submitted by the December 1, 2022 due date as specified in the 2021 permit. The City is now implementing the updated SWMP and will begin implementing the CCCSMP on July 1, 2023 (the start of the following reporting year 2023-24).

1.2 Regulatory Background – TMDL Implementation Plan

The City originally submitted its TMDL Plan to DEQ on March 31, 2008. Comments from DEQ were received and addressed by the City, and DEQ approved the City's TMDL Plan in May of 2009. In August 2014, at the end of the initial 5-year implementation period, the City updated its TMDL Plan to include refined measurable goals, performance measures and milestones.

In February 2019, the City submitted an updated TMDL Plan to DEQ for approval following the second 5-year implementation period. On November 2, 2020, the City received confirmation from DEQ that this 2019 TMDL Plan was approved. In August 2022, the City submitted an updated TMDL Plan to DEQ to address the Revised Willamette Basin Mercury TMDL Water Quality Management Plan.

The City's TMDL Plan identifies and describes management strategies that the City will implement to address nonpoint sources of pollution generated in the Middle Willamette River subbasin in the Willamette Basin. The **non-point source** TMDL parameter of concern is temperature, and therefore, the TMDL Plan focuses on temperature management activities. The

City's NPDES MS4 permit, as implemented through the SWMP, identifies practices the City will implement to address **point sources** of pollution. The point source TMDL parameters of concern are bacteria and mercury.

1.3 Document Organization

Table 1 outlines the organization of this annual report document, with respect to the annual reporting requirements outlined in Schedule B.5 of the City's 2021 NPDES MS4 Phase 1 permit. This report emphasizes efforts and activities associated with individual Best Management Practices (BMPs) from the City's 2022 SWMP, as summarized in Appendix A. Additional reporting requirements associated with the 2021 MS4 NPDES permit are located in Section 6.0 and subsequent Appendices.

Table 1. Summary of the NPDES MS4 Phase 1 Annual Report Requirements

Annual reporting requirement	Location in document
a) The status of implementing the Stormwater Management Program (SWMP) and each control measure program element in Schedule A.3, including progress in meeting the measurable goals and program tracking and assessment metrics identified in the SWMP Document as well as additional annual reporting requirements identified in each section, or, prior to SWMP Document approval by DEQ, measurable goals and tracking metrics approved under the previous permit's approved SWMP.	Appendix A
b) A summary of the adaptive management implementation and any changes or updates to programs made during the reporting year, including rationales for any proposed changes to the SWMP (e.g., new BMPs), and review of related new and historical monitoring data. This summary should also include discussion of the implications of or any findings related to recent years' adaptive management and/or changes made to the SWMP Document, based on data from tracking measures, measurable goals, and/or any monitoring related to the change.	Section 2.0
c) Any proposed changes to SWMP program elements that are designed to reduce Total Maximum Daily Loads (TMDL) pollutants.	None this reporting year
d) A summary of education & outreach and public involvement activities, progress toward or achievement of measurable goals, and any relevant assessment of those activities. This should include planned adaptive management or other program enhancements to occur in the following years.	Appendix A – BMP: CD5, CD8
e) A summary describing the number and nature of enforcement actions, inspections, and public education programs, including results of ongoing field screening and follow-up activities related to illicit discharges.	Appendix A – BMP: CD1
f) A list of entities referred to DEQ for possible 1200-Z NPDES general permit coverage based on co-permittee screening activities, a list of categories of facilities inspected, and an overview of the results of inspections of commercial and industrial facilities.	Appendix A – BMP: PW/CD3
g) A summary of total stormwater program expenditures and funding sources over the reporting fiscal year, and those anticipated in the next fiscal year.	Section 3.0
h) A summary of monitoring program results, including monitoring data that are accumulated throughout the reporting year submitted in the DEQ-approved Data Submission Template,	Section 5.1 & 5.2

and any assessments or evaluations of that data completed by the co-permittees or an authorized third party.	
i) Any proposed modifications to the monitoring plan that are necessary to ensure that adequate data and information are collected to conduct stormwater program assessments.	None this reporting year
j) An overview, as related to MS4 discharges, of concept planning, land use changes and new development activities (including the number of new post-construction permits issued) that occurred within the Urban Growth Boundary (UGB) expansion areas during the reporting year, and those forecast for the following year, where such data is available.	Section 4.1 & 4.2
k) The details of all corrective actions implemented associated with Schedule A.1.b.iii during the reporting year.	None this reporting year
l) Additional requirements for December 1, 2023 per the 2021 MS4 NPDES Phase 1 permit	Section 6.0 & Appendices C, D, E

2.0 ADAPTIVE MANAGEMENT PROCESS IMPLEMENTATION

The City submitted its adaptive management approach to DEQ on November 1, 2012. The City's approach includes two elements:

1. An **annual** process to determine if the City's stormwater program is being implemented in accordance with the SWMP, and to determine if progress towards measurable goals is being made. The annual process may include program adjustments, if needed.

2. A comprehensive process at the **end of the permit term** and submitted as part of the City's permit renewal package, to identify proposed program modifications including modification, addition, or removal of BMPs incorporated into the SWMP. Such program modifications are based on a more in-depth evaluation of submitted program documentation and studies.

The City conducted a comprehensive process to identify proposed program modifications as part of their NPDES MS4 permit renewal application, submitted February 2017. The City's updated 2022 SWMP was developed using an adaptive management process which included evaluating the City's implementation of the 2012 SWMP and ensuring compliance with the 2021 NPDES MS4 Phase 1 permit requirements. The adjustments made to BMPs in the City's 2022 SWMP reflect improvements the City has identified while assessing the implementation of the 2012 SMWP over the past ten years. The City's goal is to effectively implement the 2022 SWMP BMPs to achieve water quality goals to the Maximum Extent Practicable (MEP).

3.0 PROGRAM EXPENDITURES

The City's stormwater management program is funded through a combination of its stormwater utility, system development charges (SDCs) for new development, and additional fees associated with erosion control, natural resources, and stormwater plan reviews and inspections. A portion of the utility fee and all SDC revenue is placed in a fund dedicated for capital improvement project (CIP) development.

For the 2022-23 reporting year, the stormwater utility rate was $11.90 per equivalent residential unit (ERU). Future increases will be implemented with the adoption of the updated Stormwater Master Plan in 2024.

A summary of the City's direct stormwater program expenditures for the 2022-23 reporting year and anticipated stormwater program expenditures for the 2023-24 reporting year are outlined below. The Natural Resources Program manages requirements for the NPDES permit and the associated costs are reflected under the Management Activities. The Public Works Department performs operations and maintenance activities and the associated costs are reflected under Maintenance Activities. Administrative support is funded separately.

Table 2. Stormwater Program Expenditures

	Management Activities	Maintenance Activities
Reporting Year 2022-23		
Wages and benefits	$239,058	$266,866
Materials and services	$137,861	$586,417
Reporting Year 2023-24 (projected)		
Wages and benefits	$301,773	$324,810
Materials and services	$123,500	$830,350

4.0 OVERVIEW OF PLANNING AND LAND USE CHANGES, UGB EXPANSION AND NEW DEVELOPMENT ACTIVITIES

The City has experienced rapid growth over the last two decades. When the initial NPDES MS4 permit was issued, the City's population was approximately 9,300. Wilsonville's current population is approximately 26,664.

The following section outlines land use changes, Urban Growth Boundary (UGB) expansions, land annexations and new development activities that occurred during this reporting year. Figure 1 reflects the City's current zoning and city limits.

4.1 Annexations and UGB Expansion

As of June 2023, the City's NPDES MS4 permit area is approximately 5,037 acres.

In Wilsonville, annexations are applicant- and development-driven. The City and City Council have not historically initiated the annexation of property outside of the city limits, and do not plan on doing so in the future. The City actively conducts development-based concept planning for

large development areas to facilitate annexation. Past concept planning efforts include the following:

- **Villebois.** This 480-acre area is located along the City's western boundary and prior to UGB expansion, this area was once the Dammasch State Hospital site, rural residential parcels and agricultural lands. The Villebois Village Master Plan was adopted in 2003 and incorporates sustainability practices and onsite stormwater management to minimize impacts of new development. This area is nearing full build out with approximately 2,600 residential units of a variety of housing types.

- **Frog Pond West.** This 181-acre area is located adjacent to the City's eastern boundary, north of Boeckman Road and west of Stafford Road. The Master Plan was adopted in spring 2017 and calls for the redevelopment of rural residential and agricultural lands to residential. A total of nearly 124 acres have been annexed within Frog Pond West. A majority of the area has received land use entitlements with construction continuing over the next couple years. At build out, the area is expected to be around 600 residential units, including primarily detached homes with a number of attached two-unit residential buildings.

- **Frog Pond East & South.** Metro approved a UGB expansion of 280 acres in December 2018. The City adopted a Master Plan for development of the area in December 2022. Construction is anticipated to begin in the next few years with estimated 1,400-1,600 homes of a variety of housing types built over the coming decades.

- **Coffee Creek Industrial.** This 226-acre area is located adjacent to the City's northwestern boundary and is composed of industrial, residential, and agricultural land uses. The Coffee Creek Master Plan was adopted in 2007. Annexation and redevelopment, in accordance with the Master Plan, will include regionally significant industrial land uses including warehouse, manufacturing, and office space designed according to the City's Industrial Form-based Code provisions. In 2021, the City completed construction of an industrial roadway along SW Garden Acres Road to promote development in this area. Since then, two large warehouses have been built in the area and two more properties have been annexed with plans approved for industrial development.

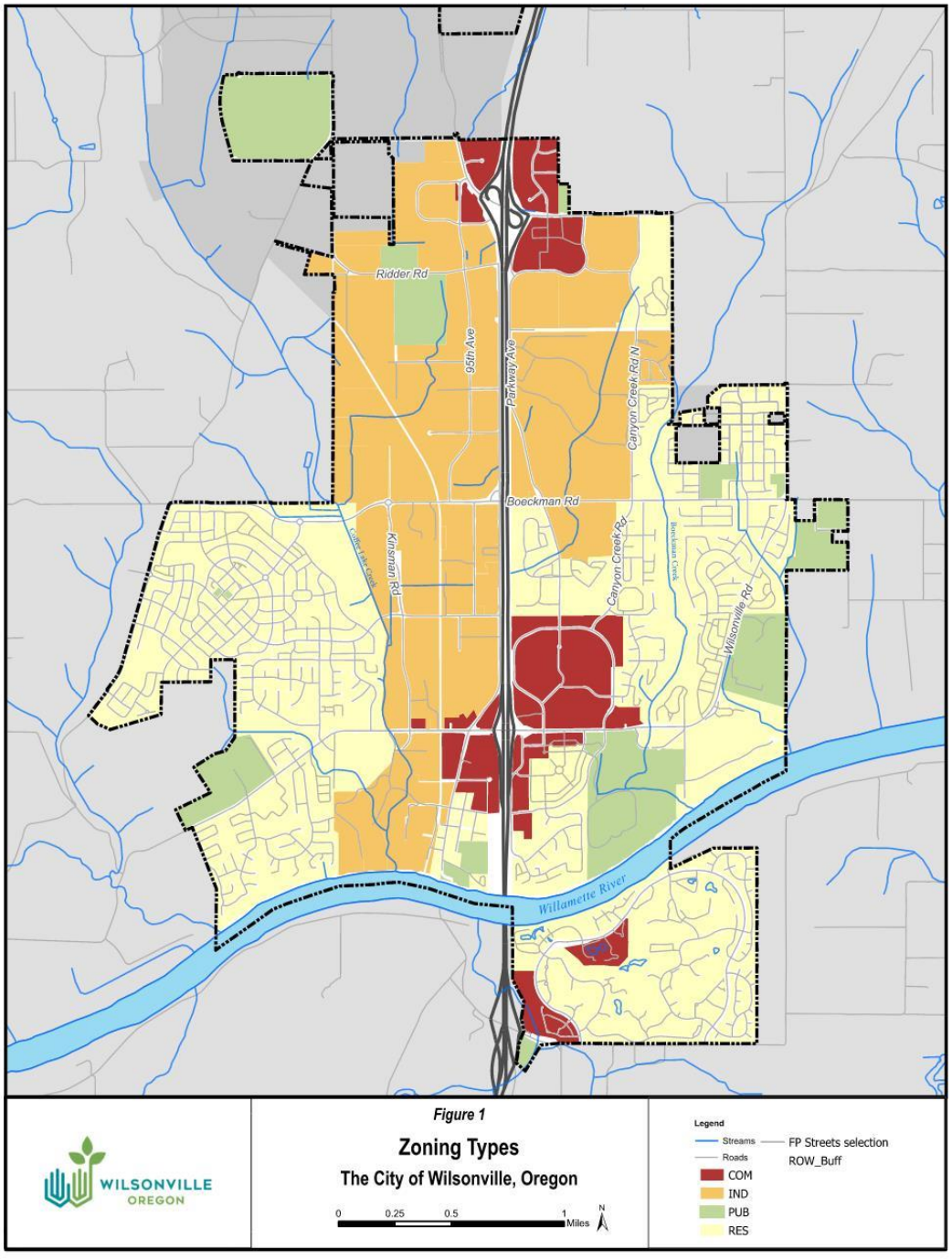
- **Basalt Creek.** This area is located along the north and northwest boundary of the City, bound by Basalt Creek Parkway and Greenhill Lane to the north, Coffee Lake Creek on the west, and I-5 to the east. The final planning steps are underway to make this area development-ready. Annexation and development, in accordance with these plans and policies, will result in an attractive business district including high-tech and craft industries with office, manufacturing, and warehouse space. To date, no developmental approvals and annexations have been granted by the City.

4.2 Land Use Changes and New Development Activities

In 2014, the City prepared updated stormwater design standards, as outlined in Section 3 of its Public Works Standards, to address post-construction stormwater control in accordance with the NPDES MS4 Phase 1 permit requirements issued in 2012. The City requires structural stormwater controls for water quality and water quantity on all new and redevelopment projects that add or replace 5,000 square feet or more of impervious surface. The standards require the use of low impact development (LID) practices, stormwater facility sizing based on a flow duration standard, and inclusion of specific stormwater submittal requirements.

During the 2022-23 reporting year, the City issued six post-construction permits for development activities triggering stormwater management requirements. Development activities included three housing subdivisions, two commercial buildings, and one large scale industrial facility. Development activities from 119 housing units, multiple City of Wilsonville municipal buildings, and a shipping facility resulted in 828,604 square feet of new and replaced impervious surface.

During the 2022-23 reporting year, seven parcels from unincorporated Clackamas County were annexed by the City in the Frog Pond West development area. These parcels were zoned as residential and comprise approximately 80 acres of land.



5.0 ENVIRONMENTAL MONITORING

Clackamas co-permittees, including the City of Wilsonville, participate in the Clackamas County Coordinated Stormwater Monitoring Program (CCCSMP). The CCCSMP was updated and resubmitted to DEQ on May 30, 2023, following the completion and outcome of the Clackamas NPDES MS4 Permit Modification (initiated in January 2023). The CCCSMP reflects updated pesticide monitoring frequencies and was approved by DEQ on June 7, 2023, for implementation beginning in July 2023.

Detail related to the environmental monitoring activities conducted during the 2022-23 reporting year are outlined in Section 5.1. Online submission of the resulting data from the environmental monitoring activities is outlined in section 5.2.

5.1 Summary of Monitoring Data

Under the 2021 CCCSMP, the City has two instream monitoring locations and one stormwater outfall monitoring location. Monitoring events are grouped into the dry season and wet season to maintain compliance with the 2021 NPDES MS4 Phase 1 permit. The City chose to collect three of the four instream sample events during the wet weather season. The sampling schedule was determined prior to the start of the sampling year. Grab samples are collected during dry weather conditions and time-composited grab samples during rainfall events. The City contracted out stormwater and instream sample collection activities during the 2022-23 reporting year. Specific monitoring locations and frequencies are outlined in Table 3.

Table 3. Summary of Wilsonville Environmental Monitoring Activities per CCCSMP

Sampling type	Monitoring location	Waterbody name/ receiving water	Sampling frequency	Land use represented
Outfall (stormwater) monitoring	Library Detention Pond inlet at Memorial Park	Tributary to Boeckman Creek	3x/year	• Commercial • Residential
Ambient (instream) monitoring	Boeckman Creek at the Boeckman Road crossing	Boeckman Creek (upstream)	4x/year (min. of 2 events during the wet season)	• Agricultural (outside City limits) • Commercial • Residential
Ambient (instream) monitoring	Boeckman Creek at the Rose Lane footbridge in Memorial Park	Boeckman Creek (downstream)	4x/year (min. of 2 events during the wet season)	• Commercial • Residential

Monitoring results for all locations are summarized in the DEQ approved Grab Data Submission Template outlined in section 5.2. The template includes parameters, methods, and results for each event collected. Monthly rainfall totals for the 2022-2023 reporting year are summarized in Table 4.

Stormwater outfall monitoring was conducted at the Library Detention Pond three times during the 2022-23 reporting year. The initial stormwater monitoring event occurred on October 24th, 2022 during the first significant rainfall event. E.coli was the only metric in exceedance of DEQ's

water quality criteria during this October 24th sampling event. All metrics were well within the acceptable water quality criteria for the second and third monitoring events on January 18th and March 28th, respectively. All of the samples taken at this location were composite except for a single pH sample and single E. coli sample that were grab readings during the March 28th sampling event.

Two instream monitoring locations on Boeckman Creek were sampled quarterly throughout the reporting year. The upstream and downstream locations were sampled on July 13th and October 12th of 2022, and April 12th and June 11th of 2023. Phosphorous was the only metric in slight exceedance during the reporting year. Samples from the upstream location in July resulted in levels of phosphorus above water quality criteria, and both the upstream and downstream locations showed slightly elevated phosphorus levels during the October sampling. Besides phosphorus, results from all four sampling events at both locations indicate that Boeckman Creek meets DEQ water quality criteria for temperature, E.coli, and nitrates. All readings from these locations were from composite samples.

Table 4. Monthly Rainfall Totals (inches) 2022-2023

July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	April	May	June
0.10	0.06	0.29	1.77	7.87	5.57	3.25	2.84	5.17	5.19	0.61	0.44

Data retrieved from the National Weather Service http://w2.weather.gov/climate/index.php?wfo=pqr
Weather station location: Salem Airport (McNary Field)

5.2 Submission of Monitoring Data

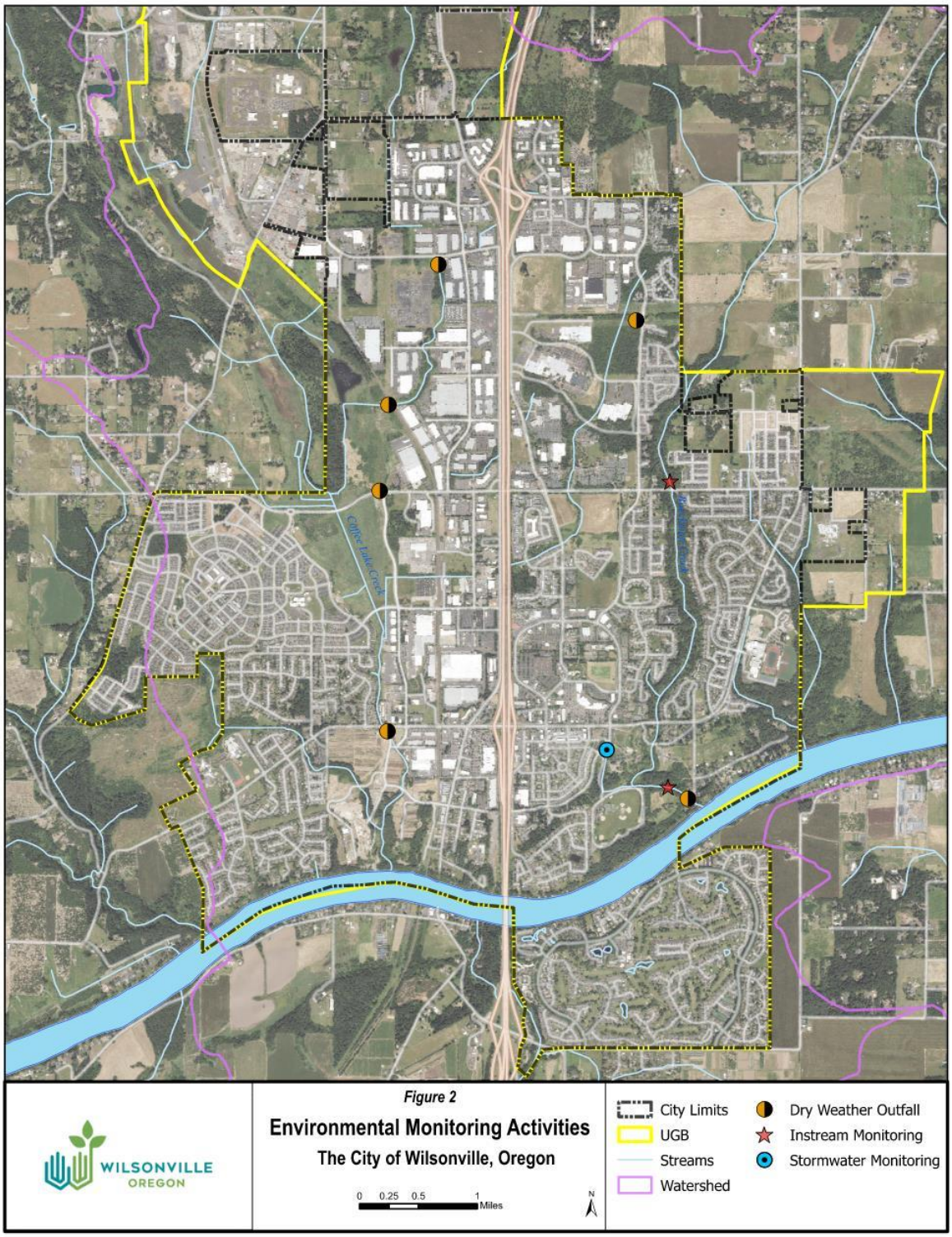
The data collected from instream and stormwater outfall monitoring events has typically been presented as an appendix in the City's NPDES MS4 Phase 1 annual reports. Due to updated reporting requirements from DEQ, the city will no longer submit custom data tables in annual report documents and will instead submit data via the approved Grab Data Submission Template on the DEQ website. For the 2022-23 reporting year, the City's data was submitted by Community Development Director, Chris Neamtzu, on Monday, 11/20/23 at 11:39 am.

5.3 Temperature Monitoring

Boeckman Creek and Coffee Lake Creek were historically chosen as the two streams to monitor for temperature within the City of Wilsonville as they contribute the largest amount of flow to the Willamette River. Starting in the summer of 2017, the City partnered with the City of Lake Oswego and the U.S. Geological Survey (USGS) to conduct water temperature monitoring data in the tributaries and the main stem of the Lower Willamette River. Starting in 2018, City staff deployed continuous temperature monitoring sensors at the mouths of Boeckman Creek and Coffee Lake Creek annually during the summer months.

Only one sensor was deployed at the mouth of Boeckman Creek during the summer of 2022. Possibly due to the age of the City's equipment, issues with battery life, or user error, this single sensor failed to consistently log data during its deployment. With only one faulty sensor deployed, the City does not have stream temperature data to submit for the current reporting year. Due to staff turnover and shortages of field personnel, the City also failed to deploy any sensors during the summer of 2023. This will yield a two year reporting gap in the temperature

data sets for Boeckman Creek and Coffee Lake Creek. Since the initial collaboration with Lake Oswego and USGS, the City has consistently reported stream temperature data as part of their NPDES MS4 Phase 1 annual report and intends to pick up this monitoring effort in the summer of 2024 to have data available for the 2024-25 reporting year and beyond.



6.0 Additional Annual Report Requirements for 2023

As outlined in the Summary of Required Elements table in the 2021 NPDES MS4 Phase 1 permit, and within the body of the permit itself, the City is responsible for additional deliverables that correspond with the December 1st, 2023 report submission deadline. The additional elements are outlined below.

The City also updated their 2022 SWMP during the current reporting year to document the required submittals per the December 1st, 2023 submission deadline. No additional proposed changes were made to the SWMP at this time. A Revision Log is included in the updated SWMP to document SWMP changes. The revised SWMP is posted on the City's online NPDES MS4 Phase 1 permit resource library page of their public website.

- **TMDL 5 year look back survey**

In February 2019, the City submitted an updated TMDL Plan to DEQ for approval following a second 5-year implementation period. On November 2, 2020, the City received confirmation from DEQ that this 2019 TMDL Plan was approved.

Following its third 5-year implementation period, the City is required to populate a survey, administered by DEQ, which captures statistics from the previous 4 years of reporting in addition to the current reporting year. During the current TMDL Plan implementation term, the City's annual NPDES MS4 Phase 1 reports contain a matrix of best management practices aimed at reducing temperatures in tributaries of the Willamette River. For the 2022-23 annual report, the survey will be filled out in lieu of including the normally submitted TMDL Implementation Plan Status matrix.

- **Industrial/Commercial SOP**

Since 2013, the City of Wilsonville has implemented an inspection program of industrial and commercial facilities as a component of a DEQ approved Stormwater Management Program. The document outlining the inspection program, which is part of the City's overall Industrial/Commercial Facility Strategy, was updated during the 2022-23 reporting year. Updates included refinement of the methods of screening businesses on an annual basis and documentation of inspection procedures, reflecting both windshield and onsite inspection needs. This SOP describes the steps the City will follow to implement an inspection program aimed at reducing pollutants in stormwater discharges to the MS4 from industrial and commercial facilities.

City staff posted an updated draft of the 2023 Industrial/Commercial Facility Strategy to the City's website for a 30-day public comment period. No comments or proposed edits were received from the public.

- **IDDE SOP**

The City drafted its initial Illicit Discharge Detection and Elimination SOP in 2012. During the current reporting year, the City updated this SOP to include new priority outfall locations for dry weather field screenings. This updated SOP document has been approved by DEQ and is currently available on the City's online NPDES MS4 Phase 1 permit resource library page. Not seeing any need to change the updated high priority outfalls in 2023, City staff will use these

outfall locations for the 2023-24 reporting year. City staff will continue to evaluate these locations moving forward.

- **LID/GI Strategy and Program Description**

As outlined in the Summary of Required Elements table in the 2021 NPDES MS4 Phase 1 permit, the City is required to submit an LID/GI Strategy to DEQ during the current reporting year. The City has outlined their LID/GI strategy as it pertains to controlling post-construction stormwater runoff in the attached Appendix C. As part of the overall LID/GI strategy, City Natural Resources and Engineering staff have begun discussions to update the Public Works standards for LID/GI facilities within the City of Wilsonville.

- **Hydromodification Assessment and Retrofit Strategy Update**

As outlined in the Summary of Required Elements table in the 2021 NPDES MS4 Phase 1 permit, the City is required to submit an update to their Hydromodification Assessment and Retrofit Strategy during the current reporting year. This strategy document is a compliment to the work in progress on the City's Stormwater Master Plan which will be approved during the 2023-24 reporting year. Updates to the strategy document can be found in Appendix D.

- **Erosion Control Escalating Enforcement Procedure**

During the 2021-22 reporting year, the City received a DEQ warning letter regarding a 17-acre construction site in the Frog Pond Ridge development area. This warning letter stated that the City was out of compliance with their Erosion and Sediment Control Plan as required by element CD4 of the City's Stormwater Management Plan. Within the warning letter, DEQ offered an opportunity for corrective measures to be implemented. As a response to corrective measure #3, the City updated their Erosion Control Escalating Enforcement Procedure for the 2022-23 annual report. This enforcement procedure can be found in Appendix E.

Appendix A

SWMP Implementation Status

Appendix A. SWMP Implementation Status

Key to Pollutant Symbols: **A full circle (●) indicates the BMP is expected to address the parameter. An empty circle (○) indicates the BMP may be expected to address the parameter. A blank cell indicates that the effect of the BMP is unknown at this time.**

BMP Title	BMP Name	Program Element(s)	Addresses bacteria?	Addresses mercury?	Responsible City Department	Measurable goals (2022 SWMP)	Tracking measures (2022 SWMP)	Annual Report Information (Tracking Measure Status 2022-2023)	Notes
CD1	Illicit Discharge Detection and Elimination	Illicit Discharge Detection and Elimination	○	○	Community Development Public Works	• Conduct annual dry weather illicit discharge screening/inspections for all high priority outfall locations. • Continue to follow dry weather field screening procedures for all outfalls suspected of illicit discharges. • Notify the Public Works Director of all positively identified illicit connections and take necessary actions to eliminate them. • Revise procedures for conducting the illicit discharge elimination and investigation program in accordance with permit requirements by November 1, 2012.	1. Track number of outfalls inspected annually. 2. Summarize inspection results and indicate outfalls requiring monitoring (sampling) and/or investigations. 3. Document the outcome and resolution of any investigation activities conducted.	1. Six major outfalls identified as high priority sites were inspected in September '23 and October '23 after 72 hours of dry weather using the Dry Weather Field Screening Inspection Form. Outfall inspection locations can be found on Figure 2. Throughout the reporting year, the Public Works Department inspected 292 storm outlets as part of their routine maintenance program. 2. Two out of the six high priority outfalls exhibited flow, warranting sampling for pH and conductivity. Both locations showed acceptable pH readings and conductivity levels well below the 500 microsiemens threshold requiring additional lab analysis. The other four high priority outfall locations were dry and no further sampling was conducted. 3. No investigation activities were performed during the 2022-23 reporting year.	
PW/CD2	Spill Prevention, Training, and Response	Illicit Discharge Detection and Elimination Education and Outreach	○	○	Community Development Public Works	• City staff to respond to non-hazardous material spills. • Notify appropriate parties, including State and National Emergency Response Systems as necessary, of all known spills within the City. • Train city staff to the OSHA First Responder Operations level.	1. Track number of City employees attending OSHA spill-response training and/or refresher courses. 2. Track the number of spills responded to by City staff. 3. Track the type/source of pollutant discharges associated with each reported spill.	1. A total of 29 City employees attended OSHA spill-response training courses and/or refresher courses during the 2022-23 reporting year. 2. City staff responded to 2 spills and/or reports of dumping during the 2022-23 reporting year. 3. The details related to the type or source of each specific spill are listed in the Notes column.	• August '22 – Multiple sandbags broke open on SW Town Center Loop impacting a single storm water catch basin. City staff responded by vactoring out the basin and removing loose sand from the roadway. • October '22 – City staff provided traffic control and cleanup for a concrete spill under an I-5 bridge.
PW/CD3	Industrial and Commercial Facilities	Industrial and Commercial Facilities	○	○	Community Development Public Works	• Review business license applications and SIC codes for new businesses to identify potential high source facilities. Obtain Environmental Survey from new businesses (i.e., non-residential sewer users) identified as a potential high pollutant source. • Update facility information by sending the Environmental Survey to applicable, existing businesses every three years. • Identify facilities needing NPDES 1200-Z permits and notify the facility and DEQ within 30 days. • Annually inspect facilities identified as warranting inspection. • Ensure illicit discharges are eliminated, if discovered.	1. Track the number of facilities inspected annually. 2. Track the number of existing and potential new NPDES 1200-Z permitted facilities identified annually. 3. Track any enforcement actions associated with inspections.	1. Fifteen facilities identified as high potential pollutant sources received a windshield inspection of their outdoor areas. 2. Twelve facilities in the City are permitted through a DEQ NPDES 1200-Z permit. No new business licenses were flagged for potential 1200-Z permits during the reporting year. 3. There were no enforcement actions taken as a result of the windshield inspections at the high potential pollutant sites but follow up tasks, including formal business site inspections, were identified for five of the fifteen facilities inspected.	

Appendix A. SWMP Implementation Status									
Key to Pollutant Symbols: A full circle (●) indicates the BMP is expected to address the parameter. An empty circle (○) indicates the BMP may be expected to address the parameter. A blank cell indicates that the effect of the BMP is unknown at this time.									
BMP Title	**BMP Name**	**Program Element(s)**	**Addresses bacteria?**	**Addresses mercury?**	**Responsible City Department**	**Measurable goals (2022 SWMP)**	**Tracking measures (2022 SWMP)**	**Annual Report Information (Tracking Measure Status 2022-2023)**	**Notes**
CD4	Erosion Control and Construction Site Management	Construction Site Runoff Control Education and Outreach	●	●	Community Development	• Require all new and redevelopment disturbing over 500 square feet to submit an erosion and sediment control plan. • Conduct weekly erosion control inspections on all construction sites disturbing over 500 square feet.	1. Track the number of erosion and sediment control plans approved. 2. Track the number of 1200-CN and 1200-C permits issued. 3. Track the number and frequency of erosion control inspections conducted. 4. Track the number and type of enforcement actions taken by the City or DEQ.	1. The City approved erosion and sediment control plans for 156 projects during the 2022-23 reporting year. The majority of these plans were for single-family homes. 2. At the conclusion of the reporting year there was one 1200-CN and seven 1200-C permits active in the City. 3. Certified City inspectors performed a total of 836 erosion control inspections. Depending on the project, Inspectors visit sites daily, weekly, or quarterly. During the wet months, inspection frequency increased. Additional inspections typically occur due to complaints or weather conditions. 4. During the 2022-23 reporting year, 59 Inspection Notice of Corrections were issued with initial erosion control inspections. An additional 43 Inspection Notice of Corrections were issued at the mid-project inspection. No Notice of Violation or Stop Work Orders were issued.	
CD5	Public Education Participation	Education and Outreach Pollution Prevention for Municipal Operations Stormwater Management Facilities Operation and Maintenance Activities	○	○	Community Development	• Publish stormwater related articles in the City newsletter and website. • Organize public outreach programs such as Adopt-a-Road and volunteer monitoring of stream corridors. • Label catch basins as necessary. • Distribute door hangers as necessary in neighborhoods where non-stormwater discharges have been identified. • Coordinate with other, local Phase I jurisdictions in providing/compiling information regarding public education effectiveness. Provide the results to DEQ by July 1, 2015.	1. Track the number of educational articles published per year. 2. Estimate public participation in City-sponsored volunteer events. 3. Track the number of catch basins labeled.	1. During the 2022-23 reporting year, seven educational/informational articles were published in the City's newsletter, The Boones Ferry Messenger. 2. City-sponsored volunteer event details for the 2022-23 reporting year are listed in the Notes column. 3. Manhole lids over catch basins are stamped "Dump No Waste, Drains to Stream". During the 2022-23 reporting year the City affixed 72 catch basin markers prioritizing older neighborhoods that drain directly to outfalls without receiving treatment.	• Adopt a Road Participants: 73 volunteers • City's WERK Day: 91 participants removed debris, invasive plants, and planted trees in Wilsonville Parks.

Appendix A. SWMP Implementation Status									
Key to Pollutant Symbols: **A full circle (●) indicates the BMP is expected to address the parameter. An empty circle (○) indicates the BMP may be expected to address the parameter. A blank cell indicates that the effect of the BMP is unknown at this time.**									
BMP Title	**BMP Name**	**Program Element(s)**	**Addresses bacteria?**	**Addresses mercury?**	**Responsible City Department**	**Measurable goals (2022 SWMP)**	**Tracking measures (2022 SWMP)**	**Annual Report Information (Tracking Measure Status 2022-2023)**	**Notes**
CD6	Public Reporting for Spills, Illicit Discharges, and Dumping	Education and Outreach	○	○	Community Development	• Continue to implement the "Citizen Concern" form for public reporting of spills, illicit discharges, and dumping. • Include the phone number and website for reporting illicit discharges in a minimum of one published article each year.	1. Track the number of citizen reports of spills, illicit discharges, and dumping received each year and follow-up actions resulting from the requests.	1. The City received three complaints from citizens during the 2022-23 reporting year related to spills, illicit discharges and dumping. Details are provided in the Notes column.	• July '22 – Citizen reported a fresh oil stain near a catch basin on Pioneer Ct. City staff referred the report to Public Works to see if anything could be done, Public Works investigated the oil stain. • August '22 – Citizen reported a Wilsonville Concrete truck spill on Wilsonville Rd at SW Boones Ferry Rd. City staff identified the spill and informed Wilsonville Concrete they were responsible for the cleanup. Cleanup was conducted shortly thereafter. • September '22 – Citizen reported observing Ace Hardware parking lot maintenance without proper catch basin protections in place. The parking lot was being resealed and pollutants were discharged into the MS4. City staff followed up with a site visit and contacted the company to request a catch basin cleanout before any rain occurred. The City received an invoice from the company within the specified timeframe.
PW/CD7	Municipal Staff Training for Stormwater Pollution Prevention	Education and Outreach Pollution Prevention for Municipal Operations			Community Development Public Works	• Conduct municipal staff training related to stormwater pollution prevention as appropriate. • Coordinate with other Clackamas County co-permittees regarding regional water quality efforts through scheduled co-permittee meetings. • Attend applicable conferences and trainings as appropriate.	1. Track the number of municipal staff training activities. 2. Track number of conferences attended. 3. Track any cost share or joint projects conducted annually with Clackamas County or other permitted agencies.	1. City staff participated in multiple stormwater trainings during the 2022-23 reporting year, including: spill prevention and sediment & erosion control. Overall, 10 staff from the Engineering Division, Fleet Services, and Public Works participated in stormwater pollution prevention training. 2. Staff attended one conference related to stormwater management during the 2022-23 reporting year. 3. The City currently coordinates with WES and the City of Oregon City in updates to the BMP Sizing Tool (used to address post-construction stormwater requirements).	
CD8	Public Involvement and Participation	Public Involvement and Participation			Community Development	• Provide for public review and comment with the monitoring plan, SWMP revisions, and pollutant load reduction benchmarks.	N/A	N/A	• The City retains the last four years of NPDES MS4 reports on its website for public review. • The City posted their updated SMWP document to its website during the 2022-23 reporting year.

Appendix A. SWMP Implementation Status

Key to Pollutant Symbols: **A full circle (●) indicates the BMP is expected to address the parameter. An empty circle (○) indicates the BMP may be expected to address the parameter. A blank cell indicates that the effect of the BMP is unknown at this time.**

BMP Title	BMP Name	Program Element(s)	Addresses bacteria?	Addresses mercury?	Responsible City Department	Measurable goals (2022 SWMP)	Tracking measures (2022 SWMP)	Annual Report Information (Tracking Measure Status 2022-2023)	Notes
CD9	Planning and Development Review	Post-Construction Site Runoff Pollution Prevention for Municipal Operations	●	●	Community Development	• Continue to require new and redevelopment projects that add or replace over 5,000 square feet of impervious surface to install stormwater quality controls. • Review all new and redevelopment plans that add or replace over 5,000 square feet for compliance with stormwater control requirements.	1. Track number of development applications reviewed for compliance with the City's stormwater requirements. 2. Track the number and type of structural water quality and quantity facilities installed. 3. Track the number of CIPs or retrofits proposed/initiated for water quality improvement.	1. During the 2022-23 reporting year, ten development applications were reviewed for compliance with the City's stormwater requirements, which pertain to development activities that add or replace 5,000 sq. ft. or more of impervious surface. 2. During the 2022-23 reporting year, a total of 71 structural water quality and quantity facilities were installed. Details related to the facilities are provided in the Notes column. 3. A public street improvement project was completed during the 2022-23 reporting year, providing facilities to two roadways in an industrial area that previously did not receive any stormwater flow control or treatment. An additional road improvement project broke ground during the current reporting year that will also provide stormwater facilities to a growing residential area. This retrofit project is slated for completion in 2025.	• During the reporting period the following structures were installed throughout the City: 30 Vegetated Swales 10 Planter Boxes 30 Rain Gardens 1 Detention Pond
CD10	Review and Update Applicable Code and Development Standards Related to Stormwater Control	Post-Construction Site Runoff	○	○	Community Development	• Review the City's current public works standards to minimize or eliminate identified barriers related to the use of low impact development and green infrastructure techniques. • Review the City's current stormwater treatment and detention standards for compliance with new MS4 NPDES permit language (e.g., design storm, etc.). • Update the City's post-construction stormwater design standards and code language by November 1, 2014.	1. Track progress related to the review and update of the City's stormwater treatment and detention standards for compliance with the MS4 NPDES permit.	1. The City of Wilsonville adopted updated Public Works Standards for stormwater in September 2014 to address NPDES MS4 requirements for treatment and flow control. The City's Standards were amended in December 2015 to address minor editorial and clarification items. During the 2022-23 reporting year, City staff began conversations regarding updates to the Public Works standards for stormwater facilities in new development projects. The new construction standards should be finished and made publically available in 2024.	
PW11	Routine Road Maintenance	Pollution Prevention for Municipal Operations	●	●	Public Works	• Sweep all curbed City streets monthly. • Schedule and conduct street maintenance activities during dry weather conditions. • Continue to sponsor Adopt-a-Road program.	1. Track street sweeping frequency. 2. Track length of roadway swept annually. 3. Track volume of debris removed annually.	1. During the 2022-23 reporting year, the City swept all curbed, public streets monthly. 2. During the 2022-23 reporting year, a total of 3,449 miles of road were swept. 3. During the 2022-23 reporting year, street sweeping resulted in the removal of 579 tons of debris.	
PW/CD12	Pest Management	Pollution Prevention for Municipal Operations			Community Development Public Works	• Follow the Integrated Pest Management principles and Pest Management Program for public landscape maintenance. • Require all staff and hired contractors applying chemicals within the City to be certified.	1. Track amount of pesticides and fertilizers applied to public property and general area of application. 2. Estimate number and area of sites where the planting of native vegetation was incorporated into the maintenance activities.	1. During the 2022-23 reporting year, the City applied approximately 19.3 gallons of pesticides to 179.7 acres of public landscaping areas. The City applied approximately 1,565 pounds and 92.5 gallons of fertilizer to 23.4 acres of City Parks and other public, City-owned property. 2. During the 2022-23 reporting year, the Parks and Recreation Department planted approximately 1000 native plants across seven different sites within the City.	

Appendix A. SWMP Implementation Status

Key to Pollutant Symbols: **A full circle (●) indicates the BMP is expected to address the parameter. An empty circle (○) indicates the BMP may be expected to address the parameter. A blank cell indicates that the effect of the BMP is unknown at this time.**

BMP Title	BMP Name	Program Element(s)	Addresses bacteria?	Addresses mercury?	Responsible City Department	Measurable goals (2022 SWMP)	Tracking measures (2022 SWMP)	Annual Report Information (Tracking Measure Status 2022-2023)	Notes
PW/CD13	Municipal Facility Stormwater Management	Pollution Prevention for Municipal Operations	○	○	Community Development Public Works	• Inventory municipal facilities subject to this permit requirement. • Identify and implement strategies to minimize discharges from identified municipal facilities by July 1, 2013.	1. Inventory municipal facilities and develop strategies to reduce the impact of stormwater runoff from municipal facilities.	1. The City adopted their Stormwater Pollution Prevention Strategy (SWPPS) for municipal facilities in 2013. Applicable municipal facilities include the Three Bay Facility, the SMART Operations & Fleet Facility, and the Memorial Park Maintenance Barn. For the 2022-23 reporting period, the oil water separator at the SMART Operations & Fleet Facility was cleaned every four months and a stormwater pretreatment vault at the SMART Bus station was serviced annually.	The Three Bay Facility and the Memorial Park Maintenance Barn do not contain stormwater facilities and rely on source and structural controls to reduce the impact of stormwater runoff.
PW14	Conveyance System Cleaning	Stormwater Management Facilities Operation and Maintenance Activities	○	○	Public Works	• Inspect public conveyance system annually for maintenance needs. • Maintain and repair public conveyance system as needed based on inspections.	1. Estimate the length of conveyance system serviced each year. 2. Estimate type and volume of debris removed.	1. During the 2022-23 reporting year, the City cleaned and maintained approximately 18,174 linear feet of the stormwater conveyance system (mains and laterals). 2. Approximately 58 cubic yards of debris was removed in conjunction with conveyance system cleaning activities during the 2022-23 reporting year.	
PW15	Catch Basin Cleaning	Stormwater Management Facilities Operation and Maintenance Activities	●	●	Public Works	• Clean all high-priority public catch basins (approximately 25% of all public catch basins) annually and the remaining public catch basins over a four-year period. • Inspect catch basins for maintenance and repair needs during catch basin cleaning activities. • Schedule catch basin repair activities as needed, based on inspections.	1. Track percent of total catch basins cleaned each year. 2. Track number of catch basin repair activities conducted each year. 3. Estimate volume of debris removed annually.	1. During the 2022-23 reporting year, the City cleaned 998 catch basins, reflecting 33% of all public catch basins in the City. 2. During the 2022- 23 reporting year, 9 catch basins were repaired. 3. During the 2022-23 reporting year, 209 cubic yards of debris was removed from catch basins.	
PW/CD16	Structural Control Cleaning	Stormwater Management Facilities Operation and Maintenance Activities	●	●	Community Development Public Works	• Inspect public structural controls annually and maintain and repair as needed. • Ensure maintenance of new private structural stormwater facilities serving 5,000 square feet of area or greater through the tracking of *Stormwater Maintenance and Access Easement* agreements. • Maintain GIS “atlas” for both public and private water quality structural controls.	1. Track number of public stormwater structural controls inspected. 2. Track number of public stormwater structural controls maintained. 3. Track covenant agreements on file and annual maintenance reports submitted for private stormwater structural control facilities. 4. Track number of private stormwater structural controls inspected and maintained.	1. During the 2022-23 reporting year, the City inspected 190 public structural controls. 2. During the 2022-23 reporting year, the City maintained 143 public structural controls. 3. For the 2022-23 reporting year, there were 126 private stormwater maintenance agreements on file. Annual inspection and maintenance report requests were sent to all facility owners in March ‘23. 60 maintenance reports were returned. See notes column regarding the submitted reports 4. During the 2022-23 reporting year, the City inspected 20 sites containing private stormwater facilities. Most of the parties responsible for private facility maintenance performed some type of maintenance over the course of the year. During these inspections, 14 facilities were recognized as needing follow up maintenance.	The sites with outstanding maintenance reports will inform the inspection schedule for the 2023-24 reporting year. The 66 sites that still have reports due to the City are the highest priority, especially if they have more than the current year’s maintenance report missing.

Appendix B

Winter Weather Tracking and Reporting

Appendix C. Winter Maintenance Tracking and Reporting					
BMP Name	**Program Element(s)**	**Responsible City Department**	**Tracking measures (2022 SWMP)**	**Annual Report Information (Tracking Measure Status 2022-2023)**	**Notes**
Winter Operations and Maintenance Program	Pollution Prevention and Good Housekeeping for Municipal Operations	Public Works	1. Track type of material used and number of events material was used 2. Quantities and general location of each material used (pounds per mile) 3. Actions to protect waters of the state	1. During the reporting year, magnesium chloride and sand were applied to portions of local roads during four winter weather events. 2. 990 gallons of magnesium chloride was applied to 93.2 miles of road at a rate of 10.6 gallons per mile. 11,000 pounds of sand was applied to 7.8 miles of road at a rate of 1,410 pounds per mile. 3. Sand was removed from roads with a street sweeper	

Appendix C

LID/GI Strategy and Program Description

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Technical Memorandum

Prepared for: City of Wilsonville

Project Title: 2023-2024 NPDES MS4 Permit and TMDL Compliance Support

Project No.: 185493

Technical Memorandum

Subject: Low Impact Development and Green Infrastructure Strategy

Date: December 1, 2023

To: Kerry Rappold, Natural Resources Program Manager

From: Amory Cervarich, Sr. Staff Engineer and Angela Wieland, Sr. Water Resources Engineer

Reviewed by: _____
Angela Wieland, PE, Project Manager

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Section 1: Introduction

Schedule A.3.e.ii of the City of Wilsonville's (City's) National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Phase I Permit (Permit) requires co-permittees to *"review and update or develop and begin implementation of a strategy to require to the maximum extent feasible, the use of Low Impact Development and Green Infrastructure (LID/GI) design, planning, and engineering strategies intended to minimize effective impervious area or surfaces, and reduce the volume of stormwater discharge and the discharge of pollutants in stormwater runoff from development and redevelopment projects"* by December 1, 2023.

The Permit requires the co-permittees to document this strategy in the subsequent Annual Report and incorporate or reference the strategy in the Stormwater Management Program (SWMP) Document after completion and DEQ approval. The purpose of this technical memorandum (TM) is to summarize and document the City's current LID/GI strategy to meet the Permit requirements. The TM includes a review of the LID/GI requirements in the City's Stormwater and Surface Water Design and Construction Standards (SSWDCS) and other City resources.

This TM is organized as follows:

- Section 2 provides a brief overview of the City's SSWDCS as they relate to LID/GI.
- Section 3 provides the City's existing LID/GI strategy in the SSWDCS and other City resources.
- Section 4 provides a summary of next steps.

Section 2: City of Wilsonville's SSWDCS

The City's SSWDCS were revised and updated in December 2015 to address the 2012 Clackamas co-permittees NPDES MS4 Phase I Permit requirements. The purpose of the SSWDCS update was to address Permit requirements related to prioritization of LID/GI, optimization of onsite retention, and targeting of predevelopment hydrologic functions as much as practical. The City's Municipal Code (CWMC) contains the codified ordinances passed by the City Council and gives the City the legal authority to enforce the SSWDCS for development projects.

The City's LID/GI strategy is implemented in accordance with the SSWDCS and is consistent with the current NPDES MS4 Permit language in Schedule A.3.e.ii. The SSWDCS require the use of LID facilities to the Maximum Extent Practicable (MEP) for new and redevelopment activities that meet defined project thresholds. Although LID is not currently explicitly defined in the SSWDCS or CWMC, site planning is required to preserve existing natural resource areas, minimize site disturbance, minimize soil compaction, minimize impervious surfaces, and retain and infiltrate stormwater runoff, which is consistent with the requirements for a LID/GI strategy. The City requires either LID facilities to the MEP or full onsite retention of the 10-year design storm unless limiting conditions restrict using onsite infiltration.

Section 3: Wilsonville's LID/GI Strategy

The purpose of this section is to summarize how the City's current SSWDCS and other resources incorporate LID/GI facilities and LID approaches for development projects.

3.1 Definitions

Below is a summary of green infrastructure (GI) and LID definitions from the NPDES MS4 Permit to help inform the understanding and application of the City's LID/GI strategy.

The NPDES MS4 Permit definition for GI is *"a specific type of stormwater control using vegetation, soils, and natural processes to manage stormwater. At the scale of a neighborhood or site, green infrastructure refers to stormwater management systems designed to mimic nature by reducing and/or storing stormwater through infiltration, evaporation, and transpiration. At the site level, such measures may include the use of plant or soil systems, permeable pavement or other pervious surfaces or substrates, stormwater harvest and reuse, or landscaping to store, infiltrate, or evapotranspirate stormwater and reduce flows to sewer systems or to surface waters. At the scale of city or county, green infrastructure refers to the patchwork of natural areas that provides flood protection and natural processes that remove pollutants from stormwater."*

NPDES MS4 Permit Schedule D.4.q

The City does not explicitly define GI in the SSWDCS but uses the term LID facilities and requires that LID facilities be used "to mimic the natural stormwater runoff conditions of the pre-developed site and recharge the groundwater" (City of Wilsonville, 2015). The City's use of the term LID facilities is consistent with the NPDES MS4 permit definition of GI in that both apply to facilities that retain and infiltrate stormwater runoff and mimic natural conditions.

The NPDES MS4 Permit definition for LID is *"a stormwater management approach that seeks to mitigate the impacts of increased runoff and stormwater pollution using a set of planning, design and construction approaches and stormwater management practices that promote the use of natural systems, green infrastructure, and other techniques for infiltration, filtration, evapotranspiration, and reuse of rainwater, and can occur at a wide range of landscape scales (e.g., regional, community and site). Low impact development is a comprehensive land planning and engineering design approach to stormwater management with a goal of mimicking the predevelopment hydrologic regime of urban and developing watersheds."*

NPDES MS4 Permit Schedule D.4.x

The City does not explicitly define LID in the SSWDCS in accordance with the NPDES MS4 definition but does include various site assessment and site planning principals for new and redevelopment activities that align with the land planning and engineering design approach to ultimately "mimic the predevelopment hydrologic regime of urban and developing watersheds." These site assessment and planning requirements are detailed in a Site Assessment and Planning checklist (Table 3.1) and need to be completed in accordance with development permit applications.

3.2 SSWDCS LID/GI Strategy

This section summarizes the City's LID/GI strategy in the SSWDCS. As described in Section 3.1, the City's SSWDCS includes site planning requirements and prioritizes LID facilities for stormwater management. Relevant sections from the City's SSWDCS are summarized in Table 1 and direct language is reflected in italics.

Table 1. Summary of the Existing LID/GI Strategy in the SSWDCS	
SSWDCS Section Reference	**SSWDCS Content and Short Description**
301.1.05(b)	• Goal for stormwater systems to "*maintain the pre-development stormwater runoff characteristics to minimize effects on the drainageways such as sediment transport, erosion and degradation generally associated with urbanization*." • Requirement for stormwater management facilities to "*maximize groundwater recharge through the process of infiltration of runoff into vegetated facilities and the use of…LID facilities and/or flow controls to address hydromodification."*
301.2.03.3	• Site Planning objectives, which need to be reflected on a Preliminary Site Plan, include to "*preserve existing resources, minimize site disturbance, minimize soil compaction, and minimize imperviousness."*
301.2.03.4	• Requirement for incorporation of "*LID facilities to infiltrate stormwater runoff to the Maximum Extent Practicable (MEP) to recharge groundwater and mimic pre-development hydrologic conditions."* • Requirement to apply a stormwater management strategy to either use "*(a) LID facilities to the MEP"* or "*(b) onsite retention of the 10-year design storm*." • Requirement to size stormwater management facilities using either the BMP Sizing Tool or Engineered Method when using the LID facilities to the MEP strategy
301.4.03	• Lists "*LID facilities such as planters, swales, rain gardens, ponds, and other vegetated facilities"* as "*the preferred strategy to meet the stormwater management requirements for water quality treatment and flow control."* • Lists "*impervious area reduction techniques, such as preservation of existing trees, retaining vegetation and open space, clustering buildings, disconnecting residential downspouts, and constructing pervious pavement and green roofs…as techniques to help mitigate stormwater runoff and reduce the size of the required stormwater management facilities"*
301.4.04(a)	• Design criteria for LID to the MEP is detailed as "*prioritize the use of LID facilities to the MEP to mimic the natural stormwater runoff conditions of the pre-developed site and recharge the groundwater."* • City's strategy to meet LID to the MEP is to "*to incorporate LID principles in site planning and facility design."*
301.4.04(c)	• Design criteria for the water quality requirement is for water quality facilities *"to capture and treat 80% of the average annual runoff volume to the MEP with the goal of 70% total suspended solids (TSS) removal…. The treatment volume equates to a design storm of 1.0 inch over 24 hours. The BMP Sizing Tool addresses these water quality requirements to size stormwater management facilities."*
301.4.04(d)	• Design criteria for the flow control requirement is for the "*duration of peak flow rates from post-development conditions shall be less than or equal to the duration of peak flow rates from pre-development conditions for all peak flows between 42% of the 2-year storm peak flow rate up to the 10-year peak flow rate…..The BMP Sizing Tool incorporates these flow control requirements to size stormwater management facilities."*

Although the City uses onsite retention of the 10-year design storm as a stormwater management strategy, the City's SSWDCS more directly adheres to the Alternative Compliance Performance Standard in Schedule A.3.e.iii.(B) of the NPDES MS4 Permit, with a focus on prioritization of infiltration in order to target natural surface or pre-development site hydrology and reduction of pollutant discharge from new and redeveloped impervious surfaces.

Given suitable site and soil conditions, use of LID to infiltrate where possible helps meet the City's LID, water quality and flow control stormwater strategies. The City defines MEP in the SSWDCS as "installing LID facilities with a surface area of at least 10 percent of the total new or redeveloped impervious area" (City of Wilsonville, 2015). The design and sizing requirements for LID facilities assume that, at a minimum, the water quality and flow control requirements are also met.

The City requires developers to conduct a Site Assessment and prepare a Preliminary Site Plan prior to designing stormwater management facilities. The purpose of this requirement is to ensure that the physical attributes of the development site are reviewed before placing permanent features such as streets, parking lots, and buildings. This requirement optimizes site design to apply stormwater management techniques and sensitive areas protection and reduces or eliminate potential conflicts between site development elements and required stormwater management systems. The site assessment includes review of topography, soils, seasonal high groundwater, infiltration rates, site hydrology, natural features, downstream conveyance, existing vegetation, vegetated buffers, land use and zoning. Applicants are required to address the following four objectives in the Site Plan: preservation of existing resources and minimization of site disturbance, soil compaction, and imperviousness. These objectives are all considered to be LID design techniques.

The City provides guidance for facility selection in the SSWDCS and states that vegetated LID facilities are the preferred strategy for water quality treatment and flow control. The City includes impervious area reduction methods such as porous pavement, green roofs, and planting/preservation of trees. LID stormwater management facilities include stormwater planters, rain gardens, vegetated filter strips, vegetated swales, and detention ponds. The approved facilities are consistent with the NPDES MS4 Permit definition of GI.

3.3 Additional LID/GI Strategy references from City Resources

The City incorporates LID/GI strategy elements into other City resources including CWMC, the Comprehensive Plan, Stormwater Management Plan Best Management Practices reference materials, and the recently developed draft Residential Stormwater Design Standards.

3.3.1 CWMC

The City includes LID/GI strategy elements in Chapter 4 of the CWMC, which is also known as the Development Code or Zoning Code. In Chapter 4, the City requires open space area for residential development in any zone. Open space includes preserved wetlands and their buffers, natural and/or tree covered areas, new natural/wildlife habitat areas, non-fenced vegetated stormwater features and other types of open space. Open space can provide some stormwater retention, can help facilitate evaporation, and can delay the timing of runoff to receiving waters, which are all important components of an LID/GI strategy.

Chapter 4 of the CWMC also includes additional requirements for development in the Village Zone to submit a Rainwater Management Program. The Rainwater Management Program must address opportunities to address water quality, detention, and infiltration with natural features and proposed development areas, methods to reduce runoff based on the 90th percentile storm event, methods to meet pre-development hydrology, management of the ¼-inch, 24-hour rainfall event, and mitigation of 100 percent of impervious area from designated areas. This program highlights the City's prioritization of LID/GI facilities and practices.

Chapter 4 of the CWMC also defines the Significant Resource Overlay Zone (SROZ). The goal of the SROZ is "to implement the goals and policies of the Comprehensive Plan relating to natural resources, open space, environment, flood hazard, and the Willamette River Greenway." SROZ areas include all inventoried significant natural resources such as wetlands, riparian corridors, and wildlife habitat. Development and construction that encroach within SROZ areas must use habitat-friendly development practices to "minimize grading, removal of native vegetation, disturbance and removal of native soils, and impervious area" and "minimize adverse hydrological impacts on water resources." Habitat-friendly development practices that also qualify as LID per the NPDES MS4 Permit include the use of amended soils to promote infiltration, use of pervious paving materials, the incorporation of stormwater management in road rights-of-way, landscaping with rain gardens, use of green roofs, disconnection of downspouts, use of bioretention cells in parking lot islands, and application of a treatment train approach.

Finally, additional components from Chapter 4 that help define the City's LID/GI strategy include requirements for landscaping, screening, and buffering to encourage retention through the use of existing topsoil and vegetation as well as tree preservation and protection to improve water quality, control runoff, and promote groundwater recharge. The City prioritizes the preservation of SROZ areas, trees, and woodlands.

3.3.2 Comprehensive Plan

The Comprehensive Plan also includes elements of the City's LID/GI strategy. The Comprehensive Plan defines the goals for SROZ areas and the City's intention to protect natural resources within SROZ areas from development. The Comprehensive Plan also requires developers to protect native vegetation in designated areas to decrease runoff, promote infiltration, and improve water quality. The Comprehensive Plan states that storm water detention facilities are used for flow control.

3.3.3 SWMP Document Best Management Practices Reference Materials

The City provides online resources listed in the SWMP Document Best Management Practices reference materials section on the NPDES Stormwater Permit Information webpage.

The City published an LID Guidebook in 2021 to provide an overview of LID practices and facilities applicable to the City. The guidebook stresses the City's commitment to prioritization of LID practices and facilities. The City defines LID in the LID Guidebook as "an innovative approach to site planning and stormwater management. The goal of LID is to apply techniques that capture, filter, store, evaporate, and infiltrate runoff close to the source to mimic pre-development runoff conditions." Sizing and site layout information is provided for typical development categories and for all stages of development from planning through design, construction, and maintenance.

The City has also published a manual for the Operation and Maintenance of Privately Owned Stormwater Facilities. The manual outlines maintenance practices in accordance with the City's stormwater management strategy to use LID facilities to manage stormwater close to its point of origin.

3.3.4 Draft Residential Stormwater Design Standards

Recently the City has developed draft Residential Stormwater Design Standards. Upon adoption of these draft Standards, which are intended to supplement the SSWDCS, the City will require the decentralized use of LID facilities in residential areas and the integration of LID facilities more intentionally into the design of neighborhoods. Specific guidelines addressing the placement of LID facilities is also provided, with emphasis on placement of facilities along collector and arterial medians and planter strips, curb extensions, edges and buffers around parks, and existing landscape areas.

Section 4: Conclusion

The SSWDCS meet the 2021 Permit requirements in Schedule A.3.e.ii which states that by November 1, 2023, the City must *"begin implementation of a strategy to require to the maximum extent feasible, the use of LID and GI design, planning, and engineering strategies intended to minimize effective impervious area or surfaces, and reduce the volume of stormwater discharge and the discharge of pollutants in stormwater runoff from development and redevelopment projects."*

The City will consider minor updates to the SSWDCS and other referenced documents to improve alignment with the Permit by December 1, 2024. These updates may include refinement of the City's Comprehensive Plan with respect to references to "detention facilities." The current references may imply that detention is the main or sole type of facility used for stormwater management. Due to the focus of the NPDES MS4

Permit on GI, LID facilities, and infiltration/retention, use of a broader term such as “stormwater management facilities” or listing prioritized types of LID facilities may be included. In addition, inclusion of specific definitions for LID and GI in either the SSWDCS or CWMC may be considered, as well as the pending integration of the draft Residential Stormwater Design Standards in the SSWDCS.

These updates will collectively support and build upon the City’s LID/GI strategy.

References

City of Wilsonville. *Stormwater & Surface Water Design & Construction Standards. Section 3–Public Works Standards*. December 2015.

City of Wilsonville, *City of Wilsonville Comprehensive Plan*, October 2018.

City of Wilsonville, *Wilsonville LID Guidebook*, 2021.

City of Wilsonville, *Stormwater Management Program Document*, 2022.

City of Wilsonville, *Code of Ordinances*, March 2023.

City of Wilsonville, *Attachment 3 Draft Residential Stormwater Facilities Standards*, October 2023.

Oregon Department of Environmental Quality. *NPDES MS4 Phase I Individual Permit Clackamas Group Permit Modification #1*, 2023.

Appendix D

Hydromodification Assessment and Retrofit Strategy Update

Brown AND Caldwell

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Technical Memorandum

Prepared for: City of Wilsonville

Project Title: Wilsonville NPDES 2023-24

Project No.: 185493

Technical Memorandum

Subject: Infrastructure Retrofit and Hydromodification Assessment Update

Date: December 1, 2023

To: Kerry Rappold, City of Wilsonville

From: Angela Wieland, PE and Krista Reininga, PE

Prepared by: 

Angela Wieland, PE

Reviewed by: _____

Krista Reininga, PE

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Section 1: Introduction/Background

In the City of Wilsonville's (City) 2012 Phase 1 National Pollutant Discharge Elimination System (NPDES) municipal separate storm sewer system (MS4) permit (Permit), Schedule A.5 required the City to conduct a hydromodification assessment to examine the City's hydromodification impacts related to MS4 discharges, including erosion, sedimentation, and alteration to stormwater flow, volume, and duration that may cause or contribute to water quality degradation. The assessment and resulting report was required to "identify strategies and priorities for preventing or reducing hydromodification impacts related to the permittees MS4 discharges and identify or develop effective tools to reduce hydromodification". The report was required for submittal to DEQ by July 1, 2015.

Also included in the 2012 NPDES MS4 Permit, Schedule A.6., the City was required to develop a stormwater quality retrofit strategy that applied to developed areas of the City identified as impacting water quality and underserved or lacking stormwater controls. The strategy and resulting plan were required to include "a retrofit control measure project or approach priority list, including rationale, identification and map of potential stormwater retrofit locations where appropriate, and an estimated timeline and cost for implementation of each project or approach." As with the hydromodification assessment, this plan was also due to DEQ by July 1, 2015.

Schedule A.3.h of the City's 2021 NPDES MS4 Permit requires permittees by December 1, 2023, to "consider the impacts of policy, capital improvements, and retrofit projects on MS4 discharges to receiving waters, considering the goals and proposed actions described in the 2012 Permit's Hydromodification Assessment and Stormwater Retrofit Strategy reports (i.e., the 2015 submittals). Specifically, permittees are required to prepare "an assessment of any outcomes related to the Hydromodification Assessment and Stormwater Retrofit Strategy Reports." This assessment is required to include the following:

1. An assessment of how the Hydromodification Assessment and Stormwater Retrofit Strategy have been used, considered, or implemented since the time the reports were completed (see Sections 2.1 and 3.1);
2. Progress toward or completion of projects identified in the Retrofit Strategy priority list, and a qualitative assessment of the benefits of those projects (see Section 2.2);
3. Description of any further actions taken as a result of the Hydromodification Assessment, and a rationale for those actions since the writing of the reports (see Section 3.3);
4. Narrative describing progress toward addressing gaps in the hydromodification information or data related to waterbodies within the permittees' jurisdiction as identified in the Hydromodification Assessment (see Section 3.2); and,
5. New goals, tools, priorities, and planned or potential projects for addressing ongoing hydromodification and/or water quality impacts resulting from historical development/infrastructure, and for improving retrofit planning, considering information gathered in the time since the completion of the reports (see Sections 2.3 and 3.4).

The Permit requires the permittees to document this assessment in the third annual report (i.e., the 2023 annual report) as an appendix or subsection. This technical memorandum (TM) was prepared to fulfill the permit requirement. Findings and results are based on City review of completed and in-progress capital projects, code implementation, and pending programmatic and regulatory activities.

Section 2: 2015 Retrofit Strategy Summary

2.1 What was included in the Retrofit Strategy and how has it been used, considered, or implemented since 2015?

The City's 2015 Stormwater Retrofit Plan (Retrofit Plan) was developed to improve water quality in areas of the City that are currently underserved or lacking stormwater quality controls. The Retrofit Plan documented current (at the time of development) stormwater policies, projects, and programs related to water quality improvements. Implementation of the Retrofit Plan was intended to support the ongoing prioritization of water quality related capital projects (CPs) as documented in their 2012 Stormwater Master Plan (2012 SMP).

2.1.1 Policies

The City's stormwater policies and implementation measures outlined in the Retrofit Plan included: 1) locating regional facilities downstream of existing development to protect existing wetland and riparian areas; 2) prioritizing the implementation of Low Impact Development (LID) techniques for new development, redevelopment, and retrofitting existing development; 3) requiring post-developed water quality to be equivalent or better than the pre-developed water quality conditions: and 4) rehabilitation of outfalls identified in the 2012 SMP that cause erosion.

Implementation of the 2012 SMP included projects specifically related to outfall rehabilitation and regional facility installations (see Section 2.1.3), in accordance with identified policies.

The City adopted Stormwater and Surface Water Design and Construction Standards (SSWDCS) as Section 3 of their Public Works Standards in 2015. The SSWDCS reflects prioritization and use of LID practices and facilities to prioritize infiltration and treatment of stormwater runoff and requires flow control to replicate pre-development site hydrology. Implementation of the SSWDCS includes use of the BMP Sizing Tool to support the sizing of LID facilities to meet water quality and flow control requirements.

2.1.2 Programs

The Retrofit Plan also identified several programs that address or promote water quality treatment in underserved areas. These programs are related to implementation of the City's TMDL Implementation Plan (TMDL IP) for the Willamette Basin, as well as their Stormwater Management Program (SWMP) document. Programs include continued participation in riparian and upland planting efforts, including coordination with Friends of Trees; industrial and commercial facility screening and inspection; public outreach activities to educate the community about pollution prevention and water quality protection; and implementation of setbacks and buffers within the defined Significant Resource Overlay Zone (SROZ).

The City continues to maintain and refine these programs in accordance with updates to their TMDL IP (current date August 2022) and 2022 SWMP Document (developed per the 2021 NPDES MS4 permit reissuance).

2.1.3 Projects

The 2015 Retrofit Plan included review and re-prioritization of non-constructed CPs per the 2012 SMP and 2014 Capital Improvement Program (CIP). Although water quality was reflected in the prioritization of CPs within the 2012 SMP, specific focus on regulatory drivers and water quality metrics was not reflected. Twenty projects were included in this prioritization effort.

The City's updated prioritization/ scoring criteria reflected the following retrofit objectives:

- Progress Toward TMDL Wasteload Allocations (i.e., bacteria and mercury)

- Priority Areas for Treatment (i.e., focusing on areas with no structural stormwater treatment facility and high pollutant generating land uses)
- Temperature Control
- Erosion Prevention and Control (i.e., retrofit of outfalls or stream channel restoration where active erosion results in the transport of excess sediment, increasing turbidity and reducing instream water quality)
- Additional Objectives, including project integration, maintenance, livability/ sustainability, safety and land acquisition)

Since 2015, the City has used this updated scoring to supplement the original prioritization per the 2012 SMP and inform the City's 2-year Capital Improvement Program.

Current (2023) status of the projects listed in the Retrofit Plan are detailed in Table 1. Results of the retrofit-based prioritization effort per the Retrofit Plan are reflected in Table 1 as the "2015 Overall Score".

2.2 What progress has been made toward completion of projects identified in the Retrofit Strategy priority list, and what have been the benefits of those projects?

As reflected in Table 1, two projects have been constructed since 2015.

- WD-4B: Belknap Ct. Outfall Protection
- WD-4C: Morey Ct. West Outfall Protection

Both projects were not originally reflected in the 2012 SMP but were included in the 2014 CIP. The need to rehabilitate outfalls contributing to stream bank erosion, bank stabilization issues, and excessive sediment discharge to receiving waters was identified and added as a City policy per the 2015 Retrofit Plan.

2.3 What are the new goals, tools, priorities and planned or potential projects for improving retrofit planning to address water quality impacts resulting from historical development/infrastructure?

In 2021, the City initiated an update to their SMP to guide capital project and program needs over the next 20-year planning period. The updated (2023) SMP is currently in draft form, and adoption is anticipated in the Spring of 2024. It reflects CPs and programs that add or enhance water quality treatment, as well as address natural system deficiencies. The updated SMP was prompted by the need to address changing regulatory requirements as well as assess the storm system based on pending new and redevelopment activities.

Development of the 2023 SMP included a review and validation of CPs per the Retrofit Plan. Of the 18 unconstructed CPs listed in the Retrofit Plan, seven CPs were determined to be no longer be needed. Three projects were maintained for implementation under a proposed Porous Pavement/ Green Street Retrofit Program (P-2) per the 2023 SMP and the remaining eight projects were considered as a project opportunity with the 2023 SMP. Per the draft 2023 SMP, four of the projects were ultimately maintained as a costed CP for implementation. A summary of the validation effort is reflected in Table 1.

The City anticipates continuing its retrofit strategy in conjunction with finalization and implementation of the 2023 SMP. CP prioritization efforts per the 2023 SMP reflect more defined prioritization criteria related to water quality, vegetation management, and hydromodification/erosion prevention and mitigation. Of the 18 costed CPs in the 2023 SMP, a total of six CPs address water quality directly and five address erosion and sediment control issues.

In addition to implementation of the 2023 SMP, the City anticipates refinement of their SSWDCS in conjunction with the reissued 2021 NPDES MS4 permit by December 1, 2024. The City recently completed documentation of their Low Impact Development (LID)/Green Infrastructure (GI) Strategy, and proposed refinements will prioritize the types of LID facilities installed in conjunction with new development and clarify submittal requirements.

Table 1. 2015 Retrofit Assessment Project Status Update

2015 Retrofit Assessment Project ID	Project Name	Constructed?	2015 Overall Score [a]	Retrofit Assessment Findings			
				Review and Validation	Incorporation into 2023 SMP		
					Project Opportunity	Program Opportunity	N/A
LID3	SW Camelot Green Street Mid-block Curb Extension	No	16	Viable opportunity; may not require funding as a stand-alone CP		X	
LID7	SW Wilsonville Road Stormwater Planters	No	16	Viable opportunity; may not require funding as a stand-alone CP		X	
CLC-10B	Coffee Creek Storm Projects	No	16	Not Applicable–project number was a placeholder per the 2014 CIP and project coverage is consistent with 2012 SMP CLC-1 project.			X
BC-5	Boeckman Creek Outfall Realignment	No	13	• Project involves realignment of an existing outfall into Boeckman Creek (330' N of Wilsonville Rd) that was reportedly causing erosion, but the erosion issues were not identified/confirmed in 2022 stream assessment effort. • Project location overlaps another Project Opportunity Area per the 2023 SMP effort.	X		
CLC-6	Coffee Lake Creek South Tributary Wetland Enlargement	No	13	• Referenced as a long-term project need from source document of retrofit assessment. • Project location overlaps with a portion of the Boeckman Road mitigation area (Siemens/Ash Meadows) negating need. Current METRO project may also negate the project need.			X
BC-4	Gesellschaft Water Well Channel Restoration	No	13	Project still viable and construction may occur in conjunction with other infrastructure projects (Sewer Interceptor Trail project).	X		
LID2	SW Hillman Green Street Stormwater Curb Extension	No	13	Viable opportunity; may not require funding as a stand-alone CP		X	
BC-8	Canyon Creeks Estate Pipe Removal	No	12	• Short term/High priority CP need per retrofit assessment. • Project location overlaps another Project Opportunity Area per the 2023 SMP effort.	X		
CLC-3	Commerce Circle Channel Restoration	No	12	• Mid-term project need from source document of retrofit assessment. • Project location overlaps another Project Opportunity Area per the 2023 SMP effort.	X		
WD-4A	Willamette Way West Outfall Replacement	No	11	Project location is being monitored. No immediate project needs.			X
WD-4B	Belknap Ct Outfall Protection	Yes	11	Completed. Remove from list.			X
WD-4C	Morey Ct West Outfall Protection	Yes	11	Completed. Remove from list.			X

Table 1. 2015 Retrofit Assessment Project Status Update

2015 Retrofit Assessment Project ID	Project Name	Constructed?	2015 Overall Score [a]	Retrofit Assessment Findings			
				Review and Validation	Incorporation into 2023 SMP		
					Project Opportunity	Program Opportunity	N/A
BC-2	Boeckman Creek Outfall Rehabilitation	No	9	• Project involves rehab of five existing outfalls between Wilsonville Rd and Boeckman Rd that have erosion issues. • Erosion issues not identified/confirmed in the 2022 stream assessment. • Targeted retrofit of culverts has already occurred.			X
BC-10	Memorial Park Stream and Wetland Enhancement	No	9	• Project was originally intended to enhance the existing stream channel that flows into Boeckman Creek to the N of Memorial Park baseball field (near sanitary lift station). This stream receives flow from the Memorial Drive Swales which are just upstream. • Mid-term project need from retrofit assessment.	X		
CLC-1	Detention/Wetland Facility Near Tributary to Basalt Creek	No	8	• Referenced as a long-term project need from retrofit assessment but aligns with problem area. • Project location overlaps another Project Opportunity Area per the 2023 SMP effort.	X		
CLC-2	SW Parkway Avenue Stream Restoration	No	8	• Project is no longer needed, given onsite improvements for capacity (La Quinta). Remove from retrofit assessment.			X
CLC-7	Coffee Lake Creek South Tributary Stream Restoration	No	8	• Project is no longer needed as this location conflicts with new Public Works building. Current METRO project may also negate the project need.			X
CLC-8	Coffee Lake Creek Restoration	No	8	• Project is no longer needed. This location was associated with 5th and Kinsman Road Project, but the project is no longer viable in order to maintain access for Wilsonville Concrete.			X
CLC-5	Coffee Lake Creek Stream and Riparian Enhancement	No	7	• Referenced as a long-term project need from source document of retrofit assessment. • Limited access onto private property.			X
CLC-4	Ridder Road Wetland Restoration	No	7	• Referenced as a long-term project need from source document of retrofit assessment. • Not a high priority need for future restoration, but maintain as a future Project Opportunity Area.	X		

a. The overall score is per the 2015 Retrofit Assessment and was considered for the 2023 SMP as an indication of the preferred water quality projects per the 2012 SMP.

Section 3: 2015 Hydromodification Assessment Summary

3.1 What were the results of the Hydromodification Assessment? How has it been used, considered, or implemented since 2015?

The City's 2015 Hydromodification Assessment included a desktop GIS evaluation and field assessments, along with a review of the SSWDCS, Wilsonville Municipal Code (WMC) and other planning documents and watershed studies, to qualitatively evaluate stream channel conditions and identify locations where past development patterns and controls (or lack of controls) have resulted in significant stream channel impacts.

The 2015 Hydromodification Assessment found that stream channels in the city show hydromodification impacts from past development. These impacts include bed incision and bank erosion where flow has been restricted or concentrated or in headwater areas where smaller and less channelized flow is more common. With soil characteristics and the level of future development activity anticipated in the City, future development has the potential to exacerbate these impacts.

Strategies and recommendations per the 2015 Hydromodification Assessment included ongoing data collection and monitoring, continued implementation of the SSWDCS and other policies related to stream channel buffers and setbacks, and implementation of capital projects that enhance stream channel conditions and/or mitigate peak flow.

3.1.1 Monitoring

The field assessment effort from the 2015 Hydromodification Assessment focused on using hydromodification indicators to identify locations where the stream channel appeared to have been altered due to anthropogenic effects and where ongoing hydromodification impacts may be observed. Locations were flagged for future monitoring and investigations.

In conjunction with the 2023 SMP update, a geomorphic stream assessment was conducted to improve the understanding of stream processes and identify infrastructure risks in targeted (priority) stream reaches. The assessment included stream walks to evaluate channel conditions and inform capital project needs. Locations targeted for the stream walk included those locations previously flagged for future monitoring in the 2015 Hydromodification Assessment. These locations included:

- Arrowhead Creek at Jobsey Lane (site 001 per the 2015 Hydromodification Assessment)
- Boeckman Creek at Canyon Creek Park (site 008)
- Boeckman Creek along Boeckman Creek Canyon (site 010): erosion at stormwater outfalls on hillside above the creek
- Boeckman Creek at Gesellschaft Water Well (site 011): active erosion in outfall channel on hillside above the creek

3.1.2 Stormwater Design Standard Implementation

The City's stormwater design standards, which were being finalized at the time of the 2015 Hydromodification Assessment, recognize hydromodification risk in the City and reflect the use of LID facilities to promote infiltration. The standards also include both peak flow and flow-duration matching requirements to mimic historic pre-development hydrology. These standards were established to mitigate potential flow changes from future development, and they continue to be implemented in the City.

3.1.3 Capital Project Implementation

The 2015 Hydromodification Assessment identified CPs per the 2012 SMP and 2014 Capital Improvement Program that may enhance existing stream channel conditions and/or mitigate peak flows.

The current (2023) status of the projects listed in the 2015 Hydromodification Assessment is detailed in Table 2. As with the Retrofit Plan, development of the 2023 SMP included validation and development of capital projects intended to address locations with observed hydromodification risk. Table 2 also reflects how the projects listed in the 2015 Hydromodification Assessment were considered in the 2023 SMP.

Table 2. 2015 Hydromodification Assessment Project Status Update

2015 Hydromodification Assessment Project ID	Project Name	Constructed?	2015 Retrofit Project?	Review and Validation			
				Findings	Incorporation into 2023 SMP		
					Project Opportunity	Future Monitoring Need	N/A
CLC-9	Jobsey Lane Culvert Replacement	No	No	Project still viable per 2022 geomorphic stream assessment.	X		
CLC-8	Coffee Lake Creek Restoration	No	Yes	Project is no longer needed. This location was associated with 5th and Kinsman Road Project, but the project is no longer viable in order to maintain access for Wilsonville Concrete.			X
CLC-7	Coffee Lake Creek South Tributary Stream Restoration	No	Yes	Project is no longer needed as this location conflicts with the new Public Works building. Current METRO project may also negate the project need.			X
CLC-3	Commerce Circle Channel Restoration	No	Yes	• Project need coordinated with Day Road Improvements.	X		
BC-2	Boeckman Creek Outfall Rehabilitation	No	Yes	• Project involves rehab of five existing outfalls between Wilsonville Rd and Boeckman Rd that have erosion issues. • Erosion issues not identified/confirmed in the 2022 geomorphic stream assessment. • Targeted retrofit of culverts has already occurred.			X
BC-5	Boeckman Creek Outfall Realignment	No	Yes	• Project involves realignment of an existing outfall into Boeckman Creek (330' N of Wilsonville Rd) that was reportedly causing erosion, but the erosion issues were not identified/confirmed in 2022 stream assessment effort. • Project location overlaps another Project Opportunity Area per the 2023 SMP effort.	X	X	
BC-4	Gesellschaft Water Well Channel Restoration	No	Yes	• Project still viable and construction may occur in conjunction with other infrastructure projects (Sewer Interceptor Trail project).	X		

3.2 Were there any identified gaps in the hydromodification information or data related to waterbodies within the City's jurisdiction and, if so, what progress has been made in addressing gaps?

The City's 2015 Hydromodification Assessment focused primarily on urbanized areas of Boeckman Creek and Coffee Lake Creek. The assessment recommended that future hydromodification evaluations/ monitoring be conducted on recently completed CPs that involve instream work to provide a mechanism to track effectiveness of projects over time. In addition, the assessment recommended monitoring of stream conditions in areas adjacent to or directly downstream of planned or pending future development to establish a baseline stream condition with which to evaluate any future impacts.

As part of the 2023 SMP development effort, the geomorphic stream assessment effort included portions of Newland Creek and the unnamed tributary to the Willamette River that drains runoff from the Frog Pond East and South Planning Area. The expanded monitoring is intended to help establish baseline stream conditions in this newly developing area. The 2023 SMP draft also includes a planning project to continue geomorphic monitoring efforts at a defined frequency in select priority reaches. Implementation of this planning project would be subject to adoption by City Council.

In addition, physical condition monitoring (in conjunction with macroinvertebrate sampling) is also reflected in the updated Clackamas County Coordinated Stormwater Monitoring Plan (CCCSMP), updated in 2023, and reflecting a July 1, 2023 implementation start date.

3.3 What further actions have been taken as a result of the Hydromodification Assessment, and what was the rationale for those actions?

As described in Sections 3.1 and 3.2, additional monitoring and consideration of hydromodification objectives with CP development and prioritization was considered in the development of the draft 2023 SMP, pending adoption by City Council.

In addition, the city anticipates updates and refinement of their SSWDCS in conjunction with the reissued 2021 NPDES MS4 permit by December 1, 2024. This continued refinement will ensure effective implementation of the City's flow-duration based stormwater design standards.

3.4 What are the City's new goals, tools, priorities, and planned or potential projects for addressing ongoing hydromodification?

Due to the conclusions from the 2015 Hydromodification Assessment as provided in Section 3.1, 3.2 and 3.3, the City plans to address hydromodification risk areas with implementation of their 2023 SMP, including CP installations and monitoring of stream channel conditions at frequencies established in accordance with planning projects. The City continues to implement stream setbacks and buffers with new development, and continues to enforce their SSWDCS.

Appendix E

Erosion Control Escalating Enforcement Procedure

POLICIES & PROCEDURES

City of Wilsonville
Engineering Division
29799 SW Town Center Loop E
Wilsonville, OR 97070
503.682.4960
www.ci.wilsonville.or.us

Erosion Control Enforcement Standard Operating Procedure	Adopted: June 30, 2023 Last Reviewed: --
EPP 001	Next Review: --

Table of Contents

Summary

This Standard Operating Procedure (SOP) outlines the steps for escalating enforcement action on active construction sites that disturb more than 500 square feet of area.

Policy

Wilsonville recognizes the importance of protecting the environment and providing for the long-term stewardship of our natural resources. In an effort to protect our water resources (i.e., receiving waters such as rivers, streams and wetlands), erosion control permits are required for all construction projects that measure more than 500 square feet in area.

Through its plan review, permit issuance and inspection process, the City's erosion control program is intended to focus on outreach and education to best prevent erosion and control sediment before it becomes a problem. Ensuring erosion control plans are adequately prepared and reviewed and best management practices are installed, inspected and approved by City staff prior to other permits being issued, helps to meet these program goals. There are circumstances, however, where additional steps may be necessary to correct erosion and sediment control issues to protect water resources and the City's stormwater system.

This Standard Operating Procedure provides guidance in administering and enforcing the Wilsonville Code and complying with the City's National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer Systems (MS4) Phase I permit.

Applicable Code, Permit and Standards

Wilsonville Code

- Section 8.317 — Erosion Prevention and Sediment Control (Link)
- Section 8.318 – Stormwater – Violations (Link)

NPDES MS4 Phase I Permit

- Schedule A.3.d. – Construction Site Runoff Control (Link)
- Stormwater Management Program 2021 (Link)

City of Wilsonville Public Works Standards

- Section 101.9.00 – Environmental Protection, Erosion Prevention, and Sediment Control (Link)

Erosion Prevention and Sediment Control Planning Design Manual

- Planning and Design Manual – June 2020 (Link)

Procedures

The process below will be followed for erosion control plan review, inspections and escalating enforcement action responses.

Erosion Control Permits

Permit Types

All construction projects that disturb more than 500 square feet in area are required to obtain an erosion control permit. The City issues four types of permits, depending on the size and complexity of the project. All permits can be obtained through the City's online permitting portal: www.ci.wilsonville.or.us/online-portal.

1. EC-1 – Erosion control sites > 500 square feet and < 1 acre of disturbance
2. EC-1200CN – Erosion control sites > 1 acre and < 5 acres of disturbance
3. EC-1200C – Erosion control sites > 5 acre
4. EC-1200CA – All City capital projects > 1 acre

Plan Review

For every erosion control permit type, the application shall include an erosion and sediment control plan (ESCP). The ESCP contains site specific measures and best management practices (BMPs) to be implemented during all phases of construction to prevent visible and/or measureable sediment or sediment-laden runoff from the site. For projects between 1 and 5 acres, the ESCP shall comply with the DEQ NPDES 1200-C ESCP requirements, but a DEQ-issued NPDES 1200-C permit is not required. For projects over 5 acres, both a DEQ-issued NPDES 1200C permit and a City-issued EC-1200C permit are required. The ESCP for all City capital projects, disturbing more than 1 acre, shall comply with the DEQ-issued NPDES 1200-CA requirements.

ESCPs and proposed BMPs for erosion and sediment control are reviewed according to the general site characteristics (i.e., slope, cover, vegetation, etc.), the construction schedule, and the proposed drainage of the site. Implementation of the erosion and sediment control measures is required prior to and concurrent with construction activities. It is the applicant/contractor's responsibility to ensure that all erosion control measures remain in good working order throughout the duration of the project.

Permit Issuance

Once the ESCP has been reviewed and approved by City staff, the erosion control permit can be issued. For sites larger than 1 acre, a pre-construction meeting will be required prior to issuance of the permit. For sites greater than 5 acres, a City-issued EC-1200C permit will not be issued until after the City receives a copy of the DEQ- issued NPDES 1200C permit.

Inspections

The City conducts a minimum of three (3) inspections during the construction period and more frequently if general site characteristics, weather conditions, and/or results of previous inspections indicate that structural and non-structural erosion control measures are in need of maintenance or may

not perform as expected. Inspections are intended to determine if the approved ESCP is being adequately implemented and effective in preventing erosion and sediment from the construction site.

Tree Protection Fencing
Prior to any other work onsite, including the installation of erosion control BMPs, tree protection fencing shall be installed, inspected and approved by City staff.

Initial Inspection
Once tree protection fencing has been approved by City staff, erosion control measures shall be installed in accordance with the approved ESCP. No other work can occur onsite including demolition, grubbing, stump removal or grading, until erosion control measures have been installed, inspected and approved by the City. No other City permits shall be issued until erosion control measures have been approved by the City.

Mid-Project Inspection
For single-family home construction, around the time that a project requests a framing inspection, the City should perform a mid-project inspection. For all other projects, the City should perform at least one mid-project inspection to assure that the existing BMPs are still being maintained and functioning as intended.

Final Inspection
Prior to final project close-out, after the site has been stabilized and all construction activities have ceased, the City will perform a final inspection. Final occupancy permits will not be issued until the site has been stabilized, inspected and approved by the City.

Other Inspections
In addition to the inspections listed above, the City may perform additional inspections to respond to complaints from the public or other agencies or to follow up on previous inspections that identified erosion control measures that needed to be corrected.

Escalating Enforcement Action Responses

The City's erosion control program is designed to work with developers, consultants, contractors and other permit holders during the development process to achieve the mutual goal of meeting erosion and sediment control requirements and to protect the environment to the maximum extent possible. This is achieved through standard verbal communication or through inspection reports. When these efforts fail to ensure compliance, the following enforcement steps will be taken.

Step 1. Inspection Notice of Correction

Deficiencies in erosion control best management practices (BMPs) will be documented on the City's inspection form. Permittees will be given a verbal notice of the deficiencies as well as an electronic inspection report. For initial inspections, no other permits will be issued by the City until all deficiencies have been corrected. For mid- project and other inspections, the deficiencies will be documented and the permittee will be given three (3) business days to make corrections. If corrections are not made within three (3) business days, enforcement will escalate to the next step. If there is a confirmed or imminent

threat of significant sediment leaving the site and entering a water resource or the City's stormwater system, a Stop Work Order may be issued as noted in Step 3.

Step 2. Notice of Violation

If the permittee does not correct the deficiencies noted in Step 1 within the three (3) business days allowed, the City will follow up with a formal Notice of Violation (Appendix A), as well as documenting the remaining deficiencies in an electronic inspection report. The formal Notice of Violation will be given to the permittee to formally notify them that they are not compliant with the permit conditions and/or city codes and ordinances. The purpose of this notice is to provide a warning that clearly outlines that more serious consequences will result if deficiencies are not corrected within three (3) business days of this notice.

Step 3. Stop Work Order

If Steps 1 and 2 above do not ensure compliance, or if there is an imminent threat of sediment leaving the site and violating Wilsonville Code (WC) Section 8.317, a Stop Work Order (Appendix B) will be issued. The Stop Work Order will be issued by the City Manager, or designee, in accordance with WC 8.318(4). Upon issuance of the Stop Work Order, all work on the development site shall halt except work necessary to correct the violations. The Stop Work Order shall not be lifted until mitigation measures are implemented, inspected and approved by the City.

Other Compliance Measures

Wilsonville Code (WC) Section 8.318 provides for additional measures if Steps 1-3 do not produce a compliant situation. It is assumed that these measures will be used sparingly and only in extreme cases.

- Termination of Permit(s)
  WC Section 8.318(5) allows the City to revoke any and all other site permits associated with a specific site development to ensure compliance.

- Civil Penalties and associated actions
  WC Section 8.318(6) allows the City to impose civil penalties, as well as any other enforcement measures allowed in Wilsonville Code. Civil penalties, when imposed, will be levied in accordance with the established amounts dictated by Wilsonville Code.

Appendixes

A. Notice of Violation form
B. Stop Work Order

Appendix A

City of Wilsonville
Engineering Division
29799 SW Town Center Loop E
Wilsonville, OR 97070
503.682.4960
www.ci.wilsonville.or.us

NOTICE OF VIOLATION

Date/Time: _____

Address: _____ EC Permit No: _____

Location of non-compliance (use nearby address if non-compliance off-site):

Description of non-compliance:

Corrective action needed:

Issue date: _____ Posted by: _____
Date/Time Print Name: _____
Title: _____

Contacted someone non-site regarding non-compliance? ☐ Yes ☐ No

CORRECTION REQUIRED WITHIN 3 BUSINESS DAYS OF NOTIFICATION

Appendix B

City of Wilsonville
Engineering Division
29799 SW Town Center Loop E
Wilsonville, OR 97070
503.682.4960
www.ci.wilsonville.or.us

STOP WORK

ADDRESS: _____

EC PERMIT NO: _____

This site has been inspected and an order to stop work issued for the following reasons:

You are in violation of Wilsonville Code Section 8.317 – Erosion Prevention and Sediment Control. Therefore, by authority of Wilsonville Code Section 8.318(4) you are required to immediately stop all work except work directly related to correction the erosion and sediment control violations. Work shall not resume until such time as the City Manager or designee provides specific approval in writing.

This order is dated _____

By _____

City Manager or Designee

Posted: _____ Posted by: _____

Date/Time Print Name: _____

Title: _____

DO NOT REMOVE THIS NOTICE UNTIL AUTHORIZED BY THE CITY ENGINEER