



Oregon City

Infrastructure Retrofit and Hydromodification Assessment Update

December 1, 2023

Section 1: Introduction/Background

In Oregon City's (City's) previous 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 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 report was required to *"identify strategies and priorities for preventing or reducing hydromodification impacts related to the co-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 Permit, in Schedule A.6., was a requirement to develop a stormwater quality retrofit strategy that applied to developed areas that were identified as impacting water quality, and that were identified as underserved or lacking stormwater controls. The plan was 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 current 2021 NPDES MS4 Permit requires co-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 previous permit's Hydromodification Assessment and Stormwater Retrofit Strategy reports"* (i.e., the 2015 submittals). Specifically, co-permittees are required to prepare *"an assessment of any outcomes related to the Hydromodification Assessment and Stormwater Retrofit Strategy Reports."* This documented assessment is required to include the following:

- A. *An assessment of how the Hydromodification Assessment and Stormwater Retrofit Strategy have been used, considered, or implemented since the time the reports were completed;*
- B. *Progress toward or completion of projects identified in the Retrofit Strategy priority list, and a qualitative assessment of the benefits of those projects;*
- C. *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;*
- D. *Narrative describing progress toward addressing gaps in the hydromodification information or data related to waterbodies within the co-permittees' jurisdiction as identified in the Hydromodification Assessment; and,*
- E. *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.*

The Permit requires the City to document this assessment in the third annual report (i.e., the 2023 annual report) as an appendix or subsection. This documented assessment was prepared to fulfill this requirement and is being included as an appendix to the 2023 annual report.

Section 2 of this assessment provides a summary of the previous retrofit strategy, progress made since the strategy was submitted in 2015, and goals for moving forward. Section 3 of this assessment provides a summary of the previous hydromodification assessment, progress made since the assessment was submitted in 2015, and goals for moving forward. Section 4 provides an overall summary.

Section 2: 2015 Retrofit Strategy Summary

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

The City's 2015 retrofit strategy objectives were to: reduce pollutants of concern and reduce hydromodification impacts. To address these objectives, the strategy included the following:

- ✓ Update the Oregon City Stormwater Master Plan – The City committed to developing an updated stormwater master plan to replace the previous 1988 plan. One of the main objectives of developing an updated master plan was to provide an evaluation and inventory of proposed capital improvement projects (CIPs) to address water quality. This included a review of existing flood control facilities for retrofit opportunities to also address water quality, and it included an identification of potential opportunities for new water quality facilities. Another objective of the master plan was to develop and include CIPs to address problems identified in the City's hydromodification assessment.
- ✓ Incorporate Stormwater Treatment Measures into Transportation/Road Improvement Projects When Feasible – A continuing strategy for the City was to provide stormwater treatment elements with road improvement projects. Examples of these types of projects began in 2007 and included the Beavercreek Road Improvement Project (2007, stormwater planters), 10th Street Project (2008, stormwater planters), Warner-Milne Road Project (2010, raingarden), and the McLoughlin Boulevard Enhancement Project, Phase 2 (2015, water quality swales). This element of the strategy stated that newer projects implemented since the City's stormwater design standards were updated in 2015, will adhere to the standards to emphasize low impact development practices, source controls and to address hydromodification through flow duration matching. The purpose of this element of the strategy was to commit to continuing with these types of projects as road project opportunities arise.
- ✓ Investigate Treatment Retrofit Opportunities on City-owned Properties - This element of the City's strategy was to incorporate retrofit opportunities on City-owned properties when opportunities arise. Potential examples listed included: 1) working with the Greater Oregon City Watershed Council to construct a water quality swale to improve conditions in the "Scatter Canyon" area of the Mountain View Cemetery which flows into Newell Creek (this was also identified as a project to address a hydromodification issue); and 2) incorporating water quality retrofits into upcoming improvement projects to municipal buildings (e.g., the Public Safety Building and the Public Works Operations Center).

Since 2015, the City has been using the strategy to implement water quality retrofit projects. The status of project implementation is provided in Section 2, Item 2.

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

The following retrofit projects have been completed since 2015 to implement the retrofit strategy:

- ✓ Update the Oregon City Stormwater Master Plan: The City met their commitment to develop an updated stormwater master plan. The Stormwater Master Plan was updated in 2019 and adopted by Ordinance 19-1014 on March 18, 2020, being effective on April 17, 2020. The updated stormwater master plan includes a water quality/retrofit assessment (Section 5 of the Master Plan). The City's overall recommended CIP list in the master plan includes a total of 12 CIPs. Six of these CIPs include water quality enhancement including the following:
 - Oregon City Shopping Center treatment facility for discharges to Clackamette Cove.
 - South End Road Stormwater Improvements (to include potential water quality enhancements),

- Pebble Beach Pond Retrofit (retrofit pond to provide water quality treatment),
- Coffee Creek Stream Restoration,
- Scattering Canyon Stormwater Improvement (stream restoration and water quality enhancement), and,
- Newell Canyon Outfall Assessment (assess outfalls to address problems associated with erosion and downcutting).

Of the six water quality CIPs, the Scattering Canyon Stormwater Improvement project, and the Newell Canyon Outfall Assessment were implemented (as described in Section 3, Item 3) given that these projects are retrofit projects that also address hydromodification impacts. The Newell Canyon Outfall Assessment resulted in the identification of a CIP need to restore ravine located at the downstream end of an outfall at Beemer Way. This Beemer Way Outfall project was completed in August of 2023, and is also described in Section 3, Item 3.

- ✓ Incorporate Stormwater Treatment Measures into Transportation/Road Improvement Projects When Feasible:
 - While many roadside stormwater facilities have been constructed in Oregon City since 2015, these facilities were associated with new development projects and not classified as retrofits.
- ✓ Investigate Treatment Retrofit Opportunities on City-owned Properties: The following retrofit projects were constructed on City-owned properties.
 - Oregon City Operations Complex - Rain gardens and stormwater planters were constructed to treat 50,135 square ft drainage area.
 - Carnegie Library Expansion - One vegetated planter was constructed treating 14,500 sf.
 - Mountain View Cemetery, Scattering Canyon – An outfall stabilization and water quality facility was constructed to address a significant instream erosion problem. The outfall drains an area of approximately 33.5 acres. See Section 3, Item 3 for a description of this project.

In terms of benefits of the projects, the master plan project enabled the City to evaluate the storm system City-wide to identify and prioritize water quality projects and provide a roadmap for capital project implementation. The Scatter Canyon and Beemer Way Outfall projects have been implemented and are addressing identified stream erosion issues and preventing significant sediment discharges. In addition, an additional approximately 64,000 sf of previously untreated impervious surface on City-owned property is now being treated with green water quality facilities.

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?

No Stormwater Master Plan projects or road improvement projects including stormwater quality treatment facilities are planned for implementation in the next biennium.

Section 3: 2015 Hydromodification Assessment Summary

1. 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 field assessment that was conducted for the City's 2015 hydromodification assessment prioritized urbanized areas of the Abernethy Creek watershed, including the Newell Creek subbasin. In terms of any gaps, the assessment indicated that it would be beneficial for future hydromodification evaluations to include the investigation of additional areas including tributaries to Beaver Creek (Caufield, Mud, and Central Point basins). The purpose of the additional investigations would be to look for hydromodification indicators and identify potential in-stream capital project locations to address issues as identified. It was suggested that these investigations could potentially be conducted as part of the City's upcoming stormwater master plan and that data collected from the City's ongoing water quality and macroinvertebrate sampling could also be used to inform hydromodification project priorities.

In 2016, as part of the City's stormwater master plan update, field evaluations were conducted to expand and enhance the 2015 hydromodification assessment results and address gaps. Locations for the 2016 field assessment were selected based on known problem areas, annual problem area monitoring sites, and locations throughout the Beaver Creek tributary subbasins that were not evaluated in 2015. Field visits to the tributaries of Beaver Creek showed that the channels downstream of large residential developments appeared to be stable and preserved in their natural states and that hydromodification did not appear to be occurring in these areas. Newer development in these areas had been designed with required water quality and flow control facilities that appeared to be protecting the integrity of the tributaries and natural systems.

2. What were the results of the Hydromodification Assessment and how has it been used, considered or implemented since 2015?

The 2015 hydromodification assessment conducted by the City included a desktop GIS assessment of watershed conditions, a field assessment, a review of existing planning documents to identify whether current land use policy and development standards were adequate to protect against further impacts, and an evaluation of planning documents and watershed studies to identify projects that will restore impacted channels or help manage stormwater runoff to better mimic historical conditions.

Results of the assessment included the following recommended programs and projects:

- Data collection and data gaps – As mentioned above, a recommendation was made to conduct further field assessments of the Beaver Creek tributaries to address gaps from the 2015 field assessment.
- Develop an updated Stormwater Master Plan – This recommendation included support for updating the City's stormwater master plan and for including capital projects to address identified hydromodification issues.
- Monitor problem areas – Annual inspections were recommended to monitor known problem areas and proposed capital project locations.
- Capital projects – Four potential capital projects were proposed to carry forward for consideration in the update of the City's stormwater master plan.

The recommendations from the hydromodification assessment were considered and incorporated into stormwater master planning efforts. The City's stormwater master plan was finalized in 2019.

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

The following actions were taken to address the recommendations that resulted from the 2015 hydromodification assessment that are listed above.

- Data collection and data gaps – As described above, an additional field assessment was conducted in 2016 to assess the Beaver Creek system for potential hydromodification issues.
- Develop an updated Stormwater Master Plan – The City updated their stormwater master plan and included consideration of hydromodification issues and projects in the update of the plan. As a result, capital projects were recommended (see item 4 below).
- Monitor problem areas – Visual inspections were conducted at outfall locations.
- Capital projects – Twelve capital projects were prioritized for implementation in the City's updated Stormwater Master Plan. Three of the projects implemented to address hydromodification issues are as follows:
 - **Scattering Canyon Stormwater Improvement:** The Scattering Canyon Stormwater Improvement project was proposed to address a identified hydromodification impacts (erosion/downcutting) occurring at an outfall location on a tributary to Newell Creek in the Mountain View Cemetery property. The creek was experiencing hydromodification in the form of severe channel incision and erosion near the outfall. This project was included in the master plan and construction of the project was completed in 2022. The project includes a pollution control manhole and 16 check dam structures that direct water quality flow to a treatment swale controlling flow and reducing erosive energy. Large boulders and vegetation were placed near the existing outfall to prevent further incision. Multiple boulder check dams were installed in the swale for flow control to reduce erosive energy.
 - **Newell Canyon Outfall Assessment:** The area around Newell Creek, commonly referred to as Newell Canyon, has several locations where erosion, bank sloughing, and landslides have occurred during and following storm events. The canyon is largely protected from development because of Metro ownership and protections. However, prior development of the drainage area contributing to Newell Canyon has resulted in some degradation of the natural systems. Newell Canyon has been established as a problem area that is characterized by steep slopes, erodible soils, and numerous stormwater outfalls and small drainage tributaries. The development in this watershed is generally lacking stormwater management facilities. The combination of development without flow controls and highly erodible soils has resulted in observed stream incision, erosion at the outfalls, and severely altered stream channels. Newell Canyon hillsides have also experienced sloughing and small landslides, though those problems cannot be attributed solely to stormwater runoff. Newell Creek has some areas of severe downcutting and incision in the upper reaches of the creek but lower reaches of the creek through the base of the canyon seem to be well preserved. Stream surveys and site visits in 2015 and 2016 documented areas where stormwater outfalls showed noticeable degradation. Outfalls showed visible increases in erosion and degradation over the course of 12 months. There is concern that ongoing degradation may lead to more significant bank and hillside stability problems.

The project proposed in the master plan was to conduct further study to evaluate the outfalls in the Newell Canyon area. This would include conducting a widespread outfall assessment to evaluate stormwater outfalls, identify significant problem locations, and develop concept plans to stabilize degrading systems. This outfall assessment was completed in 2022 and included inspection of 17 sites. As a result of the inspections, a new project to restore and outfall was identified for implementation at Beemer Way. This project is described in the following paragraph.

- **Beemer Way Outfall Project:** Due to the nature of the Beemer Way Outfall, the ravine had started to deteriorate, and the side slopes had started to erode. The City identified this outfall as a near term project in 2022 and begin working on a design to repair the outfall, stabilize the slopes and provide mitigation plantings within the ravine. The City worked with multiple government agencies including the US Army Corps of Engineers, Department of State Lands, and the Department of Environmental Quality. The ravine was regraded to remove the perched outfall and to repair and armor the eroded slopes. A new concrete headwall was constructed with a stoned swale that reduces the energy and velocity of the stormwater discharge. Native plant species were also included in areas impacted by the work. The project was completed in August, 2023. The City plans to continue to monitor this outfall and provide maintenance as needed.

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

The City will continue to implement projects from the Stormwater Master Plan as budget and resources allow. The City will also continue to implement the Oregon City Stormwater and Grading Standards for private development and public infrastructure projects. These standards require rigorous flow duration matching requirements to prevent hydromodification impacts to streams from new and redevelopment. The City also plans to follow up with minor maintenance activities and observations for the Newell Canyon outfalls, and will expend outfall evaluations to other parts of the City.

Section 4: Summary

In summary, since the 2015 Retrofit Strategy and Hydromodification Assessments were conducted, the City accomplished some significant efforts toward identifying and implementing projects to address these issues. Two of the efforts were planning efforts including: 1) development of a Stormwater Master Plan to identify capital projects including those that address water quality issues; and 2) completion of field assessments of the Beaver Creek and Newell Canyon areas to identify project needs for addressing hydromodification impacts. As a result of these assessments/plans, two significant projects were designed and constructed including the \$542,000 Scatter Canyon outfall/stream stabilization and water quality facility, and the \$310,000 Beemer Way outfall project. Both of these hydromodification related projects are also considered as system retrofits. In addition, rain gardens and planters were constructed in association with the Oregon City Operations Complex and the Carnegie Library Expansion providing treatment for previously untreated drainage areas. The City will continue to implement projects from the Stormwater Master Plan as resources allow.