Otak

City of Washougal

Stormwater Master Plan

Adopted

Submitted to:

City of Washougal
2247 Main Street
Washougal, WA 98671

Prepared by:

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Acknowledgements

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Submitted to

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Adopted, Washougal City Council

by Consent, Agenda Bill #22-2024, June 10, 2024

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Abbreviations and Acronyms

CARA	Critical Aquifer Recharge Areas
CIP	Capital Improvement Program
ERU	Equivalent Residential Unit
FTE	Full Time Equivalent
GIS	Geographic Information System
HOA	Home Owners Association
LID	Low Impact Development
LOS	Level of Service
NPDES	National Pollutant Discharge Elimination System
O&M	Operation and Maintenance
SFAP	Stormwater Financial Assistance Program
SMA	Stormwater Management Actions
SMAP	Stormwater Management Action Plan
SMP	Stormwater Master Plan (this document)
SR	State Road
UGA	Urban Growth Area
UIC	Underground Injection Control
WAC	Washington Administrative Code
WMC	Washougal Municipal Code

Section 1. Introduction

Purpose and Objectives

The City of Washougal (the City) is located on the eastern edge of Clark County in the greater Vancouver, Washington area along State Route 14. The City is on the banks of the Columbia River and contributes runoff to the Washougal River, Gibbons Creek, and Lacamas Creek that all flow into the Columbia River (City of Washougal, March 2023). The population of the city is approximately 17,000 (U.S. Census Bureau, 2024). Washougal city limits and vicinity map are shown in Figure 1.

Stormwater runoff occurs when rain or snowmelt can't percolate into the ground or evaporate into the air. The City owns and operates a municipal stormwater drainage system and associated stormwater facilities that have been constructed over decades. The City manages stormwater runoff both to avoid ponding and flooding resulting from runoff from streets or roofs and to comply with state and federal regulations that protect the quality of water bodies such as streams, lakes, rivers, and groundwaters. The municipal storm sewer system consists of more than 2,000 individual structures and more than 40 miles of ditches and pipes as documented in Section 3.

The purpose of this Stormwater Master Plan (SMP) is to support the management and operation of the City's storm sewer system over the next 10 years. The SMP provides recommendations for operating and maintaining the system, maintaining regulatory compliance, and capital improvements. Preliminary staffing recommendations and capital improvement costs developed during the planning process were used in the City's 2023 utility rate study, and the SMP documents the justification for the capital improvements and recommended increase in staffing.

The primary outcomes of the SMP include:

- Formally documenting current deficiencies in the municipal storm sewer system and associated water quality facilities (known issues).
- Identifying and prioritizing capital improvement projects and maintenance programs to solve the most urgent known issues.
- Estimating and dividing the cost of proposed capital improvements over a ten-year period.
- Anticipating regulatory changes and inventory growth that could require additional staffing to manage.

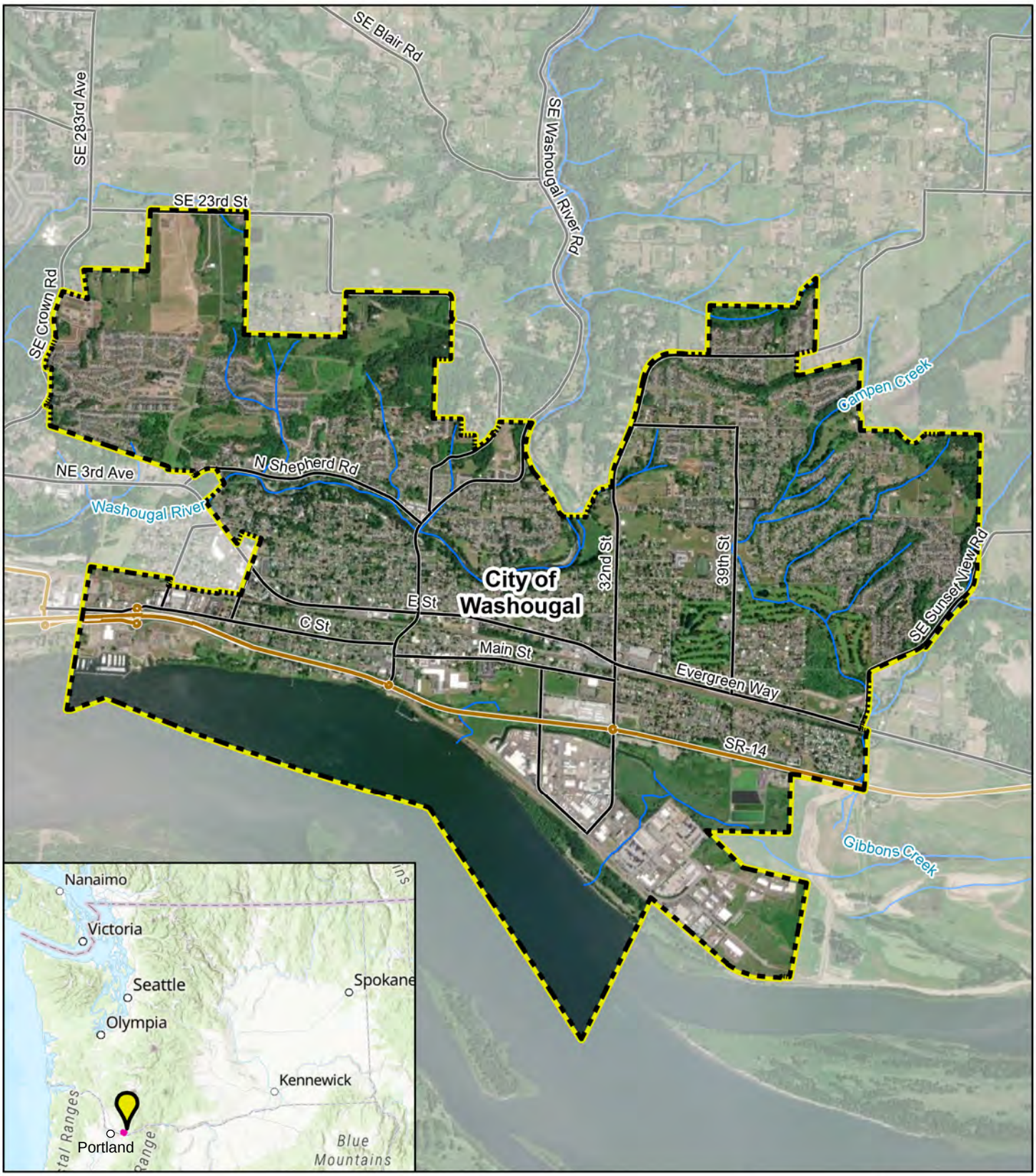

FIGURE 1
WASHOUGAL CITY LIMITS AND VICINITY
WASHOUGAL SMP

City Limits
Streams
Highway
Major Road

0 0.5 1 Mile

Date: 2/7/2024
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

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Stormwater Division Organization and Staffing

The City's Stormwater Division within the Public Works Department manages the City's storm sewer system with support from the Community Development Department. The Stormwater Division is responsible for:

- Maintaining compliance with stormwater permits and regulations (outlined below);
- Inspecting public and private stormwater facilities;
- Maintaining all public stormwater facilities to ensure that they continue to operate as designed to protect surface waters and groundwater;
- Mapping and inventorying the storm sewer and stormwater facilities;
- Responding to spills and inspecting outfalls and catch basins for illicit discharges;
- Sweeping City streets to reduce stormwater impacts associated with runoff from lands owned and operated by the City; and
- Capital project administration.

Other divisions within the Community Development Department provide support to the Stormwater Division by helping with development plan review (of stormwater plans and permits), code compliance, source control, capital project management, and other tasks as required.

Currently, the Stormwater Division is responsible for the maintenance of 1,700 catch basins, 175 drywells, 160 treatment facilities, 20 detention ponds, over 36 miles of stormwater pipe, and 10 miles of ditches. Washougal's unique location along the banks of the Columbia River makes it extremely important that stormwater runoff be adequately treated before discharging to surface waters with critical habitat.

The total full-time equivalent (FTE) positions funded by the City's stormwater utility is 6.50, some of which are employed by other City divisions or departments, as described above, or provide Public Works administration. The stormwater utility funded 5.45 FTE in 2022 and 5.3 in 2021, resulting in a 1.05 and a 1.2 FTE increase, respectively. In 2023, City staff reported that the Stormwater Division had four dedicated FTEs that include one Utility Supervisor, one Operations Specialist, and two Maintenance Workers. The remaining 2.5 FTE are distributed across other departments such as Finance, Community Development, and the City Manager's office. The work of those staff outside of the Stormwater Division has not been documented in this plan. In the spring, the City hires additional seasonal workers to assist with the maintenance of the storm sewer system facilities through the summer months as needed. See the Stormwater Division organization chart in Figure 2.

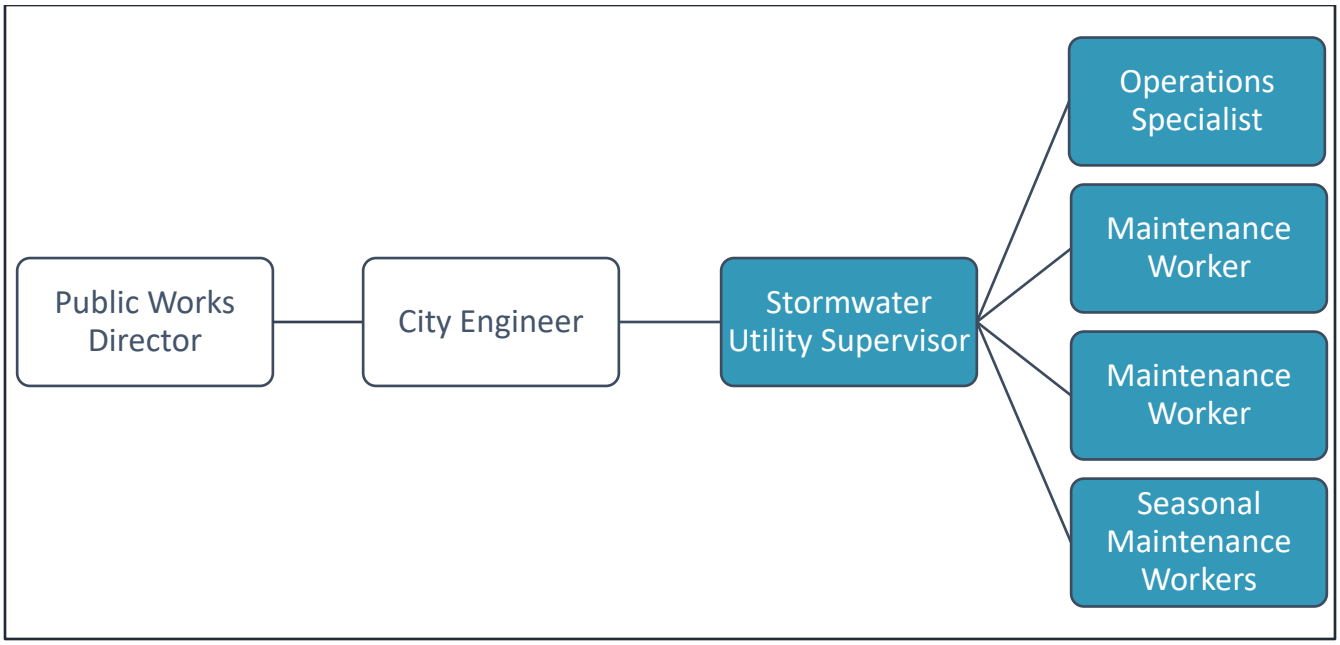

Figure 2 Stormwater Division Organization Chart

Regulatory Context and Relationships

The primary regulatory driver of stormwater management activities in the City is the Western Washington Phase II Municipal Stormwater Permit (Permit). The Permit implements the National Pollutant Discharge Elimination System (NPDES) program of the federal Water Pollution Control Act (Clean Water Act) and the State of Washington Water Pollution Control Law. The Washington State Department of Ecology (Ecology) develops and administers the Permit.

The Permit authorizes the discharge of stormwater runoff to surface waters and to groundwaters of the State from the municipal storm sewer system owned and operated by the City.

Washougal's current permit is effective August 1, 2019 through July 31, 2024. A draft of the 2024-2029 Permit has been issued. The final Permit likely will be issued in July 2024, after publication of this SMP. A summary of the potential new or updated requirements that could result in additional cost, new policies, or the need for additional staffing after 2024 includes:

- Adopt tree canopy goals and requirements by 2028 to support stormwater management and water quality improvements; begin mapping tree canopy on City-owned properties.
- Add information about PCBs in stormwater runoff to source control education materials and update illicit discharge ordinance to avoid entry of PCBs into the City's storm sewer system.
- Collect more data in order to increase detail of storm sewer system maps.
- Reduce threshold for requiring runoff treatment stormwater facilities on some development sites and road projects.
- Construct new City stormwater facilities to treat untreated runoff from 1.7 acres of land and/or introduce new source control practices to treat runoff from an equivalent area.
- Increase street sweeping to reduce stormwater contaminants on City roads.
- Adopt the anticipated 2024 update of Ecology's *Stormwater Management Manual for Western Washington (SWMMWW)*.

Discharges to groundwaters of the State through Underground Injection Controls (UICs) are regulated under the state UIC program, Chapter 173-218 Washington Administrative Code (WAC). A UIC well is a structure built to discharge fluids from the ground surface into the subsurface. Common examples of UIC wells in Washougal include drywells and infiltration trenches with perforated pipe. The UIC program is a provision of the federal Safe Drinking Water Act administered by Ecology. The UIC program regulates UIC wells used to manage stormwater (Class V wells) and requires wells used to manage stormwater to meet two requirements, as follows:

- The non-endangerment performance standard prohibits discharges that allow movement of fluids containing contaminants to reach groundwater, and
- UIC facility owners/operators must register their UIC wells with Ecology.

In 2019, Ecology incorporated updated UIC program guidance into the 2019 SWMMWW and allowed permittees of the Permit to implement a single Stormwater Management Program that combines requirements for municipal UICs used to manage stormwater and the storm sewer system. The Washougal 2023 Stormwater Management Program included activities both to manage UIC wells and the storm sewer system.

The Washougal Municipal Code (WMC) Chapter 14.28 Stormwater Utility establishes the City's surface and stormwater utility for the purpose of construction, condemnation and purchase, acquisition, addition to, maintenance, conduct and operation, management, regulation and control of the surface and stormwater within the boundaries of the city, as necessary to protect the health, safety, and welfare of the citizens of the City. The utility is administered by the City's Public Works Director.

The City's *Engineering Standards for Public Works Construction* (Engineering Standards) establishes the standards for design and construction of public improvements. This includes streets, bikeway, drainage, water, and sanitary sewer. Through the Engineering Standards, the City has established requirements for the design of stormwater facilities intended to protect the public health, safety, and welfare from damage due to flooding. Beyond that level of protection, additional measures are specified in this chapter that are intended to protect water quality, protect stream channels from the adverse effects of increased stormwater runoff, minimize any potential flooding damage, and allow for efficient operation, repair, and maintenance of the storm drainage system (City of Washougal, 2022).

In addition to the Engineering Standards, the City adopted the 2019 SWMMWW through both ordinances and the Engineering Standards to guide stormwater management for new development and redevelopment projects; make low impact development (LID) the preferred and commonly used approach for site development; establish maintenance standards for the storm sewer system and UIC wells; and define site suitability, treatment requirements, and design criteria for stormwater facilities and UIC wells.

Relationships to Other Planning Efforts

Stormwater Management Program

The City is required to prepare an annual Stormwater Management Program report to document its plan for complying with the Permit. The Stormwater Management Program plan breaks down all activities being performed, how they are being implemented within the required timeframe of the Permit term, and progress toward complete plan implementation. Many of the inspections, maintenance, and mapping of the storm sewer system described in this plan are required by the Permit.

Stormwater Management Action Plan

As required by the Permit, in 2023, the City completed a Stormwater Management Action Plan (SMAP) focused on identifying stormwater facility retrofit projects, land management and development strategies, and customized stormwater management actions related to Permit requirements. The City's SMAP is designed to reduce the harmful effects of stormwater runoff in Campen Creek, a tributary of Gibbons Creek. The SMAP for Campen Creek includes recommended capital improvement projects, programs, and policies to improve water quality in Campen Creek (City of Washougal, 2023). The recommendations from the Campen Creek SMAP are incorporated into this SMP. The SMAP is attached in Appendix A.

Utility Rate Study

In 2023, the City conducted a rate study for its three utilities: water, wastewater (sanitary sewer), and stormwater. The prior rate study was completed in 2018. The rate study helped the City create funding strategies for critical and mandated capital projects and addressed customer rate equity.

The SMP was coordinated with the utility rate study to provide updated Capital Improvement Project (CIP) costs and staffing recommendations. The draft ten-year schedule and cost summaries for stormwater CIPs and long-term management recommendations were provided to the rate study team.

City Council passed a Utility Rates ordinance on January 22, 2024. The City increased the Stormwater Utility Rate 2.0% from $34.44 bimonthly per Equivalent Residential Unit (ERU) to $35.17, effective January 1, 2024, with an approved additional annual increase through 2028.

Recent Accomplishments in Stormwater

The City has made progress addressing replacement of failing catch basins and drywells, responding to urgent stream erosion and flooding issues using emergency maintenance techniques until a more permanent or permanent solution can be implemented, beginning a program to implement runoff treatment retrofit projects, and maintaining Permit compliance most of the time. The City has a backlog of storm sewer system infrastructure problems. The City’s catch basin maintenance program is more proactive, and most catch basins are cleaned when they are partially filled with sediment but before they stop working.

The following paragraphs describe notable recent projects:

- In 2021, the City purchased a vacuum truck, which is shared between the Wastewater Utility and the Stormwater Utility. The vacuum truck is used to clean catch basins, flow control structures, and short segments of stormwater pipe.
- In 2022, the City instituted an annual Catch Basins and Drainage line item in its capital improvement program. The purpose of this annual program is to work through the backlog of smaller-scale storm sewer infrastructure repairs by replace existing aging catch basins and drainage infrastructure at various locations throughout the City. Some of these projects can be constructed by a City Operations crew. Other projects in this program require a basic engineered design, which will be prepared by the City’s on-call civil engineering firm, and then the City will bundle several small projects to bid for construction.
- In 2022, the City implemented a long-term temporary repair of bank erosion on Campen Creek at 39th Street and M Street, which required a Hydraulic Project Approval (HPA) to work in the stream from Washington Department of Fish and Wildlife. The causes of the bank erosion have not been studied in detail but are likely related to a historic realignment of Campen Creek which created a 90-degree turn at 39th Street and M Street and increases in stream flow due to increased runoff from upstream

development. The City could consider studying causes and assessing alternatives for a more permanent solution in the future.

- In 2023, the City replaced a failing drywell which routinely caused significant ponding on P Street in the Buffalo Ranch subdivision under the annual Catch Basins and Drainage Improvements program.
- In 2024, the City will repair erosion of the Jemtegaard Trail. When constructed, the Jemtegaard Trail was more than 20 feet away from the ordinary high-water mark of Gibbons Creek. Since 2020, heavy bedload transport has caused the creek channel to shift east, eroding the bank and compromising trail infrastructure. The design for this project is nearing completion and construction is expected in 2025.
- In 2024, the City will improve the storm sewer system as part of the Sanitary Pump Station #1 Project. Undersized and failing storm infrastructure will be replaced with runoff treatment and infiltration facilities. This project is expected to be constructed in 2024.
- In 2024, the City will replace filter vault cartridges city-wide using a Stormwater Capacity Grant provided by Ecology.

The Stormwater Division continues to foster relationships with local organizations and has begun to consistently seek grant funding for water quality improvement projects. The following efforts are in-process as of the writing of this plan:

- The City is partnering with Lower Columbia Estuary Partnership (LCEP) on the Washougal High School Vicinity Stormwater Retrofits project to add runoff treatment to the high school parking lot and several adjacent City streets. The project received a grant for design from Ecology and is capital improvement project SMA-1 proposed in the 2023 SMAP for Campen Creek.
- In 2024, the City will begin design to add pre-treatment and redirect stormwater in a 20-acre basin to drain to the existing, underutilized Q Street Infiltration Pond. The project received a grant for design from Ecology and is capital improvement project SMA-2 proposed in the 2023 SMAP for Campen Creek.
- The City is partnering with LCEP on the Campen Creek Reconnection Project. The project aims to restore Campen Creek's connection to its floodplain and enhance riparian and wetland habitats within nine acres of city park. The project is managed by LCEP and has received an offer of nearly $500,000 of Centennial program funding from Ecology. The grant match will be entirely funded by LCEP.

Section 2. Planning Area

Characteristics

The City of Washougal is located in the southeastern corner of Clark County in southwest Washington along Washington State Route 14 (SR-14). The City sits on the banks of the Columbia River and contributes runoff to three receiving waters that flow into the Columbia River: the Washougal River, Gibbons Creek, and Lacamas Creek. These three watersheds are described in more detail in the Receiving Water Prioritization memorandum located in Appendix C of the SMAP (Appendix A of this document).

The receiving waters that run through Washougal were once abundant with salmon, steelhead, and rainbow trout (Northwest Indian Fisheries Commission, 2022). Chinook, coho, chum, and steelhead are now listed as threatened under the Endangered Species Act and their populations in the City's receiving waters have dropped dramatically in recent years. There are many reasons for the decline, and among them was the change in land cover from forests and prairies to urban and suburban buildings and infrastructure (Lower Columbia Fish Recovery Board, 2010). Historically, forests and wetlands soaked up rain where it fell, and forests and wetlands absorbed nutrients and pollutants transported by stormwater runoff. As more people moved to Washougal, lands were cleared, and wetlands were filled in. Now when it rains, chemicals and particles from roads, vehicle tires, roofs, lawns, and outdoor storage areas are swept quickly into the nearest stream by stormwater runoff. These chemicals and particles include pollutants that harm ecosystems and make waters unsuitable for use by people such as heavy metals, petroleum products, pet waste, pesticides, fertilizers, and sediment (U.S. Environmental Protection Agency, 2022).

Soils in the area consist of two primary types: alluvial deposits composed of sand and gravel in the Columbia River and the Washougal River floodplains, and Troutdale Formation composed of an upper layer of coarse sand and gravel, with a lower layer of finer sand and gravel found in the upland areas (City of Washougal, 2016).

Groundwater in Washougal consists of the Columbia River Lowlands aquifer located in the flood plain of the Columbia River alluvial deposits. The groundwater is replenished by infiltration from the Columbia and Washougal Rivers, precipitation, and by seepage from upland areas (U.S. Geological Survey, 1964).

The City has a number of designated critical areas within the Urban Growth Area (UGA). Critical areas are valuable and fragile natural resources with significant development constraints that, in their natural state, provide many valuable social and ecological functions (City of Washougal, 2022). These areas include wetlands, critical aquifer recharge areas (CARAs), fish and wildlife habitat conservation areas, frequently flooded areas and geologically hazardous areas.

- Wetlands occur within the floodway of the Washougal River and in the low-lying southeast area of the adjacent to the Columbia River.
- CARAs are located within City limits, in close proximity to the Washougal River and areas south of the Washougal River.
- The Washougal River is a significant fish habitat conservation resource because numerous species of anadromous fish spawn in the river.
- The wetlands of the Steigerwald Wildlife Refuge attract numerous bird species, making this an area of significance for wildlife habitat conservation.
- Gibbons Creek supplies additional habitat for anadromous fish runs.

- Washougal's floodplain areas are 1) within the Washougal River basin, 2) the low-lying areas to the southeast within the Steigerwald Wildlife Refuge, and 3) adjacent to the Columbia River.
- Geologically hazardous areas comprising slopes greater than 25% and unstable slopes are located predominately to Washougal's north. Hazardous areas occur at the extremely steep banks of the Washougal River and unstable slopes in the northeasterly portion of the UGA.

(City of Washougal, 2016)

Inventory of Storm Sewer System Assets

The City maintains a Geographic Information System (GIS) database of stormwater assets that includes assets owned and operated by the City and other property owners. The inventory includes gravity mains, ditches, inlets, detention facilities, discharge points, and treatment facilities. Asset records contain information about location, type, material, age, status, ownership, and the source of information. A summary of the types of stormwater assets in shown in Table 1.

Table 1 Storm Sewer System Inventory

Type of Stormwater Asset	Examples	Count of Existing, In-Service Assets Maintained by the City
Mains	Gravity and detention pipes	36 miles
Ditches	Roadside ditches	4.5 miles
Catch Basin and Inlets	Catch basins, curb inlets	1,784
Culverts	Driveway or road crossings for drainage or natural resources	56
Underground Facilities	Filter treatment vaults, hydrodynamic separators, flow control facilities, and detention vaults	100
Vegetated Facilities	Bioretention and infiltration treatment facilities, detention ponds	102
Discharge points	Outfalls to water bodies and outlets to open channel or stormwater facilities	163
UIC wells	Dry wells, infiltration trenches with perforated pipe	186

Future Growth

The City is growing in population and area. The 2010 Census documented a population of 14,095 and 5.42 square miles (sq. mi.) land area, and the 2020 Census identified a population of 17,039 and 5.95 sq. mi. (U.S. Census Bureau, 2024). The City's Comprehensive Plan outlines direction and policies to accommodate an additional 6,415 residents over the 20-year planning horizon for a year 2035 population of 22,347, an increase of 42% over 2015. The City has established a UGA to accommodate growth expected between 2015 and 2035 in accordance with the State of Washington Growth Management Act.

Growth is encouraged only in those areas where public services can be effectively and efficiently provided.

Growth leads to additional municipal stormwater infrastructure in public streets which the City is obligated to operate and maintain in perpetuity. In addition, growth leads to additional private stormwater facilities which the City is obligated to issue permits for, review prior to construction, and inspect annually over time.

Section 3. Planning Analysis

In 2022, the City retained Otak to develop this SMP. The primary purpose of the SMP is to provide a recommended set of programs to address systematic problems and develop new stormwater CIPs to address capital construction needs for stormwater conveyance and water quality. The planning methodology for this SMP relies primarily on identifying the backlog of existing known issues based on review of existing studies, maintenance records, and institutional knowledge from City staff. Issues were then sorted by type, categorized, and prioritized based on frequency, extent, and severity. Related issues that could be solved with a single project were grouped together resulting in an overall list of 116 known issues.

Known Issues Summary

During the initial data collection phase, a total of 116 known issues were mapped and classified into four categories. Counts and percentages of known issues by type are presented in Table 2 and Figure 3. Some issues fall into multiple categories.

Table 2 Known Issue Category Statistics

Category	Category Description	Count	Percentage
	Total Known Issues	**116**	
Water Quality	Lacking water quality structures	46	39%
Drainage	Persistent drainage problem or flooding	49	42%
Habitat	Stream habitat degradation or fish passage barrier	4	3%
Maintenance	Dangerous conditions during maintenance, lack of access to maintain, indeterminate or confusing designation of maintenance responsibility, and issues exacerbated by lack of maintenance	65	56%

** The total count and percentages do not add up to 100% because many issues fall into more than one category.*

Since some of these issues fall into multiple categories, a summary of known issue grouped categories is presented in Table 3.

Table 3 Known Issue Grouped Categories Statistics

Category	Count	Percent
Quality Only	40	34%
Drainage, Maintenance	34	29%
Maintenance Only	25	21%
Drainage Only	9	8%
Drainage, Maintenance, Quality	3	3%
Maintenance, Quality	2	2%
Drainage, Habitat	1	1%

Category	Count	Percent
Drainage, Quality	1	1%
Drainage, Maintenance, Habitat	1	1%
Quality, Habitat	1	1%
Habitat Only	0	0%

The known issues statistics presented in Table 2 and Table 3 show that maintenance is the City's largest category encountered. Some additional statistics for the maintenance category include:

- Thirteen catch basins or curb inlets.
- Eight ditch inlets.
- Twenty-one facilities lacking private maintenance.
- More than half (34) are also associated with flooding concerns.

The Washougal Stormwater Master Plan Review of Existing Data memorandum summarizing the initial data collection process and listing all known issues is provided in Appendix B.

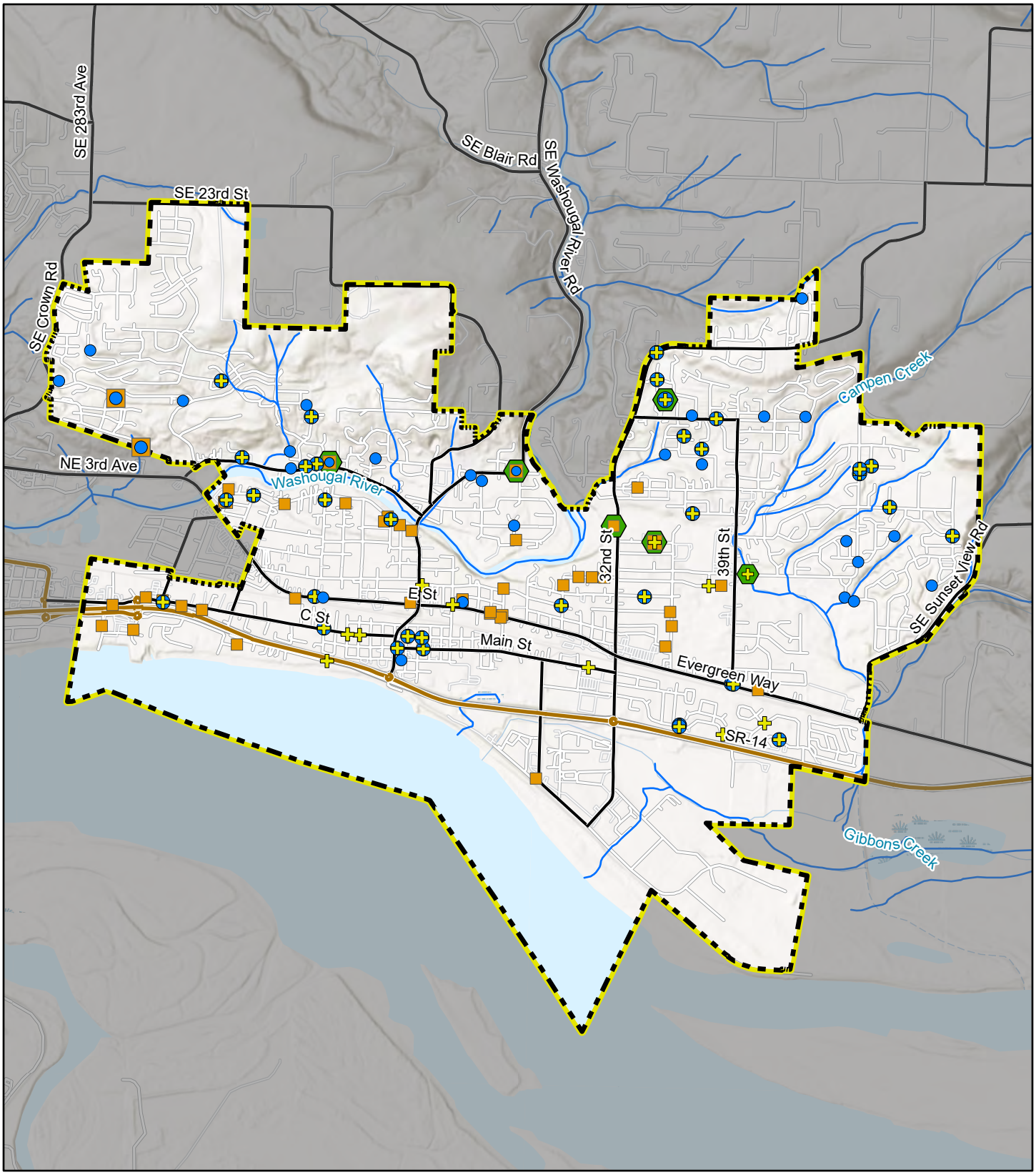

FIGURE 3
KNOWN ISSUE CATEGORIES
WASHOUGAL SMP

Known Issue Category

- Maintenance
- Drainage
- Quality
- Habitat

- City Limits
- Highway
- Major Road
- Streams

0 0.25 0.5 Miles

Date: 2/8/2024
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

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Screening Methodology

After collecting and categorizing types of issues as described above, known issues were screened and grouped by status and by type of solution most appropriate for the problem. Screening consisted of two steps: screening out long-term management program candidates and identifying potential stormwater CIPs.

Identify Program Candidates

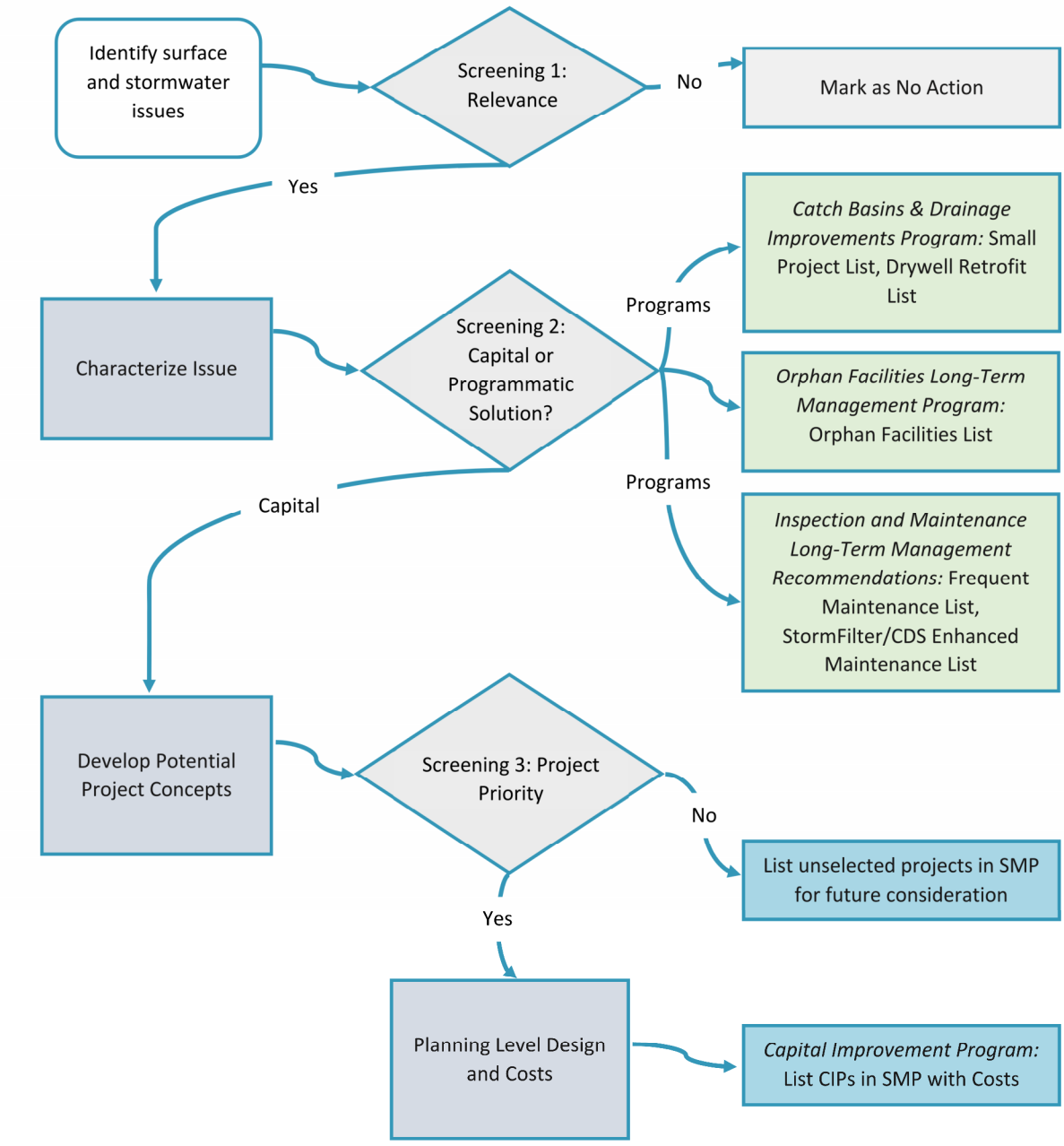
The 116 known issues identified were screened to ensure they were current and relevant to the SMP and were grouped by type of solution required. Known issues were removed when considered no longer relevant typically because the City has a solution planned in the near-term, or the data collection process collected the same issue from multiple sources. Issues were then characterized based on type, frequency, extent, and severity. More severe and urgent issues that can be solved with a standalone large construction project were identified as potential capital improvement projects (CIPs). The City defines a CIP as a project that can consist of construction, major maintenance, and/or improvements, such as projects that build new infrastructure, provide system upgrades, or system replacement.

When issues similar to each other were, as a group, important but not urgent and/or could be solved with a smaller capital project, Otak grouped them into five program lists:

- Small Projects
- Orphan Facility Management
- Frequent Maintenance
- StormFilter/CDS Enhanced Maintenance
- Drywell Retrofits

Figure 4 illustrates the issue screening criteria and solution resolution process used for this SMP. Both the long-term management programs and CIP candidates are mapped in Figure 5.

City of Washougal Stormwater Master Plan
Revised Issue Screening Criteria and Solution Resolution Process
December 2023



Screening Questions

Screening 1: Is this issue the responsibility of the City and still pertinent?

Screening 2: Is the solution to this issue a standalone capital improvement project?

Screening 3: Does the project rank highly? (Apply Rating Criteria)

Figure 4 Issue Screening and Solution Development Methodology

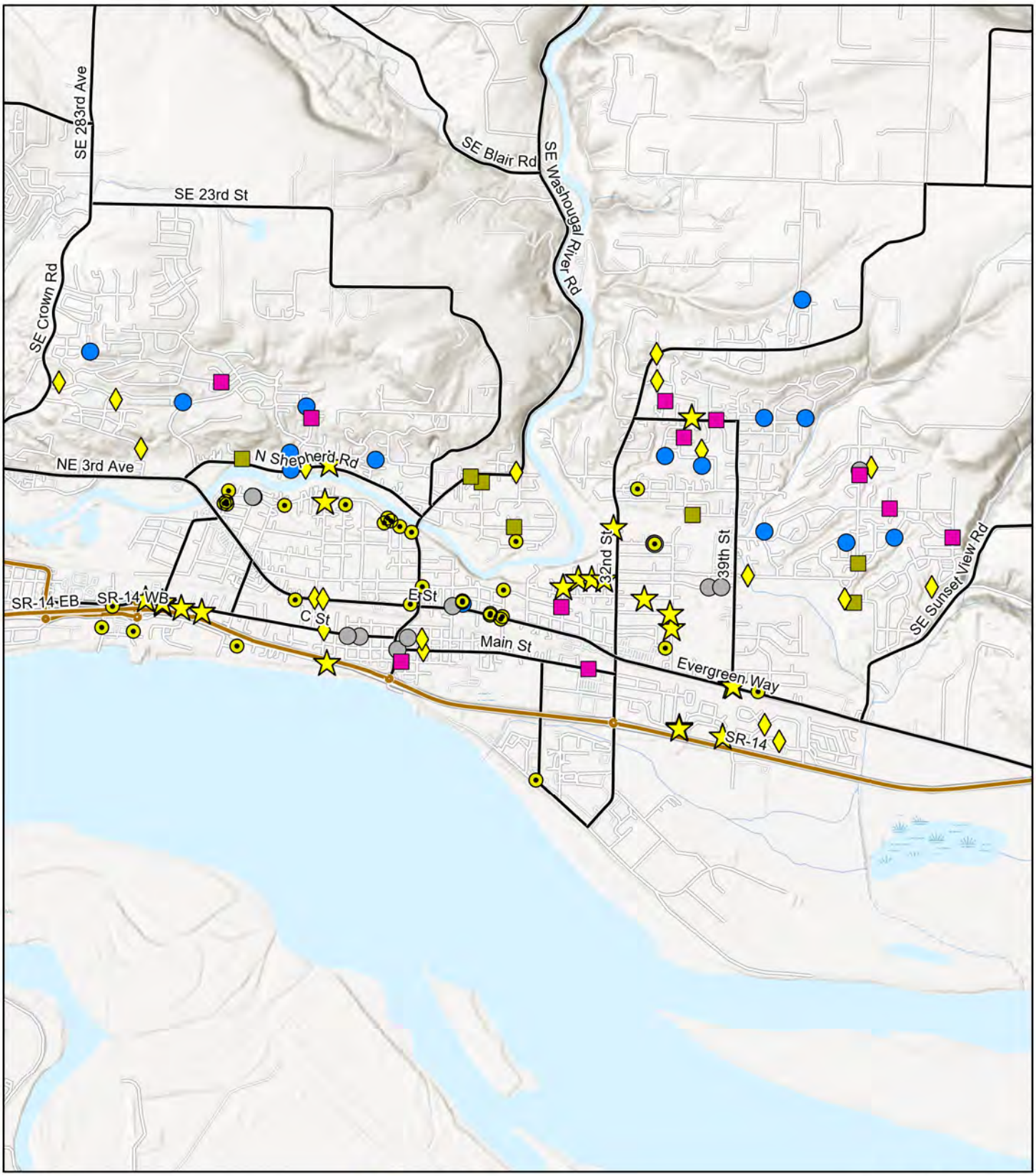


FIGURE 5
KNOWN ISSUES PROGRAMS
WASHOUGAL SMP

City Limits
Highway
Major Road
Streams

Program
CIP Candidate
Small Project
Orphan Facility Management
Frequent Maintenance List
StormFilter/ CDS Enhanced Maintenance List
Drywell Retrofit
No Action

0 0.25 0.5 Miles

Date: 4/30/2024
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Potential Capital Improvement Projects

For each remaining issue after grouping known issues into programs, the Otak team identified 10 potential CIP projects that were grouped into the CIP candidate category. These 10 concepts combined the most severe and urgent issues and are summarized in Table 4 and mapped in Figure 6. These potential projects were then prioritized based on a public survey and the rating criteria and ranking process described in the following section. The top three rated projects were selected as CIP projects to include in this SMP.

Table 4 Potential CIP Projects

ID Number	Project Name	Project Type
PP-01	Addy St Flood Reduction	Catch basin and conveyance repair
PP-02	39th St and Evergreen Way Drainage Improvement	New collection and drywells
PP-03	Addy Street Stormwater Facilities Rehabilitation	Detention facility rehabilitation
PP-04	North P St Stormwater Facility Rehabilitation	Detention facility rehabilitation
PP-05	C St High-Risk Drywells Retrofit	Drywell retrofits and drainage
PP-06	I St High-Risk Drywells Retrofit	Drywell retrofits
PP-07	W St and 36th St Stormwater Facility Safety Improvements	Maintenance safety
PP-08	S A St Drainage Improvement	New collection and conveyance
PP-09	H St and 34th St High-Risk Drywells Retrofit	Drywell retrofits and drainage
PP-10	9th St Drainage Improvement	Drywell retrofits and drainage

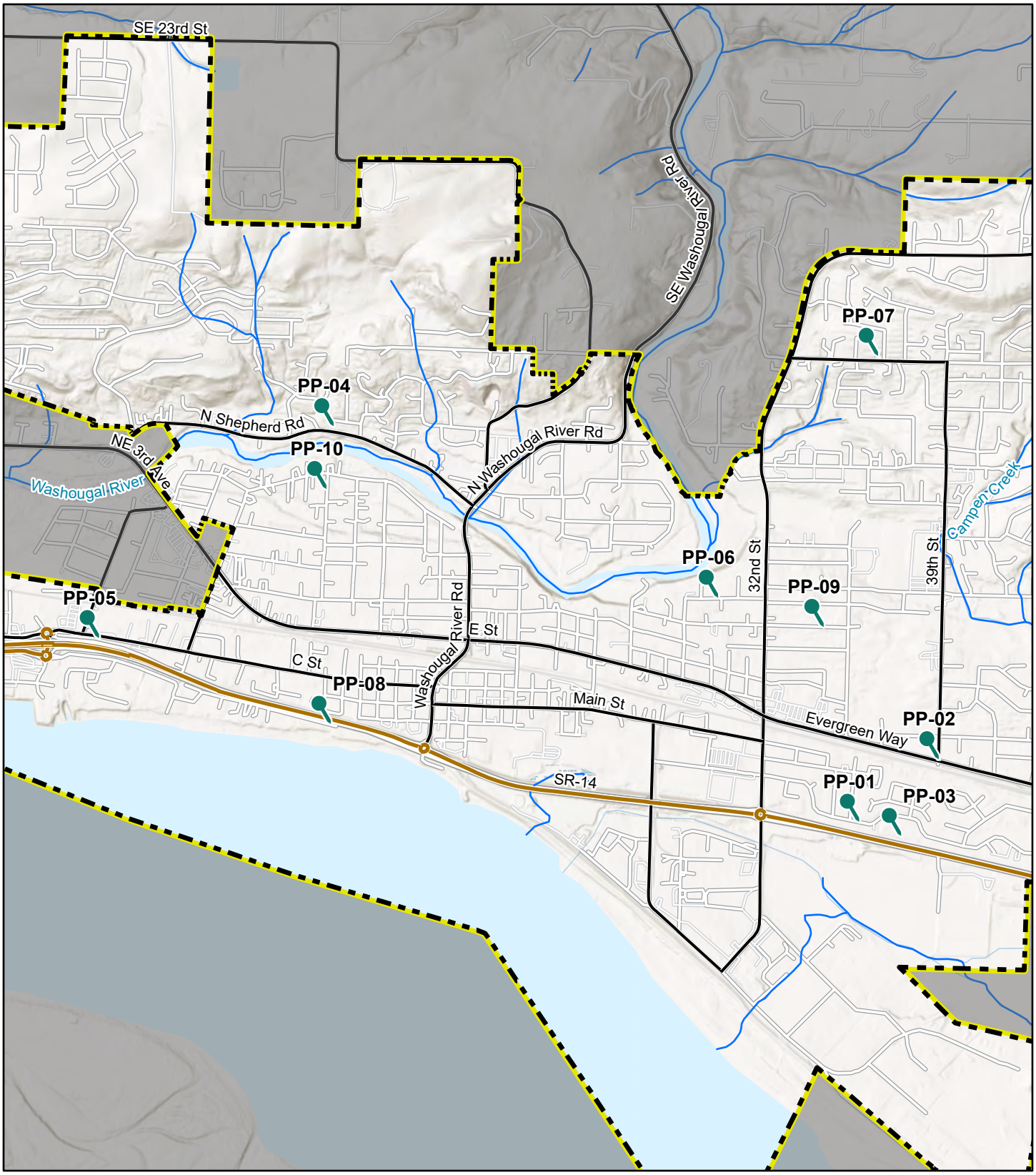

FIGURE 6

POTENTIAL CIP PROJECTS

WASHOUGAL SMP

City Limits
Streams
Highway
Major Road
Potential CIP Project

0 0.25 0.5 Miles

Otak

Date: 2/8/2024
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Rating Criteria and Ranking Process

The number of potential projects was too large for the City to consider in a ten-year CIP program. To reduce the list into a manageable size for creating conceptual designs and cost estimates, a set of rating criteria to score and rank the potential projects was developed. This process was developed by reviewing meeting notes, City strategic documents, and the results of a recent City public engagement survey to identify values and goals applicable to the SMP. The summarized information was discussed with public works staff and the rating and ranking criteria outlined in Table 5 was used to select CIPs. Each criterion was given a score of 0, 1, 3, or 5, and the categories were weighted to reflect City priorities.

Table 5 Rating and Ranking Criteria

Criteria	Description of Scoring Concepts
Conveyance and Flooding	
Flooding Impact	Project scores higher when the drainage issue threatens public safety, occupied buildings, or important infrastructure.
Flooding Extent	Project scores higher when the drainage issue extends over a larger area.
Flooding Frequency	Project scores higher when the drainage issue occurs more frequently.
Water Quality	
Treated Land Use	Project scores higher when the drainage area includes land use types that are more likely to pollute stormwater runoff.
Acres Treated	Project scores higher when the drainage area is larger.
Maintenance Considerations	
Reduce/ Streamline Maintenance	Project scores higher when the completed construction project reduces or streamlines maintenance.
Maintenance Safety/ Access	Project scores higher when the completed construction project improves safety of workers performing maintenance.
Providing Multiple Benefits	
Increased Service	Project scores higher when it provides drainage and stormwater management to an area where stormwater issues are clustered.
Implements or Complements Another City Plan or Strategy	Project scores high if the project recommended in another City plan or complement a goal identified in another City plan or strategy.

Criteria	Description of Scoring Concepts
Community Amenities, Benefits, and Aesthetics	Project scores higher if it can be expanded to include additional community amenities such as educational or recreational amenities and/or if it contributes to City beautification or an enhanced sense of place.
Stream Channel Stabilization	Project scores higher if it directly improves stream channel stability, reduces erosion, or reduces stormwater quantity or rate of discharges.
Fiscal	
Coordination	Project scores higher if there a possibility for coordination and cost-sharing with other projects such as streets, parks, or facilities.
Potential Funding Sources	Project scores higher if there a possibility of receiving grant funding or partnering with another organization to decrease City funds towards project implementation.

Three of the 10 CIP projects were developed to conceptual design. The data on each known issues and potential CIP projects were collected or developed to complete the rating criteria for each project, and the projects were ranked against each other. See Appendix C for the full rating matrix. The ranks of the potential projects and the project descriptions were reviewed with the Public Works staff. Based on those discussions, the project concepts were adjusted, and the projects were re-ranked. The final ranking of each project is presented in the following section.

Section 4. Stormwater Capital Improvement Projects

Capital Improvement Projects

After evaluating the project scores and rankings, three projects were selected as presented in Table 6 for implementation over the next 10 years.

Table 6 Recommended CIPs

Rank	ID Number	Project Name	Brief Description	Cost
1	PP-10	9th Street Drainage Improvements	Two aging drywells on 9th Street between J Street and K St are not functioning. Runoff ponds on the street and floods adjacent properties. Replace the drywells with shallow infiltration facilities, add water quality treatment, and add rolled curb to 9th Street.	$630,000
2	PP-02	39th Street and Evergreen Way Drainage Improvements	Drainage improvements will be made at the intersection of 39th Street and Evergreen Way paired with multiple phased stormwater infiltration facilities to gradually reduce high gutter flows on cross street and further up on 39th Street.	$730,000*
3	PP-01	Addy Street Drainage Improvements	Two catch basins on Addy St are undersized, making them difficult to inspect and clean the upstream and downstream conveyance pipes. The downstream 12-inch pipe is also obstructed with tree roots contributing to ponding in the street and flooding adjacent yards. The project includes replacing the two catch basins with standard catch basins, performing a CCTV inspection, adding two manholes for maintenance access, and lining the 12-inch pipe.	$240,000
			Total	**$1,600,000**

** PP-02 is designed to be implemented in phases with each phase providing benefit. The flooding of 39th Street may be sufficiently alleviated without expending the full $730,000 cost.*

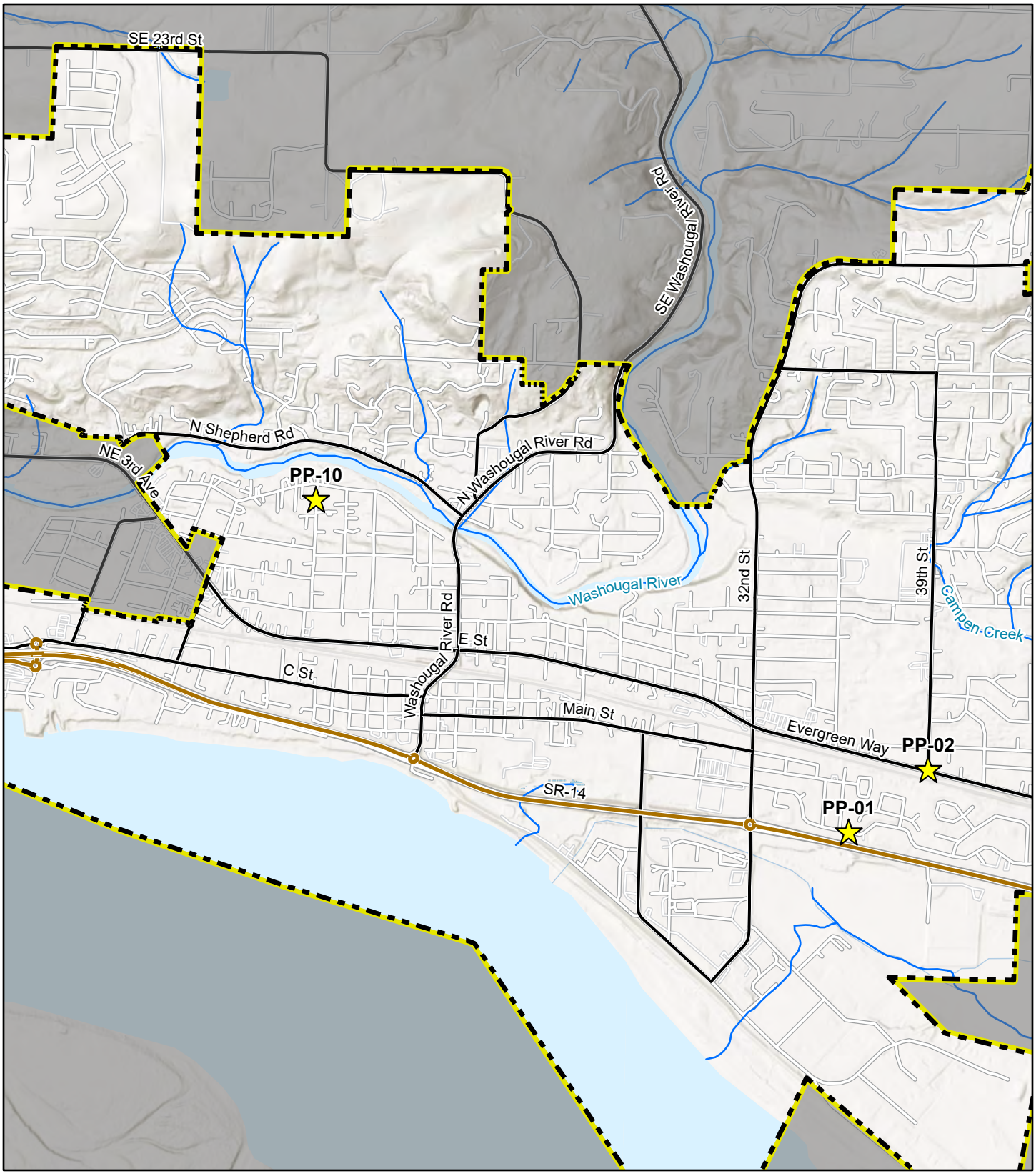

FIGURE 7
RECOMMENDED CIP PROJECTS
WASHOUGAL SMP

- City Limits
- Streams
- Highway
- Major Road
- Recommended CIP Project

0 0.25 0.5 Miles

Date: 2/8/2024
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

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Otak

Stormwater Management Action Plan CIPs

The City's SMAP for Campen Creek includes six stormwater retrofit CIPs that will address water quality or flow control deficiencies within the Campen Creek basin. The SMAP recommended four of these CIPs for implementation within six years. These four CIPs are listed in Table 7 and mapped in Figure 8. The City may consider implementing the other two stormwater retrofit CIPs at a future date (Figure 8). Fact sheets for the four recommended CIPs are included in Appendix E of the SMAP (Appendix E of this document).

Table 7 SMAP Stormwater Management Action CIPs

Rank	ID Number	Project Name	Brief Description	Cost
1	SMA-1	Washougal High School Vicinity Stormwater Retrofits (City Portion)	Renovate an existing bioretention swale that collects stormwater on Washougal High School property and retrofit the high school parking lot with bioretention planters as well as portions of I and J Streets between 34th Street and 39th and 36th Street. The project will also include the addition of one new drywell on I Street and modification of an existing drywell as a sedimentation manhole. This project is in process and is being funded by Ecology.	$978,000
2	SMA-2	Q Street Infiltration Pond Retrofit	Redirect stormwater in a 20-acre basin to drain to an existing, underutilized infiltration pond and add pre-treatment. Since publication of the SMAP, the City has received an offer of funding from Ecology for this project.	$776,000
3	SMA-3	X Street Water Quality Retrofit	Install a water quality vault upstream of the existing detention pipe.	$400,000
4	SMA-5	J Street and 42nd Street (Vintage Crest Estates) Water Quality Retrofit	Install bioretention planters for runoff treatment throughout the Vintage Crest Estates Subdivision.	$2,360,000
			Total	**$4,514,000**

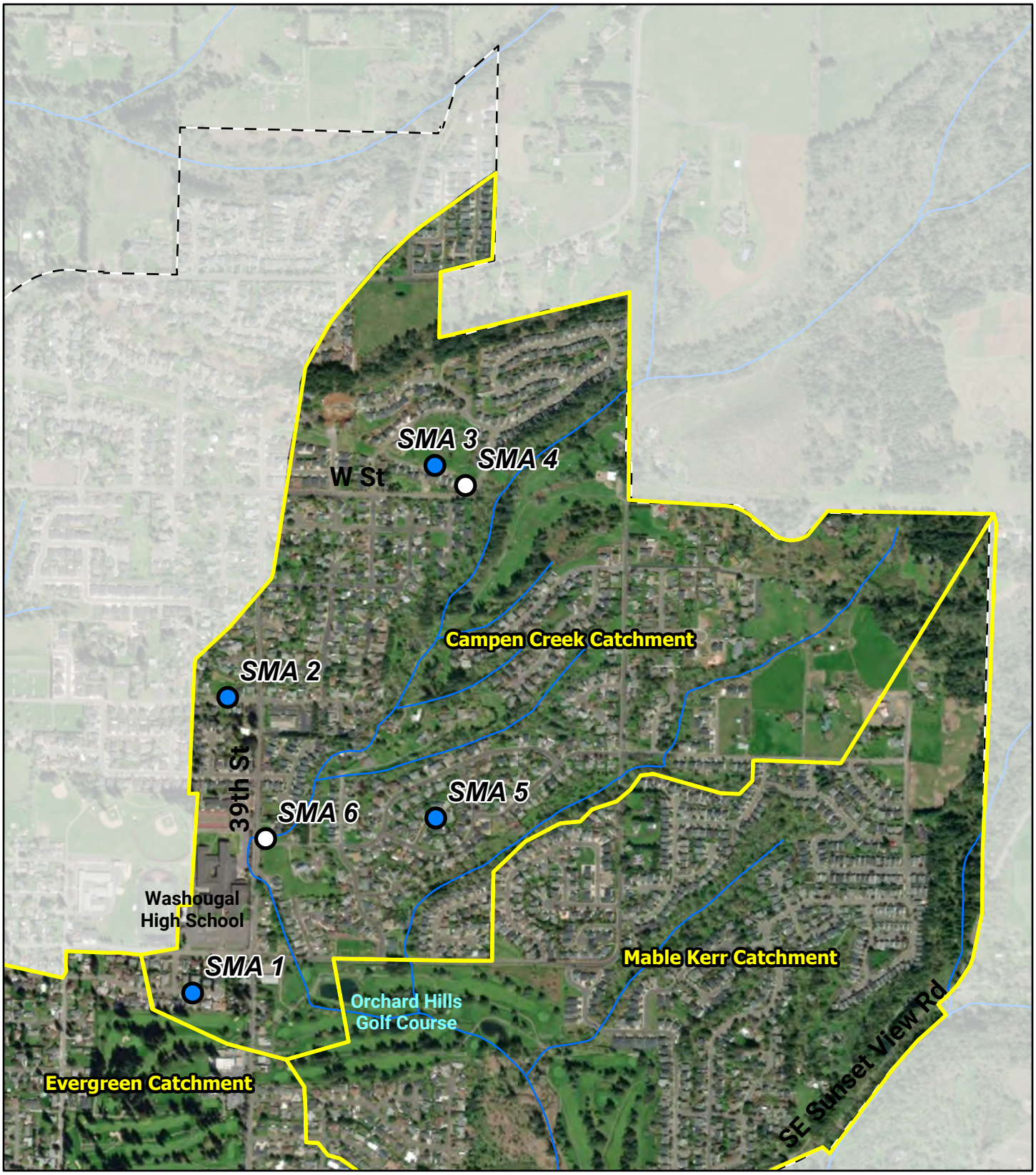

FIGURE 8
SMAP PROJECT LOCATIONS
WASHOUGAL SMP

Gibbons Creek Basin Catchments
Washougal City Limits
Streams
Stormwater Facility Retrofit Projects
Recommended CIP
Additional CIP

0 250 500 1,000
Feet

Date: 2/8/2024
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.
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Annual Catch Basins and Drainage Improvements

In 2023, the City implemented its first annual Catch Basins and Drainage Improvements programmatic CIP. The Catch Basins and Drainage Improvements program will have an annual budget of $400,000. The annual program is designed to fund several smaller drainage improvements and capital maintenance items per year. Drainage improvements in this program will generally be designed by the City's on-call civil engineering consultant.

For operation and maintenance of the storm sewer system, the City is primarily relying on a reactive maintenance model where the City repairs or replaces infrastructure only after a problem has been discovered via complaint or inspection. Using this reactive model, a backlog of issues has accumulated. Using this program, the City can make progress toward addressing its existing backlog of systemic or small issues each year. Each year, the Stormwater Supervisor should select the highest priority systemic and small issues that can be addressed within the budget of this program. The program also gives flexibility to quickly address new urgent issues that arise and that can be solved within the budget of this program. Future Catch Basins and Drainage Improvements may also include the construction of small projects designed in a previous year. The lists that may be addressed through this program are presented in Appendix D and include the following:

- Small Project
- Frequent Maintenance List
- StormFilter/CDS Enhanced Maintenance List
- Drywell Retrofits

The 2024 Catch Basins and Drainage Improvements CIP plan is described in Table 8.

Table 8 2024 Annual Catch Basins and Drainage Improvements Project List

Project Name	Brief Description
Addy Street Drainage Improvements	The first phase of Project PP-01 (see Table 6) will be implemented as part of the Catch Basins and Drainage Improvements program. Improvements include replacing two non-standard catch basins.
39th Street and Evergreen Way – Phase 1	The first phase of Project PP-02 (see Table 6) will be implemented as part of the Catch Basins and Drainage Improvements program. Improvements include a curb cut, a conveyance swale in existing landscaping strip, and a new ditch inlet.
H Street Drywell Drainage Improvement	A drywell on H Street (Known Issue KI-40) has been observed to surcharge multiple times per year and flows onto private property and into the basement of 3294 H Street. Flows will be redistributed to adjacent facilities.
Bluestone Cottages	Improvements are anticipated to include adding a new catch basin and drywell with associated lateral piping and connecting the new structures to an existing catch basin. The design was previously completed as part of the 2023 City Wide Stormwater Improvements project.

Project Name	Brief Description
Park East Apartments	Improvements are anticipated to include replacing two (2) existing nonstandard catch basins and constructing new lateral piping to an existing manhole.
4th Street Drywell	Improvements are anticipated to include replacing an existing catch basin with a filtered catch basin, installation of a new drywell, and associated conveyance piping.
UIC Registrations	Recently installed new municipals UICs that will be registered with Ecology.

Cost Estimating Process

Based on the scoping-level design of each selected project, a cost estimate was prepared using the methods discussed in the City of Washougal SMP Project Cost Opinion Methodology memorandum included in Appendix E. Costs were estimated for design, permitting, easements, construction, and materials. Costs are presented in 2023 dollars and follow a similar methodology as cost estimates in the SMAP.

Section 5. Long-term Management Recommendations

As part of the Washougal SMP, Otak developed two white papers to address long-term inspection and maintenance recommendations regarding staffing needs. The following topics were selected during the visioning workshops with City staff:

- Inspection and Maintenance Staffing
- Orphan Facility Management

Each paper is summarized below, and the full text is provided in Appendix F.

Inspection and Maintenance Staffing

Inspection and maintenance of stormwater facilities is a key component of the City's stormwater management program. All storm sewer system components require proper maintenance to continue to function properly and prevent flooding and water quality concerns. Inspections help the City determine maintenance needs and to assess rehabilitation and infrastructure replacement needs as stormwater infrastructure ages.

Operation and maintenance (O&M) is a common challenge for stormwater utilities. The Water Environment Federation's Stormwater Institute has identified asset management and lack of sustained operation and maintenance as consistent challenges for stormwater programs across the United States.

To ensure adequate maintenance of stormwater infrastructure, the City's Public Works department needs to assure adequate staffing and manage information about stormwater assets effectively.

The City's current inspection and maintenance workload is based on the requirements of the Permit. Otak conducted an analysis of current stormwater facility inventory and an employee timecard analysis from the years 2020 through 2022. The analysis provides a baseline of staff hours needed to inspect, operate, and maintain the storm sewer system at the current level of service. Current inventory is the facility count at the beginning of 2022. The analysis showed that the 4,888 hours are available each year for stormwater operations and maintenance and inspections, spread among four full-time equivalent (FTE) positions, which include and Operations Specialist, two Maintenance Workers, and a Utility Supervisor as shown in Table 9. With the four FTE, the City provides a basic level of stormwater inspection and maintenance level of service (LOS) that enables the City to comply with the current 2019-2024 Permit and address some complaints.

Table 9 Stormwater Positions Current Available Task Time

Positions		Task Category				
		Stormwater O&M	Stormwater Inspections *	Other **	Over-head	Total
Operations Specialists and Maintenance Workers ***	(Hrs/FTE/yr)	1,456	0	0	624	2,080
	FTE (Count)	3	3	3	3	
Subtotal		**4,368**	**0**	**0**	**1,872**	**6,240**
Utility Supervisor	(Hrs/FTE/yr)	0	520	936	624	2,080
	FTE (Count)	1	1	1	1	
Subtotal		**0**	**520**	**936**	**624**	**2,080**
Total		**4,368**	**520**	**936**	**2,496**	**8,320**
Total Available Task Time - Stormwater O&M and Stormwater Inspections		**4,888**				

** The Stormwater Inspections task category includes inspections of public and private stormwater facilities and source control inspections of businesses.*

*** The Other task category includes other permit compliance activities, data management, project management, coordination with other permittees, construction inspection, and supervision.*

**** There are 2 FTE Maintenance Worker and 1 FTE Operations Specialist.*

The following recommendations are based on a review of the regulatory context, an evaluation of the City's stormwater infrastructure and resourcing, and an evaluation of level of service (LOS) based on regulatory requirements and preventive maintenance needs.

Near-Term Planned Workload

In the near-term, workload for inspections, maintenance, and tracking of the storm sewer system is expected to increase. The City expects the 2024-2029 Permit to increase requirements for street sweeping and to maintain a high standard for annual inspection and maintenance of stormwater facilities, including follow-up with private facility owners. The City aspires to increase LOS to meet service expectations and reduce flooding, improve tracking and technical support after inspection of private stormwater facilities, and implement a routine UIC inspection schedule to ensure that maintenance needs are identified early enough to schedule maintenance that preserves facility function. In addition, approximately 40 existing stormwater facilities are expected to be added to the public facility inventory over the next three years.

The near-term increase in workload is based on changes to LOS to meet regulatory requirements, to preserve the function of facilities that pose risks to public safety or groundwater if not adequately maintained, and to address a backlog in facility inventory.

The white paper documents a need for an additional 1,779 hours of work per year over several years.

Long-Term Planned Workload

The long-term planned workload documents the City's expected need for additional staffing over the next 10 years to inspect, operate, maintain, and track stormwater assets. Long-term needs are based on expected increases in storm sewer system asset inventory between 2022 and 2033 (11 years of growth). The long-term planned workload assumes a constant level of service based on the current level of service plus any increases recommended in the near-term, above. In addition, the long-term planned workload

assumes that the City will implement an infrastructure asset management system across multiple departments within five years.

Maintenance workload is expected to increase primarily due to inventory increase, and for UICs, workload is also expected to increase due to increase in LOS from 20% to 50% of UICs maintained per year.

Inspection workload is also expected to increase due to inventory increase. For public facilities, the growth projections used for facility maintenance workload are also used for inspection. For private facility inventory, an average of 10 private stormwater facilities were added per year between 2010 and 2022, and this growth is expected to continue at the same number per year.

Over the long-term, Otak has assumed that the 0.2 FTE business source control inspection position at Clark County Public Health, which is currently funded by a grant from the state, will need to be staffed instead by City of Washougal personnel. Therefore, the long-term workload is expected to increase by 0.2 FTE (416 hours annually) for source control business inspections by 2033.

The white paper documents a need for a total of 10,217 hours of work per year by 2033 as shown in the summary provided in Table 10. At the current staffing level, the City would have a shortfall of 5,329 hours of available task time per year by 2033.

Table 10 Long-Term Planned Workload Summary

Activity Type	Category	Long-Term Expected Workload (Hrs/yr), (2033)
Public Stormwater Facilities	Maintenance, Routine	4,362
UICs	Maintenance, Routine	296
Conveyance and Collection Systems	Maintenance, Routine	2,121
Street Sweeping	Maintenance, Routine	792
Proactive maintenance at public underground stormwater facilities with known flooding issues	Maintenance, Preventive	114
Public and Private stormwater facilities	Inspection	1,671
UICs	Inspection	99
Source control business inspections	Inspection	416
Asset management administration	Coordination/ Management	250
GIS Backlog Entry & Correction and Ongoing Data Entry	Coordination/ Management	96
Total = Documented Need for Inspection and Maintenance Activities		
	Hours	10,217
Available for Inspection and Maintenance at Current Staffing Level		
	Hours	4,888
Shortfall		
	Hours	5,329

Staffing Recommendation

The four FTE that provide stormwater inspection and maintenance in Washougal may be insufficient to provide the needed LOS over the near-term and the long-term due to increasing regulation, community expectations about drainage and stormwater facility condition, and ever-increasing inventory of stormwater assets. One Stormwater FTE would assist with both near-term and long-term workload for inspections, GIS, and coordination of asset tracking. In the long-term, Otak recommends the City monitor the storm system inventory and maintenance workload and prepare to hire an additional one or two Stormwater FTE between 2026 and 2033, as needed.

Orphan Facility Management

Most publicly owned stormwater facilities in the City are located on the City's property or in the City's rights-of-way. However, City staff have identified 15 residential subdivisions where HOAs or property owners have been designated as the parties responsible for maintaining the City-owned public stormwater facilities. Some of these facilities are not being adequately maintained. The identified subdivisions range in size from six to 70 lots with one to four stormwater facilities and were built between the years 2006 and 2009. There are 43 facilities total, and they have been described by the City as orphan facilities as shown in Figure 9.

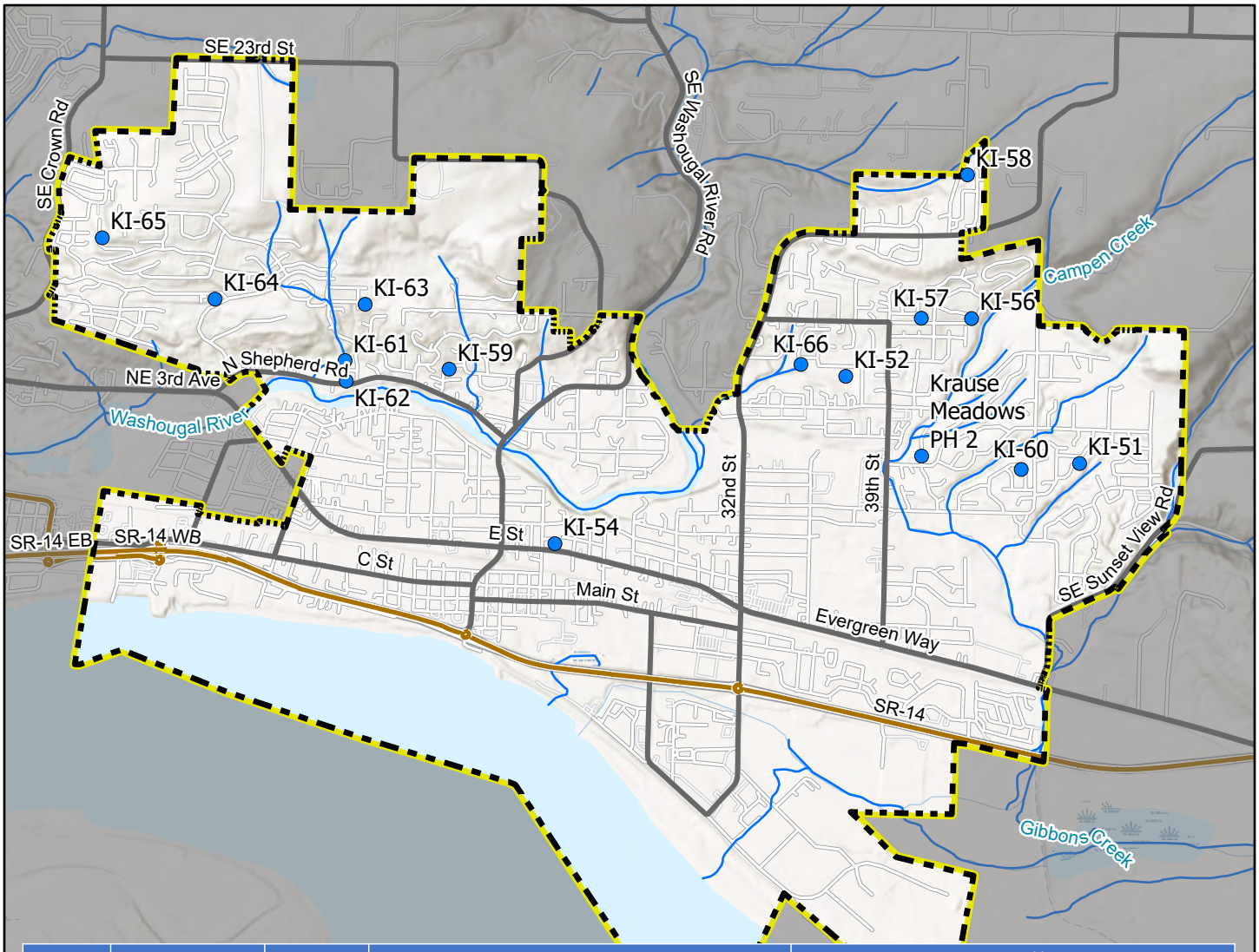
The types of facilities include filter catch basins/vaults, ponds, swales, flow control manholes, detention pipes, and hydrodynamic separators. Insufficient maintenance has led to overgrown vegetation blocking access to the sites and to inlet/outlet pipes, sediment and debris build-up, and regulatory non-compliance with maintenance standards. The orphan facilities are not currently posing any immediate risks to water quality or downstream flooding. Although it has not been investigated, the lack of maintenance could be causing these facilities to go into overflow mode more frequently, which reduces their effectiveness in protecting water quality. Since the City owns the tracts they are located on, the City is ultimately responsible to ensure maintenance is being performed on a routine basis and meets the required maintenance standards.

Preferred Alternative

The white paper (Appendix F) explores alternative approaches the City could implement to effectively manage orphan facilities moving forward. Four alternatives were assessed based on a background review of each residential development including size/types of stormwater facilities, HOA status, legal documentation, and enforcement options, The alternatives include:

1. Convert orphan facilities to publicly maintained facilities.
2. Enforce Washougal Municipal Code (WMC) Chapter 14.36 by pursuing enforcement options against HOAs.
3. Enforce WMC Chapter 14.36 by pursuing enforcement options against property owners.
4. City performs the overdue maintenance and bills the HOA or property owners.

The pros and cons of each alternative were evaluated, and a preferred alternative recommended that includes the City taking on maintenance responsibility for all the orphan facilities. This alternative would provide the quickest solution to bring all facilities up to current standards and ensure consistent long-term maintenance is performed as required by the Permit. The tradeoff is there will be some one-time and long-term staffing needed to notify property owners of the change in maintenance responsibility, complete the overdue maintenance, and perform routine maintenance moving forward.



Known Issue ID	Development Name	Parcel Number	Facility Type	Facility ID(s)
KI-51	Walnut Valley PH 2	132864054	Filter Vault, Flow Control Manhole, and Detention Vault	P802, P643, P356
KI-52	Summit View PH 1 & 2	132576064	Filter Vault, Flow Control Manhole, and Detention Pipes	P637, P312, P313, P314, 803
KI-54	Rohan Commons	71900016	Filter Catch Basin	P836
KI-56	Summer Slope North	130036110	Swale, Detention Pipes, and Flow Control Manhole	P25, 782
KI-57	Bristol Ridge	130056068	Swale	P26
KI-58	Mt. Norway Village PH 1	130046080	Swale, Detention Pipes, Flow Control Manhole, and Hydrodynamic Separator	P268, P269, 3186, 601, 36
KI-59	River View Place	131187060	Swale, Detention Pipes, Flow Control Manhole, and Hydrodynamic Separator	P299, P300, P301, P302, P303, P304, P305, P306, P307, P308, P309, P912, P633
KI-60	Myers Addition	986037253	Filter Catch Basin, Detention Pond, and Flow Control Manhole	P600, P88
KI-61	Crown Pointe Estates	131173106	Swale, Detention Pond, and Flow Control Manhole	P48, P74, P610
KI-62	Crown Creek PUD	986036343	Swale, Detention Pond, and Flow Control Manhole	P640, P87
KI-63	Granite Highlands PH 5A	130561098	Swale, Detention Pond, and Flow Control Manhole	P73, P57
KI-64	Lookout Ridge PH 5	123012148	Detention Pond, Flow Control Manhole, and Hydrodynamic Separator	P59
KI-65	Coda Ridge Estates	122996084	Swale, Detention Pond, and Flow Control Manhole	P606, P70, P71
KI-66	Daniel Park	132349096	Filter Vault, Detention Pond, and Flow Control Manhole	810, 30
N/A[1]	Krause Meadows PH 2	132802000	Filter Catch Basin, Detention Pond, and Flow Control Manhole	P806, P23, P624

[1] Subdivision was added after list of known issues was developed.

FIGURE 9
STORMWATER ORPHAN FACILITIES MANAGEMENT
WASHOUGAL SMP

City Limits
Orphan Facility Management
Highway
Major Road
Streams

0 0.25 0.5 Miles

Date: 2/8/2024
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

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Otak

Staffing Recommendation and Vendor Cost

If all 43 orphan facilities are converted from private to publicly maintained facilities, it would require a one-time increase to City staff's workload followed by an increase in routine maintenance workload for the long-term. The one-time effort will include notifying property owners of the transfer of maintenance responsibility and performing the overdue maintenance to get the facilities functioning as designed and meeting current maintenance standards. After the initial investment, long-term maintenance of each facility will need to be incorporated into the City's existing stormwater maintenance program. Eventual asset replacement will also need to be planned for and budgeted accordingly.

As described in the Inspection and Maintenance Staffing white paper, the City should expect to spend 19.8 hours per facility annually to maintain vegetated facilities and 7.2 hours per facility annually for structural facilities. These assumptions were used to estimate both one-time and long-term maintenance workload required. For one-time overdue maintenance to bring up to current standards, this one-time effort is assumed to require double the current annual effort, which equals 39.6 hours for vegetated facilities and 14.4 hours for structural facilities.

Third-party maintenance for StormFilter® treatment facilities was estimated based on an actual invoice from the City's service provider.

To convert orphan facilities to publicly maintained facilities, an immediate and long-term increase to staff workload will be required as well as third-party maintenance costs as summarized below:

One-time Efforts

- Total implementation workload = 996 hours, 0.68 FTE
- Third-party initial maintenance costs for StormFilter® facilities = $15,000

Long-term Efforts

- Routine maintenance = 468 hours/year, 0.32 FTE/year

Third-party Maintenance Costs

- StormFilter® facilities = $15,000 plus 4% inflation/year, every two years beginning in 2026

Address Additional Systemic Issues Over Time

Until such time as the City implements an asset management program, staff should continue to maintain lists of systemic or grouped issues that require alternate frequencies or unique types of maintenance or inspection. As high-priority issues are resolved through the CIP or the Catch Basins & Drainage Improvements Program, the City should consider prioritizing some of the lower priority systemic issues for more permanent solutions. We recommend that the Small Projects List and the Drywell Retrofits List be next in line for inclusion in either the CIP or the Catch Basins and Drainage Improvements Program, followed by issues on the Frequent Maintenance List and the StormFilter/CDS Enhanced Maintenance List.

Each of these lists can be found in Appendix D.

Section 6. Implementation

Over the past several years, the City has made sensible investments in its storm sewer system that respond to arising drainage and erosion issues, plan to protect quality of groundwater and surface water, and hold the line on complying with increasing requirements of the Permit. The SMP builds on the good work of City staff by prioritizing capital improvements to improve drainage and water quality, documenting the need for continuing the new Catch Basins and Drainage Improvements Program, and recommending near-term and long-term staffing increases to manage new Permit requirements and growing storm sewer system inventory.

The SMP recommendations span a 10-year timeframe. Implementation of the SMP depends upon budgetary approval of the recommended projects and actions. It is expected that new issues will arise, regulations may change, and projections of inventory growth over time may be either too low or too high. The SMP recommendations should be reevaluated over time; the methods in the plan can be reused to evaluate arising drainage or water quality issues and staffing needs.

Proposed Implementation Schedule

The proposed implementation schedule incorporates CIP projects from both the SMP and the SMAP, programmatic recommendations from both the SMP and the SMAP, staffing changes, and policy considerations from the SMAP. CIP timing may be altered by a change in frequency or severity of drainage issues, discovery of new urgent issues that require immediate attention, and availability of funding from the City's stormwater capital fund and grant funders such as Ecology. A proposed implementation schedule is given in Table 11.

Table 11 Proposed Implementation Schedule

Name of CIP or Recommendation	ID	Prior Yrs	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	Future Yrs
Stormwater Administration, Operations, and Permit Compliance													
Maintain Compliance with Current Permit	n/a	●	●										
Increase Activity to Comply with 2024-2029 Permit	n/a		●	●	●	●	●	●					
Maintain Stormwater Operations LOS	n/a	●	●										
Increase Stormwater Operations LOS as Described	n/a		●	●	●	●	●	●	●	●	●	●	
Evaluate Inventory Growth and Stormwater Utility Rates	n/a						●						
Add 3 Stormwater FTE	n/a		●				●				●		
SMP CIPs													
39th Street and Evergreen Way Drainage Improvements	PP-02 (Phases 1 - 4)		●	●				●		●			
Addy Street Drainage Improvements	PP-01 (Phases 1 & 2)		●		●								
9th Street Drainage Improvements	PP-10				●	●							
SMAP CIPs													
Washougal High School Vicinity Stormwater Retrofits	SMA-1	●	●	●									
Q Street Infiltration Pond Retrofit	SMA-2			●	●								
X Street Water Quality Retrofit	SMA-3					●							
J Street and 42nd Street (Vintage Crest Estates) Retrofit	SMA-5 (Phases 1 & 2)						●	●	●	●	●	●	
Columbia View Flow Control and Water Quality Retrofit	SMA-4												●
M Street and 39th Street Channel Erosion Study	SMA-6												●
Programmatic CIPs													
Annual Catch Basins and Drainage Improvements Program	ST-2024-02	●	●	●	●	●	●	●	●	●	●	●	●
Existing/Ongoing CIPs and Maintenance Projects													
Campen Creek Reconnection Project	n/a		●	●									
Jemtegaard Trail Repairs	n/a		●	●									
Sanitary Pump Station #1 Project – storm sewer system improvements	n/a		●										
City-wide Stormwater Filter Vault Cartridge Replacement	n/a		●										
SMAP Policies and Programs													
Septic Elimination Program	SMA-8 (Phases 1 & 2)							●			●		
Stream Shade Program	SMA-9						●						
Targeted Pet Waste Reduction Program	SMA-11					●							
Urban Forestry Program and Policy	SMA-12				●								
Golf Course Voluntary Water Quality Program	SMA-10												●

Stormwater CIP and Program Costs

The proposed CIPs and increases to stormwater operations and compliance activities, including the SMAP, amount to $10.1 million in capital investment over the next 10 years, and would require the addition of three Stormwater FTE as summarized in Table 12. The City expects to implement the SMAP CIPs only when grant funding from Ecology is available, the City's typical match for Ecology grants is 20%.

Table 12 Summary of Estimated Costs and FTE Required

Name of CIP or Recommendation	Estimated Cost or FTE	Notes
Permit Compliance & Stormwater Operations		
Maintain Current LOS	6.5 FTE	
Increase Stormwater Operations LOS as Described, including permit compliance	3 FTE	SMP documents need for additional 3 FTE by 2033
SMP CIPs		
9th Street Drainage Improvements	$630,000	Estimated in 2023 dollars
39th Street and Evergreen Way Drainage Improvements	$730,000	Estimated in 2023 dollars
Addy Street Drainage Improvements	$240,000	Estimated in 2023 dollars
Sub-Total	**$1,600,000**	
SMAP CIPs		
Washougal High School Vicinity Stormwater Retrofits	$978,000	Estimated in 2023 dollars
Q Street Infiltration Pond Retrofit	$776,000	Estimated in 2023 dollars
X Street Water Quality Retrofit	$400,000	Estimated in 2023 dollars
J Street and 42nd Street (Vintage Crest Estates) Retrofit	$2,360,000	Estimated in 2023 dollars
Columbia View Flow Control and Water Quality Retrofit	Not estimated	Estimated in 2023 dollars
M Street and 39th Street Channel Erosion Study	Not estimated	Estimated in 2023 dollars
Sub-Total	**$4,514,000**	
Programmatic CIPs		
Annual Catch Basins and Drainage Improvements Program	$400,000 per year	
Sub-Total	**$4,000,000**	
SMAP Policies and Programs		
Five SMAP Policies and Programs, documented in SMAP (Appendix A)	Not estimated	
Totals		
Total Capital Costs	**$10,114,000**	
Annual Average Capital Costs	**$1,011,400**	

Funding

The City budgets stormwater operations from its Stormwater Utility, Fund 403. The stormwater utility fee paid by property owners in the City provides the revenue for Fund 403. The City analyzes the cost of providing stormwater services and the stormwater utility fee about every five years.

Capital improvements and capital purchases are budgeted from fund balances in Fund 403, by grants from Ecology, and by the stormwater connection fees, which is used to fund capital improvements to increase capacity to serve growth. Capital investments have also been made using revenue bonds in the past. The following stormwater projects and capital purchases were funded by revenue bonds in the past (City of Washougal, 2022):

- Point Repairs
- Catch Basins & Drainage Program
- Mowers
- Stormwater Master Plan

Partnership Opportunities

The City anticipates the need to work in partnership with other organizations to implement the CIP projects summarized in Section 4. Due to the cost and scale of capital projects and programs outlined in this SMP, the availability and timing of grants and other outside funding will determine the actual timeframe for implementation of some projects.

Ecology has been a significant source of funding in the past for Washougal stormwater projects and should be considered for implementing the SMAP CIP projects and recommendations. Ecology's Water Quality Combined Funding Program funds projects that improve and protect water quality. Funds are made available through an annual single-application process to apply for funding from multiple sources. Funding availability varies based on the state budget, and grant and loan amounts depend on the funding source and project type. (Washington State Department of Ecology, 2022). The City has recently been designated as a community that is required to contribute a reduced match of only 5% of a project's budget.

Lower Columbia Estuary Partnership and Washougal School District are important partners for stormwater capital improvements, urban forestry, and pollutant reduction in the Gibbons Creek watershed. They are partners for the Washougal High School Vicinity Stormwater Retrofits, project SMA-1 and the Campen Creek Reconnection Project.

Other potential funding sources for SMAP projects and recommendations are discussed in the SMAP (Appendix A).

Maintaining Permit Compliance

Maintaining compliance with the Permit is a priority for the Public Works Department. Several impending changes in the permit have been summarized here, based on a draft of the permit. The City should evaluate the final permit conditions and plan to comply with new requirements over the next five years when the final permit is issued in June 2024.

Summary

The SMP implementation plan is designed as a flexible framework rather than a rigid schedule. As circumstances change, the order of implementing recommendations could change to reflect urgent

needs, emergent opportunities, differences in permit requirements, and different asset inventory growth pattern than the one projected. Providing annual funding of $400,000 for the Catch Basins and Drainage Improvements Program will go a long way both toward maintaining flexibility to respond to emerging needs and opportunities as well as maintaining steady progress to address a backlog of smaller drainage and repair issues before they become critical. Ensuring the City has enough dedicated personnel to administer, operate, and maintain the storm sewer system while maintaining compliance with the permit and UIC regulations will reduce risk of regulatory non-compliance and reduce risk of facility failures that pose a danger to maintenance staff or damages private property or infrastructure.

The prioritization methodology and schedule are included with the SMP. When the City identifies new issues and opportunities, staff will be able to quickly rank projects against existing priorities and develop conceptual plans and costs to implement solutions. These tools will allow the City to adapt the implementation plan to changing circumstances.

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Appendix A

Stormwater Management Action Plan

Otak

City of Washougal

Stormwater Management Action Plan

Final

Submitted to:

City of Washougal
2247 Main Street
Washougal, WA 98671

Prepared by:

Otak, Inc.
805 Broadway Street,
Suite 130
Vancouver, WA 98660

March 2023

Project No. 20155

DEPARTMENT OF ECOLOGY
State of Washington

Acknowledgements

Project Name: Washougal Stormwater Management Action Plan

Submittal Level: Final

Submitted to

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Project Sponsor: Scott Collins, City Engineer/Deputy Public Works Director

Project Manager: Sean Mulderig, Stormwater Program Coordinator

Ecology Grant Team

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Technical Advisor: Doug Howie, Senior Stormwater Engineer

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APPENDICES

Section 1. Introduction

The City of Washougal (the City) is located near the eastern edge of Clark County in southwest Washington State along State Route 14. The City sits on the banks of the Columbia River, and the City contributes runoff to three receiving waters that flow into the Columbia River: the Washougal River, Gibbons Creek, and Lacamas Creek (Figure 1).

The receiving waters that run through Washougal were once abundant with salmon, steelhead, and rainbow trout (Northwest Indian Fisheries Commission, 2022). Chinook, coho, chum, and steelhead are now listed as threatened under the Endangered Species Act and their populations in the City's receiving waters have dropped dramatically in recent years. There are many reasons for the decline, and among them was the change in land cover from forests and prairies to urban and suburban buildings and infrastructure (Lower Columbia Fish Recovery Board, 2010). Historically, forests and wetlands soaked up rain where it fell, and forests and wetlands absorbed nutrients and pollutants transported by stormwater runoff. As more people moved to Washougal, lands were cleared, and wetlands were filled in. Now when it rains, chemicals and particles from roads, vehicle tires, roofs, lawns, and outdoor storage areas are swept quickly into the nearest stream by stormwater runoff. These chemicals and particles include pollutants that harm ecosystems and make waters unsuitable for use by people such as heavy metals, petroleum products, pet waste, pesticides, fertilizers, and sediment (United States Environmental Protection Agency, 2022).

The City's municipal stormwater permit requires the City to develop a Stormwater Management Action Plan (SMAP). See Section 2 for more about the permit. The City developed this SMAP to improve water conditions for fish and human recreation in Campen Creek, a tributary of Gibbons Creek. This plan identifies stormwater facility retrofit projects, land management and development strategies, and customized stormwater management actions related to Permit requirements the City can implement to reduce the harmful effects of stormwater runoff in Campen Creek. This SMAP will help the City focus its efforts on water quality improvements in Campen Creek, align resources, and apply for grants to improve stream health.

This document is the final component of the SMAP process. The City has already completed the receiving water conditions assessment and receiving water prioritization steps. These steps assessed and compared the receiving waters in Washougal and identified the priority basin and catchment for this SMAP. The process and outcome of these steps is summarized in Section 3, Receiving Water Conditions Assessment, and Section 4, Summary of Receiving Water Prioritization. Section 5 describes the process used to develop the SMAP and the selected stormwater management actions (SMAs). This section includes the recommended stormwater management actions, implementation schedule, budget sources, and adaptive management.

FIGURE 1
WASHOUGAL CITY LIMITS AND WATERSHEDS
WASHOUGAL SMAP

City Limits
Streams
Watershed Boundaries

0 0.25 0.5 1 Miles

Date: 12/30/2022
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

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Section 2. Regulatory Context

The City of Washougal is authorized to discharge stormwater runoff to surface waters of the State by the Washington State Department of Ecology (Ecology) under the Western Washington Phase II NPDES Municipal Stormwater Permit (Permit). The Permit regulates discharges from small municipal separate storm sewers (MS4s). Regulated small MS4s typically serve municipalities with populations greater than 10,000 and fewer than 100,000. The current Permit is effective August 1, 2019 through July 31, 2024.

SMAP is a new requirement of the current Permit. The SMAP requirements are described in more detail in Ecology's *Stormwater Management Action Planning Guidance* published in 2019 (2019 SMAP Guidance). Ecology uses SMAP as both a verb for the planning process and as a noun for the resulting plan. This plan complies with Permit condition S5.C.1.d, SMAP, by following the 2019 SMAP Guidance.

SMAP is focused on addressing the effects of cumulative development on a watershed under existing and future conditions. Therefore, a SMAP includes actions to protect and improve receiving water conditions while meeting the needs of future development. SMAP actions include stormwater facility retrofits, land management and development strategies, and customized stormwater management actions. The 2019 SMAP Guidance gives higher priority to protecting higher quality receiving waters and restoring highly degraded receiving waters. The 2019 SMAP Guidance also recommends focusing efforts on basins where jurisdictions have the most influence, either alone or in partnership with another jurisdiction.

The SMAP process consists of three major phases outlined in the Permit and described in detail in the 2019 SMAP Guidance:

- Phase 1 – Receiving Water Conditions Assessment. Document and assess existing information related to local receiving waters and contributing area conditions to identify which receiving waters are most likely to benefit from SMAP.
- Phase 2 – Receiving Water Prioritization. Develop and implement a prioritization process and select the receiving water that will receive the most benefit from implementation of SMAP actions.
- Phase 3 – SMAP. Develop a SMAP for at least one high priority catchment area that describes the SMAP actions, estimated implementation schedule, and potential budget sources.

The City received a grant from Ecology under the Water Quality Combined Funding Program to fund the development of this SMAP including the Receiving Water Conditions Assessment, Receiving Water Prioritization, and the completed SMAP. The grant agreement also established additional conditions on developing the SMAP (Appendix A). The grant required the City to conduct further outreach including an online map and required the City to gather more input than the base permit requirements. The Ecology grant team provided additional review of the Receiving Water Conditions Assessment, Receiving Water Prioritization, and the completed SMAP.

These additional conditions are incorporated into the in the Receiving Water Conditions Assessment – SMAP memorandum (Appendix B), the Receiving Water Prioritization – SMAP memorandum (Appendix C), the text of this SMAP, and the accompanying GIS web map.

Section 3. Summary of Receiving Water Conditions Assessment

The purpose of the receiving water conditions assessment was to identify basins and receiving waters that could benefit from stormwater management action planning. This phase resulted in a list of candidate basins that included the information needed to support the receiving water prioritization process

summarized in Section 4. The process followed the receiving water conditions assessment steps in the 2019 SMAP Guidance:

- Delineate basins and identify receiving waters,
- Assess receiving water conditions,
- Assess stormwater management influence, and
- Assess relative conditions and contributions.

In addition, the 2019 SMAP Guidance encourages cities to prioritize basins with a restoration or protection basin management strategy based on the "Management Matrix for Restoration and Protection", reproduced as Figure 2.

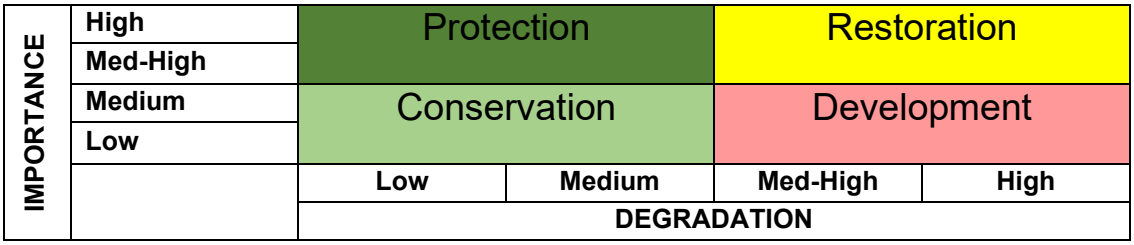

Figure 2 Watershed Management Matrix[1]

The receiving waters in the City of Washougal were identified using Clark County's watershed delineations and modified based on an analysis of topography, the City's storm sewer geographic information system (GIS), and recent levee construction. In this document, "watershed" refers to an entire contributing area to a receiving water both within and outside Washougal city limits. "Basin" is used to mean only the portion of the watershed within Washougal city limits. During this phase, existing information on each receiving water was compiled and reviewed to inform the receiving waters conditions assessment.

The relative conditions assessment was an assessment of historic conditions, current degradation, and stormwater management influence (SMI) which were used to develop the basin management strategy for each basin. Historic fish use and degree of recovery needed to meet regional fish recovery goals were used to determine the level of importance of the stream or river. Degradation was determined by considering urbanization, fish passage barriers, and documented water quality impairments. The SMI sought to discover the relative influence the City's development and storm system has on stream or river health. By concentrating resources in basins where the City has a higher SMI, the City can maximize the effect of the SMAP on watershed health. The SMI evaluation informed the selection of a catchment where the SMAP will be applied. The assessment also reviewed data from the Environmental Protection Agency's (EPA) Environmental Justice (EJ) Screening and the Washington Environmental Health Disparities Map (WEHDM) to evaluate the environmental health impact for each basin and identify inequity and overburdened communities (United States Environmental Protection Agency, 2022; Washington State Department of Health, 2022). The demographic factors used in the EPA EJ Screening did not significantly distinguish census block groups in Washougal. The WEHDM was used to compare the relative environmental health disparity of each basin. The WEHDM displays a combined index score for census tracts based on data for 19 indicators that include pollutant exposure, poverty, and health factors (Washington State Department of Health, 2022). To show the relative environmental health disparity, an area-weighted average of the combined index scores within each basin was calculated.

The outcome of this phase was a list of candidate basins that included the information needed to support a prioritization process. The full results of the assessment are summarized in the Receiving Water

[1] Reproduced from Figure 5c (Stanley, et al., 2016)

Conditions Assessment – SMAP memorandum (Appendix B). Table 1 summarizes the findings of the relative conditions assessment.

Table 1 Relative Conditions Assessment Summary

Basin Name	Gibbons Creek Basin	Washougal River Basin	Lacamas Creek Basin
Receiving Waters within Basin	Gibbons Creek; Campen Creek; Steigerwald Lake	Washougal River	Lacamas Creek
Watershed Area (Acres) [SqMi]	7,100 [11]	78,880 [123]	42,784 [67]
Area inside City (Acres)	1,721	1,918	203
Fraction of Watershed within City	24.20%	2.40%	0.50%
Percent of the City that is Occupied by the Basin	45%	50%	5%
SMI Score	High	Medium	Low
Basin Management Strategy	Restoration	Protection	Conservation
Relative Environmental Health Disparity	Medium (5.7)	Medium (5.4)	Low (3.2)

Gibbons Creek Basin and Washougal River Basin had higher relative SMI scores than Lacamas Creek Basin. Gibbons Creek Basin and Washougal River Basin were assigned restoration and protection management strategies, respectively. As a result, Gibbons Creek Basin and Washougal River Basin were selected to move into the receiving water prioritization step.

Section 4. Summary of Receiving Water Prioritization

The purpose of the receiving water prioritization was to determine which receiving water would receive the most benefit from implementation of stormwater facility retrofit projects, land management and development strategies, and customized stormwater management actions related to Permit requirements. This phase selected a basin and catchment for which a SMAP will be developed. Prioritization began with prioritizing a receiving water basin. Following selection of a receiving water basin, catchments within the selected receiving water basin were delineated, and a catchment within that basin was prioritized.

The receiving water prioritization criteria included numerous factors divided into three categories: receiving water condition information, SMI, and community factors. The receiving water conditions and the SMI were sufficient to identify the priority basin. Community factors were initially evaluated during the receiving water conditions assessment and became more influential as the City narrowed the geographic focus during the receiving water prioritization.

Community factors included the Relative Environmental Health Disparity data evaluated during the receiving water conditions assessment step and the results of a public engagement survey conducted during the receiving water basin prioritization step. The City invited the general public and interested

parties to participate in prioritizing a receiving water basin for two weeks in June and July 2022. A StoryMap website explained the SMAP process, presented the receiving water conditions assessment findings, and offered a two-question survey. The first question asked respondents to select a priority basin (Gibbons Creek Basin or Washougal River Basin). The second question asked respondents to plot a point within the City of Washougal where SMAP could address water quality, stream/river conditions, or uncontrolled stormwater runoff. Sixteen survey responses were collected. Eleven participants selected Gibbons Creek Basin, and five selected the Washougal River Basin for prioritization. Additionally, nine responses to the second question were located in the Gibbons Creek Basin and four in the Washougal River Basin.

Table 2 presents the criteria and scores for Gibbons Creek Basin and Washougal River Basin.

Table 2 Receiving Water Prioritization Criteria and Scores

Consideration	Basin Scoring*	
	Gibbons Creek Basin	Washougal River Basin
Receiving Water Conditions		
Fish passage barriers	High (0 barriers)	High (0 barriers)
Ability to Influence (SMI)		
Hydrologic Impact	High (high score)	Low (low score)
Pollutant Loading Impact	High (high score)	Medium (medium score)
Watershed Management Strategy	High (Restoration)	Medium (Protection)
Community Factors**		
Stakeholder/Community Feedback	High (9 community points)	Low (4 community points)
Relative Environmental Health Disparity	Medium (5.7)	Medium (5.4)

** Higher scores indicate the receiving water may benefit more from implementation of a SMAP.*
***Intended to be used as a tiebreaker, if needed*

Based on consideration of the above factors and scores, the City selected Gibbons Creek Basin as the priority receiving water. The full results of the prioritization process are described in the Receiving Water Prioritization – SMAP memorandum (Appendix C).

Following the selection of the priority basin, the consulting team delineated catchments in Gibbons Creek based on the SMAP Guidance which states catchments should be between 400-600 acres or a scale that is appropriate for the jurisdiction. Gibbons Creek Basin and its catchments are shown in Figure 3. City of Washougal is a smaller southwest Washington city, and the appropriate catchment size tended to be smaller. Catchments range from 282 to 661 acres and are based on drainage areas to stream channels, adjusted for stormwater infrastructure, and to some extent, uniformity in land uses and storm system type.

To select a catchment, the team evaluated many of the same factors as had been considered in prioritizing a receiving water. An additional category, collaboration factors, was added and evaluated for selection of the priority catchment. Collaboration factors looked at rehabilitation efforts by other regional and local entities and other capital projects planned by the City.

Table 3 presents the criteria and scores for the Gibbons Creek catchment. The City and consultant team also conducted a site visit in Gibbons Creek Basin in July 2022 to inform catchment selection by

identifying stormwater retrofit opportunities and stormwater management needs. The site visit indicated the greatest number of opportunities for water quality projects are in the Campen Creek Catchment.

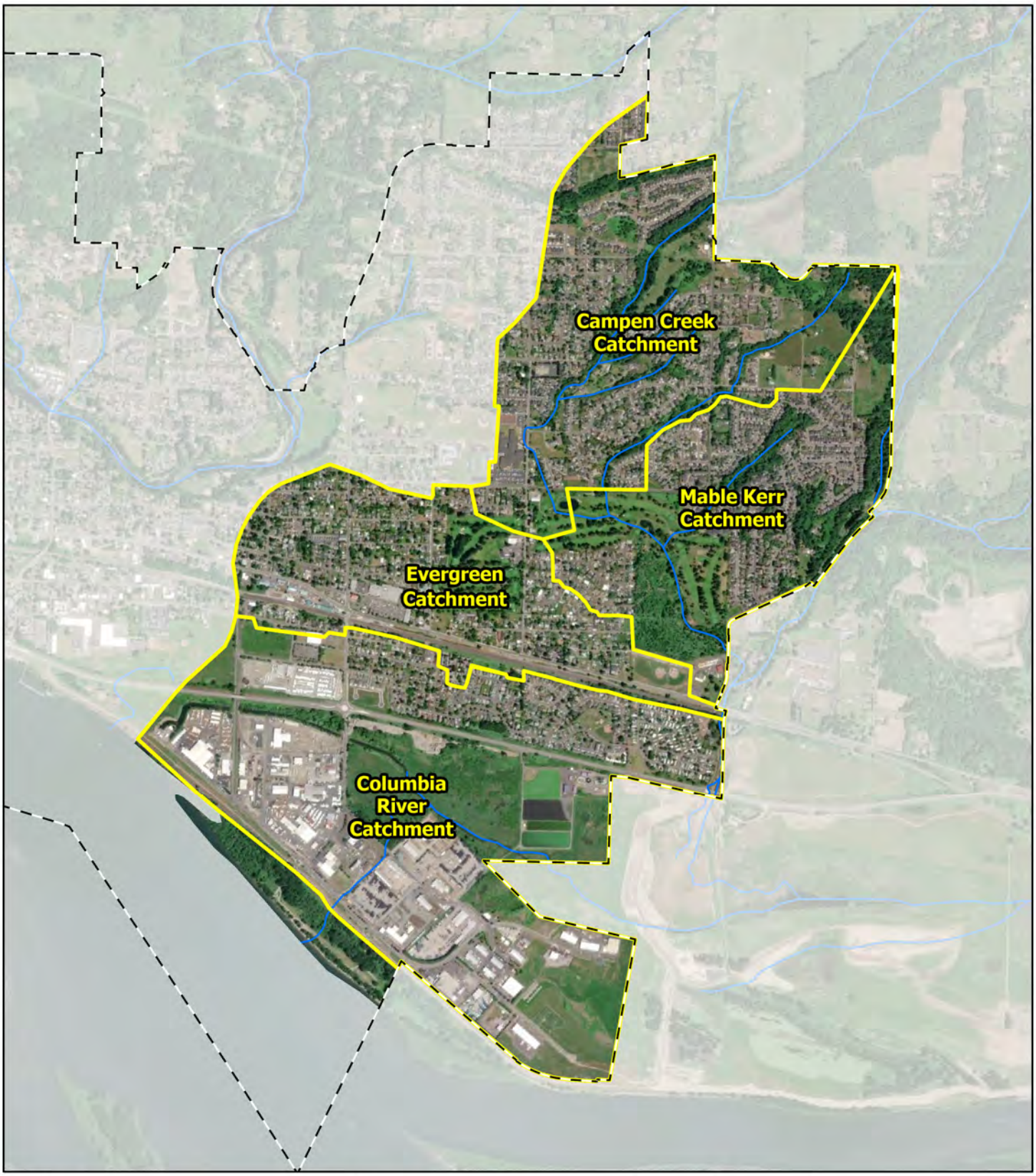

FIGURE 3

GIBBONS CREEK BASIN CATCHMENTS

WASHOUGAL SMAP

Date: 12/30/2022
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

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Table 3 Catchment Scores and Prioritization

Catchment Scoring				
Consideration	**Campen Creek**	**Mable Kerr**	**Evergreen**	**Columbia River**
Receiving Water Conditions				
Ratio of existing water quality facilities to pollution-generating land uses and large pollution-generating pervious surfaces*	Low (0.27)	High (0.09)	High (0.09)	High (0.05)
Ratio of existing flow control facilities to impervious surfaces*	Medium (0.13)	Medium (0.13)	High (0.05)	High (0.04)
Ability to Influence (SMI)				
Availability of publicly owned land (acres)	High (88.28)	Medium (31.15)	Low (8.37)	High (71.61)
Availability of right-of-way (miles / acre of catchment)	Neutral (0.02)	Neutral (0.02)	Neutral (0.02)	Neutral (0.02)
Community Factors				
Stakeholder feedback	High (4 community points)	Medium (2 community points)	Low (0 community points)	Medium (3 community points)
Washington Information System for Architectural and Archaeological Records Data (WISAARD) Predictive Model	Medium (Very high risk in approximately ½ of the catchment)	Medium (Very high risk in approximately ¾ of the catchment)	High (Very high risk throughout catchment)	High (Very high risk throughout catchment)
Relative Environmental Health Disparity **	Low (3.18)	Low (3.08)	Low (3.90)	High (9.00)
Collaboration Factors				
Regional and local rehabilitation and restoration efforts	Medium	Medium	None Identified	None Identified
City's Capital Improvement Projects	Hartwood Bridge Replacement	N/A	32nd Street Underpass; 39th Street/ Evergreen Way Realignment; J Street Water Main Installation	32nd Street Underpass; Biosolids Handling Facility
Final Selection				
Site visit / observations / engineering judgement	High	Medium	Medium	Low
Selection status	Catchment Selected for SMAP	Not Selected for SMAP – Second Choice	Not Selected for SMAP – Third Choice	Not Selected for SMAP – Fourth Choice

**Some private stormwater facilities may not be documented in the City's GIS, particularly in the Columbia River Catchment.*

***Intended to be used as a tiebreaker, if needed.*

The City selected the Campen Creek Catchment as the priority catchment. The Campen Creek Catchment is 407 acres and consists primarily of residential development. The City is located in the downstream half of the drainage to Campen Creek which extends north into unincorporated Clark County.

The Campen Creek Catchment was selected for SMAP because of the ease of coordination for placing facilities in the ROW in underserved residential areas, the number of existing older publicly owned flow control facilities that are eligible for retrofit, the presence of a known erosion problem in the tributary at 39th Street, and the focus on this catchment demonstrated through public feedback and the efforts by the Lower Columbia Estuary Partnership.

Section 5. Action Plan

Section 5 describes a 20-year action plan to improve conditions in the Campen Creek Catchment of Gibbons Creek. Relevant characteristics of Campen Creek Catchment and the recommended stormwater management actions are presented in a web map. The URL is included in Appendix F.

Campen Creek Catchment

The Campen Creek Catchment consists of 407 acres of the City of Washougal. The catchment is located in the northwest portion of the city and consists primarily of residential development. The Campen Creek mainstem and the uppermost tributary pass through the catchment. The headwaters of the tributaries in this system are north of the City in unincorporated Clark County.

Hartwood Park, Eldridge Park, the Summer Slope subdivision open space, and portions of the Orchard Hills Golf Club are significant open spaces in the catchment. The Washougal High School is located at the western edge along 39th Street. Portions of the Orchard Hills Golf Course are also in the Evergreen and Mable Kerr Catchments, and part of the high school property is located in the Washougal River Basin. The northeastern corner of the catchment is currently agricultural and forested, and this area is expected to develop with residences.

Campen Creek is a tributary of Gibbon Creek. Gibbon Creek and Campen Creek are listed on Ecology's *Washington State Water Quality Assessment* as impaired for temperature and fecal coliform bacteria. High water temperatures prevent the creeks from attaining their designated uses for aquatic life, affecting salmonid spawning, rearing, and migration. High levels of fecal coliform bacteria prevent the creeks from attaining their designated uses for recreation (Washington State Department of Ecology, 2022). Gibbons Creek and its tributaries have a Total Maximum Daily Load (TMDL) for fecal coliform bacteria to address the impairment and attain water quality standards. Improving water quality in the catchment would also benefit Gibbon Creek (Post, 2000). Recommendations for decreasing fecal coliform bacteria in Gibbons Creek include focusing on Campen Creek within Washougal city limits, identifying illegal discharges, failing septic systems, and contributions from residential pet waste (Collyard, 2013).

City staff have observed that Campen Creek and its tributaries through this catchment are flashy, which means that stream levels rise very quickly after rainstorms. Flashiness is typical of streams that have been impacted by urban development.

Many residential subdivisions in the catchment were developed under Clark County regulations in the 1990s and 2000s which means most of them have older flow control and older water quality facilities, and many of these subdivisions have wider county road widths. The Summer Slopes subdivision drains to poorly functioning water quality and flow control facilities. These facilities are located in a large city-owned property. The property is a former wetland which is now dominated by invasive blackberry plants. The poor drainage in the Campen Creek Park-Rolling Meadows neighborhood has resulted in sinkholes, and

the area has little treatment with an older flow control facility. Additionally, old county roads in the area have no treatment or flow control; however, rights-of-way are wide and provide opportunities for retrofit. The Vintage Crest Estates Subdivision drains to an older public flow control facility and treatment facility. The facilities are in poor condition, and a downstream culvert experiences high flow. J Street, south of Washougal High School, has no treatment, and I Street, also south of Washougal High School, experiences street flooding. A potentially high-risk drywell exists on I Street and may be contributing to poor drainage. The City has also identified an erosion problem in Campen Creek at 39th Street.

During the site visit to Gibbons Creek Basin, the City and consultant team identified stormwater retrofit opportunities and stormwater management needs throughout the Campen Creek Catchment. These opportunities and needs include poorly functioning, older water quality and flow control facilities; potential high-risk drywells; residences on septic systems; and the erosion problem at 39th Street.

The Campen Creek Catchment was selected for action planning because of the water quality impairments and inadequate flow controls. Addressing these issues will require a combination of approaches. The City will address some factors directly with structural retrofits and new policy changes to stormwater management activities. Other factors will require the City to implement non-structural programs and outreach to change public behavior in the catchment.

Process

After selection of the Campen Creek Catchment, the consulting team proposed twelve stormwater management actions (SMAs) to improve water quality in Gibbons Creek. Seven of these were structural actions (capital improvements or construction projects) and five were non-structural actions or programs that change the way land or stormwater is managed. In order to have enough information to select preferred SMAs to include in the plan, each SMA was given a name and brief description, and the following characteristics were described: pollutants removed, relative initial cost (high / medium / low), relative ongoing cost (high / medium / low), and relative benefit based on number of acres served.

For two weeks in November 2022, a website, web map, and survey were available for public feedback on the twelve SMA options. The City advertised this engagement opportunity on social media and with a flyer posted at City Hall, Permit Center, Library, and other locations. See Appendix D for the survey and responses. See Figure 4 for screenshots of the website and web map.

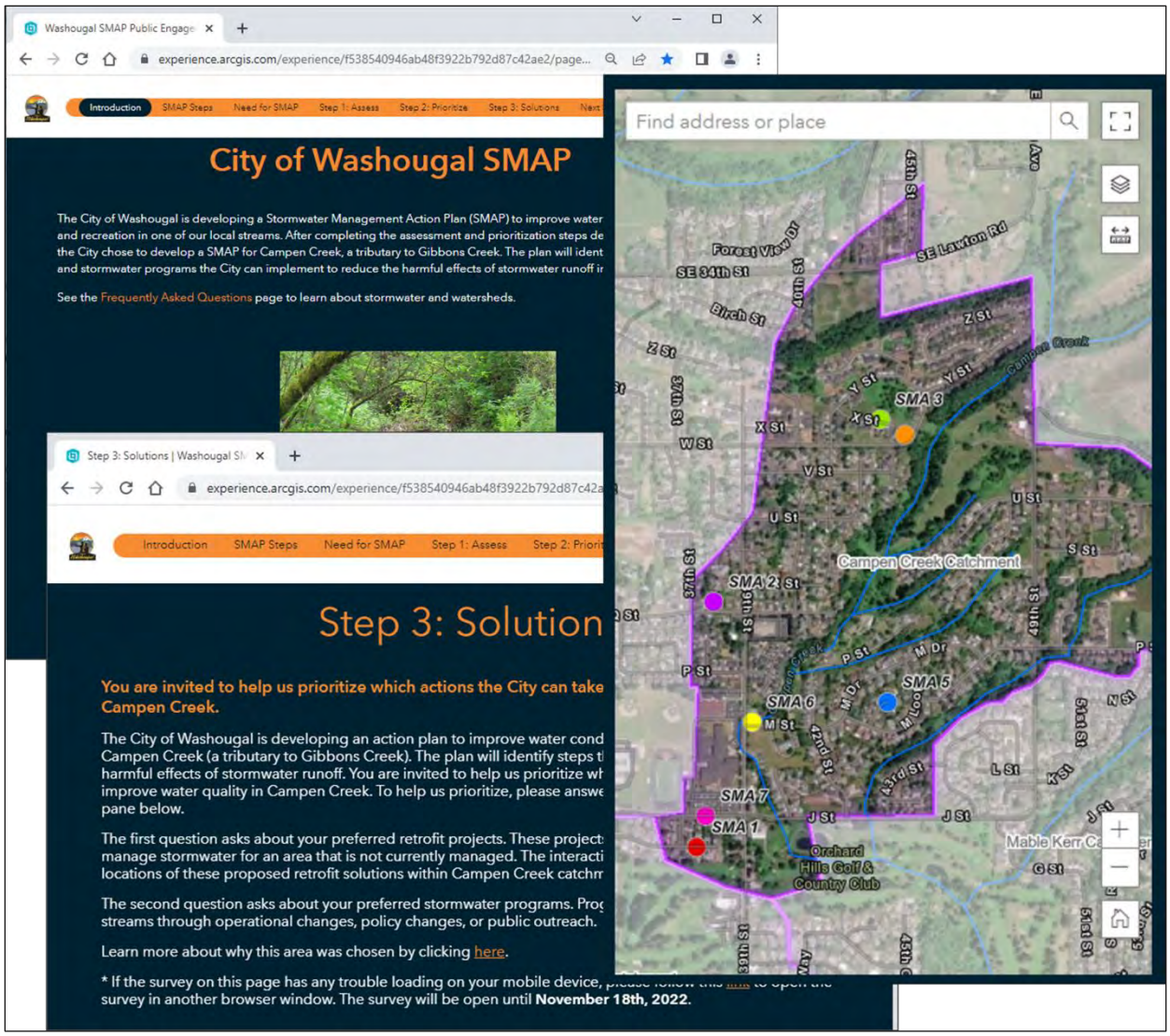

Figure 4 SMA Public Involvement Website Screencaps

Based on the relative benefits and costs, coordination opportunities, and feedback from the public, the City prioritized several SMAs for short-term action. All SMAs and their selection status are described in the section below.

Stormwater Management Actions

The City plans to implement a suite of SMAs in the Campen Creek Catchment. They are divided into structural projects (stormwater facility retrofit projects) and non-structural programs which include both land management and development strategies and customized stormwater management actions.

Structural Stormwater Management Actions

The SMAP includes six stormwater facility retrofit projects. These retrofit projects would address water quality or flow control deficiencies in existing infrastructure. Four retrofits are the recommended Capital Improvement Projects (CIPs) for short-term implementation. Two retrofits are additional CIPs the City may consider for long-term implementation. See Table 4 and Figure 5 for recommended and additional CIPs.

Table 4 Stormwater Facility Retrofit Projects

SMA ID	Project Name	Brief Description
Recommended Capital Improvement Projects		
SMA1	Washougal High School Stormwater Vicinity Retrofits	This project will renovate a bioretention swale that collects on Washougal High School property and retrofit the high school parking lot with bioretention planters. The project will retrofit portions of I and J Streets between 34th Street and 39th as well as 36th Street with bioretention planters. The project will also add a new drywell on I Street and reconfigure the existing drywell as a sedimentation manhole. This project will capitalize on an existing project at the Washougal High School property. Ecology rated the project highly and proposed the project for funding on the Draft Water Quality Funding List published in January 2023. The Final Funding List will be published in July 2023.
SMA2	Q Street Infiltration Pond Retrofit	Redirect stormwater in a 20-acre basin to drain to an existing, underutilized infiltration pond and add pre-treatment.
SMA3	X Street Water Quality Retrofit	Install a water quality vault upstream of the existing detention pipe.
SMA5	J Street and 42nd (Vintage Crest Estates) Water Quality Retrofit	Install bioretention planters for runoff treatment throughout the Vintage Crest Estates Subdivision.
Additional Capital Improvement Projects		
SMA4	Columbia View Flow Control and Water Quality Retrofit	Add detention pipe capacity to meet current flow control standards and retrofit or expand existing swale to improve treatment from the Columbia View neighborhood.
SMA6	M Street and 39th Street Channel Erosion Study	Evaluate the cause of erosion at the corner of M Street and 39th Street and prepare an alternatives analysis. Potential solutions to prevent erosion include addressing runoff upstream, realigning the channel, and retrofitting existing facilities.

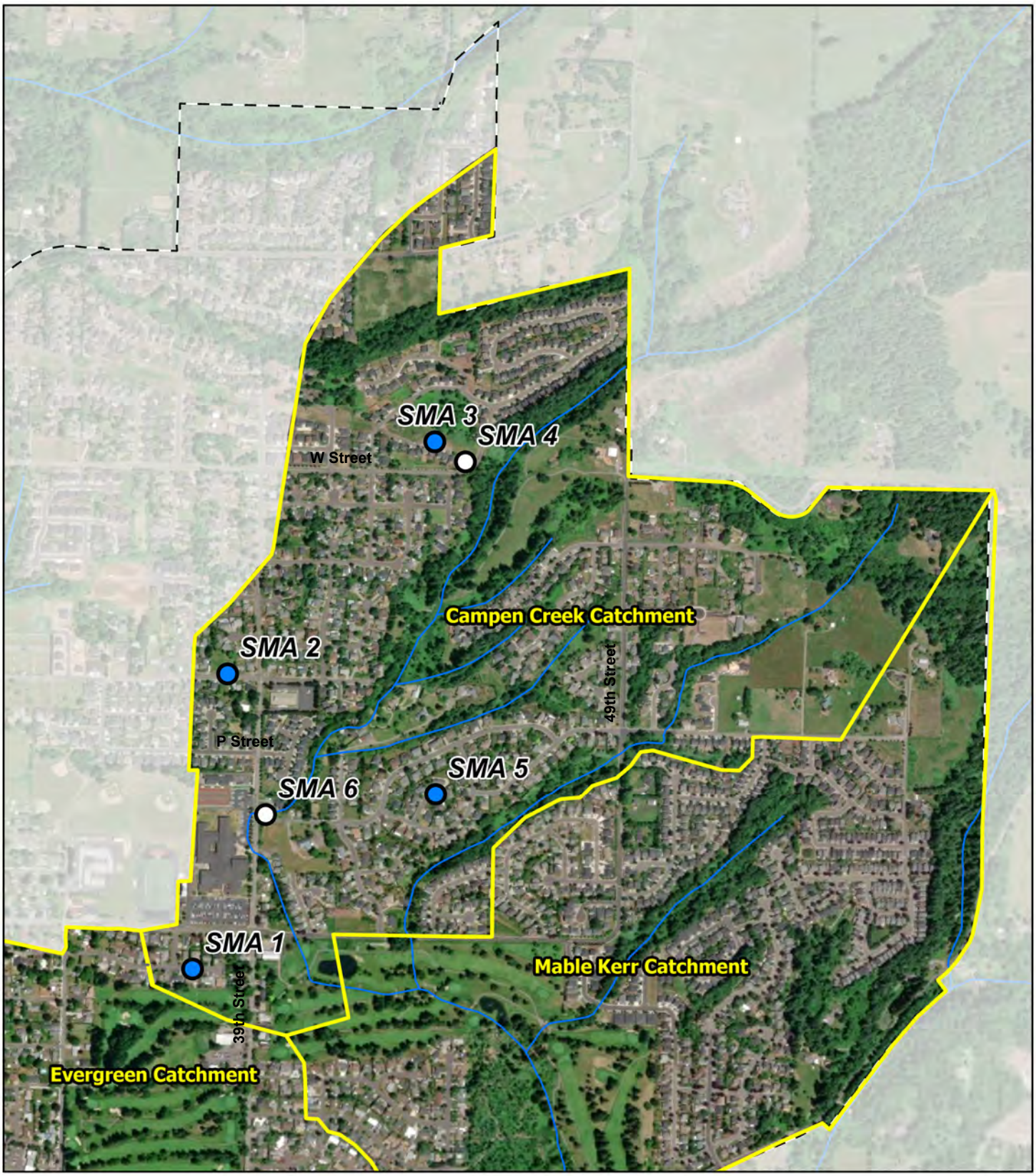

FIGURE 5

STORMWATER FACILITY RETROFIT PROJECTS

WASHOUGAL SMAP

Gibbons Creek Basin Catchments

Washougal City Limits

Streams

Stormwater Facility Retrofit Projects

Recommended CIP

Additional CIP

0 250 500 1,000 Feet

Date: 1/12/2023
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

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Otak

A factsheet for each recommended CIP is included in Appendix E with a description of the issue, a conceptual project solution, and a planning level cost opinion. Project concepts and costs for SMA 1 were developed by Juncus Studio consultants, and project concepts and costs for other projects to be implemented in the short-term planning horizon were developed by Otak. Each of the recommended CIPs is summarized below. Table 5 presents the total project costs.

SMA 1 Washougal High School Vicinity Stormwater Retrofits

The City developed SMA 1 and submitted the concept sketch as part of a grant application. This project will improve drainage and water quality of runoff from the high school and streets in the vicinity of the high school. The project will renovate a bioretention swale that collects runoff from a portion of the school roof and landscaping. The project will also retrofit an untreated parking lot with bioretention planters. Capitalizing on the renovations at the high school, the City will also retrofit about five blocks of City streets south of the school with bioretention planters or improved biofiltration swales. The project will add a new drywell on I Street and reconfigure the existing drywell as a sedimentation manhole to reduce clogging and increase infiltration. An existing sidewalk will be replaced with permeable pavement. This project is a partnership between the City, Washougal School District, and the Lower Columbia Estuary Partnership. Ecology rated the project highly and proposed the project for funding on the Draft Water Quality Funding List published in January 2023. The Final Funding List will be published in July 2023.

SMA2 Q Street Infiltration Pond Retrofit

The Q Street Infiltration Pond Retrofit project will redirect runoff from a large drainage area from Q Street to W Street and between approximately 37th Street and 41st Street to an existing, underutilized infiltration pond. The project will also install two proprietary pre-treatment facilities in Q Street to extend the life of the infiltration pond. The project will provide flow control and remove total suspended solids (TSS), phosphorus, and dissolved metals from runoff for 22 acres.

SMA 3 X Street Water Quality Retrofit

The X Street Water Quality Retrofit project will install two proprietary runoff treatment vaults upstream of the detention facility in the Summer Slope open space and evaluate the existing detention facility's function for potential repair or redesign. The proprietary treatment vaults will remove TSS and phosphorus from runoff for the entire drainage basin that is currently directed to the existing detention facility.

SMA 5 J Street and 42nd (Vintage Crest Estates) Water Quality Retrofit

The J Street and 42nd (Vintage Crest Estates) Water Quality Retrofit project will install bioretention planters for runoff treatment throughout the Vintage Crest Estates Subdivision. The bioretention planters will supplement the water quality treatment provided by an existing swale and remove TSS, dissolved metals, and 6PPD-quinone. The project will install approximately 14,000 square feet of stormwater planters in the rights-of-way of 42nd Street north of J Street, M Drive, M Loop, and Rolling Meadows Drive.

Table 5 Recommended CIP Costs

SMA ID	Project Name	Cost
SMA 1*	Washougal High School Vicinity Stormwater Retrofits (City Portion)	$978,000
SMA 2	Q Street Infiltration Pond Retrofit	$776,000
SMA 3	X Street Water Quality Retrofit	$400,000
SMA 5	J Street and 42nd (Vintage Crest Estates) Water Quality Retrofit	$2,360,000
Total Cost		**$4,514,000**

** Stated cost may omit improvements to the I Street drywell. The City will refine costs at the next steps.*

Non-Structural Stormwater Management Actions

In addition to stormwater facility retrofit projects, the SMAP recommends five non-structural SMAs (programs or policies) to reduce sources of pollutants and increase tree and native vegetation canopy. These programs are intended to increase water quality in the Campen Creek Catchment. These actions are categorized in the Permit and the 2019 SMAP Guidance into land management and development strategies and customized stormwater management actions which are related to Permit requirements. Table 6 below summarizes the non-structural actions, and Figure 6 shows the effective area of each one. Recommendations are described in greater detail starting on page 18.

Table 6 Non-structural SMA Summary

SMA ID	Program Name	Brief Description
SMA 8	Septic Elimination Program	This program will partially or fully fund connections to the City's sewer system for properties currently operating on septic systems in the catchment. The purpose is to reduce fecal coliform bacteria in streams.
SMA 9	Stream Shade Program	This program will incentivize homeowners to improve native trees and shrubs along Campen Creek, tributaries, and ditches. The purpose is to reduce temperature of streams.
SMA 10	Golf Course Voluntary Water Quality Program	The City would attempt to partner with Orchard Hills Golf Course to voluntarily adjust their turf management practices and landscaping along Campen Creek to reduce nutrients in runoff and increase tree and native vegetation canopy. The purpose is to reduce temperature of streams and improve water quality of runoff.
SMA 11	Targeted Pet Waste Reduction Program	The City will enhance the existing pet waste reduction program. The purpose is to reduce fecal coliform bacteria in runoff.
SMA 12	Urban Forestry Program	The City will implement an urban forestry program that includes community outreach; active tree management; and policies managing removal, pruning, and planting of trees. Purposes for this program related to SMAP are to reduce temperature of runoff and reduce runoff volume.

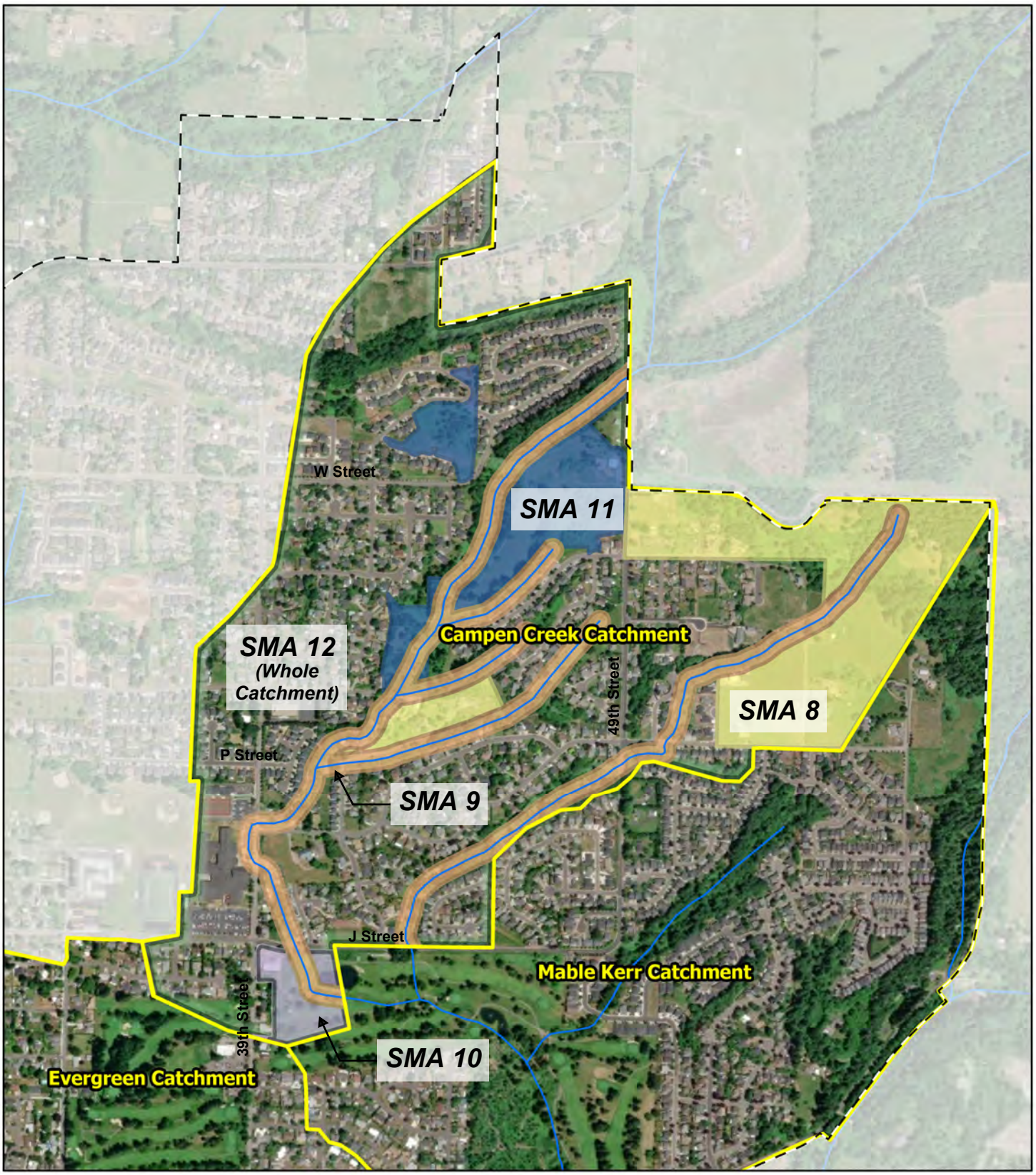

FIGURE 6
PROGRAM AND POLICY SMAs
WASHOUGAL SMAP

Gibbons Creek Basin Catchments
Washougal City Limits
Streams

Program

SMA 8	Septic Elimination
SMA 9	Stream Shade
SMA 10	Golf Course Water Quality
SMA 11	Targeted Pet Waste
SMA 12	Urban Forestry

0 250 500 1,000
Feet

Otak

Date: 1/16/2023
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

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Land Management and Development Strategies

Land management and development strategies entail identification of land that should be conserved or protected and the strategies to achieve this. The 2019 SMAP Guidance notes these strategies are most beneficial to undeveloped catchments which drain to a small stream or lake with good water quality and habitat conditions. In built-out areas such as the Campen Creek Catchment, the 2019 SMAP Guidance recommends implementing strategies to increase canopy cover. Tree and vegetation canopy intercepts rainfall and reduces erosion as well as providing surface area for rain to evaporate and creating soil conditions for infiltration (United States Environmental Protection Agency, 2022). If maintained or planted along streams, rivers, or lakes, trees and shrubs provide shade to reduce water temperatures. The following programs were identified to maintain or increase tree and native vegetation canopy in the Campen Creek Catchment.

SMA 9 Stream Shade Program

The SMAP recommends a stream shade program. Through the stream shade program, the City will incentivize homeowners to improve riparian habitat along Campen Creek, tributaries, and ditches. This program is modeled on the Watershed Alliance Washougal River Homeowner Incentive Program which provides technical assistance and financial reimbursement for installation of stormwater best management practices and planting native trees and shrubs on riverside properties. The City could partner with the Watershed Alliance or other non-profit to implement this program. Improving riparian habitat includes increasing canopy and shade which could reduce runoff volume and reduce temperatures of Campen Creek through approximately ten acres of contributing area.

SMA 12 Urban Forestry Program

The SMAP recommends a citywide urban forestry program. The urban forestry program will manage trees in Washougal to preserve and increase canopy cover citywide. The program could include community outreach, increased management of trees on City property and rights-of-way, and regulation of tree removal on private property. Urban forests help manage stormwater by breaking up impervious land cover. Trees reduce stormwater runoff and soil erosion by intercepting precipitation in their canopies and root zones. Trees also treat pollutants from runoff by filtering nutrients, sediment, and pesticides (US Environmental Protection Agency, 2021). Preservation or increase of canopy cover in Campen Creek Catchment could also reduce temperatures in Campen Creek by providing shade or reducing the temperature of runoff.

Urban forestry outreach could involve newsletters, informative signs and events, stewardship events such as pruning and planting, and tree care assistance (City of Portland, 2022). The City may also adopt a tree protection ordinance to conserve and protect tree resources and protect the community from potential risks by requiring the maintenance and protection of trees on public and private property (Nicholas Institute for Environmental Policy, 2017).

If adopted, an urban forestry program will be implemented citywide and will be expected to provide benefits in the Campen Creek Catchment. The urban forestry program could increase the urban tree canopy on approximately ten acres of area draining to the Campen Creek Catchment.

Customized Stormwater Management Actions

These SMAs are based on activities conducted as part of the City's Permit required Stormwater Management Program (SWMP). These actions and activities are designed to reduce the discharge of pollutants from the City's storm sewer system and protect water quality. The 2019 SMAP Guidance recommends including targeted, enhanced, or customized implementation of SWMP activities in the

SMAP. The following programs were identified to focus SWMP activities on the specific needs of the Campen Creek Catchment.

SMA 8 Septic Elimination Program

The SMAP recommends a septic system elimination program. The City has identified 23 parcels with on-site sewage systems (often called septic systems) in the Campen Creek Catchment. Eliminating septic systems in the catchment could reduce the discharge of fecal coliform and E. coli bacteria to streams and ditches from approximately 49 acres of contributing area. Eliminating sources of bacteria is the only method Ecology approves for addressing bacteria in stormwater and surface water.

The program will focus on outreach to properties in the Campen Creek Catchment which are using on-site sewage systems. Outreach will identify the pollutants associated with use of septic systems, encourage property owners to inspect and maintain their systems per state law, and encourage property owners to consider connecting to public sewer. To enhance the outreach program, the City will investigate whether options exist for financially supporting connection of residential properties to public sewer. For example, City of Vancouver offers a Sewer Connection Incentive Program (SCIP) which supports sewer connections by guaranteeing the cost of the public sanitary sewer extension for the property owner and providing low-interest financing for property owners to connect (City of Vancouver, 2023). In order to expand the Septic Elimination Program from an outreach-based program to an incentive program, the City will research legal implications, identify a source of funding, and request City Council support for a policy.

SMA 10 Golf Course Voluntary Water Quality Program

The SMAP recommends a voluntary golf course water quality program. This recommendation is conditional on voluntary cooperation of the private golf course operators. The Orchard Hills Golf Course is located entirely in the Gibbons Creek Basin and part of the golf course is located in the Campen Creek Catchment. The City would attempt to partner with Orchard Hills Golf Course to work towards elements of the Salmon Safe Certification program that reduce nutrient runoff and reduce stream temperatures. Full certification as a Salmon-Safe golf course would involve meeting specific standards and related performance requirements in six habitat-related management categories:

- Instream habitat protection and restoration,
- Riparian/wetland/vegetation protection and restoration,
- Stormwater management,
- Water use management,
- Erosion prevention and sediment control, and
- Chemical and nutrient containment (Salmon-Safe Inc., 2019).

Although there is some overlap in the benefits from these categories, this program would focus on riparian/wetland/vegetation protection and restoration to increase shade and filter nutrients and implementing a chemical and nutrient containment plan.

Riparian, wetland, and vegetation protection and restoration focuses on assessing the condition of riparian and wetland vegetation and maintaining and restoring these areas to provide shade, stream bank stability and cover, and filtration of sediment. A nutrient containment plan would minimize the potential for nutrient and lime use to contaminate stormwater and streams through the use of alternative practices to maintain soil fertility, using fertilizers with discretion based on soil fertility and plant needs, using slow-reacting fertilizers, and ensuring proper application of fertilizer and lime in terms of amounts and timing (Salmon-Safe Inc., 2019).

This program would involve the golf course voluntarily adjusting their turf management practices and landscaping along Campen Creek. Meeting these standards would reduce the discharge of pesticide, fertilizer, and nutrient pollutants to and reduce temperatures in Campen Creek from approximately 93 aces of contributing area.

In developing this program, the City would consider options for incentivizing participation. Available options have not been determined.

SMA 11 Enhanced Pet Waste Reduction Program

The SMAP recommends an enhanced pet waste reduction program. The enhanced pet waste reduction program will enhance the existing SWMP public education and outreach activities also required by the Permit. As part of the SMWP, the City conducts a citywide pet waste behavior change program which provides pet waste bags at parks and trailheads. The enhanced pet waste reduction program will construct permanent signs that discuss the impacts of pet waste on water quality in Washougal's waterbodies. The program will be expected to benefit Campen Creek. Two parks are located along Campen Creek within the Campen Creek Catchment and are connected by a trail, Campen Creek Park and Hartwood Park. These parks and trail are prime candidates for pet waste reduction. Increasing proper disposal of pet waste will reduce the discharge of fecal coliform and E. coli bacteria from approximately 33 acres of contributing area. Eliminating sources of bacteria is the only method Ecology approves for addressing bacteria in stormwater and surface water. Signs, posters, and fliers to support this program are available through the Clark County Canines for Clean Water program. Poop Smart Clark (https://poopsmartclark.org/), run by the Clark Conservation District in partnership with Clark County and the Washington State University Extension is another potential partner for pet waste signage installations and maintenance.

Implementation Schedule

The 2019 SMAP Guidance directs the City to propose an implementation strategy and identify potential budget sources to fund the plan. The schedule should outline the time and resources required for detailed planning and successful implementation of the SMAP actions.

The implementation schedule is divided into short-term and long-term actions. Short-term actions take place within a one-to-six-year timeframe. Short-term actions are a mix of opportunistic efforts and strategic projects and activities. Short-term actions should take advantage of other efforts occurring or planned in the area. Long-term actions and projects are intended to be strategic, rather than opportunistic.

Implementation of CIPs will be funded by the City's stormwater utility capital projects fund and grants. The projects will be implemented and phased based on the available funding and constructability. Larger projects may be divided into phases to fit the available budget. One hypothetical schedule is presented in Table 7. Project order and phasing may be adjusted depending on funding opportunities and other City priorities. The schedule also simplifies project scheduling, some project costs may begin before and continue after the fiscal years shown.

Table 7 Hypothetical CIP Implementation Schedule

Project	Project Name	Project Total Cost	City Portion of Cost	Phase Sub-Total	FY1	FY2	FY3	FY4	FY5	FY6	FY7	FY8	FY9	FY10	FY11
SMA 1	**Washougal High School Stormwater Retrofit**	**$1,718,000**	**$978,000**												
	Design and Permitting														
	Construction Year 1				$703,035										
	Construction Year 2					$275,446									
SMA 2	**Q Street Infiltration Pond Retrofit**	**$776,000**	**$776,000**												
	Design and Permitting						$270,400								
	Construction Year 1							$505,100							
SMA 3	**X Street Water Quality Retrofit**	**$400,000**	**$400,000**												
	Design and Permitting								$144,300						
	Construction								$255,400						
SMA 5	**J Street and 42nd Street Water Quality Retrofit**	**$2,360,000**	**$2,360,000**												
	Phase 1			**$1,338,275**											
	Design and Permitting									$489,075					
	Construction Year 1										$424,600				
	Construction Year 2											$424,600			
	Phase 2			**$1,012,225**											
	Design and Permitting												$163,025		
	Construction Year 1													$424,600	
	Construction Year 2														$424,600
Total		**$5,254,000**	**$4,514,000**		**$703,035**	**$275,446**	**$270,400**	**$505,100**	**$399,700**	**$489,075**	**$424,600**	**$424,600**	**$163,025**	**$424,600**	**$424,600**

Short-Term Actions

Phase 1 (years one through six of implementation) will be an initiation and early action phase. The selected stormwater facility retrofit projects, customized stormwater management actions, and outreach and incentive aspects of land management and development strategies are considered short-term actions. Exploration, and implementation if feasible, of the regulatory aspects of land management and development strategies is also a short-term action.

The short-term actions include the following structural SMAs which were developed into concept sketches and cost opinions (Appendix E):

- SMA 1, Washougal High School Vicinity Stormwater Retrofit – This SMA was submitted as part of a grant application in partnership with the Lower Columbia Estuary Partnership and Washougal School District (Appendix E). This project could be implemented immediately if funded.
- SMA 2, Q Street Infiltration Pond Retrofit – This SMA makes use of an existing infiltration pond and add pre-treatment to provide water quality treatment and flow control to 20 acres of existing residential development. This project will require minor construction and can be implemented as a short-term action.
- SMA 3, X Street Water Quality Retrofit – This SMA will install a water quality vault upstream of an existing detention facility. This project will require minor construction and can be implemented as a short-term action.
- SMA 5, J Street and 42nd (Vintage Crest Estates) Water Quality Retrofit – This SMA will install bioretention planters throughout the Vintage Crest Estates Subdivision to provide water quality treatment. The project will require more extensive construction than SMA 2 or SMA 3; however, the project is straightforward in concept and can be implemented as a short-term action.

The short-term actions also include the following non-structural SMAs:

- SMA 8, Septic Elimination Program – This SMA includes both short-term and long-term actions. This SMA will conduct outreach and provide incentives to connect residential properties on septic systems to the City's sanitary sewer to reduce fecal coliform bacteria in streams. Outreach activities will start in the short-term timeframe. The City will also research policy and financial options in the short-term.
- SMA 9, Stream Shade Program – This SMA will incentivize homeowners to improve native trees and shrubs to reduce temperature of streams in the Campen Creek Catchment. Incentivizing homeowners to improve native trees and shrubs is a short-term action.
- SMA 11, Targeted Pet Waste Reduction Program – This SMA will enhance the existing pet waste reduction program to reduce fecal coliform bacteria in streams. Implementation of the pet waste reduction program is a short-term action.
- SMA 12, Urban Forestry Program – This SMA will implement an urban forestry program that includes community outreach; active tree management; and policies managing removal, pruning, and planting of trees to reduce temperature of runoff and reduce runoff volume. Development and implementation of the urban forestry program supports other City goals and is a short-term action.

Long-Term Actions

Phase 2 of SMAP implementation is proposed to occur in years seven through 20. SMAs initiated during the short-term phase will continue during the long-term phase based on lessons learned through adaptive management. Additional long-term actions include stormwater management actions with limited

immediate opportunity or a greater likelihood of being modified through adaptive management. Short-term actions that are not implemented during Phase 1 could be better suited for and completed in Phase 2.

Structural SMAs recommended but not selected as CIPs may be implemented in Phase 2:

- SMA 4, Columbia View Flow Control and Water Quality Retrofit will add detention pipe capacity to meet current flow control standards and retrofit or expand the existing swale to improve from the Columbia View neighborhood. The parcel to the north of the existing swale is owned by the City, and the parcel to the east is owned by the Columbia View neighborhood association. The project may be implemented in phases to achieve funding.

- SMA 6, M Street and 39th Street Channel Erosion Study will evaluate the cause of erosion at the corner of M Street and 39th Street and prepare an alternatives analysis of potential solutions. Potential solutions may include developing upstream solutions, realigning the channel to remove a 90-degree bend, and identifying retrofits of existing facilities that will prevent erosion. The location of this erosion was the focus of a recent City repair project. The efficacy of that project should be evaluated as part of this study to determine what additional effort, if any, is required to prevent erosion at the site.

Additional non-structural SMAs not implemented in Phase 1 could also be implemented in Phase 2. These include land management and development strategies and customized stormwater management actions or elements of these strategies and actions that require additional study or funding prior to adoption.

Phase 2 actions may also require collaboration with other jurisdictions, stewardship groups, and organizations such as adjacent cities, Clark County, the Lower Columbia River Fish Recovery Board, and WSDOT.

The following non-structural SMAs are identified for implementation in Phase 2:

- SMA 8, Septic Elimination Program – This SMA includes both short-term and long-term actions. This stage of SMA 8 will continue outreach efforts and implement options to financially support connection of residential properties to public sewer.

- SMA 10, Golf Course Voluntary Water Quality Program – This SMA will attempt to partner with Orchard Hills Golf Course to voluntarily adjust their turf management practices and landscaping along Campen Creek to reduce temperature of streams and improve water quality of runoff. Partnering with Orchard Hills Golf Course is a long-term action.

Budget Sources

The current Permit only requires the City to prepare a SMAP. Ecology has not yet established a level of effort for SMAP implementation. However, the 2019 SMAP Guidance states the City should identify potential fundings sources to support a realistic schedule to achieve progress on both short-term and long-term actions. What follows is a summary discussion of available resources to fund SMAP actions.

The two major sources of available funding are revenues from stormwater utility fees and grants from external sources.

The stormwater utility maintains the stormwater facilities around the City. The stormwater utility is funded through the stormwater fund, which is an enterprise fund. Enterprise funds are used to account for activities for which the City charges a fee to operate the service. An associated capital project fund used to account for stormwater capital projects is supported by the enterprise operation fund and supplemented by other revenues, such as grants, revenue bonds, and impact fees.

The fees for utility services are the primary source of revenue for this fund (budget). The stormwater fees are assessed against each parcel of property within the boundaries of the utility and are based on the amount of impervious surface contained within each parcel. The rate structure includes service charges and system development charges.

Service charges are used to pay operating expenses and capital expenses through system reinvestment funding. System development charges are assessed on new development rather than from the existing customer base. The system development charge revenue can legally be used in two ways: applied to capital project costs directly or applied toward annual debt service payments. The City uses system development charge revenue to directly fund capital expenses.

The operating account holds funds used to pay for staff salaries, wages, and benefits; services; supplies; and intergovernmental services to perform regular maintenance and operations of the stormwater utility. The City maintains an operating reserve sufficient to fund 30-45 days of operations in the operating account. Funds in excess of the operating reserve are transferred from the operating account to the capital account at year-end. The stormwater capital fund holds debt proceeds, system development charge revenues, system reinvestment funding from rates, and any transfers of cash reserves from the operating account. (City of Washougal, 2021).

Service charges are based on impervious area estimated as an equivalent residential unit (ERU). All single-family dwelling units and accessory uses are deemed to contain one ERU, and each dwelling unit of a duplex structure is deemed to contain one ERU. For all other developed properties, the number of equivalent residential units is determined by dividing the number of square feet of impervious surface on each property by 3,900 square feet per ERU and rounded to the nearest half. Each developed parcel is deemed to comprise a minimum of one ERU.

Effective Jan. 1, 2023, the stormwater rate will be $35.17 bimonthly ($17.59 per month) per ERU. The City provides a reduced rate for low-income senior citizens and credits for commercial properties with private on-site stormwater quality and quantity facilities.

In addition to service charges, the City imposes system development charges on the owners of properties seeing to connect to the City’s stormwater system. The system development charge is $478.00 times the number of proposed ERUs. The system development charge is paid at the time of permit issuance for development and prior to actual development. The system development charge reflects a proportionate share of the utility’s capital costs attributable to the newly developed property (City of Washougal, 2022).

The City is undertaking a utility rate study to be completed in 2023. The rate study will establish the amount required to fully fund the water, wastewater, and stormwater utility programs while also proportionally distributing those costs among various users in accordance with their impact on the total utility system. In order to track with system changes and improvements, a rate study should be completed every 4-5 years. The last rate study was completed in 2018.

The City anticipates the need to work in partnership with federal, regional, other local government agencies, and other organizations if the SMAP is implemented. Due to the cost and scale of capital projects and programs outlined in this SMAP, the availability and timing of grants and other outside funding will determine the actual timeframe for implementation.

The City should investigate and evaluate potential funding sources and collaborative options further, as a part of the implementation of Phase 1 of the SMAP. If certain SMAP strategies are implemented, the City’s operations and maintenance program budget may need to be slightly increased.

Ecology has been a significant source of funding in the past for Washougal stormwater projects and should be considered for SMAP implementation. Washougal received Water Quality Stormwater Capacity grants in 2015, 2017, 2019 and 2021 totaling $175,000 to assist with management of the municipal stormwater program (Washington State Department of Ecology, 2022). The Water Quality Combined Funding Program funds projects that improve and protect water quality. Funds are made available through an annual single-application process to apply for funding from multiple sources. Funding available varies based on the state budget, and grant awards depend on the funding source and project type. (Washington State Department of Ecology, 2022). The City has recently been designated as a community that is required to contribute a reduced matching of only 5% of a project's budget.

The Lower Columbia Fish Recovery Board's Salmon Recovery Plan also provides funding sources for appropriate projects and programs (Lower Columbia Fish Recovery Board, 2022). Lower Columbia Fish Recovery Board may also support the City in seeking funding for other local, state, and federal sources. Ecology's Regional On-Site Sewage System Loan Program provides loans to replace or repair failing septic systems state-wide through a non-profit lender. The City may assist with applications to replace septic systems when homeowners are under orders to fix their system (Washington State Department of Ecology, 2021).

Adaptive Management

The 2019 SMAP Guidance requires the City to adaptively manage the SMAP. Adaptive management will allow City goals and methods to change in response to new information, new opportunities, or new or changed community or regulatory goals. The key process in adaptive management is assessing progress. The City's Public Works Department will be responsible for assessing progress towards meeting the City's SMAP goals and making or recommending changes.

The adaptive management process will include implementation tracking and an ongoing assessment of what portion of the planned projects and activities have taken place, and how much of the catchment area has been addressed. The City will ensure adaptive management of the SMAP by keeping the SMAP document and the live web map accessible on the City's website. As adaptations, findings, and status changes occur over the implementation period, the web map will be updated to reflect live progress and associated metrics.

The Ecology Stormwater Action Monitoring program conducts status and trends monitoring of Campen Creek annually as part of the Lower Columbia urban streams study (Washington State Department of Ecology, 2022). Data from this study will provide valuable feedback for this SMAP.

Adaptive management will allow the City to document progress toward meeting SMAP goals and enable the City to report progress to the funders, the public, and Ecology. If SMAP is implemented, the City expects to adapt its approach to SMAP over time as lessons are learned from implementation of various strategies.

Section 6. Conclusion

Campen Creek and Gibbons Creek are important water resources for the City of Washougal. The impairment of these waters harms the quality of life in Washougal. Poor water quality reduces opportunities for recreation and harms threatened species of fish that define the character of the City and region. This SMAP will guide the City's continuing work to restore these streams.

Section 7. References

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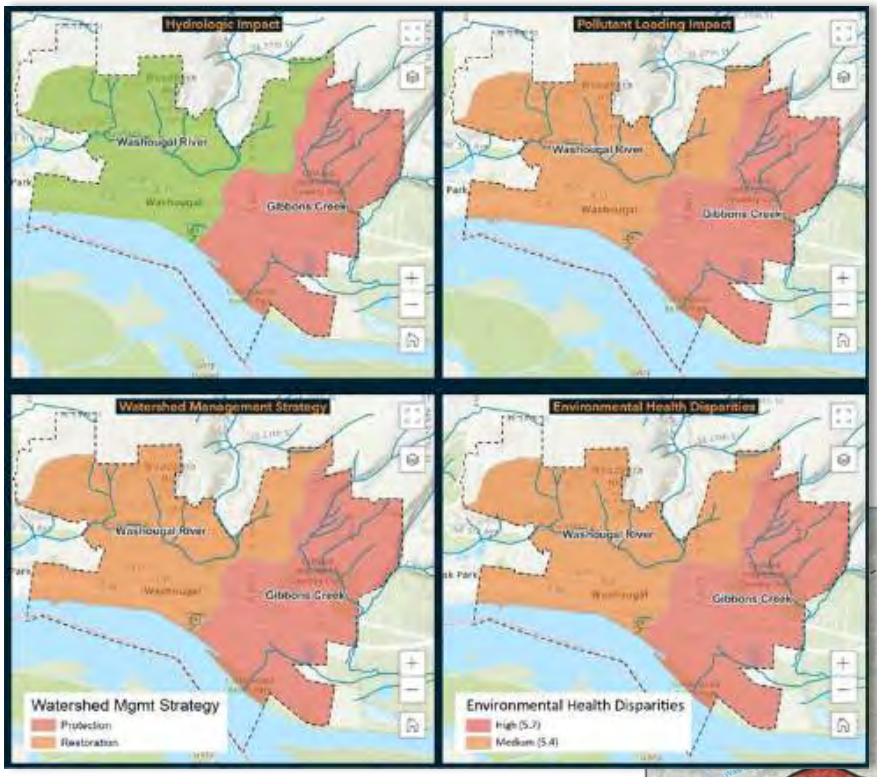
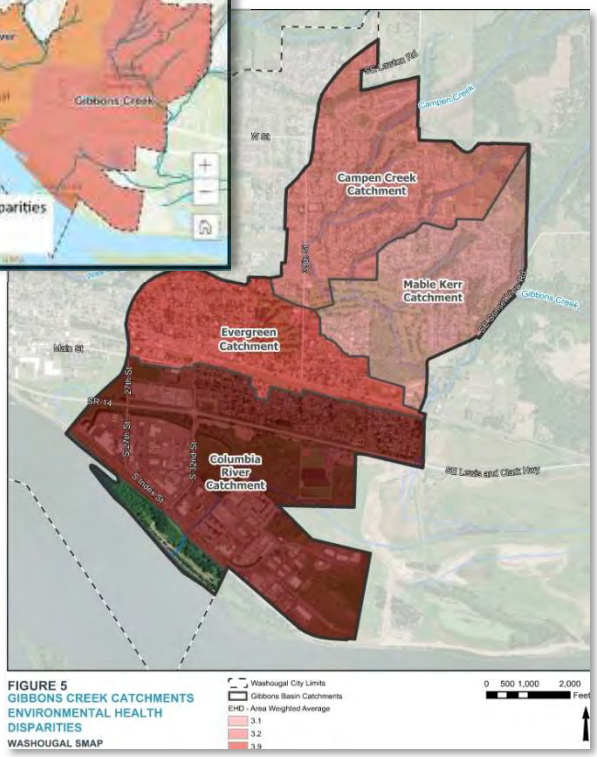
Otak





City of Washougal

Stormwater Management Action Plan: Appendices

Final

Submitted to:

City of Washougal
2247 Main Street
Washougal, WA 98671

Prepared by:

Otak, Inc.
805 Broadway Street,
Suite 130
Vancouver, WA 98660

March 2023

Project No. 20155

DEPARTMENT OF ECOLOGY
State of Washington

Appendix A

Water Quality Combined Financial Assistance Agreement

Agreement No. WQC-2022-WashPW-00041

WATER QUALITY COMBINED FINANCIAL ASSISTANCE AGREEMENT

BETWEEN

THE STATE OF WASHINGTON DEPARTMENT OF ECOLOGY

AND

CITY OF WASHOUGAL PUBLIC WORKS DEPARTMENT

This is a binding Agreement entered into by and between the state of Washington, Department of Ecology, hereinafter referred to as "ECOLOGY," and City of Washougal Public Works Department, hereinafter referred to as the "RECIPIENT," to carry out with the provided funds activities described herein.

GENERAL INFORMATION

Project Title:	Washougal Stormwater Management Action Plan (SMAP)
Total Cost:	$129,360.00
Total Eligible Cost:	$129,360.00
Ecology Share:	$97,020.00
Recipient Share:	$32,340.00
The Effective Date of this Agreement is:	07/01/2021
The Expiration Date of this Agreement is no later than:	06/30/2024
Project Type:	Stormwater Facility

Project Short Description:

This project will improve water quality in the City of Washougal by removing pollutants before they can be carried by stormwater into Lacamas Lake, Washougal River, or the Columbia River by engaging in a Stormwater Management Action Plan (SMAP) process. The process will include a Receiving Water Conditions Assessment, Receiving Water Prioritization, and developing a SMAP to effectively reduce pollutant loads and address hydrologic impacts from existing development.

Project Long Description:

The City of Washougal is a small city of approximately 16,000 people and is about seven square miles. Located on the banks of the Columbia River and spanning the lower reaches of the Washougal River, the City has a long history as a local hub of agriculture, industry, river navigation, natural resources extraction, and small-town living. The majority of the City drains to the two rivers and the ground via Underground Injection Controls wells.

The RECIPIENT will follow Ecology's Stormwater Management Action Planning (SMAP) Guidance for Phase I and Western Washington Phase II Municipal Stormwater Permits (Ecology, 2019; Publication 19-10-010), to envision where stormwater retrofits and targeted stormwater management actions would be the most effective in protecting or restoring water quality and hydrology for fish and people. The first steps in the SMAP planning process is to complete the Receiving Waters Conditions Assessment, prioritize the receiving waters, and identify one for additional planning efforts. The RECIPIENT will compile existing information related to Washougal's receiving waters including: the Washougal River, Columbia River, Gibbons Creek, Campen Creek, and Lacamas Creek.

For each receiving water they will delineate the watershed boundary and the portion of each receiving water's watershed inside City limits. The RECIPIENT will identify the designated uses and desired water quality conditions to support those uses, assess the extent to which the desired conditions are being met, and determine if the water body is impaired, or likely to become impaired under future development conditions.

The pollutants of concern are likely to be one or more of the following: bacteria (Gibbons Creek Watershed Bacteria TMDL), metals (common stormwater pollutant), or total suspended solids (common stormwater pollutant). The following pollutants may be addressed if the assessment concludes that stormwater management actions could improve these conditions and temperature (Category 5 listings on the Columbia River, Gibbons Creek, and Lacamas Creek). This information will assist the RECIPIENT in selecting a receiving water for more targeted SMAP planning efforts.

Next, the RECIPIENT will develop and implement a process to determine which receiving waters will benefit most from stormwater facility retrofits, tailored implementation of stormwater management program actions, and other land/development management actions. This Receiving Water Prioritization process will include the identification of high priority catchment area(s) for focus of the SMAP. The RECIPIENT will present the draft prioritization to stakeholders for consideration and comment and incorporate feedback into the final prioritization. The RECIPIENT will select a basin within the priority receiving water watershed.

The RECIPIENT will prepare a SMAP for at least one high priority catchment area identified during the Receiving Water Prioritization process. The SMAP will include, but is not limited to, stormwater facility retrofits, land management/development strategies, and implementation of stormwater management actions related to the City of Washougal municipal stormwater permit. The SMAP will also include a proposed implementation schedule, budget sources, and a process to adaptively manage the plan.

Overall Goal:
This project will help protect and restore water quality in Washington state by reducing stormwater impacts from existing infrastructure and development.

RECIPIENT INFORMATION

Organization Name: City of Washougal Public Works Department

Federal Tax ID: 91-6001525
UEI Number: K76UWJBQAN37

Mailing Address: 1701 C Street
Washougal, WA 98671

Physical Address: 1701 C Street
Washougal, Washington 98671

Organization Email: rcharles@cityofwashougal.us

Contacts

Project Manager	Sean Mulderig Stormwater program Coordinator 1701 C Street Washougal, Washington 98671 Email: sean.mulderig@cityofwashougal.us Phone: (360) 835-2662 X230
Billing Contact	Monie Holmes Assistant Finance Director 1701 C Street Washougal, Washington 98671 Email: monie.holmes@cityofwashougal.us Phone: (360) 835-8501
Authorized Signatory	Rob Charles 1701 C Street Washougal, Washington 98671 Email: rcharles@ci.washougal.wa.us Phone: (360) 835-2662

ECOLOGY INFORMATION

Mailing Address: Department of Ecology
Water Quality
PO BOX 47600
Olympia, WA 98504-7600

Physical Address: Water Quality
300 Desmond Drive SE
Lacey, WA 98503

Contacts

Project Manager	David Mora 12121 NE 99th Street Suite 2100 Vancouver, Washington 98677 Email: damo461@ecy.wa.gov Phone: (360) 690-4782
Financial Manager	Melissa Conger PO Box 47600 Olympia, Washington 98504-7600 Email: MECO461@ecy.wa.gov Phone: (360) 407-6225
Technical Advisor	Doug Howie Senior Stormwater Engineer PO Box 47600 Olympia, Washington 98504-7600 Email: DOHO461@ecy.wa.gov Phone: (360) 407-6444

AUTHORIZING SIGNATURES

RECIPIENT agrees to furnish the necessary personnel, equipment, materials, services, and otherwise do all things necessary for or incidental to the performance of work as set forth in this Agreement.

RECIPIENT acknowledges that they had the opportunity to review the entire Agreement, including all the terms and conditions of this Agreement, Scope of Work, attachments, and incorporated or referenced documents, as well as all applicable laws, statutes, rules, regulations, and guidelines mentioned in this Agreement. Furthermore, the RECIPIENT has read, understood, and accepts all requirements contained within this Agreement.

This Agreement contains the entire understanding between the parties, and there are no other understandings or representations other than as set forth, or incorporated by reference, herein.

No subsequent modifications or amendments to this agreement will be of any force or effect unless in writing, signed by authorized representatives of the RECIPIENT and ECOLOGY and made a part of this agreement. ECOLOGY and RECIPIENT may change their respective staff contacts without the concurrence of either party.

This Agreement shall be subject to the written approval of Ecology's authorized representative and shall not be binding until so approved.

The signatories to this Agreement represent that they have the authority to execute this Agreement and bind their respective organizations to this Agreement.

Washington State
Department of Ecology

By: DocuSigned by: On behalf of 2BCA6B80046746E... 5/27/2022

Vincent McGowan, P.E. Date

Water Quality

Program Manager

Template Approved to Form by
Attorney General's Office

City of Washougal Public Works Department

By: DocuSigned by: 9C171485ECA4477... 5/27/2022

Rob Charles Date

SCOPE OF WORK

Task Number: 1 **Task Cost:** $0.00

Task Title: Grant and Loan Administration

Task Description:

A. The RECIPIENT shall carry out all work necessary to meet ECOLOGY grant or loan administration requirements. Responsibilities include, but are not limited to: Maintenance of project records; submittal of requests for reimbursement and corresponding backup documentation; progress reports; the EAGL (Ecology Administration of Grants and Loans) recipient closeout report; and a two-page outcome summary report (including photos, if applicable). In the event that the RECIPIENT elects to use a contractor to complete project elements, the RECIPIENT shall retain responsibility for the oversight and management of this funding agreement.

B. The RECIPIENT shall keep documentation that demonstrates the project is in compliance with applicable procurement, contracting, and interlocal agreement requirements; permitting requirements, including application for, receipt of, and compliance with all required permits, licenses, easements, or property rights necessary for the project; and submittal of required performance items. This documentation shall be available upon request.

C. The RECIPIENT shall maintain effective communication with ECOLOGY and maintain up-to-date staff contact information in the EAGL system. The RECIPIENT shall carry out this project in accordance with any completion dates outlined in this agreement.

Task Goal Statement:

Properly managed and fully documented project that meets ECOLOGY's grant or loan administrative requirements.

Task Expected Outcome:

* Timely and complete submittal of requests for reimbursement, quarterly progress reports, Recipient Closeout Report, and two-page outcome summary report.
* Properly maintained project documentation.

Grant and Loan Administration

Deliverables

Number	Description	Due Date
1.1	Progress Reports that include descriptions of work accomplished, project challenges or changes in the project schedule. Submitted at least quarterly.	
1.2	Recipient Closeout Report (EAGL Form)	
1.3	Two-page Outcome Summary Report	

SCOPE OF WORK

Task Number: 2 **Task Cost:** $0.00

Task Title: Consultant Selection

Task Description:
The RECIPIENT will submit a consultant scope of work and select a consultant following the RECIPIENT's purchasing guidelines.

A. The RECIPIENT will respond to ECOLOGY comments on the consultant scope of work.

B. The RECIPIENT will attain a signed contract with their consultant.

Task Goal Statement:
The RECIPIENT will select and contract a consultant.

Task Expected Outcome:
Completion of Washougal Stormwater Management Action Plan (SMAP) grant deliverables.

Consultant Selection

Deliverables

Number	Description	Due Date
2.1	Signed SMAP consultant contract. Upload to EAGL and notify ECOLOGY when upload is complete.	

SCOPE OF WORK

Task Number: 3 **Task Cost:** $40,449.00

Task Title: Receiving Water Conditions Assessment

Task Description:
The RECIPIENT will use the approach outlined in the Stormwater Management Action Planning Guidance for Phase I and Western Washington Phase II Municipal Stormwater Permits (Ecology, 2019; Publication 19-10-010) to support the Receiving Water Conditions Assessment.

A. The RECIPIENT will identify receiving waters, delineate each receiving water's watershed boundary, and calculate the total basin size and portion of each receiving water basin within city limits. In addition to other resources, the RECIPIENT will use the latest GIS data of the municipal separate storm sewer system (MS4) to help perform this task.

B. The RECIPIENT will document and assess existing information related to their local receiving waters and contributing area conditions.

C. The RECIPIENT will determine the relative influence of the RECIPIENT's MS4 and land use patterns on each receiving water. At a minimum the assessment will consider: MS4 relative flow contribution to receiving water, land cover, pollution generating impervious surface, large-scale pollution generating pervious surfaces, traffic volume, presence and lack of treatment and flow control facilities, and land uses.

D. The RECIPIENT will assess the relative conditions of receiving waters and contributions of basins using information collected in previous steps to identify which receiving waters are most likely to benefit from stormwater management planning. The management goals described in Building Cities in the Rain (BCitR) will be considered as part of the evaluation process.

E. The RECIPIENT will submit a watershed inventory table that references a map of delineated basins. The table will include: the receiving water name, its total watershed area, the percent of the total watershed area that is in the Permittee's jurisdiction, and the findings of the stormwater management influence assessment for each receiving water. The table will indicate which receiving water basins are expected to have a relatively low Stormwater Management Influence for the SMAP. In addition to a text copy of the watershed inventory, the information should be presented in online GIS interface.

Task Goal Statement:
The RECIPIENT will respond to ECOLOGY and complete Receiving Water Conditions Assessment in a timely manner.

Task Expected Outcome:
Receiving Water Conditions Assessment will generate a candidate list of receiving waters to be further assessed in Task 4: Receiving Water Prioritization.

Receiving Water Conditions Assessment

Deliverables

Number	Description	Due Date
3.1	Present data layers that identify receiving waters and the associated drainage basins. Present data as an online GIS interface. Notify ECOLOGY Project Manager when the online GIS interface is published.	
3.2	Draft Receiving Water Conditions Assessment that includes a watershed inventory table, referenced basin map, proposed MS4 influence method, and analysis. The watershed inventory should be presented as an online GIS interface. Upload to EAGL and notify ECOLOGY Project Manager when upload is complete.	
3.3	Response to ECOLOGY Receiving Water Conditions Assessment. Upload to EAGL and notify ECOLOGY Project Manager when upload is complete.	
3.4	ECOLOGY acceptance of Receiving Water Conditions Assessment. Upload acceptance letter to EAGL and notify ECOLOGY Project Manager when upload is complete.	
3.5	Final Receiving Water Conditions Assessment including online GIS interface. Upload to EAGL and notify ECOLOGY Project Manager when upload is complete. Notify ECOLOGY Project Manager when the online GIS interface is updated.	

SCOPE OF WORK

Task Number: 4 **Task Cost:** $39,240.00

Task Title: Receiving Water Prioritization

Task Description:

A. The RECIPIENT will prioritize the candidate list of receiving waters from Task 3 to select a subbasin or catchment area tributary to the receiving water of focus where the SMAP will be applied.

The RECIPIENT will develop a system to score and prioritize the receiving waters and pick a catchment area to focus improvements. The RECIPIENT will build on the results of Task 3, which narrow down which receiving waters to prioritize through relative comparison. The BCitR and Stormwater Management Action Planning Guidance will be referenced to support development of the scoring methodology. The development of the scoring method will be documented.

B. The RECIPIENT will apply the scoring methodology in Task 4A to the candidate list of receiving waters developed in Task 3. The ranking process will identify a list of high priority receiving waters and catchment area(s) for focus of the SMAP.

C. The RECIPIENT will develop a public involvement process to inform the community and solicit feedback regarding the prioritization of catchment area(s). A list of key internal and external stakeholders will be developed. One opportunity will be provided for stakeholders to review and comment on prioritized catchment area(s). The RECIPIENT will consider feedback from the stakeholders in selecting a priority receiving water and catchment. Stakeholder feedback will be documented.

D. The RECIPIENT will document the Receiving Water Prioritization process and results in a memorandum and online GIS interface.

Task Goal Statement:

The RECIPIENT will complete the Receiving Water Prioritization and respond to ECOLOGY and public comments in a timely manner.

Task Expected Outcome:

The Receiving Water Prioritization will select high priority catchment area(s) where the SMAP will be developed as well as record comments from stakeholders to assist in the development of the SMAP.

Receiving Water Prioritization

Deliverables

Number	Description	Due Date
4.1	Draft prioritization scoring methodology. Upload to EAGL and notify ECOLOGY Project Manager when upload is complete.	
4.2	Response to ECOLOGY prioritization scoring methodology comments. Upload to EAGL and notify ECOLOGY Project Manager when upload is complete.	
4.3	Draft public outreach materials that provide the public and stakeholders an opportunity to comment on proposed prioritized catchment area(s). Upload to EAGL and notify ECOLOGY when upload is complete.	
4.4	Document stakeholder feedback, and document responsiveness to comments. Upload documentation of effort to EAGL and notify ECOLOGY when upload is complete.	
4.5	Submit text document of the final Receiving Water Prioritization process and results in a memorandum and online GIS interface. The online GIS interface at this stage must include: Critical Areas, High Risk Cultural Resource Areas from WISAARD, and Environmental Justice areas of concern.	

SCOPE OF WORK

Task Number: 5 **Task Cost:** $49,671.00

Task Title: Stormwater Management Action Plan

Task Description:

A. Within the prioritized subbasin or catchment area(s), the RECIPIENT will describe potential Stormwater Management Actions (SMAs) consisting of structural best management practices (BMPs) and non-structural SMAs. This may include non-structural BMPs, land/development management policies and actions, and targeted stormwater management program (SWMP) actions to support improved receiving water quality. Structural SMAs could be proposed as new treatment or flow control facilities, retrofit of existing treatment or flow control facilities, or opportunities to provide additional treatment or flow control service with planned public construction projects.

B. The RECIPIENT will continue the public involvement process developed in Task 4 to inform the community and solicit feedback regarding the SMAs. One opportunity will be provided for stakeholders to review and comment on the proposed SMAs. Stakeholder feedback will be documented and taken into consideration when developing the SMAP.

C. The RECIPIENT will prepare a draft SMAP, including a proposed implementation schedule, short and long term goals, conceptual budget, potential funding sources, and adaptive management.

D. The RECIPIENT will prepare a final SMAP that considers and incorporates ECOLOGY feedback as appropriate.

Task Goal Statement:

Prepare Stormwater Management Action Plan.

Task Expected Outcome:

Development of stormwater and land management strategies that act as water quality management tools intended to conserve, protect, or restore water quality in a selected Receiving Water.

Stormwater Management Action Plan

Deliverables

Number	Description	Due Date
5.1	Draft list of structural and non-structural SMAs. For treatment and flow control facilities, the online GIS interface will include feature layers for each facility's approximate catchment and approximate footprint. Facility attributes will include type of facility and types of pollutants removed. Notify ECOLOGY when public outreach has been initiated and the list of SMAs and online GIS interface are published.	
5.2	Document stakeholder feedback and responsiveness to comments. Upload documentation to EAGL and notify ECOLOGY when upload is complete.	
5.3	Draft SMAP, including supporting narrative, proposed schedule, conceptual budget, potential funding sources, and adaptive management. Upload to EAGL and notify ECOLOGY when upload is complete.	
5.4	Response to ECOLOGY SMAP comments. Upload to EAGL and notify ECOLOGY when upload is complete.	
5.5	Final written SMAP, including list of SMAs for targeted areas and online GIS interface. Upload to EAGL and notify ECOLOGY when upload is complete.	

SCOPE OF WORK

Task Number: 6 **Task Cost:** $0.00

Task Title: Cultural and Environmental Reviews, and Permitting

Task Description:
The RECIPIENT shall ensure the following items are completed and provide the associated deliverables to ECOLOGY. The RECIPIENT must approve all materials prior to submitting them to ECOLOGY for acceptance.

A. The RECIPIENT will provide both the ECOLOGY project manager and separegister@ecy.wa.gov an initial consultation on the draft State Environmental Policy Act (SEPA) documents.

B. The RECIPIENT will notify the ECOLOGY project manager, in addition to the required distribution and public notice, when SEPA documents have been issued for the official comment period, which is a minimum of 21 days.

C. The RECIPIENT is responsible for application of, receipt of, and compliance with all required local, state, tribal and federal permits, licenses, easements, or property rights necessary for the project.

D. The RECIPIENT will submit the documents listed below to ECOLOGY to initiate cultural resources review. Property acquisition and above and below ground activities proposed at any project site must be reviewed for potential affects to cultural resources.

1. The RECIPIENT will submit the Cultural Resources Review Form to ECOLOGY, using the ECOLOGY template. Any supporting materials must conform to the Department of Archeology and Historic Preservation's Washington State Standards for Cultural Resource Reporting. The Cultural Resources Review Form template may be found on the ECOLOGY website.

2. The RECIPIENT will submit an Inadvertent Discovery Plan (IDP) to ECOLOGY, using the ECOLOGY template. The RECIPIENT will ensure that all contractors and subcontractors have a copy of the completed IDP prior to and while working on-site. The IDP template may be found on the ECOLOGY website.

The RECIPIENT must receive written notice from ECOLOGY prior to proceeding with work. Examples of work may include (but are not limited to) geotechnical work, acquisition, site prep work, and BMP installations. Work done prior to written notice to proceed shall not be eligible for reimbursement.

Task Goal Statement:
The RECIPIENT will complete all cultural and environmental reviews and permitting tasks in a timely manner.

Task Expected Outcome:
The project will meet the requirements set forth by the cultural resource protection requirements, State Environmental Policy Act, and all other applicable federal, state, and local laws, and regulations.

Cultural and Environmental Reviews, and Permitting

Deliverables

Number	Description	Due Date
6.1	SEPA checklist, or other documentation for projects considered exempt from SEPA review. Upload to EAGL and notify ECOLOGY when upload is complete.	
6.2	List of permits acquired and environmental review documents. Upload to EAGL and notify ECOLOGY when upload is complete.	
6.3	Cultural Resources Review Form. Email the form and any supplemental cultural resources documentation directly to the ECOLOGY Project Manager. ECOLOGY will upload documentation to EAGL when cultural resources is complete.	
6.4	Inadvertent Discovery Plan. Upload to EAGL and notify ECOLOGY when upload is complete.	

BUDGET

Funding Distribution EG220698

NOTE: *The above funding distribution number is used to identify this specific agreement and budget on payment remittances and may be referenced on other communications from ECOLOGY. Your agreement may have multiple funding distribution numbers to identify each budget.*

Funding Title: SFAP
Funding Type: Grant
Funding Effective Date: 07/01/2021
Funding Expiration Date: 06/30/2024

Funding Source:

Title: SFAP - SFY22

Fund: FD
Type: State
Funding Source %: 100%
Description: Model Toxics Control Capital Account(MTCCA) Stormwater

Approved Indirect Costs Rate: Approved State Indirect Rate: 0%
Recipient Match %: 25%
InKind Interlocal Allowed: No
InKind Other Allowed: No
Is this Funding Distribution used to match a federal grant? No

SFAP	Task Total
Grant and Loan Administration	$ 0.00
Consultant Selection	$ 0.00
Receiving Water Conditions Assessment	$ 40,449.00
Receiving Water Prioritization	$ 39,240.00
Stormwater Management Action Plan	$ 49,671.00
Cultural and Environmental Reviews, and Permitting	$ 0.00
Total: $	**129,360.00**

Funding Distribution Summary

Recipient / Ecology Share

Funding Distribution Name	Recipient Match %	Recipient Share	Ecology Share	Total
SFAP	25.00 %	$ 32,340.00	$ 97,020.00	$ 129,360.00
Total		**$ 32,340.00**	**$ 97,020.00**	**$ 129,360.00**

AGREEMENT SPECIFIC TERMS AND CONDITIONS

N/A

SPECIAL TERMS AND CONDITIONS

SECTION 1: DEFINITIONS

Unless otherwise provided, the following terms will have the respective meanings for all purposes of this agreement:

“Administration Charge” means a charge established in accordance with Chapter 90.50A RCW and Chapter 173-98 WAC, to be used to pay Ecology’s cost to administer the State Revolving Fund by placing a percentage of the interest earned in an Administrative Charge Account.

“Administrative Requirements” means the effective edition of ECOLOGY's Administrative Requirements for Recipients of Ecology Grants and Loans at the signing of this agreement.

“Annual Debt Service” for any calendar year means for any applicable bonds or loans including the loan, all interest plus all principal due on such bonds or loans in such year.

“Average Annual Debt Service” means, at the time of calculation, the sum of the Annual Debt Service for the remaining years of the loan to the last scheduled maturity of the loan divided by the number of those years.

“Acquisition” means the purchase or receipt of a donation of fee or less than fee interests in real property. These interests include, but are not limited to, conservation easements, access/trail easements, covenants, water rights, leases, and mineral rights.

“Centennial Clean Water Program” means the state program funded from various state sources.

“Contract Documents” means the contract between the RECIPIENT and the construction contractor for construction of the project.

“Cost Effective Analysis” means a comparison of the relative cost-efficiencies of two or more potential ways of solving a water quality problem as described in Chapter 173-98-730 WAC.

“Defease” or “Defeasance” means the setting aside in escrow or other special fund or account of sufficient investments and money dedicated to pay all principal of and interest on all or a portion of an obligation as it comes due.

“Effective Date” means the earliest date on which eligible costs may be incurred.

“Effective Interest Rate” means the total interest rate established by Ecology that includes the Administrative Charge.

“Estimated Loan Amount” means the initial amount of funds loaned to the RECIPIENT.

“Estimated Loan Repayment Schedule” means the schedule of loan repayments over the term of the loan based on the Estimated Loan Amount.

“Equivalency” means projects designated by ECOLOGY to meet additional federal requirements.

“Expiration Date” means the latest date on which eligible costs may be incurred.

“Final Accrued Interest” means the interest accrued beginning with the first disbursement of funds to the RECIPIENT through

such time as the loan is officially closed out and a final loan repayment schedule is issued.
“Final Loan Amount” means all principal of and interest on the loan from the Project Start Date through the Project Completion Date.
“Final Loan Repayment Schedule” means the schedule of loan repayments over the term of the loan based on the Final Loan Amount.
“Forgivable Principal” means the portion of a loan that is not required to be paid back by the borrower.
“General Obligation Debt” means an obligation of the RECIPIENT secured by annual ad valorem taxes levied by the RECIPIENT and by the full faith, credit, and resources of the RECIPIENT.
“General Obligation Payable from Special Assessments Debt” means an obligation of the RECIPIENT secured by a valid general obligation of the Recipient payable from special assessments to be imposed within the constitutional and statutory tax limitations provided by law without a vote of the electors of the RECIPIENT on all of the taxable property within the boundaries of the RECIPIENT.
“Gross Revenue” means all of the earnings and revenues received by the RECIPIENT from the maintenance and operation of the Utility and all earnings from the investment of money on deposit in the Loan Fund, except (i) Utility Local Improvement Districts (ULID) Assessments, (ii) government grants, (iii) RECIPIENT taxes, (iv) principal proceeds of bonds and other obligations, or (v) earnings or proceeds (A) from any investments in a trust, Defeasance, or escrow fund created to Defease or refund Utility obligations or (B) in an obligation redemption fund or account other than the Loan Fund until commingled with other earnings and revenues of the Utility or (C) held in a special account for the purpose of paying a rebate to the United States Government under the Internal Revenue Code.
“Guidelines” means the ECOLOGY's Funding Guidelines that that correlate to the State Fiscal Year in which the project is funded.
“Initiation of Operation Date” means the actual date the Water Pollution Control Facility financed with proceeds of the loan begins to operate for its intended purpose.
“Loan” means the Washington State Water Pollution Control Revolving Fund Loan or Centennial Clean Water Fund (Centennial) Loan made pursuant to this loan agreement.
“Loan Amount” means either an Estimated Loan Amount or a Final Loan Amount, as applicable.
“Loan Fund” means the special fund created by the RECIPIENT for the repayment of the principal of and interest on the loan.
“Loan Security” means the mechanism by which the RECIPIENT pledges to repay the loan.
“Loan Term” means the repayment period of the loan.
“Maintenance and Operation Expense” means all reasonable expenses incurred by the RECIPIENT in causing the Utility to be operated and maintained in good repair, working order, and condition including payments to other parties, but will not include any depreciation or RECIPIENT levied taxes or payments to the RECIPIENT in lieu of taxes.
“Net Revenue” means the Gross Revenue less the Maintenance and Operation Expense.
“Original Engineer’s Estimate” means the engineer’s estimate of construction costs included with bid documents.
“Principal and Interest Account” means, for a loan that constitutes Revenue-Secured Debt, the account created in the loan fund to be first used to repay the principal of and interest on the loan.
“Project” means the project described in this agreement.
“Project Completion Date” means the date specified in the agreement on which the Scope of Work will be fully completed. This term is only used in loan agreements.
“Project Schedule” means that schedule for the project specified in the agreement.
“Revenue-Secured Debt” means an obligation of the RECIPIENT secured by a pledge of the revenue of a utility and one not a general obligation of the RECIPIENT.
“Reserve Account” means, for a loan that constitutes a Revenue Secured Debt and if specifically identified as a term and condition of the funding agreement, the account of that name created in the loan fund to secure the payment of the principal of and interest on the loan.

"Risk-Based Determination" means an approach to sub-recipient monitoring and oversight based on risk factors associated to a RECIPIENT or project.
"Scope of Work" means the tasks and activities constituting the project.
"Section 319" means the section of the Clean Water Act that provides funding to address nonpoint sources of water pollution.
"Senior Lien Obligations" means all revenue bonds and other obligations of the RECIPIENT outstanding on the date of execution of this loan agreement (or subsequently issued on a parity therewith, including refunding obligations) or issued after the date of execution of this loan agreement having a claim or lien on the Gross Revenue of the Utility prior and superior to the claim or lien of the loan, subject only to Maintenance and Operation Expense.
"State Water Pollution Control Revolving Fund (Revolving Fund)" means the water pollution control revolving fund established by Chapter 90.50A.020 RCW.
"Termination Date" means the effective date of ECOLOGY's termination of the agreement.
"Termination Payment Date" means the date on which the RECIPIENT is required to repay to ECOLOGY any outstanding balance of the loan and all accrued interest.
"Total Eligible Project Cost" means the sum of all costs associated with a water quality project that have been determined to be eligible for ECOLOGY grant or loan funding, including any required recipient match.
"Total Project Cost" means the sum of all costs associated with a water quality project, including costs that are not eligible for ECOLOGY grant or loan funding.
"ULID" means any utility local improvement district of the RECIPIENT created for the acquisition or construction of additions to and extensions and betterments of the Utility.
"ULID Assessments" means all assessments levied and collected in any ULID. Such assessments are pledged to be paid into the Loan Fund (less any prepaid assessments permitted by law to be paid into a construction fund or account). ULID Assessments will include principal installments and any interest or penalties which may be due.
"Utility" means the sewer system, stormwater system, or the combined water and sewer system of the RECIPIENT, the Net Revenue of which is pledged to pay and secure the loan.

SECTION 2: THE FOLLOWING CONDITIONS APPLY TO ALL RECIPIENTS OF WATER QUALITY COMBINED FINANCIAL ASSISTANCE FUNDING.
The Water Quality Financial Assistance Funding Guidelines are included in this agreement by reference and are available on ECOLOGY's Water Quality Program website.
A. Architectural and Engineering Services: The RECIPIENT certifies by signing this agreement that the requirements of Chapter 39.80 RCW, "Contracts for Architectural and Engineering Services," have been, or shall be, met in procuring qualified architectural/engineering services. The RECIPIENT shall identify and separate eligible and ineligible costs in the final architectural/engineering services contract and submit a copy of the contract to ECOLOGY.
B. Acquisition: The following provisions shall be in force only if the project described in this agreement is an acquisition project:
a. Evidence of Land Value and Title. The RECIPIENT shall submit documentation of the cost of the property rights and the type of ownership interest that has been acquired.
b. Legal Description of Real Property Rights Acquired. The legal description of the real property rights purchased with funding assistance provided through this agreement (and protected by a recorded conveyance of rights to the State of Washington) shall be incorporated into the agreement before final payment.
c. Conveyance of Rights to the State of Washington. Upon purchase of real property rights (both fee simple and lesser interests), the RECIPIENT shall execute the document necessary to convey certain rights and responsibilities to ECOLOGY, on behalf of the State of Washington. The documents required will depend on the project type, the real property rights being acquired, and whether or not those rights are being acquired in perpetuity (see options below). The RECIPIENT shall use language provided by ECOLOGY, to record the executed document in the County where the real property lies, and to provide a copy of the recorded document to ECOLOGY.

Documentation Options:

1. Deed of Right. The Deed of Right conveys to the people of the state of Washington the right to preserve, protect, and/or use the property for public purposes consistent with the fund source. RECIPIENTs shall use this document when acquiring real property rights that include the underlying land. This document may also be applicable for those easements where the RECIPIENT has acquired a perpetual easement for public purposes. The RECIPIENT must obtain ECOLOGY approval on the draft language prior to executing the deed of right.

2. Assignment of Rights. The Assignment of Rights document transfers certain rights such as access and enforcement to ECOLOGY. The RECIPIENT shall use this document when an easement or lease is being acquired for water quality and habitat conservation. The Assignment of Rights requires the signature of the underlying landowner and must be incorporated by reference in the easement document.

3. Easements and Leases. The RECIPIENT may incorporate required language from the Deed of Right or Assignment of Rights directly into the easement or lease document, thereby eliminating the requirement for a separate document. Language will depend on the situation; therefore, the RECIPIENT must obtain ECOLOGY approval on the draft language prior to executing the easement or lease.

d. Real Property Acquisition and Relocation Assistance.

1. Federal Acquisition Policies. See Section 4 of this agreement for requirements specific to Section 319 and SRF funded projects.

2. State Acquisition Policies. When state funds are part of this agreement, the RECIPIENT agrees to comply with the terms and conditions of the Uniform Relocation Assistance and Real Property Acquisition Policy of the State of Washington, Chapter 8.26 RCW, and Chapter 468-100 WAC.

3. Housing and Relocation. In the event that housing and relocation costs, as required by federal law set out in subsection (1) above and/or state law set out in subsection (2) above, are involved in the execution of this project, the RECIPIENT agrees to provide any housing and relocation assistance required.

e. Hazardous Substances.

1. Certification. The RECIPIENT shall inspect, investigate, and conduct an environmental audit of the proposed acquisition site for the presence of hazardous substances, as defined in RCW 70.105D.020(10), and certify:

i. No hazardous substances were found on the site, or

ii. Any hazardous substances found have been treated and/or disposed of in compliance with applicable state and federal laws, and the site is deemed “clean.”

2. Responsibility. Nothing in this provision alters the RECIPIENT's duties and liabilities regarding hazardous substances as set forth in RCW 70.105D.

3. Hold Harmless. The RECIPIENT will defend, protect and hold harmless ECOLOGY and any and all of its employees and/or agents, from and against any and all liability, cost (including but not limited to all costs of defense and attorneys' fees) and any and all loss of any nature from any and all claims or suits resulting from the presence of, or the release or threatened release of, hazardous substances on the property the RECIPIENT is acquiring.

f. Restriction On Conversion Of Real Property And/Or Facilities To Other Uses

The RECIPIENT shall not at any time convert any real property (including any interest therein) or facility acquired, developed, maintained, renovated, and/or restored pursuant to this agreement to uses other than those purposes for which funds were approved without prior approval of ECOLOGY. For acquisition projects that are term limited, such as one involving a lease or a term-limited restoration, renovation or development project or easement, this restriction on conversion shall apply only for the length of the term, unless otherwise provided in written documents or required by applicable state or federal law. In such case, the restriction applies to such projects for the length of the term specified by the lease, easement, deed, or landowner agreement.

C. Best Management Practices (BMP) Implementation: If the RECIPIENT installs BMPs that are not approved by

ECOLOGY prior to installation, the RECIPIENT assumes the risk that part or all of the reimbursement for that activity may be delayed or ineligible. For more details regarding BMP Implementation, please reference the Water Quality Financial Assistance Funding Guidelines available on ECOLOGY's Water Quality Program funding website.

D. Electronic Fund Transfers: Payment will be issued through Washington State's Office of Financial Management's Statewide Payee Desk. To receive payment you must register as a statewide vendor by submitting a statewide vendor registration form and an IRS W-9 form at website, https://ofm.wa.gov/it-systems/statewide-vendorpayee-services. If you have questions about the vendor registration process or electronic fund transfers, you can contact Statewide Payee Help Desk at (360) 407-8180 or email PayeeRegistration@ofm.wa.gov.

E. Equipment Purchase: Equipment purchases over $5,000 and not included in the scope of work or the Ecology approved construction plans and specifications, must be pre-approved by ECOLOGY's project manager before purchase. All equipment purchases over $5,000 and not included in a contract for work being completed on the funded project, must also be reported on the Equipment Purchase Report in EAGL.

F. Funding Recognition: The RECIPIENT must inform the public about ECOLOGY or any EPA (see Section 3.B for Section 319 funded or Section 5.E for SRF funded projects) funding participation in this project through the use of project signs, acknowledgement in published materials, reports, the news media, websites, or other public announcements. Projects addressing site-specific locations must utilize appropriately sized and weather-resistant signs. Sign logos are available from ECOLOGY's Financial Manager upon request.

G. Growth Management Planning: The RECIPIENT certifies by signing this agreement that it is in compliance with the requirements of Chapter 36.70A RCW, "Growth Management Planning by Selected Counties and Cities." If the status of compliance changes, either through RECIPIENT or legislative action, the RECIPIENT shall notify ECOLOGY in writing of this change within 30 days.

H. Interlocal: The RECIPIENT certifies by signing this agreement that all negotiated interlocal agreements necessary for the project are, or shall be, consistent with the terms of this agreement and Chapter 39.34 RCW, "Interlocal Cooperation Act." The RECIPIENT shall submit a copy of each interlocal agreement necessary for the project to ECOLOGY upon request.

I. Lobbying and Litigation: Costs incurred for the purposes of lobbying or litigation are not eligible for funding under this agreement.

J. Post Project Assessment Survey: The RECIPIENT agrees to participate in a brief survey regarding the key project results or water quality project outcomes and the status of long-term environmental results or goals from the project approximately three years after project completion. A representative from ECOLOGY's Water Quality Program may contact the RECIPIENT to request this data. ECOLOGY may also conduct site interviews and inspections, and may otherwise evaluate the project, as part of this assessment.

K. Project Status Evaluation: ECOLOGY may evaluate the status at any time. ECOLOGY's Project Manager and Financial Manager will meet with the RECIPIENT to review spending trends, completion of outcome measures, and overall project administration and performance. If the RECIPIENT fails to make satisfactory progress toward achieving project outcomes, ECOLOGY may change the scope of work, reduce grant funds, or increase oversight measures.

L. Technical Assistance: Technical assistance for agriculture activities provided under the terms of this agreement shall be consistent with the current U.S. Natural Resource Conservation Service ("NRCS") Field Office Technical Guide for Washington State and specific requirements outlined in the Water Quality Funding Guidelines. Technical assistance, proposed practices, or project designs that do not meet these standards may be eligible if approved in writing by ECOLOGY.

SECTION 3: THE FOLLOWING CONDITIONS APPLY TO SECTION 319 AND CENTENNIAL CLEAN WATER FUNDED PROJECTS BEING USED TO MATCH SECTION 319 FUNDS.

The RECIPIENT must submit the following documents to ECOLOGY before this agreement is signed by ECOLOGY:

1. Federal Funding Accountability and Transparency Act (FFATA) Form, available on the Water Quality Program website. (This form is used for Section 319 funds only)

2. "Section 319 Initial Data Reporting" form in EAGL.

A. Data Reporting: The RECIPIENT must complete the "Section 319 Initial Data Reporting" form in EAGL before this agreement can be signed by Ecology. This form is used to gather general information about the project for EPA.

B. Funding Recognition and Outreach: In addition to Section 2.F. of these Special Terms and Conditions, the RECIPIENT shall provide signage that informs the public that the project is funded by EPA. The signage shall contain the EPA logo and follow usage requirements available at http://www2.epa.gov/stylebook/using-epa-seal-and-logo. To obtain the appropriate EPA logo or seal graphic file, the RECIPIENT may send a request to their Ecology Financial Manager.

To increase public awareness of projects serving communities where English is not the predominant language, RECIPIENTS are encouraged to provide their outreach strategies communication in non-English languages. Translation costs for this purpose are allowable, provided the costs are reasonable. (Applies to both the Section 319 funded projects and the Centennial match projects)

The RECIPIENT shall use the following paragraph in all reports, documents, and signage developed under this agreement: (Applies to Section 319 funded projects only)

"This project has been funded wholly or in part by the United States Environmental Protection Agency under an assistance agreement to the Washington State Department of Ecology. The contents of this document do not necessarily reflect the views and policies of the Environmental Protection Agency, nor does the mention of trade names or commercial products constitute endorsement or recommendation for use."

C. Load Reduction Reporting: The RECIPIENT shall complete the "Section 319 Annual Load Reduction Reporting" form in EAGL by January 15 of each year and at project close-out. ECOLOGY may hold reimbursements until the RECIPIENT has completed the form. This form is used to gather information on best management practices (BMPs) installed and associated pollutant load reductions that were funded as a part of this project.

D. Time Extension: The RECIPIENT may request a one-time extension for up to 12 months. However, the time extension cannot exceed the time limitation established in EPA's assistance agreement. In the event a time extension is requested and approved by ECOLOGY, the RECIPIENT must complete all eligible work performed under this agreement by the expiration date. (For Section 319 funded projects only)

SECTION 4: THE FOLLOWING CONDITIONS APPLY TO SECTION 319 AND STATE REVOLVING FUND (SRF) LOAN FUNDED PROJECTS ONLY.

A. Accounting Standards: The RECIPIENT shall maintain accurate records and accounts for the project (PROJECT Records) in accordance with Generally Accepted Accounting Principles (GAAP) as issued by the Governmental Accounting Standards Board (GASB), including standards related to the reporting of infrastructure assets or in accordance with the standards in Chapter 43.09.200 RCW "Local Government Accounting – Uniform System of Accounting."

B. Acquisitions: Section 319 and SRF Equivalency project RECIPIENTs shall comply with the terms and conditions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, 84 Stat. 1894 (1970)--Public Law 91-646, as amended by the Surface Transportation and Uniform Relocation Assistance Act, PL 100-17-1987, and applicable regulations and procedures of the federal agency implementing that Act.

C. Audit Requirements: In accordance with 2 CFR 200.501(a), the RECIPIENT agrees to obtain a single audit from an independent auditor, if their organization expends $750,000 or more in total Federal funds in their fiscal year. The RECIPIENT must submit the form SF-SAC and a Single Audit Report Package within 9 months of the end of the fiscal year or 30 days after receiving the report from an independent auditor. The SF-SAC and a Single Audit Report Package MUST be submitted using the Federal Audit Clearinghouse's Internet Data Entry System available at: https://facweb.census.gov/..

D. Archaeological Resources and Historic Properties (Section 106): The RECIPIENT shall comply with the additional requirements under section 106 of the National Historic Preservation Act (NHPA, 36 CFR 800).

E. Data Universal Numbering System (DUNS) and Central Contractor Registration (CCR) Requirements: RECIPIENTs shall

have a DUNS number. Unless exempted from this requirement under 2 CFR 25.110, the RECIPIENT must ensure that their organization's information in the System for Award Management (SAM), https://www.sam.gov, is kept current through project closeout. This requires that the RECIPIENT reviews and updates the information at least annually after the initial registration, and more frequently if information changes.

F. Disadvantaged Business Enterprise (DBE): General Compliance, 40 CFR, Part 33. The RECIPIENT agrees to comply with the requirements of the Environmental Protection Agency's Program for Utilization of Small, Minority, and Women's Business Enterprises (MBE/WBE) 40CFR, Part 33 in procurement under this agreement.

Six Good Faith Efforts, 40 CFR, Part 33, Subpart C. The RECIPIENT agrees to make the following good faith efforts whenever procuring construction, equipment, services, and supplies under this agreement. Records documenting compliance with the following six good faith efforts shall be retained:

1) Ensure Disadvantaged Business Enterprises are made aware of contracting opportunities to the fullest extent practicable through outreach and recruitment activities. For Indian Tribal, State and Local and Government RECIPIENTs, this shall include placing Disadvantaged Business Enterprises on solicitation lists and soliciting them whenever they are potential sources.

2) Make information on forthcoming opportunities available to Disadvantaged Business Enterprises and arrange time frames for contracts and establish delivery schedules, where the requirements permit, in a way that encourages and facilitates participation by Disadvantaged Business Enterprises in the competitive process. This includes, whenever possible, posting solicitations for bids or proposals for a minimum of thirty (30) calendar days before the bid or proposal closing date.

3) Consider, in the contracting process, whether firms competing for large contracts could subcontract with Disadvantaged Business Enterprises. For Indian Tribal, State, and Local Government RECIPIENTs, this shall include dividing total requirements when economically feasible into smaller tasks or quantities to permit maximum participation by Disadvantaged Business Enterprises in the competitive process.

4) Encourage contracting with a consortium of Disadvantaged Business Enterprises when a contract is too large for one of these firms to handle individually.

5) Use services and assistance of the Small Business Administration and the Minority Business Development Agency of the Department of Commerce.

6) If the prime contractor awards subcontracts, require the prime contractor to take the five good faith efforts steps in paragraphs 1 through 5 above.

The RECIPIENT agrees to submit ECOLOGY's Contractor Participation Report Form D with each payment request.

Contract Administration Provisions, 40 CFR, Section 33.302. The RECIPIENT agrees to comply with the contract administration provisions of 40 CFR, Section 33.302.

Non-discrimination Provision. The RECIPIENT shall not discriminate on the basis of race, color, national origin or sex in the performance of this agreement. The RECIPIENT shall carry out applicable requirements of 40 CFR Part 33 in the award and administration of contracts awarded under EPA financial assistance agreements. Failure by the RECIPIENT to carry out these requirements is a material breach of this agreement which may result in the termination of this contract or other legally available remedies.

This does not preclude the RECIPIENT from enacting broader nondiscrimination protections.

The RECIPIENT shall comply with all federal and state nondiscrimination laws, including but not limited to, Title VI and VII of the Civil Rights Act of 1964, Section 504 of the Rehabilitation Act of 1973, Title IX of the Education Amendments of 1972, the Age Discrimination Act of 1975, and Chapter 49.60 RCW, Washington's Law Against Discrimination, and 42 U.S.C. 12101 et seq, the Americans with Disabilities Act (ADA).

In the event of the RECIPIENT's noncompliance or refusal to comply with any applicable nondiscrimination law, regulation, or policy, this agreement may be rescinded, canceled, or terminated in whole or in part and the RECIPIENT may be declared ineligible for further funding from ECOLOGY. The RECIPIENT shall, however, be given a reasonable time in which to cure this noncompliance.

The RECIPIENT shall include the following terms and conditions in contracts with all contractors, subcontractors, engineers,

vendors, and any other entity for work or services pertaining to this agreement.
"The Contractor will not discriminate on the basis of race, color, national origin or sex in the performance of this Contract. The Contractor will carry out applicable requirements of 40 CFR Part 33 in the award and administration of contracts awarded under Environmental Protection Agency financial agreements. Failure by the Contractor to carry out these requirements is a material breach of this Contract which may result in termination of this Contract or other legally available remedies."
Bidder List, 40 CFR, Section 33.501(b) and (c). The RECIPIENT agrees to create and maintain a bidders list. The bidders list shall include the following information for all firms that bid or quote on prime contracts, or bid or quote subcontracts, including both MBE/WBEs and non-MBE/WBEs.
1. Entity's name with point of contact
2. Entity's mailing address, telephone number, and e-mail address
3. The procurement on which the entity bid or quoted, and when
4. Entity's status as an MBE/WBE or non-MBE/WBE
G. Electronic and information Technology (EIT) Accessibility: RECIPIENTs shall ensure that loan funds provided under this agreement for costs in the development or purchase of EIT systems or products provide individuals with disabilities reasonable accommodations and an equal and effective opportunity to benefit from or participate in a program, including those offered through electronic and information technology as per Section 504 of the Rehabilitation Act, codified in 40 CFR Part 7. Systems or products funded under this agreement must be designed to meet the diverse needs of users without barriers or diminished function or quality. Systems shall include usability features or functions that accommodate the needs of persons with disabilities, including those who use assistive technology.
H. Hotel-Motel Fire Safety Act: The RECIPIENT shall ensure that all space for conferences, meetings, conventions or training seminars funded in whole or in part with federal funds complies with the protection and control guidelines of the Hotel and Motel Fire Safety Act (15 USC 2225a, PL 101-391, as amended). Recipients may search the Hotel-Motel National Master List at http://www.usfa.dhs.gov/applications/hotel/ to see if a property is in compliance, or to find other information about the Act. Pursuant to 15 USC 2225a.
I. Trafficking In Persons: The RECIPIENT and RECIPIENT employees that are private entities shall not engage in forms of trafficking in persons during the period of time this agreement is effective. This includes, but is not limited to, the procurement of a commercial sex act or forced labor. The RECIPIENT shall notify ECOLOGY immediately of any information received from any source alleging a violation under this provision.

SECTION 5: THE FOLLOWING CONDITIONS APPLY TO STATE REVOLVING FUND (SRF) LOAN FUNDED PROJECTS ONLY.
The RECIPIENT must submit the following documents/forms to ECOLOGY before this agreement is signed by ECOLOGY:
1. Financial Capability Assessment Documentation
2. Opinion of RECIPIENT's Legal Council
3. Authorizing Ordinance or Resolution
4. Federal Funding Accountability and Transparency Act (FFATA) Form (Required for SRF Equivalency projects only)
5. CWSRF Federal Reporting Information form available in EAGL
6. Fiscal Sustainability Plan (Asset Management) Certification Form in EAGL (Only required if the project includes construction of a wastewater or stormwater facility construction)
7. Cost and Effectiveness Analysis Certification Form in EAGL (Required for all projects receiving SRF Loan funding)
8. State Environmental Review Process (SERP) Documentation (Required for facility projects only)
A. Alteration and Eligibility of Project: During the term of this agreement, the RECIPIENT (1) shall not materially alter the design or structural character of the project without the prior written approval of ECOLOGY and (2) shall take no action which would adversely affect the eligibility of the project as defined by applicable funding program rules and state statutes, or which would cause a violation of any covenant, condition, or provision herein.

B. American Iron and Steel (Buy American): This loan provision applies to projects for the construction, alteration, maintenance, or repair of a "treatment works" as defined in the Federal Water Pollution Control Act (33 USC 1381 et seq.) The RECIPIENT shall ensure that all iron and steel products used in the project are produced in the United States. Iron and Steel products means the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials. The RECIPIENT may request waiver from this requirement from the Administrator of the Environmental Protection Agency. The RECIPIENT must coordinate all waiver requests through ECOLOGY. This provision does not apply if the engineering plans and specifications for the project were approved by ECOLOGY prior to January 17, 2014. ECOLOGY reserves the right to request documentation of RECIPIENT'S compliance with this provision.
C. Authority of RECIPIENT: This agreement is authorized by the Constitution and laws of the state of Washington, including the RECIPIENT's authority, and by the RECIPIENT pursuant to the authorizing ordinance or resolution. The RECIPIENT shall submit a copy of the authorizing ordinance or resolution to the ECOLOGY Financial Manager before this agreement shall be signed by ECOLOGY.
D. Equivalency Projects: (For designated equivalency projects only)
1. The RECIPIENT must procure architectural and engineering services in accordance with the federal requirements in Chapter 11 of Title 40, U.S.C. (see www.gpo.gov/fdsys/pkg/USCODE-2011-title40/pdf/USCODE-2011-title40-subtitleI-chap11.pdf).
E. Fiscal Sustainability Plan Certification: The RECIPIENT shall submit a completed Fiscal Sustainability Plan Certification before this agreement is signed by ECOLOGY. The Fiscal Sustainability Plan Certification is available from the ECOLOGY Financial Manager or on the Water Quality Program website.
F. Funding Recognition and Outreach: In addition to Section 2.F of these Terms and Conditions, the RECIPIENT agrees to comply with the EPA SRF Signage Guidance in order to enhance public awareness of EPA assistance agreements nationwide. The signage guidance can be found at: https://ecology.wa.gov/About-us/How-we-operate/Grants-loans/Find-a-grant-or-loan/Water-Quality-grants-and-loans/Facility-project-resources.
G. Insurance: The RECIPIENT shall at all times carry fire and extended insurance coverage, public liability, and property damage, and such other forms of insurance with responsible insurers and policies payable to the RECIPIENT on such of the buildings, equipment, works, plants, facilities, and properties of the Utility as are ordinarily carried by municipal or privately-owned utilities engaged in the operation of like systems, and against such claims for damages as are ordinarily carried by municipal or privately-owned utilities engaged in the operation of like systems, or it shall self-insure or participate in an insurance pool or pools with reserves adequate, in the reasonable judgment of the RECIPIENT, to protect it against loss.
H. Litigation Authority: No litigation is now pending, or to the RECIPIENT's knowledge, threatened, seeking to restrain, or enjoin:
(i) the execution of this agreement; or
(ii) the fixing or collection of the revenues, rates, and charges or the formation of the ULID and the levy and collection of ULID Assessments therein pledged to pay the principal of and interest on the loan (for revenue secured lien obligations); or
(iii) the levy and collection of the taxes pledged to pay the principal of and interest on the loan (for general obligation-secured loans and general obligation payable from special-assessment-secured loans); or
(iv) in any manner questioning the proceedings and authority under which the agreement, the loan, or the project are authorized. Neither the corporate existence, or boundaries of the RECIPIENT nor the title of its present officers to their respective offices is being contested. No authority or proceeding for the execution of this agreement has been repealed, revoked, or rescinded.
I. Loan Interest Rate and Terms: This loan agreement shall remain in effect until the date of final repayment of the loan, unless terminated earlier according to the provisions herein.
When the Project Completion Date has occurred, ECOLOGY and the RECIPIENT shall execute an amendment to this loan

agreement which details the final loan amount (Final Loan Amount), and ECOLOGY shall prepare a final loan repayment schedule. The Final Loan Amount shall be the combined total of actual disbursements made on the loan and all accrued interest to the computation date.

The Estimated Loan Amount and the Final Loan Amount (in either case, as applicable, a "Loan Amount") shall bear interest based on the interest rate identified in this agreement as the "Effective Interest Rate," per annum, calculated on the basis of a 365 day year. Interest on the Estimated Loan Amount shall accrue from and be compounded monthly based on the date that each payment is mailed to the RECIPIENT. The Final Loan Amount shall be repaid in equal installments, semiannually, over the term of this loan "Loan Term" as outlined in this agreement.

J. Loan Repayment:

Sources of Loan Repayment

1. Nature of RECIPIENT's Obligation. The obligation of the RECIPIENT to repay the loan from the sources identified below and to perform and observe all other agreements and obligations on its part, contained herein, shall be absolute and unconditional, and shall not be subject to diminution by setoff, counterclaim, or abatement of any kind. To secure the repayment of the loan from ECOLOGY, the RECIPIENT agrees to comply with all of the covenants, agreements, and attachments contained herein.

2. For General Obligation. This loan is a General Obligation Debt of the RECIPIENT.

3. For General Obligation Payable from Special Assessments. This loan is a General Obligation Debt of the RECIPIENT payable from special assessments to be imposed within the constitutional and statutory tax limitations provided by law without a vote of the electors of the RECIPIENT on all of the taxable property within the boundaries of the RECIPIENT.

4. For Revenue-Secured: Lien Position. This loan is a Revenue-Secured Debt of the RECIPIENT's Utility. This loan shall constitute a lien and charge upon the Net Revenue junior and subordinate to the lien and charge upon such Net Revenue of any Senior Lien Obligations.

In addition, if this loan is also secured by Utility Local Improvement Districts (ULID) Assessments, this loan shall constitute a lien upon ULID Assessments in the ULID prior and superior to any other charges whatsoever.

5. Other Sources of Repayment. The RECIPIENT may repay any portion of the loan from any funds legally available to it.

6. Defeasance of the Loan. So long as ECOLOGY shall hold this loan, the RECIPIENT shall not be entitled to, and shall not affect, an economic Defeasance of the loan. The RECIPIENT shall not advance refund the loan.

If the RECIPIENT defeases or advance refunds the loan, it shall be required to use the proceeds thereof immediately upon their receipt, together with other available RECIPIENT funds, to repay both of the following:

(i) The Loan Amount with interest

(ii) Any other obligations of the RECIPIENT to ECOLOGY under this agreement, unless in its sole discretion ECOLOGY finds that repayment from those additional sources would not be in the public interest.

Failure to repay the Loan Amount plus interest within the time specified in ECOLOGY's notice to make such repayment shall incur Late Charges and shall be treated as a Loan Default.

7. Refinancing or Early Repayment of the Project. So long as ECOLOGY shall hold this loan, the RECIPIENT shall give ECOLOGY thirty days written notice if the RECIPIENT intends to refinance or make early repayment of the loan.

Method and Conditions on Repayments

1. Semiannual Payments. Notwithstanding any other provision of this agreement, the first semiannual payment of principal and interest on this loan shall be due and payable no later than one year after the project completion date or initiation of operation date, whichever comes first.

Thereafter, equal payments shall be due every six months.

If the due date for any semiannual payment falls on a Saturday, Sunday, or designated holiday for Washington State agencies, the payment shall be due on the next business day for Washington State agencies.

Payments shall be mailed to:

Department of Ecology

Cashiering Unit
P.O. Box 47611
Olympia WA 98504-7611

In lieu of mailing payments, electronic fund transfers can be arranged by working with ECOLOGY's Financial Manager.

No change to the amount of the semiannual principal and interest payments shall be made without a mutually signed amendment to this agreement. The RECIPIENT shall continue to make semiannual payments based on this agreement until the amendment is effective, at which time the RECIPIENT's payments shall be made pursuant to the amended agreement.

2. Late Charges. If any amount of the Final Loan Amount or any other amount owed to ECOLOGY pursuant to this agreement remains unpaid after it becomes due and payable, ECOLOGY may assess a late charge. The late charge shall be one percent per month on the past due amount starting on the date the debt becomes past due and until it is paid in full.

3. Repayment Limitations. Repayment of the loan is subject to the following additional limitations, among others: those on defeasance, refinancing and advance refunding, termination, and default and recovery of payments.

4. Prepayment of Loan. So long as ECOLOGY shall hold this loan, the RECIPIENT may prepay the entire unpaid principal balance of and accrued interest on the loan or any portion of the remaining unpaid principal balance of the Loan Amount. Any prepayments on the loan shall be applied first to any accrued interest due and then to the outstanding principal balance of the Loan Amount. If the RECIPIENT elects to prepay the entire remaining unpaid balance and accrued interest, the RECIPIENT shall first contact ECOLOGY's Revenue/Receivable Manager of the Fiscal Office.

K. Loan Security

Due Regard: For loans secured with a Revenue Obligation: The RECIPIENT shall exercise due regard for Maintenance and Operation Expense and the debt service requirements of the Senior Lien Obligations and any other outstanding obligations pledging the Gross Revenue of the Utility, and it has not obligated itself to set aside and pay into the loan Fund a greater amount of the Gross Revenue of the Utility than, in its judgment, shall be available over and above such Maintenance and Operation Expense and those debt service requirements.

Where collecting adequate gross utility revenue requires connecting additional users, the RECIPIENT shall require the sewer system connections necessary to meet debt obligations and expected operation and maintenance expenses.

Levy and Collection of Taxes (if used to secure the repayment of the loan): For so long as the loan is outstanding, the RECIPIENT irrevocably pledges to include in its budget and levy taxes annually within the constitutional and statutory tax limitations provided by law without a vote of its electors on all of the taxable property within the boundaries of the RECIPIENT in an amount sufficient, together with other money legally available and to be used therefore, to pay when due the principal of and interest on the loan, and the full faith, credit and resources of the RECIPIENT are pledged irrevocably for the annual levy and collection of those taxes and the prompt payment of that principal and interest.

Not an Excess Indebtedness: For loans secured with a general obligation pledge or a general obligation pledge on special assessments: The RECIPIENT agrees that this agreement and the loan to be made do not create an indebtedness of the RECIPIENT in excess of any constitutional or statutory limitations.

Pledge of Net Revenue and ULID Assessments in the ULID (if used to secure the repayment of this loan): For so long as the loan is outstanding, the RECIPIENT irrevocably pledges the Net Revenue of the Utility, including applicable ULID Assessments in the ULID, to pay when due the principal of and interest on the loan.

Utility Local Improvement District (ULID) Assessment Collection (if used to secure the repayment of the loan): All ULID Assessments in the ULID shall be paid into the Loan Fund and used to pay the principal of and interest on the loan.

L. Maintenance and Operation of a Funded Utility: The RECIPIENT shall, at all times, maintain and keep the funded Utility in good repair, working order, and condition.

M. Opinion of RECIPIENT's Legal Counsel: The RECIPIENT must submit an "Opinion of Legal Counsel to the RECIPIENT" to ECOLOGY before this agreement will be signed. ECOLOGY will provide the form.

N. Prevailing Wage (Davis-Bacon Act): The RECIPIENT agrees, by signing this agreement, to comply with the Davis-Bacon Act prevailing wage requirements. This applies to the construction, alteration, and repair of treatment works carried out, in

whole or in part, with assistance made available by the State Revolving Fund as authorized by Section 513, title VI of the Federal Water Pollution Control Act (33 U.S.C. 1372). Laborers and mechanics employed by contractors and subcontractors shall be paid wages not less often than once a week and at rates not less than those prevailing on projects of a character similar in the locality as determined by the Secretary of Labor.

The RECIPIENT shall obtain the wage determination for the area in which the project is located prior to issuing requests for bids, proposals, quotes or other methods for soliciting contracts (solicitation). These wage determinations shall be incorporated into solicitations and any subsequent contracts. The RECIPIENT shall ensure that the required EPA contract language regarding Davis-Bacon Wages is in all contracts and sub contracts in excess of $2,000. The RECIPIENT shall maintain records sufficient to document compliance with the Davis-Bacon Act, and make such records available for review upon request.

The RECIPIENT also agrees, by signing this agreement, to comply with State Prevailing Wages on Public Works, Chapter 39.12 RCW, as applicable. Compliance may include the determination whether the project involves "public work" and inclusion of the applicable prevailing wage rates in the bid specifications and contracts. The RECIPIENT agrees to maintain records sufficient to evidence compliance with Chapter 39.12 RCW, and make such records available for review upon request.

O. Progress Reports: RECIPIENTS funded with State Revolving Fund Loan or Forgivable Principal shall include the following verification statement in the "General Comments" text box of each progress report.

"We verify that we are in compliance with all the requirements as outlined in our funding agreement(s) with the Department of Ecology. This includes but is not limited to:

- The Davis-Bacon Act, 29 CFR (If applicable)
- Washington State Prevailing Wage Rate, Chapter 39.12 RCW (Pertaining to all recipients)
- The Disadvantaged Business Enterprise (DBE), 40 CFR, Part 33"

P. Representations and Warranties: The RECIPIENT represents and warrants to ECOLOGY as follows:

Application: Material Information. All information and materials submitted by the RECIPIENT to ECOLOGY in connection with its loan application were, when made, and are, as of the date the RECIPIENT signs this agreement, true and correct. There is no material adverse information relating to the RECIPIENT, the project, the loan, or this agreement known to the RECIPIENT, which has not been disclosed in writing to ECOLOGY.

Existence; Authority. It is a duly formed and legally existing municipal corporation or political subdivision of the state of Washington or a federally recognized Indian Tribe. It has full corporate power and authority to execute, deliver, and perform all of its obligations under this agreement and to undertake the project identified herein.

Certification. Each payment request shall constitute a certification by the RECIPIENT to the effect that all representations and warranties made in this loan agreement remain true as of the date of the request and that no adverse developments, affecting the financial condition of the RECIPIENT or its ability to complete the project or to repay the principal of or interest on the loan, have occurred since the date of this loan agreement. Any changes in the RECIPIENT's financial condition shall be disclosed in writing to ECOLOGY by the RECIPIENT in its request for payment.

Q. Sale or Disposition of Funded Utility: The RECIPIENT shall not sell, transfer, or otherwise dispose of any of the works, plant, properties, facilities, or other part of the funded Utility or any real or personal property comprising a part of the funded Utility unless:

1. The facilities or property transferred are not material to the operation of the funded Utility, or have become unserviceable, inadequate, obsolete, or unfit to be used in the operation of the funded Utility or are no longer necessary, material, or useful to the operation of the funded Utility; or

2. The aggregate depreciated cost value of the facilities or property being transferred in any fiscal year comprises no more than three percent of the total assets of the funded Utility; or

3. The RECIPIENT receives from the transferee an amount equal to an amount which will be in the same proportion to the net amount of Senior Lien Obligations and this LOAN then outstanding (defined as the total amount outstanding less the

amount of cash and investments in the bond and loan funds securing such debt) as the Gross Revenue of the funded Utility from the portion of the funded Utility sold or disposed of for the preceding year bears to the total Gross Revenue for that period.

4. Expressed written agreement by the ECOLOGY-.

The proceeds of any transfer under this paragraph must be used (1) to redeem promptly, or irrevocably set aside for the redemption of, Senior Lien Obligations and to redeem promptly the loan, and (2) to provide for part of the cost of additions to and betterments and extensions of the Utility.

R. Sewer-Use Ordinance or Resolution for Funded Wastewater Facility Projects: If not already in existence, the RECIPIENT shall adopt and shall enforce a sewer-use ordinance or resolution. Such ordinance or resolution shall be submitted to ECOLOGY upon request.

The sewer use ordinance must include provisions to:

1) Prohibit the introduction of toxic or hazardous wastes into the RECIPIENT's sewer system.

2) Prohibit inflow of stormwater into separated sewer systems.

3) Require that new sewers and connections be properly designed and constructed.

S. Termination and Default:

Termination and Default Events

1. For Insufficient ECOLOGY or RECIPIENT Funds. ECOLOGY may terminate this loan agreement for insufficient ECOLOGY or RECIPIENT funds.

2. For Failure to Commence Work. ECOLOGY may terminate this loan agreement for failure of the RECIPIENT to commence project work.

3. Past Due Payments. The RECIPIENT shall be in default of its obligations under this loan agreement when any loan repayment becomes 60 days past due.

4. Other Cause. The obligation of ECOLOGY to the RECIPIENT is contingent upon satisfactory performance in full by the RECIPIENT of all of its obligations under this loan agreement. The RECIPIENT shall be in default of its obligations under this loan agreement if, in the opinion of ECOLOGY, the RECIPIENT has unjustifiably failed to perform any obligation required of it by this loan agreement.

Procedures for Termination. If this loan agreement is terminated prior to project completion, ECOLOGY shall provide to the RECIPIENT a written notice of termination at least five working days prior to the effective date of termination (the "Termination Date"). The written notice of termination by the ECOLOGY shall specify the Termination Date and, when applicable, the date by which the RECIPIENT must repay any outstanding balance of the loan and all accrued interest (the "Termination Payment Date").

Termination and Default Remedies

No Further Payments. On and after the Termination Date, or in the event of a default event, ECOLOGY may, at its sole discretion, withdraw the loan and make no further payments under this agreement.

Repayment Demand. In response to an ECOLOGY initiated termination event, or in response to a loan default event, ECOLOGY may at its sole discretion demand that the RECIPIENT repay the outstanding balance of the Loan Amount and all accrued interest.

Interest after Repayment Demand. From the time that ECOLOGY demands repayment of funds, amounts owed by the RECIPIENT to ECOLOGY shall accrue additional interest at the rate of one percent per month, or fraction thereof.

Accelerate Repayments. In the event of a default, ECOLOGY may, in its sole discretion, declare the principal of and interest on the loan immediately due and payable, subject to the prior lien and charge of any outstanding Senior Lien Obligation upon the Net Revenue. That is, the loan is not subject to acceleration so long as any Senior Lien Obligations are outstanding. Repayments not made immediately upon such acceleration will incur Late Charges.

Late Charges. All amounts due to ECOLOGY and not paid by the RECIPIENT by the Termination Payment Date or after acceleration following a default event, as applicable, shall incur late charges.

Intercept State Funds. In the event of a default event and in accordance with Chapter 90.50A.060 RCW, "Defaults," any state funds otherwise due to the RECIPIENT may, at ECOLOGY's sole discretion, be withheld and applied to the repayment of the loan.

Property to ECOLOGY. In the event of a default event and at the option of ECOLOGY, any personal property (equipment) acquired under this agreement may, in ECOLOGY's sole discretion, become ECOLOGY's property. In that circumstance, ECOLOGY shall reduce the RECIPIENT's liability to repay money by an amount reflecting the fair value of such property.

Documents and Materials. If this agreement is terminated, all finished or unfinished documents, data studies, surveys, drawings, maps, models, photographs, and reports or other materials prepared by the RECIPIENT shall, at the option of ECOLOGY, become ECOLOGY property. The RECIPIENT shall be entitled to receive just and equitable compensation for any satisfactory work completed on such documents and other materials.

Collection and Enforcement Actions. In the event of a default event, the state of Washington reserves the right to take any actions it deems necessary to collect the amounts due, or to become due, or to enforce the performance and observance of any obligation by the RECIPIENT, under this agreement.

Fees and Expenses. In any action to enforce the provisions of this agreement, reasonable fees and expenses of attorneys and other reasonable expenses (including, without limitation, the reasonably allocated costs of legal staff) shall be awarded to the prevailing party as that term is defined in Chapter 4.84.330 RCW.

Damages. Notwithstanding ECOLOGY's exercise of any or all of the termination or default remedies provided in this agreement, the RECIPIENT shall not be relieved of any liability to ECOLOGY for damages sustained by ECOLOGY and/or the state of Washington because of any breach of this agreement by the RECIPIENT. ECOLOGY may withhold payments for the purpose of setoff until such time as the exact amount of damages due ECOLOGY from the RECIPIENT is determined.

T. User-Charge System for Funded Utilities: The RECIPIENT certifies that it has the legal authority to establish and implement a user-charge system and shall adopt a system of user-charges to assure that each user of the funded utility shall pay its proportionate share of the cost of operation and maintenance, including replacement during the design life of the project. The user-charge system will include provisions for a connection charge.

In addition, the RECIPIENT shall regularly evaluate the user-charge system, at least annually, to ensure the system provides adequate revenues necessary to operate and maintain the funded utility, to establish reserves to pay for replacement, and to repay the loan.

GENERAL FEDERAL CONDITIONS

If a portion or all of the funds for this agreement are provided through federal funding sources or this agreement is used to match a federal grant award, the following terms and conditions apply to you.

A. CERTIFICATION REGARDING SUSPENSION, DEBARMENT, INELIGIBILITY OR VOLUNTARY EXCLUSION:

1. The RECIPIENT/CONTRACTOR, by signing this agreement, certifies that it is not suspended, debarred, proposed for debarment, declared ineligible or otherwise excluded from contracting with the federal government, or from receiving contracts paid for with federal funds. If the RECIPIENT/CONTRACTOR is unable to certify to the statements contained in the certification, they must provide an explanation as to why they cannot.
2. The RECIPIENT/CONTRACTOR shall provide immediate written notice to ECOLOGY if at any time the RECIPIENT/CONTRACTOR learns that its certification was erroneous when submitted or had become erroneous by reason of changed circumstances.
3. The terms covered transaction, debarred, suspended, ineligible, lower tier covered transaction, participant, person, primary covered transaction, principal, proposal, and voluntarily excluded, as used in this clause, have the meaning set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact

ECOLOGY for assistance in obtaining a copy of those regulations.

4. The RECIPIENT/CONTRACTOR agrees it shall not knowingly enter into any lower tier covered transaction with a person who is proposed for debarment under the applicable Code of Federal Regulations, debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction.
5. The RECIPIENT/CONTRACTOR further agrees by signing this agreement, that it will include this clause titled "CERTIFICATION REGARDING SUSPENSION, DEBARMENT, INELIGIBILITY OR VOLUNTARY EXCLUSION" without modification in all lower tier covered transactions and in all solicitations for lower tier covered transactions.
6. Pursuant to 2CFR180.330, the RECIPIENT/CONTRACTOR is responsible for ensuring that any lower tier covered transaction complies with certification of suspension and debarment requirements.
7. RECIPIENT/CONTRACTOR acknowledges that failing to disclose the information required in the Code of Federal Regulations may result in the delay or negation of this funding agreement, or pursuance of legal remedies, including suspension and debarment.
8. RECIPIENT/CONTRACTOR agrees to keep proof in its agreement file, that it, and all lower tier recipients or contractors, are not suspended or debarred, and will make this proof available to ECOLOGY before requests for reimbursements will be approved for payment. RECIPIENT/CONTRACTOR must run a search in <http://www.sam.gov> and print a copy of completed searches to document proof of compliance.

B. FEDERAL FUNDING ACCOUNTABILITY AND TRANSPARENCY ACT (FFATA) REPORTING REQUIREMENTS:

CONTRACTOR/RECIPIENT must complete the FFATA Data Collection Form (ECY 070-395) and return it with the signed agreement to ECOLOGY.

Any CONTRACTOR/RECIPIENT that meets each of the criteria below must report compensation for its five top executives using the FFATA Data Collection Form.

- Receives more than $30,000 in federal funds under this award.
- Receives more than 80 percent of its annual gross revenues from federal funds.
- Receives more than $25,000,000 in annual federal funds.

Ecology will not pay any invoices until it has received a completed and signed FFATA Data Collection Form. Ecology is required to report the FFATA information for federally funded agreements, including the required Unique Entity Identifier in www.sam.gov <http://www.sam.gov/> within 30 days of agreement signature. The FFATA information will be available to the public at www.usaspending.gov <http://www.usaspending.gov/>.

For more details on FFATA requirements, see www.fsrs.gov <http://www.fsrs.gov/>.

C. FEDERAL FUNDING PROHIBITION ON CERTAIN TELECOMMUNICATIONS OR VIDEO SURVEILLANCE SERVICES OR EQUIPMENT:

As required by 2 CFR 200.216, federal grant or loan recipients and subrecipients are prohibited from obligating or expending loan or grant funds to:

1. Procure or obtain;
2. Extend or renew a contract to procure or obtain; or

3. Enter into a contract (or extend or renew a contract) to procure or obtain equipment, services, or systems that use covered telecommunications equipment, video surveillance services or services as a substantial or essential component of any system, or as critical technology as part of any system. As described in Public Law 115-232 <https://www.govinfo.gov/content/pkg/PLAW-115publ232/pdf/PLAW-115publ232.pdf>, section 889, covered telecommunications equipment is telecommunications equipment produced by Huawei Technologies Company or ZTE Corporation (or any subsidiary or affiliate of such entities).

Recipients, subrecipients, and borrowers also may not use federal funds to purchase certain prohibited equipment, systems, or services, including equipment, systems, or services produced or provided by entities identified in section 889, are recorded in the System for Award Management (SAM) <https://sam.gov/SAM/> exclusion list.

GENERAL TERMS AND CONDITIONS

Pertaining to Grant and Loan Agreements With the state of Washington, Department of Ecology

GENERAL TERMS AND CONDITIONS
For DEPARTMENT OF ECOLOGY GRANTS and LOANS
06/24/2021 Version

1. ADMINISTRATIVE REQUIREMENTS

a) RECIPIENT shall follow the "Administrative Requirements for Recipients of Ecology Grants and Loans – EAGL Edition." (https://fortress.wa.gov/ecy/publications/SummaryPages/1701004.html)

b) RECIPIENT shall complete all activities funded by this Agreement and be fully responsible for the proper management of all funds and resources made available under this Agreement.

c) RECIPIENT agrees to take complete responsibility for all actions taken under this Agreement, including ensuring all subgrantees and contractors comply with the terms and conditions of this Agreement. ECOLOGY reserves the right to request proof of compliance by subgrantees and contractors.

d) RECIPIENT's activities under this Agreement shall be subject to the review and approval by ECOLOGY for the extent and character of all work and services.

2. AMENDMENTS AND MODIFICATIONS

This Agreement may be altered, amended, or waived only by a written amendment executed by both parties. No subsequent modification(s) or amendment(s) of this Agreement will be of any force or effect unless in writing and signed by authorized representatives of both parties. ECOLOGY and the RECIPIENT may change their respective staff contacts and administrative information without the concurrence of either party.

3. ACCESSIBILITY REQUIREMENTS FOR COVERED TECHNOLOGY

The RECIPIENT must comply with the Washington State Office of the Chief Information Officer, OCIO Policy no. 188, Accessibility (https://ocio.wa.gov/policy/accessibility) as it relates to "covered technology." This requirement applies to all products supplied under the Agreement, providing equal access to information technology by individuals with disabilities, including and not limited to web sites/pages, web-based applications, software systems, video and audio content, and electronic documents intended for publishing on Ecology's public web site.

4. ARCHAEOLOGICAL AND CULTURAL RESOURCES

RECIPIENT shall take all reasonable action to avoid, minimize, or mitigate adverse effects to archaeological and historic archaeological sites, historic buildings/structures, traditional cultural places, sacred sites, or other cultural resources, hereby referred to as Cultural Resources.

The RECIPIENT must agree to hold harmless ECOLOGY in relation to any claim related to Cultural Resources discovered, disturbed, or damaged due to the RECIPIENT's project funded under this Agreement.

RECIPIENT shall:

a) Contact the ECOLOGY Program issuing the grant or loan to discuss any Cultural Resources requirements for their project:

• Cultural Resource Consultation and Review should be initiated early in the project planning process and must be completed prior to expenditure of Agreement funds as required by applicable State and Federal requirements.

* For state funded construction, demolition, or land acquisitions, comply with Governor Executive Order 21-02, Archaeological and Cultural Resources.

• For projects with any federal involvement, comply with the National Historic Preservation Act of 1966 (Section 106).

b) If required by the ECOLOGY Program, submit an Inadvertent Discovery Plan (IDP) to ECOLOGY prior to implementing any project that involves field activities. ECOLOGY will provide the IDP form.

RECIPIENT shall:

• Keep the IDP at the project site.
• Make the IDP readily available to anyone working at the project site.
• Discuss the IDP with staff, volunteers, and contractors working at the project site.
• Implement the IDP when Cultural Resources or human remains are found at the project site.

c) If any Cultural Resources are found while conducting work under this Agreement, follow the protocol outlined in the project IDP.

• Immediately stop work and notify the ECOLOGY Program, who will notify the Department of Archaeology and Historic Preservation at (360) 586-3065, any affected Tribe, and the local government.

d) If any human remains are found while conducting work under this Agreement, follow the protocol outlined in the project IDP.

• Immediately stop work and notify the local Law Enforcement Agency or Medical Examiner/Coroner's Office, the Department of Archaeology and Historic Preservation at (360) 790-1633, and then the ECOLOGY Program.

e) Comply with RCW 27.53, RCW 27.44, and RCW 68.50.645, and all other applicable local, state, and federal laws protecting Cultural Resources and human remains.

5. ASSIGNMENT

No right or claim of the RECIPIENT arising under this Agreement shall be transferred or assigned by the RECIPIENT.

6. COMMUNICATION

RECIPIENT shall make every effort to maintain effective communications with the RECIPIENT's designees, ECOLOGY, all affected local, state, or federal jurisdictions, and any interested individuals or groups.

7. COMPENSATION

a) Any work performed prior to effective date of this Agreement will be at the sole expense and risk of the RECIPIENT. ECOLOGY must sign the Agreement before any payment requests can be submitted.

b) Payments will be made on a reimbursable basis for approved and completed work as specified in this Agreement.

c) RECIPIENT is responsible to determine if costs are eligible. Any questions regarding eligibility should be clarified with ECOLOGY prior to incurring costs. Costs that are conditionally eligible require approval by ECOLOGY prior to expenditure.

d) RECIPIENT shall not invoice more than once per month unless agreed on by ECOLOGY.

e) ECOLOGY will not process payment requests without the proper reimbursement forms, Progress Report and supporting documentation. ECOLOGY will provide instructions for submitting payment requests.

f) ECOLOGY will pay the RECIPIENT thirty (30) days after receipt of a properly completed request for payment.

g) RECIPIENT will receive payment through Washington State's Office of Financial Management's Statewide Payee Desk. To receive payment you must register as a statewide vendor by submitting a statewide vendor registration form and an IRS W-9 form at website, https://ofm.wa.gov/it-systems/statewide-vendorpayee-services. If you have questions about the vendor registration process, you can contact Statewide Payee Help Desk at (360) 407-8180 or email PayeeRegistration@ofm.wa.gov.

h) ECOLOGY may, at its sole discretion, withhold payments claimed by the RECIPIENT if the RECIPIENT fails to satisfactorily comply with any term or condition of this Agreement.

i) Monies withheld by ECOLOGY may be paid to the RECIPIENT when the work described herein, or a portion thereof, has been completed if, at ECOLOGY's sole discretion, such payment is reasonable and approved according to this Agreement, as appropriate, or upon completion of an audit as specified herein.

j) RECIPIENT must submit within thirty (30) days after the expiration date of this Agreement, all financial, performance, and other reports required by this Agreement. Failure to comply may result in delayed reimbursement.

8. COMPLIANCE WITH ALL LAWS

RECIPIENT agrees to comply fully with all applicable federal, state and local laws, orders, regulations, and permits related to this Agreement, including but not limited to:

a) RECIPIENT agrees to comply with all applicable laws, regulations, and policies of the United States and the State of Washington which affect wages and job safety.

b) RECIPIENT agrees to be bound by all applicable federal and state laws, regulations, and policies against discrimination.

c) RECIPIENT certifies full compliance with all applicable state industrial insurance requirements.

d) RECIPIENT agrees to secure and provide assurance to ECOLOGY that all the necessary approvals and permits required by authorities having jurisdiction over the project are obtained. RECIPIENT must include time in their project timeline for the permit and approval processes.

ECOLOGY shall have the right to immediately terminate for cause this Agreement as provided herein if the RECIPIENT fails to comply with above requirements.

If any provision of this Agreement violates any statute or rule of law of the state of Washington, it is considered modified to conform to that statute or rule of law.

9. CONFLICT OF INTEREST

RECIPIENT and ECOLOGY agree that any officer, member, agent, or employee, who exercises any function or responsibility in the review, approval, or carrying out of this Agreement, shall not have any personal or financial interest, direct or indirect, nor affect the interest of any corporation, partnership, or association in which he/she is a part, in this Agreement or the proceeds thereof.

10. CONTRACTING FOR GOODS AND SERVICES

RECIPIENT may contract to buy goods or services related to its performance under this Agreement. RECIPIENT shall award all contracts for construction, purchase of goods, equipment, services, and professional architectural and engineering services through a competitive process, if required by State law. RECIPIENT is required to follow procurement procedures that ensure legal, fair, and open competition.

RECIPIENT must have a standard procurement process or follow current state procurement procedures. RECIPIENT may be required to provide written certification that they have followed their standard procurement procedures and applicable state law in awarding contracts under this Agreement.

ECOLOGY reserves the right to inspect and request copies of all procurement documentation, and review procurement practices related to this Agreement. Any costs incurred as a result of procurement practices not in compliance with state procurement law or the RECIPIENT's normal procedures may be disallowed at ECOLOGY's sole discretion.

11. DISPUTES

When there is a dispute with regard to the extent and character of the work, or any other matter related to this Agreement the determination of ECOLOGY will govern, although the RECIPIENT shall have the right to appeal decisions as provided for below:

a) RECIPIENT notifies the funding program of an appeal request.

b) Appeal request must be in writing and state the disputed issue(s).

c) RECIPIENT has the opportunity to be heard and offer evidence in support of its appeal.

d) ECOLOGY reviews the RECIPIENT's appeal.

e) ECOLOGY sends a written answer within ten (10) business days, unless more time is needed, after concluding the review.

The decision of ECOLOGY from an appeal will be final and conclusive, unless within thirty (30) days from the date of such decision, the RECIPIENT furnishes to the Director of ECOLOGY a written appeal. The decision of the Director or duly authorized representative will be final and conclusive.
The parties agree that this dispute process will precede any action in a judicial or quasi-judicial tribunal.
Appeals of the Director's decision will be brought in the Superior Court of Thurston County. Review of the Director's decision will not be taken to Environmental and Land Use Hearings Office.
Pending final decision of a dispute, the RECIPIENT agrees to proceed diligently with the performance of this Agreement and in accordance with the decision rendered.
Nothing in this Agreement will be construed to limit the parties' choice of another mutually acceptable method, in addition to the dispute resolution procedure outlined above.

12. ENVIRONMENTAL DATA STANDARDS

a) RECIPIENT shall prepare a Quality Assurance Project Plan (QAPP) for a project that collects or uses environmental measurement data. RECIPIENTS unsure about whether a QAPP is required for their project shall contact the ECOLOGY Program issuing the grant or loan. If a QAPP is required, the RECIPIENT shall:

- Use ECOLOGY's QAPP Template/Checklist provided by the ECOLOGY, unless ECOLOGY Quality Assurance (QA) officer or the Program QA coordinator instructs otherwise.
- Follow ECOLOGY's Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies, July 2004 (Ecology Publication No. 04-03-030).
- Submit the QAPP to ECOLOGY for review and approval before the start of the work.

b) RECIPIENT shall submit environmental data that was collected on a project to ECOLOGY using the Environmental Information Management system (EIM), unless the ECOLOGY Program instructs otherwise. The RECIPIENT must confirm with ECOLOGY that complete and correct data was successfully loaded into EIM, find instructions at: http://www.ecy.wa.gov/eim.
c) RECIPIENT shall follow ECOLOGY's data standards when Geographic Information System (GIS) data is collected and processed. Guidelines for Creating and Accessing GIS Data are available at: https://ecology.wa.gov/Research-Data/Data-resources/Geographic-Information-Systems-GIS/Standards. RECIPIENT, when requested by ECOLOGY, shall provide copies to ECOLOGY of all final GIS data layers, imagery, related tables, raw data collection files, map products, and all metadata and project documentation.

13. GOVERNING LAW

This Agreement will be governed by the laws of the State of Washington, and the venue of any action brought hereunder will be in the Superior Court of Thurston County.

14. INDEMNIFICATION

ECOLOGY will in no way be held responsible for payment of salaries, consultant's fees, and other costs related to the project described herein, except as provided in the Scope of Work.
To the extent that the Constitution and laws of the State of Washington permit, each party will indemnify and hold the other harmless from and against any liability for any or all injuries to persons or property arising from the negligent act or omission of that party or that party's agents or employees arising out of this Agreement.

15. INDEPENDENT STATUS

The employees, volunteers, or agents of each party who are engaged in the performance of this Agreement will continue to be employees, volunteers, or agents of that party and will not for any purpose be employees, volunteers, or agents of the other party.

16. KICKBACKS

RECIPIENT is prohibited from inducing by any means any person employed or otherwise involved in this Agreement to give up any part of the compensation to which he/she is otherwise entitled to or receive any fee, commission, or gift in return for award of a subcontract hereunder.

17. MINORITY AND WOMEN'S BUSINESS ENTERPRISES (MWBE)

RECIPIENT is encouraged to solicit and recruit, to the extent possible, certified minority-owned (MBE) and women-owned (WBE) businesses in purchases and contracts initiated under this Agreement.

Contract awards or rejections cannot be made based on MWBE participation; however, the RECIPIENT is encouraged to take the following actions, when possible, in any procurement under this Agreement:

a) Include qualified minority and women's businesses on solicitation lists whenever they are potential sources of goods or services.

b) Divide the total requirements, when economically feasible, into smaller tasks or quantities, to permit maximum participation by qualified minority and women's businesses.

c) Establish delivery schedules, where work requirements permit, which will encourage participation of qualified minority and women's businesses.

d) Use the services and assistance of the Washington State Office of Minority and Women's Business Enterprises (OMWBE) (866-208-1064) and the Office of Minority Business Enterprises of the U.S. Department of Commerce, as appropriate.

18. ORDER OF PRECEDENCE

In the event of inconsistency in this Agreement, unless otherwise provided herein, the inconsistency shall be resolved by giving precedence in the following order: (a) applicable federal and state statutes and regulations; (b) The Agreement; (c) Scope of Work; (d) Special Terms and Conditions; (e) Any provisions or terms incorporated herein by reference, including the "Administrative Requirements for Recipients of Ecology Grants and Loans"; (f) Ecology Funding Program Guidelines; and (g) General Terms and Conditions.

19. PRESENTATION AND PROMOTIONAL MATERIALS

ECOLOGY reserves the right to approve RECIPIENT's communication documents and materials related to the fulfillment of this Agreement:

a) If requested, RECIPIENT shall provide a draft copy to ECOLOGY for review and approval ten (10) business days prior to production and distribution.

b) RECIPIENT shall include time for ECOLOGY's review and approval process in their project timeline.

c) If requested, RECIPIENT shall provide ECOLOGY two (2) final copies and an electronic copy of any tangible products developed.

Copies include any printed materials, and all tangible products developed such as brochures, manuals, pamphlets, videos, audio tapes, CDs, curriculum, posters, media announcements, or gadgets with a message, such as a refrigerator magnet, and any online communications, such as web pages, blogs, and twitter campaigns. If it is not practical to provide a copy, then the RECIPIENT shall provide a description (photographs, drawings, printouts, etc.) that best represents the item.

Any communications intended for public distribution that uses ECOLOGY's logo shall comply with ECOLOGY's graphic requirements and any additional requirements specified in this Agreement. Before the use of ECOLOGY's logo contact ECOLOGY for guidelines.

RECIPIENT shall acknowledge in the communications that funding was provided by ECOLOGY.

20. PROGRESS REPORTING

a) RECIPIENT must satisfactorily demonstrate the timely use of funds by submitting payment requests and progress reports to ECOLOGY. ECOLOGY reserves the right to amend or terminate this Agreement if the RECIPIENT does not document timely use of funds.
b) RECIPIENT must submit a progress report with each payment request. Payment requests will not be processed without a progress report. ECOLOGY will define the elements and frequency of progress reports.
c) RECIPIENT shall use ECOLOGY's provided progress report format.
d) Quarterly progress reports will cover the periods from January 1 through March 31, April 1 through June 30, July 1 through September 30, and October 1 through December 31. Reports shall be submitted within thirty (30) days after the end of the quarter being reported.
e) RECIPIENT must submit within thirty (30) days of the expiration date of the project, unless an extension has been approved by ECOLOGY, all financial, performance, and other reports required by the Agreement and funding program guidelines. RECIPIENT shall use the ECOLOGY provided closeout report format.

21. PROPERTY RIGHTS

a) Copyrights and Patents. When the RECIPIENT creates any copyrightable materials or invents any patentable property under this Agreement, the RECIPIENT may copyright or patent the same but ECOLOGY retains a royalty free, nonexclusive, and irrevocable license to reproduce, publish, recover, or otherwise use the material(s) or property, and to authorize others to use the same for federal, state, or local government purposes.
b) Publications. When the RECIPIENT or persons employed by the RECIPIENT use or publish ECOLOGY information; present papers, lectures, or seminars involving information supplied by ECOLOGY; or use logos, reports, maps, or other data in printed reports, signs, brochures, pamphlets, etc., appropriate credit shall be given to ECOLOGY.
c) Presentation and Promotional Materials. ECOLOGY shall have the right to use or reproduce any printed or graphic materials produced in fulfillment of this Agreement, in any manner ECOLOGY deems appropriate. ECOLOGY shall acknowledge the RECIPIENT as the sole copyright owner in every use or reproduction of the materials.
d) Tangible Property Rights. ECOLOGY's current edition of "Administrative Requirements for Recipients of Ecology Grants and Loans," shall control the use and disposition of all real and personal property purchased wholly or in part with funds furnished by ECOLOGY in the absence of state and federal statutes, regulations, or policies to the contrary, or upon specific instructions with respect thereto in this Agreement.
e) Personal Property Furnished by ECOLOGY. When ECOLOGY provides personal property directly to the RECIPIENT for use in performance of the project, it shall be returned to ECOLOGY prior to final payment by ECOLOGY. If said property is lost, stolen, or damaged while in the RECIPIENT's possession, then ECOLOGY shall be reimbursed in cash or by setoff by the RECIPIENT for the fair market value of such property.
f) Acquisition Projects. The following provisions shall apply if the project covered by this Agreement includes funds for the acquisition of land or facilities:
1. RECIPIENT shall establish that the cost is fair value and reasonable prior to disbursement of funds provided for in this Agreement.
2. RECIPIENT shall provide satisfactory evidence of title or ability to acquire title for each parcel prior to disbursement of funds provided by this Agreement. Such evidence may include title insurance policies, Torrens certificates, or abstracts, and attorney's opinions establishing that the land is free from any impediment, lien, or claim which would impair the uses intended by this Agreement.
g) Conversions. Regardless of the Agreement expiration date, the RECIPIENT shall not at any time convert any equipment, property, or facility acquired or developed under this Agreement to uses other than those for which assistance was originally approved without prior written approval of ECOLOGY. Such approval may be conditioned upon payment to ECOLOGY of that portion of the proceeds of the sale, lease, or other conversion or encumbrance which monies granted pursuant to this Agreement bear to the total acquisition, purchase, or construction costs of such property.

22. RECORDS, AUDITS, AND INSPECTIONS

RECIPIENT shall maintain complete program and financial records relating to this Agreement, including any engineering documentation and field inspection reports of all construction work accomplished.

All records shall:

a) Be kept in a manner which provides an audit trail for all expenditures.

b) Be kept in a common file to facilitate audits and inspections.

c) Clearly indicate total receipts and expenditures related to this Agreement.

d) Be open for audit or inspection by ECOLOGY, or by any duly authorized audit representative of the State of Washington, for a period of at least three (3) years after the final grant payment or loan repayment, or any dispute resolution hereunder.

RECIPIENT shall provide clarification and make necessary adjustments if any audits or inspections identify discrepancies in the records.

ECOLOGY reserves the right to audit, or have a designated third party audit, applicable records to ensure that the state has been properly invoiced. Any remedies and penalties allowed by law to recover monies determined owed will be enforced. Repetitive instances of incorrect invoicing or inadequate records may be considered cause for termination.

All work performed under this Agreement and any property and equipment purchased shall be made available to ECOLOGY and to any authorized state, federal or local representative for inspection at any time during the course of this Agreement and for at least three (3) years following grant or loan termination or dispute resolution hereunder.

RECIPIENT shall provide right of access to ECOLOGY, or any other authorized representative, at all reasonable times, in order to monitor and evaluate performance, compliance, and any other conditions under this Agreement.

23. RECOVERY OF FUNDS

The right of the RECIPIENT to retain monies received as reimbursement payments is contingent upon satisfactory performance of this Agreement and completion of the work described in the Scope of Work.

All payments to the RECIPIENT are subject to approval and audit by ECOLOGY, and any unauthorized expenditure(s) or unallowable cost charged to this Agreement shall be refunded to ECOLOGY by the RECIPIENT.

RECIPIENT shall refund to ECOLOGY the full amount of any erroneous payment or overpayment under this Agreement.

RECIPIENT shall refund by check payable to ECOLOGY the amount of any such reduction of payments or repayments within thirty (30) days of a written notice. Interest will accrue at the rate of twelve percent (12%) per year from the time ECOLOGY demands repayment of funds.

Any property acquired under this Agreement, at the option of ECOLOGY, may become ECOLOGY's property and the RECIPIENT's liability to repay monies will be reduced by an amount reflecting the fair value of such property.

24. SEVERABILITY

If any provision of this Agreement or any provision of any document incorporated by reference shall be held invalid, such invalidity shall not affect the other provisions of this Agreement which can be given effect without the invalid provision, and to this end the provisions of this Agreement are declared to be severable.

25. STATE ENVIRONMENTAL POLICY ACT (SEPA)

RECIPIENT must demonstrate to ECOLOGY's satisfaction that compliance with the requirements of the State Environmental Policy Act (Chapter 43.21C RCW and Chapter 197-11 WAC) have been or will be met. Any reimbursements are subject to this provision.

26. SUSPENSION

When in the best interest of ECOLOGY, ECOLOGY may at any time, and without cause, suspend this Agreement or any portion thereof for a temporary period by written notice from ECOLOGY to the RECIPIENT. RECIPIENT shall resume performance on the next business day following the suspension period unless another day is specified by ECOLOGY.

27. SUSTAINABLE PRACTICES

In order to sustain Washington's natural resources and ecosystems, the RECIPIENT is fully encouraged to implement sustainable practices and to purchase environmentally preferable products under this Agreement.

a) Sustainable practices may include such activities as: use of clean energy, use of double-sided printing, hosting low impact meetings, and setting up recycling and composting programs.

b) Purchasing may include such items as: sustainably produced products and services, EPEAT registered computers and imaging equipment, independently certified green cleaning products, remanufactured toner cartridges, products with reduced packaging, office products that are refillable, rechargeable, and recyclable, 100% post-consumer recycled paper, and toxic free products.

For more suggestions visit ECOLOGY's web page, Green Purchasing, https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Sustainable-purchasing.

28. TERMINATION

a) For Cause

ECOLOGY may terminate for cause this Agreement with a seven (7) calendar days prior written notification to the RECIPIENT, at the sole discretion of ECOLOGY, for failing to perform an Agreement requirement or for a material breach of any term or condition. If this Agreement is so terminated, the parties shall be liable only for performance rendered or costs incurred in accordance with the terms of this Agreement prior to the effective date of termination.

Failure to Commence Work. ECOLOGY reserves the right to terminate this Agreement if RECIPIENT fails to commence work on the project funded within four (4) months after the effective date of this Agreement, or by any date mutually agreed upon in writing for commencement of work, or the time period defined within the Scope of Work.

Non-Performance. The obligation of ECOLOGY to the RECIPIENT is contingent upon satisfactory performance by the RECIPIENT of all of its obligations under this Agreement. In the event the RECIPIENT unjustifiably fails, in the opinion of ECOLOGY, to perform any obligation required of it by this Agreement, ECOLOGY may refuse to pay any further funds, terminate in whole or in part this Agreement, and exercise any other rights under this Agreement.

Despite the above, the RECIPIENT shall not be relieved of any liability to ECOLOGY for damages sustained by ECOLOGY and the State of Washington because of any breach of this Agreement by the RECIPIENT. ECOLOGY may withhold payments for the purpose of setoff until such time as the exact amount of damages due ECOLOGY from the RECIPIENT is determined.

b) For Convenience

ECOLOGY may terminate for convenience this Agreement, in whole or in part, for any reason when it is the best interest of ECOLOGY, with a thirty (30) calendar days prior written notification to the RECIPIENT, except as noted below. If this Agreement is so terminated, the parties shall be liable only for performance rendered or costs incurred in accordance with the terms of this Agreement prior to the effective date of termination.

Non-Allocation of Funds. ECOLOGY's ability to make payments is contingent on availability of funding. In the event funding from state, federal or other sources is withdrawn, reduced, or limited in any way after the effective date and prior to the completion or expiration date of this Agreement, ECOLOGY, at its sole discretion, may elect to terminate the Agreement, in whole or part, or renegotiate the Agreement, subject to new funding limitations or conditions. ECOLOGY may also elect to suspend performance of the Agreement until ECOLOGY determines the funding insufficiency is resolved. ECOLOGY may exercise any of these options with no notification or restrictions, although ECOLOGY will make a reasonable attempt to provide notice.

In the event of termination or suspension, ECOLOGY will reimburse eligible costs incurred by the RECIPIENT through the effective date of termination or suspension. Reimbursed costs must be agreed to by ECOLOGY and the RECIPIENT. In no

event shall ECOLOGY's reimbursement exceed ECOLOGY's total responsibility under the Agreement and any amendments. If payments have been discontinued by ECOLOGY due to unavailable funds, the RECIPIENT shall not be obligated to repay monies which had been paid to the RECIPIENT prior to such termination.
RECIPIENT's obligation to continue or complete the work described in this Agreement shall be contingent upon availability of funds by the RECIPIENT's governing body.

c) By Mutual Agreement
ECOLOGY and the RECIPIENT may terminate this Agreement, in whole or in part, at any time, by mutual written agreement.

d) In Event of Termination
All finished or unfinished documents, data studies, surveys, drawings, maps, models, photographs, reports or other materials prepared by the RECIPIENT under this Agreement, at the option of ECOLOGY, will become property of ECOLOGY and the RECIPIENT shall be entitled to receive just and equitable compensation for any satisfactory work completed on such documents and other materials.
Nothing contained herein shall preclude ECOLOGY from demanding repayment of all funds paid to the RECIPIENT in accordance with Recovery of Funds, identified herein.

29. THIRD PARTY BENEFICIARY
RECIPIENT shall ensure that in all subcontracts entered into by the RECIPIENT pursuant to this Agreement, the state of Washington is named as an express third party beneficiary of such subcontracts with full rights as such.

30. WAIVER
Waiver of a default or breach of any provision of this Agreement is not a waiver of any subsequent default or breach, and will not be construed as a modification of the terms of this Agreement unless stated as such in writing by the authorized representative of ECOLOGY.

End of General Terms and Conditions

Appendix B

Receiving Water Conditions Assessment – SMAP, Memorandum

Memorandum

To:	Sean Mulderig, City of Washougal
From:	Trista Kobluskie, Cara Donovan, Frank Sottosanto, PE, Otak, Inc.
Copies:	Rob Charles
Date:	March 30, 2022
Subject:	Receiving Water Conditions Assessment - SMAP
Project No.:	20155

1. Introduction and Organization

The Receiving Water Conditions Assessment has been prepared pursuant to the City of Washougal's Phase II National Pollutant Discharge Elimination System (NPDES) municipal stormwater permit and a water quality grant from the Washington Department of Ecology. The assessment generally follows the receiving water conditions assessment steps described in the *Stormwater Management Action Planning Guidance* published by the Washington Department of Ecology in 2019 (2019 SMAP Guidance). The purpose of the Receiving Water Conditions Assessment is to identify basins and receiving waters that could benefit from stormwater management action planning (SMAP). The outcome of this phase is a narrowed list of candidate basins that includes the information needed to support a prioritization process. The ultimate outcome of the process is a SMAP for a priority catchment within the City of Washougal where the City's investments in stormwater retrofits, targeted stormwater management activities, or targeted policies could benefit a receiving water.

The results of this assessment are summarized in this memorandum. Geographic input data and analyses used in or created for this assessment are presented in a web map. The URL is provided in Attachment A to this memorandum, which may be updated if the web map URL changes.

This memorandum is organized as follows:

This project has been funded in part by a grant from Washington State Department of Ecology.

Figures

Tables

2. Methodologies

This section describes the methodologies used to assess the receiving waters and assess relative conditions. Assessments have been made using available information from reports, studies, and geographic information systems (GIS) of City of Washougal, Clark County, state agencies, and federal agencies.

2.1. Receiving Water Conditions Assessment Methodology

This section describes the methods used to assess conditions in each receiving water.

Setting and Flow Characteristics

The receiving waters in the City of Washougal are identified using Clark County's watershed delineations. Washougal River and Gibbons Creek watershed boundaries have both been modified for this analysis using the City's storm sewer geographic information system (GIS) and topography. Washougal River Watershed has been extended into Skamania County to its natural topographic boundary. Gibbons Creek Watershed has been modified along the Columbia River to account for new levees and along the Skamania County border based on topography, omitting the Lawton Creek drainage which is included in the County's delineation. In this document, "watershed" refers to an entire basin both within the City of

Washougal and outside of it, while “basin” refers to only the portion of the watershed within Washougal’s City limits.

Clark County's Stormwater Needs Assessment Reports were reviewed for important information about each receiving water. Receiving waters are the result of the physical characteristics of the basin as well as human intervention that has altered the natural characteristics. The characteristics considered for the receiving water assessment are listed and described below.

Information regarding flow characteristics of the receiving waters has been collected largely from the City, Clark County, the US Geological Survey (USGS), and Federal Emergency Management Agency (FEMA) flood insurance studies.

The distribution of soil types influences the flow of surface water and groundwater within a watershed. The assessment uses soil data from the Natural Resources Conservation Service (NRCS). The hydrologic-soil group designations include hydrologic soils groups A, B, C, and D. Generally, group A allows infiltration, soil group B allows for a moderate rate of infiltration, and groups C and D allow limited infiltration and produce more runoff.

Topography plays a large role in defining drainage basins and influences the flow of water within a basin. The assessment uses 5-foot contours from Clark and Skamania Counties. The assessment very generally describes watershed topography.

Changes in land cover from historic forests and prairies to impervious surfaces and lawns impacts streams by directing more runoff to them and changing the timing and duration of their peak flows. Land cover has been collected from the 2019 National Land Cover Dataset (NLCD). To estimate current impervious surfaces within City limits, a National Agriculture Imagery Program (NAIP) raster dataset has been clipped to the City limits and reclassified. Impervious surface coverage is classified by three types (dark roofs, light roofs, and roadways) and combined for analysis.

Stormwater facilities designed to control flow (flow control facilities) in Washougal mitigate some impacts of such land cover changes. Stormwater facilities within City limits are classified as flow control facilities or water quality facilities based on the City’s GIS data. The following facilities are classified as flow control facilities:

- Detention vaults
- Infiltration trenches
- Permeable pavement
- Infiltration planters
- Bio-infiltration planters
- Ponds
- Infiltration rain gardens

Flow control facilities, water quality facilities, outfalls, drywells, stormwater pipes, and ditches are counted and located within each basin to determine whether infrastructure distribution is consistent with land cover and land use.

The City protects wetlands, wetland buffers, critical aquifer recharge areas, geologically hazardous areas, frequently flooded areas, and fish and wildlife habitat conservation areas through its critical areas ordinance (Chapter 16.04). Wetlands and wetland buffers are important to hydrology and water quality

because they reduce the velocity of stormwater and provide a natural filter for sediment and metals. The presence, quality, and location of critical areas in the watershed can be key indicators in understanding the health of the watershed. Presence of critical areas may also affect where development can occur. Critical areas are mapped and listed for each basin.

Stormwater improvement projects can be most easily placed in the public right-of-way and in publicly-owned land. Major public lands in the City limits were collected from the City, Clark County, Washington State, and the federal government.

Water Quality and Aquatic Habitat

Washington State's Department of Ecology's Water Quality Atlas and Washington's Administrative Code have been reviewed for each receiving water's water quality standards. These criteria, outlined in Section 4, are used to assess the health of the surface water for recreation, drinking water, aquatic life, and other uses.

Washington State's Department of Ecology's 2016 Water Quality Assessment has been reviewed for each receiving water. Category 4 and 5 impairments are listed for each watershed. Any total maximum daily loads (TMDL)s or water quality improvement (WQI) projects are listed.

Fish use in each receiving water and contributing waterbodies has been collected from the Northwest Indian Fisheries Commission's Statewide Integrated Fish Distribution webmap.

The location and severity of fish barriers from the Washington Department of Fish and Wildlife's (WDFW) Washington State Fish Passage webmap are described for each stream and tributary.

The Puget Sound Stream Benthos webmap, Ecology's Environmental Information Management System, USGS's Water Quality Data for the Nation, and USGS's Regional Stream Quality Assessment have been reviewed for stream health of the receiving waters. Water quality data is summarized for each watershed in Section 4.

Land use has a significant impact on water quality. The City's zoning was used as a proxy for land use in the City limits. Zoning is classified as polluting or non-polluting for the purpose of this assessment. The areas zoned medium density residential, high density residential, town center, commercial, industrial, and schools/public facilities are classified as land uses that contribute stormwater pollutants such as total suspended solids (TSS), turbidity, and metals. Low-density residential and open spaces/parks are considered non-pollution generating land uses.

Large-scale pervious surfaces can be significant contributors of pollution. Pervious surfaces with areas greater than a city block that receive intensive management have been digitized in GIS by reviewing aerial imagery. Areas with this designation have been confirmed with City staff's knowledge of land management on the identified tracts.

Water quality treatment facilities mitigate the impacts of urban land uses on receiving waters. Stormwater facilities in City limits are classified as flow control facilities or water quality facilities based on the City's GIS data. The following facilities are classified as water quality facilities:

- Bio-infiltration swales
- Filter vaults
- Contech StormFilters

- Bioretention rain gardens

Heavily traveled roadways produce more pollutants in runoff than other land uses. Heavily traveled roadways and highways in the City with an average daily traffic (ADT) greater than 7,500 have been collected from the Southwest Washington Regional Transportation Council.

Environmental Justice and Cultural Review

The Washington Environmental Health Disparities Map (WEHDM) project compares communities for health disparities related to the environment. The map may assist local decision-makers to prioritize public investments where disparities exist. The map shows a "cumulative environmental health impact score for each census tract reflecting pollutant exposures and factors that affect people's vulnerability to environmental pollution" (WEHDM, 2019). Environmental exposures include, but are not limited to, ozone and toxic releases, while factors that affect vulnerability include, but are not limited to, socioeconomic factors and populations with health sensitivities. Impact ranks are calculated relative to other communities in the state and range between 1 and 10, with 10 being communities with the highest impact.

The WEHDM index scores of each census tract and the area of each census tract that falls within a basin have been collected. A weighted average based on the area of each census tract in the basin is calculated with this information. The area weighted averages are included in Section 4 for each basin.

Based on Ecology's SMAP guidance and the City's grant agreement with Ecology, the Environmental Protection Agency's (EPA) Environmental Justice (EJ) Screening was reviewed. The intent of the review was to find inequity and overburdened communities and include those as a factor in prioritizing a receiving water. In the best-case scenario, there would be factors in the EJScreen tool which would present inequity that could be addressed by stormwater solutions. However, the demographic indicators (demographic index, people of color, and low-income data) in Washougal did not significantly distinguish census block groups from one another. Therefore, the Washington Environmental Health Disparities (WEHDM) project has been used for this assessment instead, as described above.

Future analyses in the prioritized basin will include review of cultural resources data available from the Washington State Department of Archaeology and Historic Preservation.

2.2. Relative Conditions Assessment Methodology

The relative conditions assessment includes an assessment of stormwater management influence (SMI) as well as an assessment of historic conditions and current degradation to inform the selection of a basin management strategy. Each assessment process is described further below.

Stormwater Management Influence

The influence of the City's municipal separate storm sewer system (MS4) and land uses on the existing conditions of the receiving waters is assessed based on Step 3 of the 2019 SMAP Guidance, with some guidance derived from *Building Cities in the Rain: Watershed Prioritization for Stormwater Retrofits*, published by the Washington Department of Commerce in 2016. The purpose of stormwater management influence (SMI) is to discover the relative influence that the City's storm system has in maintaining or improving stream or river health. The SMI evaluation in turn informs the selection of a high priority catchment where the SMAP will be applied.

SMI for each basin is qualitatively evaluated based on information in Table 1 and Section 4, Receiving Waters Conditions Assessment Analysis and MS4 Influence. Nine factors are considered. A description of each factor and how it influences the City's SMI score for each receiving water is described below.

SMI - Hydrology Factors

The first factor is whether the receiving water is flow control exempt. A flow control exempt waterbody has a high volume of flow; therefore, the City's MS4 may have little influence on its hydrology. Flow control exempt waters receive a low score and non-flow control exempt receiving waters receive a high score.

The second factor is the percent of the watershed within City limits (Table 1). The City has a higher influence on a stream or river if a significant portion of the watershed is within City limits. This factor is a relative assessment between watersheds. A higher score is assigned to basins where the City controls a larger fraction of the basin.

The third factor is the City's location in the basin (Table 1). The City's location in the basin is an important consideration because if the receiving water is already degraded before it reaches City limits, the City's MS4 may not have a significant impact on its condition.

The fourth factor is impervious surfaces within City limits. Impervious surfaces alter the hydrology of a watershed and can increase the number of pollutants entering a receiving water. The fraction of impervious coverage of each basin within City limits is calculated in Section 4. This factor is a relative assessment between watersheds. A basin with a higher percentage of imperviousness within City limits receives a higher score.

The fifth factor is a relative assessment between impervious land cover mitigated by flow control facilities and drywells. The factor is measured by the density of flow control facilities and drywells per acre of developed surfaces. The number of flow control facilities and drywells in each basin is tabulated in Section 4. The density of these facilities is calculated based on the developed surfaces in the basin using the National Land Cover Dataset (NLCD). Higher scores are given to basins with a lower density of flow control facilities because these may have a larger impact on hydrology in the existing condition.

SMI - Water Quality Factors

The sixth factor is a relative assessment of pollutant-generating land uses within City limits. The fraction of pollutant-generating land uses for each basin is calculated in Section 4. Zoning is used as a proxy for land use, and each zone is categorized as pollutant-generating or non-pollutant-generating. For this assessment, pollutant-generating zoning includes high-density residential, medium-density residential, commercial, industrial, and school/public facilities. A higher score is assigned to a basin with a larger area of pollutant-generating land use because of its influence on water quality under existing conditions.

The seventh factor is the presence of high traffic roadways in the basin. High traffic roads and highways are known to produce more pollutants in runoff. Higher scores are given to basins with high relative area of road with average daily traffic (ADT) greater than 7,500. Area of high ADT roadways for each basin is documented in Section 4.

The eighth factor is large pollutant-generating pervious surfaces within City limits. Large pollutant-generating pervious surfaces are defined as golf courses, ball fields, maintained turf in parks and cemeteries, and manicured private yards exceeding one city block. Locations are identified using visual review of aerial imagery. The fraction of large pollutant-generating pervious surfaces within Ccity limits is calculated in Section 4. Only those identified surfaces that do not overlap pollution-generating land uses

(factor 6) are counted to ensure pollutant-generating areas are not double-counted. A higher score is assigned to a basin with a larger relative area of large pollution-generating pervious surfaces compared to other basins.

The ninth factor is a relative assessment of the density of water quality facilities per acre of pollutant-generating surfaces. Section 4 describes the area of polluting land uses, the area of large pollution-generating pervious surfaces, and the number of water quality treatment facilities in each basin within City limits. Higher scores are given to basins with a lower density of water quality facilities per area of pollutant-generating surfaces because of the impact on water quality in the existing condition.

Basin Management Strategy

The 2019 SMAP Guidance suggests the use of the *Building Cities in the Rain* "Management Matrix for Restoration and Protection" for prioritizing basins suitable for stormwater retrofit investment. A simplified version is shown in *Puget Sound Characterization: Volume 1: the Water Resource Assessments* and is reproduced in Figure 1, below. The matrix allows watersheds to be compared by level of importance and level of degradation and then sorted into one of four management strategies: protection, restoration, conservation, and development.

<table>
<tr><td rowspan="5">IMPORTANCE</td><td>High</td><td colspan="2" rowspan="2">Protection</td><td colspan="2" rowspan="2">Restoration</td></tr>
<tr><td>Med-High</td></tr>
<tr><td>Medium</td><td colspan="2" rowspan="2">Conservation</td><td colspan="2" rowspan="2">Development</td></tr>
<tr><td>Low</td></tr>
<tr><td></td><td>Low</td><td>Medium</td><td>Med-High</td><td>High</td></tr>
<tr><td colspan="5">DEGRADATION</td></tr>
</table>

Figure 1 Watershed Management Matrix, reproduced from Figure 5c (Stanley, S. et. al., 2016)

For the purposes of this plan, importance and degradation are determined qualitatively as described below.

Historic fish use and degree of recovery needed to meet regional fish recovery goals has been used to determine the level of importance of the stream or river (the Y axis of Figure 1). Historic fish use information in the basin is collected from the Lower Columbia Fish Recovery Board (LCFRB) and includes streams in the basin, fish species that were historically present in each, and their quantities. Higher importance of the historic resource is given to waters with a high number of species and high numbers of individuals present in the historic condition. The need for recovery for each fish species is also collected from the LCFRB. The relative need for recovery is based on regional recovery objectives: productive populations, abundant populations, support of multiple life history strategies, and utilization of significant portions of the subbasin. Higher importance is given to waters that require a higher functioning ecosystem to reach the recovery goal.

In order to determine degradation (the X axis of Figure 1), the following factors are considered: urbanization, fish passage barriers, and documented water quality impairments. Urbanization leads to higher imperviousness, which impacts both water flow and water quality in a receiving water. For this assessment, urbanization is calculated as the percentage of developed surfaces in each basin using the National Land Cover Dataset (NLCD) 2019 (see Land Cover Comparison graph for each basin in Section 4). Fish passage barrier data is collected from the Washington Department of Fish and Wildlife's (WDFW) Fish Passage Website. For this analysis, the number of 0-33% passable barriers in the City of Washougal

and downstream until next receiving water are tabulated. These are the most restrictive fish passage barriers and, therefore, prevent or significantly impede anadromous fish from accessing upstream reaches. Finally, water quality impairment information is collected from Ecology's Water Quality Atlas and the Washington State Water Quality Assessment 303(d)/305(b) List database. The presence, severity, and quantity of water quality impairments in the basin are considered and rated qualitatively. Water quality impairments are listed for each basin in Section 4.

Once the levels of importance and degradation for each basin are collected, the basin management strategy is assigned by plotting the results on the Figure 1 matrix. The assigned management strategy is then confirmed by reviewing Clark County's recommended stream health strategies (Clark County, 2010).

The Puget Sound Partnership includes the following list of solutions associated with each of the four management strategies:

- Typical BMPs, habitat improvements, and policies that apply to **all management strategies** include maintaining stream/wetland physical integrity, restoring floodplains and wetlands, restoring riparian zones, and protecting aquifer recharge areas.
- Typical BMPs that apply to the **conservation and the development management strategies** include all of the above plus emphasizing dispersion and on-site infiltration.
- Typical BMPs and policies that apply to the **protection management category** include all of the above plus increasing buffer widths, reducing groundwater withdrawals, reducing interception of shallow groundwater in ditches, and revegetating uplands.
- Typical BMPs that apply to the **restoration management category** include all of the above plus retrofitting structures and roads for greater infiltration, and reconstructing stream reaches or artificial wetlands. (Puget Sound Partnership, 2016).

3. Watershed Inventory

Table 1 lists each receiving water, the watershed area draining to the receiving water, and the fraction of that basin within City limits.

Table 1 Receiving Water Inventory – Watershed Area and Fraction within Washougal

Basin Name	Receiving Waters within Basin	Watershed Area (Acres) [SqMi]	Area inside Washougal (Acres)	Fraction of Watershed within Washougal	Percent of the City Occupied by the Basin
Gibbons	Gibbons Creek; Campen Creek; Steigerwald Lake	7,100 [11]	1,721	24.2%	45%
Washougal	Washougal River	78,880 [123]	1,918	2.4%	50%
Lacamas	Lacamas Creek	42,784 [67]	203	0.5%	5%

4. Receiving Water Conditions Assessment and Relative Conditions Analyses

The purpose of the Receiving Water Assessment is to identify receiving waters that could benefit from stormwater management planning. The outcome of this assessment is a list of candidate basins that includes the information needed to support a prioritization process.

4.1. Gibbons Creek Receiving

The Gibbons Creek Watershed is a largely rural basin in Clark County and water resource inventory area (WRIA) 28. Gibbons Creek drains a total of 11.1 square miles, flowing in a southwesterly direction through southeast Clark County and the City of Washougal before joining the Columbia River east of Washougal.

The main stem of Gibbons Creek flows for approximately eight miles. Roughly 24% of the Gibbons Creek Watershed is located within the City, and it occupies roughly 45% of the City. The stream's entire basin is referred to hereafter as the "Gibbons Creek Watershed." The portion of the stream's drainage basin located within the City limits is referred to hereafter as the "Gibbons Creek Basin."

Flow for the Gibbons Creek Watershed originates northeast of the City limits, near the Clark and Skamania County border. Gibbons Creek has several tributaries, the largest of which is Campen Creek. Gibbons Creek flows through the Steigerwald Lake National Wildlife Refuge before its confluence with the Columbia River. Since the refuge was established, the Columbia River has been cut off by a 5.5 mile levee (Lower Columbia Estuary Partnership, 2022a).

This memorandum presents the highlights of the Receiving Water Assessment for Gibbons Creek. The majority of the assessment is presented in a web map as a series of data layers.

Setting and Flow Characteristics

The total area of the Gibbons Creek Watershed is approximately 7,100 acres (11.1 square miles). The area within the City limits is 1,720 acres (2.7 square miles), or 24% of the watershed. The main streams within the Gibbons Creek Watershed consist of Gibbons Creek (31,730 ft/ 6.0 miles) and its tributary Campen Creek (12,170 ft/ 2.3 miles). The watershed boundary as described by Clark County and in this assessment also includes lands south of Washington State Highway 14 (SR-14) which discharge directly to the Columbia River or to wetlands that are not connected to Gibbons Creek itself. Gibbons Creek flows into the Columbia River east of the City of Washougal. No flow monitoring data was found for Gibbons Creek. However, based on information from the USGS StreamStats application, the 100-year flow is estimated to be 1,040 cubic feet per second (cfs), downstream of the culvert under SR-14.

The stream course downstream of SR-14 was significantly impacted in the 1960s when the Army Corps of Engineers constructed a 5.5-mile long flood control levee along the Columbia River from the Lawton Creek drainage (east of Gibbons) to what is now known as Steamboat Landing Park. In 1992, Gibbons Creek was rerouted west to Port of Camas-Washougal property where a pump system discharged the flows past the levee. This change left a 1.5 mile remnant channel connected to Steigerwald Lake and its wetlands (Ecology, 1996). In recent years, the Steigerwald Floodplain Restoration Project (constructed in 2019-2022) removed portions of the levee along the Columbia River, removed the fish ladder, and constructed two new cross-levees preventing Gibbons Creek from flowing to the Port pump system.

Gibbons Creek was returned to a more natural discharge pathway through the floodplain and then to the Columbia River (Lower Columbia Estuary Partnership, 2022).*

Neither Gibbons nor Campen Creeks are listed as a flow control exempt receiving water based on Appendix I-A of the 2019 Stormwater Management Manual for Western Washington; therefore, the Gibbons Creek Watershed is not flow control exempt.

Washington State Highway 14 (SR-14) and the BNSF Railroad traverse the watershed in an east-west direction, paralleling the Columbia River. The City operates a wastewater treatment plant. The watershed contains a large federal facility, the Steigerwald National Wildlife Refuge (NWR), the William Clark Regional Park (Cottonwood Beach Park), and several city parks.

Slopes are generally very steep in the northern portion of the watershed, with incised valleys that form the tributaries. Slopes remain steep until Gibbons Creek reaches Washington State Highway 14, where slopes decrease significantly (WSDOE, 2013). Elevations range from 1116 ft. at the northern border of the watershed and the lowest elevation is 8 ft at the Columbia River. The highest elevation within the City is 596 ft near the northern border.

The upper areas of Gibbons Creek Watershed outside the City limits, consists of agricultural and rural areas. The southwestern portion of the Gibbons Creek Watershed within the City limits consists of residential, commercial, and industrial areas, including the City's wastewater treatment plant. The southeastern portion of the watershed consists of agricultural and rural areas, as well as lakes and significant wetlands in the Steigerwald National Wildlife Refuge (NWR).

Soils in the watershed include hydrologic soil groups B, C, and D. The northern portion of the watershed (including the northern portion of the City limits) mainly consists of clay soils with a hydrologic soil group C, which is considered poorly to moderately drained soils. Soils near the Evergreen Way and Washington State Highway 14 consist of loam and silt loams, with hydrologic soil group B, which is considered moderately to well drained soils. South of Washington State Highway 14, where the wetlands are located, soils mainly consist of silt loams with a hydrologic soil groups B, C, and C/D, which are considered moderately to well drained soils.

Critical areas within the Gibbons Creek Watershed consist of critical aquifer recharge areas (CARAs), wetland areas, geological hazardous areas (steep slopes), and frequently flooded areas. The CARA are only located within the northern portions of the City limits. Wetlands are located just south of SR-14, concentrated in Steigerwald NWR. Geological hazardous areas with slopes greater than 15% are generally located near Gibbons or Campen Creeks, as well as their tributaries. Frequently flooded areas mainly occur south of SR-14.

The watershed remains nearly 30% forested, while grass covers another 30%, developed surfaces cover about 18%, and remaining land cover is a mix of wetlands, shrub/scrub, and cultivated/open space areas. Areas south of SR-14 and outside City limits have pasture hay, emergent herbaceous wetlands, and cultivated crops. These areas have low imperviousness values. Within the City limits (Gibbons Basin), forest cover is less than 5% while developed surfaces cover more than 60%, and remaining land cover is a mix of wetlands, shrub/scrub, grass, and cultivated/open space areas. Areas within the City limits have open space development, low intensity development (rural areas), and medium/high intensity

* Changes to the Gibbons Creek flow path are so recent that no maps yet show its path.

development (residential, commercial, and industrial). Many neighborhoods in the Campen Creek tributary basin were annexed to the City from unincorporated Clark County and have wider paved rights-of-way than required under City codes. These areas have high imperviousness values.

A comparison of land cover with the watershed and within the City limits can be found in Figure 2 below.

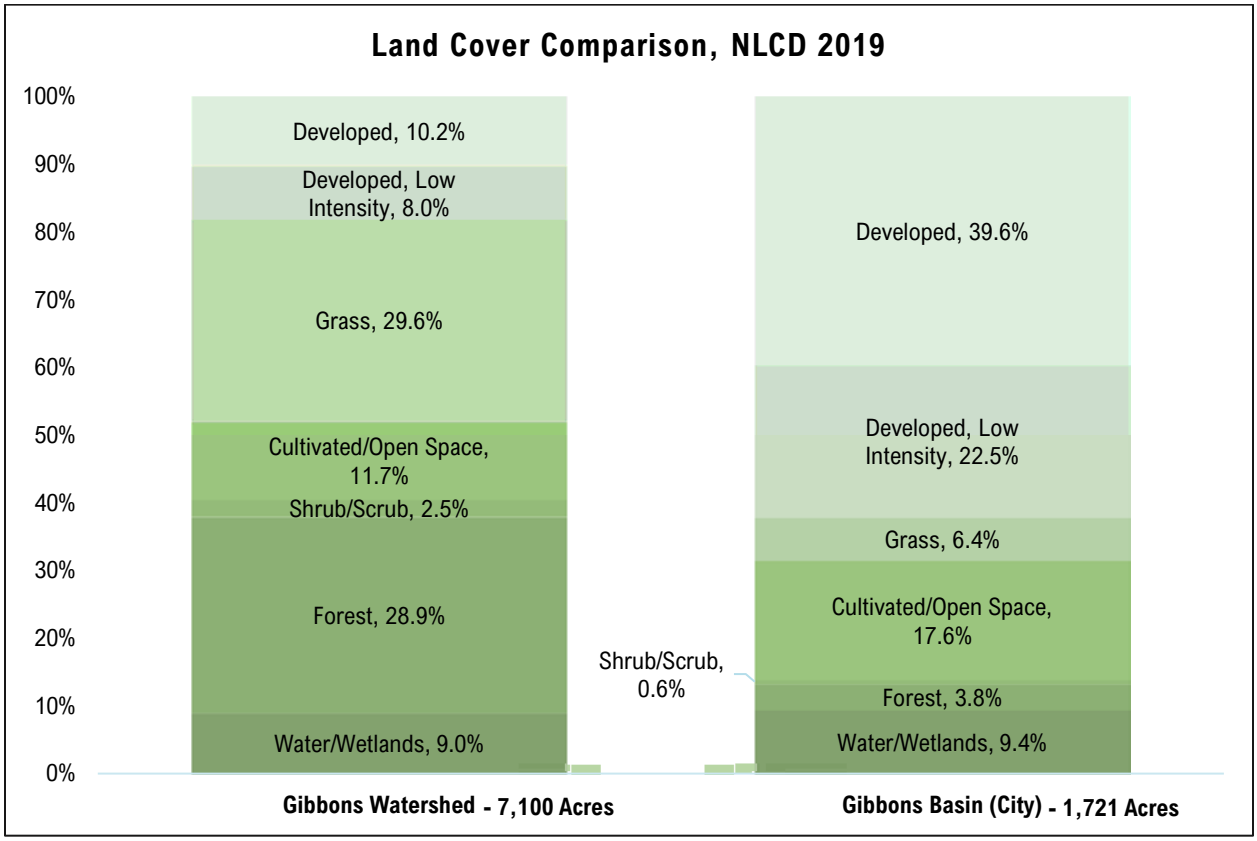


Figure 2 Land Cover Comparison, Gibbons Creek Watershed to Gibbons Creek Basin

Using a different data source (NAIP 2019) and processing technique, impervious surface in the Gibbons Creek Basin is estimated to be 761 acres, or 44% of the basin.

Within City limits, the stormwater infrastructure consists of conveyance pipes, detention ponds water quality facilities, and drywells. In the Campen Creek tributary basin, there are numerous flow control and water quality facilities serving residential subdivisions. Drywells are concentrated in the mid-basin north of Evergreen Way. The storm system outfalls to the tributaries of Gibbons or Campen Creek. Conveyances from industrial areas in the southern portion of the City often discharge directly to wetlands. Table 2 presents stormwater infrastructure counts in Gibbons Creek basin.

Table 2 Gibbons Creek Basin City-Owned and Privately Owned Stormwater Infrastructure

Stormwater Infrastructure	Measure
Outfalls (ea.)	51
Drywells (ea.)	71

Stormwater Infrastructure	Measure
Pipe[1] (ft.)	95,000 (18 miles)
Ditches (ft.)	5,145 (0.97 miles)
Flow control facilities (ea.)	26 of these 56 were installed after 2009 using the latest standards
Water quality facilities (ea.)	29 of these 63 were installed after 2009 using the latest standards

[1] includes all pipe diameters and excludes culverts

Water Quality and Aquatic Habitat

The State of Washington Department of Ecology (Ecology) has set water quality standards for surface waters. These criteria are used to assess the health of the surface water for recreation, drinking water, aquatic life, and other uses. The most stringent designated uses and associated water quality standards are outlined in Table 3 below.

Table 3 Gibbons Creek Designated Uses and Water Quality Standards

Designated Use	Parameter	Water Quality Standard (WAC 173-201A)
Aquatic Life		
Salmonid Spawning, Rearing, and Migration	Temperature	Highest 7-DADMax[1]: 17.5°C (63.5°F)
	DO	Lowest 1-Day Minimum: 8.0 mg/L
	pH	6.5 - 8.5 pH units, with a human-caused variation within the range of less than 0.5 units
	Turbidity	< 5 NTU over background[2] when the background is 50 NTU or less; or a 10% increase in the turbidity when the background turbidity is more than 50 NTU
Recreation		
Primary Contact	Bacteria	Fecal coliform organism levels within an averaging period must not exceed a geometric mean value of 100 CFU or MPN per 100 mL, with not more than 10% of all samples (or any single sample when less than ten sample points exist) obtained within an averaging period exceeding 200 CFU or MPN per 100 mL
		E. coli organism levels within an averaging period must not exceed a geometric mean value of 100 CFU or MPN per 100 mL, with not more than 10% of all samples (or any single sample when less than ten sample points exist) obtained within the averaging period exceeding 320 CFU or MPN per 100 mL

[1] 7-DADMax is the arithmetic average of seven consecutive measures of daily maximum temperatures
[2] Background levels are not established for Gibbons Creek

Numerous reaches of Gibbons Creek do not meet water quality standards and are listed by Ecology in its 2016 water quality assessment.† Gibbons Creek upstream of SE Wooding Road in unincorporated Clark County, has a Category 5 listing for temperature and a Category 4A listing for bacteria. Two tributaries in unincorporated Clark County also have water quality listings, one of which is a Category 4A listing for

† While not included in this analysis, there are other water quality listings in the watershed available through the Washington Department of Ecology.

bacteria. The middle reach of Gibbons Creek, upstream of Campen Creek, has four listings, including a Category 5 listing for temperature. Downstream of Campen Creek, Gibbons Creek has three listings, including a Category 5 listing for temperature and a Category 4A listing for bacteria (Ecology, 2016).

The Gibbons Creek Remnant Channel receives wastewater from industrial facilities and stormwater runoff from other facilities (Ecology, 1996), and it has a Category 4A listing for bacteria among other listings (Ecology, 2016; Ecology, 2022).

Campen Creek also has several water quality listings including a Category 5 listing for temperature, a Category 4A listing for bacteria that is associated with the Gibbons Creek Watershed Bacteria TMDL. An unknown tributary to Campen Creek has a Category 4A listing for bacteria (Ecology, 2016; Ecology, 2022).

The Category 4A listings for bacteria are addressed in the Gibbons Creek Watershed Bacteria TMDL (Ecology, 2016; Ecology, 2022).

USGS's Regional Stream Quality Assessment evaluated Gibbons Creek at Evergreen Highway in 2015. Total nitrogen and total phosphorus levels were concerning, although the rest of the samples indicated Gibbons Creek's health is fair.

Using various measurements of macroinvertebrate health in Gibbons Creek, stream health appears to be good. In 2019, Clark County assessed a B-IBI score of 83.7 (excellent) just downstream of the Campen Creek confluence. In 2015, USGS's Regional Stream Quality Assessment evaluated Gibbons Creek at Evergreen Highway in 2015, and found a macroinvertebrate MMI score of 76.15 (good).

According to the Statewide Integrated Fish Distribution (SWIFD) web map, fish species present in Gibbons Creek or Campen Creek include Fall Chum, Coho Salmon, Rainbow Trout, and Winter Steelhead (Northwest Indian Fisheries Commission, 2022). There is only one fish passage barrier upstream of the City of Washougal at the headwaters of a tributary to Gibbons Creek which is not passable (WDFW, 2022).

Water quality in Gibbons Creek Basin is impacted by pollution-generating land uses, large-scale pollution-generating pervious surfaces, and highways with high traffic volumes.

Zoning in the City of Washougal is used as a proxy for land use. Within City limits, Gibbons Creek Basin is dominated by single family housing in the upper portion of the basin, industrial zoning near the Columbia River, and schools/public facilities zoning that is scattered throughout. Other zoning in the basin includes medium density residential, town center, commercial, rural estate, water, parks, open space, and greenway. For the purposes of this assessment, the following zoning categories have been defined as "pollution-generating": high-density residential, medium-density residential, commercial, industrial, and school/public facilities. Pollution-generating land uses make up 46% of the basin (Figure 3).

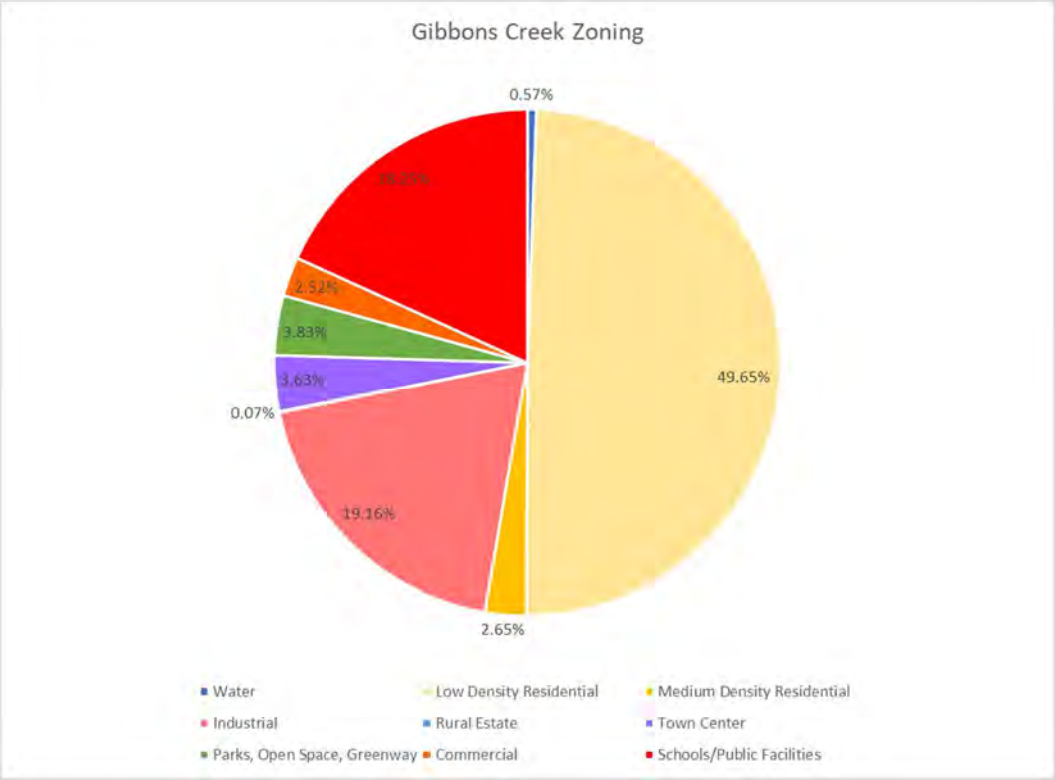


Figure 3 Gibbons Creek Basin Zoning

Several large-scale pollution-generating pervious surfaces are present in the basin, including golf courses, ball fields, parks, and large lawns on private property. Most of these are located within zoning considered pollution-generating and, for the purposes of this assessment, were not counted again. Ten acres of pollution-generating pervious surfaces (0.61% of the basin) are present outside of the pollution-generating zoning.

The roadway in Gibbons Creek Basin with high average daily traffic (ADT) is a portion of SR-14 in the western portion the basin accounting for 4,900 feet of pollution-generating surface‡.

Some pollutant-generating land uses are managed under NPDES Industrial Stormwater General Permits issued to industrial site operators by Department of Ecology. The permit holders are responsible for monitoring, measuring, and reducing stormwater pollution leaving their site. The active Industrial Stormwater General Permits in Gibbons Creek basin are:

- Advanced Drainage Systems Inc (WAR000137); 627 S 37TH ST
- ALLEN BROWN WOODWASTE INC (WAR001811); 3495 TRUMAN RD
- Burlington Environmental LLC Washougal (WAR003079); 625 S 32ND ST
- CALVERT CO INC WASHOUGAL (WAR011365); 3559 S TRUMAN RD
- Corrosion Companies Inc (WAR011162); 3725 S GRANT ST STE 3
- FIBER WEB WASHOUGAL INC (WAR000503); 3720 GRANT ST
- INTECH ENTERPRISES GRANT ST WASHOUGAL (WAR011345); 3825 GRANT ST

‡ High ADT roadway surfaces that overlap with the pollution-generating land uses were subtracted from the area in order to avoid double-counting.

- IP Maintenance Yard (CNE301470); 2197 Index street
- Kemira Chemicals Inc Washougal Plant (WAR001125); 1150 S 35TH ST
- ORBIT INDUSTRIES (WAR001814); 778 S 27TH ST
- Northwest Adhesives (CNE304754); 4325 S Lincoln Street
- Norwesco Inc (WAR304442); 3860 GRANT ST
- PILLER PLASTICS INC GRANT ST (WAR011660); 3925 S GRANT ST
- WASHOUGAL TRANSFER STATION (WAR012022); 4020 S GRANT ST
- FERGUSON INDUSTRIAL PLASTICS (WAR004479); 740 S 28TH ST
- TrueGuard LLC (WA0040029); 725 S 32nd St

Future Development and Improvement Plans

The City expects redevelopment within its Town Center East Village District consisting of higher density housing, auto-oriented retail, and open space. Upcoming redevelopment in the Gibbons Creek Basin will be required to meet current stormwater standards which will mitigate for impervious surfaces by providing flow control and water quality facilities. The City is planning major upgrades to the sewage treatment facility south of SR-14 and a few other capital improvements, including:

- J Street Water Main Installation from 32nd to 34th Street
- 39th Street/Evergreen Way Realignment near the City of Washougal Permit Center
- 32nd Street Underpass Preliminary Design - one component of a significant multi-component economic development and safety project providing improved access to the Port of Camas-Washougal and the growing Washougal Town Center, a much needed grade separated railroad crossing at 32nd Street, new connector streets in the Town Center and road improvements within the Port's industrial park. The underpass will ensure the free-flow of traffic off of SR14 by eliminating the delays at the rail crossing. This project includes a roundabout at 32nd and Main Street, a signal at 32nd Street and Evergreen Way to reduce costs and excavation, a free right turn (that does not stop) from northbound 32nd Street east on Evergreen Way, and a sidewalk and multi-use path to maximize funding support. The 32nd Street underpass also provides for a third BNSF track (which is a required request by the BNSF)
- Hartwood Bridge to install a new bridge over Campen Creek and replace existing abutments

Stormwater Retrofits and Restoration Projects in the Basin

- The collaborative Steigerwald Reconnection Project recently reconnected 965 acres of Columbia River floodplain, reducing flood risk from Gibbons Creek, improving habitat for fish and wildlife, and creating new trails for recreation at the refuge.
- The Lower Columbia Estuary Partnership collaborated with the City to select a stormwater retrofit and restoration site in the Gibbons Creek Basin, focusing particularly on the Campen Creek tributary drainage. The site, currently a ditch in the right-of-way along Washougal High School's parking lot, plans to provide treatment and flow control for the entire South parking lot.
- 32nd Street will be widened; however, cost barriers may prevent additional stormwater management projects from being included

Environmental Justice

To show the relative environmental health disparity of the Gibbons Creek basin, an area-weighted average of the combined index scores of 19 factors from 4 census tracts was calculated. Overall, the environmental health disparities indices in the basin are between 3 and 9, which is low to high. The area-weighted average of the combined index scores for Gibbons Creek basin is 5.7. This indicates that the community in the Gibbons Creek basin ranks moderately high according to the risk from environmental factors that influence health outcomes.

Relative Conditions Assessment

The relative conditions assessment includes an assessment of stormwater management influence (SMI) as well as an assessment of historic conditions and current degradation to inform the selection of a basin management strategy.

Stormwater Management Influence

The influence of the City's land uses and stormwater system (Stormwater Management Influence (SMI)) on Gibbons Creek is estimated qualitatively using the following factors and findings (Table 4). The analysis relies on selected elements that have been described above in the Receiving Water Assessment. The assessment includes influence on both hydrology and water quality and is relative to other basins in the City. Factors are listed in descending order of those that most describe the City's influence on receiving water conditions. The percentage of the watershed within the City limits is included in both the hydrology and water quality assessments.

Table 4 SMI Assessments for Gibbons Creek

SMI Parameter	Assessment Theory	Gibbons Creek Basin Characteristics	Assessment
Hydrology			
Flow Control Exempt	A flow control exempt waterbody has a high volume of flow; therefore, the City can have little influence on its hydrology. Flow control exempt receiving waters receive a low score and non-flow control exempt receiving waters receive a high score.	Gibbons Creek is not flow control exempt	High
Percent of Watershed in City Limits	This factor is a relative assessment between watersheds that indicates the amount of the basin that falls within the City limits. A higher percentage within the City results in a higher score.	24% of the watershed is in the City	High
Location of City within Watershed	The location of the City in the watershed dictates the influence the City can have on hydrology. A City at the headwaters has high influence and receives a high score while a City near the mouth has a low influence and receives a low score.	The City is located at the lower reaches of Gibbons Creek while nearly the entire Campen Creek tributary, including most of its headwaters, is within the City	Medium
Impervious Surfaces	This factor is a relative assessment between watersheds, where the basin with the higher percentage of imperviousness will receive the higher score.	761 of 1,721 acres, or 44%	High

SMI Parameter	Assessment Theory	Gibbons Creek Basin Characteristics	Assessment
Density of Flow Control Facilities and Drywells Per Acre of Developed Surfaces	This indicates what level of the developed surfaces in the basin is being managed by flow control facilities. A low density of flow control facilities will receive a high score and a high density of flow control facilities will receive a low score relative to other basins.	56 flow control facilities plus 71 drywells (127) and 682 acres developed surfaces, or 0.186 facilities/acre	Low
Influence on Hydrology			**High**
Water Quality			
Percent of Watershed in City Limits	This factor is a relative assessment between watersheds that indicates the amount of the basin that falls within the City limits. A higher percentage within the City results in a higher score.	24% of the watershed is in the City	High
Pollution-Generating Land Use	This factor is a relative assessment between watersheds of pollution-generating land use in the basin within City limits. A high percent of pollution-generating land use in the basin will receive a high score and a low percentage of pollution-generating land use in the basin will receive a low score.	790 of 1,721 acres, or 46%	High
Roadways with High Traffic Volumes	This factor is a relative assessment of high traffic volumes in the basin within City limits. A high score is assigned to a basin with a higher length of roadways with a high AADT of 7,500 or greater and a low score is assigned to a basin with a low number of roadways with a high AADT of 7,500 or greater relative to other basins. Only segments that do not overlap pollution-generating land uses are counted.	4,908 linear feet (Estimated width of SR-14 is 22 feet per lane for an area of 107,976 square feet)	Medium
Large Pollution-Generating Pervious Surfaces	This factor is a relative assessment of large pollution-generating pervious surfaces. A high score is assigned to a basin with a large area of large pollution-generating pervious surfaces and a low score is assigned to a basin with a small area of large pollution-generating pervious surfaces relative to other basins. Only those that do not overlap pollution-generating land uses are counted.	36 of 1,721 acres, or 2.1%	High

SMI Parameter	Assessment Theory	Gibbons Creek Basin Characteristics	Assessment
Density of Water Quality Facilities Per Acre of Pollution-Generating Land Use and Large Pervious Surfaces	This indicates what level of the pollution-generating land use and large pervious surfaces in the basin is being managed by water quality facilities. A high score is assigned to a basin with a lower density of water quality facilities per area of pollution-generating land uses, and a low score is assigned to a basin with a higher density of water quality facilities per area of pollution-generating land uses relative to other basins.	63 water quality facilities and 826 acres of pollution-generating land use plus large pollution-generating pervious surfaces, or 0.076 facilities/acre	Medium
Influence on Water Quality			**High**

Basin Management Strategy

The basin management strategy for Gibbons Creek has been established using several factors described in Table 5.

Table 5 Factors Used to Select a Basin Management Strategy for Gibbons Creek Basin

		Gibbons Creek
Importance	**Historic Fish Use**	High
	Explanation	The Lower Gorge Tributaries are part of the Columbia Lower Subbasin as defined by the NPPC (Figure O1). The primary streams are Gibbons Creek, Lawton Creek, Duncan Creek, Hardy Creek, and Hamilton Creek. These streams historically supported abundant winter steelhead, chum, coho, and fall chinook. (LCFRB, Vol. II - Ch. O, Lower Columbia Gorge Tribs, p. 4)
	Need For Recovery	High
	Explanation	Lower Gorge Tributaries winter steelhead and coho will need to be restored to a high level of viability, chum to a very high level of viability, and fall Chinook to a medium level of viability to meet regional recovery objectives. This means that the populations are productive, abundant, exhibit multiple life history strategies, and utilize significant portions of the subbasin. (LCFRB, Vol. II - Ch. O, Lower Columbia Gorge Tribs, p. 4-5)
Degradation	**Urbanization**	High
	Explanation	Developed surfaces make up 39.6% of the land cover in the Gibbons Creek Basin.
	Fish Passage Barriers	Low
	Explanation	There are no 0-33% passable barriers in the City and downstream until next receiving water.
	Water Quality Impairments	High
	Explanation	There are 6 Category 4A and 3 Category 5 water quality impairments in the receiving water and tributaries within City limits or downstream of Washougal.

Given the high importance and high degradation of the Gibbons Creek Basin, the selected basin management strategy is restoration.

The restoration management goal requires the highest level of investment for returning an important and degraded watershed to a more functional system. The Puget Sound Partnership includes the following list of solutions associated with each of the four management strategies:

- Typical BMPs and habitat improvements and policies that apply to **all management strategies** include maintaining stream/wetland physical integrity, restoring floodplains and wetlands, restoring riparian zones, and protecting aquifer recharge areas.
- Typical BMPs that apply to the **conservation and the development management strategies** include all of the above plus emphasizing dispersion and on-site infiltration.
- Typical BMPs and policies that apply to the **protection management category** include all of the above plus increasing buffer widths, reducing groundwater withdrawals, reducing interception of shallow groundwater in ditches, and revegetating uplands.
- Typical BMPs that apply to the **restoration management category** include all of the above plus retrofitting structures and roads for greater infiltration, and reconstructing stream reaches or artificial wetlands. (Puget Sound Partnership, 2016).

Clark County assessed Gibbons Creek in its 2010 Clark Count Stream Health Report and recommended the following actions for improving the health of receiving waters in the Gibbons Basin: stream health strategies include conserving agricultural lands and promoting healthy practices; working with property owners to eliminate pollution sources; increasing infiltration and retention of stormwater runoff in developed areas; and restoring riparian vegetation in lower watershed (particularly along Steigerwald channel) (Clark County, 2010)

Conclusion

Nearly 25% of the Gibbons Creek Watershed is within City limits, and the City has a relatively high influence over both hydrology and water quality compared to other receiving waters in its jurisdiction. The Gibbons Creek Watershed is important for fish recovery and is degraded, as evidenced by several water quality impairments and a TMDL for bacteria. Several other agencies have recently or are planning to focus efforts to improving conditions in Gibbons Creek, Steigerwald Lake, and Campen Creek.

Therefore, the Gibbons Creek Basin is a likely candidate for Stormwater Management Action Planning.

4.2. Washougal River

The Washougal River Watershed is a largely rural basin in Skamania and Clark Counties and WRIA 28. Washougal River drains a total of 123 square miles, flowing in a southwesterly direction through southwest Skamania County, southeast Clark County, and the City of Washougal before joining the Columbia River in Camas, Washington.

The main stem of Washougal River flows for approximately 47 miles from Lookout Mountain in the Gifford Pinchot National Forest. Roughly 2.4% of the Washougal River Watershed is located within the City of Washougal, and it occupies roughly 50% of the City's area. The river's entire basin is referred to hereafter as the "Washougal River Watershed." The portion of the river's drainage basin located within the City limits is referred to hereafter as the "Washougal River Basin."

Flow for the Washougal River Watershed originates northeast of the City limits, in southwestern Skamania County. Washougal River has several tributaries, the largest of which are the West Fork Washougal River, Little Washougal River, and Lacamas Creek.

This memorandum presents the highlights of the Receiving Water Assessment for Washougal River. The majority of the assessment is presented in a web map as a series of data layers.

Setting and Flow Characteristics

The total area of the Washougal River Watershed is approximately 78,880 acres (123.2 square miles). The area of the Washougal River Watershed that is within the City limits is 1,918 acres (3.0 square miles), or 2.4% of the watershed. The main tributaries are the Little Washougal River (50,500 ft/9.56 miles), which enters from the north just 0.6 miles northeast of City limits at SE Blair Road, Cougar Creek, which enters from the north at N. Bon Road in Clark County, the West Fork Washougal River (59,400 ft/ 11.25 miles), which enters from the north between Skye and Northfork Roads in Skamania County, and Lacamas Creek (88,705 ft/16.8 miles), which enters from the north in Camas. Within City limits, five small unnamed tributaries flow south from the bluffs south of SE 30th Street to the Washougal River. Each of these tributaries drains a basin of less than one square mile and is highly modified, flowing through a combination of piped and open channel segments. The Washougal River flows into the Columbia River in Camas, just west of Washougal.

A stream gage is located on the main stem approximately 3.7 miles upstream of the confluence with the Little Washougal River. Based on the results from Clark County Flood Insurance Study, the 100-year flow is estimated to be 30,138 cfs at the stream gage and 56,672 cfs at the mouth of the Washougal River (FEMA, 2018).

The Washougal River is not listed as a flow control exempt receiving water based on Appendix I-A of the *2019 Stormwater Management Manual for Western Washington*; therefore, the Washougal River Watershed is not flow control exempt. However, its estimated 100-year flow at the mouth is higher than the estimated flow at the mouth of the East Fork Lewis River (26,900 cfs (FEMA, 2018) in Clark and Cowlitz counties, which has a similar watershed area and is listed as a flow control exempt water body.

Washington State Highway 14 (SR-14) and the BNSF Railroad traverse the watershed in an east-west direction, paralleling the Columbia River. The Washougal River Road follows the mainstem through the City, into Clark County, past Washougal River State Park, and into Skamania County until it reaches state Department of Natural Resources (DNR) lands in the upper watershed. The Port of Camas-Washougal is a significant landholder in the City and neighboring City of Camas.

Slopes are generally very steep in the upper watershed, with steep forested valleys that form hundreds of tributaries. Elevations range from 3790 ft. at the northern border of the watershed to 10 ft. at the Columbia River. Within City limits, slopes are steep north of the river and flatten south of the river. The highest elevation within the City is 620 ft just south of SE 30th Street.

Soils in the watershed include hydrologic soil groups B and C. Soils in the northeastern watershed in unincorporated Skamania and Clark counties includes clay loam and gravelly loam soils with a hydrologic soil group B. Soils just north of the City limits include clay loams with hydrologic soil group C. Within City limits, soils north of the river are clay loams, with hydrologic soil group C, and soils south of the river are clay loams and gravelly loams with a hydrologic soil group B. All major soil groups noted here are considered well drained.

Critical areas within the Washougal River Watershed include critical aquifer recharge areas (CARAs), wetlands, geological hazard areas (steep slopes), and frequently flooded areas. The CARAs are located within City limits, in close proximity to the Washougal River and areas south of the Washougal River.

Wetlands are located in close proximity to the Washougal River and along the Columbia River. Geological hazard areas with slopes greater than 15% are generally located near the Washougal River, as well as its tributaries. The geological hazard areas are more frequent upstream of the Washougal River. Frequently flooded areas mainly occur south of SR-14 and in areas in close proximity to the Washougal River. Critical areas in Skamania County were not assessed.

According to the National Land Cover Dataset (NLCD) 2019, the watershed remains nearly 70% forested, while grass covers another 10%, developed surfaces cover about 4%, and remaining land cover is a mix of wetlands, shrub/scrub, and cultivated/open space areas. Areas north of the City limits have pasture/hay, forests, shrub/scrub and grasslands. These areas have low imperviousness values. Within the City limits (Washougal River Basin), forest cover is less than 10% while developed surfaces cover more than 60%, and remaining land cover is a mix of wetlands, shrub/scrub, grass, and cultivated/open space areas. Areas within the City limits have open space development, low intensity development (rural areas), and medium/high intensity development (residential, commercial, and industrial). These areas have high imperviousness values. (NLCD, 2019)

A comparison of land cover with the watershed and within the City limits can be found in Figure 4 below.

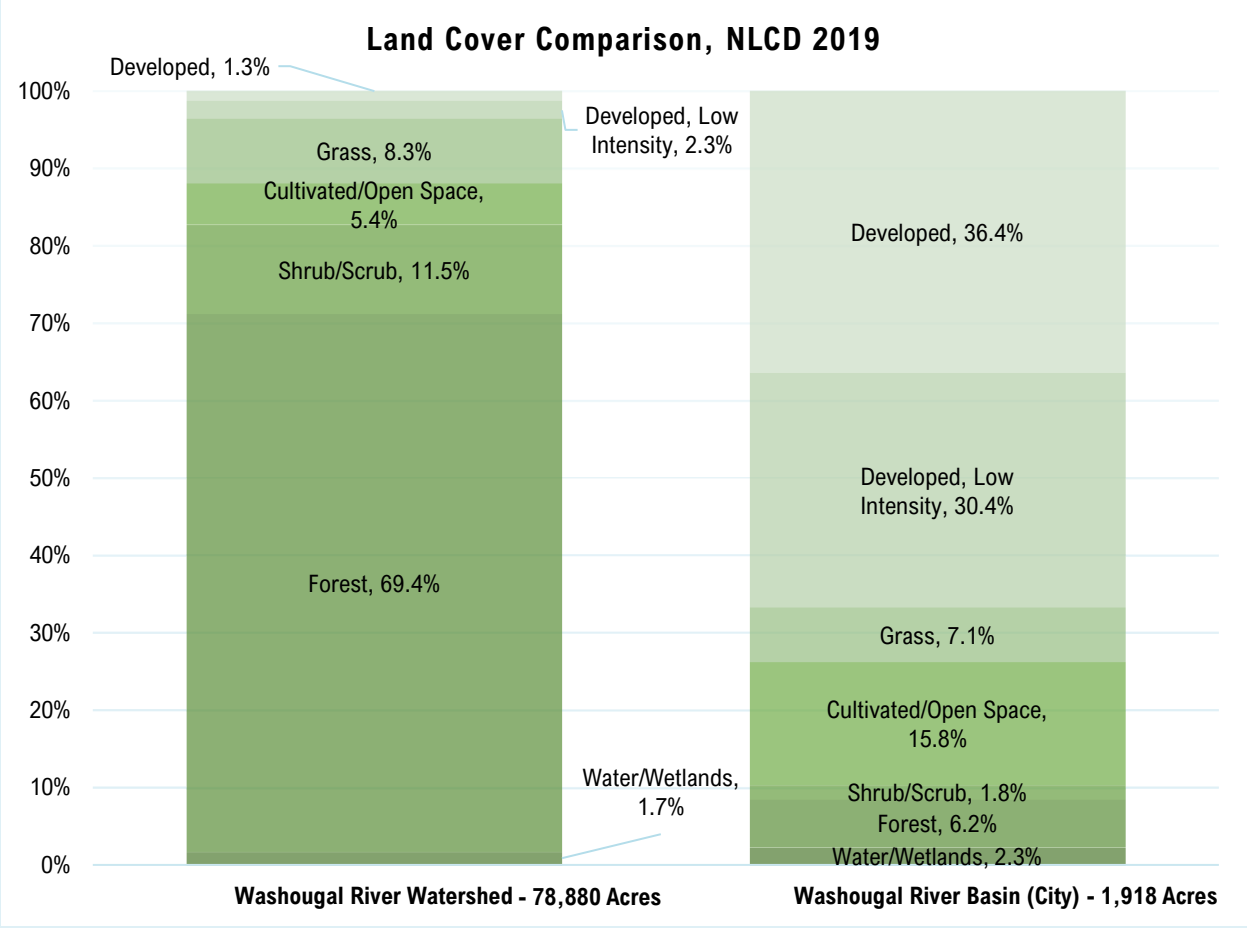


Figure 4 Land Cover Comparison, Washougal River Watershed to Washougal River Basin

Using a different data source (NAIP 2019) and processing technique, impervious surface in the Washougal River Basin is estimated to be 852 acres, or 44% of the basin.

Within City limits, the stormwater infrastructure consists of conveyance pipes, detention ponds, water quality facilities, and drywells. Drywells are concentrated in the southern portion of the City limits, south of the Washougal River. The storm system outfalls to the Washougal River. Table 6 presents stormwater infrastructure counts in the Washougal River Basin.

Table 6 Washougal River Basin City-Owned and Privately Owned Stormwater Infrastructure

Stormwater Infrastructure	Measure
Outfalls (ea.)	38
Drywells (ea.)	142
Pipe[1] (ft.)	110,770 (21 miles)
Ditches (ft.)	12,481 (2.36 miles)
Flow control facilities (ea.)	33 of these 202 were installed after 2009 using the latest standards
Water quality facilities (ea.)	43 of these 76 were installed after 2009 using the latest standards

[1] includes all pipe diameters and excludes culverts

Water Quality and Aquatic Habitat

The State of Washington Department of Ecology (Ecology) has set water quality standards for surface waters. These criteria are used to assess the health of the surface water for recreation, drinking water, aquatic life, and other uses. The most stringent designated uses and associated water quality standards are outlined in Table 7 below.

Table 7 Washougal River Designated Uses and Water Quality Standards

Receiving Water	Designated Use	Parameter	Water Quality Standard (WAC 173-201A)
Washougal River: Downstream from latitude 45.5883, longitude -122.3711 at NE 3rd Ave	**Aquatic Life**		
	Salmonid Spawning, Rearing, and Migration	Temperature	Highest 7-DADMax[1]: 17.5°C (63.5°F)
		DO	Lowest 1-Day Minimum: 8.0 mg/L
		pH	6.5 - 8.5 pH units, with a human-caused variation within the range of less than 0.5 units
		Turbidity	< 5 NTU over background[2] when the background is 50 NTU or less; or a 10% increase in the turbidity when the background turbidity is more than 50 NTU
	Recreation		
	Primary Contact	Bacteria	Fecal coliform organism levels within an averaging period must not exceed a geometric mean value of 100 CFU or MPN per 100 mL, with not more than 10% of all samples (or any single sample when less than ten sample points exist) obtained within an averaging period exceeding 200 CFU or MPN per 100 mL

Receiving Water	Designated Use	Parameter	Water Quality Standard (WAC 173-201A)
			E. coli organism levels within an averaging period must not exceed a geometric mean value of 100 CFU or MPN per 100 mL, with not more than 10% of all samples (or any single sample when less than ten sample points exist) obtained within the averaging period exceeding 320 CFU or MPN per 100 mL
Washougal River: Upstream from latitude 45.5883, longitude -122.3711 at NE 3rd Ave, including tributaries	**Aquatic Life**		
	Salmonid Spawning, Rearing, and Migration	Temperature	Highest 7-DADMax1: 16°C (60.8°F)
		Supplemental Spawning	Salmon and trout (13°C (55.4 °F)) from 2/15 to 6/15
		DO	Lowest 1-Day Minimum: 9.5 mg/L
		pH	6.5 - 8.5 pH units, with a human-caused variation within the range of less than 0.2 units
		Turbidity	< 5 NTU over background[2] when the background is 50 NTU or less; or a 10% increase in the turbidity when the background turbidity is more than 50 NTU
	Recreation		
	Primary Contact	Bacteria	Fecal coliform organism levels within an averaging period must not exceed a geometric mean value of 100 CFU or MPN per 100 mL, with not more than 10% of all samples (or any single sample when less than ten sample points exist) obtained within an averaging period exceeding 200 CFU or MPN per 100 mL
			E. coli organism levels within an averaging period must not exceed a geometric mean value of 100 CFU or MPN per 100 mL, with not more than 10% of all samples (or any single sample when less than ten sample points exist) obtained within the averaging period exceeding 320 CFU or MPN per 100 mL

[1] 7-DADMax is the arithmetic average of seven consecutive measures of daily maximum temperatures
[2] Background levels are not established for Washougal River

Numerous reaches of Washougal River do not meet water quality standards and are listed by Ecology in its 2016 water quality assessment.§ Outside of City limits and upstream of the Little Washougal River confluence, Washougal River has a Category 5 listing for temperature. Slightly upstream of the Clark-Skamania County border, there are two listings for Washougal River, one of which is a Category 5 listing for bacteria. Stebbins Creek is a tributary to the Washougal River near the headwaters. An unnamed tributary to Stebbins Creek has a Category 5 listing for temperature (Ecology, 2016).

§ While not included in this analysis, there are other water quality listings in the watershed available through the Washington Department of Ecology.

Using measurements of macroinvertebrate health in the upper Washougal River Watershed, stream health appears to be good. In 2020, the Washington State Department of Ecology assessed a B-IBI score of 79.8 (good) approximately six miles from the headwaters of Washougal River in Skamania County. In 2019, Clark County assessed stream health at the mouth of Cougar Creek, a tributary to Washougal River north of Washougal City limits. The B-IBI score was assessed to be 67.3 (good).

According to the Statewide Integrated Fish Distribution (SWIFD) web map, fish species present in Washougal River include fall chum, fall Chinook salmon, coho salmon, rainbow trout, summer steelhead, winter steelhead, coastal cutthroat trout, eastern brook trout, largemouth bass, mountain whitefish, and Native char/Dolly Varden/bull trout (Northwest Indian Fisheries Commission, 2022). According to WDFW, there are 12 fish passage barriers on the Washougal River, both man-made and natural. The barriers on the main stem of the Washougal River are upstream of Washougal. There are 80 additional fish passage barriers on various tributaries in the watershed that range from 0% passable to 99% passable (WDFW, 2022).

Water quality in the Washougal River Basin is impacted by pollution-generating land uses, large-scale pollution-generating pervious surfaces, and highways with high traffic volumes.

Zoning in the City of Washougal is used as a proxy for land use. Within City limits, Washougal River Basin is dominated by single family housing in the upper portion of the basin, industrial zoning near the Columbia River, commercial and town center zoning near the center of the basin, and schools/public facilities zoning that is scattered throughout. Other zoning in the basin includes urban high density residential, water, parks, and open space. For the purposes of this assessment, the following zoning categories have been defined as “pollution-generating”: high-density residential, medium-density residential, commercial, industrial, and school/public facilities. Pollution-generating land uses make up 30% of the basin (Figure 5).

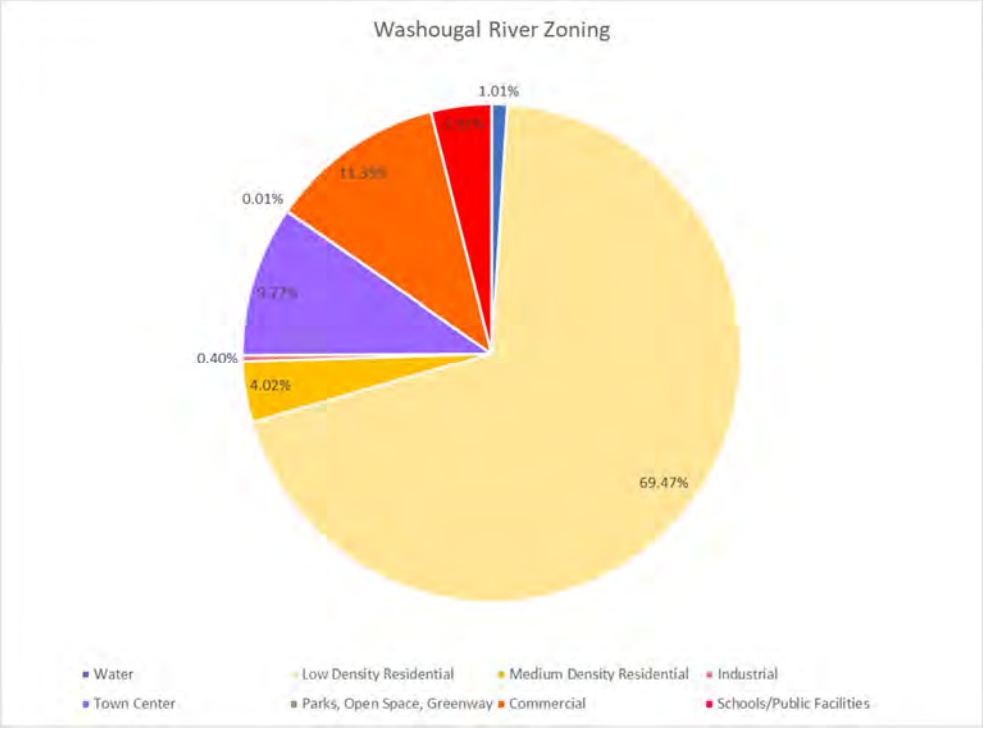


Figure 5 Washougal River Basin Zoning

Several large-scale pollution-generating pervious surfaces are present in the basin, including ball fields, parks, and large lawns on private property. Most of these are located within zoning considered pollution-generating and, for the purposes of this assessment, were not counted again. 27 acres of pollution-generating pervious surfaces (1.41% of the basin) are present outside of the pollution-generating zoning.

The roadway in Washougal River Basin with high average daily traffic (ADT) is SR-14 in the western portion of the basin. Each direction of travel is a total 9,527.5 feet in length and an estimate average width of 22 feet was applied to each direction of travel for SR-14. Therefore, the high ADT roadways in the basin account for 419,210 square feet of pollution-generating surface.

Some pollutant-generating land uses are managed under NPDES Industrial Stormwater General Permits issued by Department of Ecology. These permit holders are responsible for monitoring, measuring, and reducing stormwater pollution leaving their site. The active Industrial Stormwater General Permit in Washougal River basin is:

- PENDLETON WOOL MILL (WAR005577); 2 Pendleton Way

Future Development and Improvement Plans

The City expects redevelopment within its Town Center East Village District consisting of higher density housing, auto-oriented retail, and open space. The Port of Camas-Washougal is investing in significant development on the Columbia River waterfront including commercial, retail, mixed use, residential, and community spaces. Upcoming redevelopment in the Washington River Basin will be required to meet current stormwater standards which will mitigate for impervious surfaces by providing flow control and water quality facilities. The City is planning a few capital improvements including:

- Wastewater Pump Station #1 Relocation
- Wastewater Pump Station #2, #4, #5, and #8 Upgrades
- East County Family Resource Center Maintenance and Repair Project
- Schmid Family Park on the river may be developed in the near future, however, cost barriers may prevent the project from moving forward

Stormwater Retrofits and Restoration Projects in the Basin

- No upcoming or recent retrofits or restoration projects were identified in the City limits.
- There are several stormwater projects in the Washougal River Basin on the City's stormwater repairs and replacements list. If this basin is prioritized, these projects and other localized drainage concerns would be incorporated into future water quality and water flow capital improvement projects (CIPs) in the SMAP where possible.

Environmental Justice

To show the relative environmental health disparity of the Washougal River basin, an area-weighted average of the combined index scores of 19 factors from 6 census tracts was calculated. Overall, the environmental health disparities indices in the basin are between 3 and 9, which is low to high. The area-weighted average of the combined index scores for Gibbons Creek basin is 5.4. This indicates that the community in the Washougal River basin ranks moderate according to the risk from environmental factors that influence health outcomes.

Relative Conditions Assessment

The relative conditions assessment includes an assessment of stormwater management influence (SMI) as well as an assessment of historic conditions and current degradation to inform the selection of a basin management strategy.

Stormwater Management Influence

The influence of the City's land uses and stormwater system (Stormwater Management Influence (SMI)) on Washougal River is estimated qualitatively using the following factors and findings. The analysis relies on selected elements that have been described above in the Receiving Water Assessment. The assessment includes influence on both hydrology and water quality and is relative to other basins in the City (Table 8). Factors are listed in descending order of those that most describe the City's influence on receiving water conditions. The percentage of the watershed within the City limits is included in both the hydrology and water quality assessments.

Table 8 SMI Assessment for Washougal River

SMI Parameter	Assessment Theory	Washougal River Basin Characteristics	Assessment
Hydrology			
Flow Control Exempt	A flow control exempt waterbody has a high volume of flow; therefore, the City can have little influence on its hydrology. Flow control exempt receiving waters receive a low score and non-flow control exempt receiving waters receive a higher score.	Washougal River is not flow control exempt; however, its estimated 100-year discharge is greater than flow control exempt rivers with a similar watershed area	Medium
Percent of Watershed in City Limits	This factor is a relative assessment between watersheds that indicates the amount of the basin that falls within the City limits. A higher percentage within the City results in a higher score.	2.4% of the watershed is in the City	Low
Location of City within Watershed	The location of the City in the watershed dictates the influence the City can have on hydrology. A City at the headwaters has high influence and receives a high score while a City near the mouth has a low influence and receives a low score.	The City is located at the lower reaches of Washougal River	Low
Impervious Surfaces	This factor is a relative assessment between watersheds, where the basin with the higher percentage of imperviousness within City limits will receive the higher score.	852 of 1,918 acres, or 44%	High
Density of Flow Control Facilities and Drywells Per Acre of Developed Surfaces	This factor is a relative assessment that indicates what level of the developed surfaces in the basin within City limits is being managed by flow control facilities. A low density of flow control facilities will receive a high score and a high density of flow control facilities will receive a low score relative to other basins.	202 flow control facilities plus 142 drywells (344) and 698 acres developed surfaces, or 0.493 facilities/acre	Medium
Influence on Hydrology			**Low**

SMI Parameter	Assessment Theory	Washougal River Basin Characteristics	Assessment
Water Quality			
Percent of Watershed in City Limits	This factor is a relative assessment between watersheds that indicates the amount of the basin that falls within the City limits. A higher percentage within the City results in a higher score.	2.4% of the watershed is in the City	Low
Pollution-Generating Land Use	This factor is a relative assessment between watersheds of pollution-generating land use in the basin within City limits. A high percent of pollution-generating land use in the basin will receive a high score and a low percentage of pollution-generating land use in the basin will receive a low score.	567 of 1,918 acres, or 30%	Medium
Roadways with High Traffic Volumes	This factor is a relative assessment of high traffic volumes in the basin within City limits. A high score is assigned to a basin with a higher length of roadways with a high AADT of 7,500 or greater and a low score is assigned to a basin with a low number of roadways with a high AADT of 7,500 or greater relative to other basins. Only segments that do not overlap pollution-generating land uses are counted.	419,210 square feet	High
Large Pollution-Generating Pervious Surfaces	This factor is a relative assessment of large pollution-generating pervious surfaces. A high score is assigned to a basin with a large area of large pollution-generating pervious surfaces and a low score is assigned to a basin with a small area of large pollution-generating pervious surfaces relative to other basins. Only those that do not overlap pollution-generating land uses are counted.	45 of 1,918 acres, or 2.3%	High
Density of Water Quality Facilities Per Acre of Pollution-Generating Land Use and Large Pervious Surfaces	This factor is a relative assessment that indicates what level of the pollution-generating land use and large pervious surfaces in the basin within City limits is being managed by water quality facilities. A high score is assigned to a basin with a low density of water quality facilities per area of pollution-generating land uses, and a low score is assigned to a basin with a higher density of water quality facilities per area of pollution-generating land uses relative to other basins.	76 water quality facilities and 567 acres of pollution-generating land use plus large pollution-generating pervious surfaces, or 0.134 facilities/acre	Low
Influence on Water Quality			**Medium**

Basin Management Strategy

The basin management strategy for Washougal River has been selected using several factors described in Table 9.

Table 9 Factors Used to Select a Basin Management Strategy for Washougal River Basin

Washougal River		
Importance	Historic Fish Use	High
	Explanation	The Washougal River is one of twelve major Northwest Power and Conservation Council (NPCC) subbasins in the Washington portion of the Lower Columbia Region. The subbasin historically supported thousands of fall Chinook, chum, coho, and summer and winter steelhead. (LCFRB, Vol. II - Ch. N, North Washougal Subbasins, p. 4)
	Need For Recovery	High
	Explanation	Today, numbers of naturally spawning salmon and steelhead have plummeted to levels far below historical numbers. Chinook, coho, chum, and steelhead have been listed as threatened under the Endangered Species Act. Washougal River fall Chinook, and chum, will need to be restored to a high level of viability and coho and steelhead will need to be restored to a medium viability level to meet regional recovery objectives. (LCFRB, Vol. II - Ch. N, North Washougal Subbasins, p. 4)
Degradation	Urbanization	Medium
	Explanation	Developed surfaces make up 36.4% of the land cover in the Washougal River Basin.
	Fish Passage Barriers	Low
	Explanation	There are no 0-33% passable barriers in the City or downstream until next receiving water.
	Water Quality Impairments	Low
	Explanation	There are no Category 4A or 5 water quality impairments in the receiving water and tributaries within City limits or downstream of Washougal.

Given the high importance and moderate degradation of the Washougal River Basin, the selected basin management strategy is protection.

The protection management goal requires some of the highest levels of investment for maintaining a functional system. The Puget Sound Partnership includes the following list of solutions associated with each of the four management strategies:

- Typical BMPs, habitat improvements, and policies that apply to **all management strategies** include maintaining stream/wetland physical integrity, restoring floodplains and wetlands, restoring riparian zones, and protecting aquifer recharge areas.
- Typical BMPs that apply to the **conservation and the development management strategies** include all of the above plus emphasizing dispersion and on-site infiltration.
- Typical BMPs and policies that apply to the **protection management category** include all of the above plus increasing buffer widths, reducing groundwater withdrawals, reducing interception of shallow groundwater in ditches, and revegetating uplands.

- Typical BMPs that apply to the **restoration management category** include all of the above plus retrofitting structures and roads for greater infiltration, and reconstructing stream reaches or artificial wetlands. (Puget Sound Partnership, 2016).

Clark County assessed the Washougal River in its 2010 Clark County Stream Health Report and recommended the following actions for improving the health of receiving waters in the Washougal River Basin: stream health strategies include conserving agricultural lands and promoting healthy practices; implementing development regulations to minimize impacts, particularly from clearing and grading; protecting and restoring stream channels and riparian forest in tributary streams; and minimizing the impact of surface and groundwater withdrawals in tributary streams (Clark County, 2010).

Conclusion

Only 2.4% of the Washougal River Watershed is within City limits, and the City is located in the lower watershed. About 2/3 of the watershed is located in Skamania County, with significant tracts dedicated to agriculture and forestry. Tributaries within City limits each drain less than one square mile and may not be perennial. In addition, much of the City's downtown drains to drywells, thereby avoiding surface outfalls to the river. City of Washougal has a low influence on hydrology and a low or moderate influence on water quality compared to other receiving waters in its jurisdiction. The Washougal River Watershed is important for fish recovery and is moderately degraded, as evidenced by a few water quality impairments. No significant ongoing or future retrofit or restoration efforts were located for the Washougal River Watershed.

The Washougal River Basin may be a candidate for Stormwater Management Action Planning because it makes up 50% of the City's land area. However, the large size of the watershed may limit the City's ability to significantly influence receiving water conditions through stormwater management actions alone.

4.3. Lacamas Creek

The Lacamas Creek Watershed is a largely rural basin in Clark County and WRIA 28. Lacamas Creek drains a total of 67 square miles, flowing in a southeasterly direction from south of the City of Battle Ground through central Clark County and the City of Camas before joining the Washougal River approximately 1.3 miles upstream of the mouth.

The main stem of Lacamas Creek flows for approximately 24 miles. Roughly 0.5% of the Lacamas Creek Watershed is located within the City of Washougal, and it occupies roughly 5% of the City's area. The creek's entire basin is referred to hereafter as the "Lacamas Creek Watershed." The portion of the creek's drainage basin located within the City limits is referred to hereafter as the "Lacamas Creek Basin."

Flow for the Lacamas Creek Watershed originates northwest of the City limits, in central Clark County. Lacamas Creek has several tributaries, the largest of which are Fifth Plain Creek, East Fork Lacamas Creek, and Matney Creek. It flows through the regionally significant Lacamas Lake as well as Round Lake before reaching City of Washougal.

This memorandum presents the highlights of the Receiving Water Assessment for Lacamas Creek. The majority of the assessment is presented in a web map as a series of data layers.

Setting and Flow Characteristics

The total area of the Lacamas Creek Watershed is approximately 42,784 acres (66.9 square miles). The area of the Lacamas Creek Watershed that is within the City limits is 203 acres (0.32 square miles), or

0.5% of the watershed. Approximately, 5,300 acres (8 square miles) is within City of Camas, 1,700 acres (2.7 square miles) is within City of Vancouver, and the remaining area is in unincorporated Clark County.

Lacamas Creek is the main stream in the watershed (126,720 ft/24.0 miles), with numerous significant tributaries. The primary tributaries are Fifth Plain Creek (36,200 ft/ 6.86 miles), which enters Lacamas Creek from the north 7 miles northwest of City limits near the intersection of SR-500 and NE 182nd Avenue, Shanghai Creek (28,740 ft/5.44 miles), which is a tributary to Fifth Plain Creek, Matney Creek (23,670 ft/4.48 miles), North Fork Lacamas Creek (13,835 ft/ 2.62 miles), and East Fork Lacamas Creek (16,620 ft/ 3.14 miles).

Clark County designates the following nine sub-watersheds within the Lacamas Creek Watershed:

- Lacamas Lake
- Dwyer Creek
- Lower Lacamas Creek
- Upper Lacamas Creek
- Matney Creek
- Lower Fifth Plain Creek
- Shanghai Creek
- China Ditch
- Upper Fifth Plain Creek

City of Washougal is located in the Lacamas Lake sub-watershed. Neither Lacamas Creek nor any of its major tributaries flow within City limits. Lacamas Creek flows through the regionally significant Lacamas Lake, Round Lake, and Lacamas Park before passing near the City of Washougal and flowing into the Washougal River in the City of Camas. The levels of both Lacamas Lake and Round Lake are controlled by two dams on Round Lake, which are owned by the City of Camas.

Flows in the Lacamas Creek Watershed are relatively stable and are not flashy (Clark County, 2011). No stream gages were identified along Lacamas Creek. Based on information from the USGS StreamStats application, the 100-year flow is estimated to be 7,330 cfs at the mouth of Lacamas Creek.

Lacamas Creek is not listed as a flow control exempt receiving water based on Appendix I-A of the *2019 Stormwater Management Manual for Western Washington*; however, Lacamas Lake is listed as a flow control exempt receiving water. All areas draining directly to Lacamas Lake are flow control exempt.

The watershed is large with several important roads and highways. SR-500 traverse the watershed in a southeast-northwest direction north and west of City of Washougal. Within or near City limits, public roads include SE Crown Road and SE 23rd Street.

Slopes are generally steep in the upper northeast watershed, with grades ranging from 15%-25% near Lacamas Creek and tributaries while the northwestern watershed near Hockinson is nearly flat, with grades ranging from 0%-5%. Slopes become less steep south of NE 53rd Avenue. The areas near the mouth of Lacamas Creek including Lacamas Park and Lacamas Creek Park are geologically hazardous areas with slopes greater than 25% and have historic and active landslides according to Clark County data. Slopes within the City limits include slopes that are greater than 25%. Elevations range from 2,200 ft. at the northern border of the watershed to 12 ft. at the mouth of Lacamas Creek. The highest elevation within the City is 620 ft just south of SE 23rd Street.

Soils in the watershed include hydrologic soil groups B and C. Soils in the majority of the watershed includes clay loam with hydrologic soil group C. There are some large areas in the western edges of the watershed (near Mill Plain), and areas north of Lacamas Lake that include gravelly loam with hydrological soil group B. Within City limits, there is near an even mixture of clay loams, with hydrologic soil group C, and gravelly loams with a hydrologic soil group B. All major soil groups noted here are considered moderately well drained.

Critical areas within the Lacamas Creek Watershed include, wetlands, geological hazard areas (steep slopes), and frequently flooded areas. Wetlands are located in close proximity to the Lacamas Lake, Lacamas Creek and tributaries to Lacamas Creek. Geological hazard areas with slopes greater than 15% are generally located in the northern portions of the watershed north of NE 53rd Avenue, and in areas near the mouth of Lacamas Creek, that include Lacamas Park and Lacamas Creek Park are areas with slopes greater than 25% and have historic and active landslides. Geological hazard areas also include portions in the City limits include slopes that are great than 15%.

According to the National Land Cover Dataset (NLCD) 2019, the Lacamas Creek watershed remains nearly 33% forested, while grass covers another 25%, developed surfaces cover about 20%, and remaining land cover is a mix of wetlands, shrub/scrub, and cultivated/open space areas.

Areas within unincorporated Clark County are largely pasture/hay, forests, shrub/scrub and grasslands. These areas have low imperviousness values. Medium intensity development is present in and near City of Vancouver at the western border of the watershed. Areas within the City of Camas mainly consist of low and medium intensity developments, pasture/hay, some forested and wetland areas. Within the Washougal City limits (Lacamas Creek Basin), grass cover is 63%, while developed surfaces are 25%, and remaining land cover is cultivated/open space areas, forests, and shrub/scrub (NLCD, 2019). A comparison of land cover with the watershed and within the City limits can be found in Figure 6 below.

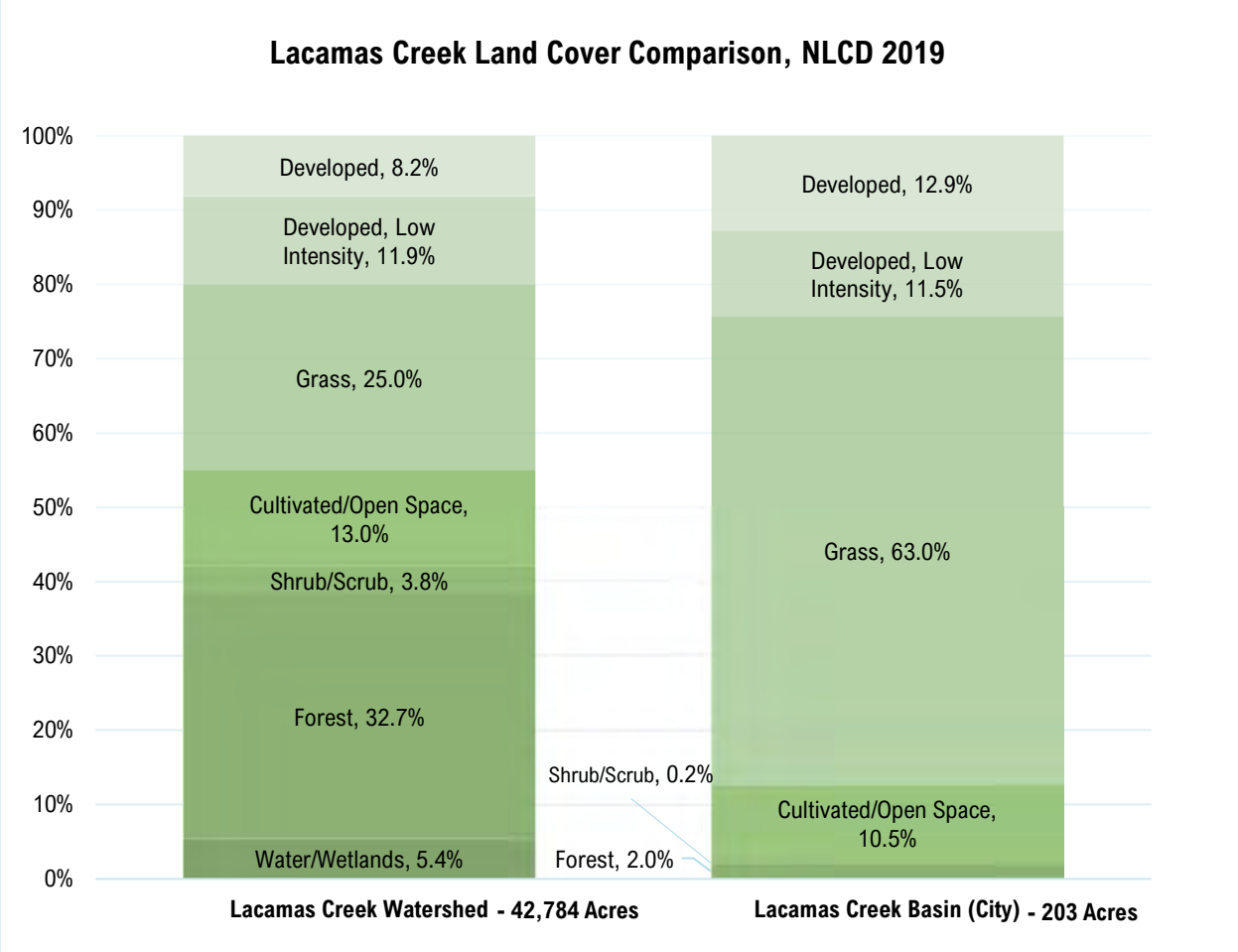


Figure 6 Land Cover Comparison, Lacamas Creek Watershed to Lacamas Creek Basin

Using a different data source (NAIP 2019) and processing technique, impervious surface in the Lacamas Creek Basin is estimated to be 54 acres, or 27% of the basin.

Within City limits, the stormwater infrastructure consists of conveyance pipes, detention ponds, and water quality facilities. The storm system outfalls to vegetated natural areas without defined channels. Table 10 presents stormwater infrastructure counts in the Lacamas River Basin.

Table 10 Lacamas River Basin City-Owned and Privately Owned Stormwater Infrastructure

Stormwater Infrastructure	Measure
Outfalls (ea.)	6
Drywells (ea.)	0
Pipe[1] (ft.)	10,433 (2.00 miles)
Ditches (ft.)	688 (0.13 miles)
Flow control facilities (ea.)	14, All installed after 2009 using the latest standards
Water quality facilities (ea.)	7, All were installed after 2009 using the latest standards

[1] includes all pipe diameters and excludes culverts

Water Quality and Aquatic Habitat

The State of Washington Department of Ecology (Ecology) has set water quality standards for surface waters. These criteria are used to assess the health of the surface water for recreation, drinking water, aquatic life, and other uses. The most stringent designated uses and associated water quality standards are outlined in Table 11 below.

Table 11 Lacamas Creek Designated Uses and Water Quality Standards

Designated Use	Parameter	Water Quality Standard (WAC 173-201A)
Aquatic Life		
Salmonid Spawning, Rearing, and Migration	Temperature	Highest 7-DADMax[1]: 17.5°C (63.5°F)
	DO	Lowest 1-Day Minimum: 8.0 mg/L
	pH	6.5 - 8.5 pH units, with a human-caused variation within the range of less than 0.5 units
	Turbidity	< 5 NTU over background[2] when the background is 50 NTU or less; or a 10% increase in the turbidity when the background turbidity is more than 50 NTU
Recreation		
Primary Contact	Bacteria	Fecal coliform organism levels within an averaging period must not exceed a geometric mean value of 100 CFU or MPN per 100 mL, with not more than 10% of all samples (or any single sample when less than ten sample points exist) obtained within an averaging period exceeding 200 CFU or MPN per 100 mL
		E. coli organism levels within an averaging period must not exceed a geometric mean value of 100 CFU or MPN per 100 mL, with not more than 10% of all samples (or any single sample when less than ten sample points exist) obtained within the averaging period exceeding 320 CFU or MPN per 100 mL

[1] 7-DADMax is the arithmetic average of seven consecutive measures of daily maximum temperatures
[2] Background levels are not established for Lacamas Creek

Numerous reaches of Lacamas Creek do not meet water quality standards and are listed by Ecology in its 2016 water quality assessment (Ecology, 2016). Lacamas Lake, Round Lake, and tributaries to Lacamas Creek also have water quality listings. Category 5 listings for these waterbodies are presented in Table 12.** Ecology is currently developing a multi-parameter water quality improvement project for Lacamas Creek.

** While not included in this analysis, there are other water quality listings in the watershed available through the Washington Department of Ecology.

Table 12 Lacamas Creek Watershed Water Quality Listings

Waterbody (Location)	Category 5 Parameter
Lacamas Creek (Downstream of Matney Creek, at the crossing of SR-500)	Temperature Dissolved oxygen
Lacamas Creek (Upstream of Matney Creek)	Temperature Dissolved oxygen
Lacamas Creek (Immediately upstream of Lacamas Lake)	Temperature Dissolved oxygen Bacteria
Lacamas Creek (Downstream of Round Lake)	Temperature Dissolved oxygen pH
Lacamas Lake	Total phosphorus
Round Lake	Dissolved oxygen pH
Lacamas Creek Tributaries	
Dwyer Creek	Dissolved oxygen
Matney Creek	pH Dissolved oxygen Temperature Bacteria
Shanghai Creek	pH Dissolved oxygen Temperature
Fifth Plain Creek	Dissolved oxygen Temperature Bacteria Bioassessment
China Ditch	Dissolved oxygen Temperature
China Lateral	Dissolved oxygen Temperature

Using various measurements of macroinvertebrate health in Lacamas Creek Watershed, stream health appears to be fair. In 2017, Clark County assessed a B-IBI score of 36.1 (poor) at a sampling site slightly upstream of Lacamas Lake and a B-IBI score of 70.4 (good) at a sampling site slightly downstream of Camp Bonneville. Clark County also assessed several tributaries to Lacamas Creek. Matney Creek has a B-IBI score of 72 (good) based on data gathered at a sampling site slightly upstream of Lacamas Creek in 2019. Shanghai Creek has a B-IBI score of 78.8 (good) based on data gathered by Clark County in 2017. China Ditch Creek has a B-IBI score of 47.7 (fair) based on data gathered by Clark County in 2017. Finally, stream health of Fifth Plain Creek appears to be fair. There were two sampling locations, one site slightly upstream of Lacamas Creek and another site slightly upstream of Shanghai Creek which have B-IBI scores of 58.7 (fair) and 45.4 (fair), respectively.

The health of Lacamas Lake is affected by nutrients, and Clark County Public Health closes recreation sites on the lake each year due to toxic algae blooms.

According to the Statewide Integrated Fish Distribution (SWIFD) web map, fish species present in Lacamas Creek include fall Chinook salmon, coho salmon, rainbow trout, winter steelhead, coastal cutthroat trout, largemouth bass, and mountain whitefish (Northwest Indian Fisheries Commission, 2022). According to WDFW, there are 7 fish passage barriers on Lacamas Creek, both man-made and natural ranging from 0% passable to 99% passable. The barriers are not in the City of Washougal. There are 13 additional fish passage barriers on various tributaries and in Lacamas Lake that range from 0% passable to 99% passable (WDFW, 2022).

The Lacamas Creek Basin has few pollution-generating land uses and neither large-scale pollution-generating pervious surfaces nor highways with high traffic volumes.

Zoning in the City of Washougal is used as a proxy for land use. Within City limits, Lacamas Creek Basin is dominated by single family housing in the majority of the basin and schools/public facilities zoning in the southern portion of the basin. For the purposes of this assessment, the following zoning categories have been defined as “pollution-generating”: high-density residential, medium-density residential, commercial, industrial, and school/public facilities. Pollution-generating land uses make up 1% (2 acres) of the basin (Figure 7).

Some pollutant-generating land uses are managed under NPDES Industrial Stormwater General Permits issued by Department of Ecology. The permit holders are responsible for monitoring, measuring, and reducing stormwater pollution leaving their site. There are no active Industrial Stormwater General Permits in the Lacamas Creek Basin.

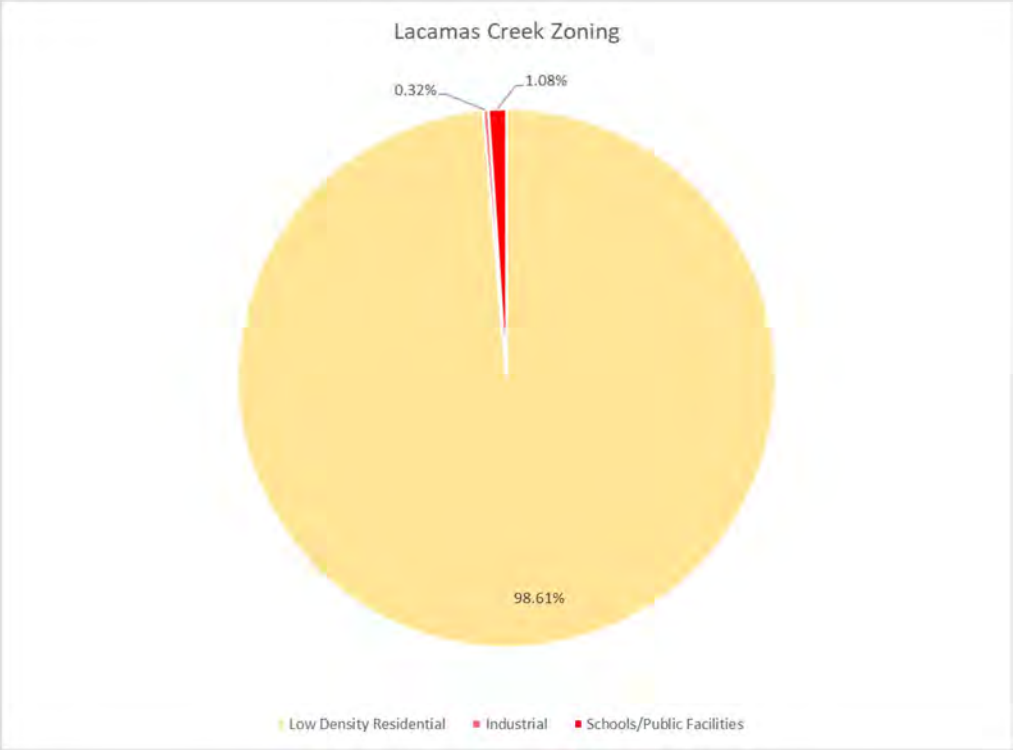


Figure 7 Lacamas Creek Basin Zoning

Future Development and Improvement Plans

Within the Lacamas Creek Basin, approximately 140 acres of the City's Northwest Urban Grown Area (UGA) has been annexed since 2017. The area is currently undergoing residential development of these former agricultural and rural lands, and the City expects available land to be developed within the next five to ten years. The City's critical areas ordinances may preserve small portions of this area as wetland (in the northeast corner downstream of Price Reservoir (in unincorporated Clark County)). The area also contains a severe erosion hazard area and potential unstable slopes as mapped by Clark County. Within the basin, approximately 90 acres of urban growth area (UGA) remain.

Significant development is expected to take place in the Lacamas Creek Watershed in City of Camas. The most notable development is a recent City of Camas annexation of largely undeveloped land on the north side of Lacamas Lake (City of Camas, 2022c). Currently, land use in this area consists of agriculture and single-family residences. The City of Camas subarea plan will be completed in 2022. The subarea plan will outline a plan for 140 acres of publicly held land along the shoreline, acquired by the City of Camas and Clark County's Legacy Land Program, and 670 acres of privately-owned land which is currently zoned largely for business parks and multifamily residential use.

Generally, Clark County is a fast growing county, and the unincorporated areas within Lacamas Creek Watershed are subject to development under Clark County's Comprehensive Plan. In upper Lacamas Creek Watershed Clark County accepted ownership of a private military post called Camp Bonneville in 2011. A master plan is anticipated in 2022 which will identify land uses. "Currently the county is implementing a forest management plan that uses selective thinning to create a healthy forest ecosystem that supports a diversity of plants and animals" (Clark County Public Works, 2021). The County and project partners intend to explore opportunities to preserve high-value riparian and upland areas along the extensive network of small streams in the project area.

In Clark County's Natural Areas Acquisition Plan, a 115-acre acquisition is planned in 2022 (Clark County Public Works, 2021). The acquisition will include the high point of Green Mountain and the area connecting Green Mountain to the Lacamas Prairie Natural Area. Another acquisition is planned for 2025 which will add 50 acres to the Lacamas Prairie Natural Area for wet meadow restoration.

The City of Camas is developing a Lacamas Lake Management Plan which will include Lacamas Lake, Round Lake, and Fallen Leaf Lake which is expected to be completed in 2023. The plan will identify goals and identify how to improve water quality and protect desired conditions of the lakes. The City of Camas will work towards objectives by "characterizing the lakes' water quality, identifying and quantifying the nutrient sources that are affecting the lakes, and evaluating potential management measures" (City of Camas, 2022b).

Stormwater Retrofits and Restoration Projects in the Basin

- The City of Camas is supporting a dam improvement project which will provide mechanical upgrade improvements to two Lacamas Lake dams. The project will also remove unnecessary equipment and conduct a hydraulic analysis (City of Camas, 2022a).

Environmental Justice

To show the relative environmental health disparity of the Lacamas Creek Basin, an area-weighted average of the combined index scores of 19 factors from 2 census tracts was calculated. Overall, the environmental health disparities indices in the basin are between 3 and 4, which is low to moderate. The

area-weighted average of the combined index scores is 3.2. This indicates that the community in the Lacamas Creek basin ranks low according to the risk from environmental factors that influence health outcomes.

Relative Conditions Assessment

The relative conditions assessment includes an assessment of stormwater management influence (SMI) as well as an assessment of historic conditions and current degradation to inform the selection of a basin management strategy.

Stormwater Management Influence

The influence of the City's land uses and stormwater system (Stormwater Management Influence (SMI)) on Lacamas Creek is estimated qualitatively using the following factors and findings. The analysis relies on selected elements that have been described above in the Receiving Water Assessment. The assessment includes influence on both hydrology and water quality and is relative to other basins in the City (Table 13). Factors are listed in descending order of those that most describe the City's influence on receiving water conditions. The percentage of the watershed within the City limits is included in both the hydrology and water quality assessments.

Table 13 SMI Assessment for Lacamas Creek

SMI Parameter	Assessment Theory	Lacamas Creek Basin Characteristics	Assessment
Hydrology			
Flow Control Exempt	A flow control exempt waterbody has a high volume of flow; therefore, the City can have little influence on its hydrology. Flow control exempt receiving waters receive a low score and non-flow control exempt receiving waters receive a higher score.	Lacamas Creek is not flow control exempt; however, Lacamas Lake is flow control exempt upstream of the City.	High
Percent of Watershed in City Limits	This factor is a relative assessment between watersheds that indicates the amount of the basin that falls within the City limits. A higher percentage within the City results in a higher score.	0.5% of the watershed is in the City	Low
Location of City within Watershed	The location of the City in the watershed dictates the influence the City can have on hydrology. A City at the headwaters has high influence and receives a high score while a City near the mouth has a low influence and receives a low score.	The City is located at the lower reaches of the Lacamas Creek Watershed and no waterbodies are located in the City.	Low
Impervious Surfaces	This factor is a relative assessment between watersheds, where the basin with the higher percentage of imperviousness within City limits will receive the higher score.	54 of 203 acres, or 27%	Low
Density of Flow Control Facilities and Drywells Per Acre of Developed Surfaces	This factor is a relative assessment that indicates what level of the developed surfaces in the basin within City limits is being managed by flow control facilities. A low density of flow control facilities will receive a high score and a high density of flow control facilities will receive a low score relative to other basins.	14 flow control facilities plus 0 drywells (14) and 26 acres developed surfaces, or 0.538 facilities/acre	Low

SMI Parameter	Assessment Theory	Lacamas Creek Basin Characteristics	Assessment
Influence on Hydrology			**Low**
Water Quality			
Percent of Watershed in City Limits	This factor is a relative assessment between watersheds that indicates the amount of the basin that falls within the City limits. A higher percentage within the City results in a higher score.	0.5% of the watershed is in the City	Low
Pollution-Generating Land Use	This factor is a relative assessment between watersheds of pollution-generating land use in the basin within City limits. A high percent of pollution-generating land use in the basin will receive a high score and a low percentage of pollution-generating land use in the basin will receive a low score.	2 of 203 acres, or 1%	Low
Roadways with High Traffic Volumes	This factor is a relative assessment of high traffic volumes in the basin within City limits. A high score is assigned to a basin with a higher length of roadways with a high AADT of 7,500 or greater and a low score is assigned to a basin with a low number of roadways with a high AADT of 7,500 or greater relative to other basins. Only segments that do not overlap pollution-generating land uses are counted.	N/A	Low
Large Pollution-Generating Pervious Surfaces	This factor is a relative assessment of large pollution-generating pervious surfaces. A high score is assigned to a basin with a large area of large pollution-generating pervious surfaces and a low score is assigned to a basin with a small area of large pollution-generating pervious surfaces relative to other basins. Only those that do not overlap pollution-generating land uses are counted.	N/A	Low
Density of Water Quality Facilities Per Acre of Pollution-Generating Land Use and Large Pervious Surfaces	This factor is a relative assessment that indicates what level of the pollution-generating land use and large pervious surfaces in the basin within City limits is being managed by water quality facilities. A high score is assigned to a basin with a low density of water quality facilities per area of pollution-generating land uses, and a low score is assigned to a basin with a higher density of water quality facilities per area of pollution-generating land uses relative to other basins.	7 water quality facilities and 203 acres of pollution-generating land use, or 0.034 facilities/acre	High
Influence on Water Quality			**Low**

Basin Management Strategy

The basin management strategy has been selected using several factors described in Table 14.

Table 14 Factors Used to Select a Basin Management Strategy for Lacamas Creek Basin

Lacamas Creek		
Importance	Historic Fish Use	Medium
	Explanation	The Washougal River is one of twelve major NPCC subbasins in the Washington portion of the Lower Columbia Region. The subbasin historically supported thousands of fall Chinook, chum, coho, and summer and winter steelhead. (LCFRB, Vol. II - Ch. N, North Washougal Subbasins, p. 4) Focal salmonid species in Washougal River watersheds include fall Chinook, summer and winter steelhead, chum and coho. (LCFRB, Vol. II - Ch. N, North Washougal Subbasins, p. 13) For this analysis, it is assumed anadromous fish species historically present were only able to access the lower reaches of Lacamas Creek due to natural barrier called Lower Falls which WDFW states currently ends anadromous access to upper portions of Lacamas Creek (WDFW, 2022)
	Need For Recovery	Medium
	Explanation	Today, numbers of naturally spawning salmon and steelhead have plummeted to levels far below historical numbers. Chinook, coho, chum, and steelhead have been listed as threatened under the Endangered Species Act. (LCFRB, Vol. II - Ch. N, North Washougal Subbasins, p. 4) Recovery goals call for restoring fall Chinook, and chum populations to a high or better viability level. This level will provide for a 95% or better probability of population survival over 100 years. Coho and steelhead will be restored to a moderate or better level of viability or a 75 to 95% probability of persistence over 100 years. (LCFRB, Vol. II - Ch. N, North Washougal Subbasins, p. 77) A spawning ground survey in 2000 found one chum salmon in Lacamas Creek (LCFRB, Vol. II - Ch. N, North Washougal Subbasins, p. 18). Although LCFRB describes the need for recovery to a high level of viability, it is assumed that only the lower reaches of Lacamas Creek will be available for anadromous fish use. Therefore, a “medium” value has been selected for Need for Recovery.
Degradation	Urbanization	Low
	Explanation	Developed surfaces make up 12.9% of the land cover in the Lacamas Creek Basin.
	Fish Passage Barriers	Low
	Explanation	There are no 0-33% passable barriers in the City or downstream of the City.
	Water Quality Impairments	Medium
	Explanation	There are no Category 4A water quality impairments and 3 Category 5 water quality impairments in the receiving water and tributaries within City limits or downstream of Washougal.

Given the moderate importance and moderate degradation of the Lacamas Creek Basin, the selected basin management strategy is conservation.

The conservation management goal requires some investment in maintaining the integrity of existing natural resources in a watershed. The Puget Sound Partnership includes the following list of solutions associated with each of the four management strategies:

- Typical BMPs, habitat improvements, and policies that apply to **all management strategies** include maintaining stream/wetland physical integrity, restoring floodplains and wetlands, restoring riparian zones, and protecting aquifer recharge areas.
- Typical BMPs that apply to the **conservation and the development management strategies** include all of the above plus emphasizing dispersion and on-site infiltration.
- Typical BMPs and policies that apply to the **protection management category** include all of the above plus increasing buffer widths, reducing groundwater withdrawals, reducing interception of shallow groundwater in ditches, and revegetating uplands.
- Typical BMPs that apply to the **restoration management category** include all of the above plus retrofitting structures and roads for greater infiltration, and reconstructing stream reaches or artificial wetlands. (Puget Sound Partnership, 2016).

Clark County assessed the Lacamas Watershed in its 2010 Clark County Stream Health Report and recommended the following actions for improving the health of receiving waters in the Lacamas Creek Watershed: stream health strategies include protecting remaining forested areas in upper watershed and Camp Bonneville; restoring stream channels and riparian forests; increasing infiltration and retention of stormwater runoff from older developments; implementing development regulations to minimize impacts, particularly enhanced nutrient control regulations to protect Lacamas Lake; and conserving agricultural lands and promoting healthy practices (Clark County, 2010).

Conclusion

Only 0.5% of the Lacamas Creek Watershed is within City limits, and the City is located in the lower watershed. The watershed also includes the cities of Vancouver and Camas, although the majority is located in unincorporated Clark County (87.6%). Neither Lacamas Creek nor any major tributaries to it are within Washougal City limits. City of Washougal has a low influence on hydrology and a low influence on water quality of Lacamas Creek compared to other receiving waters in its jurisdiction. The Lacamas Creek Basin is moderately important for fish recovery and is moderately degraded. No significant ongoing or future retrofit or restoration efforts are planned within the Lacamas Creek Basin, although the City of Washougal abuts Lacamas Park, which is a part of a matrix of parks and open spaces near Lacamas Lake preserved by a combination of Clark County and City of Camas.

Therefore, the Lacamas Creek Basin is not a likely candidate for Stormwater Management Action Planning.

5. Receiving Water Conditions Conclusion

Gibbons Creek Basin and Washougal River Basin higher relative SMI scores than Lacamas Creek Basin. In addition, Ecology's SMAP Guidance encourages cities to prioritize basins with a restoration or protection basin management strategy (Ecology, 2019). Gibbons Creek Basin and Washougal River Basin have been given restoration and protection management strategies, respectively. As a result,

Gibbons Creek Basin and Washougal River Basin have been selected to move into the receiving water prioritization step of SMAP. Table 15 summarizes the findings of the relative conditions assessment.

Table 15 Relative Conditions Assessment Summary

Basin Name	Receiving Waters within Basin	Watershed Area (Acres) [SqMi]	Area inside City (Acres)	Fraction of Watershed within City	Percent of the City that is Occupied by the Basin	SMI Score	Basin Management Strategy
Gibbons	Gibbons Creek; Campen Creek; Steigerwald Lake	7,100 [11]	1,721	24.2%	45%	High	Restoration
Washougal	Washougal River	78,880 [123]	1,918	2.4%	50%	Medium	Protection
Lacamas	Lacamas Creek;	42,784 [67]	203	0.5%	5%	Low	Conservation

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Abbreviation	Definition
7-DADMax	The arithmetic average of seven consecutive measures of daily maximum temperatures
AADT	Annual average daily traffic
ADT	Average daily traffic
B-IBI	Benthic index of biotic integrity, a measure of stream health using an assessment of the health of aquatic macroinvertebrate communities
C, °C	Celsius, degrees Celsius, a unit measuring temperature
CARA	Critical aquifer recharge areas
cfs	Cubic feet per second
CFU	Colony forming unit
CIP	Capital improvement projects
DO	Dissolved oxygen
Ecology	Washington Department of Ecology
EJ	Environmental Justice
EPA	Environmental Protection Agency
F, °F	Fahrenheit, degrees Fahrenheit, a unit measuring temperature
FEMA	Federal Emergency Management Agency (FEMA)
GIS	Geographic information system
LCFRB	Lower Columbia Fish Recovery Board
mg/L	Milligrams per liter
mL	Milliliter
MMI	Multimeric index, a measure of stream health using an assessment of the health of aquatic macroinvertebrate communities
MPN	Most probable number
NAIP	National Agriculture Imagery Program
NLCD	National Land Cover Dataset
NPCC	Northwest Power and Conservation Council
NRCS	Natural Resources Conservation Service
NWR	National Wildlife Refuge
MS4	Municipal separate storm sewer system
NWIFC	Northwest Indian Fisheries Commission

Abbreviation	Definition
NTU	Nephelometric turbidity units
pH	Power of hydrogen (a unit measuring acidity)
SMAP	Stormwater management action plan, also Stormwater management action planning
SMI	Stormwater management influence
SR	State route
SWIFD	Statewide Integrated Fish Distribution
TMDL	Total maximum daily load
TSS	Total suspended solids
UGA	Urban growth area
USGS	US Geological Survey
WAC	Washington administrative code
WDFW	Washington Department of Fish and Wildlife
WEHDM	Washington Environmental Health Disparities
WRIA	Water resource inventory area
WQI	Water quality improvement

Attachment A

Web Map

March 2022 - The web map associated with this memorandum is located at this link:
https://washstorm.maps.arcgis.com/apps/webappviewer/index.html?id=f460f23d1bba4edc95634347535c7b21

Appendix C

Receiving Water Prioritization – SMAP, Memorandum

Memorandum

To: Sean Mulderig, City of Washougal

From: Trista Kobluskie, Cara Donovan, Frank Sottosanto, PE, Otak, Inc.

Copies:

Date: August 26, 2022

Subject: Receiving Water Prioritization – SMAP

Project No.: 20155

1. Introduction

The Receiving Water Prioritization has been prepared pursuant to the City of Washougal's Phase II National Pollutant Discharge Elimination System (NPDES) municipal stormwater permit and a water quality grant from the Washington Department of Ecology. The prioritization generally follows the steps described in the Stormwater Management Action Planning Guidance published by the Washington Department of Ecology in 2019 (2019 SMAP Guidance). The purpose of the Receiving Water Prioritization is to determine which receiving water will receive the most benefit from implementation of stormwater facility retrofits, targeted stormwater management activities, and/or targeted policies. The outcome of this phase is a selected basin and catchment for which a stormwater management action plan (SMAP) will be developed. The results of the prioritization are summarized in this memorandum.

1.1. Summary of Receiving Water Conditions Assessment

The receiving water and relative conditions assessments were previously completed and are available for review on the City of Washougal's website. Gibbons Creek, Washougal River, and Lacamas Creek Basin were assessed. Gibbons Creek Basin and Washougal River Basin scored higher in the stormwater management influence (SMI) and relative conditions assessments than Lacamas Creek. As a result, Gibbons Creek Basin and Washougal River Basin were selected to be considered for the receiving water prioritization step.

2. Prioritization

Prioritization began with prioritizing a receiving water in the City of Washougal. The community was engaged in the receiving water prioritization decision. Following selection of a receiving water, a catchment within that basin was prioritized.

2.1. Receiving Water Prioritization

The receiving water basin prioritization criteria included numerous factors divided into three categories: receiving water condition information, stormwater management influence (SMI), and community factors. These factors and other receiving water conditions were described extensively in the *Receiving Water Conditions Assessment – SMAP* technical memorandum dated March 30, 2022, by Otak, which is

available for review on the City's website. Appendix A outlines the reasoning, score rationale, data sources, and notes for each of the considerations outlined in Table 1 below.

Table 1 Receiving Water Basin Prioritization Criteria

Consideration	Basin Scoring*	
	Gibbons Creek Basin	Washougal River Basin
Receiving Water Conditions		
Fish passage barriers	High (0 barriers)	High (0 barriers)
Ability to Influence (SMI)		
Hydrologic Impact	High (high score)	Low (low score)
Pollutant Loading Impact	High (high score)	Medium (medium score)
Watershed Management Strategy	High (Restoration)	Medium (Protection)
Community Factors		
Stakeholder/Community Feedback**	High (9 community points)	Low (4 community points)
Overburdened Communities	Medium (5.7)	Medium (5.4)

** Higher scores indicate the receiving water may benefit more from implementation of a SMAP.*
*** Stakeholder and community feedback is described is Section 2.2.*

Consideration of the above factors and scores for Gibbons Creek Basin and Washougal River Basin resulted in the section of the Gibbons Creek as the priority receiving water.

2.2. Community Engagement

The SMAP guidance calls for actively seeking input from natural resource agencies and tribes and for involving interested parties and the public early in the prioritization process. The City invited the general public and interested parties to participate in prioritizing a basin for two weeks in June and July 2022. A storymap website explained the SMAP process, presented the receiving waters assessment findings (Figure 1), and offered a survey.

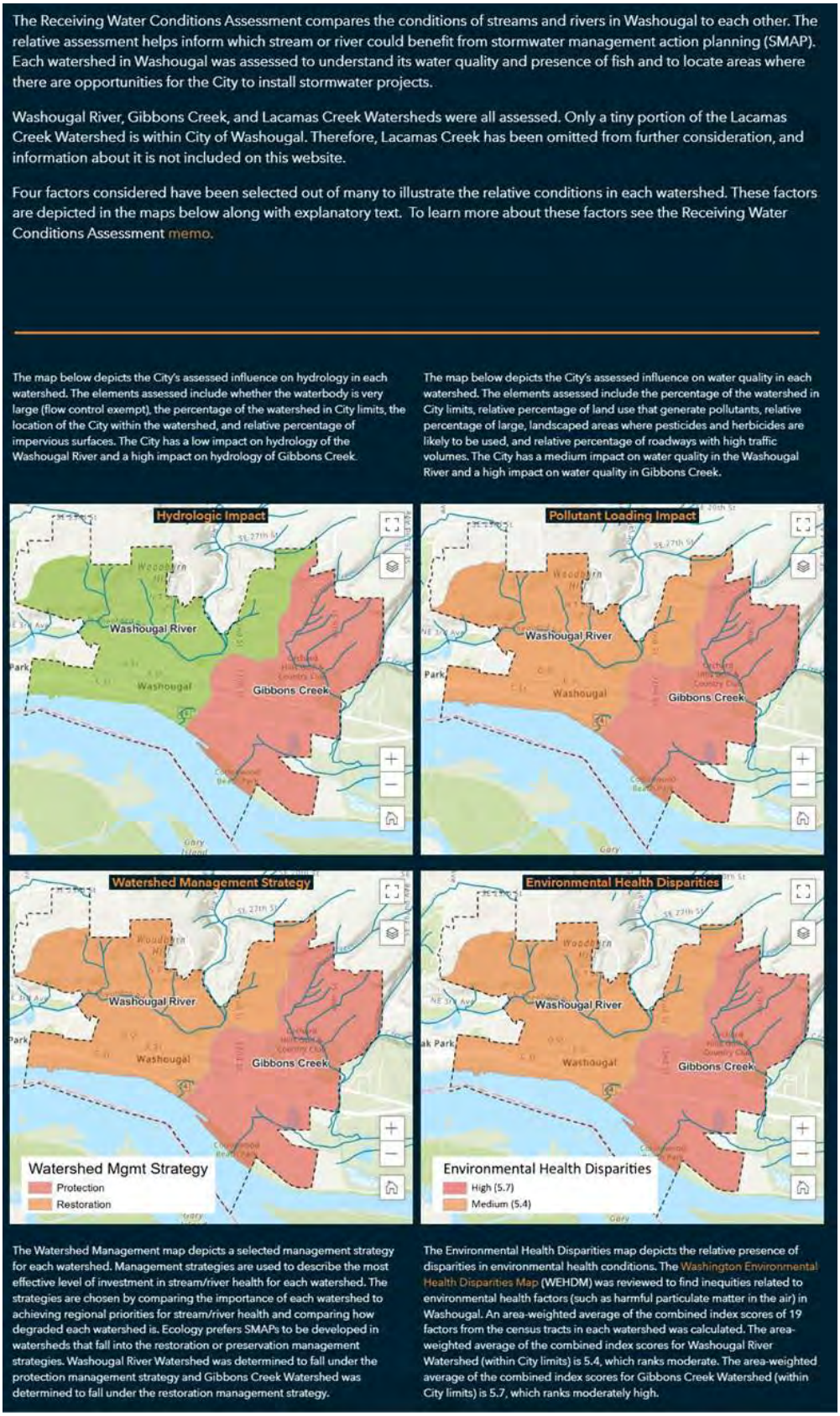

Figure 1: Receiving Water Assessment Findings in the Community Engagement Storymap

The survey included two questions. The first asked respondents to select a priority basin (Gibbons Creek or Washougal River). The second asked respondents to plot a point within the City of Washougal where SMAP should address water quality, stream/river conditions, or uncontrolled stormwater runoff. Once a point was selected the respondent could choose to answer the following questions:

- Why is this location important to you?
- Why is this location an area of concern?
- How would you like the City to address this issue?
- Do you have any additional comments?

To advertise the storymap and survey, the City contacted the community in various ways. The City identified and emailed interested parties. Interested parties included adjacent jurisdictions, the Port of Camas-Washougal, the Cowlitz Indian Tribe, and environmental groups such as the Lower Columbia Estuary Partnership. The storymap was announced on the City's website, the City's Facebook page, and on a flyer posted at public, high-traffic public places in Washougal.

Sixteen responses were collected. Eleven participants selected Gibbons Creek Basin and five selected the Washougal River Basin for prioritization (Table 2).

Table 2 Community Survey Responses

Community Survey Responses			
Comment ID	**Basin**	**Catchment**	**Comment***
1	Gibbons	Campen Creek	There are septic systems in this area. There are no curbs which allows direct runoff into Campen Creek.
2	Gibbons	Campen Creek	Golf courses provide almost no shade, little spawning habitat, and contribute significantly to chemical pollution. All the work at the Steigerwald Wildlife Refuge appears to be paying off. Let's keep enhancing what's already been started.
3	Gibbons	Mable Kerr	Mable Kerr Park is highly degraded and there is little stormwater treatment.
4	Gibbons	Columbia	There is continued industrial development in this area.
5	Gibbons	Columbia	There needs to be improved stream quality, improved riparian buffers, and removal of fish passage barriers to proactively improve stream health in the industrial areas.
6**	Gibbons	Campen Creek	Urbanization continues in Western Gibbons Creek.
7	Gibbons	Columbia River	Runoff from the private gravel mine and gravel washing facility [outside City limits] impacts the water quality flowing in Steigerwald Wildlife Refuge. Potential for holding ponds to fail, releasing contaminated water into Gibbons Creek.

Community Survey Responses			
Comment ID	**Basin**	**Catchment**	**Comment***
8	Washougal River	N/A***	[No comment]
9	Washougal River	N/A	All of the streets except K street have no sidewalks or storm drains for runoff.
10	Gibbons	Campen Creek	[No comment]
11	Gibbons	Mable Kerr	I have seen lots of litter, pollutants, and invasive plant species coming into the Steigerwald Wildlife Refuge during floods. I suspect they are coming from upstream development on Campen Creek
12	Washougal	N/A	There is runoff from a lot of cars and trucks driving on the roadway and parked on the side streets Where the Washougal River runs into Camas.
13	Gibbons	Campen Creek	The high school is the largest area of contiguous impervious surface in the Campen Creek watershed.

** Comments are responses to the question "Why is this location an area of concern?" and have been edited for clarity and privacy.*
*** Point is shown in the wrong basin on the map, as placed by the respondent. Based on the comment, we assume Gibbons Creek is the point of interest.*
**** Catchments were not delineated for Washougal River Basin.*

Fourteen responses to the second question can be seen in Figure 2, which shows that nine of the 13 points of interest or concern are in the Gibbons Creek Basin. Respondents chose their selected locations for a variety of reasons including degraded conditions, a lack of infrastructure, synergy with recent improvements to Steigerwald Lake National Wildlife Refuge, and concerns about pollutants from large private landowners, among other reasons.

2.3. Catchment Selection

The purpose of the catchment selection exercise was to determine which area of the Gibbons Creek Basin would receive the most benefit from a stormwater management action plan by the City.

2.3.1. Catchment Delineation

The consulting team delineated catchments in Gibbons Creek based on the SMAP Guidance, which states catchments should be between 400-600 acres or a scale that is appropriate for the jurisdiction. City of Washougal is a smaller southwest Washington city, and the appropriate catchment size tended to be smaller. Catchments range from 282 to 661 acres and are based on drainage areas to stream channels, adjusted for stormwater infrastructure, and to some extent, uniformity in land uses and storm system type. Catchments are presented on Figure 3.

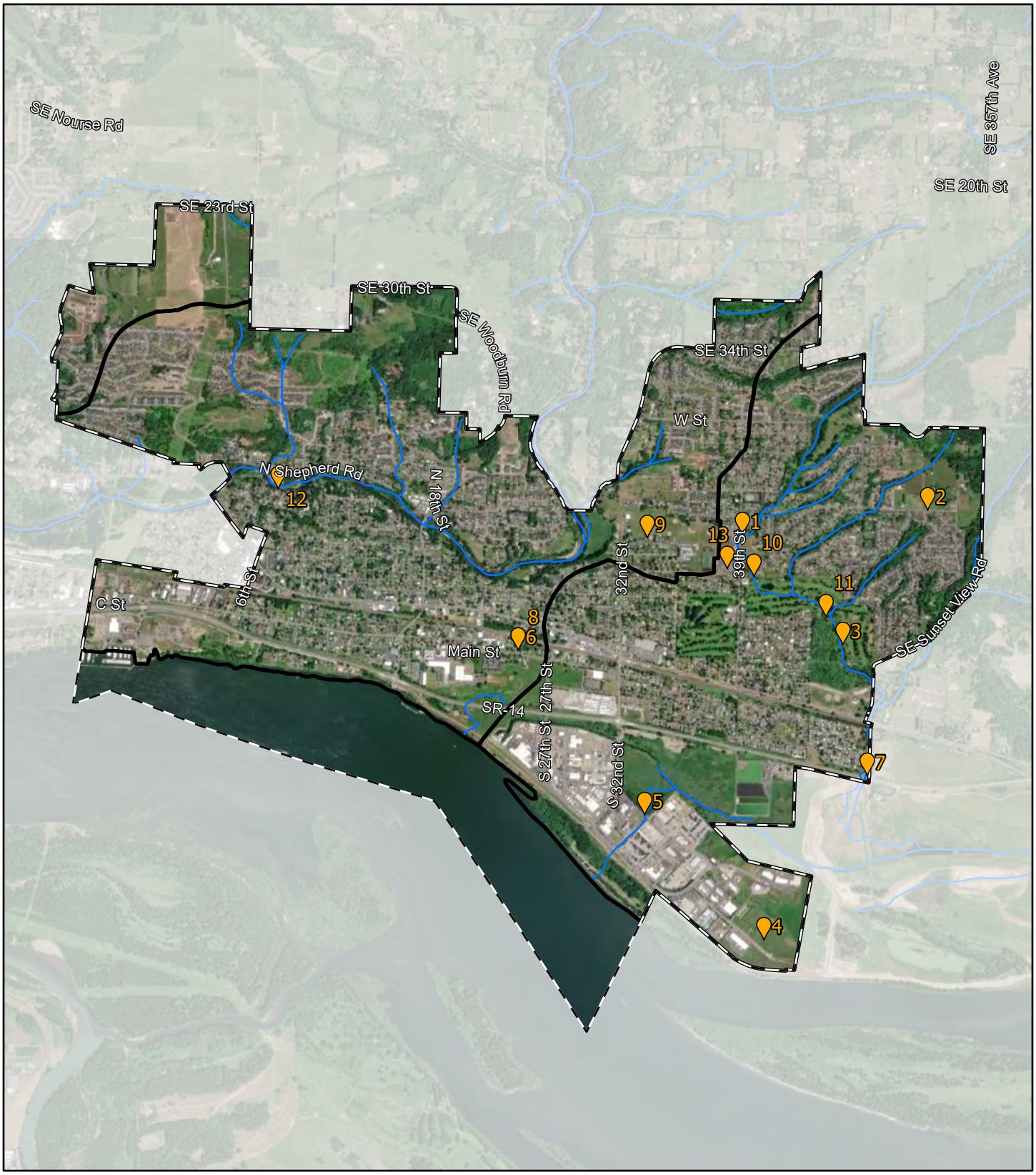

FIGURE 2
SURVEY RESPONSE LOCATIONS
WASHOUGAL SMAP

Basin Prioritization Survey Points

Washougal City Limits

Washougal Basins

Streams

0 1,000 2,000 4,000 Feet

Date: 8/24/2022
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

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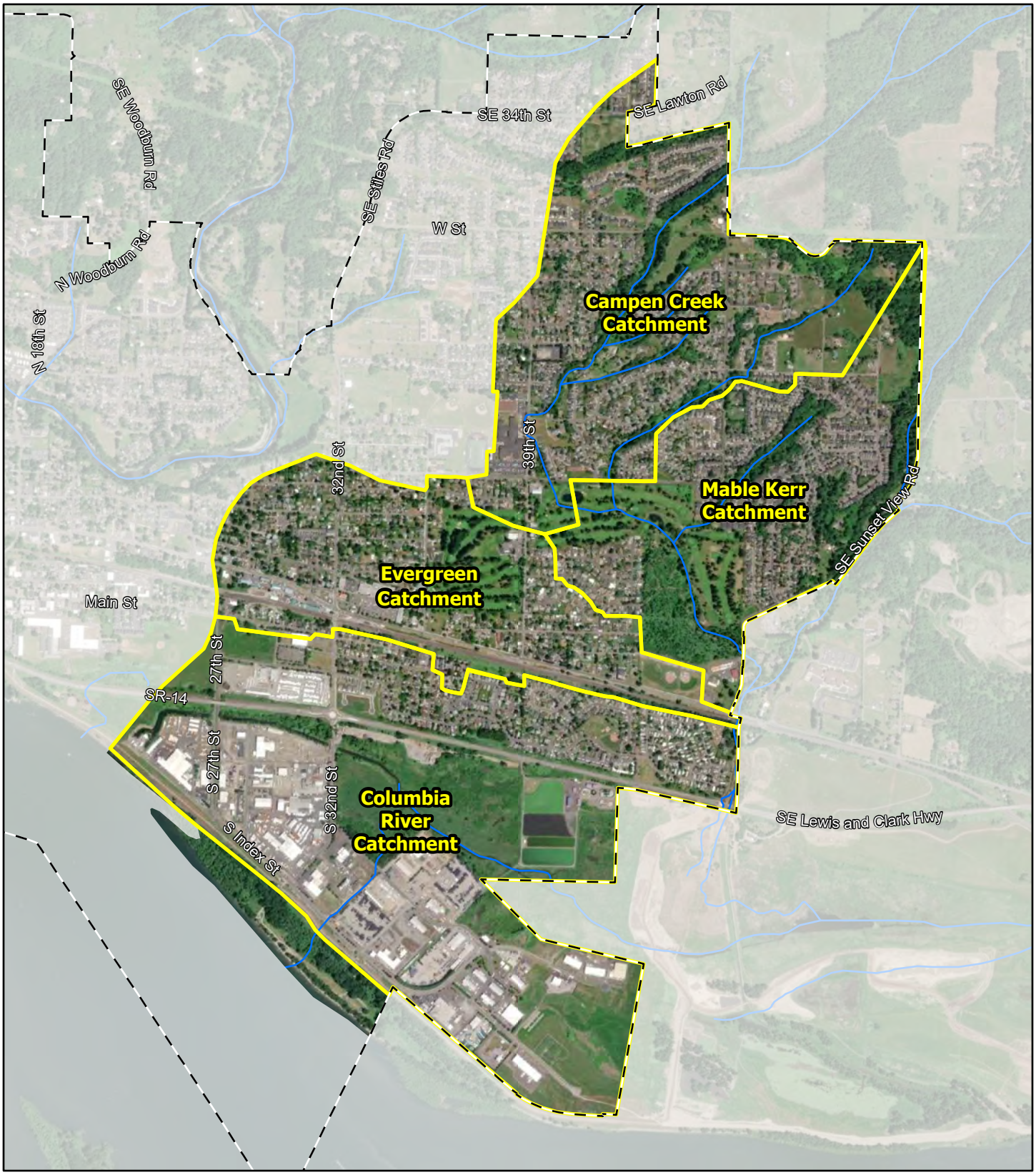

FIGURE 3

GIBBONS CREEK BASIN CATCHMENTS

WASHOUGAL SMAP

Washougal City Limits
Streams
Gibbons Creek Basin Catchments

0 500 1,000 2,000
Feet

Date: 8/24/2022
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

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2.3.2. Catchment Selection

The catchment prioritization criteria included numerous factors divided into four categories: receiving water condition information, stormwater management influence (SMI), community factors, and collaboration factors. Many of these factors and other receiving water conditions were described extensively in the *Receiving Water Conditions Assessment – SMAP* technical memorandum dated March 30, 2022, by Otak, which is available for review on the City of Washougal's website. Attachment A outlines the reasoning, score rationale, data sources, and notes for each of the scoring factors. Factors considered in catchment prioritization are also depicted on the Washougal SMAP Catchment Prioritization Web Map (Attachment B). Figure 4 and Figure 5, below Table 3, depict the Washington Department of Archaeology and Historic Preservation's archaeology predictive model (available through their WISAARD portal) and environmental health disparities within each Gibbon Creek catchment, respectively.

The City and consultant team conducted a site visit in Gibbons Creek Basin on July 27, 2022. The intent was to identify retrofit opportunities and stormwater management needs in Gibbons Creek Basin to inform catchment selection. Prior to the site visit the team evaluated many of the same factors as had been considered in prioritizing a receiving water, such as presence of pollution-generating surfaces, presence of City-owned properties, and presence of public stormwater facilities. The site visit included a drive through the Evergreen Catchment and stops within five areas in the Campen Creek and Mable Kerr catchments (Figure 6). During the visit, the team evaluated availability and ease of building in the right of way, condition of selected public stormwater facilities, and benefit of retrofitting selected public stormwater facilities. The site visit indicated the greatest number of opportunities for water quality projects are in the Campen Creek catchment.

Consideration of the prioritization factors and relative scores for the Gibbons Creek Basins catchments resulted in the section of the Campen Creek Catchment as the priority catchment as outlined in Table 3 below. Narrative of selected findings is presented in sections 2.3.2.1 through 2.3.2.4.

Table 3 Catchment Scores and Prioritization

Catchment Scoring				
Consideration	**Campen Creek**	**Mable Kerr**	**Evergreen**	**Columbia River**
Receiving Water Conditions				
Ratio of existing water quality facilities to pollution-generating land uses and large pollution-generating pervious surfaces*	Low (0.27)	High (0.09)	High (0.09)	High (0.05)
Ratio of existing flow control facilities to impervious surfaces*	Medium (0.13)	Medium (0.13)	High (0.05)	High (0.04)
Ability to Influence (SMI)				
Availability of publicly owned land (acres)	High (88.28)	Medium (31.15)	Low (8.37)	High (71.61)
Availability of right-of-way (miles / acre of catchment)	Neutral (0.02)	Neutral (0.02)	Neutral (0.02)	Neutral (0.02)
Community Factors				

Catchment Scoring				
Consideration	**Campen Creek**	**Mable Kerr**	**Evergreen**	**Columbia River**
Stakeholder Feedback (Figure 2)	High (4 community points)	Medium (2 community points)	Low (0 community points)	Medium (3 community points)
Washington Information System for Architectural and Archaeological Records Data (WISAARD) Predictive Model (Figure 4)	Medium (Very high risk in approximately ½ of the catchment)	Medium (Very high risk in approximately ¾ of the catchment)	High (Very high risk throughout catchment)	High (Very high risk throughout catchment)
Overburdened Communities** (Figure 5)	Low (3.18)	Low (3.08)	Low (3.90)	High (9.00)
Collaboration Factors				
Regional and local rehabilitation and restoration efforts	Medium See narrative below	Medium See narrative below	None identified	None Identified
City's Capital Improvement Projects	Hartwood Bridge Replacement	N/A	32nd Street Underpass; 39th Street/ Evergreen Way Realignment; J Street Water Main Installation	32nd Street Underpass; Biosolids Handling Facility
Final Selection				
Site Visit / Observations / Engineering Judgement	High See narrative below	Medium See narrative below	Medium See narrative below	Low See narrative below
Selection Status	Catchment Selected for SMAP	Not Selected for SMAP – Second Choice	Not Selected for SMAP – Third Choice	Not Selected for SMAP – Fourth Choice

**Some private stormwater facilities may not be documented in the City's GIS, particularly in the Columbia River Catchment*
***Intended to be used as a tiebreaker, if needed*

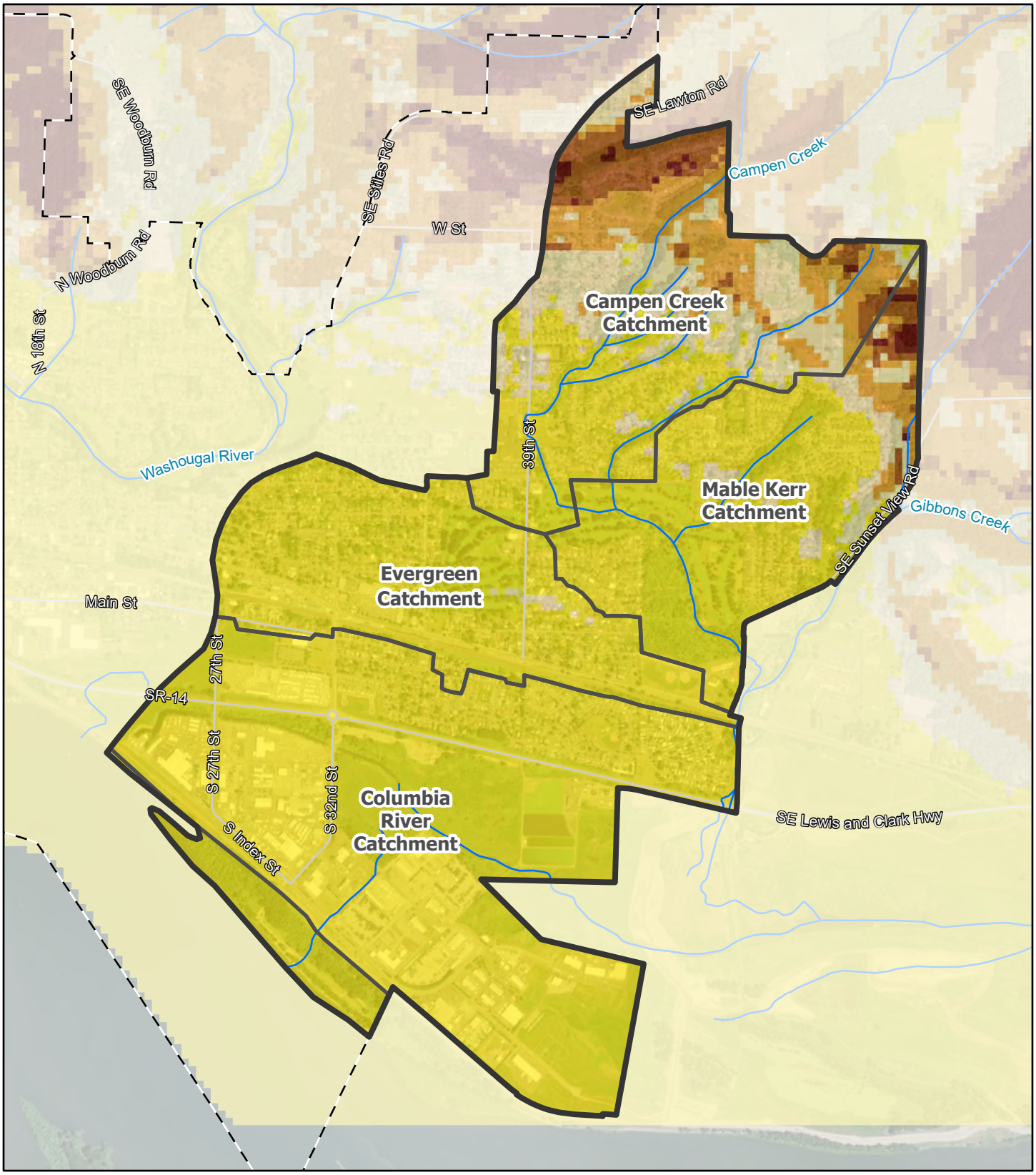

FIGURE 4

WISAARD PREDICTIVE MODEL RESULTS

WASHOUGAL SMAP

Washougal City Limits
Gibbons Basin
Gibbons Basin Catchments

Environmental Factors with Archaeological Resources Results

1 - Survey Contingent Upon Project Parameters: Low Risk (Color: Brick Red)
2 - Survey Contingent Upon Project Parameters: Moderately Low Risk (Color: Burnt Orange)
3 - Survey Recommended: Moderate Risk (Color: Orange)
4 - Survey Highly Advised: High Risk (Color: Pale Yellow)
5 - Survey Highly Advised: Very High Risk (Color: Brightest Yellow/Canary Yellow)

0 500 1,000 2,000
Feet

Date: 8/24/2022
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

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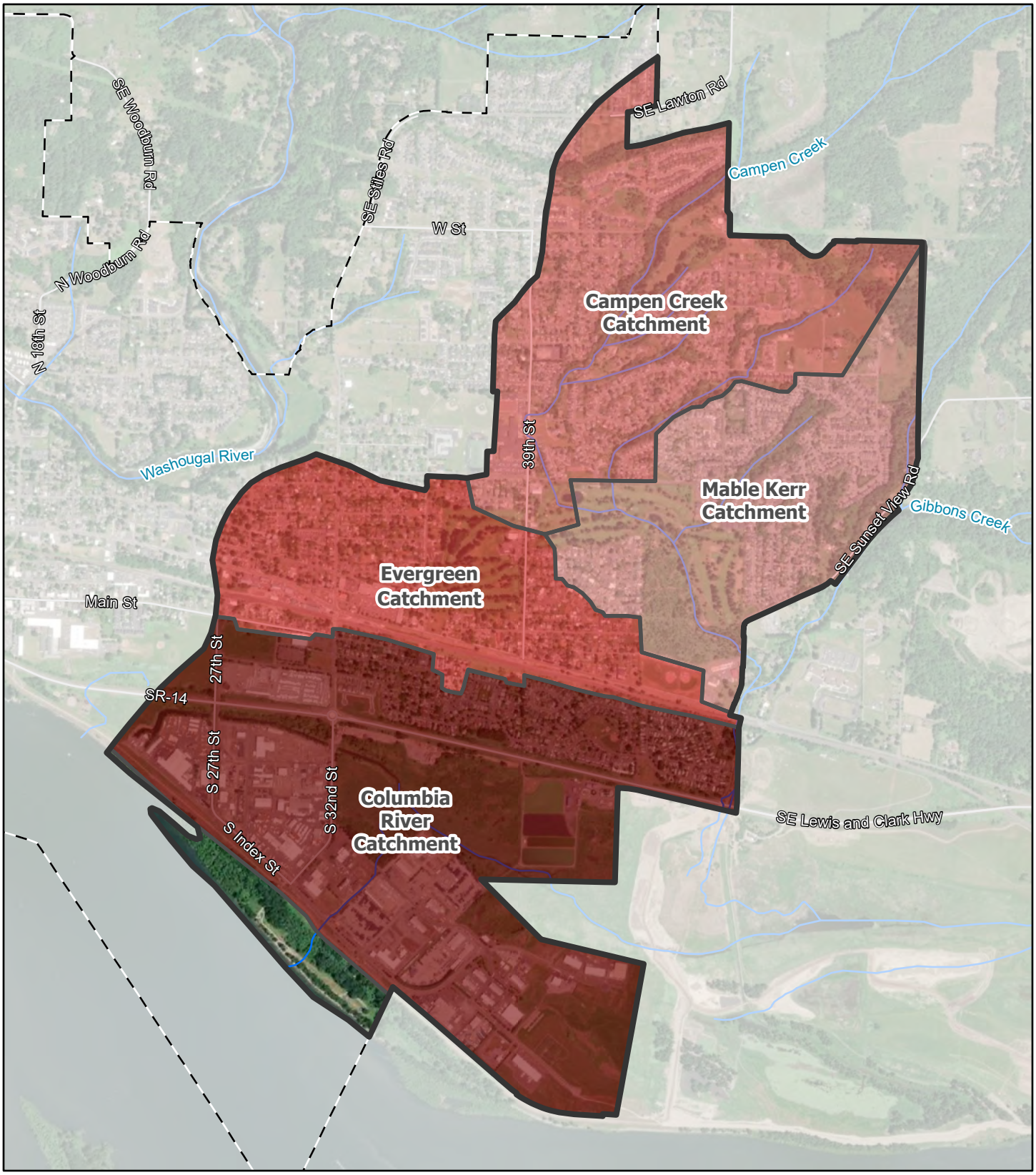

FIGURE 5
GIBBONS CREEK CATCHMENTS ENVIRONMENTAL HEALTH DISPARITIES
WASHOUGAL SMAP

Washougal City Limits
Gibbons Basin Catchments
EHD - Area Weighted Average
3.1
3.2
3.9
8.9
Streams

0 500 1,000 2,000
Feet

Date: 8/24/2022
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

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Site Visit
Poorly functioning older water quality and flow control facilities on big city property. Property is a former wetland and current blackberry briar.

Site Visit
Neighborhood draining to older flow control and water quality facility on public property. Facilities in poor condition.

Culvert has high flow.

Treat right-of-way, improve flow control

Site Visit
Neighborhood with little treatment and an older flow control facility. Prime area for right-of-way retrofit because old county roads are wide and have no treatment or flow control.

Sink holes have formed here. Address drainage.

Treat right-of-way, improve flow control

Site Visit
Possible high risk City-owned drywell with no treatment

Site Visit
Neighborhood draining to older public flow control facility. Facility has a lot of flow, and infiltrates amazingly well. This is not a problem facility.

Treat large pollution generating pervious surfaces and right-of-way, improve flow control

Riverview Park
Summer Slope Open Space
Hartwood Park
Eldridge Park
Campen Creek Park-Rolling Meadows Area
Campen Creek Catchment
Schmid Family Park
Washougal River
Hathaway Park
Campen Creek
Mable Kerr Park
Mable Kerr Catchment
Evergreen Catchment
George Schmid Park
Hamlik Park
Columbia River Catchment
Captain William Clark Park
Gibbons Creek
1
2
3
4
5
7
10
13

FIGURE 6
AREAS OF OPPORTUNITY & NEED
GIS ANALYSIS FOR FIELD STUDY
GIBBONS CREEK BASIN
WASHOUGAL SMAP

Gibbons Basin
Pollution Generating Overlay
Taxlots
City Owned Properties
Roads - Washougal Jurisdiction
Streams
High ADT Roads (> 6,000 / day)
Basin Prioritization Survey Points
Gibbons Creek Catchments

Stormwater Facilities
New Water Quality
Newer Flow Control
Older Flow Control
Older Water Quality

Drywells
Risk Level, Maintained By
High, COW
Not High, COW
Not High, PVT

Outlets
Subtype
Discharge Point
Outfall

0 250 500 1,000 Feet

Date: 8/24/2022
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

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2.3.2.1. Campen Catchment Narrative and Site Visit Findings

The Campen Creek catchment is 407 acres and consists primarily of residential development. The City is located in the downstream half of the catchment, which extends north into unincorporated Clark County. The Campen Creek mainstem and the uppermost tributary pass through it. Hartwood Park, Eldridge Park, the Summer Slope subdivision open space, and portions of the Orchard Hills Golf Club are significant open spaces in the catchment. The Washougal High School is located at the western edge along 39th St. (Note: part of the high school property is located in the Washougal River Basin.) The northeastern corner of the catchment is currently agricultural and forested, and this area is expected to develop with residences.

Many residential subdivisions were developed under Clark County regulations in the 1990s and 2000s, which means most of them have older flow control and older water quality facilities, and many of them have wider county road widths. Some of these neighborhoods have steeper roadways, providing a challenge for stormwater facility retrofits in the rights-of-way. A small number of subdivisions are infill, and these have stormwater facilities built to the standards implemented in 2009. One large detention-only facility on Q Street west of 39th provides an opportunity to retrofit it for water quality for significant acres, including a higher traffic roadway, 39th St. One public underground injection control well has been identified as a possible risk to groundwater in this catchment. There is an opportunity to provide vegetated water quality treatment in this location.

City staff have noted that Campen Creek and its tributaries through this catchment are flashy. The City has documented a chronic erosion problem in the stream channel where Campen Creek crosses south under M Street, just east of 39th. The chronic erosion problem has not been studied in detail but could be caused both by historic realignment of the channel to a 90-degree bend and by increased flows and velocities resulting from upstream development. Above this erosion location, several flow control facilities were built to older standards and may provide opportunity to retrofit existing ponds to help address the erosion problem.

The City and Lower Columbia Estuary Partnership are constructing a water quality retrofit at the Washougal High School. The City is also pursuing a temporary repair of the erosion issue at 39th Street.

As Campen Creek is a tributary to Gibbons Creek, improving water quality in the catchment would also benefit Gibbons Creek itself. Campen Creek was selected for SMAP because of the ease of coordination for placing facilities in the ROW is underserved residential areas, the number of existing older publicly-owned flow control facilities that are eligible for retrofit, the presence of a known erosion problem in the tributary at 39th Street, and the focus on this catchment demonstrated through public feedback and the efforts the Lower Columbia Estuary Partnership.

2.3.2.2. Mable Kerr Catchment Narrative and Site Visit Findings

The Mable Kerr Catchment is 318 acres and consists primarily of residential development. The lowest downstream tributary to Campen Creek passes through this catchment and is the primary stream channel in it. Gibbons Creek mainstem flows for a short stretch at the eastern edge of the catchment along SE Sunset View Road. There are significant open spaces including: Mable Kerr Park, a Washougal School District open space between the George Schmidt Park ballfields and Mable Kerr Park, the majority of the Orchard Hills Golf Club, and the Sunset Ridge open space along the tributary stream channel. Most open spaces are located in the lower reach of the catchment. The northeastern corner is currently agricultural and forested, and this area is expected to develop with residences.

Residential subdivisions tend to have been developed under Clark County regulations in the 1990s and 2000s, which means most of them have older flow control and older water quality facilities, and many of them have wider county road widths. Some of these neighborhoods have steeper roadways, providing a challenge for stormwater facility retrofits in the rights-of-way. A small number of subdivisions are infill, and these have stormwater facilities built to the standards implemented in 2009. Several older water quality and flow control facilities near the creek channel serve entire subdivisions and could provide opportunities for retrofit to more current standards. A large infiltration facility near Sunset View Road performs well and serves a large drainage basin.

The large private golf course is primarily located in this catchment. The City does not control this property but could consider reaching out to property owners to develop a voluntary land management strategy that protects water quality in the stream. Because the golf course is within three catchments, a program like this could benefit multiple catchments.

The Lower Columbia Estuary Partnership is planning to restore vegetation and the stream channel on both sides of the stream through Mable Kerr Park, including parts of the golf course. The degraded habitat and stream conditions along Campen Creek through the golf course and Mable Kerr Park are a focus of the community, as evidenced by public feedback and the Lower Columbia Estuary Partnership's project. As Campen Creek is a tributary to Gibbons Creek, improving water quality in the catchment would also benefit Gibbons Creek itself.

2.3.2.3. Evergreen Catchment

The Evergreen Catchment is 282 acres and consists of dense residential and commercial development. Open spaces include part of the Orchard Hills Golf Club and George Schmidt Park. The BNSF Railroad and Evergreen Way traverse east-west through the catchment.

The area is served largely by public and private underground injection control wells (UICs) that manage stormwater, some of which have been identified as a possible risk to groundwater. Older water quality facilities are clustered around the commercial center at Evergreen Way and 32nd Street, which includes a grocery store, pharmacy, restaurants, and other businesses. Although most of the area is served by UICs, surface flow likely travels along Evergreen Way and the railroad and may make its way to the Gibbons Creek mainstem just northwest of Steigerwald National Wildlife Reserve (outside of City limits). Current surface flow contributions to Gibbons are not well documented due to the recent rerouting of Gibbons Creek and installation of a cross levee.

The large private golf course is partly located in this catchment. The City does not control this property but could consider reaching out to property owners to develop a voluntary land management strategy that protects water quality in the stream. Because the golf course is within three catchments, a program like this could benefit multiple catchments.

Improving water quality in this catchment is likely to have a greater impact on groundwater but could also benefit Gibbons Creek.

2.3.2.4. Columbia River Catchment

The Columbia River Catchment is 661 acres and consists of residential development, large tracts of industrial land including Port of Camas-Washougal, and the City's sewage treatment plant. Open spaces include a large open space which has the remnant Gibbons Creek channel located south of State Route

14 (SR-14), which traverses east-west through the area, Hamllik Park, and Captain William Clark Park along the Columbia River.

The catchment drains east towards the lower mainstem of Gibbons Creek and south to the Columbia River and includes both piped storm sewer, surface water flow, and UICs. Conveyances throughout the catchment often discharge directly to wetlands. Older water quality facilities are located in the northwest and southeast corners, near a commercial center and industrial area respectively. There is a small commercial development at SR-14 and 32nd Street which has two newer water quality facilities and a flow control facility. The rest of the residential portion of the catchment north of SR-14 and Hamllik Park are served by two older flow control facilities near SR-14. Runoff from this area is directed to wetlands along SR-14 which may naturally provide some treatment. There are opportunities to retrofit infrastructure serving this area to more current standards.

The Washington Department of Ecology currently has issued 16 NPDES Industrial Stormwater General Permits to industrial site operators in this catchment. Industrial NPDES permittees must monitor the quality of runoff at their outfalls and take corrective action if pollutants exceed benchmarks. Therefore, the team assesses that stormwater quality may be managed sufficiently on sites at Port of Camas-Washougal and other industrial properties. In addition, there are fewer public roads where the City may place new stormwater facilities in the industrial-zoned area along the Columbia River. The team considered and discarded the possibility of water quality retrofits at the City's Treatment Plant due to space limitations on the facility.

Improving water quality in this catchment could impact groundwater, Gibbons Creek, and the Columbia River.

The team notes that the Columbia River catchment has the highest environmental health disparities score (Table 3), which was intended to be used as a tiebreaker in prioritizing a catchment. The Columbia River catchment was not a contender for SMAP selection due to limited number of surface water discharges to Gibbons Creek, the predominance of industrial lands with existing NPDES permits, presence of significant wetlands that may naturally provide treatment, and right-of-way considerations. Therefore, the team did not employ the tiebreaker.

3. Conclusion

The receiving water basin prioritization criteria indicate that in each of the three categories Gibbons Creek Basin would receive the most benefit from a stormwater management action plan by the City. Additionally, 69% of survey respondents prioritized Gibbons Creek Basin. Therefore, Gibbons Creek was selected as the priority receiving water.

The receiving water catchment prioritization indicates that selecting the Campen Creek Catchment can benefit water quality in both Campen Creek and downstream Gibbons Creek. Existing efforts in the Campen Creek Catchment will be enhanced by additional City investment, and an existing erosion problem with threatens 39th Street as well as potentially impacting water quality in Campen Creek could be addressed with the SMAP.

Attachment A

Prioritization Criteria

Washougal Basin and Catchment Prioritization Criteria

5/18/2022

Prioritization					
Consideration	**Scale Applied**	**Reasoning**	**Influence / Score**	**Data Source**	**Notes**
Receving Water Conditions					
Ratio of existing stormwater facilities to pollution-generating land uses and large pollution-generating pervious surfaces	Catchment	Where there is a higher ratio, more treatment is already provided and may mean that there is less need for retrofit.	Smaller ratio = higher score	RWA at basin scale - recalculate at catchment scale	
Fish passage barriers	Basin	BCiTR. Applied at the basin scale because we are looking at the lowest downstream barrier on the waterbody. This factor helps distinguish receiving waters but does not help distinguish catchments.	Downstream barriers (with no removal plan) = lower score	RWA; Local knowledge of barrier removals	
Ability to Influence (SMI)					
Hydrologic Impact	Basin	Heavily impacted basins should have stormwater mitigation. Applied at the basin scale for comparison of basins. Individual factors within this analysis may be considered for catchment prioritization.	High impact = high score, medium = medium, low = low	RWA	Considers impervious surfaces, flow control exemption, portion/location of the basin in the City, density of flow control facilities and drywells per acre of developed surfaces, available area for treatment, and opportunities for retrofit. Assessment follows the SMI categories and weighting agreed upon by City and Consultant Team
Pollutant loading impact	Basin	High pollutant loading should be mitigated. Applied at the basin scale for comparison of basins. Individual factors within this analysis may be considered for catchment prioritization.	High impact = high score, medium = medium	RWA	Considers pollutant-generating land uses, large pollutant generating pervious surfaces, high ADT roads, portion/location of the basin in the City, density of water quality facilities per acre of pollutant-generating land uses, available area for treatment, and opportunities for retrofit Assessment follows the SMI categories and weighting agreed upon by City and Consultant Team
Watershed management strategy	Basin	BCiTR. Applied at the basin scale for comparison of basins. The factors considered in this decision are not applicable at the catchment scale.	Restoration = high score, Protection = medium score, Conservation = low score	RWA	Considers historic fish use, need for fish recovery, urbanization, fish passage barriers, and water quality impairments
Availability of Rights-of-Way and publicly-owned properties	Catchment	City has more influence where it owns the most land or rights-of-way	Catchments with more available City land and ROW will be preferred over catchments with less.	RWA, field visit	
Community Factors					
Stakeholder feedback	Basin and catchment	SMAP Guidance	High support = high score for basin Within a catchment = high number of areas of concern= high score	Stakeholder feedback from Survey 1 & Survey 2	Survey 1 requests stakeholder selection of a priority receiving water (basin). Survey 2 asks stakeholders to place points at specific areas of concern, allowing us to evaluate stakeholder's emphasis of different catchments.
WISAARD Predictive Model	Catchment	Considers where cultural resources are less likely to be disturbed by construction.	Lower risk of cultural resources = higher score	Washington State Department of Archaeology and Historic Preservation	Five risk levels are shown in the predictive model
Overburdened Communities	Basin and catchment	Included in SMAP guidance and BCiTR	Higher inequity = higher score	Washingoton State Environmental Health Disparities and ENSCREEN Demographic Index (shown on RWA map)	Use as a tiebreaker between similar catchments. The inequities measured by these indices may not be alleviated through stormwater management actions
Collaboration Factors					
Regional and local rehabilitation and restoration efforts	Catchment	Included in SMAP guidance and BCiTR	Numerous regional and local rehabilitation and restoration efforts = high score	RWA, WRIA plans, salmon recovery plans, MTCA/Superfund cleanups, critical habitat designations, local efforts	
City's CIPs	Catchment	Included in SMAP guidance and BCiTR	City's future CIP projects that can be combined with retrofits = high score	City's GIS	

Process
First, a receiving water (basin) will be prioritized using factors applied at the basin scale. Second, within the priority basin, a catchment will be prioritized using factors applied at the catchment scale. Results are qualitative.

Attachment B

Web Map

August 2022 - The web map associated with this memorandum is located at this link:
https://washstorm.maps.arcgis.com/apps/webappviewer/index.html?id=cc66036796d24913bcb51d4aff76b9b2

Appendix D

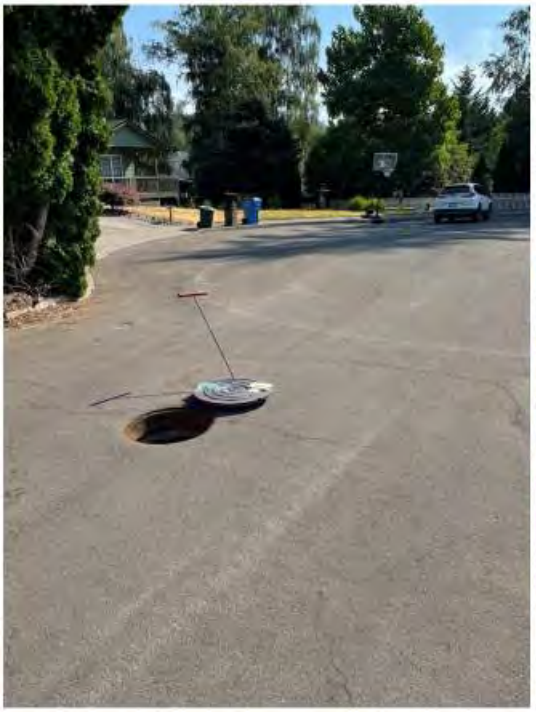
Solutions Outreach Supporting Material

Washougal Stormwater Management Solutions for Campen Creek Catchment

Question 1. Select up to three preferred stormwater retrofit solutions from the seven options listed below. To help you decide, we have shown each solution on the map to the right and have listed some key details for each option.

☐ **SMA 1) I Street Drywell Retrofit**

Project Description: Add a new drywell and reconfigure the existing drywell on I Street as a sedimentation manhole. Add bioretention planters upstream on I Street to provide water quality treatment.
Relative Initial Cost: Low
Relative Ongoing Cost: High
Relative Benefit: Low (8.5 acres)
Types of Pollutants Controlled/Removed: Flow control, TSS, dissolved metals, and 6PPD-q



☐ **SMA 2) Q Street Infiltration Pond Retrofit**

Project Description: Redirect stormwater in a 20-acre basin to drain to the existing infiltration

pond which is currently underutilized. Add pre-treatment.

Relative Initial Cost: Low

Relative Ongoing Cost: Low

Relative Benefit: High (20-27 acres)

Types of Pollutants Controlled/Removed: Flow control

Photo sourced from Google Maps

☐ **SMA 3) X Street Water Quality Retrofit**

Project Description: Install a water quality vault upstream of the existing detention pipe.

Relative Initial Cost: Low

Relative Ongoing Cost: Low

Relative Benefit: High (27 acres)

Types of Pollutants Controlled/Removed: TSS

Photo provided by Contech Engineered Solutions

☐ **SMA 4) Columbia View Flow Control and Water Quality Retrofit**

Project Description: Add detention pipe capacity to meet current flow control standards and add bioretention planters for additional treatment throughout the Columbia View neighborhood upstream of flow control facility.

Relative Initial Cost: High

Relative Ongoing Cost: High

Relative Benefit: High (20.5 acres)

Types of Pollutants Controlled/Removed: Flow control, TSS, dissolved metals, and 6PPD-q


☐ **SMA 5) J Street and 42nd (Vintage Crest Estates) Water Quality Retrofit**

Project Description: This project will install bioretention planters for runoff treatment throughout the Vintage Crest neighborhood.
Relative Initial Cost: Moderate
Relative Ongoing Cost: High
Relative Benefit: High (31.5 acres)
Types of Pollutants Controlled/Removed: TSS, dissolved metals, and 6PPD-q


☐ **SMA 6) M Street and 39th Street Channel Erosion Study**

Project Description: This study will evaluate the cause of erosion at the corner of M Street and 39th Street. The project will develop upstream solutions or identify retrofits of existing facilities that would prevent erosion.
Relative Initial Cost: High
Relative Ongoing Cost: None
Relative Benefit: Moderate

Types of Pollutants Controlled/Removed: Sediment and direct stream habitat improvement

☐ **SMA 7) J Street High School Frontage Retrofit**

Project Description: This project will capitalize on an existing project at the Washougal high school property. The project will resurface portions of J Street, improve ditches and install bioswales along J Street, and connect a catch basin to reduce ponding. Potential pervious concrete sidewalk on one side of J Street.
Relative Initial Cost: Moderate
Relative Ongoing Cost: High
Relative Benefit: Low (1 acre)
Types of Pollutants Controlled/Removed: Flow control and TSS

Photo sourced from Google Maps

☐ **I do not prefer any of these options.**

Next

Washougal Stormwater Management Solutions for Campen Creek Catchment

Question 2. Select up to two preferred programs to improve water quality from the five options listed below.

☐ **SMA 8) Septic Elimination Program**

Project Description: This program will partially or fully fund properties currently operating on septic systems to connect to the City's sewer system in the catchment. There are 23 parcels with septic systems in the catchment.
Relative Initial Cost: Low
Relative Ongoing Cost: None
Relative Benefit: Moderate (49.3 acres)
Types of Pollutants Controlled/Removed: Fecal coliform and E. coli

☐ **SMA 9) Stream Shade Program**

Project Description: Modeled on the Watershed Alliance program the City will incentivize homeowners to improve native trees and shrubs along Campen Creek, tributaries, and ditches.
Relative Initial Cost: Low
Relative Ongoing Cost: Low
Relative Benefit: Low (10 acres)
Types of Pollutants Controlled/Removed: Flow control and temperature

☐ **SMA 10) Golf Course Voluntary Water Quality Program**

Project Description: The City would attempt to partner with Orchard Hills Golf Course. The golf course would voluntarily adjust their turf management practices and landscaping along Campen Creek to work towards the nutrient and temperature elements of the Salmon Safe Certification program (Riparian/Wetland/Vegetation Protection and Restoration; Pest Management and Nutrient Containment). Orchard Hills Golf Course could work towards being a Salmon Safe certified golf course in the future.
Relative Initial Cost: Low
Relative Ongoing Cost: Low
Relative Benefit: High (93 acres)
Types of Pollutants Controlled/Removed: Pesticides, fertilizers, temperature, and nutrients

☐ **SMA 11) Targeted Pet Waste Reduction Program**

Project Description: The program will enhance the existing pet waste program which provides pet waste bags at parks and trailheads by constructing permanent signs that discuss the impacts of pet waste on water quality in Washougal's waterbodies.
Relative Initial Cost: None
Relative Ongoing Cost: Low
Relative Benefit: Moderate (33 acres)
Types of Pollutants Controlled/Removed: Fecal coliform and E. coli

☐ **SMA 12) Urban Forestry Program**

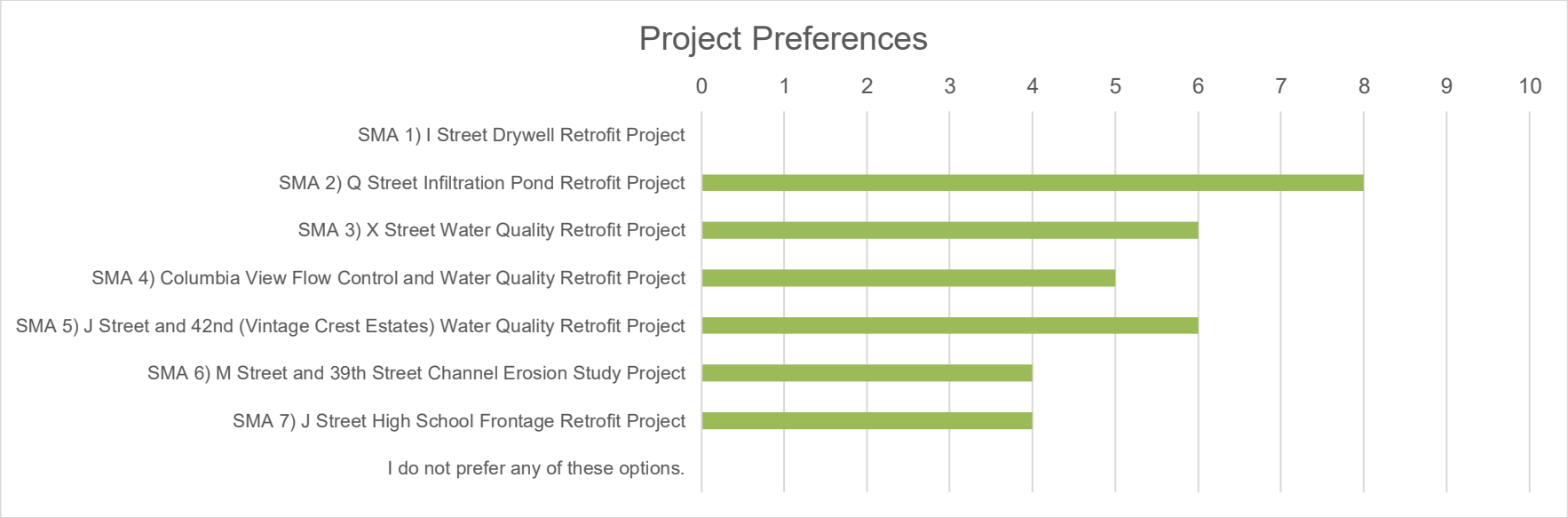
Project Description: The program aims to preserve, manage, and increase the urban tree canopy in Washougal. The program will include community outreach, active tree management, and policies managing removal, pruning, and planting of trees. If adopted, an urban forestry program would likely be city-wide but would be expected to provide benefits in Campen Creek Catchment.
Relative Initial Cost: Low
Relative Ongoing Cost: Low
Relative Benefit: High (10 acres)
Types of Pollutants Controlled/Removed: Flow control and temperature

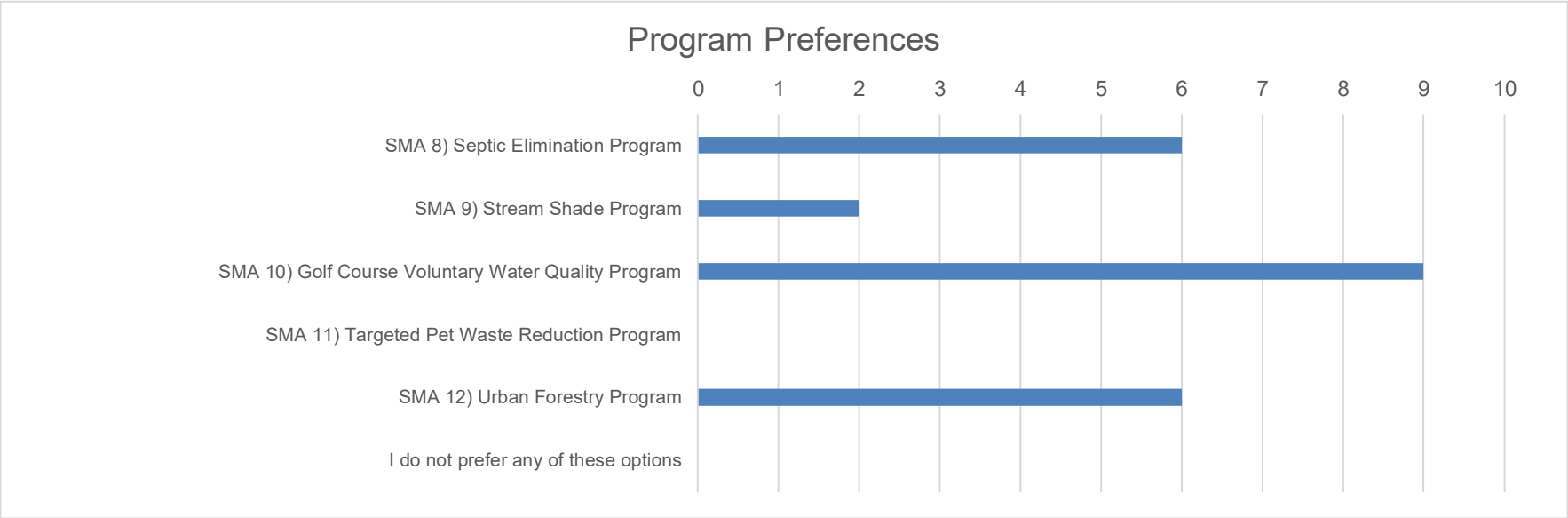
☐ **I do not prefer any of these options.**

Thank you for taking time to respond to this survey. Please press the "Done" button below for your answers to be recorded.

Prev Done

City of Washougal
SMAP Solutions Public Survey Results
November 2022





#1

COMPLETE

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Last Modified:	Thursday, November 03, 2022 12:48:28 PM
Time Spent:	00:04:18
IP Address:	74.85.229.90

Page 1

Q1

Question 1. Select up to three preferred stormwater retrofit solutions from the seven options listed below. To help you decide, we have shown each solution on the map to the right and have listed some key details for each option.

SMA 6) M Street and 39th Street Channel Erosion StudyProject Description: This study will evaluate the cause of erosion at the corner of M Street and 39th Street. The project will develop upstream solutions or identify retrofits of existing facilities that would prevent erosion.Relative Initial Cost: HighRelative Ongoing Cost: NoneRelative Benefit: ModerateTypes of Pollutants Controlled/Removed: Sediment and direct stream habitat improvement

Page 2

Q2

Question 2. Select up to two preferred programs to improve water quality from the five options listed below.

SMA 8) Septic Elimination ProgramProject Description: This program will partially or fully fund properties currently operating on septic systems to connect to the City's sewer system in the catchment. There are 23 parcels with septic systems in the catchment.Relative Initial Cost: LowRelative Ongoing Cost: NoneRelative Benefit: Moderate (49.3 acres)Types of Pollutants Controlled/Removed: Fecal coliform and E. coli

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SMA 10) Golf Course Voluntary Water Quality Program Project Description: The City would attempt to partner with Orchard Hills Golf Course. The golf course would voluntarily adjust their turf management practices and landscaping along Campen Creek to work towards the nutrient and temperature elements of the Salmon Safe Certification program (Riparian/Wetland/Vegetation Protection and Restoration; Pest Management and Nutrient Containment). Orchard Hills Golf Course could work towards being a Salmon Safe certified golf course in the future. Relative Initial Cost: LowRelative Ongoing Cost: LowRelative Benefit: High (93 acres)Types of Pollutants Controlled/Removed: Pesticides, fertilizers, temperature, and nutrients

#2

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IP Address:	73.157.183.19

Page 1

Q1

Question 1. Select up to three preferred stormwater retrofit solutions from the seven options listed below. To help you decide, we have shown each solution on the map to the right and have listed some key details for each option.

SMA 5) J Street and 42nd (Vintage Crest Estates) Water Quality RetrofitProject Description: This project will install bioretention planters for runoff treatment throughout the Vintage Crest neighborhood.Relative Initial Cost: ModerateRelative Ongoing Cost: HighRelative Benefit: High (31.5 acres)Types of Pollutants Controlled/Removed: TSS, dissolved metals, and 6PPD-q

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SMA 3) X Street Water Quality RetrofitProject Description: Install a water quality vault upstream of the existing detention pipe.Relative Initial Cost: LowRelative Ongoing Cost: LowRelative Benefit: High (27 acres)Types of Pollutants Controlled/Removed: TSS

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SMA 4) Columbia View Flow Control and Water Quality RetrofitProject Description: Add detention pipe capacity to meet current flow control standards and add bioretention planters for additional treatment throughout the Columbia View neighborhood upstream of flow control facility. Relative Initial Cost: HighRelative Ongoing Cost: HighRelative Benefit: High (20.5 acres)Types of Pollutants Controlled/Removed: Flow control, TSS, dissolved metals, and 6PPD-q

Page 2

Q2

Question 2. Select up to two preferred programs to improve water quality from the five options listed below.

SMA 12) Urban Forestry ProgramProject Description: The program aims to preserve, manage, and increase the urban tree canopy in Washougal. The program will include community outreach, active tree management, and policies managing removal, pruning, and planting of trees. If adopted, an urban forestry program would likely be city-wide but would be expected to provide benefits in Campen Creek Catchment. Relative Initial Cost: LowRelative Ongoing Cost: LowRelative Benefit: High (10 acres)Types of Pollutants Controlled/Removed: Flow control and temperature

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SMA 10) Golf Course Voluntary Water Quality Program Project Description: The City would attempt to partner with Orchard Hills Golf Course. The golf course would voluntarily adjust their turf management practices and landscaping along Campen Creek to work towards the nutrient and temperature elements of the Salmon Safe Certification program (Riparian/Wetland/Vegetation Protection and Restoration; Pest Management and Nutrient Containment). Orchard Hills Golf Course could work towards being a Salmon Safe certified golf course in the future. Relative Initial Cost: LowRelative Ongoing Cost: LowRelative Benefit: High (93 acres)Types of Pollutants Controlled/Removed: Pesticides, fertilizers, temperature, and nutrients

#3

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Time Spent:	00:09:07
IP Address:	50.39.122.91

Page 1

Q1

Question 1. Select up to three preferred stormwater retrofit solutions from the seven options listed below. To help you decide, we have shown each solution on the map to the right and have listed some key details for each option.

SMA 2) Q Street Infiltration Pond RetrofitProject Description: Redirect stormwater in a 20-acre basin to drain to the existing infiltration pond which is currently underutilized. Add pre-treatment.Relative Initial Cost: LowRelative Ongoing Cost: LowRelative Benefit: High (20-27 acres)Types of Pollutants Controlled/Removed: Flow control

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SMA 4) Columbia View Flow Control and Water Quality RetrofitProject Description: Add detention pipe capacity to meet current flow control standards and add bioretention planters for additional treatment throughout the Columbia View neighborhood upstream of flow control facility. Relative Initial Cost: HighRelative Ongoing Cost: HighRelative Benefit: High (20.5 acres)Types of Pollutants Controlled/Removed: Flow control, TSS, dissolved metals, and 6PPD-q

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SMA 7) J Street High School Frontage Retrofit Project Description: This project will capitalize on an existing project at the Washougal high school property. The project will resurface portions of J Street, improve ditches and install bioswales along J Street, and connect a catch basin to reduce ponding. Potential pervious concrete sidewalk on one side of J Street.Relative Initial Cost: ModerateRelative Ongoing Cost: HighRelative Benefit: Low (1 acre)Types of Pollutants Controlled/Removed: Flow control and TSS

Page 2

Q2

Question 2. Select up to two preferred programs to improve water quality from the five options listed below.

SMA 12) Urban Forestry ProgramProject Description: The program aims to preserve, manage, and increase the urban tree canopy in Washougal. The program will include community outreach, active tree management, and policies managing removal, pruning, and planting of trees. If adopted, an urban forestry program would likely be city-wide but would be expected to provide benefits in Campen Creek Catchment. Relative Initial Cost: LowRelative Ongoing Cost: LowRelative Benefit: High (10 acres)Types of Pollutants Controlled/Removed: Flow control and temperature

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SMA 10) Golf Course Voluntary Water Quality Program Project Description: The City would attempt to partner with Orchard Hills Golf Course. The golf course would voluntarily adjust their turf management practices and landscaping along Campen Creek to work towards the nutrient and temperature elements of the Salmon Safe Certification program (Riparian/Wetland/Vegetation Protection and Restoration; Pest Management and Nutrient Containment). Orchard Hills Golf Course could work towards being a Salmon Safe certified golf course in the future. Relative Initial Cost: LowRelative Ongoing Cost: LowRelative Benefit: High (93 acres)Types of Pollutants Controlled/Removed: Pesticides, fertilizers, temperature, and nutrients

#4

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Page 1

Q1

Question 1. Select up to three preferred stormwater retrofit solutions from the seven options listed below. To help you decide, we have shown each solution on the map to the right and have listed some key details for each option.

SMA 2) Q Street Infiltration Pond RetrofitProject Description: Redirect stormwater in a 20-acre basin to drain to the existing infiltration pond which is currently underutilized. Add pre-treatment.Relative Initial Cost: LowRelative Ongoing Cost: LowRelative Benefit: High (20-27 acres)Types of Pollutants Controlled/Removed: Flow control

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SMA 3) X Street Water Quality RetrofitProject Description: Install a water quality vault upstream of the existing detention pipe.Relative Initial Cost: LowRelative Ongoing Cost: LowRelative Benefit: High (27 acres)Types of Pollutants Controlled/Removed: TSS

Page 2

Q2

Question 2. Select up to two preferred programs to improve water quality from the five options listed below.

SMA 8) Septic Elimination ProgramProject Description: This program will partially or fully fund properties currently operating on septic systems to connect to the City's sewer system in the catchment. There are 23 parcels with septic systems in the catchment.Relative Initial Cost: LowRelative Ongoing Cost: NoneRelative Benefit: Moderate (49.3 acres)Types of Pollutants Controlled/Removed: Fecal coliform and E. coli

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SMA 12) Urban Forestry ProgramProject Description: The program aims to preserve, manage, and increase the urban tree canopy in Washougal. The program will include community outreach, active tree management, and policies managing removal, pruning, and planting of trees. If adopted, an urban forestry program would likely be city-wide but would be expected to provide benefits in Campen Creek Catchment. Relative Initial Cost: LowRelative Ongoing Cost: LowRelative Benefit: High (10 acres)Types of Pollutants Controlled/Removed: Flow control and temperature

#5

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Page 1

Q1

Question 1. Select up to three preferred stormwater retrofit solutions from the seven options listed below. To help you decide, we have shown each solution on the map to the right and have listed some key details for each option.

SMA 2) Q Street Infiltration Pond RetrofitProject Description: Redirect stormwater in a 20-acre basin to drain to the existing infiltration pond which is currently underutilized. Add pre-treatment.Relative Initial Cost: LowRelative Ongoing Cost: LowRelative Benefit: High (20-27 acres)Types of Pollutants Controlled/Removed: Flow control

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SMA 3) X Street Water Quality RetrofitProject Description: Install a water quality vault upstream of the existing detention pipe.Relative Initial Cost: LowRelative Ongoing Cost: LowRelative Benefit: High (27 acres)Types of Pollutants Controlled/Removed: TSS

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SMA 4) Columbia View Flow Control and Water Quality RetrofitProject Description: Add detention pipe capacity to meet current flow control standards and add bioretention planters for additional treatment throughout the Columbia View neighborhood upstream of flow control facility. Relative Initial Cost: HighRelative Ongoing Cost: HighRelative Benefit: High (20.5 acres)Types of Pollutants Controlled/Removed: Flow control, TSS, dissolved metals, and 6PPD-q

Page 2

Q2

Question 2. Select up to two preferred programs to improve water quality from the five options listed below.

SMA 12) Urban Forestry ProgramProject Description: The program aims to preserve, manage, and increase the urban tree canopy in Washougal. The program will include community outreach, active tree management, and policies managing removal, pruning, and planting of trees. If adopted, an urban forestry program would likely be city-wide but would be expected to provide benefits in Campen Creek Catchment. Relative Initial Cost: LowRelative Ongoing Cost: LowRelative Benefit: High (10 acres)Types of Pollutants Controlled/Removed: Flow control and temperature

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SMA 9) Stream Shade Program Project Description: Modeled on the Watershed Alliance program the City will incentivize homeowners to improve native trees and shrubs along Campen Creek, tributaries, and ditches. Relative Initial Cost: LowRelative Ongoing Cost: LowRelative Benefit: Low (10 acres)Types of Pollutants Controlled/Removed: Flow control and temperature

#6

COMPLETE

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Time Spent:	00:08:40
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Page 1

Q1

Question 1. Select up to three preferred stormwater retrofit solutions from the seven options listed below. To help you decide, we have shown each solution on the map to the right and have listed some key details for each option.

SMA 2) Q Street Infiltration Pond RetrofitProject Description: Redirect stormwater in a 20-acre basin to drain to the existing infiltration pond which is currently underutilized. Add pre-treatment.Relative Initial Cost: LowRelative Ongoing Cost: LowRelative Benefit: High (20-27 acres)Types of Pollutants Controlled/Removed: Flow control

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SMA 3) X Street Water Quality RetrofitProject Description: Install a water quality vault upstream of the existing detention pipe.Relative Initial Cost: LowRelative Ongoing Cost: LowRelative Benefit: High (27 acres)Types of Pollutants Controlled/Removed: TSS

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SMA 4) Columbia View Flow Control and Water Quality RetrofitProject Description: Add detention pipe capacity to meet current flow control standards and add bioretention planters for additional treatment throughout the Columbia View neighborhood upstream of flow control facility. Relative Initial Cost: HighRelative Ongoing Cost: HighRelative Benefit: High (20.5 acres)Types of Pollutants Controlled/Removed: Flow control, TSS, dissolved metals, and 6PPD-q

Page 2

Q2

Question 2. Select up to two preferred programs to improve water quality from the five options listed below.

SMA 12) Urban Forestry ProgramProject Description: The program aims to preserve, manage, and increase the urban tree canopy in Washougal. The program will include community outreach, active tree management, and policies managing removal, pruning, and planting of trees. If adopted, an urban forestry program would likely be city-wide but would be expected to provide benefits in Campen Creek Catchment. Relative Initial Cost: LowRelative Ongoing Cost: LowRelative Benefit: High (10 acres)Types of Pollutants Controlled/Removed: Flow control and temperature

#7

COMPLETE

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Page 1

Q1

Question 1. Select up to three preferred stormwater retrofit solutions from the seven options listed below. To help you decide, we have shown each solution on the map to the right and have listed some key details for each option.

SMA 2) Q Street Infiltration Pond RetrofitProject Description: Redirect stormwater in a 20-acre basin to drain to the existing infiltration pond which is currently underutilized. Add pre-treatment.Relative Initial Cost: LowRelative Ongoing Cost: LowRelative Benefit: High (20-27 acres)Types of Pollutants Controlled/Removed: Flow control

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SMA 3) X Street Water Quality RetrofitProject Description: Install a water quality vault upstream of the existing detention pipe.Relative Initial Cost: LowRelative Ongoing Cost: LowRelative Benefit: High (27 acres)Types of Pollutants Controlled/Removed: TSS

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SMA 7) J Street High School Frontage Retrofit Project Description: This project will capitalize on an existing project at the Washougal high school property. The project will resurface portions of J Street, improve ditches and install bioswales along J Street, and connect a catch basin to reduce ponding. Potential pervious concrete sidewalk on one side of J Street.Relative Initial Cost: ModerateRelative Ongoing Cost: HighRelative Benefit: Low (1 acre)Types of Pollutants Controlled/Removed: Flow control and TSS

Page 2

Q2

Question 2. Select up to two preferred programs to improve water quality from the five options listed below.

SMA 8) Septic Elimination ProgramProject Description: This program will partially or fully fund properties currently operating on septic systems to connect to the City's sewer system in the catchment. There are 23 parcels with septic systems in the catchment.Relative Initial Cost: LowRelative Ongoing Cost: NoneRelative Benefit: Moderate (49.3 acres)Types of Pollutants Controlled/Removed: Fecal coliform and E. coli

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SMA 10) Golf Course Voluntary Water Quality Program Project Description: The City would attempt to partner with Orchard Hills Golf Course. The golf course would voluntarily adjust their turf management practices and landscaping along Campen Creek to work towards the nutrient and temperature elements of the Salmon Safe Certification program (Riparian/Wetland/Vegetation Protection and Restoration; Pest Management and Nutrient Containment). Orchard Hills Golf Course could work towards being a Salmon Safe certified golf course in the future. Relative Initial Cost: LowRelative Ongoing Cost: LowRelative Benefit: High (93 acres)Types of Pollutants Controlled/Removed: Pesticides, fertilizers, temperature, and nutrients

#8

COMPLETE

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Last Modified:	Sunday, November 06, 2022 4:09:52 PM
Time Spent:	Over a day
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Page 1

Q1

Question 1. Select up to three preferred stormwater retrofit solutions from the seven options listed below. To help you decide, we have shown each solution on the map to the right and have listed some key details for each option.

SMA 5) J Street and 42nd (Vintage Crest Estates) Water Quality RetrofitProject Description: This project will install bioretention planters for runoff treatment throughout the Vintage Crest neighborhood.Relative Initial Cost: ModerateRelative Ongoing Cost: HighRelative Benefit: High (31.5 acres)Types of Pollutants Controlled/Removed: TSS, dissolved metals, and 6PPD-q

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SMA 6) M Street and 39th Street Channel Erosion StudyProject Description: This study will evaluate the cause of erosion at the corner of M Street and 39th Street. The project will develop upstream solutions or identify retrofits of existing facilities that would prevent erosion.Relative Initial Cost: HighRelative Ongoing Cost: NoneRelative Benefit: ModerateTypes of Pollutants Controlled/Removed: Sediment and direct stream habitat improvement

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SMA 7) J Street High School Frontage Retrofit Project Description: This project will capitalize on an existing project at the Washougal high school property. The project will resurface portions of J Street, improve ditches and install bioswales along J Street, and connect a catch basin to reduce ponding. Potential pervious concrete sidewalk on one side of J Street.Relative Initial Cost: ModerateRelative Ongoing Cost: HighRelative Benefit: Low (1 acre)Types of Pollutants Controlled/Removed: Flow control and TSS

Page 2

Q2

Question 2. Select up to two preferred programs to improve water quality from the five options listed below.

SMA 9) Stream Shade Program Project Description: Modeled on the Watershed Alliance program the City will incentivize homeowners to improve native trees and shrubs along Campen Creek, tributaries, and ditches. Relative Initial Cost: LowRelative Ongoing Cost: LowRelative Benefit: Low (10 acres)Types of Pollutants Controlled/Removed: Flow control and temperature

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SMA 10) Golf Course Voluntary Water Quality Program Project Description: The City would attempt to partner with Orchard Hills Golf Course. The golf course would voluntarily adjust their turf management practices and landscaping along Campen Creek to work towards the nutrient and temperature elements of the Salmon Safe Certification program (Riparian/Wetland/Vegetation Protection and Restoration; Pest Management and Nutrient Containment). Orchard Hills Golf Course could work towards being a Salmon Safe certified golf course in the future. Relative Initial Cost: LowRelative Ongoing Cost: LowRelative Benefit: High (93 acres)Types of Pollutants Controlled/Removed: Pesticides, fertilizers, temperature, and nutrients

#9

COMPLETE

Collector:	Web Link 1 (Web Link)
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Last Modified:	Monday, November 07, 2022 4:39:52 PM
Time Spent:	00:13:06
IP Address:	71.236.207.172

Page 1

Q1

Question 1. Select up to three preferred stormwater retrofit solutions from the seven options listed below. To help you decide, we have shown each solution on the map to the right and have listed some key details for each option.

SMA 5) J Street and 42nd (Vintage Crest Estates) Water Quality RetrofitProject Description: This project will install bioretention planters for runoff treatment throughout the Vintage Crest neighborhood.Relative Initial Cost: ModerateRelative Ongoing Cost: HighRelative Benefit: High (31.5 acres)Types of Pollutants Controlled/Removed: TSS, dissolved metals, and 6PPD-q

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SMA 2) Q Street Infiltration Pond RetrofitProject Description: Redirect stormwater in a 20-acre basin to drain to the existing infiltration pond which is currently underutilized. Add pre-treatment.Relative Initial Cost: LowRelative Ongoing Cost: LowRelative Benefit: High (20-27 acres)Types of Pollutants Controlled/Removed: Flow control

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SMA 3) X Street Water Quality RetrofitProject Description: Install a water quality vault upstream of the existing detention pipe.Relative Initial Cost: LowRelative Ongoing Cost: LowRelative Benefit: High (27 acres)Types of Pollutants Controlled/Removed: TSS

Page 2

Q2

Question 2. Select up to two preferred programs to improve water quality from the five options listed below.

SMA 8) Septic Elimination ProgramProject Description: This program will partially or fully fund properties currently operating on septic systems to connect to the City's sewer system in the catchment. There are 23 parcels with septic systems in the catchment.Relative Initial Cost: LowRelative Ongoing Cost: NoneRelative Benefit: Moderate (49.3 acres)Types of Pollutants Controlled/Removed: Fecal coliform and E. coli

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SMA 10) Golf Course Voluntary Water Quality Program Project Description: The City would attempt to partner with Orchard Hills Golf Course. The golf course would voluntarily adjust their turf management practices and landscaping along Campen Creek to work towards the nutrient and temperature elements of the Salmon Safe Certification program (Riparian/Wetland/Vegetation Protection and Restoration; Pest Management and Nutrient Containment). Orchard Hills Golf Course could work towards being a Salmon Safe certified golf course in the future. Relative Initial Cost: LowRelative Ongoing Cost: LowRelative Benefit: High (93 acres)Types of Pollutants Controlled/Removed: Pesticides, fertilizers, temperature, and nutrients

#10

COMPLETE

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Last Modified:	Wednesday, November 16, 2022 7:16:25 AM
Time Spent:	00:02:48
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Page 1

Q1

Question 1. Select up to three preferred stormwater retrofit solutions from the seven options listed below. To help you decide, we have shown each solution on the map to the right and have listed some key details for each option.

SMA 5) J Street and 42nd (Vintage Crest Estates) Water Quality RetrofitProject Description: This project will install bioretention planters for runoff treatment throughout the Vintage Crest neighborhood.Relative Initial Cost: ModerateRelative Ongoing Cost: HighRelative Benefit: High (31.5 acres)Types of Pollutants Controlled/Removed: TSS, dissolved metals, and 6PPD-q

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SMA 2) Q Street Infiltration Pond RetrofitProject Description: Redirect stormwater in a 20-acre basin to drain to the existing infiltration pond which is currently underutilized. Add pre-treatment.Relative Initial Cost: LowRelative Ongoing Cost: LowRelative Benefit: High (20-27 acres)Types of Pollutants Controlled/Removed: Flow control

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SMA 6) M Street and 39th Street Channel Erosion StudyProject Description: This study will evaluate the cause of erosion at the corner of M Street and 39th Street. The project will develop upstream solutions or identify retrofits of existing facilities that would prevent erosion.Relative Initial Cost: HighRelative Ongoing Cost: NoneRelative Benefit: ModerateTypes of Pollutants Controlled/Removed: Sediment and direct stream habitat improvement

Page 2

Q2

Question 2. Select up to two preferred programs to improve water quality from the five options listed below.

SMA 8) Septic Elimination ProgramProject Description: This program will partially or fully fund properties currently operating on septic systems to connect to the City's sewer system in the catchment. There are 23 parcels with septic systems in the catchment.Relative Initial Cost: LowRelative Ongoing Cost: NoneRelative Benefit: Moderate (49.3 acres)Types of Pollutants Controlled/Removed: Fecal coliform and E. coli

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SMA 10) Golf Course Voluntary Water Quality Program Project Description: The City would attempt to partner with Orchard Hills Golf Course. The golf course would voluntarily adjust their turf management practices and landscaping along Campen Creek to work towards the nutrient and temperature elements of the Salmon Safe Certification program (Riparian/Wetland/Vegetation Protection and Restoration; Pest Management and Nutrient Containment). Orchard Hills Golf Course could work towards being a Salmon Safe certified golf course in the future. Relative Initial Cost: LowRelative Ongoing Cost: LowRelative Benefit: High (93 acres)Types of Pollutants Controlled/Removed: Pesticides, fertilizers, temperature, and nutrients

#11

COMPLETE

Collector:	Web Link 1 (Web Link)
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Last Modified:	Thursday, November 17, 2022 11:25:28 AM
Time Spent:	00:05:58
IP Address:	50.193.214.237

Page 1

Q1

Question 1. Select up to three preferred stormwater retrofit solutions from the seven options listed below. To help you decide, we have shown each solution on the map to the right and have listed some key details for each option.

SMA 5) J Street and 42nd (Vintage Crest Estates) Water Quality RetrofitProject Description: This project will install bioretention planters for runoff treatment throughout the Vintage Crest neighborhood.Relative Initial Cost: ModerateRelative Ongoing Cost: HighRelative Benefit: High (31.5 acres)Types of Pollutants Controlled/Removed: TSS, dissolved metals, and 6PPD-q

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SMA 2) Q Street Infiltration Pond RetrofitProject Description: Redirect stormwater in a 20-acre basin to drain to the existing infiltration pond which is currently underutilized. Add pre-treatment.Relative Initial Cost: LowRelative Ongoing Cost: LowRelative Benefit: High (20-27 acres)Types of Pollutants Controlled/Removed: Flow control

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SMA 7) J Street High School Frontage Retrofit Project Description: This project will capitalize on an existing project at the Washougal high school property. The project will resurface portions of J Street, improve ditches and install bioswales along J Street, and connect a catch basin to reduce ponding. Potential pervious concrete sidewalk on one side of J Street.Relative Initial Cost: ModerateRelative Ongoing Cost: HighRelative Benefit: Low (1 acre)Types of Pollutants Controlled/Removed: Flow control and TSS

Page 2

Q2

Question 2. Select up to two preferred programs to improve water quality from the five options listed below.

SMA 12) Urban Forestry ProgramProject Description: The program aims to preserve, manage, and increase the urban tree canopy in Washougal. The program will include community outreach, active tree management, and policies managing removal, pruning, and planting of trees. If adopted, an urban forestry program would likely be city-wide but would be expected to provide benefits in Campen Creek Catchment. Relative Initial Cost: LowRelative Ongoing Cost: LowRelative Benefit: High (10 acres)Types of Pollutants Controlled/Removed: Flow control and temperature

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SMA 10) Golf Course Voluntary Water Quality Program Project Description: The City would attempt to partner with Orchard Hills Golf Course. The golf course would voluntarily adjust their turf management practices and landscaping along Campen Creek to work towards the nutrient and temperature elements of the Salmon Safe Certification program (Riparian/Wetland/Vegetation Protection and Restoration; Pest Management and Nutrient Containment). Orchard Hills Golf Course could work towards being a Salmon Safe certified golf course in the future. Relative Initial Cost: LowRelative Ongoing Cost: LowRelative Benefit: High (93 acres)Types of Pollutants Controlled/Removed: Pesticides, fertilizers, temperature, and nutrients

#12

COMPLETE

Collector:	Web Link 1 (Web Link)
Started:	Thursday, November 17, 2022 12:29:39 PM
Last Modified:	Thursday, November 17, 2022 1:15:53 PM
Time Spent:	00:46:13
IP Address:	198.99.101.244

Page 1

Q1

Question 1. Select up to three preferred stormwater retrofit solutions from the seven options listed below. To help you decide, we have shown each solution on the map to the right and have listed some key details for each option.

SMA 5) J Street and 42nd (Vintage Crest Estates) Water Quality RetrofitProject Description: This project will install bioretention planters for runoff treatment throughout the Vintage Crest neighborhood.Relative Initial Cost: ModerateRelative Ongoing Cost: HighRelative Benefit: High (31.5 acres)Types of Pollutants Controlled/Removed: TSS, dissolved metals, and 6PPD-q

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SMA 4) Columbia View Flow Control and Water Quality RetrofitProject Description: Add detention pipe capacity to meet current flow control standards and add bioretention planters for additional treatment throughout the Columbia View neighborhood upstream of flow control facility. Relative Initial Cost: HighRelative Ongoing Cost: HighRelative Benefit: High (20.5 acres)Types of Pollutants Controlled/Removed: Flow control, TSS, dissolved metals, and 6PPD-q

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SMA 6) M Street and 39th Street Channel Erosion StudyProject Description: This study will evaluate the cause of erosion at the corner of M Street and 39th Street. The project will develop upstream solutions or identify retrofits of existing facilities that would prevent erosion.Relative Initial Cost: HighRelative Ongoing Cost: NoneRelative Benefit: ModerateTypes of Pollutants Controlled/Removed: Sediment and direct stream habitat improvement

Page 2

Q2

Question 2. Select up to two preferred programs to improve water quality from the five options listed below.

SMA 8) Septic Elimination ProgramProject Description: This program will partially or fully fund properties currently operating on septic systems to connect to the City's sewer system in the catchment. There are 23 parcels with septic systems in the catchment.Relative Initial Cost: LowRelative Ongoing Cost: NoneRelative Benefit: Moderate (49.3 acres)Types of Pollutants Controlled/Removed: Fecal coliform and E. coli

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SMA 10) Golf Course Voluntary Water Quality Program Project Description: The City would attempt to partner with Orchard Hills Golf Course. The golf course would voluntarily adjust their turf management practices and landscaping along Campen Creek to work towards the nutrient and temperature elements of the Salmon Safe Certification program (Riparian/Wetland/Vegetation Protection and Restoration; Pest Management and Nutrient Containment). Orchard Hills Golf Course could work towards being a Salmon Safe certified golf course in the future. Relative Initial Cost: LowRelative Ongoing Cost: LowRelative Benefit: High (93 acres)Types of Pollutants Controlled/Removed: Pesticides, fertilizers, temperature, and nutrients

Appendix E

Recommended CIP Factsheets

Memorandum

To:	Sean Mulderig (City of Washougal)
From:	Trista Kobluskie; Cody Kent; Frank Sottosanto, PE
Date:	February 15, 2023
Subject:	City of Washougal SMAP Project Cost Opinion Methodology
Project No.:	20155

The Washougal Stormwater Management Action Plan (SMAP) includes four recommended Capital Improvement Projects (CIPs). These CIPs are retrofit projects that would address water quality or flow control deficiencies in existing infrastructure. Otak developed planning-level project scopes and cost opinions for these projects. This appendix describes the procedure used to assess the cost of these CIPs.

1. Project Scopes

Cost opinions are based on conceptual project scopes and engineering and are presented in 2023 dollars. Conceptual project scopes and designs are developed with limited detail about permit requirements, existing system attributes (e.g., invert elevations), utility conflicts, and external impacts. Conceptual engineering includes preliminary engineering calculations or uses information from recent similar work. Concepts and costs should be considered preliminary.

2. Construction

Construction consists of construction elements and required ancillary construction pay items.

2.1. Construction Elements

Construction elements are the necessary significant pay items to construct the project. Items are usually presented as a package that includes labor and a variety of materials. For example, the unit cost for a right-of-way bioretention planter is a package based on a typical design and includes labor and materials such as Portland cement, pipe, bioretention soils, plants, and other needed materials. Otak civil engineers researched unit prices from recently completed local and regional construction projects to assess project costs. Each project includes an engineer's assumption for preliminary unit quantities.

2.2. Required Ancillary Items

Required ancillary construction items include mobilization, temporary water management, erosion & sedimentation control, traffic control, and a planning level construction contingency. Each of these is calculated based on a percentage of project costs as described in the table below.

Type of Cost	Includes	How Applied	How Calculated
Mobilization	▪ Contractor's mobilization	All projects	10% of construction elements subtotal
Erosion & Sedimentation Control	▪ Contractor's erosion control costs	All projects	5% of construction elements subtotal
Traffic Control	▪ Contractor's traffic control costs	If needed based on desktop analysis of site conditions	Percentage of construction elements subtotal based on engineering judgement
Planning Level Construction Contingency	▪ Expected costs that are not specified at the planning level	All projects	Percentage of total construction cost ▪ 40% for less than $500,000 construction ▪ 30% for over $500,000 construction

3. Permitting and Land Acquisition

Basic Permitting cost was applied to all sites. Based on desktop analysis, no sites trigger federal or state environmental permits or environmental mitigation, which would entail additional cost. Basic permitting is estimated to be $15,000 for all projects.

Land acquisition is not anticipated for any of the projects.

4. Studies and Engineering

Type of Cost	Includes	How Applied	How Calculated
State Sales Tax*	▪ State sales and use tax rate ▪ Local City/County sales and use tax rate ▪ Rates effective 1/1/2023	All Projects	8.5% of total construction

Type of Cost	Includes	How Applied	How Calculated
Engineering	▪ Engineering design ▪ Preparation of SWPPP and erosion & sediment control plans ▪ Geotechnical studies (if needed) ▪ Archaeological survey (if needed) ▪ Other special studies when described in fact sheet	All projects	Varied percentage of total construction cost ▪ 25% for construction under $500,000 ▪ 20% for construction over $500,000 ▪ 15% for construction over $1 million
Project Administration	▪ City's staffing cost to manage the project and related grants, if any	All projects	Varied percentage of total construction cost ▪ 5% for construction under $1 million ▪ 2% for construction over $1 million
Construction Management	▪ Either the City's staffing or a contractor to oversee construction	All projects	10% of total construction
Survey	▪ Survey	All projects	2% of total construction

* Depending on classification of the project, it may not require a separate sales tax. City will make this determination when putting a project out to bid.

5. Escalation and Future Estimation

Cost opinions were developed in 2023 dollars. Cost opinions in the SMAP do not include escalation. Otak recommends escalating a cost opinion using an established index when the City adds a project to its capital improvement program. After the project design phase is complete, the construction costs should be replaced by the engineers' estimate.

PROJECT FACTSHEET—SMA-1

Project Title: Washougal High School Vicinity Stormwater Retrofit

Location: Washougal High School property; I and J Streets between 34th Street and 39th Street

Campen Creek Stormwater Improvement Project

October 12, 2022

Project Lead:

Lower Columbia Estuary Partnership

Project Partners:

City of Washougal

WASHOUGAL SCHOOL DISTRICT

Designer:

JUNCUS STUDIO

GENERAL INFORMATION

ROADWAY FUNCTIONAL CLASSIFICATION:

J ST	Urban Collector
36TH ST	Local Roads
I ST	Local Roads

DRAINAGE BASINS:

1	EAST BIORETENTION SWALE RENOVATION	30,600 SF (3.00 AC)
2	PARKING LOT BIORETENTION PLANTER RETROFITS	88,030 SF (2.02 AC)
3	J ST ROADSIDE BIORETENTION SWALE RENOVATION	64,900 SF (1.49 AC)
4	36TH ST ROADSIDE BIORETENTION PLANTER RETROFIT	12,850 SF (0.29 AC)
5	I ST ROADSIDE BIORETENTION PLANTER RETROFIT	70,500 SF (1.62 AC)
Total		**366,800 SF (8.42 AC)**

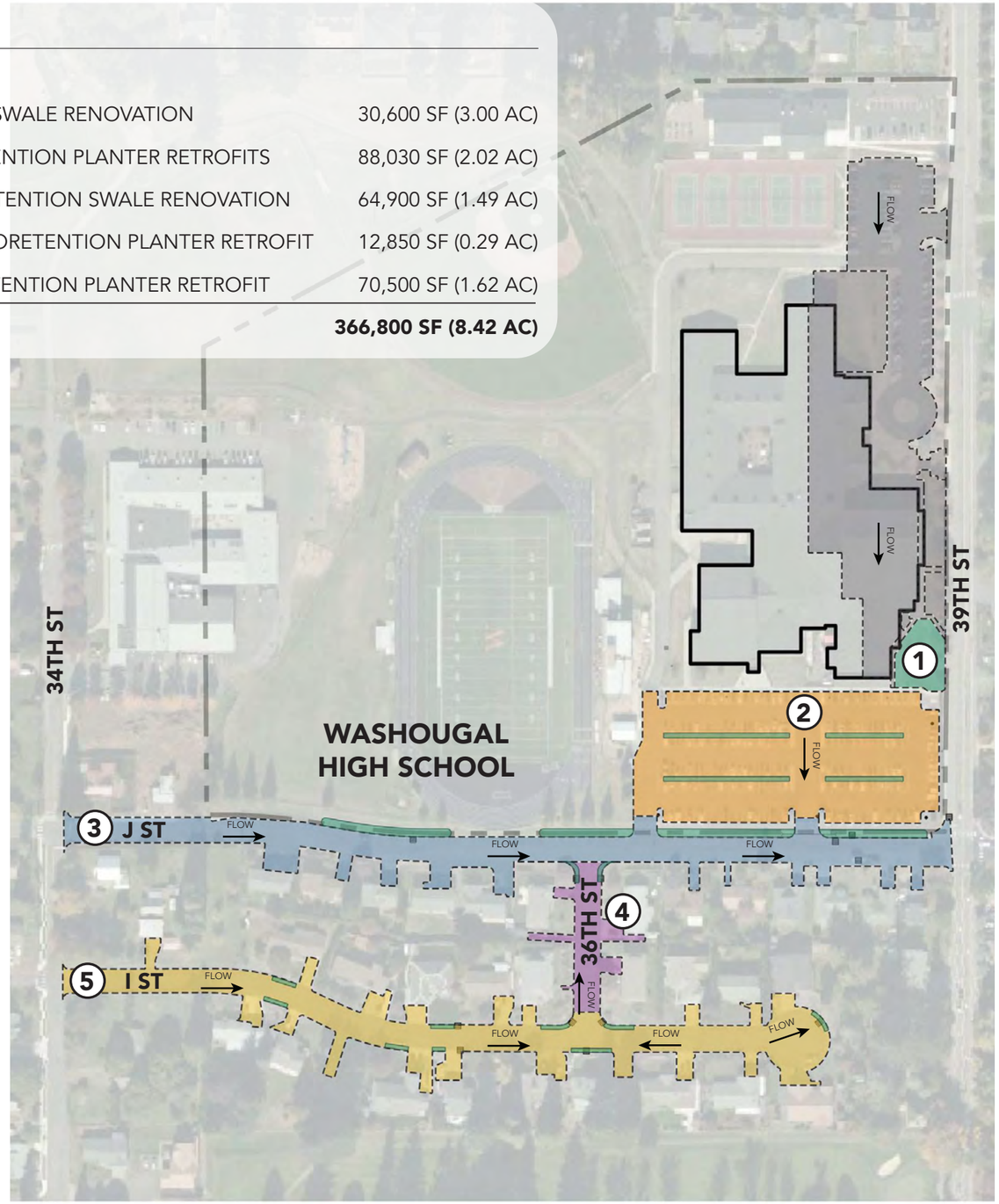
1 EAST BIORETENTION SWALE RENOVATION

2 PARKING LOT BIORETENTION PLANTER RETROFITS

4 ROADSIDE BIORETENTION PLANTER RETROFITS

3 ROADSIDE BIORETENTION SWALE RENOVATION

5 ROADSIDE BIORETENTION PLANTER RETROFITS



SCHOOL RETROFITS

CITY RETROFITS

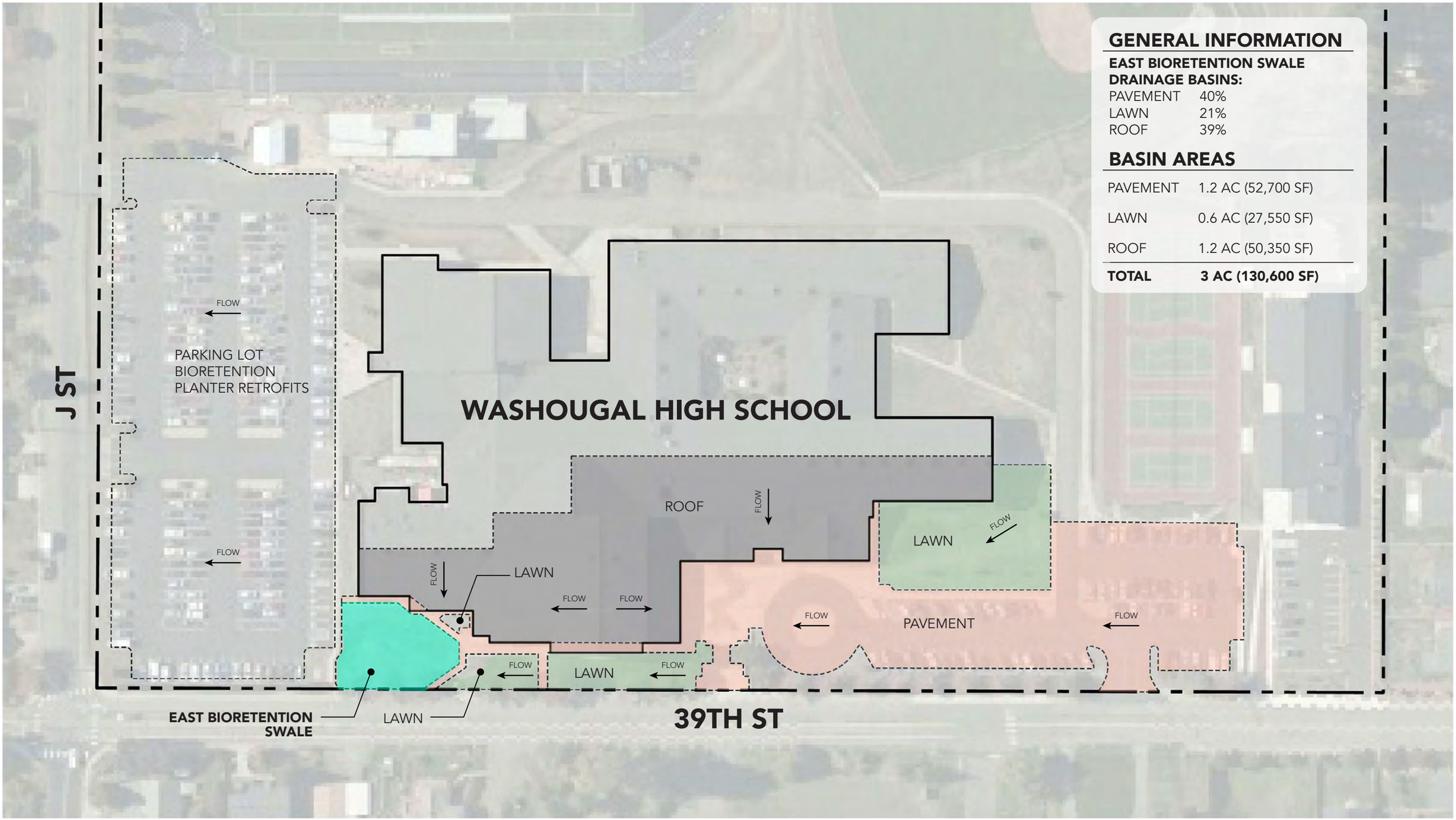
Neighborhood Drainage Basins

Campen Creek Stormwater Improvement Project

October 12, 2022

0 100′ 200′ 400′

JUNCUS STUDIO



GENERAL INFORMATION

EAST BIORETENTION SWALE DRAINAGE BASINS:

PAVEMENT	40%
LAWN	21%
ROOF	39%

BASIN AREAS

PAVEMENT	1.2 AC (52,700 SF)
LAWN	0.6 AC (27,550 SF)
ROOF	1.2 AC (50,350 SF)
TOTAL	**3 AC (130,600 SF)**

1 East Bioretention Swale Drainage Basins

Campen Creek Stormwater Improvement Project

October 12, 2022

0 40′ 80′ 160′

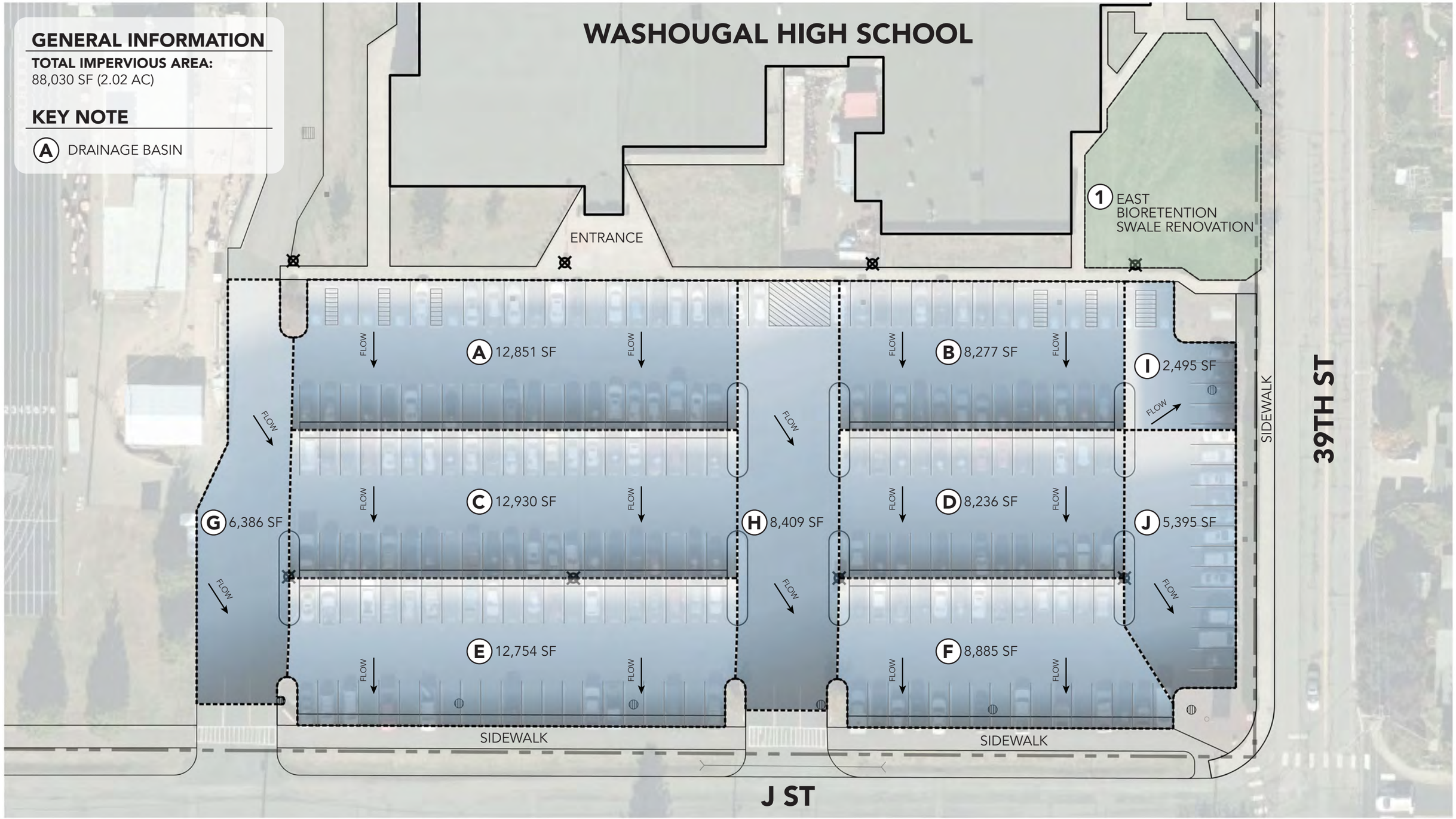
JUNCUS STUDIO

GENERAL INFORMATION

TOTAL IMPERVIOUS AREA:
88,030 SF (2.02 AC)

KEY NOTE

(A) DRAINAGE BASIN



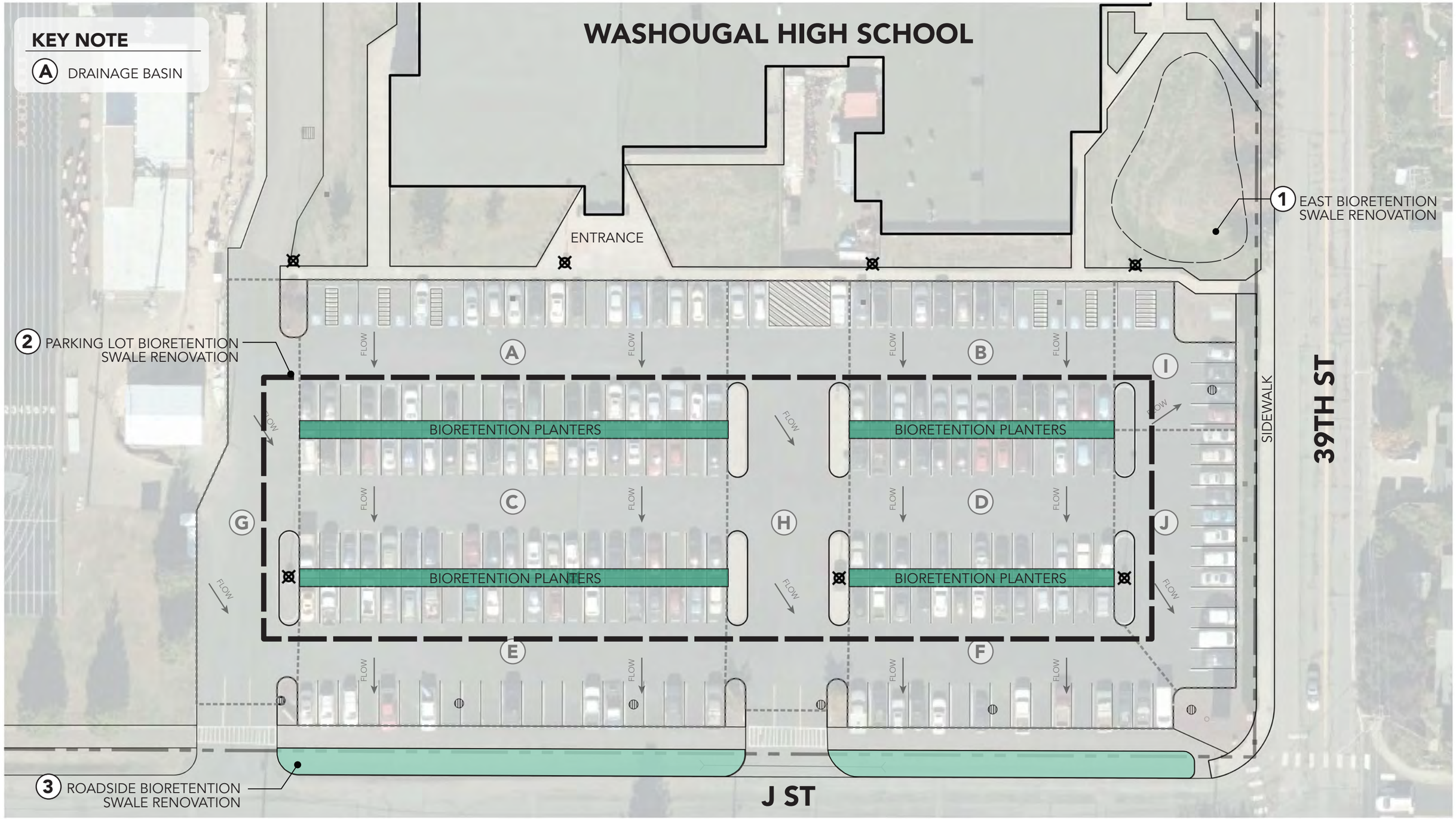
2 Parking Lot Drainage Basins

Campen Creek Stormwater Improvement Project

October 12, 2022

0 20′ 40′ 80′

JUNCUS STUDIO



2 Parking Lot Bioretention Planter Retrofits

Campen Creek Stormwater Improvement Project

October 12, 2022

0 20′ 40′ 80′

JUNCUS STUDIO

OPTION WITH WHEEL STOPS

Total Area of SW Facilities : 3,060 SF
Total Impervious Runoff Area Managed : 37,000 SF (0.9 AC)

OPTION WITH CURB & GUTTER

Total Area of SW Facilities : 4,300 SF
Total Impervious Runoff Area Managed : 36,000 SF (0.8 AC)

2 Parking Lot Bioretention Planter Retrofit

Campen Creek Stormwater Improvement Project

October 12, 2022

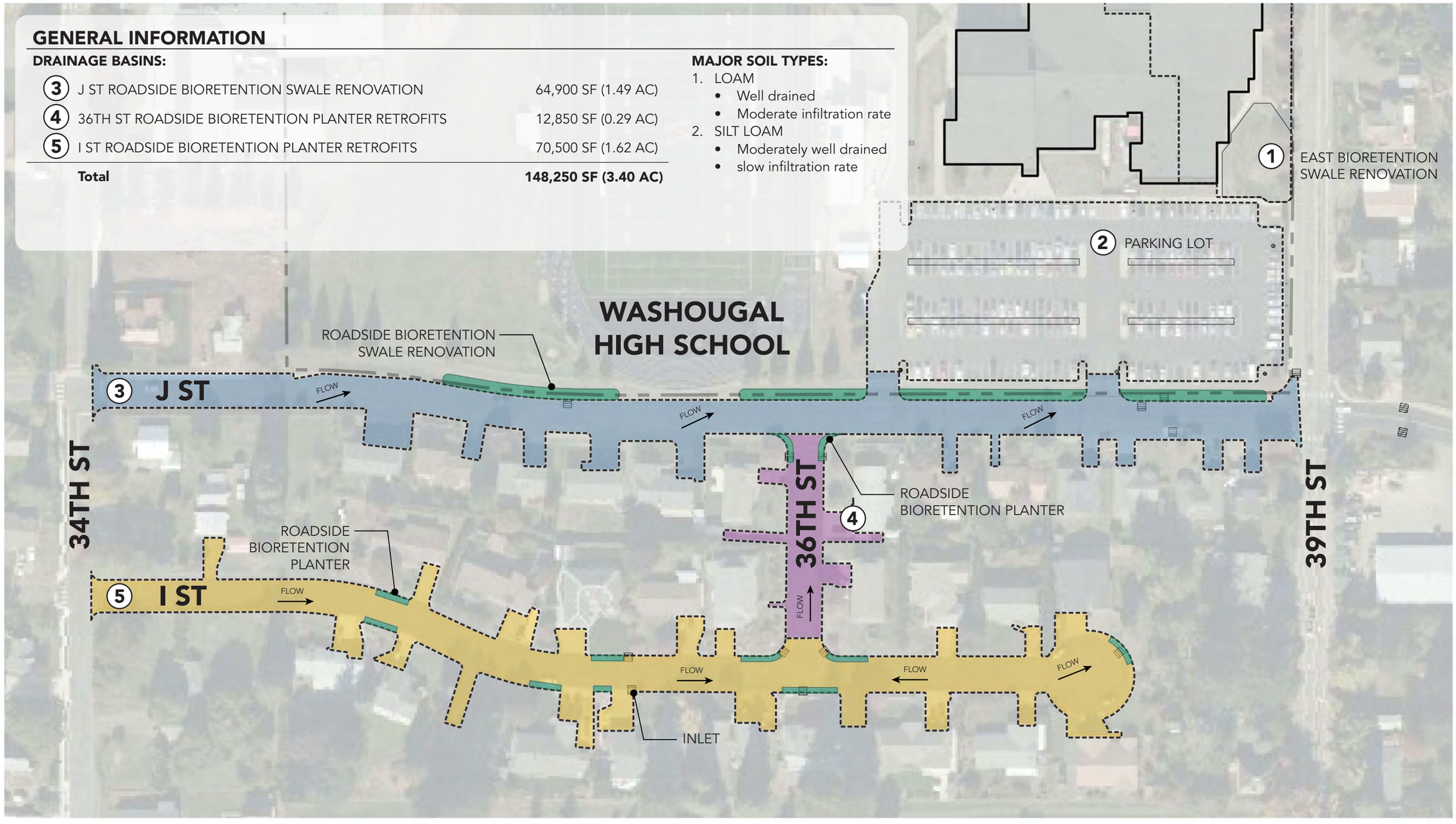
GENERAL INFORMATION

DRAINAGE BASINS:

3	J ST ROADSIDE BIORETENTION SWALE RENOVATION	64,900 SF (1.49 AC)
4	36TH ST ROADSIDE BIORETENTION PLANTER RETROFITS	12,850 SF (0.29 AC)
5	I ST ROADSIDE BIORETENTION PLANTER RETROFITS	70,500 SF (1.62 AC)
	Total	**148,250 SF (3.40 AC)**

MAJOR SOIL TYPES:

1. LOAM
   - Well drained
   - Moderate infiltration rate
2. SILT LOAM
   - Moderately well drained
   - slow infiltration rate



3 4 5 Roadside Bioretention Options

Campen Creek Stormwater Improvement Project

October 12, 2022

0 50′ 100′ 200′

JUNCUS STUDIO

3 **J ST ROADSIDE BIORETENTION SWALE RENOVATION OPTION**

Total Area of SW Facilities : 8,320 SF
Total Impervious Runoff Area Managed : 64,900 SF (1.49 AC)

4 **5** **36TH ST & I ST ROADSIDE BIORETENTION PLANTER RETROFITS**

Total Area of SW Facilities : 2,050 SF
Total Impervious Runoff Area Managed : 83,350 SF (1.91 AC)

1 WHS INTERIOR PARKING (LOOKING EAST)

2 WHS INTERIOR PARKING (LOOKING WEST)

3 WHS EAST BIORETENTION SWALE

4 J ST SOUTH OF WHS PARKING LOT

5 J ST NEAR WHS PARKING LOT ENTRANCE

6 J ST SOUTH OF WHS ATHLETIC FIELD

Existing Conditions - WHS Parking Lot & J St

Campen Creek Stormwater Improvement Project

October 12, 2022

JUNCUS STUDIO

7 **36TH ST & J ST INTERSECTION (LOOKING SOUTH)**

8 **36TH ST & I ST INTERSECTION (LOOKING SOUTH)**

9 **36TH ST & I ST INTERSECTION (LOOKING NORTH)**

10 **I ST (LOOKING WEST)**

11 **I ST (LOOKING EAST)**

12 **I ST CUL-DE-SAC**

Existing Conditions - 36th St & I St

GENERAL INFORMATION

TOTAL IMPERVIOUS AREA:
88,028 SF (2.02 AC)

SOIL TYPES:
1. SILT LOAM
   - Moderately well drained
   - Slow infiltration rate
2. LOAM
   - Well drained
   - Moderate infiltration rate

KEY NOTE

1 PHOTO LOCATION

WASHOUGAL HIGH SCHOOL

ENTRANCE

EAST BIORETENTION SWALE

LIGHT POLE

PROPERTY BOUNDARY

AREA INLET

6

23'

FLOW

383'

26'

189'

36'

117'

25'

SIDEWALK

39TH ST

25'

153'

36'

2

1

189'

144'

3

4

LOAM

SILT LOAM

SIDEWALK

SIDEWALK

5

ROADSIDE BIORETENTION SWALE

J ST

CULVERT

ROADSIDE BIORETENTION SWALE

Existing Conditions - WHS Parking Lot

Campen Creek Stormwater Improvement Project

October 12, 2022

0 20' 40' 80'

JUNCUS STUDIO

City of Washougal Campen Creek Stormwater Improvement Project
Application: WQC-2024-WashPW-00175
Overall Project Budget - October 2022

Direct Construction Costs				
Category of Work				**Subtotals**
1 - Washougal High School East Bioretention Swale Renovation				$93,088
2 - Washougal High School Parking Bioretention Planter Retrofits				$362,540
3 - J Street Bioretention Swale Renovation				$433,000
4 - 36th Street Roadside Bioretention Planter Retrofit				$50,340
5 - I Street Roadside Bioretention Planter Retrofit				$126,560
SubTotal Direct Consruction Cost				**$1,065,528**
Compounded Mark Up Categories and Description		**%**	**Amount**	**Subtotals**
Estimating Level of Confidence Buffer		30.00%	$319,658	$1,385,186
General Conditions		10.00%	$138,519	$1,523,705
Overhead		3.00%	$45,711	$1,569,416
Profit		7.00%	$109,859	$1,679,275
Insurance		1.50%	$25,189	$1,704,464
Bond		1.50%	$25,566.97	$1,730,031
Pre-Scope Contingency Direct Construction Costs				**$1,730,031**
Construction Contingency		10.00%	$173,003	$1,903,035
Total Compounded Mark-Up		78.60%	$837,507	
Total Direct Construction Contract Cost				**$1,903,035**
Design/Engineering Consultant Contract Estimator				
Percentage of "Not to Exceed" Construction Budget		16.00%		
Total Design/Engineering Consultant Contract Cost				**$304,486**
Design/Engineering Services Breakdown				
Landscape Architect		38.00%		$115,705
Civil Engineer		30.00%		$91,346
Structural Engineer		5.00%		$15,224
Geotechnical Engineer		5.00%		$15,224
Cultural Resources		2.00%		$6,090
Permitting		5.00%		$15,224
Surveyor		15.00%		$45,673
Design/Engineering Services Subtotal		**100.00%**		**$304,486**
Design Contingency		10.00%		$30,449
Estuary Partnership Project Management		25.00%		$76,121
Total Project Cost (Design/Engineering/Project Management/Etc.)				**$411,055**
Estuary Partnership Cash Match Provided		**15.00%**		**$61,658**
Total Ecology Grant Request				**$349,397**

City of Washougal Campen Creek Stormwater Improvement Project
Application: WQC-2024-WashPW-00175
Direct Construction Cost Calculator

	Qty	Unit	Price / Unit	Total Price	Notes/Assumptions
1 - WHS East Bioretention Swale Renovation					
Mobilization (7%)	1	LS	$6,000.00	$6,000.00	
Construction Staking (1.5%)	1	LS	$1,275.00	$1,275.00	
Erosion Control(2%)	1	LS	$2,500.00	$2,500.00	
Excavation including haul	185	CY	$125.00	$23,125.00	Assume 5000 sf. - 1 ft excavation
Concrete Check Dams	3	EA	$1,500.00	$4,500.00	
Stormwater Planter Soil Import	185	CY	$90.00	$16,650.00	Assume 5000 sf. - 1 ft excavation
Tree Planting	5	EA	$750.00	$3,750.00	
Shrub Planting (No. 1 Cont)	920	EA	$15.00	$13,800.00	1800 sf bioswale permiter w/ shrubs 18" o.c.
Beehive Inlet	1	EA	$2,350.00	$2,350.00	Costs pulled from Clackamas WES Design Std.
Seeding	3,200	SF	$0.75	$2,400.00	
Bark Mulch	85	CY	$82.00	$6,988.31	4" depth
Misc. Drainage Pipe + Fittings	50	LF	$195.00	$9,750.00	Costs pulled from Clackamas WES Design Std.
			Subtotal =	**$93,088.31**	
2 - WHS Parking Bioretention Planter Retrofits					
Mobilization (7%)	1	LS	$14,500.00	$14,500.00	
Construction Staking (1.5%)	1	LS	$3,500.00	$3,500.00	
Traffic Control Plan (3%)	1	LS	$6,500.00	$6,500.00	
Erosion Control (2%)	1	LS	$4,500.00	$4,500.00	
Sawcut Asphalt	1280	LF	$1.50	$1,920.00	
Excavation including haul	320	CY	$125.00	$40,000.00	2 ft soil depth
Asphalt Demolition and Disposal	4290	SF	$2.00	$8,580.00	
Asphalt Patch	3850	SF	$8.00	$30,800.00	3 ft patch around perimeter
Concrete Curb + Gutter	1290	LF	$86.00	$110,940.00	
Stormwater Planter Soil Import	320	CY	$90.00	$28,800.00	2 ft soil depth
Tree Planting	25	EA	$750.00	$18,750.00	
Shrub Planting (No. 1 Cont)	2190	EA	$15.00	$32,850.00	
Bark Mulch	60	CY	$125.00	$7,500.00	4" depth
Educational Signage	2	EA	$2,500.00	$5,000.00	
Beehive Inlets	4	EA	$2,350.00	$9,400.00	Costs pulled from Clackamas WES Design Std.
Misc. Drainage Pipe + Fittings	200	LF	$195.00	$39,000.00	Costs pulled from Clackamas WES Design Std.
			Subtotal =	**$362,540.00**	
3 - J Street Bioretention Swale Renovation					
Mobilization (7%)	1	LS	$21,500.00	$21,500.00	
Construction Staking (1.5%)	1	LS	$5,000.00	$5,000.00	
Traffic Control Plan (3%)	1	LS	$10,000.00	$10,000.00	
Erosion Control(2%)	1	LS	$6,800.00	$6,800.00	
Sawcut Asphalt	750	LF	$1.50	$1,125.00	
Excavation including haul	310	CY	$125.00	$38,750.00	1 ft soil depth
Asphalt Planing	7,580	SF	$1.00	$7,580.00	
Asphalt Demolition & Disposal	7,580	SF	$2.00	$15,160.00	
Crushed Gravel Base	7,580	SF	$3.00	$22,740.00	
Asphalt Paving & Overlay	15,160	SF	$4.00	$60,640.00	
Beehive Inlet	2	EA	$2,700.00	$5,400.00	Costs pulled from Clackamas WES Design Std.
Misc. Drainage Pipe + Fittings	125	LF	$195.00	$24,375.00	Costs pulled from Clackamas WES Design Std.
Concrete Curb + Gutter	910	LF	$86.00	$78,260.00	
Concrete Check Dams	14	EA	$1,000.00	$14,000.00	
Stormwater Planter Soil Import	310	CY	$90.00	$27,900.00	1ft soil depth
Tree Planting	28	EA	$750.00	$21,000.00	
Shrub Planting	4,250	EA	$15.00	$63,750.00	8,300 sf of planting area
Bark Mulch	110	CY	$82.00	$9,020.00	4" depth
			Subtotal =	**$433,000.00**	
4 - 36th St. Roadside Bioretention Planter Retrofit					
Mobilization (7%)	1	LS	$2,500.00	$2,500.00	
Construction Staking (5%)	1	LS	$1,500.00	$1,500.00	
Traffic Control Plan (3%)	1	LS	$1,500.00	$1,500.00	
Erosion Control(2%)	1	LS	$1,000.00	$1,000.00	
Sawcut Asphalt	130	LF	$1.50	$195.00	
Excavation including haul	33	CY	$125.00	$4,125.00	2 ft soil depth
Asphalt Demolition and Disposal	440	SF	$2.00	$880.00	
Asphalt Patch	600	SF	$8.00	$4,800.00	
Concrete Curb	125	LF	$45.00	$5,625.00	
Concrete Curb + Gutter	100	LF	$86.00	$8,600.00	
Concrete Check Dams	2	EA	$600.00	$1,200.00	
Stormwater Planter Soil Import	33	CY	$90.00	$2,970.00	2 ft soil depth
Tree Planting	2	EA	$750.00	$1,500.00	
Shrub Planting	225	EA	$15.00	$3,375.00	
Bark Mulch	10	CY	$82.00	$820.00	4" depth
Misc. Drainage Pipe + Fittings	50	LF	$195.00	$9,750.00	Costs pulled from Clackamas WES Design Std.
			Subtotal =	**$50,340.00**	
5 - I St. Roadside Bioretention Planter Retrofit					
Mobilization (7%)	1	LS	$10,000.00	$10,000.00	
Construction Staking (1.5%)	1	LS	$2,500.00	$2,500.00	
Traffic Control Plan (3%)	1	LS	$4,500.00	$4,500.00	
Erosion Control(2%)	1	LS	$3,250.00	$3,250.00	
Sawcut Asphalt	360	LF	$1.50	$540.00	
Excavation including haul	120	CY	$125.00	$15,000.00	
Asphalt Demolition and Disposal	1,610	SF	$2.00	$3,220.00	
Asphalt Patch	1,110	SF	$8.00	$8,880.00	
Concrete Curb	360	LF	$45.00	$16,200.00	
Concrete Curb + Gutter	280	LF	$86.00	$24,080.00	
Stormwater Planter Soil Import	120	CY	$90.00	$10,800.00	
Tree Planting	5	EA	$750.00	$3,750.00	
Shrub Planting	830	EA	$15.00	$12,450.00	
Bark Mulch	20	CY	$82.00	$1,640.00	
Misc. Drainage Pipe + Fittings	50	LF	$195.00	$9,750.00	
			Subtotal =	**$126,560.00**	
			SUB -TOTAL DIRECT CONSTRUCTION COST =	**$1,065,528**	

PROJECT FACTSHEET—SMA-2

Project Title: Q Street Infiltration Pond Retrofit

Location: Stormwater facility north of Q Street between 37th and 39th Street

Issue Description and Additional Benefits:

Issue	Description
Flow Control	The runoff from most of the Campen Creek Villa subdivision drains to Campen Creek without being detained and could contribute to high flows in the stream. Either by accident or by design, an older existing large infiltration pond in the vicinity is underutilized for the drainage area.
Water Quality	The area was developed before modern water quality standards were in place. Runoff from residential roofs and streets likely contains high concentrations of fine sediment, dissolved metals, and 6PPD-quinone. Runoff drains into Campen Creek without treatment.

Project Description:

A large infiltration pond exists on the north side of Q Street between 37th and 39th Streets in the Campen Creek Villa subdivision. Based on the available as-built drawings and a desktop analysis, the infiltration pond currently only collects and infiltrates stormwater from adjacent properties (approximately 0.7 acres). There no inlet pipe to the infiltration pond and one overflow outlet from the infiltration pond to the stormwater system on Q Street. Runoff from the remaining residential properties and streets in the Campen Creek Villa subdivision is conveyed directly to Campen Creek without flow control or treatment.

Following an initial survey and engineering investigation to confirm the existing drainage area, this project will redirect runoff from a drainage area of approximately 22 acres (assumed to be 70% impervious and 30% pervious) from Q Street to W Street and between approximately 37th Street and 41st Street to the existing infiltration facility. This will involve installing a new manhole at the intersection of Q Street and 39th Street. New stormwater pipe will be installed to redirect runoff to the infiltration pond from the new manhole to the west and the existing manhole on Q Street and 37th Street to the east to redirect runoff to the infiltration pond. The project will also install two proprietary pre-treatment facilities in Q Street to remove total suspended solids (TSS) and protect the infiltration capacity of the pond's soils. The existing infiltration pond outlet will be raised to the infiltration pond's overflow elevation. This will discharge excess runoff from the infiltration pond directly to the public stormwater sewer in Q Street. The project will regrade and replant the facility and, if necessary, replace compacted topsoil to ensure the facility is functioning as intended.

The existing infiltration facility will provide flow control for runoff from the drainage area. By combining pre-treatment and infiltration into native soil, the proposed facilities will also meet phosphorus, enhanced, and basic treatment performance goals. The facility will be able to provide flow control and treatment for approximately 20 acres of the total 22-acre drainage area being redirected into the infiltration pond during the 100-year storm event. Excess runoff will overflow through the infiltration pond's existing overflow outlet to the stormwater system on Q Street and discharge to Campen Creek.

Pretreatment will be provided by Contech Vortechs® 2000 structures, which have a General Use Level Designation (GULD) approval from Department of Ecology. Other GULD approved pretreatment technologies may be considered during final design.

Solution Sizing Basis:

Existing Infiltration Pond

- The existing infiltration pond is sufficiently sized to provide treatment and flow control for approximately 14 acres of impervious area and 6 acres of pervious area.
- Assumes 5.7 in-hr infiltration rate at the bottom of the pond.
- After rehabilitation and retrofit, the infiltration pond would meet the LID Performance Standard for flow control and infiltrate at least 91% of the annual runoff volume for 20 acres of the contributing drainage area.
- Facility Volume = 2.8 ac-ft

Contech Vortechs® 2000

- Two Vortechs® 2000 structures are proposed to provide pre-treatment for 14 acres of impervious area and 6 acres of pervious area.
- Water Quality Flow Rate = 1.8 cfs (0.9 cfs per each structure)
- Treatment capacity = 2.0 cfs (1.0 cfs per each structure)
- The proposed pre-treatment facilities are sized to treat at least 91% of the annual runoff volume for 20 acres of the contributing drainage area.

Pollutants Addressed: The project will provide flow control and will remove trash, debris, sediment, dissolved metals, phosphorus, hydrocarbons, and 6PPD-quinone[1] from stormwater runoff.

Future Consideration: The City will need to investigate the facility and drainage pipes on surrounding streets to ensure there are no other existing inlets to the pond. Survey in needed to ensure there is sufficient hydraulic drop for conveyance to the infiltration facility. A geotechnical study is required to confirm infiltration rate in the pond and groundwater elevations. If infiltration is found to be poor, additional excavation could be used to replace and amend compacted topsoil or the design could be changed to a detention pond with additional upstream treatment.

Estimated Project Cost: $776,000

[1] 6PPD-quinone is an emerging pollutant of concern in Washington. As of 2022, bioretention is the only runoff treatment facility type known to remove 6PPD-quinone from stormwater runoff. Because stormwater is fully infiltrated in this facility, we assume P66D-quinone is removed from the storm system by the facility.

Photographs:

Q Street Infiltration Pond. Google, Image Captured June 2021, Accessed 2022.

PLANNING LEVEL PROJECT COST OPINION

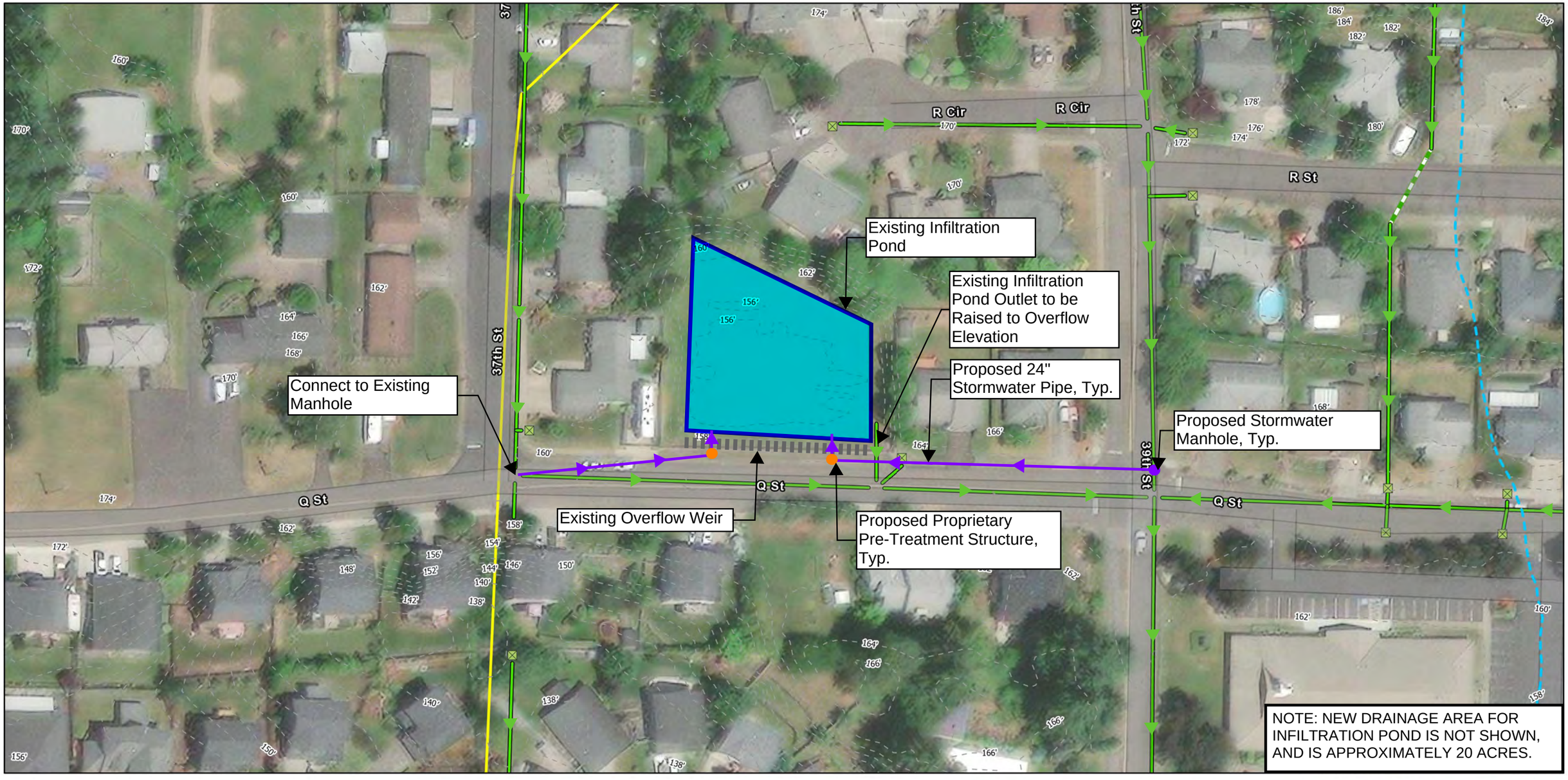
LOCATION: Q Street Infiltration Pond Retrofit
PROJ. ID: SMA-2
DESC. Flow Control and Water Quality Retrofit Improvements near Q Street and 39th Street

BY: FJS
DATE: 2/14/2023

ITEM NO.	ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
Construction Elements					
1	STORM SEWER PIPE, 24 IN. DIAM	450	LF	$ 240	$ 108,000
2	MANHOLE 48 IN. DIAM. TYPE 1	1	EA	$ 8,240	$ 8,300
3	PROPRIETARY PRE-TREATMENT STRUCTURE	2	EA	$ 50,800	$ 101,600
4	EXCAVATION (EXPORT OFFSITE)	475	CY	$ 60	$ 28,500
5	TOP SOIL	475	CY	$ 80	$ 38,000
6	DETENTION POND PLANTING	3,000	SY	$ 2.00	$ 6,000
7	RAISE EXISTING OUTLET PIPE IN POND	1	LS	$ 4,000	$ 4,000
				Subtotal Construction Elements	$ 294,400
Required Ancillary Items					
8	MOBILIZATION	10%	Of Construction Elements		$ 29,500
9	EROSION & SEDIMENTATION CONTROL	5%	Of Construction Elements		$ 14,800
10	TRAFFIC CONTROL	5%	Of Construction Elements		$ 14,800
11	PLANNING LEVEL CONSTRUCTION CONTINGENCY	30%	Of Total Construction		$ 151,600
				Subtotal Ancillary	$ 210,700
				Total Construction	**$ 505,100**
Permitting and Land Acquisition					
12	BASIC PERMITTING	1	LS	$ 15,000	$ 15,000
				Total Permitting and Land Acquisition	**$ 15,000**
Studies & Engineering					
13	STATE SALES TAX	8.5%	Of Total Construction		$ 43,000
14	ENGINEERING	25%	Of Total Construction		$ 126,300
15	PROJECT ADMINISTRATION	5%	Of Total Construction		$ 25,300
16	CONSTRUCTION MANAGEMENT	10%	Of Total Construction		$ 50,600
17	SURVEY	2%	Of Total Construction		$ 10,200
				Total Studies & Engineering	**$ 255,400**
				Total Cost	**$ 775,500**
2023 Dollars	**Total Estimated Project Cost (Rounded)**				**$ 776,000**

Notes:

1. The above cost opinion is in 2023 dollars and does not include future escalation, financing, or O&M costs.
2. The order-of-magnitude cost opinion has been prepared for guidance in project evaluation from the information available at the time of preparation and for the assumptions stated. The final costs of the project will depend on actual labor and material.



SMA 2
Q STREET INFILTRATION POND RETROFIT PLAN VIEW

WASHOUGAL SMAP

Data Sources:
Date: 2/13/2023
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

O:\PROJECT\20100\20155\CADD\GIS\MXDs\20155 Site Visit FIgures\20155 Site Visit FIgures-Convert to Graphic.aprx

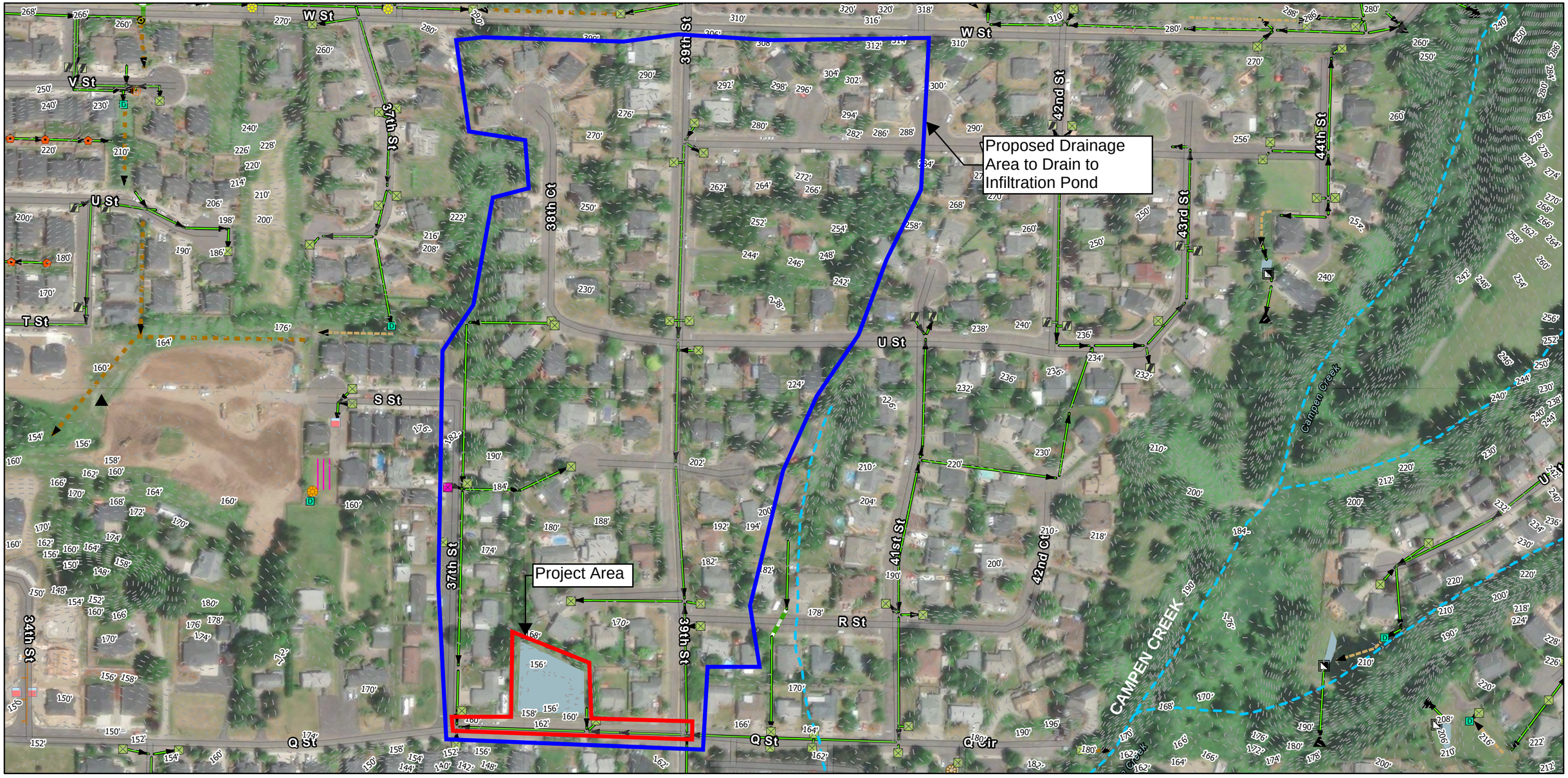
Legend

- Washougal City Limits
- Gibbons Creek Basin Catchments
- Streams
- Contours
- Storm Line
- Culverts
- Ponds
- Catchbasin
- Existing Infiltration Pond
- Proposed Proprietary Pre-Treatment Structure
- Proposed Stormwater Manhole
- Proposed Stormwater Pipe
- Existing Overflow Weir

0 37.5 75 150 Feet

N

Otak



SMA 2
Q STREET INFILTRATION POND RETROFIT DRAINAGE BASIN
WASHOUGAL SMAP

Data Sources:
Date: 12/30/2022
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

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Legend

- Washougal City Limits
- Contours
- Discharge Point
- Outfall
- <all other values>
- Cleanout
- Catchbasin
- Combination Inlet
- Curb Inlet
- Field inlet
- Flow Control Manholes
- Filter Manholes
- Sedimentation Manholes
- Flow Control Inlets
- Filter Vaults
- Filter Catchbasins
- Drywells
- Swales
- Storm line
- Infiltration Trenches
- Ditches
- Detention Vaults
- Culverts
- Ponds
- Streams
- Drainage Area (20 Acres)
- Project Area

0 125 250 500 Feet

N

Otak

PROJECT FACTSHEET—SMA-3

Project Title: X Street Water Quality Retrofit

Location: The Summer Slopes open space north of X Street between 41st Street and 45th Street

Issue Description and Additional Benefits:

Issue	Description
Flow Control	The Summer Slopes neighborhood drains to two detention facilities. One located in the power transmission line tract west of 42nd Street, and one located in the Summer Slopes open space. The detention facilities may not be functioning as designed. Runoff drains to Campen Creek and could contribute to high flows in the stream.
Water Quality	The area was developed without water quality treatment. Runoff from residential roofs and residential streets likely contains fine sediment. Runoff drains into Campen Creek without treatment.

Project Description:

Under existing conditions, runoff from the residential properties and streets from the Summer Slopes subdivision is conveyed to two detention facilities. One is located in the power transmission line tract west of 42nd Street, and one is located in the Summer Slopes open space north of X Street between 41st and 45th Streets. The runoff is discharged to Campen Creek without treatment. Additionally, the detention facility in the Summer Slopes open space may be in groundwater and therefore not providing effective detention.

This project will install two proprietary runoff treatment vaults and evaluate the function of the existing detention facilities for potential repair or redesign. The proprietary treatment vaults will remove total suspended solids (TSS) from runoff for the entire drainage basin.

Basic and phosphorus runoff treatment will be provided by two Contech Peak Diversion StormFilter® Vaults with PhosphoSorb® media, which have a General Use Level Designation (GULD) approval from Department of Ecology. PhosphoSorb® was chosen because fewer media cartridges are required to treat the same runoff volume compared to the Contech ZPG® media cartridges which provide only basic treatment. As a result, construction costs are lower, and maintenance costs are lower at the current media price differential. Other GULD approved treatment technologies may be considered during final design.

In addition to installing treatment, the function of the existing detention system will be evaluated. The function and connection of the detention facility west of 42nd Street will need to be confirmed. The function of the detention facility in the Summer Slopes open space will also need be determined. The site is a former wetland, and water flow was observed during a site visit in summer. The cause of this dry weather flow will need to be investigated, and the design of the treatment or detention facility may need to be adjusted.

Solution Sizing Basis:

Contech 6' x 12' Peak Diversion StormFilter® Vault #1

- Treats 4.1 acre of impervious area and 11 acres of pervious area
- Water Quality Flow Rate = 0.45 cfs
- Number of Cartridges = Eleven (11) 27" Cartridges (PhosphoSorb® media)

Contech 8' x 11' Peak Diversion StormFilter® Vault #2

- Treats 3.1 acre of impervious area and 8.9 acres of pervious area
- Water Quality Flow Rate = 0.59 cfs
- Number of Cartridges = Fifteen (15) 27" Cartridges (PhosphoSorb® media)

Pollutants Addressed: The project will remove total suspended solids (TSS) and phosphorus from stormwater runoff.

Future Consideration: The City will need to evaluate the function of the existing detention facility. A malfunctioning detention facility could affect the design of the planned treatment facilities, require repair, or require replacement to meet the project goals. The estimated project cost includes an engineering study to determine detention facility function but does not include repair or replacement of the facility.

Estimated Project Cost: $400,000

Photographs:

Looking North at proposed location of proprietary treatment vault location #2 from X Street.

Looking East at field inlet near proposed location of proposed proprietary treatment vault location #2 from X street.

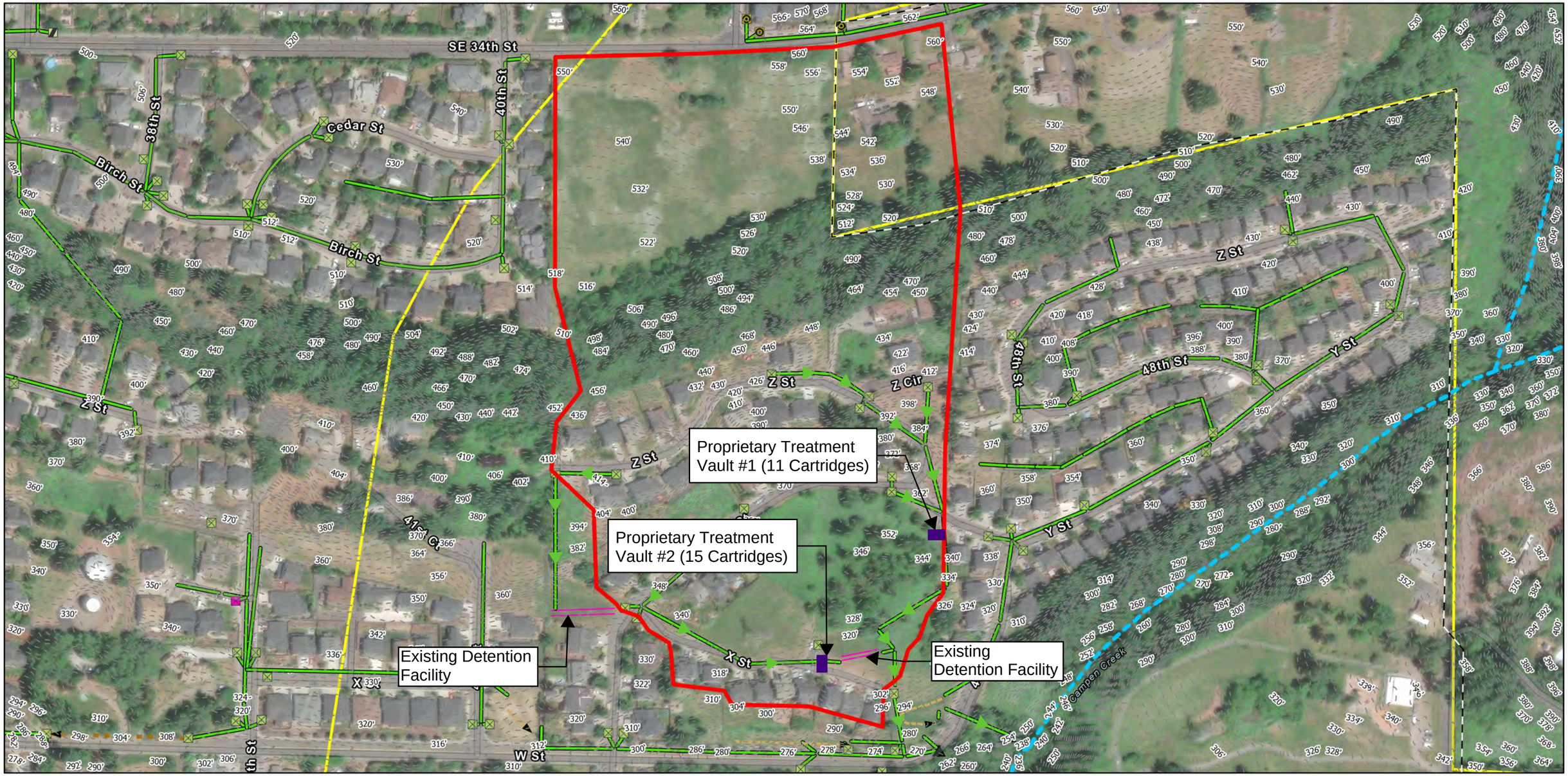
PLANNING LEVEL PROJECT COST OPINION

LOCATION: **X Street Water Quality Retrofit** **BY:** **FJS**
PROJ. ID: **SMA-3** **DATE:** **1/6/2023**
DESC. **Water Quality Retrofit Improvements on X Street**

ITEM NO.	ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
Construction Elements					
1	PROPRIETARY TREATMENT VAULT (15 CARTRIDGES)	1	LS	$ 72,000	$ 72,000
2	PROPRIETARY TREATMENT VAULT (11 CARTRIDGES)	1	LS	$ 60,000	$ 60,000
				Subtotal Construction Elements	$ 132,000
Required Ancillary Items					
3	MOBILIZATION	10%	Of Construction Elements		$ 13,200
4	EROSION & SEDIMENTATION CONTROL	5%	Of Construction Elements		$ 6,600
5	TRAFFIC CONTROL	1%	Of Construction Elements		$ 1,400
6	PLANNING LEVEL CONSTRUCTION CONTINGENCY	40%	Of Total Construction		$ 102,200
				Subtotal Ancillary	$ 123,400
				Total Construction	**$ 255,400**
Permitting and Land Acquisition					
7	BASIC PERMITTING	1	LS	$ 15,000	$ 15,000
				Total Permitting and Land Acquisition	$ 15,000
Studies & Engineering					
8	STATE SALES TAX	8.5%	Of Total Construction		$ 21,800
9	ENGINEERING	25%	Of Total Construction		$ 63,900
10	PROJECT ADMINISTRATION	5%	Of Total Construction		$ 12,800
11	CONSTRUCTION MANAGEMENT	10%	Of Total Construction		$ 25,600
12	SURVEY	2%	Of Total Construction		$ 5,200
				Total Studies & Engineering	**$ 129,300**
				Total Cost	**$ 399,700**
2023 Dollars	**Total Estimated Project Cost (Rounded)**				**$ 400,000**

Notes:

1. The above cost opinion is in 2023 dollars and does not include future escalation, financing, or O&M costs.
2. The order-of-magnitude cost opinion has been prepared for guidance in project evaluation from the information available at the time of preparation and for the assumptions stated. The final costs of the project will depend on actual labor and material.



SMA 3

X STREET WATER QUALITY RETROFIT

WASHOUGAL SMAP

Data Sources:
Date: 2/9/2023
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

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Legend

- Washougal City Limits
- Gibbons Creek Basin Catchments
- Drainage Area
- Streams
- Contours
- Storm Line
- Detention Vaults
- Outfall
- Catchbasin
- Combination Inlet
- Curb Inlet
- Filter Catchbasins
- Swales
- Ditches
- Proprietary Treatment Vault

0 125 250 500 Feet

N

Otak

PROJECT FACTSHEET—SMA-5

Project Title: J Street and 42nd Street (Vintage Crest Estates Subdivision) Water Quality Retrofit

Location: Vintage Crest Estates Subdivision: 42nd Street north of J Street, M Drive, M Loop and Rolling Meadows Drive

Issue Description and Additional Benefits:

Issue	Description
Flow Control	The neighborhood drains to an existing detention facility near J Street and 42nd Street. The detention pond was built to an older standard and may be undersized for the contributing drainage area at the current standard. City staff have not observed performance difficulties, so sizing analysis was not performed for this document.
Water Quality	The neighborhood drains to an existing biofiltration swale near J Street and 42nd Street. The water quality swale as constructed is undersized for the contributing drainage area. Runoff from residential roofs and residential streets likely contains fine sediment.

Project Description:

Under existing conditions, runoff from the residential properties and streets from the Vintage Crest Estates Subdivision is conveyed through a biofiltration swale to a detention pond located at J Street and 42nd Street. The biofiltration swale appears to have been constructed with a much smaller width than its design, and it is significantly undersized to treat the entire contributing drainage of 23.5 acres to current standards. City staff have observed excessive inundation and have installed an orifice plate in the upstream manhole to direct some flows away from the swale and directly to the detention pond. An engineering analysis using rough dimensions calculated from field photographs found that the swale can treat approximately two acres in its current condition.

This project will install bioretention planters in the neighborhood streets to treat a portion of the drainage area that is not currently treated. This project will install approximately 11,000 square feet of bioretention planter (footprint) for runoff treatment in 42nd Street north of J Street, M Drive, and M Loop. The bioretention planters will supplement the runoff treatment provided by the existing biofiltration swale and remove sediment, dissolved metals, and 6PPD-quinone. Assuming a conservative infiltration rate of 0.5 inches per hour, the bioretention planters will be able to treat approximately 8.8 acres of the drainage basin and will provide a minor flow control benefit.

The bioretention planters are able to provide both basic and enhanced treatment. The bioretention planter locations are preliminary. Bioretention planters will be designed to provide runoff treatment in accordance with BMP T7.30: Bioretention from the *2019 Stormwater Management Manual for Western Washington*.

Drainage Basin Treatment Summary:

The following is a summary of how the contributing drainage area will be treated.

- Total drainage basin = 23.5 acres
- Acres assumed to be treated by current swale = 2.0 acres
- Acres to be treated by bioretention planters = 8.8 acres
- Acres not treated by proposed project = 12.7 acres

Solution Sizing Basis:

Bioretention Planters

- Treats 6.2 acres of impervious area and 2.6 acres of pervious area
- Total Bioretention Planter footprint = 11,000 sf
- Infiltration rate 0.5in/hr

Pollutants Addressed: The project will provide limited flow control and will remove sediment, dissolved metals, and 6PPD-quinone[1] from stormwater runoff.

Future Consideration:

This project presents one option to provide treatment and flow control for the runoff from the Vintage Crest Estates Subdivision. This project is based on an initial evaluation of the existing drainage and soil conditions in the neighborhood. The first step will be a thorough evaluation of existing conditions including, survey and geotechnical evaluation, and an engineering alternatives analysis. Several variables are unknown and conservative assumptions were made in the outline of this project.

Two key unknowns are the infiltration rate of soils where bioretention planters may be constructed and the drainage area contributing flow to the biofiltration swale and detention pond located at J Street and 42nd Street. As proposed, the bioretention planters are not intended to treat the entire neighborhood due to limited space in the right-of-way. Bioretention planters can be sized to treat a specific quantity of runoff when the soil infiltration rate is known. Streets in the Vintage Crest Estates Subdivision are steep, and the bioretention sizing analysis assumed a conservative, low infiltration rate. The flow treatment and flow control benefits will be maximized to the extent feasible based on site conditions and siting limitations. The analysis also assumed a drainage area that includes the entire lots of all of the properties in the portion of the neighborhood that drains to the swale and detention pond. Based on plat documents, some houses in the northern portion of the neighborhood may drain to on-site swales at the back of each lot. The City has no evidence of construction and no access for inspection of the on-site swales, and the bioretention sizing analysis assumed they do not exist.

Additionally, there may be more effective or efficient alternatives not considered in this brief analysis. Those alternatives will need to be evaluated. Other nearby plots may be available to install treatment facilities, or final design could supplement bioretention planters with proprietary underground runoff treatment structures to treat more acreage. The existing swale should be evaluated for size and function.

[1] 6PPD-quinone is an emerging pollutant of concern in Washington. As of 2022, bioretention is the only runoff treatment facility type known to remove 6PPD-quinone from stormwater runoff.

Planters will be located in the parking lanes of residential streets; specific locations have not been selected and will need to be identified during final design with input from residents.

Total Estimated Project Cost: $2,360,000

This project may be implemented in two or more phases. The existing conditions study and alternatives analysis for the whole site could be conducted in the first phase, along with construction over one or two years. Additional phases of capital construction may follow as funding is available.

Estimated Phase 1 Cost: $1,339,000

Estimated Phase 2 Cost: $1,012,000

Photographs:

Biofiltration swale, looking East,
site visit July 27, 2022.

M Drive, looking Northeast. Google, Image Captured August 2012, Accessed 2022.

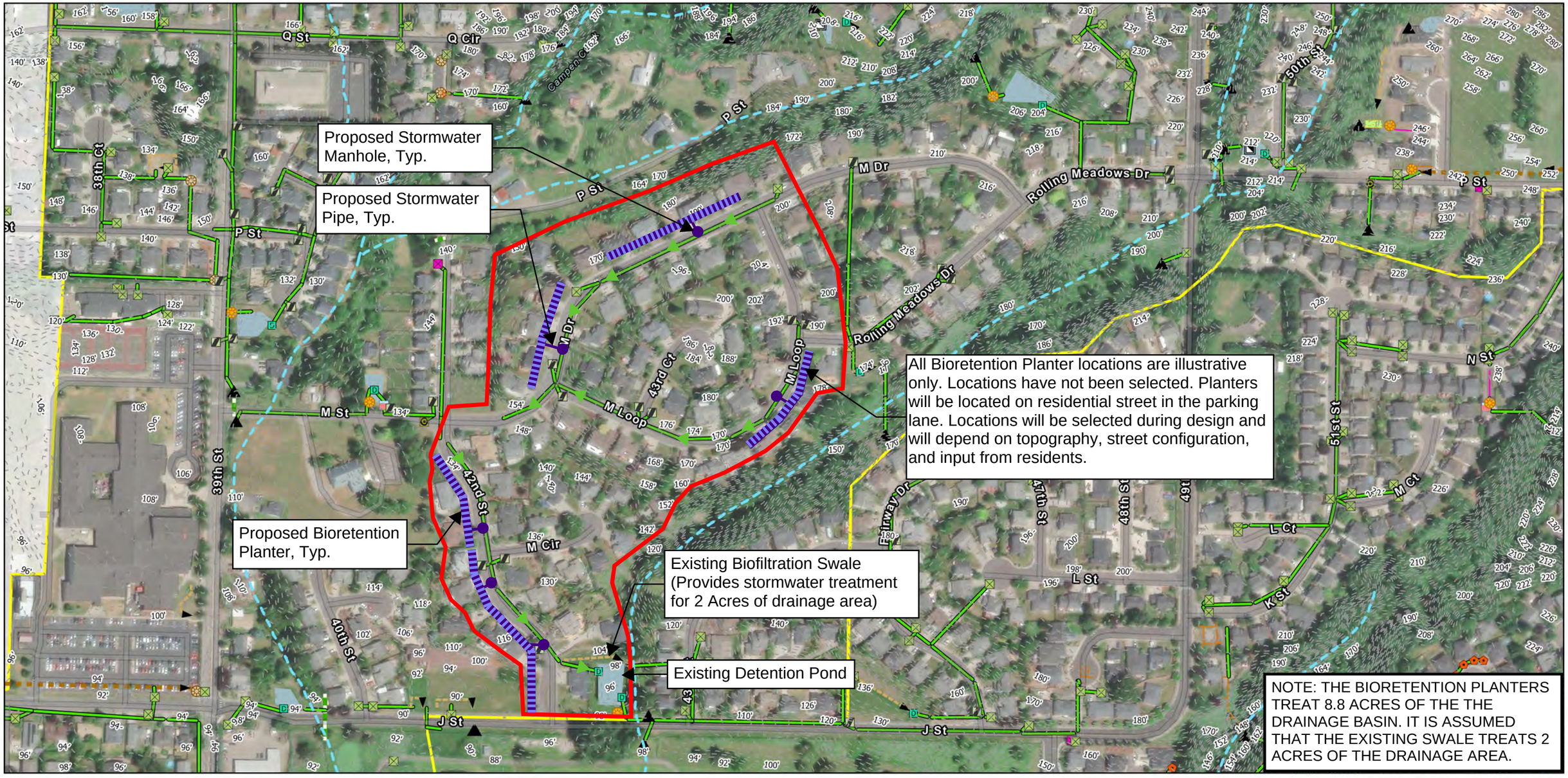
PLANNING LEVEL PROJECT COST OPINION

LOCATION: J Street and 42nd Street Water Quality Retrofit — **BY:** FJS
PROJ. ID: SMA-5 — **DATE:** 2/14/2023
DESC. Water Quality Retrofit Improvements near Q Street and 39th Street

ITEM NO.	ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
Construction Elements					
1	STORM SEWER PIPE, 12 IN. DIAM	120	LF	$ 190	$ 22,800
2	MANHOLE 48 IN. DIAM. TYPE 1	6	EA	$ 8,240	$ 49,500
3	BIORETENTION PLANTER	11,000	SF	$ 85	$ 935,000
				Subtotal Construction Elements	$ 1,007,300
Required Ancillary Items					
4	MOBILIZATION	10%	Of Construction Elements		$ 100,800
5	EROSION & SEDIMENTATION CONTROL	5%	Of Construction Elements		$ 50,400
6	TRAFFIC CONTROL	3%	Of Construction Elements		$ 30,300
7	PLANNING LEVEL CONSTRUCTION CONTINGENCY	30%	Of Total Construction		$ 509,600
				Subtotal Ancillary	$ 691,100
				Total Construction	**$ 1,698,400**
Permitting and Land Acquisition					
8	BASIC PERMITTING	1	LS	$ 15,000	$ 15,000
				Total Permitting and Land Acquisition	**$ 15,000**
Studies & Engineering					
9	STATE SALES TAX	8.5%	Of Total Construction		$ 144,400
10	ENGINEERING	15%	Of Total Construction		$ 254,800
11	PROJECT ADMINISTRATION	2%	Of Total Construction		$ 34,000
12	CONSTRUCTION MANAGEMENT	10%	Of Total Construction		$ 169,900
13	SURVEY	2%	Of Total Construction		$ 34,000
				Total Studies & Engineering	**$ 637,100**
				Total Cost	**$ 2,350,500**
2023 Dollars	**Total Estimated Project Cost (Rounded)**				**$ 2,360,000**

Notes:

1. The above cost opinion is in 2023 dollars and does not include future escalation, financing, or O&M costs.
2. The order-of-magnitude cost opinion has been prepared for guidance in project evaluation from the information available at the time of preparation and for the assumptions stated. The final costs of the project will depend on actual labor and material.



SMA 5

J STREET AND 42ND (VINTAGE CREST ESTATES) WATER QUALITY RETROFIT

WASHOUGAL SMAP

Data Sources:
Date: 2/13/2023
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

O:\PROJECT\20100\20155\CADD\GIS\MXDs\20155 Site Visit FIgures\20155 Site Visit FIgures.aprx

Legend

- Washougal City Limits
- Gibbons Creek Basin Catchments
- Streams
- Contours
- Storm Line
- Detention Vaults
- Flow Control Manholes
- Filter Manholes
- Flow Control Inlets
- Filter Vaults
- Filter Catchbasins
- Drywells
- Swales
- Infiltration Trenches
- Ditches
- Culverts
- Rain Gardens
- Ponds
- Drainage Area (23.5 acres)
- Proposed Stormwater Manhole
- Proposed Stormwater Pipe
- Proposed Bioretention Planter (11,000 SF Total)

0 125 250 500 Feet

N

Otak

Appendix F

SMAP Web Map

March 2023 - The web map associated with this plan is located at this link:
https://washstorm.maps.arcgis.com/apps/webappviewer/index.html?id=903ddd1ad8c7421c85734e21d2108a59

Appendix B

Existing Data Memorandum

Memorandum

To:	Sean Mulderig, Stormwater Program Supervisor, City of Washougal
From:	Cody Kent, Otak
Copies:	Scott Collins, City Engineer, City of Washougal; Trista Kobluskie, Otak; File
Date:	May 4, 2023
Subject:	Washougal Stormwater Master Plan Review of Existing Data
Project No.:	20272

Introduction

The purpose of this memorandum is to document the discovery phase of the City of Washougal Stormwater Master Plan (SMP). This memorandum summarizes the review of available information as well as the process for summarizing useful information about problems and solutions to be carried forward in development of the recommendations for the SMP. The planning area for the SMP includes all areas within Washougal city limits.

Review of Existing Information

The discovery phase began with a review of existing information pertaining to the stormwater infrastructure and stream systems within the city. During the discovery phase of the SMP, Otak completed work on the City's Stormwater Management Action Plan (SMAP). The SMAP is a requirement of the 2019 Western Washington Phase II Municipal Stormwater Permit, and preparing the SMAP involved conducting a receiving water conditions assessment and a receiving water prioritization. The assessment and prioritization process involved documenting and assessing existing information related to local receiving waters and contributing area conditions to select a catchment to prepare the SMAP for. The data collected for the SMAP and the actions developed for the selected catchment will inform the SMP.

In addition to data collected and analyzed for the SMAP, City of Washougal staff provided GIS datasets used to track stormwater infrastructure. The datasets included records of stormwater hot spots and the locations of drywells (Underground Injection Controls (UICs)) owned or operated by the city. The drywell data included a field identifying drywells assessed as a high risk to groundwater by Otak in 2019.

The existing information review was supplemented by meetings with City of Washougal staff to collect additional background knowledge and discuss known issue locations for the stormwater infrastructure and stream corridors in the planning area. These meetings consisted of a workshop on January 19, 2023 with City Public Works staff, and a site visit to known issue locations with City Public Works staff on April 6, 2023.

During the workshop, the City identified a class of problems related to stormwater facilities not receiving adequate maintenance. These sites are primarily located on city owned properties and where maintenance should be provided by a homeowner's association (HOA) and maintenance is not being

provided because the HOA was not established or is defunct. After the workshop the City sent a further GIS dataset containing the location and descriptions of these problems.

Exhibit A contains a comprehensive list of documents and datasets provided by the City staff and reviewed by Otak staff.

Collect and Categorize Issues

The information about issues in the storm system collected during the discovery phase was compiled and classified in an ESRI Geographic Information Systems (GIS) geodatabase. The geodatabase was composed of a collection of geographic points that identify the location of known issues. The schema for the geodatabase and numbering convention are presented in Exhibit B.

Identifying known issues was the first step in the process of studying the storm system and developing solutions. Each known issue was given a unique identification number in the geodatabase. Additional fields provided descriptive information about the issue, including the full name of the issue, a long description of the nature of the issue, as well as a field for any supplemental notes with site visits.

A group of fields were included to indicate if the known issue was primarily related to water quality, local drainage or flooding, stream habitat or fish barriers, or maintenance or maintenance access. An issue was designated as a water quality issue if there was a lack of water quality structures in the local storm system or if there was a known source affecting water quality. An issue was designated as a water quantity issue if there were consistent drainage problems or flooding at the location. An issue was designated as a maintenance issue if maintenance was needed to resolve the issue or if there was an obstacle to maintenance. Table 1 shows the number of issues that fall into each category. Some fall into multiple categories.

Table 1 Number of Known Issues Within Each Category

Type of Issue	Count
Quality	46
Drainage	49
Habitat	4
Maintenance	64

A complete list of known issues is presented in Exhibit C.

Otak and City staff visited 10 of these locations to observe conditions and discuss issues with City staff. These visits covered 13 known issues including one added to the list during the site visit. Sites were selected when more information was needed to understand an issue and develop a proposed solution. During field visits, site conditions and potential solutions were documented using the ESRI Field Maps application, notes taken on paper maps, and photographs.

Known Issue Characterization/Discovery

Known issue points were mapped and georeferenced to visually identify the location of singular points as well as trends among groups of like-featured points. Most known issues fell into the maintenance category. These points were distributed throughout the City with concentrations along or within a block of

Evergreen Way, downtown along Main Street, and along K Street just south of the Washougal River. The vast majority of issues appear to have occurred most recently in 2023 based on the hot spot descriptions and comments from City staff. Otak also assigned a most recent occurrence year of 2023 to high-risk drywells and other infrastructure which has failed and which represent an on-going issue.

Solutions

For most known issues, a solution will be proposed. Solutions could be large capital projects, long-term management recommendations, or policy recommendations. An attribute for “no action” will be used for instances in which the site visit or another source of information determined that no additional action was warranted for a known issue.

Capital Improvement Projects

Known issues that are candidates for large capital improvement projects will be given a unique potential project identification number (PPID). The potential project list will be developed in a subsequent planning step. Potential projects will be assessed and prioritized using multiple criteria approved by the City, and up to three highly rated new projects will be further developed as the Capital Improvement Projects (CIPs) with planning level cost estimates.

Long-Term Management Recommendations

In addition to large capital projects, the SMP will include long-term management recommendations to address similar types of known issues based on solutions used or recommended by other agencies such as Department of Ecology. These recommendations will include planning level estimates of staffing, equipment needs, and costs. Known issues that are candidates for long-term management programs will be identified in the Known Issues Geodatabase by a text field called “Program” and by a numeric field called “Program ID.”

SMAP Action Plan

Section 5 of the Washougal SMAP describes a 20-year action plan to improve conditions of Gibbons Creek and the Campen Creek Catchment by taking actions in the Campen Creek Catchment within city limits. Stormwater Management Actions (SMAs) adopted in the SMAP include includes six stormwater facility retrofit projects four of which were selected as CIPs. The SMAP also developed five non-structural SMAs (programs or policies) to improve water quality in the Campen Creek Catchment.

The CIPs selected developed for the SMP will supplement the CIPs in the SMAP, and the non-structural SMAs from the SMAP will inform the long-term management solutions developed for the SMP.

Exhibit A

Annotated Bibliography

Otak

Memorandum

To:	Sean Mulderig, Stormwater Program Supervisor, City of Washougal
From:	Cody Kent
Copies:	Scott Collins, City Engineer, City of Washougal
Date:	May 3, 2023
Subject:	Washougal SMP Annotated Bibliography
Project No.:	20272

The following sources of information on stormwater infrastructure assets and known issues were reviewed for inclusion in the City of Washougal Stormwater Master Plan (SMP). Using these sources, Otak compiled a list of known issues in an ESRI Geographic Information System (GIS) Geodatabase. The known issues GIS dataset will be screened, analyzed, and sorted into groups of related issues. Otak will develop and recommend solutions for each issue group. Solutions may include capital improvement program (CIP) projects and long-term management programs.

Data Sources

City of Washougal GIS Stormwater Layers
GIS Dataset. City of Washougal Public Works Department. Received 7 Dec. 2022.

The City sent Otak a GIS database containing several datasets containing locations and attributes of stormwater infrastructure:

- Connection_Points.shp
- Culverts.shp
- Detention_Vaults.shp
- Ditches.shp
- Drywells.shp
- Filter_Catchbasins.shp
- Filter_Manholes.shp
- Filter_Vaults.shp
- Flow_Control_Inlets.shp
- Flow_Control_Manholes.shp
- Hot_Spots.shp
- Hydrodynamic_Separators.shp
- Infiltration_Trenches.shp
- Inlets.shp
- Oil_Water_Separators.shp
- Outlets.shp
- Permeable_Pavement.shp

- Pipes.shp
- Planters.shp
- Ponds.shp
- Rain_Gardens.shp
- Sedimentation_Manholes.shp
- Swales.shp
- Washougal_City_Limits.shp
- Washougal_UGA.shp

These datasets primarily provide important context for the known issues data collection. They will also be used to develop solutions. The following two GIS datasets were used to directly identify stormwater problems.

Stormwater Hot Spots
This is a GIS dataset of stormwater drainage hot spot locations with descriptions compiled by the City. Otak reviewed these data points and created a known issues GIS dataset from the Hot Spots dataset. Each hot spot was given a unique known issue identification number and classified into categories for water quality problems, drainage or flooding problems, habitat degradation, and maintenance issues. Known issues could be classified into more than one category. Maintenance issues include locations receiving inadequate maintenance, requiring excessive maintenance, or where conditions make maintenance difficult or dangerous.

Where information was provided in the hot spot description, fields were filled in describing how frequently issues occur, the year of the most recent occurrence, and the severity of the issue.

Stormwater Drywells
GIS Dataset. City of Washougal Public Works Department. Received 7 Dec. 2022.

Washougal UIC Risk Assessment Summary. Revised 27 June 2019.

This is a GIS dataset of drywells (Underground Injection Controls (UICs)) maintained by the City as part of the City's map of stormwater infrastructure. The dataset includes a field identifying drywells that potentially pose a high threat to groundwater. These wells were identified through desktop analysis and field measurements by Otak as described in the 2019 Washougal UIC Risk Assessment Summary. The drywells identified as a potential high threat to groundwater were appended to the list of known issues and categorized as water quality issues.

Meeting, Correspondence, and Site Visit

Washougal SMP Interview
Scott Collins, Sean Mulderig, Scott Randall. Interview notes by Cody Kent, Trista Kobluskie, Brandon Teetsel. 19 Jan. 2023.

After assessing and categorizing the list of hot spots provided by the City, Otak met with City Public Works staff to review the list of hot spots. During this interview, questions focused on filling in data on frequency of occurrence, the year of the most recent occurrence, and the severity of the issues. In some cases, City staff noted issues that had been resolved. Otak also recorded additional issues identified during the meeting. These notes and additional issues were added to the known issues GIS dataset.

In addition to general issues identified during the meeting, the City brought up a large class of issues as a concern. These issues consist of stormwater treatment ponds located on City owned property for which a homeowner's association is supposed to provide maintenance. This class of issues is caused by facilities receiving inadequate maintenance because the HOA was never formed or has ceased to exist.

Maintenance Facility Rehab
GIS Dataset. City of Washougal Public Works Department. Received 9 Mar. 2023.

This is a GIS dataset of stormwater treatment ponds receiving inadequate maintenance and additional hot spots compiled by the City. The data points consist primarily of stormwater facilities located on property owned by the City receiving inadequate maintenance because an HOA was never formed or has ceased to exist. The lack of maintenance of these facilities results in a variety of problems including not providing water quality treatment and poor drainage resulting in flooding. These facilities were appended to the list of known issues and categorized appropriately. Most of these issues were categorized as maintenance or drainage issues.

City Comments on Washougal SMP Known Issue Identification
Copy of WashougalSMPKnownIssueIdentification20230130 City Comments 3-10-2023. Excel Spreadsheet. Notes by Sean Mulderig. 10 Mar. 2023.

Otak and the City only discussed approximately one-third of the known issues dataset during the January 19th meeting. After entering data on the discussed issues into the known issues GIS dataset, Otak sent an excel spreadsheet and PDF maps of the known issues to the City for annotation on the remaining known issues. These annotations were added to the known issue descriptions and used to update data fields for issue category, frequency, last occurrence, severity. Some issues were also marked as resolved or remove based on this feedback.

Washougal SMP Field Trip Notes
Scott Collins, Sean Mulderig, Scott Randall. Interview notes by Cody Kent, Trista Kobluskie, Brandon Teetsel. 6 Apr. 2023.

After reviewing the compiled and updated known issues GIS dataset, Otak selected known issues to visit with City staff during a site visit with the City's input. These known issues consisted of specific issues where a site visit could inform issue prioritization or solution generation and known issues that could be representative of a common type of issue. Otak and City staff visited 10 locations to observe conditions and discuss issues with City staff. The notes from this field trip were digitized and the information added to the known issues GIS dataset.

Washougal SMP Field Trip Photos
GIS Dataset and Photos. Otak, Inc. Created 6 Apr. 2023.

In addition to taking written notes, Otak staff used a GPS enabled iPad and cellphones to record coordinates, take notes, and take photos at each site visit location. These notes were incorporated into the known issues GIS dataset, and all photos were downloaded and saved to the project folder. Additionally, photos taken with the iPad were maintained as a GIS dataset to maintain location context: SiteVisit20230406.

Exhibit B

GIS Database Schema

Otak

Known Issue Geodatabase Schema

Feature Class		Feature Dataset	Dataset Location	Feature Class Name	Geometry	Attributes										
Known Issue Point		Washougal_SMP_Known_Issues	20272_Washougal_SMP_Authoritative.gdb	Known_Issue_P	point	Field	KI_ID	FullName	Quality	Drainage	Habitat	Maint	InfoSource	LongDesc	Last_Occur_Yr	Frequency
"Known_Issue_P"						*Alias*	*Known Issue ID*	*Full Name*	*Water Quality Issue*	*Local Flooding Issue*	*Stream Habitat Issue*	*Maintainability Issue*	*Information Source*	*Long description*	*Last Year of Issue Occurrence*	*Issue Frequency*
						Format	Text, 8	Text, 100	Short Int	Short Int	Short Int	Short Int	Text, 50	Text, 1500	Text, 4	Text, 50
These features represent stormwater issues (e.g., drainage problems, water quality) identified by Otak through review of city records and interviews with city public works staff. Points may have associated lines and area features that represent the same issue and share the same UNIQUEID. If Otak staff have conducted a site visit, there will be a feature in the Site Visit Point feature class and related by the "Site_Visit_ID" field.			O:\PROJECT\20200\20272\04 CAD\GIS\Data\Internal\20272_Washougal_SMP_Authoritative.gdb			Content	Unique ID for the known issue. All known issues are recorded as point features. Example "KI-001"	Full name of the issue	1 for yes or 0 for no regarding water quality issue	1 for yes or 0 for no regarding water quantity issue	1 for yes or 0 for no regarding water erosion issue	1 for yes or 0 for no regarding maintenance issue	Category of source (i.e. interview, previous study, existing data)	A long description of the issue and the nature of the issue.	A 4 digit text field for last year of known issue occurrence.	A text description of known issue frequency.

Site Visit Point		Washougal_SMP_Known_Issues	20272_Washougal_SMP_Authoritative.gdb	Site_Visit_P	point	Field	Site_Visit_ID	Related_KI_ID	Visit_Date	Access	Team	Site_Descrip	Land_Owner	Site_Long_Descript	CreatedUser	Prop_Solution
"Site_Visit_P"						*Alias*	*Site Visit ID*	*Related Known Issue ID*	*Field Visit Date*	*Site Visit Access*	*Staff Initials*	*Site Description*	*Land Ownership*	*Site Long Description*	*Created User*	*Proposed Solution*
						Format	Text, 10	Text, 8	Date	Text, 120	Text, 12	Text, 255	Text, 70	Text, 5000	Text, 50	Text, 5000
These features represent locations where Otak staff have conducted a site visit to document a stormwater known issue (e.g., drainage problems, water quality) or related existing conditions. Site Visit Point features are related to the Known Issues Point features by the "Site_Visit_ID" field. Photo attachments are enabled for field use.			O:\PROJECT\20200\20272\04 CAD\GIS\Data\Internal\20272_Washougal_SMP_Authoritative.gdb			Content	Unique ID for the site visit. This field will be related to the same field in Known Issues Points.	Related Known Issue. Unique ID for the known issue. All known issues are recorded as point features. Example "KI-001"	Date of the field visit	Site access instructions or observations	Initials of staff who visited	Describes the site and the primary problem to be addressed	Documents whether the site visit is within the responsibility of a private party, public agency, or unknown responsibility.	A longer description of the site and underlying issues in the site visit vicinity.	Person/Agency who created the area - automated	A description of a proposed solution to an issue found at the site visit.

Existing CIPs		N/A	20272_Washougal_SMP_Authoritative.gdb	Existing_CIPs	point	Field	Proj_ID	Proj_Name	Proj_Loc	Parcel_Num	Proj_Type	Owner	Proj_Yr	Phase	Design_Man	Source
"Existing_CIPs"						*Alias*	*Project ID*	*Project Name*	*Project Location*	*Parcel Number*	*Project Type*	*Project Owner*	*Project Year*	*Project Phase*	*Design Manual*	*Source Document*
						Format	Text, 24	Text, 70	Text, 70	Text, 32	Domain	Text, 48	Text, 10	Text, 20	Text, 20	Text, 32
These features represent the City's existing (planned) Capital Improvement Projects in a point feature class. The Existing CIPs may be stormwater projects, or they may be other City projects (e.g., transportation, sanitary sewer, etc.) that stormwater projects can be combined with reduce costs and expedite implementation.			O:\PROJECT\20200\20272\04 CAD\GIS\Data\Internal\20272_Washougal_SMP_Authoritative.gdb			Content	The jurisdiction's existing City project number.	The jurisdiction's CIP project name	Brief location of project.	Parcel Number, if applicable. Default is "N/A"	Type of Capital Improvement Project. Domain values include: Transportation, Parks, Sewer, Storm, and Other	CIP owner/ administrator.	Project year (of probable or planned construction). Text string allows date range.	Project phase.	If known, documents the stormwater design engineering manual used for design	Abbreviated title and year of source where CIP was documented

Potential Projects		N/A	20272_Washougal_SMP_Authoritative.gdb	Potential_Projects	point	Field	PP_ID	Shape	Project_Ty	Description_Short	KIID01	KIID02	KIID03	KIID04	KIID05	KIID06
"Potential_Projects"						*Alias*	*Potential Project ID*	*Shape*	*Project Type*	*Brief Project Description*	*KIID01*	*KIID02*	*KIID03*	*KIID04*	*KIID05*	*KIID06*
						Format	Text, 32	Geometry, point	Text, 50	Text, 100	Long Int	Long Int	Long Int	Long Int	Long Int	Long Int
These features represent Potential Projects proposed as solutions to Known Issues. Because a single Potential Project may be proposed to address multiple Known Issues, Potential Projects have a one-to-many relationship with Known Issue Point features. Known Issues are related to Potential Projects by the Known Issues UNIQUEID field. Known Issue UNIQUEIDs are entered in the Potential Project KIID01, KIID02, etc. fields.			O:\PROJECT\20200\20272\04 CAD\GIS\Data\Internal\20272_Washougal_SMP_Authoritative.gdb			Content	Unique alphanumeric ID for related Potential Projects point (if applicable)										

Known Issue Point

Issue_Sev	Status	Issue_Owner	Program	ProgramID	PP_ID	Site_Visit_ID	DocFileName	ClientID	CreatedUser	CreatedDate	LastEditedUser	LastEditedDate
Issue Severity	*Status*	*Issue Ownership*	*Program*	*Program ID*	*Potential Project ID*	*Site Visit ID*	*Document File Name*	*Client ID Code*	*Created User*	*Created Date*	*Last Edited User*	*Last Edited Date*
Text, 50	Text, 24 - Domain	Text, 48 - Domain	Text, 64	Short Int	Text, 32	Text, 10	Text, 255	Text, 50	Text, 50	Date	Text, 50	Date
A text description of known issue severity.	Documents the status of the known issue, including such values as active, solved, solution in progress, unconfirmed, and inconsequential	Documents whether known issue is the responsibility of the client (using value "public") or is the responsibility of a private party, another public agency, or unknown responsibility.	Name of the Stormwater Program, if applicable	Stormwater Program ID Number, if applicable (see below)	Unique alphanumeric ID for related Potential Projects point (if applicable)	Unique ID for the site visit. See "site visit" feature class to populate with the Site Visit ID.	Issue source document file name (or note meeting notes and date) .	This is the client's existing identification number/code, if any, of the known issue.	Person/Agency who created the point - automated	XX/XX/XXXX - automated	Person/Agency who updated the point - automated	XX/XX/XXXX - automated

Site Visit Point

Wider_Bene	DocFileName	CreatedDate	LastEditedUser	LastEditedDate	PhotoAttach
Wider Benefits	*Document File Name*	*Created Date*	*Last Edited User*	*Last Edited Date*	*Photo Attachment*
Text, 5000	Text, 120	Date	Text, 50	Date	Related Table Photo
A description of possible wider benefits to the project area from proposed solutions.	Folder or file name of any additional site visit notes or additional photos	XX/XX/XXXX - automated	Person/Agency who updated the area - automated	XX/XX/XXXX - automated	Photo Attachment

Existing CIPs

CreatedUser	CreatedDate	LastEditedUser	LastEditedUser	LastEditedDate
Created User	*Created Date*	*Last Edited User*	*Last Edited User*	*Last Edited Date*
Text, 50	Date	Text, 50	Text, 50	Date
Person/Agency who created the area - automated	XX/XX/XXXX - automated	Person/Agency who updated the area - automated	Person/Agency who updated the area - automated	XX/XX/XXXX - automated

Potential Projects

CIP_ID	Program	CIP_Rank	Project_Na	Category	Initial Ranking	Final Ranking	Description_ Long
CIP ID	*Program*	*CIP Rank*	*Project Name*	*Category*	*Initial Project Ranking*	*Final Project Ranking*	*Long Description*
Long Int	Text, 30	Long Int	Text, 255	Text, 255	Long Int	Long Int	Text, 255

Exhibit C

Known Issues

Otak

City of Washougal
Stormwater Master Plan, Known Issues
Otak Project No. 20272
Updated: May 4, 2023

KI_ID	FullName	Issue Types	Info Source	LongDesc	Last_Occur_Yr	Frequency	Issue_ Sev	Status	Site_ Visit_ID
KI-01	Catch basin, 3522 Addy Street, North	Maintenance, Drainage	City Hotspots	3522 Addy St (N side): Structurally okay; CB tied to south CB; crew needs to make sure that CB is clear of debris. City record date: 09/10/2020 KI-01 and KI-02 same issue. Catch basin is too small and leads to 900 feet of CMP under HWY 14 and a new rock pit to an unknown outlet probably in the wetland near the new dike. The City thinks the solution is a better catch basin connection to the CMP pipe and to slip line the pipe against root intrusion. Issue occurs annually if not maintained prior to rain storms. Site visit 20230406: The whole road floods and the City drains it by opening the sanitary manhole. Two mobile homes have flooded. The City modified the catch basin to the south to connect to the pipe. The connection isn't straight and can't easily be rod-jetted to clean. Cedars trees/vegetation have filled the pipe with roots. Pipe needs to be de-rooted and slip lined to HWY 14.	2023	Annually if not maintained prior to storms	High	Active	20230406_01
KI-02	Curb inlet, 3522 Addy Street, South	Maintenance, Drainage	City Hotspots	3522 Addy St (S): Homemade retrofit curb inlet; very hard to cam or rod; needs to be replaced; currently crews make sure that CB is clear of debris. City record date: 09/10/2020 KI_01 and KI_02 same issue. Roots are going through the pipe. City staff have been working to fix this for 5-7 years. Site visit 20230406: The whole road floods and the City drains it by opening the sanitary manhole. Two mobile homes have flooded. The City modified the catch basin to the south to connect to the pipe. The connection isn't straight and can't easily be rod-jetted to clean. Cedars trees/vegetation have filled the pipe with roots. Pipe needs to be de-rooted and slip lined to HWY 14.	2023	Every storm	Low	Active	20230406_02
KI-03	Catch basin, 39th St & Evergreen Way, West	Maintenance, Drainage	City Hotspots	39th St & Evergreen Way (West): CB gets clogged with leaves and ponds; crew needs to keep grate cleared of debris; large drainage area. City record date: 09/10/2020 KI_03 and KI_04 same issue. Site Visit 20230406: From crown of hill on 39th street, everything drains down the street on the surface. The Public Works parking was recently redone, and a grated catch basin was installed with an improvised curb cut, but it still clogs and the street floods. The City cleans the catch basins 1-3 times a day during heavy rain. Across Evergreen, water drains to an ad-hoc infiltration area on BNSF property. The City has a handshake deal to clear vegetation around the outlet, and when vegetation is removed, the flow is high it clears the pipes. More stormwater infrastructure (inlets and/or infiltration) is needed upstream on 39th St.	2023	Every storm	Low	Active	20230406_03
KI-04	Catch bains, 39th St & Evergreen Way, East	Maintenance, Drainage	City Hotspots	39th St & Evergreen Way (East side): Tendency to clog; huge drainage area; crew needs to keep catch basins cleared of debris. City record date: 09/10/2020 The transportation project is basically finished, but it may need a medial island. City staff think bioretention planters in the neighborhood and a drywell on 39th Street would solve it. It discharges to BNSF property without permission. Site Visit 20230406: From crown of hill on 39th street, everything drains down the street on the surface. The Public Works parking was recently redone, and a grated catch basin was installed with an improvised curb cut, but it still clogs and the street floods. The City cleans the catch basins 1-3 times a day during heavy rain. Across Evergreen, water drains to an ad-hoc infiltration area on BNSF property. The City has a handshake deal to clear vegetation around the outlet, and when vegetation is removed, the flow is high it clears the pipes. More stormwater infrastructure (inlets and/or infiltration) is needed upstream on 39th St.	2023	Infrequent, once in ~10 years	Low	Active	20230406_04
KI-05	Box Culvert, 40th St & J St	Drainage, Habitat	City Hotspots	40th St & J St: Ensure stream is flowing through the box culvert and not flooding J St. City record date: 09/10/2020, They replaced CMP culverts with a chain of box culverts on Campen Creek on J Street. The City used to routinely clean the CMP culverts. The box culverts are not deep enough. During normal weather, the water level is only 6-in below the top. KI_05 is the most downstream box culvet. When the creek stage gets high, they worry it will flood J Street and the golf course. It has flooded once since the box culvert was installed, not sure when. Worried about big storms and high flows.	c.2015	Weekly in rainy season	Low	Active	
KI-06	Ditch inlet, 5164 P St	Maintenance, Drainage	City Hotspots	5164 P St: Ditch inlet gets plugged and causes flooding; crew needs to keep ditch inlet cleared of debris. City record date: 09/10/2020 The facility filled up with a trash after a windstorm recently and does so frequently. This causes the ditch to	2023	Weekly in rainy season	Low	Active	20230406_05
KI-07	Ditch inlet, 1823 49th St	Maintenance, Drainage	City Hotspots	1823 49th St: DI has tendency to plug and flood street; crew needs to keep DI clear of debris. City record date: 09/10/2020 The facility filled up with a trash after a windstorm recently and does so frequently. This causes the ditch to flood on to the road. Ponding is not a problem, but the flooding deposits trash and gravel on	2023	Weekly in rainy season	Moderate	Active	
KI-08	Ditch inlet, 37th St & W St	Maintenance, Drainage	City Hotspots	37th St & W St: Ditch inlet needs to stay clear or flooding will occur. City record date: 09/10/2020 The facility filled up with a trash after a windstorm recently and	2023	Weekly in rainy season	Moderate	Active	

KI_ID	FullName	Issue Types	Info Source	LongDesc	Last_Occur_Yr	Frequency	Issue_ Sev	Status	Site_ Visit_ID
KI-09	Ditch inlet, 35th St & U St	Maintenance, Drainage	City Hotspots	35th St & U St: Ditch Inlet needs to stay cleared of debris or flooding will occur. City record date: 09/10/2020 The facility filled up with a trash after a windstorm recently and does so frequently. This causes the ditch to flood on to the road. Ponding is not a problem, but the flooding deposits trash and gravel on the road.	2023	Weekly in rainy season	Low	Active	
KI-10	Ditch inlet, 3337 W St	Maintenance, Drainage, Habitat	City Hotspots	3337 W St: ditch inlet needs to be kept clear so that it does not run overland and cause erosion and structural damage. City record date: 09/10/2020 The facility filled up with a trash after a windstorm recently and does so frequently. This causes the ditch to flood on to the road. Ponding is not a problem, but the flooding deposits trash and gravel on the road. Location is by Betty Gross's. Access is difficult, between houses and narrow. Maintenace must be done by hand. Easement status is unknown. This is technically a WQ facility; however, it has water running year-round. There has been a fix downstream. This is an important issue because the flow would run over private property pasture and erode their driveway. Water quality issues of sheet flow over the cattle field prompted the City to develop the prior fixes. Site Visit 20230406: No maintenance access to facility (foot path only). City has dug out the facility by hand, installed a new lower T and field inlet, and piped flow west. City keeps field inlets clear manually.	2023	Heavy rain events	Low	Active	20230406_06
KI-12	Swale outfall and stream culvert, 8th St & Shepherd Rd, NE corner	Maintenance, Drainage	City Hotspots	8th St & Shepherd Rd, NE corner: swale outfall is submerged and tends to clog; stream culvert is a safety hazard, it needs to be covered; crew checks function. City record date: 09/10/2020	2023	Failed drywell	Moderate	Active	
KI-13	Stormwater facilities, 3841 Addy St East	Drainage	City Hotspots	3841 Addy St East: Pre-2007 private stormwater facilities (north shore estates) does not discharge properly into SR 14 ROW; water in storm line backs up and floods street during heavy rain events. City record date: 11/30/2022 The facility is a detention pond. The outlet structure for the pond discharges to the HWY 14 ROW in an unpenetrable forest natural area. The discharge point is unknown, and the City can't get into the HWY 14 ROW. The outlet pipe is old corrugated and does not drain. The facility is City-owned, but privately maintained per the plan (North Shore). The HOA brought to as-built condition, but it still fills up and floods into the street. When the pond fills up, the upstream catch basins fill up and surcharge into the street. The street ponds in the gutter line and partly into the travel lane on both sides. Site Visit 20230406: Two facilities on Addy Street, P2 and P3. The facilities appear to be on property owned by the Northshores Mobile Home Park (Clark County MapsOnline). The facilities cannot be easily accessed for maintenance. The gate for P3 faces the swampy/natural area, not the street. The City cannot find the manhole, outlet structure, or outfall for these facilities. The 8-in pipe in Addy is always full, because facility P3 is always full. It overflows to the swamp/natural area. Does not flood street or home to the west. Outlet is in the WSDOT ROW/HWY 14.	2023	Multiple times/year	Moderate	Active	20230406_07
KI-14	Catch basin, 4132 Addy Loop near Hamlik Park	Drainage	City Hotspots	CB near Hamlik Park: CB has tendency to clog; undersized line to old drywell is rooted-in and does not drain well. City record date: 11/30/2022 root issues in the whole area, small project candidate.	2023	Occasional	High	Active	
KI-15	Catch basins, 4280 Addy Street, in front of apartments	Maintenance, Drainage	City Hotspots	CBs in front of apartments: CBs are prone to plugging causing flooding; drain to private storm system; crew needs to keep CB cleared of debris. City record date: 11/30/2022 Confusing situation. When Addy Street and the storm system were put in, they ran the runoff through catch basins, to dry wells, and then to HWY 14 ROW. Runoff infiltrates in the HWY 14 ROW. Later, apartments were built over the storm and sanitary system. The storm line may be blocked somewhere in the apartment complex, or the water table in the ROW could be rising and backwatering the system. No drywells are documented in the area. There are no private facilities on the apartment site. How the pipes go through the apartment site is unknown. Site Visit 20230406: Shallow catch basins with no sump. South catch basin plugs and floods roadway. Downstream manhole in good condition, trunkline under apartment buildings. Trunkline has sufficient capacity. Possible catch basin retrofit because catch basins don't have sumps. Probably not a CIP.	2023	On-going	Moderate	Active	20230406_08
KI-16	Catch basins and Drywells, 3000 block Main St	Drainage	City Hotspots	CBs/Drywell on Main St: Main st surface is not graded correctly; water has trouble getting to CBs; drywells do not perk well. City record date: 11/30/2022 Road is not graded to drain. Street flooding stopped after cleaning dry wells with the vactor truck. Ponding in parking spaces remains, but its more of a streets issue.	2023	Every storm	Low	Active	
KI-18	Catch basin, 1700 Main St, in front of coffee shop ponding	Maintenance, Drainage	City Hotspots	Main St in front of coffee shop ponding: Grate in front of coffee shop tends to plug (special decorative grate); decorative grates are installed throughout downtown and have tiny holes that clog easily; should be modified or replaced. City record date: 11/30/2022	2023	Groundwater flow constant	High	Active	
KI-19	Catch basin, 1700 C St, ponding	Maintenance, Drainage	City Hotspots	Ponding on C St: Grate tends to plug; decorative grates are installed throughout downtown and have tiny holes that clog easily; grate should be modified or replaced. City record date: 11/30/2022 Ponding caused because the street is brick pavers and they're uneven. Probable streets issue.	2023	Maintained every other year after heavy rains	Low	Active	
KI-25	Curb cuts, 897 E St	Maintenance, Drainage	City Hotspots	Curb cuts draining to swales along E St: Curb cuts tend to clog and fill with debris causing ponding on E St; crew needs to check every curb cut during rain events. City record date: 11/30/2022	2023	Multiple times/year	High	Active	
KI-26	Ponding, 1098 9th St, Ponding at K St and 9th	Maintenance, Drainage	City Hotspots	Ponding at K St and 9th: Lack of drainage infrastructure; ponding and flooding into private property; crews make sure that the limited stormwater infrastructure is cleared. City record date: 11/30/2022	2023	Multiple times/year	High	Active	
KI-11	Field inlet, 863 Shepherd Rd	Maintenance, Drainage	City Hotspots	863 Shepherd Rd: Inlets receive a lot of flow and will flood if field inlet gets clogged; crew makes sure field inlet is cleared. City record date: 09/10/2020	2023	Mutiple times a year, ponding in parking spaces on Main St.	Low	No Action	
KI-17	Curb inlet, Washougal River Road and Main St, S Corner in front of AMPM	Maintenance, Drainage	City Hotspots	S corner of WRR and Main St in front of AMPM: Curb cut inlet into swale tends to plug up with debris causing flooding; crew needs to keep it cleared. City record date: 11/30/2022	2023	On-going	Moderate	No Action	

KI_ID	FullName	Issue Types	Info Source	LongDesc	Last_Occur_Yr	Frequency	Issue_ Sev	Status	Site_ Visit_ID
KI-23	Catch basin, 953 C St, North	Maintenance, Drainage	City Hotspots	North Side of C St across from 9th: Occastional flooding due to undersided CB and large drainage area; easily plugged and adjacent property owner will not help clear CB. City record date: 11/30/2022	2023	Drywell maintained annually, flooding 4-5 times a year	High	No Action	
KI-28	Catch basin and drywell, 1000 4th St, clogging and flooding	Maintenance, Drainage	City Hotspots	Catchbasin w/ 4 in pipe with aging drywell on 4th St: Tends to get clogged and will cause flooding; crews make sure catchbasin is cleared; public drywell is on private property. City record date: 11/30/2022			High	No Action	
KI-30	Ditch inlet, 1867 N 8th St	Maintenance, Drainage	City Hotspots	Ditch inlet on N 8th St: Ditch inlet tends to plug; will overflow and run down 8th st causing flooding; crews check to see if ditch inlet is cleared. City record date: 11/30/2022			Moderate	No Action	
KI-20	Street ponding, 1615 C St, in front of Exec house	Maintenance, Drainage	City Hotspots	In front of Exec house - ponding on C St: 4in stormwater line plugs up; will be addressed as part of the 2023 repair project list. City record date: 11/30/2022	2023	Sweeping weekly in the fall leaf drop; also needs to vac out the drywell	Moderate	Previously Solved	
KI-21	Ponding, 1208 C St, failed drywell and broken pipe	Drainage	City Hotspots	Ponding failed drywell and broken pipe on 12th St: Ponding from failed drywell and broken pipe on 12th St; to be addressed with sanitary pump station upgrade in 2023 -24. City record date: 11/30/2022	c.2020	Used to be more frequent, but City staff dug it out and hasn't hadn't a problem since	High	Previously Solved	
KI-22	Flooding, 1104 C St, Flooding and broken pipe on C St	Drainage	City Hotspots	Flooding and broken pipe on C St: flooding, broken pipe, failed dw; will be addressed via 2023 storm repair projects. City record date: 11/30/2022	2023	Checking a few times a year; can't currently maintain	Moderate	Previously Solved	
KI-24	Dry well, 300 C St, across from Iron Gate	Maintenance, Drainage	City Hotspots	Failed drywell on C st across from Iron Gate: Substantial flooding; Failed drywell on C St across from Iron Gate; planned repair for 2023. City record date: 11/30/2022	2023	On-going	Low	Previously Solved	
KI-27	Drywell and catch basins, 500 K St, drywell in groundwater	Maintenance, Drainage	City Hotspots	Failed drywell and catchbasins on K and 5th: Failed drywell and catchbasins on intersection of K and 5th; to be repaired in 2023 with stormwater repair projects. City record date: 11/30/2022	2023	On-going	High	Previously Solved	
KI-33	Catch basins and drywell, 20th St and E St	Drainage	City Hotspots	20th and E St: Failed infrastructure; 2 catchbasins and drywell; included as part of the 2023 stormwater repair list. City record date: 11/30/2022	2023	On-going	Moderate	Previously Solved	
KI-41	Drywell, 3600 I St	Drainage	City Hotspots	I & J - drywell and undersized line is clogged: Drywell is failed at the end of I St causing flooding down 36th and ponds on J St. The issue was selected to be solved with the Campen Creek SMAP CIP. City record date: 11/30/2022		On-going	Moderate	Previously Solved	
KI-44	Outlet to ditch, 49th St and S St, Bank erosion	Maintenance, Drainage	Workshop 20230119	New issue. Upper ditch inlet (see map); concentrated flows, there is a big hole here. CMP needs to be cut and tied on with ADS. City staff have plan for near term fix. Can't wait for master plan. Road base may be close to failing.		Concentrated flow causing erosion and road damage	High	Previously Solved	
KI-38	Stormwater facility, near S St and Quail Ph 3	Maintenance, Drainage	City Hotspots	Stormwater facility near S St and Quail Ph 3: Facility has very limited access with aggressive homeowners encroaching into stormwater tract; outlet structures need to stay clear of debris or severe flooding will occur. City record date: 11/30/2022 The access easement into the stormwater tract is too close to houses, and the City is unable to access the tract with equipment (used to use mini-excavator). Aggressive homeowner has a garden and pathway in the tract. The outlet from this facility does not have a bypass. There are two pipes with a high-probablity of clogging. It needs to be visited before every storm. There is no downstream water quality facility. Its taking more flow than designed because of high-groundwater. Downstream is Quail Park 3 subdivision. An engineer has already made a downstream analysis and said do not alter the existing facility. Needs site visit. Downstream is Schmidt Family Park. There is room for a regional facility and potential for restoration. Park is known issue KI_47 and could solve this issue. Site Visit 20230406: Photo from street shows public access easement for trail along private drive, not the maintenance easement. Constant groundwater flow, year-round. Two large clustered trees need to be removed (and are scheduled removal) to open maitnenance access. The yellow cap in the photos is a plug. The City clears the outlet and inlets and mow around the facility.	2023	Requires maintenance every storm, constant groundwater flow	Moderate	Active	20230406_09
KI-29	Catch basins, 200 block N X St, tend to plug	Maintenance, Drainage	City Hotspots	Catchbasins on X St tend to plug: Catchbasins tend to plug; crews make sure they are clear; homes will flood if not cleared; groundwater seepage is factor as well. City record date: 11/30/2022			High	Active	
KI-31	CDS and swale, 1500 4th Ct	Maintenance, Drainage	City Hotspots	4th and Shepherd - CDS and Swale: The CDS unit and swale tend to clog and are difficult to maintain; dying oak trees are creating major leaf issues; shallow gas line runs under facility; ground water causes constant flow. City record date: 11/30/2022	2023	Groundwater flow constant; Annual leaf fall	Moderate	Active	
KI-32	Outlet, Washougal River Road, across from N 25th St, North	Maintenance, Drainage, Quality	City Hotspots	North side of Washougal River Road across from N 25th St: Outlet structure do not work as designed; floods sidewalk and planter strip; sediment load deposits on sidewalk and flooding causes erosion of planter strip. City record date: 11/30/2022			Moderate	Active	
KI-34	Drywells, 618 G St	Drainage	City Hotspots	Two drywells on G St: Two failing drywells on G St; flooding in intersection of WRR and G St. City record date: 11/30/2022	2023	On-going	High	Active	
KI-35	Drywell and catch basins, K St and 14th St	Maintenance, Drainage	City Hotspots	K and 14th intersection: Roots tend to plug limited infrastructure; undersized drywell and small catch basins; crews have to make sure catch basins are cleared or flooding will occur. City record date: 11/30/2022	2023	Annual	Moderate	Active	
KI-36	Drywell, 24th St to 28th St and E St to H St	Maintenance, Drainage	City Hotspots	24th to 28th and E to H: Limited stormwater infrastructure to drywell; has tendency to clog; increased sweeping frequency is required with how much leaf debris accumulates on streets. City record date: 11/30/2022 The City currently does increased street sweeping because these streets drain to one catch basin. Limited drainage structure. Catch basin and pipe replacement needed. Debris piles on the catch basins, and causes ponding on the travel lanes of residential streets.	2023	Multiple times/year	Moderate	Active	

KI_ID	FullName	Issue Types	Info Source	LongDesc	Last_Occur_Yr	Frequency	Issue_ Sev	Status	Site_ Visit_ID
KI-37	Ditch inlet, Stiles Rd at SE 330th Ave	Maintenance, Drainage	City Hotspots	Ditch Inlet on Stiles Rd: Ditch inlet on Stiles Rd has tendency to plug and flood over roadway; needs to be kept clear of debris. City record date: 11/30/2022 Not a ditch inlet. Old clay pipe under Stiles road. The ditch on the west side of the road is filled in and needs to be reditched. The clay pipe when plugged goes down the bank on the east side of the road and causes a muddy blow out. However, this has been dug out, and has only occured twice in 22 years.	c.2015	Once in 22 years	Low	Active	
KI-39	CDS and drywells, 3500 block P St, Buffalo Ranch flooding	Maintenance, Drainage	City Hotspots	Buffalo Ranch flooding - P St: CDS unit tends to clog and drywells do not perk well leading to severe flooding; crew needs to keep CDS unit cleared of debris. City record date: 11/30/2022			High	Active	
KI-40	Drywell, 3300 H St	Maintenance, Drainage	City Hotspots	Drywell on H St: Failed drywell on H St causing flooding and property damage; drywell needs to be cleaned very frequently to help mitigate the lack of drainage; needs to be replaced. City record date: 11/30/2022	2023	Very frequently	High	Active	
KI-42	Catch basin, 5000 S St	Maintenance, Drainage	City Hotspots	Corner of S St and 50th St: Catch basins has a tendency to plug and flood; crew needs to keep the catch basins clear of debris. City record date: 11/30/2022 Catch basins are too small. 6-in pipe under the street that needs to be bigger. Flows across the street to an open space between properties. Candidate for small projects program.			Moderate	Active	
KI-43	Ditch inlet, 57th St and N St	Maintenance, Drainage	City Hotspots	57th and N Ditch Inlet: Ditch inlet will get plugged and flood; crew needs to keep ditch inlet cleared of debris. City record date: 11/30/2022 Same issue as KI_10. Planned subdivision upstream could help the debris coming down.			Moderate	Active	20230406_10
KI-45	Drywell, 3338 L St, High risk drywell	Drainage, Quality	Workshop 20230119	New issue. Drywell high risk flooding in groundwater as of this morning while City staff was maintaining it.	2023		High	Active	
KI-46	Drywell, 1060 A St	Drainage, Quality	Workshop 20230119	New issue. See map - discuss next time				Active	
KI-47	Potential regional facility, Schmidt Family Park	Quality, Habitat	Workshop 20230119	Potential regional facility and restoration. Site Visit 20230413: Stream enters Washougal River at site. Stream originates in the City and crosses 32nd in culvert, daylights into county, then enters City/culvert again before daylighting at this site and discharging into the river. Water and sewer also cross the Washougal River at this access point to the river.		Treatment/ Restoration Opportunity	Low	Active	20230406_11
KI-48	Filter vault, 755 Fairway Dr, needs maintenance access road	Maintenance	FacilityRehab	Filter vault, 755 Fairway Dr, needs maintenance access road. Filter vault is extremely difficult to access with Vactor truck; access road needs to be constructed			Moderate	Active	
KI-49	Filter vault, 4932 G St, filter vaults need adaptors installed	Maintenance	FacilityRehab	Filter vault, 4932 G St, filter vaults need adaptors installed. All Contech filter vaults that are not half turn need adapter installed next time media is replaced			Moderate	Active	
KI-50	Facilty lid, 5569 I St, lid damage	Maintenance	FacilityRehab	Facilty lid, 5569 I St, lid damage. The lid is warped due to garbage truck turn around; needs to be replaced	2023	On-going	Low	Active	
KI-51	Filter vault, 5212 N St, City owned and private maintenance	Maintenance	FacilityRehab	Filter vault, 5212 N St, City owned and private maintenance. Owned by COW and maintained by PVT			Low	Active	
KI-52	Filter vault and detention pipes, 3644 S St, City owned and private maintenance	Maintenance	FacilityRehab	Filter vault and detention pipes, 3644 S St, City owned and private maintenance. Filter vaults and detention pipes owned by COW and "maintained" pvt. Site Visit 20230406: HOA is defunct. City would need budget to take over these facilities.			Low	Active	20230406_12
KI-53	CDS, 4901 K St, needs enhanced maintenance	Maintenance	FacilityRehab	CDS, 4901 K St, needs enhanced maintenance. All CDS Units need more than once/year maintenance	2023	Multiple times/year	Low	Active	
KI-54	Filter catch basin, 528 20th St, City owned and private maintenance	Maintenance	FacilityRehab	Filter catch basin, 528 20th St, City owned and private maintenance. Owned by COW and PVT Maintained			Low	Active	
KI-55	Permeable pavement, 1532 A St, City maintenance ineffective	Maintenance	FacilityRehab	Permeable pavement, 1532 A St, City maintenance ineffective. Currently City owned permeable pavers, concrete, asphalt does not have a effective way to be maintained. Need to explore equipment and staffing time needs for routine maintenance.			Low	Active	
KI-56	Swale and detention pond, 4344 X St, City owned and private maintenance	Maintenance	FacilityRehab	Swale and detention pond, 4344 X St, City owned and private maintenance. Swale and associated detention pond owned by COW and maintained PVT			Low	Active	
KI-57	Swale, 2410 41st St, City owned and private maintenance	Maintenance	FacilityRehab	Swale, 2410 41st St, City owned and private maintenance. Owned by City maintained pvt; HOA is intact and does maintenance			Low	Active	
KI-58	Bioretention and detetnion pipes, 3321 45th St, inadequate private maintenance	Maintenance	FacilityRehab	Bioretention and detetnion pipes, 3321 45th St, inadequate private maintenance. Bioretention and detention pipes are owned by COW and "maintained" PVT by defunct HOA			Low	Active	
KI-59	Swale and detention pipes, 1730 N 12th St, inadequate private maintenance	Maintenance	FacilityRehab	Swale and detention pipes, 1730 N 12th St, inadequate private maintenance. Swale and detention pipes owned by COW and "maintained" pvt			Low	Active	20230406_13
KI-60	Filter vault, detention pond, and flow control manhole, 1261 48th St, inadequate private maintenance	Maintenance	FacilityRehab	Filter vault, detention pond, and flow control manhole, 1261 48th St, inadequate private maintenance. Filter Vault, Detention Pond, and FC MH owned by COW and maintained by PVT			Low	Active	

KI_ID	FullName	Issue Types	Info Source	LongDesc	Last_Occur_Yr	Frequency	Issue_ Sev	Status	Site_ Visit_ID
KI-61	Flow control manhole, detention pond, and swale, 741 N P St, inadequate private maintenance	Maintenance	FacilityRehab	Flow control manhole, detention pond, and swale, 741 N P St, inadequate private maintenance. FC MH, Detention Pond, and Swale owned by COW and "maintained" pvt			Low	Active	
KI-62	Flow control manhole, detention pond, and swale, 760 N P St, inadequate private maintenance	Maintenance	FacilityRehab	Flow control manhole, detention pond, and swale, 760 N P St, inadequate private maintenance. Pond, Swale, and FC MH owned by COW and "maintained" pvt			Low	Active	
KI-63	Flow control manhole, detention pond, and swale, 2122 N 7th St, inadequate private maintenance	Maintenance	FacilityRehab	Flow control manhole, detention pond, and swale, 2122 N 7th St, inadequate private maintenance. Pond, Swale, and FC MH owned by COW and "maintained" pvt. Site Visit 20230406: High groundwater and continuous flow in stream to east. HOA president won't touch the facility beyond vegetation management because its on City land. City staff thinks this facility is contributing to a downstream blow out where a field inlet becomes blocked which then flows down the street. Liner is exposed and may be punctured.	2023	Groundwater flow constant	Moderate	Active	20230406_14
KI-64	Flow control manhole, detention pond, and CDS, 1533-2189 N Lebrun Dr, inadequate private maintenance	Maintenance	FacilityRehab	Flow control manhole, detention pond, and CDS, 1533-2189 N Lebrun Dr, inadequate private maintenance. Pond, FC MH and CDS unit owned by COW and "maintained" pvt			Low	Active	20230406_15
KI-65	Flow control manhole, detention pond, and swale, 2808 W 9th St, inadequate private maintenance	Maintenance	FacilityRehab	Flow control manhole, detention pond, and swale, 2808 W 9th St, inadequate private maintenance. Pond, swale, and FC mh owned by COW and "maintained" pvt			Low	Active	
KI-66	Filter vault, detention pond, and flow control manhole, 1901-1999 34th St, inadequate private maintenance	Maintenance	FacilityRehab	Filter vault, detention pond, and flow control manhole, 1901-1999 34th St, inadequate private maintenance. Filter vaults, pond, and fc mh owned by COW and "maintained" pvt			Low	Active	
KI-67	Drywell, 3201-3399 L St, high water table and street grading away from catch basin	Maintenance, Drainage, Quality	FacilityRehab	Drywell, 3201-3399 L St, high water table and street grading away from catch basin. Inlet pipe from CB daylights at bottom of DW; Water table is high and street grade does not allow stormwater to get into catch basin	2023	On-going	Moderate	Active	
KI-68	CDS, 1310 N 24th Ct, needs enhanced maintenance	Maintenance	FacilityRehab	CDS, 1310 N 24th Ct, needs enhanced maintenance. CDS Unit get's overwhelmed and needs frequent cleaning; many leaves and debris	2023	Annual	Low	Active	
KI-69	CDS, 2200 N Washougal River Rd, needs enhanced maintenance	Maintenance	FacilityRehab	CDS, 2200 N Washougal River Rd, needs enhanced maintenance. CDS unit receives a lot of flow and a lot of debris; needs enhanced maintenance	2023	Annual	Low	Active	
KI-70	CDS, 2157 N Q ST, needs enhanced maintenance	Maintenance	FacilityRehab	CDS, 2157 N Q ST, needs enhanced maintenance. CDS unit receives a lot of flow and a lot of debris; needs enhanced maintenance	2023	Annual	Low	Active	
KI-71	Planters, 927 E St, planters need to be redesigned and replanted	Maintenance	FacilityRehab	Planters, 927 E St, planters need to be redesigned and replanted; extremely labor intensive and high profile; areas with too much vegetation and bare areas	2023		Low	Active	
KI-72	Detention pond, 880 N P St, facility short circuiting and erosion	Maintenance, Drainage, Quality	FacilityRehab	Site Visit 20230406: City maintains this facility. Has graded and removed silt from the pond. The City also added the sinuosity in the upper portion. Difficult to maintain due to steep slope and retaining wall. Flow control manhole may be missing.	2023		Moderate	Active	20230406_16
KI-73	Detention pond, 2200 W 8th St, pet waste and trash	Maintenance, Quality	FacilityRehab	Detention pond, 2200 W 8th St, pet waste, trash, and liability issues; need to install a couple short sections of fence	2023	On-going	Low	Active	
KI-74	Swale, 624 W S Street, bank stabilization	Maintenance, Quality	FacilityRehab	Swale, 624 W S Street, bank stabilization. Facility needs bank reinforcement and stabilization; work should be able to be completed in house	2023		Moderate	Active	
KI-75	Detention pond, W Lookout Ridge Dr and SE Crown Rd, facility needs to be dredged	Maintenance	FacilityRehab	Detention pond, W Lookout Ridge Dr and SE Crown Rd, facility needs to be dredged. Facility to be dredged in coming years; work should be able to be completed in house with proper staffing and rental equipment	2023		Low	Active	
KI-76	Drywell, high risk	Quality	Washougal Stormwater\ Drywell.shp	Drywell, high risk, estimated distance to groundwater: -12 ft	2023	On-going	Moderate	Active	
KI-77	Drywell, high risk	Quality	Washougal Stormwater\ Drywell.shp	Drywell, high risk, estimated distance to groundwater: 0 ft	2023	On-going	Moderate	Active	
KI-78	Drywell, high risk	Quality	Washougal Stormwater\ Drywell.shp	Drywell, high risk, estimated distance to groundwater: -5.5 ft	2023	On-going	Moderate	Active	

KI_ID	FullName	Issue Types	Info Source	LongDesc	Last_Occur_Yr	Frequency	Issue_ Sev	Status	Site_ Visit_ID
KI-79	Drywell, high risk	Quality	Washougal Stormwater\ Drywell.shp	Drywell, high risk, estimated distance to groundwater: 0 ft	2023	On-going	Moderate	Active	
KI-80	Drywell, high risk	Quality	Washougal Stormwater\ Drywell.shp	Drywell, high risk, estimated distance to groundwater: 0 ft	2023	On-going	Moderate	Active	
KI-81	Drywell, high risk	Quality	Washougal Stormwater\ Drywell.shp	Drywell, high risk, estimated distance to groundwater: -2.6 ft	2023	On-going	Moderate	Active	
KI-82	Drywell, high risk	Quality	Washougal Stormwater\ Drywell.shp	Drywell, high risk, estimated distance to groundwater: 0 ft	2023	On-going	Moderate	Active	
KI-83	Drywell, high risk	Quality	Washougal Stormwater\ Drywell.shp	Drywell, high risk, estimated distance to groundwater: -3.8 ft	2023	On-going	Moderate	Active	
KI-84	Drywell, high risk	Quality	Washougal Stormwater\ Drywell.shp	Drywell, high risk, estimated distance to groundwater: -13.7 ft	2023	On-going	Moderate	Active	
KI-85	Drywell, high risk	Quality	Washougal Stormwater\ Drywell.shp	Drywell, high risk, estimated distance to groundwater: -13.3 ft	2023	On-going	Moderate	Active	
KI-86	Drywell, high risk	Quality	Washougal Stormwater\ Drywell.shp	Drywell, high risk, estimated distance to groundwater: -13.3 ft	2023	On-going	Moderate	Active	
KI-87	Drywell, high risk	Quality	Washougal Stormwater\ Drywell.shp	Drywell, high risk, estimated distance to groundwater: -11.2 ft	2023	On-going	Moderate	Active	
KI-88	Drywell, high risk	Quality	Washougal Stormwater\ Drywell.shp	Drywell, high risk, estimated distance to groundwater: -7.8 ft	2023	On-going	Moderate	Active	
KI-89	Drywell, high risk	Quality	Washougal Stormwater\ Drywell.shp	Drywell, high risk, estimated distance to groundwater: -16.1 ft	2023	On-going	Moderate	Active	
KI-90	Drywell, high risk	Quality	Washougal Stormwater\ Drywell.shp	Drywell, high risk, estimated distance to groundwater: -12.2 ft	2023	On-going	Moderate	Active	
KI-91	Drywell, high risk	Quality	Washougal Stormwater\ Drywell.shp	Drywell, high risk, estimated distance to groundwater: -12.2 ft	2023	On-going	Moderate	Active	
KI-92	Drywell, high risk	Quality	Washougal Stormwater\ Drywell.shp	Drywell, high risk, estimated distance to groundwater: 4.8 ft	2023	On-going	Moderate	Active	
KI-93	Drywell, high risk	Quality	Washougal Stormwater\ Drywell.shp	Drywell, high risk, estimated distance to groundwater: 0 ft	2023	On-going	Moderate	Active	
KI-94	Drywell, high risk	Quality	Washougal Stormwater\ Drywell.shp	Drywell, high risk, estimated distance to groundwater: -9.5 ft	2023	On-going	Moderate	Active	
KI-95	Drywell, high risk	Quality	Washougal Stormwater\ Drywell.shp	Drywell, high risk, estimated distance to groundwater: -12.7 ft	2023	On-going	Moderate	Active	
KI-96	Drywell, high risk	Quality	Washougal Stormwater\ Drywell.shp	Drywell, high risk, estimated distance to groundwater: -8.5 ft	2023	On-going	Moderate	Active	
KI-97	Drywell, high risk	Quality	Washougal Stormwater\ Drywell.shp	Drywell, high risk, estimated distance to groundwater: -18 ft	2023	On-going	Moderate	Active	
KI-98	Drywell, high risk	Quality	Washougal Stormwater\ Drywell.shp	Drywell, high risk, estimated distance to groundwater: -11.8 ft	2023	On-going	Moderate	Active	
KI-99	Drywell, high risk	Quality	Washougal Stormwater\ Drywell.shp	Drywell, high risk, estimated distance to groundwater: -12.5 ft	2023	On-going	Moderate	Active	
KI-100	Drywell, high risk	Quality	Washougal Stormwater\ Drywell.shp	Drywell, high risk, estimated distance to groundwater: -13 ft	2023	On-going	Moderate	Active	
KI-101	Drywell, high risk	Quality	Washougal Stormwater\ Drywell.shp	Drywell, high risk, estimated distance to groundwater: -12.2 ft	2023	On-going	Moderate	Active	
KI-102	Drywell, high risk	Quality	Washougal Stormwater\ Drywell.shp	Drywell, high risk, estimated distance to groundwater: -11.9 ft	2023	On-going	Moderate	Active	
KI-103	Drywell, high risk	Quality	Washougal Stormwater\ Drywell.shp	Drywell, high risk, estimated distance to groundwater: -12.1 ft	2023	On-going	Moderate	Active	
KI-104	Drywell, high risk	Quality	Washougal Stormwater\ Drywell.shp	Drywell, high risk, estimated distance to groundwater: -14.3 ft	2023	On-going	Moderate	Active	
KI-105	Drywell, high risk	Quality	Washougal Stormwater\ Drywell.shp	Drywell, high risk, estimated distance to groundwater: -9.4 ft	2023	On-going	Moderate	Active	
KI-106	Drywell, high risk	Quality	Washougal Stormwater\ Drywell.shp	Drywell, high risk, estimated distance to groundwater: -9.2 ft	2023	On-going	Moderate	Active	
KI-107	Drywell, high risk	Quality	Washougal Stormwater\ Drywell.shp	Drywell, high risk, estimated distance to groundwater: -7.3 ft	2023	On-going	Moderate	Active	
KI-108	Drywell, high risk	Quality	Washougal Stormwater\ Drywell.shp	Drywell, high risk, estimated distance to groundwater: -11 ft	2023	On-going	Moderate	Active	

KI_ID	FullName	Issue Types	Info Source	LongDesc	Last_Occur_Yr	Frequency	Issue_ Sev	Status	Site_ Visit_ID
KI-109	Drywell, high risk	Quality	Washougal Stormwater\ Drywell.shp	Drywell, high risk, estimated distance to groundwater: -12.3 ft	2023	On-going	Moderate	Active	
KI-110	Drywell, high risk	Quality	Washougal Stormwater\ Drywell.shp	Drywell, high risk, estimated distance to groundwater: -8 ft	2023	On-going	Moderate	Active	
KI-111	Drywell, high risk	Quality	Washougal Stormwater\ Drywell.shp	Drywell, high risk, estimated distance to groundwater: 0 ft	2023	On-going	Moderate	Active	
KI-112	Drywell, high risk	Quality	Washougal Stormwater\ Drywell.shp	Drywell, high risk, estimated distance to groundwater: -9.6 ft	2023	On-going	Moderate	Active	
KI-113	Drywell, high risk	Quality	Washougal Stormwater\ Drywell.shp	Drywell, high risk, estimated distance to groundwater: -4 ft	2023	On-going	Moderate	Active	
KI-114	Drywell, high risk	Quality	Washougal Stormwater\ Drywell.shp	Drywell, high risk, estimated distance to groundwater: -9 ft	2023	On-going	Moderate	Active	
KI-115	Drywell, high risk	Quality	Washougal Stormwater\ Drywell.shp	Drywell, high risk, estimated distance to groundwater: -18.5 ft	2023	On-going	Moderate	Active	
KI-116	P33, stormwater facility.	Maintenance, Drainage	Site Visit	Site Visit 20230413: P33 storwmater facility not functioning. Two catch basins in road were recently cleaned but full today. Manhole at intersection acts as sediment manhole. Causes neighborhood flooding. Facility in culdesac overflows and house east of facility in culdesac floods. Catch basins receive year-round flow and have algae.	2023	Multiple times/year; constant groundwater flow	Moderate	Active	20230406_17

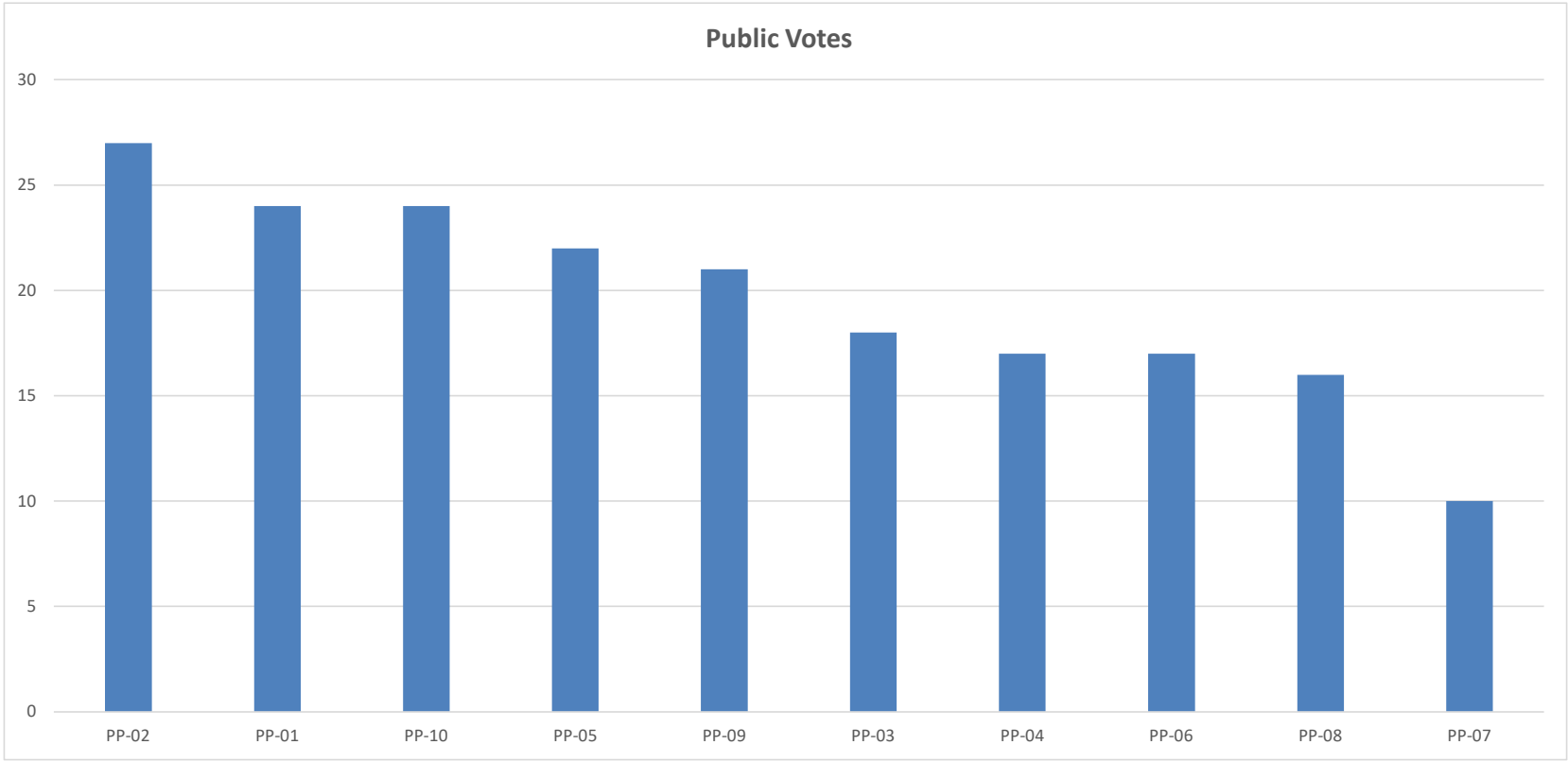
Appendix C

CIP Rating Criteria and Ranking

City of Washougal Stormwater Master Plan
Project Ranking Summary

			Public Feedback		Scoring Criteria		Final Rank
ID	Project	Description	Votes	Rank	Score	Rank	(Manual)
PP-01	Addy Street Flood Reduction (Catch Basins)	Two catch basins on Addy Street are undersized, and the stormwater pipe is clogged with tree roots. Water ponds on the street and floods adjacent yards. Difficult to maintain. Replace the catch basins and repair the stormwater pipe.	24	2	74	3	3
PP-02	39th Street and Evergreen Way Drainage Improvement	Install new catch basins and stormwater pipes along 39th Street and in the adjacent neighborhoods to reduce ponding. Potentially add stormwater treatment planters in the neighborhood streets.	27	1	75	2	2
PP-03	Addy Street Stormwater Facilities Rehabilitation	Two stormwater facilities on Addy Street do not drain and water backs up to pond on the street. Repair the existing stormwater facilities' outlet structures and improve conveyance to reduce ponding on Addy Street.	18	6	38	6	-
PP-04	North P Street Stormwater Facility Rehabiliation (Pond StormID 40)	The water quality swale, detention pond, and flow control structure on North P Street has a poor design and is hazardous to maintain. Rehabilitate the facility to detain and treat stormwater as designed. Regrade or add fall protection within the facility to improve safety during maintenance.	17	7	40	5	-
PP-05	C Street High-risk Drywells Retrofit	Four drywells on C Street, east of the 2nd Street and C Street roundabout, that may be too close to groundwater. Assess the drywells to determine distance from groundwater. Retrofit the drywells by making them shallower or adding water quality treatment.	22	4	29	7	-
PP-06	I Street High-risk Drywells Retrofit	Three drywells on I Street and one on 28th Streeet may be too close to groundwater. Assess the drywells to determine distance from groundwater. Retrofit the drywells by making them shallower or adding water quality treatment.	17	7	18	10	-
PP-07	W Street and 36th Street Detention Pond Safety Improvement (Pond StormID 29)	Stormwater detention pond at W Street and 36th Street has steep slopes and multiple retaining walls which make it difficult and hazardous to maintain. Modify the facility to improve safety during maintenance.	10	10	23	9	-
PP-08	South A Street Drainage Improvement	Runoff ponds at the culdesac on South A Street due to a lack of street drainage facility. Ponding affects pedestrian/bike trail entrance and ADA ramp. Add a new catch basin and stormwater pipe or ditch or an infiltration facility in the culdesac.	16	9	27	8	-
PP-09	H Street and 34th Street High-risk Drywells Retrofit	A failed drywell on H Street is causing street ponding and flooding properties. Two nearby drywells on 34th Street may be too close to groundwater. Retrofit the H Street drywell, and assess and retrofit the drywells on 34th Street.	21	5	62	4	-
PP-10	9th Street Drainage Improvement	Two aging drywells on 9th Street between J Street and K Street are not functioning. Runoff ponds on the street and floods adjacent properties. Replace the drywells with shallow infiltration facilities, add water quality treatment, and add rolled curb to 9th Street.	24	2	76	1	1

City of Washougal Stormwater Master Plan
Project Ranking Summary



CIP Rating Criteria

Washougal SMP

Otak Project No. 20272

June 28, 2023

						Score				Scoring Notes
ID	Weight	High Score	Max Total	Criterion	Description	0	1	3	5	
Conveyance and Flooding										
A	1.00	5	5.0	Flooding Impact	What types of properties or assets are impacted from current drainage conditions?	No flooding caused by storm system	Public property, non-structural (e.g. park landscape, soft trail) or the non-traffic lane portion of any street	Private property, uninhabitable structures (e.g. landscaping, parking lot, shed) or local street's traffic lane	Habitable or occupiable structures (e.g. homes, businesses) or collector/arterial street's traffic lane	
B	1.00	5	5.0	Flooding Extent	What is the geographic extent of the current drainage problem?	No flooding caused by storm system	Isolated (e.g. one lot, small portion of any public asset)	Multiple (e.g. several properties)	Widespread (e.g. more than 10 homes, businesses) or a full street block	
C	1.00	5	5.0	Flooding Frequency	How often does the drainage issue occur?	No flooding caused by storm system	Less frequently than once a year	Annually	Multiple times per year	
Category Weight			**2.0**							
Category Maximum			**30.0**							
Water Quality										
D	1.00	5	5.0	Treated Land Use	What type of land use will be treated under the project?	Project provides no additional water quality treatment	Mostly residential runoff	Runoff mostly from professional/low-turnover commercial/retail areas or collector streets	Runoff mostly from industrial areas, high-turnover retail (e.g. drive-thrus, convenience stores), arterial streets or a local cause of pollution requires a treatment BMP	
E	1.00	5	5.0	Acres Treated	How much area will be treated under this project?	Project provides no additional water quality treatment	<5 acres	5-15 acres	>15 acres	
Category Weight			**1.5**							
Category Maximum			**15.0**							
Maintenance Considerations										
F	1.00	5	5.0	Reduce/ Streamline Maintenance	Does the project reduce the frequency of required maintenance?	Does not change maintenance frequency	Minor reduction in required maintenance frequency	_	Significant reduction in required maintenance frequency	Note, this is a reduction over current maintenance practices.
G	2.00	5	10.0	Maintenance Safety/ Access	Does the project improve the ease of maintenance and/or safety of staff during maintenance activities?	No change	Minor improvement to access or safety	Moderate improvement to access or safety	Significant improvement to access or safety	Significant: addressing major safety problem. Moderate: some access improvement.
Category Weight			**2.0**							
Category Maximum			**30.0**							
Providing Multiple Benefits										
H	0.50	5	2.5	Increased Service	Does the project provide drainage and stormwater management to an area where stormwater issues are clustered?	No clustering	Clustering within 1/4 mi	_	Clustering within 500 feet (approx. two blocks)	GIS spatial analysis, density-based clustering tool
I	0.50	5	5.0	Implements or Complements Another City Plan or Strategy	Is the project recommended in another City plan or complement a goal identified in another City plan or strategy?		The project marginally supports a City strategic goal.		The project is recommended in another City plan or directly supports a City strategic goal.	The City's strategic priorities are: - Economic development and community prosperity - Financial health and core services - Redefined community identity - Vibrant town center - "Smart Growth"
J	1.00	5	5.0	Community Amenities, Benefits, and Aesthetics	Can the project be expanded to include additional community amenities such as educational or recreational amenities? Does the project contribute to City beautification or an enhanced sense of place?	No	_	_	Yes	Aesthetics could range from replacing visible grey infrastructure with green infrastructure to creating an attractive amenity or showcasing the natural environment.
K	0.50	5	2.5	Stream Channel Stabilization	Does the project directly improve stream channel stability, reduce erosion, or reduce stormwater quantity or rate of discharges?	No	Some improvements	Moderate improvements	Yes, the project provides significant improvements	Stormwater quantity and peak flow reduction for discharges into a stream; floodplain restoration; stream channel restoration
Category Weight			**1.0**							
Category Maximum			**15.0**							

Washougal SMP CIP Rating Criteria

						Score				Scoring Notes
ID	Weight	High Score	Max Total	Criterion	Description	0	1	3	5	
Fiscal										
L	1.00	5	5.0	Coordination	Is there a possibility for coordination and cost-sharing with other projects such as streets, parks, or facilities?	No or unknown	Low potential to integrate with other projects	_	Links directly with other projects likely to happen in the near term	
M	1.00	5	5.0	Potential Funding Sources	Is there a possibility of receiving grant funding or partnering with another organization to decrease City funds towards project implementation?	No possibility of grant funding or partnership	Low likelihood - non-City funds are not available to perform improvement, outside funds are improbable	_	High probability of leveraging other funding	
Category Weight			**3.0**							
Category Maximum			**30.0**							
Total Possible Score			**120.0**							

Appendix D

CIP Fact Sheets and Program Lists

PROJECT FACT SHEET—PP-01

Project Title: Addy Street Drainage Improvements

Location: Addy Street and East of 35th Street

Issue Description:

Two catch basins at the low point on Addy Street east of 35th Street are smaller than standard catch basins, making it hard to access the upstream and downstream pipes for maintenance. The catch basins discharge to a 12-inch storm drain conveyance pipe that is likely obstructed with roots from trees and vegetation planted along the downstream pipe alignment; the extent of intrusion is currently unknown. Water ponds on both sides of the street in the traffic lanes and floods adjacent yards a few times each year. The conveyance pipe alignment is difficult to access as it runs along the property line between North Shore Estates Mobile Home Park and a private residential lot with mature trees and shrubs planted along the pipe alignment. The pipe then runs under State Route 14 (SR-14) before discharging to federal land owned by the United States Army Corps of Engineers (USACE); the exact location of the outfall is unknown, and no records of an easement at the outfall were found. The total length of pipe is approximately 600 feet.

Project Description:

This flood reduction project has been divided into two phases of work. A description of each phase is outlined below and shown in the attached figures.

Phase 1

The first phase of the project includes replacing the undersized catch basins with standard Type I catch basins that include sumps to capture debris and sediment. Then the Public Works maintenance crew will attempt to perform a CCTV inspection of the 12-inch conveyance pipe. The inspection will be used to determine extent of root intrusion and pipe damage. If the damage is extensive and installation of the two standard catch basins does not eliminate the flooding problems, then the design approach in Phase 2 may be required.

Phase 2

During the second phase of the project, new manholes will be installed on the north and south shoulders of SR-14, as shown in the attached figures.

If root intrusion is significant, the roots will be removed to the maximum extent feasible using a heavy-duty grinder. The 12-inch storm drain conveyance pipe will then be repaired using cured-in-place-pipe (CIPP) lining technology. This technique installs a sturdy liner inside the pipe, rather than installing a smaller diameter pipe within the existing pipe (sliplining). The liner, which is impregnated with a resin, is inverted within the pipe by applying air or water pressure. As the liner inflates, it forms a close fit within the existing host pipe. Heat is applied to accelerate the curing process. The main advantage of this method is that the flow capacity of the pipe is not affected, and the work can typically be completed in less than a day. This repair will be installed for approximately 270’ from the new catch basin on Addy street to the southernmost proposed manhole.

To prevent future damage from root intrusion, trees and vegetation along the pipe alignment north of SR-14 will be removed.

PP-01: Addy Street Flood Reduction

A temporary construction easement across the residential lot and a permanent maintenance access easement over SR-14 from Washington Department of Transportation (WSDOT) will be required for construction, tree removal, and long-term maintenance access.

City staff have suggested that the City holds a utility maintenance easement across the private parcels owned by Columbia Rock Products south of SR-14 (see figure). Using this easement to access a new manhole for pipe repair and maintenance could be more feasible than obtaining an easement over SR-14 from WSDOT. However, evidence of the existing easement was not located during preparation of the Stormwater Master Plan. During the design of Phase 2, it is recommended the City perform a Title Search of the parcels to document whether an existing utility maintenance easement exists. If it exists and intersects the existing stormwater pipe alignment, then the proposed manhole on the south side of SR-14 could be placed further south inside the easement.

Solution Sizing Basis:

Future Conveyance and Treatment

- Contributing basin = 16.0 acres

Benefits:

- Reduce or eliminate flooding impacts, extent, and frequency
- Reduce and streamline maintenance
- Improve maintenance safety and access
- Linked directly to future projects

Pollutants Addressed:

No treatment is proposed for this project.

Future Considerations:

The 16-acre basin draining to Addy Street has no runoff treatment. The City could consider actions to improve pollutant removal in the drainage basin.

- A future project could install Contech StormFilter® catch basins and improved collection systems higher in the basin along 34th and 35th Street to improve conveyance of stormwater to the Addy Street catch basins. Roadside planters may not be a good option in this area because they would reduce the street parking which is widely used.
- The City could develop a more robust street sweeping program within the drainage basin to keep sediment and debris out the storm drain system, maintain pipe capacity, and provide improvements to water quality.

In addition, the City could pursue obtaining a maintenance easement for the portion of the storm drain conveyance pipe on USACE property to access the outfall location for inspection and long-term maintenance.

Estimated Project Cost: $240,000

Estimated cost for Phase 1: $40,000

Estimated cost for Phase 2: $200,000

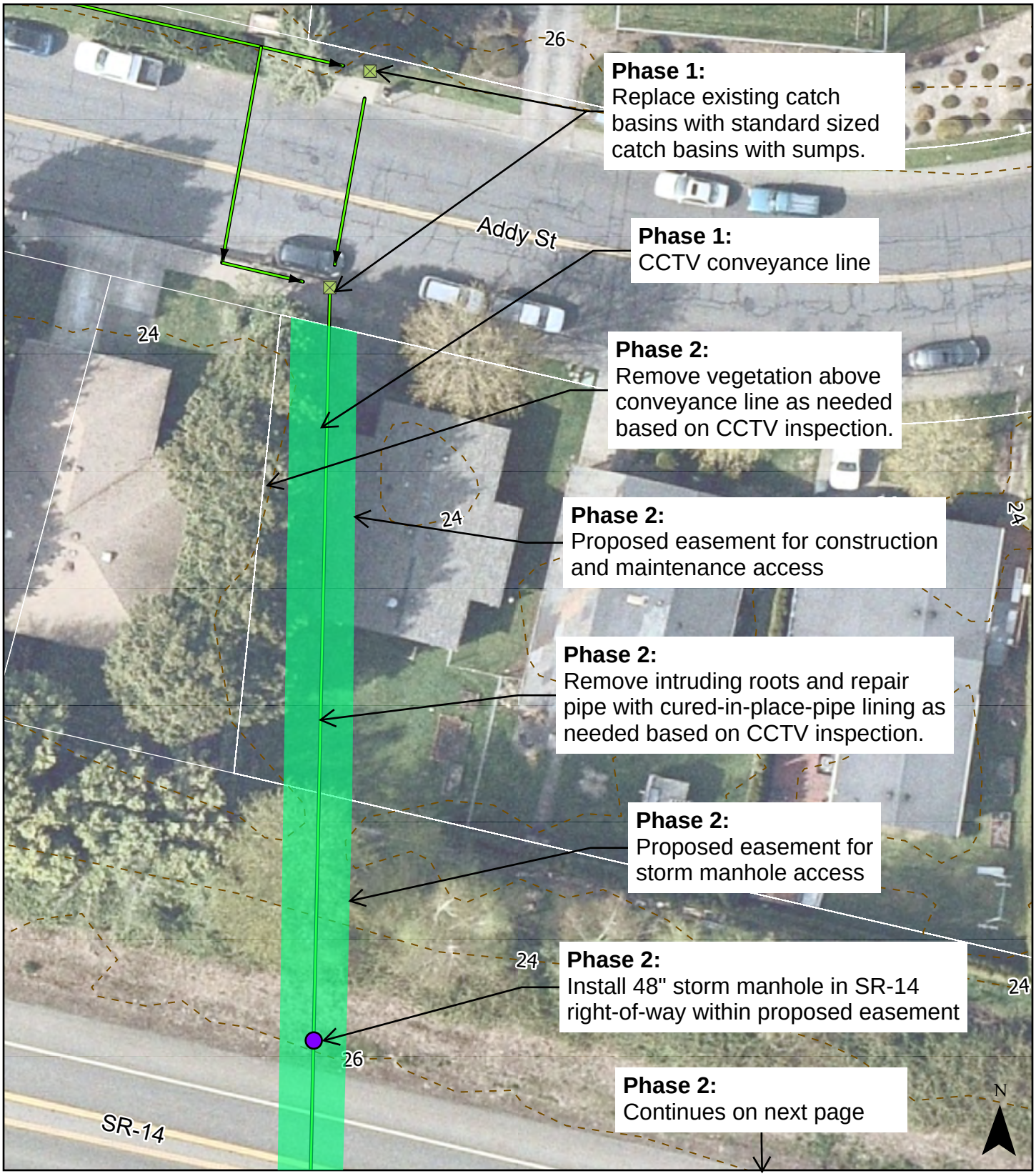
PP-01: Addy Street Flood Reduction

Photographs:

Looking east on Addy Street towards the two undersized catch basins. Trees and vegetation causing root intrusion shown. Google Image captured June 2016.

Looking south towards catch basin located on the property line and start of pipe alignment. Trees and vegetation causing root intrusion shown. Google Image captured May 2023.

Looking in undersized catch basin on north side of Addy Street.
Field photo date April 7, 2023.



FACILITY SITE MAP
ADDY STREET DRAINAGE IMPROVEMENTS

WASHOUGAL SMP | PROJECT #20272

WASHOUGAL, WA

Data Sources:
Date: 10/10/2023
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

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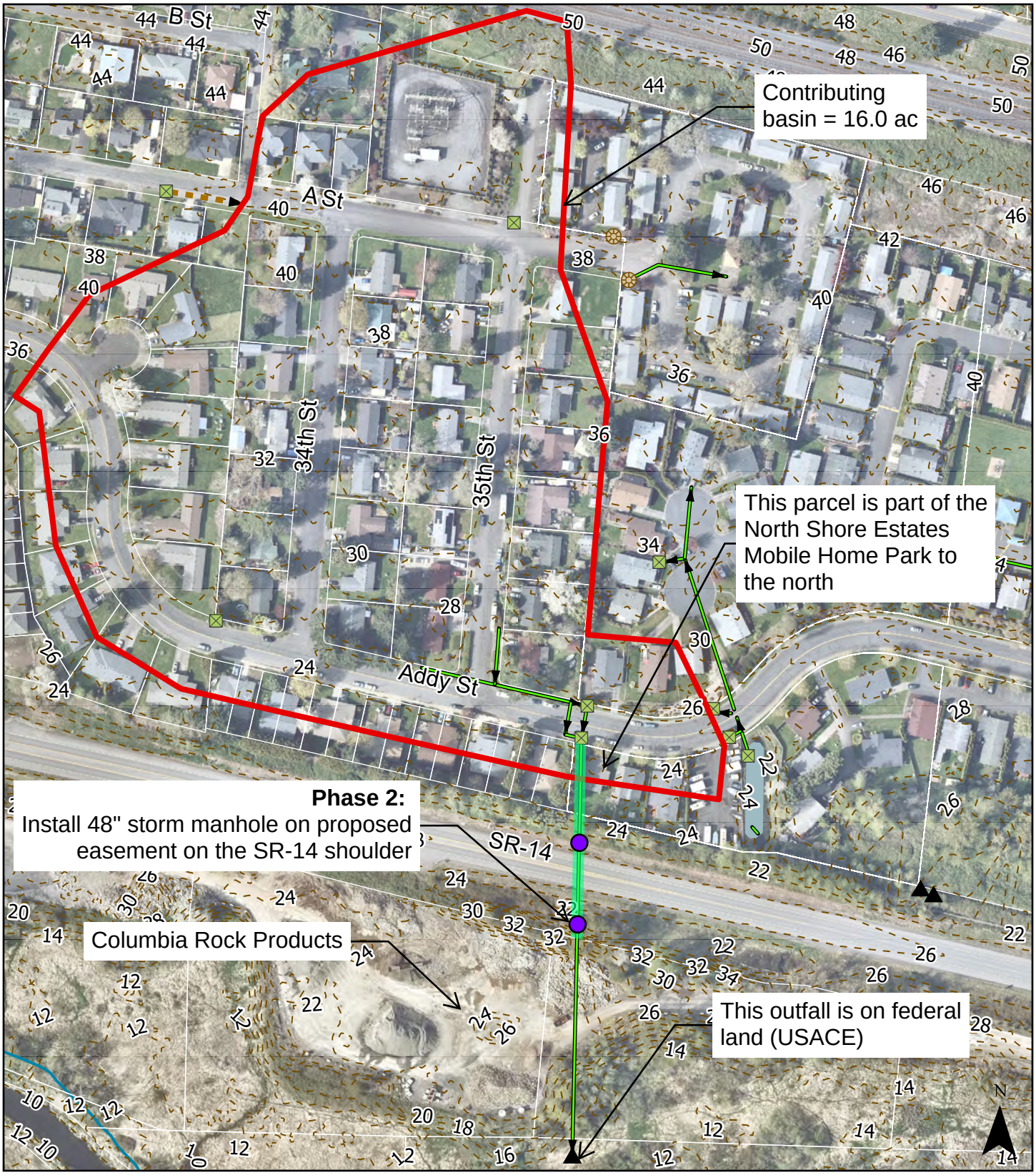
LEGEND

- Catchbasin
- Storm line
- Contours
- Proposed Storm Manhole
- Proposed Permanent Access Easement

0 30 60 ft

Otak



DRAINAGE BASIN MAP
ADDY STREET DRAINAGE IMPROVEMENTS

WASHOUGAL SMP | PROJECT #20272

WASHOUGAL, WA

Data Sources:
Date: 10/4/2023
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

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LEGEND

- Outfall
- Catchbasin
- Drywells
- Storm line
- Proposed Storm Manhole
- Proposed Permanent Access Easement
- Ditches
- Ponds
- Contours
- Streams
- Contributing Basin

0 200 400 ft

Otak

PLANNING LEVEL PROJECT COST OPINION

LOCATION: **ADDY STREET DRAINAGE IMPROVEMENTS (PHASE 1)** **BY:** **MEP**
PROJ. ID: **CIP: PP-01** **DATE:** **11/17/2023**
DESC. **Conveyance Improvements near Addy Street, East of 35th Street**

ITEM NO.	ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
Construction Elements					
1	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	1	LS	$ 1,000	$ 1,000
2	CATCH BASIN TYPE 1	2	EA	$ 3,500	$ 7,000
			Subtotal Construction Elements		$ 8,000
Required Ancillary Items					
3	MOBILIZATION	10%	Of Construction Elements		$ 800
4	EROSION & SEDIMENTATION CONTROL	5%	Of Construction Elements		$ 400
5	TRAFFIC CONTROL	5%	Of Construction Elements		$ 400
6	PLANNING LEVEL CONSTRUCTION CONTINGENCY	40%	Of Total Construction		$ 6,400
				Subtotal Ancillary	$ 8,000
				Total Construction	**$ 16,000**
Permitting and Land Acquisition					
7	ROW PERMITTING	1	LS	$ 1,000	$ 1,000
				Total Permitting and Land Acquisition	**$ 1,000**
Studies & Engineering					
8	STATE SALES TAX	8.5%	Of Total Construction		$ 1,400
9	ENGINEERING	1	LS	$ 15,000	$ 15,000
10	PROJECT ADMINISTRATION	5%	Of Total Construction		$ 800
11	CONSTRUCTION MANAGEMENT	10%	Of Total Construction		$ 1,600
12	SURVEY	2%	Of Total Construction		$ 400
				Total Studies & Engineering	**$ 19,200**
				Total Cost	**$ 36,200**
2023 Dollars	**Total Estimated Project Cost (Rounded)**				**$ 40,000**

Notes:

1. The above cost opinion is in 2023 dollars and does not include future escalation, financing, or O&M costs.
2. The order-of-magnitude cost opinion has been prepared for guidance in project evaluation from the information available at the time of preparation and for the assumptions stated. The final costs of the project will depend on actual labor and material.
3. It is assumed that the CCTV of the existing 12" storm main, will be completed by City's maintenance crews.

PLANNING LEVEL PROJECT COST OPINION

LOCATION: **ADDY STREET DRAINAGE IMPROVEMENTS (PHASE 2)** **BY:** **MEP**
PROJ. ID: **CIP: PP-01** **DATE:** **11/17/2023**
DESC. **Conveyance Improvements near Addy Street, East of 35th Street**

ITEM NO.	ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
Construction Elements					
1	TREE/VEGETATION REMOVAL	1	LS	$ 8,000	$ 8,000
2	12" STORMPIPE REHABILITATON (REMOVAL OF INTRUDING ROOTS)	100	LF	$ 60	$ 6,000
3	12" CURED IN PLACE PIPE TREATMENT	270	LF	$ 30	$ 8,100
4	MANHOLE 48 IN. DIAM. TYPE 1	2	EA	$ 7,500	$ 15,000
				Subtotal Construction Elements	$ 37,100
Required Ancillary Items					
5	MOBILIZATION	10%	Of Construction Elements		$ 3,800
6	EROSION & SEDIMENTATION CONTROL	5%	Of Construction Elements		$ 1,900
7	TRAFFIC CONTROL	5%	Of Construction Elements		$ 1,900
8	PLANNING LEVEL CONSTRUCTION CONTINGENCY	40%	Of Total Construction		$ 29,800
				Subtotal Ancillary	$ 37,400
				Total Construction	**$ 74,500**
Permitting and Land Acquisition					
9	BASIC PERMITTING	1	LS	$ 15,000	$ 15,000
10	PERMANENT ACCESS EASEMENT	4,700	SF	$ 16	$ 75,200
				Total Permitting and Land Acquisition	**$ 90,200**
Studies & Engineering					
11	STATE SALES TAX	8.5%	Of Total Construction		$ 6,400
12	ENGINEERING	1	LS	$ 15,000	$ 15,000
13	PROJECT ADMINISTRATION	5%	Of Total Construction		$ 3,800
14	CONSTRUCTION MANAGEMENT	10%	Of Total Construction		$ 7,500
15	SURVEY	2%	Of Total Construction		$ 1,500
				Total Studies & Engineering	**$ 34,200**
				Total Cost	**$ 198,900**
2023 Dollars	**Total Estimated Project Cost (Rounded)**				**$ 200,000**

Notes:

1. The above cost opinion is in 2023 dollars and does not include future escalation, financing, or O&M costs.
2. The order-of-magnitude cost opinion has been prepared for guidance in project evaluation from the information available at the time of preparation and for the assumptions stated. The final costs of the project will depend on actual labor and material.

PROJECT FACT SHEET—PP-02

Project Title: 39th Street and Evergreen Way Drainage Improvement

Location: 39th Street and Evergreen Way

Issue Description:

Runoff from residential properties and public streets in a nearly 30-acre area flows onto 39th Street, collects along curb lines on both sides of the street, and is conveyed downhill to the intersection with Evergreen Way. The intersection has three catch basins that attempt to collect runoff from the entire contributing basin. The catch basins are connected to one standard manhole that discharges to an 18-in diameter conveyance pipe that outfalls to BSNF Railway property. Based on preliminary capacity calculations, the conveyance pipe is estimated to be at 75% capacity for the 100-year storm event. The City does not have an easement to maintain the outfall and would like to avoid directing additional flow to it.

The collection system is frequently unable to handle the significant peak flows of runoff. Multiple times a year, runoff exceeds the gutters and floods portions of the traffic lanes on 39th Street from Evergreen Way to C Street. High gutter flows also occur on Liedtke Way and other cross streets in the basin. Some homeowners along Liedtke Way and 39th Street have installed asphalt berms to prevent flooding on their properties. One homeowner has created a berm that protrudes into the bike lane in the public right-of-way, causing a safety concern.

Additionally, the City recently installed rubber lane dividers on the yellow center line of 39th Street at the intersection with Evergreen Way. While the dividers provide a safer traffic pattern, they make maintenance of the catch basins at the 39th Street and Evergreen Way intersection more difficult by preventing the City from safely blocking off the northbound lane. City staff currently need to provide active maintenance of the catch basins during heavy rain several times a year.

Project Description:

The project consists of drainage improvements to immediately reduce flooding at the intersection paired with multiple phased stormwater infiltration facilities to gradually reduce high gutter flows on cross streets and further up on 39th Street.

Intersection Drainage Improvement. A one-time drainage improvement will help alleviate flooding at the intersection. A proposed curb cut on the east side of 39th Street will direct some gutter flows into a proposed small, vegetated flow path behind the curb. The proposed flow path will convey runoff to the location of the existing at-grade grated inlet, which will be replaced by a proposed slanted ditch inlet to reduce blockages and facilitate removal of debris. The proposed flow path will be excavated to a lower elevation than the adjacent roadway and will require removal or trimming of shrubs in or adjacent to the right-of-way. A proposed depressed concrete inlet would further encourage runoff from the gutter to enter the curb cut to the flow path. With these improvements, the City will likely need to provide less active maintenance during heavy rain events.

Solution Sizing Basis – Intersection Drainage Improvement

Contributing Basin = approximately 30 acres

The curb cut, inlet depression, flow path, and slanted ditch inlet dimensions and specifications will be evaluated during engineering design. They must be designed to convey a portion of the gutter flow from 39th Street without flooding adjacent property or overwhelming the slanted ditch inlet.

Stormwater Infiltration Facilities. In addition to the one-time intersection drainage improvement, stormwater infiltration facilities are proposed. The stormwater infiltration facility design has been grouped into units which could be designed and constructed independently as funds become available. Each unit includes two 13-foot deep 48-inch drywells, two catch basins, and approximately 30 feet of 12-inch diameter storm drain conveyance pipe which would provide collection, treatment, and infiltration upgradient of the Evergreen Way intersection. The estimated cost includes the elements needed to design and construct one unit. A representative unit is shown on the attached figure.

Each unit will manage runoff from approximately 8% of the overall basin, assuming the unit is designed to treat the water quality storm event and infiltrate the 25-year storm event. The conceptual sizing assumes that the soils are well-drained and that groundwater elevation is at least five feet from the bottom of each drywell. A geotechnical investigation will be conducted to evaluate these assumptions prior to final design. The geotechnical investigation will also assist the engineer in determining if treatment can be provided in the vadose zone below each drywell. The one-time geotechnical study will entail soil borings, infiltration testing, and evaluation of groundwater elevation. The geotechnical investigation will provide information necessary to site and design all necessary units, so study sites will be distributed around the basin.

If treatment cannot be provided in the vadose zone, then units will include filter catch basins rather than typical catch basins. The cost estimate conservatively assumes that filter catch basins will be required. The cost for each unit will decrease by $30,400 (13%) if the geotechnical investigation determines that the filter cartridges are not necessary.

Using conservative planning-level calculations based on sparse available geotechnical information, approximately 12 units will be required to treat and infiltrate the entire basin. The recommendation is to design and install a single unit in an upper location in the basin and then observe flooding incidents at the intersection over one or two winters. If flooding has not been reduced enough to meet community expectations, then design and construct a second unit downgradient from the first. Continue this process until flooding at 39th and Evergreen Way has been sufficiently reduced. Installing units at the top of the basin first will allow each one to be designed to provide adequate treatment and disposal for the entire area draining to it.

Solution Sizing Basis – Infiltration Facility Unit:

Contributing Basin (each unit) = 2.16 acres

Filter Cartridge Catch Basins

- Area treated = 2.16 acres (8% total basin)
- Water quality flow rate = 0.17 cfs
- Number of Cartridges = Four (4) (For sizing purposes, 27” Contech StormFilter® cartridges with PhosphoSorb® media were assumed)

Drywells

- Area infiltrated = 2.16 acres (8% total basin)
- 25-year flow rate = 1.05 cfs
- Infiltration rate per drywell = 0.67 cfs (300 gpm assumption based on general well-drained soils)
- Number of drywells = Two (2) drywells

Benefits:

- Reduce or eliminate flooding impacts and frequency
- Improve maintenance safety
- Provide water quality treatment (mechanically or through the natural vadose zone)

PP-02: 39th Street and Evergreen Way Drainage Improvement

Pollutants Addressed:

The project will provide stormwater retention and will remove sediment, dissolved metals, and hydrocarbons from the stormwater runoff.

Future Consideration:

The City of Washougal has applied for a Safe Routes to School grant to provide sidewalks and bicycle lane improvements along 39th Street. While the City's project has not yet been selected, the City intends to continue applying for grant funding for these improvements. If such funding does occur, the stormwater infiltration units would not interfere with the proposed bicycle lane and sidewalk improvements, and the design of the two projects could be coordinated to also provide the required stormwater management for the new sidewalks. The sidewalk project likely would need to decommission the intersection drainage improvements and capture runoff upstream in piped conveyances leading to the intersection.

Estimated Project Cost for Intersection Drainage Improvement: $40,000*

*The intersection drainage improvement cost estimate includes contracted survey and engineering for the design of the curb cut, flow path, and ditch inlet. The cost estimate assumes that City staff will construct the project and provide traffic control and project administration.

Estimated Project Cost for Geotechnical Investigation: $65,000

Estimated Project Cost for Stormwater Infiltration Unit: $230,000*

*An estimated 12 total units will be required to treat and infiltrate the entire basin.

PP-02: 39th Street and Evergreen Way Drainage Improvement

Photographs:

Looking northeast toward 39th Street at the intersection with Evergreen Way. Shows significant ponding in the intersection.
Photo provided by the City dated January 24, 2024.

Looking south toward Evergreen Way at the intersection with 39th Street. Shows ponding in the gutter.
Captured from video provided by the City dated April 17, 2023.

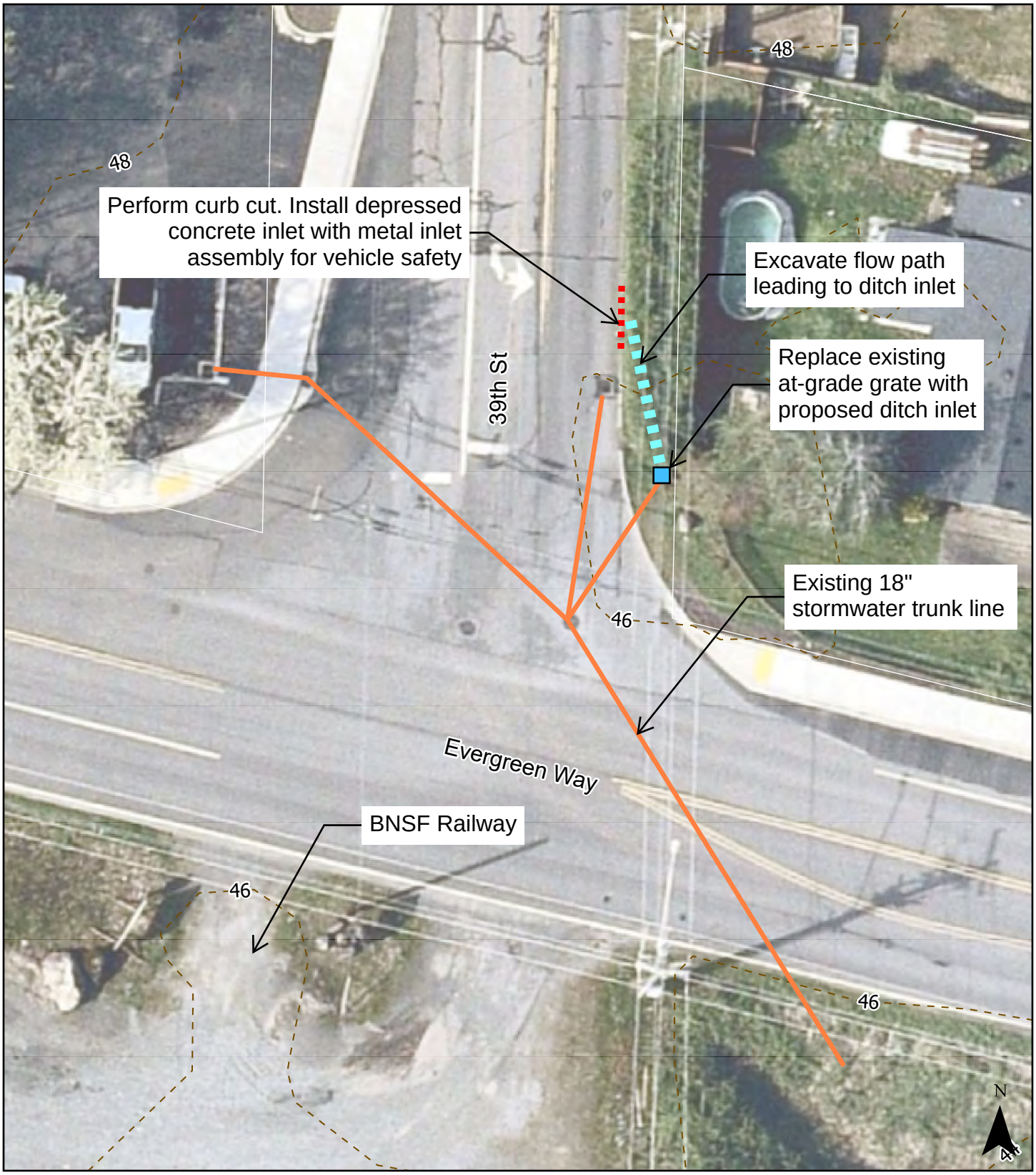
Looking north on 39th Street towards the three existing catch basins manhole connection. Google Image captured May 2023.

Field crew standing next to east catch basin immediately north of the intersection of 39th Street and Evergreen Way. This photo shows the rubber lane dividers on the center line that were recently installed.

Field photo dated September 13, 2023.

Residential homeowner created asphalt berm to divert flows away from driveway. Field photo dated September 13, 2023.

Looking northeast up Liedtke Way before connecting with 39th Street. Field photo dated September 13, 2023.



FACILITY SITE MAP
39TH STREET AND EVERGREEN WAY DRAINAGE IMPROVEMENT

WASHOUGAL SMP | PROJECT #20272

WASHOUGAL, WA

Data Sources:
Date: 10/9/2023
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

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LEGEND

- City Stormwater System Data
- Contours
- Proposed Ditch Inlet
- Existing Storm Pipe Configuration Based on Field Visit
- Rolled Curb
- Curb Cut
- Flow Path

0 20 40 ft

Otak

DRAINAGE BASIN MAP
39TH STREET AND EVERGREEN WAY DRAINAGE IMPROVEMENT

WASHOUGAL SMP | PROJECT #20272

WASHOUGAL, WA

Data Sources:
Date: 11/14/2023
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

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LEGEND

- Catchbasin
- Drywells
- Proposed Catch Basin
- Proposed Drywell
- Proposed 12" Storm Pipe
- Storm line
- Contours
- Contributing Basin

0 200 400 ft

Note: due to scale of map, elements of City storm system are not shown on this figure. See figure on previous/following page.

PLANNING LEVEL PROJECT COST OPINION

LOCATION: 39TH STREET AND EVERGREEN WAY DRAINAGE IMPROVEMENTS
BY: MEP
PROJ. ID: CIP: PP-02
DATE: 12/6/2023
DESC. Intersection drainage improvements at 39th Street and Evergreen Way

ITEM NO.	ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
Construction Elements					
1	DITCH INLET	1	EA	$ 5,000	$ 5,000
2	CURB MODIFICATION	1	LS	$ 5,000	$ 5,000
3	CONVEYANCE DITCH	1	LS	$ 1,000	$ 1,000
				Subtotal Construction Elements	$ 11,000
Required Ancillary Items					
4	MOBILIZATION	0%	Of Construction Elements		$ -
5	EROSION & SEDIMENTATION CONTROL	10%	Of Construction Elements		$ 1,100
6	TRAFFIC CONTROL	0%	Of Construction Elements		$ -
7	PLANNING LEVEL CONSTRUCTION CONTINGENCY	50%	Of Total Construction		$ 12,200
				Subtotal Ancillary	$ 13,300
				Total Construction	**$ 24,300**
Permitting and Land Acquisition					
8	ROW PERMITTING	1	LS	$ 1,000	$ 1,000
				Total Permitting and Land Acquisition	**$ 1,000**
Studies & Engineering					
9	STATE SALES TAX	8.5%	Of Total Construction		$ 2,100
10	ENGINEERING	30%	Of Total Construction		$ 7,300
11	PROJECT ADMINISTRATION	5%	Of Total Construction		$ 1,300
12	CONSTRUCTION MANAGEMENT	0%	Of Total Construction		$ -
13	SURVEY	15%	Of Total Construction		$ 3,700
				Total Studies & Engineering	**$ 14,400**
				Total Cost	**$ 39,700**
2023 Dollars	**Total Estimated Project Cost (Rounded)**				**$ 40,000**

Notes:

1. The above cost opinion is in 2023 dollars and does not include future escalation, financing, or O&M costs.

2. The order-of-magnitude cost opinion has been prepared for guidance in project evaluation from the information available at the time of preparation and for the assumptions stated. The final costs of the project will depend on actual labor and material.

3. Mobilization, Traffic Control, and Construction Management are omitted from this cost estimate because we assume City staff will construct the one-time drainage improvement.

PLANNING LEVEL PROJECT COST OPINION

LOCATION: 39TH STREET AND EVERGREEN WAY DRAINAGE IMPROVEMENTS
BY: MEP
PROJ. ID: CIP: PP-02
DATE: 12/6/2023
DESC. Drainage improvement "unit" managing 8% of basin draining to 39th Street at Evergreen Way

ITEM NO.	ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
Construction Elements					
1	STORM SEWER PIPE, 12 IN. DIAM	30	LF	$ 160	$ 4,800
2	CATCH BASIN TYPE 1	2	EA	$ 3,500	$ 7,000
3	CATCH BASIN FILTER CARTRIDGES[2]	4	EA	$ 7,600	$ 30,400
4	48" DRYWELL (13 FT DEEP)	2	EA	$ 15,000	$ 30,000
				Subtotal Construction Elements	$ 72,200
Required Ancillary Items					
5	MOBILIZATION	10%	Of Construction Elements		$ 7,200
6	EROSION & SEDIMENTATION CONTROL	5%	Of Construction Elements		$ 3,600
7	TRAFFIC CONTROL	7%	Of Construction Elements		$ 5,100
8	PLANNING LEVEL CONSTRUCTION CONTINGENCY	40%	Of Total Construction		$ 58,800
				Subtotal Ancillary	$ 74,700
				Total Construction	**$ 146,900**
Permitting and Land Acquisition					
9	ROW PERMITTING	1	LS	$ 1,000	$ 1,000
				Total Permitting and Land Acquisition	**$ 1,000**
Studies & Engineering					
10	STATE SALES TAX	8.5%	Of Total Construction		$ 12,500
11	ENGINEERING	25%	Of Total Construction		$ 36,700
12	PROJECT ADMINISTRATION	5%	Of Total Construction		$ 7,300
13	CONSTRUCTION MANAGEMENT	10%	Of Total Construction		$ 14,700
14	SURVEY	2%	Of Total Construction		$ 2,900
				Total Studies & Engineering	**$ 74,100**
				Total Cost	**$ 222,000**
2023 Dollars	**Total Estimated Project Cost (Rounded)**				**$ 230,000**

Notes:

1. The above cost opinion is in 2023 dollars and does not include future escalation, financing, or O&M costs.
2. If treatment can be achieved in the vadose zone, only Type 1 catch basins are required (Item No. 2). If treatment cannot be achieved in the vadose zone, then the use of filter cartridges will be necessary to provide water quality treatment (Item No. 3).
3. The order-of-magnitude cost opinion has been prepared for guidance in project evaluation from the information available at the time of preparation and for the assumptions stated. The final costs of the project will depend on actual labor and material.

PROJECT FACT SHEET—PP-10

Project Title: 9th Street Drainage Improvement

Location: 9th Street between J Street and K Street

Issue Description:

The runoff from 9th Street between J and K Street drains to two drywells that are not currently functioning as intended. The drywells are connected by a 12-inch storm drain conveyance pipe that flows east to west. Runoff frequently ponds on 9th Street north of the drywells and floods adjacent properties, including a residential garage on the west side of the street. While the drywell on the west side of 9th Street appears to be functioning, the drywell on the east side of the street is usually dry according to routine staff observations during storm events. This suggests that the eastern drywell is receiving less runoff than originally intended. In addition, these drywells are not located within the right-of-way, nor were they installed at the low point of 9th Street, making adequate stormwater collection difficult.

The project area was developed before current water quality standards were in place. Stormwater runoff from city streets contain contaminants such as fine sediment, dissolved metals, and hydrocarbons. This runoff currently drains into existing drywells without prior water quality treatment. It is currently unknown whether the drywells have adequate separation from groundwater and appropriate soil characteristics to provide water quality treatment under the structures in the vadose zone. The vadose zone is defined as the area between the water table and ground surface that provides water treatment as water infiltrates through the soil. This zone improves water quality via biological, chemical, and physical processes before reaching groundwater.

In addition, the contributing drainage basin for this project is located within a Category 1 critical aquifer recharge area (Category 1 CARA) that is protected under the City's Critical Areas ordinance (Chapter 16.04). Under the current ordinance, the City prohibits installation of new drywells in Category 1 CARA zones due to potential impacts to groundwater.

Project Description:

The project will install two new drywells, improve collection of runoff on 9th Street, and decommission the existing drywells. Although the City's Critical Areas ordinance prohibits the installation of new drywells in Category 1 CARA zones, the City is willing to grant a variance because the new drywells will replace existing ones and will be designed to provide equal or better treatment of runoff before discharge to groundwater. A geotechnical investigation will be performed that includes infiltration testing and groundwater monitoring during the winter months (the high groundwater period). The field investigations will provide the depth of groundwater, infiltration rates, description of subsurface soils, and the extent of the vadose zone for potential water quality treatment. If water quality treatment in the vadose zone is determined to be infeasible in accordance with Washington State Department of Ecology's Underground Injection Control (UIC) program guidelines, then filter cartridge catch basins will be installed to provide the necessary water quality treatment.

The two new drywells will be installed along the centerline of 9th Street at the low points where ponding currently occurs, each at approximately 30 feet north and south of the existing drywells. They will be connected by a 12-inch pipe to provide conveyance between the two drywells. The design of new drywells will follow the UIC program design guidance outlined in Chapter 173-218 of the Washington Administrative Code to ensure the new drywells provide adequate water quality treatment before discharging to the aquifer.

PP-10: 9th Street Drainage Improvements

The proposed drywell locations will provide better stormwater collection. Additionally, two catch basins on the east and west side of each drywell will be installed along with rolled asphalt curbing on both sides of 9th Street to efficiently direct runoff into the two drywells and protect the adjacent residential properties. As outlined above, if the vadose zone cannot provide the required water quality treatment, then filter cartridge catch basins will be installed in place of standard Type I catch basins. Once the new structures have been installed, the two existing drywells will be decommissioned by removing sediments, backfilling the drywell with cement grout, and patching the asphalt pavement.

Solution Sizing Basis:

Contributing Basin = 0.5 acres

Filter Cartridge Catch Basins

- Area treated = 0.5 acres (100% impervious, street runoff only)
- Water quality flow rate = 0.10 cfs
- Number of Cartridges = Six (6) (For sizing purposes, 18" Contech StormFilter® cartridges with PhosphoSorb® media were assumed)

Benefits:

- Reduce or eliminate flooding impacts, extent, and frequency
- Provide water quality treatment (mechanically or through the natural vadose zone)
- Reduce and streamline maintenance

Pollutants Addressed:

The project will provide improved flow control and will remove sediment, dissolved metals, and hydrocarbons from the stormwater runoff.

Future Consideration:

None.

Estimated Project Cost: $630,000

PP-10: 9th Street Drainage Improvements

Photographs:

Looking north towards property with garage that frequently floods.

Drywell west side of 9th Street.

Looking south on 9th Street towards the two drywells and J Street. Google Image captured May 2023.

FACILITY SITE MAP
9TH STREET DRAINAGE IMPROVEMENTS

WASHOUGAL SMP | PROJECT #20272

WASHOUGAL, WA

Data Sources:
Date: 11/22/2023
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

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LEGEND

- Contours
- Rolled Curb
- Proposed 12" Storm Pipe
- Proposed Catch Basin
- New Drywell

0 30 60 90 ft

Otak

DRAINAGE BASIN MAP
9TH STREET DRAINAGE IMPROVEMENTS

WASHOUGAL SMP | PROJECT #20272

WASHOUGAL, WA

Data Sources:
Date: 10/19/2023
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

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LEGEND

- Catchbasin
- Drywells
- Contributing Basin
- Storm line
- Contours

0 100 200 ft

Otak

PLANNING LEVEL PROJECT COST OPINION

LOCATION: 9TH STREET DRAINAGE IMPROVEMENTS **BY:** MEP
PROJ. ID: CIP: PP-10 **DATE:** 11/17/2023
DESC. Water Quality and Drainage Improvements along 9th Street

ITEM NO.	ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
Construction Elements					
1	STORM SEWER PIPE, 12 IN. DIAM	200	LF	$ 160	$ 32,000
2	48" DRYWELL (13 FT DEEP)	2	EA	$ 15,000	$ 30,000
3	CATCH BASIN TYPE 1	4	EA	$ 3,500	$ 14,000
4	CATCH BASIN FILTER CARTRIDGES[4]	6	EA	$ 7,600	$ 45,600
5	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	1	LS	$ 1,000	$ 1,000
6	ROLLED CURB	860	LF	$ 100	$ 86,000
				Subtotal Construction Elements	$ 208,600
Required Ancillary Items					
7	MOBILIZATION	10%	Of Construction Elements		$ 20,900
8	EROSION & SEDIMENTATION CONTROL	5%	Of Construction Elements		$ 10,400
9	TRAFFIC CONTROL	5%	Of Construction Elements		$ 10,400
10	PLANNING LEVEL CONSTRUCTION CONTINGENCY	40%	Of Total Construction		$ 166,900
				Subtotal Ancillary	$ 208,600
				Total Construction	**$ 417,200**
Permitting and Land Acquisition					
11	BASIC PERMITTING	1	LS	$ 15,000	$ 15,000
				Total Permitting and Land Acquisition	**$ 15,000**
Studies & Engineering					
12	STATE SALES TAX	8.5%	Of Total Construction		$ 35,500
13	ENGINEERING	15%	Of Total Construction		$ 62,600
14	GEOTECHNICAL INVESTIGATION	1	LS		$ 25,000
15	PROJECT ADMINISTRATION	5%	Of Total Construction		$ 20,900
16	CONSTRUCTION MANAGEMENT	10%	Of Total Construction		$ 41,700
17	SURVEY	2%	Of Total Construction		$ 8,300
				Total Studies & Engineering	**$ 194,000**
				Total Cost	**$ 626,200**
2023 Dollars	**Total Estimated Project Cost (Rounded)**				**$ 630,000**

Notes:

1. The above cost opinion is in 2023 dollars and does not include future escalation, financing, or O&M costs.
2. The order-of-magnitude cost opinion has been prepared for guidance in project evaluation from the information available at the time of preparation and for the assumptions stated. The final costs of the project will depend on actual labor and material.
3. Geotechnical Investigation will be part of Phase 1 of the project.
4. If treatment can be achieved in the vadose zone, only Type 1 catch basins are required (Item No. 3). If treatment cannot be achieved in the vadose zone, then the use of filter cartridges will be necessary to provide water quality treatment (Item No. 4).

City of Washougal Stormwater Master Plan
Smaller Capital Projects List 2023
Drywell Retrofits

ID Number	Project Name	Description	Last Occurance	Frequency	Issue Severity
KI-28	Catch basin and drywell, 1000 4th St	CB w/ 4 in pipe with aging DW on 4th St: Tends to get clogged and will cause flooding; crews make sure catch basin is cleared; public drywell is on private property. City record date: 11/30/2022 Correction: The property owner has encroached onto public ROW with their fence; regardless the DW is considered high-risk and the pipe is undersized. Leaf debris clogs the the CB and pipe very easily. City notes on known issues 20230310. Related to KI-110 and KI-113, high-risk drywells. Moved to drywell retrofit category. Potential project screening 20230607.	2023	Ongoing	High
KI-34	Drywells, 618 G St	Two drywells on G St: Two failing drywells on G St; flooding in intersection of WRR and G St. City record date: 11/30/2022.	2023	Ongoing	High
KI-35	Drywell and catch basins, K St and 14th St	K and 14th intersection: Roots tend to plug limited infrastructure; undersized drywell and small catch basins; crews have to make sure catch basins are cleared or flooding will occur. City record date: 11/30/2022 Same as known issue KI-83? Drywell, high risk, estimated distance to groundwater: -3.8 ft. Related to KI-81 and KI-108, high-risk drywells on same street. Potential project review 20230607.	2023	Annual	Moderate
KI-45	Drywell, 3338 L St, High risk drywell	Drywell, 3201-3399 L St. Inlet pipe from CB daylights at bottom of drywell. Water table is high and street grade does not allow stormwater to get into catch basin. High risk drywell in groundwater and flooding as of this morning during maintenance. Estimated distance to groundwater from drywell assessment: -14.3 ft. In CARA Recharge Area Category 1. Same issue as KI-67 and KI-104.	2023	Ongoing	High
KI-77	Drywell, high risk	Drywell, high risk, estimated distance to groundwater: 0 ft.	2023	Ongoing	Moderate
KI-78	Drywell, high risk	Drywell, high risk, estimated distance to groundwater: -5.5 ft.	2023	Ongoing	Moderate
KI-79	Drywell, high risk	Drywell, high risk, estimated distance to groundwater: 0 ft. In CARA Recharge Area Category 1.	2023	Ongoing	Moderate
KI-80	Drywell, high risk	Drywell, high risk, estimated distance to groundwater: 0 ft. In CARA Recharge Area Category 1.	2023	Ongoing	Moderate
KI-81	Drywell, high risk	Drywell, high risk, estimated distance to groundwater: -2.6 ft. Related to KI-35, KI-83, and KI-108, high-risk drywells on same street. Potential project review 20230607.	2023	Ongoing	Moderate
KI-82	Drywell, high risk	Drywell, high risk, estimated distance to groundwater: 0 ft.	2023	Ongoing	Moderate
KI-83	Drywell, high risk	Drywell, high risk, estimated distance to groundwater: -3.8 ft. Same issue as KI-35? K and 14th intersection: Roots tend to plug limited infrastructure; undersized drywell and small catch basins; crews have to make sure catch basins are cleared or flooding will occur. City record date: 11/30/2022 Related to KI-81 and KI-108, high-risk drywells on same street. Potential project review 20230607.	2023	Ongoing	Moderate
KI-84	Drywell, high risk	Drywell, high risk, estimated distance to groundwater: -13.7 ft.	2023	Ongoing	Moderate
KI-85	Drywell, high risk	Drywell, high risk, estimated distance to groundwater: -13.3 ft. Related issues KI-54 and KI-86. Potential project review 20230607.	2023	Ongoing	Moderate
KI-86	Drywell, high risk	Drywell, high risk, estimated distance to groundwater: -13.3 ft. Related issues KI-54 and KI-85. Potential project review 20230607.	2023	Ongoing	Moderate
KI-90	Drywell, high risk	Drywell, high risk, estimated distance to groundwater: -12.2 ft. Related to KI-115, high-risk drywell at same intersection. KI-91 and KI-98, high-risk drywells one block east. Potential project review 20230607.	2023	Ongoing	Moderate
KI-91	Drywell, high risk	Drywell, high risk, estimated distance to groundwater: -12.2 ft. Related to KI-98 high-risk drywell at same intersection. KI-90 and KI-115, high-risk drywells one block west. Potential project review 20230607.	2023	Ongoing	Moderate
KI-92	Drywell, high risk	Drywell, high risk, estimated distance to groundwater: 4.8 ft.	2023	Ongoing	Moderate
KI-93	Drywell, high risk	Drywell, high risk, estimated distance to groundwater: 0 ft. In CARA Recharge Area Category 1.	2023	Ongoing	Moderate
KI-94	Drywell, high risk	Drywell, high risk, estimated distance to groundwater: -9.5 ft. In CARA Recharge Area Category 1.	2023	Ongoing	Moderate
KI-97	Drywell, high risk	Drywell, high risk, estimated distance to groundwater: -18 ft.	2023	Ongoing	Moderate

City of Washougal Stormwater Master Plan
Smaller Capital Projects List 2023
Drywell Retrofits

ID Number	Project Name	Description	Last Occurance	Frequency	Issue Severity
KI-98	Drywell, high risk	Drywell, high risk, estimated distance to groundwater: -11.8 ft. Related to KI-91 high-risk drywell at same intersection. KI-90 and KI-115, high-risk drywells one block west. Potential project review 20230607.	2023	Ongoing	Moderate
KI-99	Drywell, high risk	Drywell, high risk, estimated distance to groundwater: -12.5 ft.	2023	Ongoing	Moderate
KI-100	Drywell, high risk	Drywell, high risk, estimated distance to groundwater: -13 ft.	2023	Ongoing	Moderate
KI-106	Drywell, high risk	Drywell, high risk, estimated distance to groundwater: -9.2 ft. In CARA Recharge Area Category 1.	2023	Ongoing	Moderate
KI-107	Drywell, high risk	Drywell, high risk, estimated distance to groundwater: -7.3 ft. In CARA Recharge Area Category 1.	2023	Ongoing	Moderate
KI-108	Drywell, high risk	Drywell, high risk, estimated distance to groundwater: -11 ft. Related to KI-35, KI-81, and KI-83, high risk drywells on same street. Potential project review 20230607.	2023	Ongoing	Moderate
KI-110	Drywell, high risk	Drywell, high risk, estimated distance to groundwater: -8 ft. In CARA Recharge Area Category 1. Related to KI-28 and KI-113, clogging catch basin and aging drywell, and high-risk drywell. Potential project review 20230607.	2023	Ongoing	Moderate
KI-111	Drywell, high risk	Drywell, high risk, estimated distance to groundwater: 0 ft	2023	Ongoing	Moderate
KI-113	Drywell, high risk	Drywell, high risk, estimated distance to groundwater: -4 ft. In CARA Recharge Area Category 1. Related to KI-28 and KI-110, clogging catch basin and aging drywell, and high-risk drywell. Potential project review 20230607.	2023	Ongoing	Moderate
KI-114	Drywell, high risk	Drywell, high risk, estimated distance to groundwater: -9 ft. In CARA Recharge Area Category 1.	2023	Ongoing	Moderate
KI-115	Drywell, high risk	Drywell, high risk, estimated distance to groundwater: -18.5 ft. Related to KI-90, high-risk drywell at same intersection. KI-91 and KI-98, high-risk drywells one block east. Potential project review 20230607.	2023	Ongoing	Moderate

City of Washougal Stormwater Master Plan
Smaller Capital Projects List 2023
Small Projects

ID Number	Project Name	Description	Last Occurance	Frequency	Issue Severity
KI-05	Box Culvert, 40th St & J St	40th St & J St: Ensure stream is flowing through the box culvert and not flooding J St. City record date: 09/10/2020, They replaced CMP culverts with a chain of box culverts on Campen Creek on J Street. The City used to routinely clean the CMP culverts. The box culverts are not deep enough. During normal weather, the water level is only 6-in below the top. KI_05 is the most downstream box culvert. When the creek stage gets high, they worry it will flood J Street and the golf course. It has flooded once since the box culvert was installed, not sure when. Worried about big storms and high flows.	2015	Infrequent (once in ~10 years)	Low
KI-12	Swale outfall and stream culvert, 8th St & Shepherd Rd, NE corner	8th St & Shepherd Rd, NE corner: swale outfall is submerged and tends to clog; stream culvert is a safety hazard, it needs to be covered; crew checks function. City record date: 09/10/2020	2023	Ongoing	Moderate
KI-14	Catch basin, 4132 Addy Loop near Hamllik Park	CB near Hamllik Park: CB has tendency to clog; undersized line to old drywell is rooted-in and does not drain well. City record date: 11/30/2022 root issues in the whole area, small project candidate.	2023	Ongoing	High
KI-15	Catch basins, 4280 Addy Street, in front of apartments	CBs in front of apartments: CBs are prone to plugging causing flooding; drain to private storm system; crew needs to keep CB cleared of debris. City record date: 11/30/2022 Confusing situation. When Addy Street and the storm system were put in, they ran the runoff through catch basins, to dry wells, and then to HWY 14 ROW. Runoff infiltrates in the HWY 14 ROW. Later, apartments were built over the storm and sanitary system. The storm line may be blocked somewhere in the apartment complex, or the water table in the ROW could be rising and backwatering the system. No drywells are documented in the area. There are no private facilities on the apartment site. How the pipes go through the apartment site is unknown. Site Visit 20230406: Shallow catch basins with no sump. South catch basin plugs and floods roadway. Downstream manhole in good condition, trunkline under apartment buildings. Trunkline has sufficient capacity. Possible catch basin retrofit because catch basins don't have sumps. Probably not a CIP.	2023	Multiple times per year	Moderate
KI-18	Catch basin, 1700 Main St, in front of coffee shop ponding	Main St. in front of coffee shop ponding: Grate in front of coffee shop tends to plug (special decorative grate); decorative grates are installed throughout downtown and have tiny holes that clog easily; should be modified or replaced. City record date: 11/30/2022.	2023	Multiple times per year	High
KI-19	Catch basin, 1700 C St, ponding	Ponding on C St: Grate tends to plug; decorative grates are installed throughout downtown and have tiny holes that clog easily; grate should be modified or replaced. City record date: 11/30/2022 Ponding caused because the street is brick pavers and they're uneven. Probable streets issue.	2023	Multiple times per year	Low
KI-23	Catch basin, 953 C St, North	North Side of C St across from 9th: Occasional flooding due to undersized CB and large drainage area; easily plugged and adjacent property owner will not help clear CB. City record date: 11/30/2022.	2023	Occasional	High
KI-25	Curb cuts, 897 E St	Curb cuts draining to swales along E St: Curb cuts tend to clog and fill with debris causing ponding on E St; crew needs to check every curb cut during rain events. City record date: 11/30/2022 Related known issue KI-71, planters need to be redesigned and replanted. Potential project review 20230607.	2023	Multiple times per year	High
KI-32	Outlet, Washougal River Road, across from N 25th St, North	N side of WRR across from N 25th St.: Outlet structure to not work as designed; floods sidewalk and planter strip; sediment load deposits on sidewalk and flooding causes erosion of planter strip. City record date: 11/30/2022.	<Null>	<Null>	Moderate
KI-37	Ditch inlet, Stiles Rd at SE 330th Ave	Ditch Inlet on Stiles Rd: DI on Stiles Rd. has tendency to plug and flood over roadway; needs to be kept clear of debris. City record date: 11/30/2022 Not a ditch inlet. Old clay pipe under Stiles road. The ditch on the west side of the road is filled in and needs to be re-ditched. The clay pipe when plugged goes down the bank on the east side of the road and causes a muddy blow out. However, this has been dug out, and has only occurred twice in 22 years.	c.2015	Once in 22 years	Low

City of Washougal Stormwater Master Plan
Smaller Capital Projects List 2023
Small Projects

ID Number	Project Name	Description	Last Occurance	Frequency	Issue Severity
KI-38	Stormwater facility, near S St and Quail Ph 3	Stormwater facility near S St and Quail Ph 3: Facility has very limited access with aggressive homeowners encroaching into stormwater tract with garden and path; outlet structures need to stay clear of debris or severe flooding will occur. City record date: 11/30/2022 The access easement into the stormwater tract is too close to houses, and the City is unable to access the tract with equipment (used to use mini-excavator). It needs to be visited before every storm. The outlet from this facility does not have a bypass. There are two pipes with a high-probability of clogging. Its taking more flow than designed because of high-groundwater. There is no downstream water quality facility. Downstream is Quail Park 3 subdivision. An engineer has already made a downstream analysis and said do not alter the existing facility. Also downstream is Schmidt Family Park. There is room for a regiona facility and potential for restoration. Park is known issue KI_47 and could solve this issue. Needs site visit. Site Visit 20230406: Photo from street shows public access easement for trail along private drive, not the maintenance easement. Constant groundwater flow, year-round. Two large clustered trees need to be removed (and are scheduled removal) to open maintenance access. The yellow cap in the photos is a plug. The City clears the outlet and inlets and mows around the facility. Maintenance easement to the east is insufficient and there isn't room to improve this easement. A project is needed to improve maintenance access from the west.	2023	Ongoing; Every storm	Moderate
KI-42	Catch basin, 5000 S St	Corner of S St and 50th St: CB has a tendency to plug and flood; crew needs to keep the catch basin clear of debris. City record date: 11/30/2022 Catch basins are too small. 6-in pipe under the street that needs to be bigger. Flows across the street to an open space between properties. Candidate for small projects program.	<Null>	Multiple times per year	Moderate
KI-48	Filter vault, 755 Fairway Dr, needs maintenance access road	Filter vault, 755 Fairway Dr, needs maintenance access road. Filter vault is extremely difficult to access with Vactor truck; access road needs to be constructed	<Null>	<Null>	Moderate
KI-50	Facility lid, 5569 I St, lid damage	Facility lid, 5569 I St, lid damage. The lid is warped due to garbage truck turn around; needs to be replaced	2023	Ongoing	Low
KI-71	Planters, 927 E St, planters need to be redesigned and replanted	Planters, 927 E St, planters need to be redesigned and replanted; extremely labor intensive and high profile; areas with too much veg and bare areas. Related known issue KI-25. Curb cuts draining to swales along E St: Curb cuts tend to clog and fill with debris causing ponding on E St; crew needs to check every curb cut during rain events. Potential project review 20230607.	2023	<Null>	Low
KI-73	Detention pond, 2200 W 8th St, pet waste and trash	Detention pond, 2200 W 8th St, pet waste and trash. Dog waste, trash, and liability issues; need to install a couple short sections of fence	2023	Ongoing	Low
KI-74	Swale, 624 W S Street, bank stabilization	Swale, 624 W S Street, bank stabilization. Facility needs bank reinforcement and stabilization; work should be able to be completed in house.	2023	<Null>	Moderate
KI-75	Detention pond, W Lookout Ridge Dr and SE Crown Rd, facility needs to be dredged	Detention pond, W Lookout Ridge Dr and SE Crown Rd, facility needs to be dredged. Facility to be dredged in coming years; work should be able to be completed in house with proper staffing and rental equipment.	2023	<Null>	Low
KI-116	P33, stormwater facility.	Site Visit 20230413: P33 stormwater facility not functioning. Two catch basins in road were recently cleaned but full today. Manhole at intersection acts as sediment manhole. Causes neighborhood flooding. Facility in cul-de-sac overflows and house east of facility in cul-de-sac floods. Catch basins receive year-round flow and have algae.	2023	Multiple times per year; constant groundwater flow	Moderate

City of Washougal Stormwater Master Plan
Smaller Capital Projects List 2023
StormFilter/CDS Enhanced Maintenance

ID Number	Project Name	Description	Last Occurance	Frequency	Issue Severity
KI-31	CDS and swale, 1500 4th Ct	4th and Shepherd - CDS and Swale: The CDS unit and swale tend to clog and are difficult to maintain; dyeing oak trees are creating major leaf issues; shallow gas line runs under facility; groundwater causes constant flow. City record date: 11/30/2022.	2023	Ongoing; Annual	Moderate
KI-39	CDS and drywells, 3500 block P St, Buffalo Ranch flooding	Buffalo Ranch flooding - P St: CDS unit tends to clog and drywells do not perk well leading to severe flooding; crew needs to keep CDs unit cleared of debris. City record date: 11/30/2022.	<Null>	<Null>	High
KI-49	Filter vault, 4932 G St, filter vaults need adaptors installed	Filter vault, 4932 G St, filter vaults need adaptors installed. All Contech filter vaults that are not half turn need adapter installed next time media is replaced.	<Null>	<Null>	Moderate
KI-53	CDS, 4901 K St, needs enhanced maintenance	CDS, 4901 K St, needs enhanced maintenance. All CDS Units need more than once/year maintenance.	2023	Multiple times per year	Low
KI-68	CDS, 1310 N 24th Ct, needs enhanced maintenance	CDS, 1310 N 24th Ct, needs enhanced maintenance. CDS Unit gets overwhelmed and needs frequent cleaning; many leaves and debris.	2023	Annual	Low
KI-69	CDS, 2200 N Washougal River Rd, needs enhanced maintenance	CDS, 2200 N Washougal River Rd, needs enhanced maintenance. CDS unit receives a lot of flow and a lot of debris; needs enhanced maintenance.	2023	Annual	Low
KI-70	CDS, 2157 N Q ST, needs enhanced maintenance	CDS, 2157 N Q ST, needs enhanced maintenance. CDS unit receives a lot of flow and a lot of debris; needs enhanced maintenance.	2023	Annual	Low

City of Washougal Stormwater Master Plan
Smaller Capital Projects List 2023
Frequent Maintenance

ID Number	Project Name	Description	Last Occurance	Frequency	Issue Severity
KI-06	Ditch inlet, 5164 P St	5164 P St: Ditch inlet gets plugged and causes flooding; crew needs to keep ditch inlet cleared of debris. City record date: 09/10/2020 The facility filled up with a trash after a windstorm recently and does so frequently. This causes the ditch to flood on to the road. Ponding is not a problem, but the flooding deposits trash and gravel on the road. This ditch flows year round. Site Visit 20230406: Example of a ditch inlet at the rural-urban infrastructure divide. P Street field inlet. Recycling day plus lots of wind causes trash to plug inlet. Mown grass/vegetation also clogs inlet. Highlights the constant maintenance required. Hard for crews to get out often enough. Scotty has a list of drainage hot spots to visit when it is raining or going to rain.	2023	Weekly in rainy season	Low
KI-07	Ditch inlet, 1823 49th St	1823 49th St: DI has tendency to plug and flood street; crew needs to keep DI clear of debris. City record date: 09/10/2020 The facility filled up with a trash after a windstorm recently and does so frequently. This causes the ditch to flood on to the road. Ponding is not a problem, but the flooding deposits trash and gravel on the road. There is no fix for this, it just needs to be monitored. KI_44 will not fix this issue.	2023	Weekly in rainy season	Moderate
KI-08	Ditch inlet, 37th St & W St	37th St & W St: DI needs to stay clear or flooding will occur. City record date: 09/10/2020 The facility filled up with a trash after a windstorm recently and does so frequently. This causes the ditch to flood on to the road. Ponding is not a problem, but the flooding deposits trash and gravel on the road.	2023	Weekly in rainy season	Moderate
KI-09	Ditch inlet, 35th St & U St	35th St & U St: Ditch Inlet needs to stay cleared of debris or flooding will occur. City record date: 09/10/2020 The facility filled up with a trash after a windstorm recently and does so frequently. This causes the ditch to flood on to the road. Ponding is not a problem, but the flooding deposits trash and gravel on the road. Possibly related to KI-66? Potential project review 20230607.	2023	Weekly in rainy season	Low
KI-10	Ditch inlet, 3337 W St	3337 W St: ditch inlet needs to be kept clear so that it does not run overland and cause erosion and structural damage. City record date: 09/10/2020 The facility filled up with a trash after a windstorm recently and does so frequently. This causes the ditch to flood on to the road. Ponding is not a problem, but the flooding deposits trash and gravel on the road. Location is by Betty Gross's. Access is difficult, between houses and narrow. Maintenance must be done by hand. Easement status is unknown. This is technically a WQ facility; however, it has water running year-round. There has been a fix downstream. This is an important issue because the flow would run over private property pasture and erode their driveway. Water quality issues of sheet flow over the cattle field prompted the City to develop the prior fixes. Site Visit 20230406: No maintenance access to facility (foot path only). City has dug out the facility by hand, installed a new lower T and field inlet, and piped flow west. City keeps field inlets clear manually.	2023	Weekly in rainy season	Low
KI-16	Catch basins and Drywells, 3000 block Main St	CBs/Drywell on Main St: Main St. surface is not graded correctly; water has trouble getting to CBs; drywells do not perk well. City record date: 11/30/2022 Road is not graded to drain. Street flooding stopped after cleaning dry wells with the vactor truck. Ponding in parking spaces remains, but its more of a streets issue.	2023	Multiple times/year	Low
KI-29	Catch basins, 200 block N X St, tend to plug	CBs on X St tend to plug: CBs tend to plug; crews make sure they are clear; homes will flood if not cleared; groundwater seepage is factor as well. City record date: 11/30/2022 Can be removed; maintenance issue; two CBs and the reason is a lot of street trees and constant groundwater seepage. City notes on known issues 20230310.	2022	<Null>	High
KI-30	Ditch inlet, 1867 N 8th St	Ditch inlet on N 8th St: DI tends to plug; will overflow and run down 8th St. causing flooding; crews check to see if DI is cleared. City record date: 11/30/2022 Can be removed; maintenance issue; West side of road. City notes on known issues. 20230310. Moved to frequent maintenance list. Potential project screening 20230607.	2023	Ongoing	Moderate

City of Washougal Stormwater Master Plan
Smaller Capital Projects List 2023
Frequent Maintenance

ID Number	Project Name	Description	Last Occurance	Frequency	Issue Severity
KI-36	Drywell, 24th St to 28th St and E St to H St	24th to 28th and E to H: Limited stormwater infrastructure to DW; has tendency to clog; increased sweeping frequency is required with how much leaf debris accumulates on streets. City record date: 11/30/2022 The City currently does increased street sweeping because these streets drain to one catch basin. Limited drainage structure. Catch basin and pipe replacement needed. Debris piles on the catch basins, and causes ponding on the travel lanes of residential streets. Weekly sweeping in the fall leaf drop. Dry well also needs to be vacuumed out.	2023	Multiple times/year	Moderate
KI-43	Ditch inlet, 57th St and N St	57th and N Ditch Inlet: Ditch inlet will get plugged and flood; crew needs to keep ditch inlet cleared of debris. City record date: 11/30/2022 Same issue as KI_10. Planned subdivision upstream could help the debris coming down.	2022	Multiple times/year	Moderate
KI-55	Permeable pavement, 1532 A St, City maintenance ineffective	Permeable pavement, 1532 A St, City maintenance ineffective. Currently City owned permeable pavers, concrete, asphalt does not have a effective way to be maintained. Need to explore equipment and staffing time needs for routine maintenance.	2023	Ongoing	Low

Appendix E

Cost Estimate Methodology

Memorandum

To:	Sean Mulderig (City of Washougal)
From:	Trista Kobluskie
Date:	January 10, 2024
Subject:	City of Washougal SMP Project Cost Opinion Methodology
Project No.:	20272

The Washougal Stormwater Master Plan (SMP) includes three recommended Capital Improvement Projects (CIPs). These CIPs address drainage issues where streets or properties are flooding or ponding as a result of lack of drainage infrastructure. Otak developed planning-level project scopes and cost opinions for these projects. This memo describes the procedure used to assess the cost of these CIPs.

The cost estimating methodology is similar to the methodology Otak used to develop cost estimates for the 2023 Stormwater Management Action Plan (SMAP) CIPs. Costs are presented in 2023 dollars.

1. Project Scopes

Cost opinions are based on conceptual project scopes and engineering and are presented in 2023 dollars. Conceptual project scopes and designs are developed with limited detail about permit requirements, existing system attributes (e.g., invert elevations), utility conflicts, and external impacts. Conceptual engineering includes preliminary engineering calculations or uses information from recent similar work. Concepts and costs should be considered preliminary.

2. Construction

Construction consists of construction elements and required ancillary construction pay items.

2.1. Construction Elements

Construction elements are the necessary significant pay items to construct the project. Items are usually presented as a package that includes labor and a variety of materials. For example, the unit cost for pipe installation includes labor and materials to perform excavation, pipe bedding/backfill, and asphalt patching. Unit prices were drawn from bid tabulation from a variety of recently completed local and regional construction projects. From the available data, Otak's engineers used professional judgement to estimate unit prices for each construction element. Each project includes an engineer's assumption for preliminary unit quantities.

2.2. Required Ancillary Items

Required ancillary construction items include mobilization, temporary water management, erosion & sedimentation control, traffic control, and a planning level construction contingency. Each of these is calculated based on a percentage of project costs as described in the table below.

Type of Cost	Includes	How Applied	How Calculated
Mobilization	▪ Contractor's mobilization	All projects	10% of construction elements subtotal; 0% if City crew expected to complete the work
Erosion & Sedimentation Control	▪ Contractor's erosion control costs	All projects	5% or 10% of construction elements subtotal, based on amount of excavation using engineering judgement
Traffic Control	▪ Contractor's traffic control costs	If needed based on desktop analysis of site conditions	Percentage of construction elements subtotal based on engineering judgement
Planning Level Construction Contingency	▪ Expected costs that are not specified at the planning level	All projects	40% to 50% of total construction cost based on number of unknowns (e.g., utility conflicts) using engineering judgement

3. Permitting and Land Acquisition

Permitting and land acquisition includes costs to prepare plans and obtain permits from other agencies and the City itself and to acquire easements to construct or maintain infrastructure on private or government property.

Type of Cost	Includes	How Applied	How Calculated
ROW (right-of-way) Permitting	▪ Obtaining a ROW Permit from City of Washougal	All projects in the ROW	$1,000
Basic Permitting	▪ Minimal permitting from other agencies	Projects which may involve negotiating with another agency	$15,000

Type of Cost	Includes	How Applied	How Calculated
Permanent Access Easement	▪ Cost to research, negotiate, and pay for a permanent easement for maintenance across private or agency property	If project crosses private or agency property	$16 / square foot of easement

4. Studies and Engineering

Additional project costs required to design, implement, and manage each project is summarized below.

Type of Cost	Includes	How Applied	How Calculated
State Sales Tax*	▪ State sales and use tax rate ▪ Local City/County sales and use tax rate ▪ Rates effective 1/1/2023	All Projects	8.5% of total construction
Engineering	▪ Engineering design ▪ Preparation of SWPPP and erosion & sediment control plans ▪ Geotechnical studies (if needed) ▪ Archaeological survey (if needed) ▪ Other special studies when described in fact sheet	All projects	Varied percentage of total construction cost based on project complexity using engineering judgement ▪ $15,000 for projects requiring only conveyance design ▪ 15% to 25% for other projects
Project Administration	▪ City's staffing cost to manage the project and related grants, if any	All projects	5% of total construction
Construction Management	▪ Either the City's staffing or a contractor to oversee construction	Projects that will use a contractor for construction	10% of total construction
Survey	▪ Site topography, utility locations, and property boundaries	All projects	2% to 15% of total construction based on engineering judgement

* Depending on classification of the project, it may not require a separate sales tax. City will make this determination when putting a project out to bid.

5. Escalation and Future Estimation

Cost opinions were developed in 2023 dollars. Cost opinions in the SMP do not include escalation. Otak recommends escalating a cost opinion using an established index when the City adds a project to its capital improvement program. After the project design phase is complete, the construction costs should be replaced by the engineers' estimate.

Appendix F

Long-term Management White Papers

Washougal Stormwater Master Plan

Inspection and Maintenance Staffing

Long-Term Management Recommendations

Submitted to:

City of Washougal
1701 C Street
Washougal, WA 98671

Prepared by:

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May 2024

Project No. 20272

Table of Contents

Section 1. Introduction

Stormwater system inspection and maintenance is a key component of the City of Washougal's (City) stormwater management program. All stormwater system components require maintenance to continue to function properly. Inspections allow the City to determine maintenance needs and could be used to assess rehabilitation and replacement needs as stormwater infrastructure ages.

Operation and maintenance (O&M) is a common challenge for stormwater utilities. The Water Environment Federation's Stormwater Institute has identified asset management and lack of sustained operation and maintenance as consistent challenges for stormwater programs across the United States. A major contributor to inadequate O&M is insufficient information on long-term maintenance needs and costs. This lack of information prevents utilities from acquiring the technical and financial capacity needed to maintain stormwater infrastructure performance (Water Environment Foundation, 2015).

O&M to maintain stormwater infrastructure function and reduce stormwater impacts extends beyond inspection and maintenance of stormwater facilities owned by the City. Stormwater O&M encompasses activities to reduce pollution in runoff from lands owned and maintained by the City including roads. The stormwater system also includes connections to privately owned and operated stormwater treatment and flow control facilities.

To ensure adequate maintenance of stormwater infrastructure, the City's Public Works Department needs to assure adequate staffing and manage information about stormwater assets effectively. The purpose of this white paper is to assess needed staffing resources to allow the City to effectively operate and maintain the City's stormwater system. The paper bases these recommendations on a review of the regulatory context, an evaluation of the City's stormwater infrastructure and resourcing, and an evaluation of level of service based on regulatory requirements and preventive maintenance needs.

Establish Standards

Stormwater O&M encompasses a wide range of activities intended to ensure the stormwater system components operate as designed and to protect ground and surface waters. The City has adopted the 2019 Stormwater Management Manual for Western Washington (SWMMWW) as the primary source of maintenance standards for the City's stormwater system. The City may determine if a higher level of maintenance is needed to meet residents' performance expectations or to prevent environmental impacts and reduction in facility lifespan.

Track and Manage Assets

The City's stormwater facilities are currently inventoried and mapped in a Geographic Information System (GIS) in which each asset has a unique ID, location, and fields containing information on BMP type, owner, maintainer, capacity, age, etc.; however, the GIS database is not complete. A backlog of new inventory has not been entered into the GIS. Fields are unpopulated for many assets. Other fields describing maintenance history are not present. The GIS allows the City to inventory its stormwater assets, but it is not a good tool on its own for scheduling inspections, recording condition, scheduling maintenance, assigning responsibility to different staff members for inspection or maintenance, or documenting level of effort needed to operate assets. Those functions are better provided by an asset management program.

Asset management programs enable cities to proactively address system needs, reduce expensive repairs, reduce unexpected repairs, and increase system performance. Asset management programs are proven to help utilities meet both regulatory and level of service objectives by reducing and stabilizing

long-term costs to maintain service levels and increasing financial transparency for rate payers. Developing and implementing an asset management program involves:

- Identifying the scope of the asset management program;
- Inventorying, scoring, and prioritizing assets;
- Establishing desired level of service; and,
- Implementing asset management software (US EPA, 2017).

The Public Works Department previously purchased and began to use the Cartegraph OMS software to proactively address system needs and project annual inspection, operation, and maintenance workload for storm system assets. Unfortunately, the department found the software to require too much overhead management to be used as an effective tool for the storm system assets alone, and other departments did not adopt it. The City currently uses an ESRI, Inc. ArcGIS field data gathering software known as Survey123, which allows for more streamlined inspection data collection and reporting.

Therefore, the Stormwater Program continues to rely on GIS and manual tools for scheduling, tracking, and documenting inspections, operations, maintenance, and repairs. In addition, the department relies on the institutional knowledge of stormwater operations practices and needs, drainage problem history, and the history of stormwater facility installation, maintenance, and repair held by one long-term employee who is nearing retirement. Implementing a more complete asset management system could improve O&M performance, improve efficiency, and guard against loss of significant knowledge when staff changes.

Section 2. Background

The following section contains a brief summary of regulatory policies relevant to the City's stormwater O&M activities, a review of known issues data collected during the Stormwater Master Plan (SMP) process, and a summary of the budgeted and actual stormwater positions. The regulatory policies establish the base level of stormwater system O&M, and the City's stormwater utility and utility rates provide resources to conduct O&M.

Regulatory Review

Western Washington Phase II Stormwater Permit

The Western Washington Phase II Municipal Stormwater Permit (Permit) is the primary regulatory driver of stormwater management activities implemented by the City. The Permit establishes the required activities and implementation milestones the City must meet to comply with the federal Clean Water Act and the Washington State Water Pollution Control Act. The Permit authorizes the City to discharge stormwater to surface waters of the State of Washington from the City's Municipal Separate Storm Sewer System (MS4). The Permit does not authorize discharges to groundwaters of the State through facilities regulated under the Underground Injection Control (UIC) program (Washington Department of Ecology, 2019).

The current permit covers the term 2019-2024. Permittees are required to develop and implement a Stormwater Management Program (SWMP) consisting of actions and activities comprising the components listed in Schedule S5 of the Permit. These activities include a program to conduct and regulate maintenance activities. The required maintenance activities include:

- Implement maintenance standards that are as protective, or more protective, of facility function than those specified in the Stormwater Management Manual for Western Washington (SWMMWW) or a Phase I program approved by Ecology.

- For facilities which do not have maintenance standards, develop a maintenance standard.
- The purpose of the maintenance standard is to determine if maintenance is required.

- Verify adequate long-term O&M of stormwater treatment and flow control facilities that are permitted by the City through annual inspections of all such facilities that were permitted by the City.
- Inspect and maintain municipally owned or operated stormwater treatment and flow control facilities. Herein after, these assets will be referred to as “public stormwater facilities.”
  - Inspect all public stormwater facilities annually and take appropriate maintenance actions in accordance with the adopted maintenance standards.
  - Spot check potentially damaged public stormwater facilities after major storm events.
  - Inspect all catch basins and inlets owned or operated by the City every two years.
  - Clean catch basins if the inspection indicates cleaning is needed to comply with maintenance standards.
- Implement practices, policies, and procedures to reduce stormwater impacts associated with runoff from all lands owned or maintained by the City, and road maintenance activities under the functional control of the City. Document the practices, policies, and procedures addressing activities such as, but not limited to, pipe cleaning, culvert cleaning, ditch maintenance, street cleaning, and snow and ice control.
- Implement a Stormwater Pollution Prevention Plan (SWPPP) for all heavy equipment maintenance or storage yards, and material storage facilities owned or operated by the City in the area subject to the Permit.
- Inspect business, commercial, industrial, institutional, and multi-family site that may discharge polluted stormwater to the City’s stormwater system to ensure the sites are employing adequate source control (conduct source control business inspections).

Ecology has released a draft of the 2024-2029 Permit, which will supersede the current permit in July 2024. The 2024-2029 Permit is expected to maintain requirements for the items listed above, to require street sweeping, to require mapping additional attributes of the storm system in GIS, and to lower the threshold for requiring runoff treatment facilities on some developments, which could result in faster rate of storm system inventory increase. The draft changes have been accounted for in Section 5 of this paper.

Underground Injection Control Program

The UIC program, Chapter 173-218 Washington Administrative Code (WAC), regulates discharges to groundwaters through UIC injection wells. Class V UIC wells are underground structures that allow stormwater to flow into the ground, most commonly drywells and infiltration trenches. The UIC Program is authorized by the federal Safe Drinking Water Act and administered by Ecology. To comply with the UIC Program rule, the City has chosen to incorporate operation and maintenance of new and existing UICs according to specifications in the SWMMWW Volume I Section 4 (Washington Department of Ecology, 2019) into its 2023 Stormwater Management Program prepared for the Permit. Section 4 describes the need for “frequent inspections and regular maintenance to improve the long-term performance of UIC wells,” (Ecology, 2019).

Additionally, some form of treatment is required for all stormwater discharges to UICs. When treatment is inadequate, based on a variety of factors, then UICs may pose a risk of contaminating groundwater. Ecology requires owners of Class V UIC wells that are a high threat to groundwater to retrofit them. Retrofit may include adding stormwater treatment prior to discharge to the well, providing separation between the base of the well and the top of the groundwater table, or reducing the pollutant load by

applying a source control activity. Adequate O&M can contribute to meeting the UIC well non-endangerment standard (Washington Department of Ecology, 2019).

Chapter 173-218 WAC also requires the City to register any new UIC wells that manage stormwater 60 days prior to construction.

Known Issues Summary

During the discovery phase of the Stormwater Master Plan project, Otak collected a list of 117 known issues affecting the City's stormwater system. The known issues were categorized into four categories:

- Water Quality – Location lacking water quality structures for a known pollutant source.
- Drainage – Location of a persistent drainage problem or flooding.
- Habitat – Location of stream habitat degradation or fish passage barrier.
- Maintenance – Location where frequent maintenance is required, maintenance is required to resolve an issue, or there is an obstacle to maintenance.

Table 1 shows the number and percentage of issues that fall into each category.

Table 1 Known Issue Category Statistics

Category	Count	Percent*
Quality	46	39%
Drainage	49	42%
Habitat	4	3%
Maintenance	65	56%

**The percentages do not add up to 100% because many issues fall into more than one category.*

The water quality category includes 40 UIC wells that were assessed as potentially posing a high-risk to groundwater. The City plans to retrofit these facilities by replacing existing drywells with shallower UICs to increase separation from groundwater or installing water quality treatment BMPs. In the interim, increased operational source control including UIC well inspections and cleaning can decrease the risk to groundwater.

The summary indicates maintenance is the City's largest category of issues. Of these issues:

- Thirteen of these known issues are associated with catch basins or curb inlets.
- Eight are associated with ditch inlets.
- Twenty-one should be receiving private maintenance.
- More than half (34) are also associated with drainage (small flooding) issues.

The distribution of sub-categories of the 65 maintenance issues is shown in Figure 1.

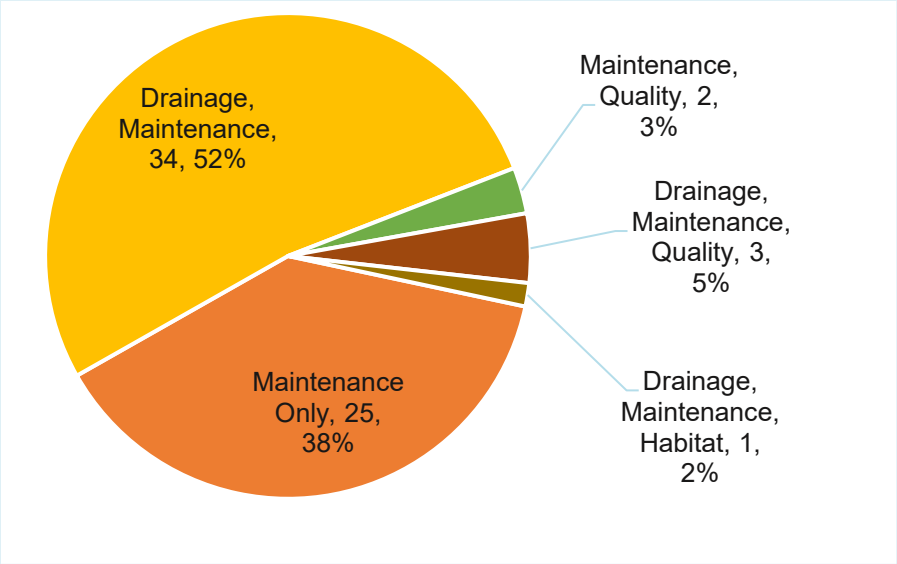

Figure 1 Maintenance Issues Sub-Categories

Budgeted and Actual Stormwater Positions

The City of Washougal stormwater fund included 5.30 budgeted FTE in 2021, 5.45 in 2022, and 6.5 in 2023 (City of Washougal, 2022). In 2023, City staff reported that the Stormwater Division had four FTEs which includes one Utility Supervisor, one Operations Specialist, and two Maintenance Workers. The remaining 2.5 FTE are distributed across other departments such as Finance, Community Development, and the City Manager's Office, and they are not typically involved in inspecting, operating, and maintaining the stormwater system. The four budgeted positions in the Stormwater Division in 2023 have been used as the basis in this memorandum for assessing additional staffing needs.

For the four positions listed above, Otak has estimated the number of labor hours available for inspection, operation, and maintenance of the stormwater system each year. We have used the assumptions that one FTE equals 2,080 hours and that all City FTE expend 30% on overhead, such as training, meetings, holidays, vacation, and sick time, leaving 1,456 productive hours annually per FTE. The Utility Supervisor needs to dedicate 45% of his time to other activities such as other Permit compliance activities, Permit annual reporting, coordination with other permittees, data management, project management, construction inspection, and supervision, leaving 25% for stormwater facility inspection and maintenance tasks. The Operations Specialist and Maintenance Workers dedicate 70% of their time to operation and maintenance. Therefore, these four positions have 4,888 hours annually for stormwater facility inspection and O&M tasks as shown in Table 2. In the spring, the City hires additional seasonal workers to assist with the maintenance of the system, as needed.

The City also has an agreement with Clark County Public Health to fund approximately 0.2 FTE to perform required source control business inspections.

Table 2 Stormwater Positions Current Available Task Time

Positions		Task Category				
		Stormwater O&M	Stormwater Inspections *	Other **	Over-head	Total
Operations Specialists and Maintenance Workers ***	(Hrs/FTE/yr)	1,456	0	0	624	2,080
	FTE (Count)	3	3	3	3	
Subtotal		**4,368**	**0**	**0**	**1,872**	**6,240**
Utility Supervisor	(Hrs/FTE/yr)	0	520	936	624	2,080
	FTE (Count)	1	1	1	1	
Subtotal		**0**	**520**	**936**	**624**	**2,080**
Total		**4,368**	**520**	**936**	**2,496**	**8,320**
Total Available Task Time - Stormwater O&M and Stormwater Inspections		**4,888**				

** The Stormwater Inspections task category includes inspections of public and private stormwater facilities and source control inspections of businesses.*

*** The Other task category includes other permit compliance activities, data management, project management, coordination with other permittees, construction inspection, and supervision.*

**** There are 2 FTE Maintenance Worker and 1 FTE Operations Specialist.*

Section 3. Current Activities and Workload

The City's current inspection and maintenance workload is based on the requirements of the Permit as described in Section 1.

Otak conducted an analysis of current stormwater facility inventory and an employee timecard analysis from the years 2020 through 2022. The analysis provides a baseline of staff hours needed to inspect, operate, and maintain the stormwater system at the current level of service. Current inventory is the facility count at the beginning of 2022. The timecard records do not identify the number of staff performing the activities, and communications with the City indicate that the number of workers was variable during the years evaluated.

Maintenance

The City currently maintains 202 public stormwater facilities. These can be classified into two sub-types based on manner of function and general maintenance: underground facilities and vegetated facilities. Underground facilities include treatment facilities such as filter treatment vaults and hydrodynamic separators as well as flow control facilities such as detention vaults. Vegetated facilities include bioretention and infiltration treatment facilities as well stormwater detention ponds. The City also maintains UICs occasionally, which includes cleaning out sediment and debris using a Vactor truck when they are not draining well.

Table 3 shows the number of public stormwater facilities and the average annual timecard hours documented for maintaining these facilities.

Table 3 Current Workload, Public Stormwater Facilities Maintenance

Facility Type	Current Inventory (2022)	Quantity Maintained Annually	Current Workload (Avg Hrs/yr)	Average Hours / Unit / Year
Underground Facilities	100	100	721	7.2
Vegetated Facilities	102	102	2,015	19.8
Subtotal – Public Stormwater Facilities	**202**	**202**	**2,736**	
UICs *	186	37*	113	3.0
Total	**388**	**239**	**2,849**	

** The City does not have a program for routine cleaning of UICs; an unknown number of UICs are maintained during maintenance of associated stormwater treatment and flow control BMPs. The current workload (113 hours per year) from timecard data recorded for drywell maintenance and repair is assumed to be needed to maintain 20%, or about 37 UICs, per year.*

Stormwater Collection and Conveyance

The City maintains ditches and collection structures such as catch basins and inlets routinely. The City does not have a routine stormwater pipe conveyance maintenance program.

The City's stormwater GIS shows 2.2 miles of stormwater pipes greater than 24-in diameter, 33.8 miles of pipes with diameters less than 24-in, and 2.6 miles of pipes with unknown diameters. Table 4 shows quantities of collection and conveyance infrastructure and the average yearly number hours documented on maintaining them based on timecards.

Table 4 Current Workload, Stormwater Collection and Conveyance Maintenance

Facility	Current Inventory (2022)	Quantity Maintained Annually	Current Workload (Avg Hrs/yr)	Average Hours / Unit / Year
Catch basins and inlets	1,784	Approximately 700	1,244	1.7
Ditches	4.5 miles	unknown	15	3.3
Large pipes (> 24-in diameter) *	2.2 miles	unknown	0	0
Small pipes (< 24-in diameter) *	33.8 miles	unknown	0	0
Total			**1,259**	

** The City does not have a routine stormwater pipe inspection or maintenance schedule, and no timecard hours are documented for maintaining pipes alone. Small portions of stormwater conveyance pipes are inspected and maintained as part of other maintenance activities.*

Streets

Streets act as stormwater conveyance, and most stormwater infrastructure in the City is associated with public rights-of-way. Streets are also significant contributors of runoff; and the runoff from roads and highways is contaminated with pollutants from vehicles such as hydrocarbons, heavy metals, as well as sediment and road salt (Washington Department of Ecology, 2019). The stormwater staff conduct street sweeping to remove debris and pollutants from the roadway before they can clog stormwater facilities or

be discharged to ground and surface waters. Table 5 presents the average yearly number of timecard hours documented for street sweeping.

Table 5 Current Workload, Stormwater-Related Street Maintenance

Activity	Current Inventory (2022)	Current Workload (Avg Hrs/yr)	Average Hours / Unit / Year
Street Sweeping	134 miles (lane) 2,500 (average miles sweeper driven)	504	0.2 hrs / miles driven / year
Total		**504**	

Inspections

Otak's analysis of current inspection workload is based on discussion with the Utility Supervisor because timecard data is not available for this activity.

The City is required to inspect public and private stormwater facilities annually. Correspondence with the City indicates that the Utility Supervisor previously spent 30% of his time inspecting stormwater facilities, but time available was reduced to 25% beginning in 2023 because the Utility Supervisor's responsibilities in other areas has increased. When devoting 30% of his time to inspections and maintenance tasks documented in this paper, the position was able to spend an average of 1.9 hours per facility annually for inspection, which includes planning, travel, inspection, documentation, re-inspection, and follow-up actions. Spending 1.9 hours on inspection annually per facility allowed the City to meet Permit requirements, but available time for these inspections has now been reduced.

The City is also required to conduct source control business inspections. This activity is being completed under contract with Clark County Public Health at this time. The activity is included in this discussion in case the City needs to take over this activity internally. It is required by the Permit.

Table 6 summarizes facilities and infrastructure required to be inspected by the Permit and average annual hours based on discussion.

Table 6 Current Workload, Stormwater Inspections

Facility Type	Frequency	Total Quantity (2022)	Quantity Inspected Annually	Current Workload (Hrs/yr)	Average Hours / Unit / Year
Public stormwater facilities	Annually	202	202	385	1.9
Private stormwater facilities permitted by the City after 2007 *	Annually	125	125	239	1.9
Subtotal		**327**	**327**	**624**	
UICs **	None Required	186	0	0	0

Facility Type	Frequency	Total Quantity (2022)	Quantity Inspected Annually	Current Workload (Hrs/yr)	Average Hours / Unit / Year
Source control business inspections ***	Annually	123	25	0	0
Total		**636**	**352**	**624**	

** Based on facilities listed as **not** maintained by the City of Washougal or WSDOT with construction dates in the City's stormwater GIS database.*

*** The City does not currently routinely inspect UICs. As the City's most recent SWMP Plan includes management of UICs, these facilities will be inspected regularly going forward as discussed in Section 4.*

**** This activity is currently provided under contract with Clark County Public Health and does not result in any City staff time. Clark County Public Health dedicates 0.2 FTE to source control business inspections for City of Washougal.*

Section 4. Near-Term Planned Workload

The near-term planned workload section documents the City's current need for additional staffing to inspect, maintain, and track its public stormwater assets. The near-term needs are based on changes to level of service to meet regulatory requirements, to preserve the function of facilities that pose risks to public safety or groundwater if not adequately maintained, and to address a backlog in facility inventory.

Level of Service

Maintenance

The City provides a basic level of stormwater maintenance level of service (LOS) that enables the City to comply with the Permit and address complaints and known issues. The department plans to increase LOS for selected activities in response to new requirements expected in the 2024-2029 MS4 Permit and also aspires to provide a higher LOS for other activities. Interviews with City staff and the summary of known issues indicates the City's current level of maintenance of underground facilities does not prevent routine blockages and flooding at certain facilities. The City aspires to increase LOS to meet service expectations and reduce flooding. Review of existing data identified seven StormFilter® and CDS units that require more frequent maintenance and 12 other structures such as catch basins that require more frequent maintenance. Hydrodynamic separators and sedimentation facilities appear to require greater than annual maintenance to keep up with the quantity of debris collected. Filter facilities also appear to require a more frequent filter replacement interval than the current schedule of once every three years. A greater level of service in these locations would include monthly visits over the rainy half of the year to proactively remove debris from inlet grates, clear outlet pipes, and manually sweep or pick up debris from up to 20 feet of gutter flow path leading to the facility. These maintenance activities performed at greater frequency will increase facility performance and reduce flooding; they could also lead to longer intervals between filter replacements. Six one-hour yearly proactive maintenance visits to prevent flooding at these 19 locations requires an additional 114 hours/year, assuming one hour per visit.

In response to the draft 2024-2029 Permit requirement to include street sweeping as a stormwater pollution control practice, the City plans to increase street sweeping by about 50% from 2,500 sweeper miles driven to approximately 3,750 sweeper miles driven per year.

Inspection

City staff have observed that the current time allocated to inspecting public stormwater facilities and private facilities (average 1.9 hours/facility) is enough to meet Permit requirements, but documentation of public facility inspections is minimal, and staff has limited ability to perform follow-up inspections and provide technical support and resources to private facility owners. By increasing the level of service for inspections, the City could improve outcomes such as more careful scheduling of public facility maintenance after an inspection, improve water quality, and ensure condition of private facilities is adequate.

Otak reviewed stormwater facility inspection level of effort at other cities in the Pacific Northwest where information was available. By comparison, City of Bothell staff spend an average of 0.7 hours/year per facility for municipal facility inspections using a tablet computer with direct link to the City's maintenance management system (LUCITY). City of Bothell staff spend an average of 2.2 hours/year per facility for private stormwater facility inspections. City of Bothell benefits from the direct link to a maintenance management system for public facility inspections, which City of Washougal does not have. Another comparison point is the City of Hillsboro, where staff spends an average of 5.1 hours per facility on public and private stormwater facility inspection.

Increasing the average inspection and follow-up time to three hours per facility is an approximate 50% increase in effort and requires an additional 360 hours/year, for a total anticipated workload of 984 hours/year for inspecting public and private stormwater facilities.

The City recently incorporated UIC management into the City's MS4 SMWP Plan, and the City would like to implement a routine UIC inspection schedule to ensure that maintenance needs are identified early enough to schedule maintenance that preserves facility function. Because of the risk of contaminating aquifers, frequent inspection and maintenance is desirable to reduce risks to public health. Inadequate inspection and maintenance of UICs can lead to clogging and system failure that necessitates the replacement of the drywell (Metropolitan Area Planning Council, 2010). To limit the potential for drywell failure, and to meet the requirements of the O&M requirements of the State's UIC Program, which describes the need for "frequent inspections and regular maintenance to improve the long-term performance of UIC wells," (Ecology, 2019), Otak recommends that the City inspect the drywell inventory every two years. The current inventory of 186 UICs would require an additional 93 hour/year for inspection, assuming one hour per visit. Preventive maintenance will follow inspection and could lead to an increase in maintenance level of service for drywells as discussed in Section 5.

Inventory Increase (Near-Term)

The City intends to take over responsibility for maintaining 27 public underground stormwater facilities and 16 public vegetated facilities that are currently under the care of private parties. The Orphan Facilities Memorandum attached to the Stormwater Master Plan describes the current situation and the preferred alternative in which the City takes over maintenance of these 43 stormwater facilities. When implementing the preferred alternative, the City will add 43 stormwater facilities to its inventory within the next one to two years, requiring a one-time effort to perform overdue maintenance on each, totaling 764 hours of maintenance. The one-time increase to perform overdue maintenance is assumed to be phased in over two years, resulting in a need for 382 additional hours of maintenance per year for two years. The near-term impact is presented in Table 7. The long-term impact resulting from taking on the Orphan Facilities is incorporated into the long-term inventory increase presented in Table 8.

GIS Database

In order to track and manage the stormwater facility inventory, the City's GIS requires updates throughout a given year. Maintaining an updated map of the City's storm system is also a requirement of the Permit, and the City risks non-compliance by allowing data entry and upkeep to lapse. Based on information from City staff, a backlog of approved developments with stormwater infrastructure needs to be added to the GIS. The current backlog extends for one year, and four prior years of entries have missing data that need to be rectified. The backlog and data completion tasks are estimated to require approximately 240 hours of one-time effort. In recent years there has been an average of six approved developments per year. Approved developments are estimated to require an average of 16 hours of coordination with Community Development to hand off records, stormwater plan interpretation, GIS data entry, quality assurance, and map publication tasks. The 2024-2025 draft Permit suggests that mapping requirements will increase in the next Permit. This will require an estimated 96 hours annually to enter future developments and keep up with mapping requirements in the Permit.

Near-Term Planned Workload Summary

The near-term planned workload is associated with increases in levels of service and to address the backlog of GIS database updates as summarized in Table 7.

Table 7 Near-Term Recommended Workload Summary

Category	Description	Summary of Increase	Addt'l Workload (Hrs/yr)
Maintenance LOS	Proactive Maintenance at public underground stormwater facilities with known flooding issues	19 sites require an additional one hour six times per year	114
Maintenance LOS	Street sweeping	Increase sweeper miles driven from 2,500 to 3,750 annually	252
Inspection LOS	Inspecting public and private stormwater facilities	327 sites require an additional 1.1 hours each, one time per year	360
Inspection LOS	Inspecting UICs	186 sites require one hour every other year (new activity)	93
Inventory Increase (Near-term)	Performing one-time overdue maintenance of Orphan Facilities	43 sites require 764 hours of overdue maintenance over two years	382
GIS Database	Inputting backlog of stormwater infrastructure into GIS	30 sites require an additional eight hours each to catch up (one time)	240
Total Additional Hours Needed per Year in Near-Term			**1,441**

Section 5. Long-Term Planned Workload

The long-term planned workload section documents the City's expected need for additional staffing over the next 10 years to inspect, operate, maintain, and track stormwater assets. Long-term needs are based on expected increases in stormwater system asset inventory between 2022 and 2033 (11 years of growth). The long-term planned workload assumes a constant level of service based on the current level of service plus any recommended increases discussed in Section 4. In addition, the long-term planned workload assumes that the City will implement an infrastructure asset management system across multiple departments within five years.

Maintenance

Maintenance workload is expected to increase primarily due to inventory increase. UICs workload is also expected to increase due to increase in LOS from 20% of UICs maintained per year to 50% maintained per year.

This paper uses past inventory data to anticipate future growth. Due to updates in Permit requirements, stormwater inventory began increasing more quickly in 2010. The average yearly increase in number of facilities between 2010 through 2021 is expected to continue through 2033. Table 8 summarizes the expected inventory and workload increases by 2033.

Table 8 Long-Term Expected Workload, Public Stormwater Facilities Maintenance

Facility Type	Current Inventory (2022) + Orphan Facilities	Facilities Built After 2010	Expected Increase per Year (Count)	LOS (Avg Hrs/unit/ yr)	Expected Inventory (2033)	Expected Workload (Hrs/yr) (2033)
Underground Facilities	121	25	3	7.2	160	1,154
Vegetated Facilities	118	44	4	19.8	162	3,208
Subtotal	**239**				**322**	**4,362**
UICs	186 *	n/a	1	3.0 *	197 **	296
Total	**425**				**519**	**4,658**

** The inventory of UICs is 186; however, it is not known how many are maintained per year. Therefore, the average hrs/unit/yr is calculated using the assumption that about 20%, or 37 UICs, are maintained per year currently.*

*** In the long-term, it is expected that the City will maintain 50% of the UIC inventory each year, rather than 20%, which is the assumption for the current LOS.*

The ages of stormwater collection and conveyance facilities are not recorded in the City's stormwater GIS database. Therefore, Otak could not anticipate growth in collection and conveyance facilities inventory using past data. Instead, this paper uses an alternative method to estimate expected inventory growth of these assets. The City's Comprehensive Plan estimates that the City will add 6,415 residents between 2015 and 2035 from a base population of 15,932. This represents a 2% average annual population growth rate over 20 years (City of Washougal, 2016). Similarly, the City's Transportation Capital Facilities Plan estimates that between 2010 and 2030, 4,474 housing units will be added within the City from a base of 6,307. This results in an average annual growth rate for housing units of 3.5% (City of Washougal, 2021). Otak has elected to assume that collection and conveyance inventory will grow at an

average rate of 3.5% per year, similar to the housing growth rate. Streets subject to street sweeping are expected to increase at a slower rate of 0.5%, and the increased LOS to be implemented in the near-term is expected to remain steady in the long-term. Table 9 summarizes the expected workload to maintain the increased inventory of stormwater collection and conveyance maintenance and for street sweeping.

Table 9 Long-Term Expected Workload, Stormwater Collection and Conveyance Maintenance

Facility	Current Inventory (2022)	Expected Growth per Year (Linear)	LOS (Avg Hrs/unit/yr)	Expected Inventory (2033)	Expected Workload (Hrs/yr) (2033)
Catch basins and inlets	1,784	3.5%	1.7	2,471	2,100*
Ditches	4.5 miles	3.5%	3.3	6.3 miles	21
Large pipes (> 24-in diameter)	2.2 miles	0	0	3.1 miles	0
Small pipes (< 24-in diameter)	33.8 miles	0	0	46.8 miles	0
Street Sweeping	3,750 (annual miles sweeper driven)	0.5%	0.2	3,960 (annual miles sweeper driven)	792
Total					**2,913**

** Based on approximately half the inventory each year.*

Inspections and Data Administration

Inspection workload is expected to increase due to inventory increase. For public facilities, the growth projections used for facility maintenance workload are also used for inspection. For private facility inventory, an average of 10 private stormwater facilities were added per year between 2010 and 2022, and this growth is expected to continue at the same number per year. The increased inspection LOS to be implemented in the near-term is expected to remain steady in the long-term.

Over the long-term, Otak has assumed that the 0.2 FTE business source control inspection position at Clark County Public Health, which is currently funded by a grant from the state, will need to be staffed instead by City of Washougal personnel. Therefore, the long-term workload is expected to increase by 0.2 FTE (416 hours annually) for source control business inspections by 2033.

In addition, through discussion with City staff, Otak has assumed that the City will implement an infrastructure asset management system across multiple departments within five years. The daily administrative and managerial work to generate and verify three to five stormwater-related work orders per day for the maintenance crew. This is expected to average one hour per workday, or approximately 250 hours per year. As noted above, the average effort needed to maintain the stormwater GIS is 96 hours per year.

The increased inventory and expected inspection workload for public and private stormwater facilities are summarized in Table 10.

Table 10 Long-Term Expected Workload, Stormwater Inspections and Asset Management

Activity	Total Inventory (2022) + Orphan Facilities	Expected Inventory Increase per Year (Count)	Workload (Avg Hrs/unit /yr) *	Expected Inventory (2033)	Expected Workload (Hrs/yr) (2033)
Public stormwater facilities inspection	239	7	3	322	966
Private stormwater facilities inspection	125	10	3	235	705
Subtotal facility inspection	**364**	**17**		**557**	**1,671**
UICs inspection	186	1	0	197	99
Subtotal facility & UIC inspection					**1,770**
Source control business inspections	25 (inspection annually)	0	16.64	25 (inspections annually)	416
Asset management administration	250 (days)	0	1 hr / day	250 (days)	250
GIS Data Entry	6 (per year)	0	16	6 (per year)	96
Total					**2,532**

**The average hours/unit/year maintains the recommended increase to inspection level of service from an average of two hours/facility/year, including preparation, follow-up inspections, communications with owners, and record-keeping, to three hours/facility/year. The recommendation is found in the Near-Term Planned Workload section.*

Section 6. Summary and Recommendations

The improvements to stormwater facility inspections, the inclusion of regular UIC inspections, increased level of service for frequent issue facilities, and GIS updates warrant an increase in staffing in the near-term. A staffing increase will also assist the City in ensuring the Operations Specialist, who possesses significant undocumented institutional knowledge of the City's stormwater system history, condition, and practices, has the opportunity to document needed information and train new and rising Operations staff. The risk to City stormwater operations from loss of this single employee with unique knowledge could include reduced effectiveness in response to stormwater system flooding, reduced ability to maintain public stormwater facilities leading to reduced effectiveness and possible Permit compliance difficulties, and additional costs to provide formal training to new staff.

To manage the increased number of stormwater facilities in 10 years, the City also needs to plan for a long-term staffing increase.

The staff available for inspection and operations and maintenance of the stormwater system include an Operations Specialist, two Maintenance Workers, and 25% of the Utility Supervisor, providing a total available task time of 4,888 hours per year (see Table 2). Because this white paper assumes that one FTE is 2,080 hours/year at 70% utilization, each 1,456 hours of documented workload equals one FTE.

Table 11 summarizes the workload calculations and calculates the shortfalls in staffing.

Table 11 Maintenance and Inspection Near-Term and Long-Term Workload Summary

Activity Type	Category	Near-Term Planned Workload (Hrs/yr)	Long-Term Expected Workload (Hrs/yr) (2033)
Public Stormwater Facilities	Maintenance, Routine	3,118	4,362
UICs	Maintenance, Routine	113	296
Conveyance and Collection Systems	Maintenance, Routine	1,259	2,121
Street Sweeping	Maintenance, Routine	756	792
Proactive maintenance at public underground stormwater facilities with known flooding issues	Maintenance, Preventive	114	114
Public and Private stormwater facilities	Inspection	984	1,671
UICs	Inspection	93	99
Source control business inspections	Inspection	0	416
Asset management administration	Coordination/ Management	0	250
GIS Backlog Entry & Correction and Ongoing Data Entry	Coordination/ Management	240	96
Total = Documented Need for Inspection and Maintenance Activities			
Hours		6,667	10,217
FTE		4.6	7.0
Available for Inspection and Maintenance at Current Staffing Level			
Hours		4,888	4,888
FTE		3.4	3.4
Shortfall			
Hours		1,779	5,329
FTE		1.2	3.6

The summary table documents a near-term shortfall of 1,779 hour/year (1.2 FTE), and a long-term shortfall of 5,329 hours/year (3.6 FTE) as inventory rises over the next 10 years. Otak's recommendation is to hire one Stormwater FTE immediately to assist with both near-term and long-term workload for inspections, GIS, and coordination of asset tracking. In the long-term, Otak recommends the City monitor the storm system inventory and maintenance workload and prepare to hire an additional one or two Stormwater FTE between 2026 and 2033, as needed.

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Otak

Washougal Stormwater Master Plan

Orphan Facilities Management

Long-term Management Recommendations

Submitted to:

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February 2024

Project No. 20272

Table of Contents

Section 1. Introduction

Stormwater management facilities help prevent flooding, protect streams from erosion, and improve water quality. Proper maintenance is required to ensure these types of facilities operate as originally designed and prevent additional maintenance issues from occurring. City of Washougal (City) staff have identified 15 residential neighborhoods where the Homeowners Association (HOA) or property owners have been designated as the parties responsible for maintaining the City-owned public stormwater facilities in the neighborhood. Some of the facilities have suffered from inadequate maintenance. The subdivisions range in size from six to 70 lots with one to four stormwater management facilities built between the years 2006 and 2009. There are 43 facilities total, and they have been labeled by the City as orphan facilities.

These orphan facilities are the only publicly owned and privately maintained stormwater facilities in the City. The types of facilities include filter catch basins/vaults, ponds, swales, flow control manholes, detention pipes, and hydrodynamic separators. Insufficient maintenance has led to overgrown vegetation blocking access to the sites and to inlet/outlet pipes, sediment and debris build-up, and regulatory non-compliance with maintenance standards. The orphan facilities are not currently imposing any immediate risks to water quality or downstream flooding. Although it has not been investigated, the lack of maintenance is likely causing these facilities to go into overflow more frequently. Since the City owns the tracts on which they are located, the City is ultimately responsible to ensure maintenance is being performed on a routine basis and meet the required maintenance standards.

These maintenance deficiencies were discovered as part of annual stormwater facility inspections required by the City's National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Phase II Permit (Permit). The City risks being out of compliance with the Permit without effectively addressing these maintenance deficiencies. In response, community development policies were changed after 2009 to require HOAs to have private ownership of stormwater tracts and to privately maintain all facilities. No orphan facilities have been created since that time. To address the 43 orphan facilities located in the 15 subdivisions, Public Works staff have met with HOAs or neighborhood representatives to discuss maintenance responsibilities, explained the maintenance process, and provided technical guidance to complete the required maintenance. Some of the subdivisions have completed the required maintenance without issue, and others have not responded to verbal requests and written warnings.

The purpose of this white paper is to evaluate alternative approaches the City can implement to effectively manage orphan facilities moving forward. Four alternatives were assessed based on a background review of each residential development including size/types of stormwater facilities, HOA status, legal documentation, and enforcement options. The pros and cons of each alternative were evaluated, and a preferred alternative recommended that includes the City taking on maintenance responsibility for all the orphan facilities. This alternative would provide the quickest solution to bring all facilities up to current standards and ensure consistent long-term maintenance is performed as required by the Permit. The tradeoff is there will be some one-time and long-term staffing needed to notify property owners of the change in maintenance responsibility, complete the overdue maintenance, and perform routine maintenance moving forward.

Section 2. Background

The following section contains a summary of the known issues collected during the Stormwater Master Plan (SMP) process to identify the subdivisions that have orphan facilities and a summary of legal documentation, HOA status, O&M requirements, and regulatory policies that governs enforcement.

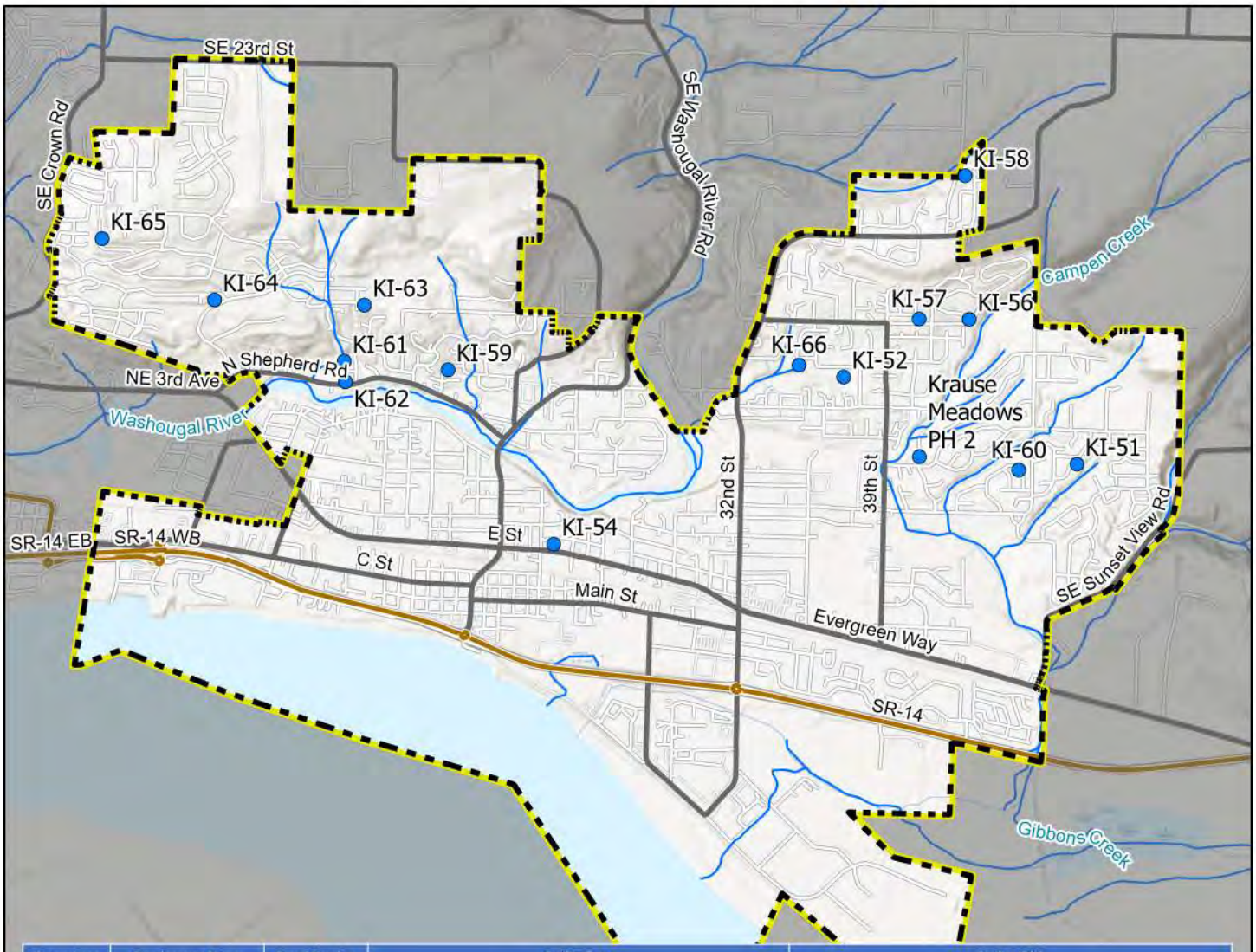
Known Issues

During the discovery phase of the SMP, Otak collected a list of 117 known issues affecting the City's stormwater system. Sixty-five known issues are associated with maintenance concerns and 15 of these are related to orphan facilities. Table 1 below shows a summary of the known issues related to orphan facilities, names of the subdivisions, and types of storm facilities impacted. Overall, there are 43 orphan facilities that have been identified. Figure 1 Stormwater Orphan Facilities Management shows the location of these facilities throughout the City.

Table 1 Known Issues Summary for Orphan Facilities

Known Issue ID	Subdivision Name	Stormwater Facility Types
KI-51	Walnut Valley PH 2	Filter Vault, Flow Control Manhole, and Detention Vault
KI-52	Summit View PH 1 & 2	Filter Vault, Flow Control Manhole, and Detention Pipes
KI-54	Rohan Commons	Filter Catch Basin
KI-56	Summer Slope North	Swale, Detention Pipes, and Flow Control Manhole
KI-57	Bristol Ridge	Swale
KI-58	Mt Norway Village PH 1	Swale, Detention Pipes, Flow Control Manhole, and Hydrodynamic Separator
KI-59	River View Place	Swale, Detention Pipes, Flow Control Manhole, and Hydrodynamic Separator
KI-60	Myers Addition	Filter Catch Basin, Detention Pond, and Flow Control Manhole
KI-61	Crown Pointe Estates	Swale, Detention Pond, and Flow Control Manhole
KI-62	Crown Creek PUD	Swale, Detention Pond, and Flow Control Manhole
KI-63	Granite Highlands PH 5A	Swale, Detention Pond, and Flow Control Manhole
KI-64	Lookout Ridge PH 5	Detention Pond, Flow Control Manhole, and Hydrodynamic Separator
KI-65	Coda Ridge Estates	Swale, Detention Pond, and Flow Control Manhole
KI-66	Daniel Park	Filter Vault, Detention Pond, and Flow Control Manhole
N/A[1]	Krause Meadows PH 2	Filter Catch Basin, Detention Pond, and Flow Control Manhole

[1] *Subdivision was added after list of known issues was developed.*



Known Issue ID	Development Name	Parcel Number	Facility Type	Facility ID(s)
KI-51	Walnut Valley PH 2	132864054	Filter Vault, Flow Control Manhole, and Detention Vault	P802, P643, P356
KI-52	Summit View PH 1 & 2	132576064	Filter Vault, Flow Control Manhole, and Detention Pipes	P637, P312, P313, P314, 803
KI-54	Rohan Commons	71900016	Filter Catch Basin	P836
KI-56	Summer Slope North	130036110	Swale, Detention Pipes, and Flow Control Manhole	P25, 782
KI-57	Bristol Ridge	130056068	Swale	P26
KI-58	Mt. Norway Village PH 1	130046080	Swale, Detention Pipes, Flow Control Manhole, and Hydrodynamic Separator	P268, P269, 3186, 601, 36
KI-59	River View Place	131187060	Swale, Detention Pipes, Flow Control Manhole, and Hydrodynamic Separator	P299, P300, P301, P302, P303, P304, P305, P306, P307, P308, P309, P912, P633
KI-60	Myers Addition	986037253	Filter Catch Basin, Detention Pond, and Flow Control Manhole	P600, P88
KI-61	Crown Pointe Estates	131173106	Swale, Detention Pond, and Flow Control Manhole	P48, P74, P610
KI-62	Crown Creek PUD	986036343	Swale, Detention Pond, and Flow Control Manhole	P640, P87
KI-63	Granite Highlands PH 5A	130561098	Swale, Detention Pond, and Flow Control Manhole	P73, P57
KI-64	Lookout Ridge PH 5	123012148	Detention Pond, Flow Control Manhole, and Hydrodynamic Separator	P59
KI-65	Coda Ridge Estates	122996084	Swale, Detention Pond, and Flow Control Manhole	P606, P70, P71
KI-66	Daniel Park	132349096	Filter Vault, Detention Pond, and Flow Control Manhole	810, 30
N/A[1]	Krause Meadows PH 2	132802000	Filter Catch Basin, Detention Pond, and Flow Control Manhole	P806, P23, P624

[1] Subdivision was added after list of known issues was developed.

FIGURE 1
STORMWATER ORPHAN FACILITIES MANAGEMENT
WASHOUGAL SMP

City Limits
Orphan Facility Management
Highway
Major Road
Streams

0 0.25 0.5 Miles

Otak

Date: 2/7/2024
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only

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Legal Documentation

Otak downloaded the plats and Covenants, Conditions, and Restrictions (CC&Rs) documents from the Clark County Property Information Center website. A summary of findings is provided in the following sections.

Plat Documents

Otak located plats for each of the 15 subdivisions. Each plat includes language stating which parcels or tracts are designated for stormwater facilities, dedicates the stormwater tracts to the City, and delegates maintenance responsibilities to the HOA. An excerpt from Coda Ridge Estates plat is shown below as an example.

> Tract "X" is for a storm water facility and is dedicated to the City of Washougal with this plat. This tract and facility is to be maintained by the Homeowner's Association.
>
> The City of Washougal shall have no responsibility to improve or maintain any open space areas, storm drainage facilities or development monument sign.

Covenants, Conditions, and Restrictions

Otak reviewed CC&R documents for three subdivisions. CC&Rs are the primary governing document setting the rights and responsibilities of the HOA and its members. Each of the CC&R documents reviewed includes language stating that the HOA shall be responsible for maintenance and additional language related to maintenance, repair, and preservation of stormwater facilities. Excerpts related to stormwater from the CC&Rs documents are provided below as examples.

> **Coda Estates**
>
> Article 3, Section 3.3 – Ownership of Common Areas. Should the HOA be terminated for any reason, the successors in interest of the Tracts shall be the individual Lot Owners of Lots within the Plat (emphasis added), or their successors in interest, who are Members of the Association at the time of said termination.
>
> Article 5, Section 5.2 – Maintenance of Common Area. The Association shall be responsible for maintenance, repair, replacement and upkeep of the Common Area, including, but not by way of limitation, the storm water facility on Tract A (emphasis added), the walking path on Tract B, the monument sign, all drainage systems, landscaping, and irrigation systems. The Association shall keep the Common Area and improvements thereon in good condition and repair, provide for all necessary services and cause all acts to be done which may be necessary or proper to assure the maintenance of the Common Area in first-class condition.
>
> **River View Place**
>
> Article VII, Section 1 – Maintenance. The Association shall have full responsibility for maintenance and repair of the Association's property and common area facilities (emphasis added) as herein defined. Common areas and common area facilities shall include those areas designated as "Common Areas" on the Plat, the Storm water [sic] Facility (as designated on the Plat Tract "X"), and Tract "X" on the Plat.
>
> Article VII, Section 4 – Perpetual Obligation. Unless conveyed to and accepted by a local public authority, the Association shall have the continuing obligation to maintain, repair, and preserve the specific common areas and facilities and Associated Property and to

collect such assessments from the Lot Owners as are necessary to cover the cost of such obligations (emphasis added).

Amended Article XV Maintenance. The Association shall have the maintenance responsibilities set forth in the Declaration. The Association shall develop a program, including, but not limited to, the employment of personnel necessary for maintenance, upkeep and repair of the common area and other property to be maintained by the Association pursuant to the Declaration (emphasis added). Costs and expenses incurred by the Association in discharging its maintenance responsibilities shall be paid in the manner described in Article IX, Section 2 of these Bylaws.

Lookout Ridge Phase 5, Woodburn Hill Townhomes Owners Association

Article 7, Section 7.3 – Maintenance of Utilities. The Association shall perform or contract to perform maintenance of any utilities, such as sanitary sewer lines, domestic water service lines and storm drainage lines, located in the Common Areas and Lots (emphasis added). Each Owner shall maintain at such Owner's expense utility lines that serve only that Unit.

Article 7, Section 7.4 – Maintenance Plan and Annual Inspections. The Association shall maintain those portions of the Property to be maintained by the Association in as good or better condition as at the time of the Turnover Meeting (emphasis added). To that end, the Board of Directors shall establish, periodically update, and implement a Maintenance Plan that identifies those components of the Property to be maintained by the Association pursuant to this Declaration requiring periodic maintenance, including a maintenance manual defining how and when such maintenance should be performed and setting forth the estimated cost of much maintenance.

HOA Status

Although maintenance responsibility of all orphan facilities was designated to the neighborhoods' HOAs, not all the HOAs are currently active. Table 2 presents the status of each HOA as listed on the Washington Secretary of State's Corporation website.

Table 2 HOA Status

HOA Status	Known Issue ID	Subdivision Name
Dissolved (1)	KI-62	Crown Creek PUD
Inactive (2)	KI-58	Mt Norway Village PH 1
	KI-64	Lookout Ridge PH 5
Active (4)	KI-59	River View Place
	KI-61	Crown Pointe Estates
	KI-65	Coda Ridge Estates
	KI-66[1]	Daniel Park
	N/A[2]	Krause Meadows PH 2

HOA Status	Known Issue ID	Subdivision Name
No HOA (7)	KI-51	Walnut Valley PH 2
	KI-52	Summit View PH 1 & 2
	KI-54	Rohan Commons
	KI-56	Summer Slope North
	KI-57	Bristol Ridge
	KI-60	Myers Addition
	KI-63	Granite Highlands PH 5A

[1] Although the Secretary of State lists the Daniel Park HOA as active, the City has attempted multiple times to contact the HOA with not success. The City is proceeding under the assumption that the HOA has been dissolved or is effectively dissolved.

[2] Subdivision was added after list of known issues was developed.

Section 3. Maintenance Requirements and Enforcement

The following section contains a summary of the regulatory policies and standards related to stormwater maintenance and the City's past technical assistant and enforcement efforts to address orphan facilities.

Legal Interpretation

To confirm understanding of the regulatory requirements that apply to the orphan facilities, Otak and City staff met and corresponded with the City Attorney. The Permit requirements for public facilities differs from the requirements for private facilities. Because the orphan facilities are owned by the City and designated to be privately maintained, City staff has not known how to apply Permit requirements. As a result of this investigation, the City is now defining the orphan facilities as public stormwater facilities.

Western Washington Phase II Stormwater Permit

The Permit is the primary regulatory driver of stormwater management activities implemented by the City. The Permit establishes the required activities and implementation milestones the City must meet to comply with the federal Clean Water Act and the Washington State Water Pollution Control Act. The Permit authorizes the City to discharge stormwater to surface waters and groundwaters of the State of Washington from the City's MS4. (Ecology, 2019).

Permittees are required to develop and implement a Stormwater Management Program (SWMP) that includes conducting and regulating stormwater maintenance. The required maintenance actions include:

S5.C.7 Operations and Maintenance

Each permittee shall implement and document a program to regulate maintenance activities and to conduct maintenance activities by the Permittee to prevent or reduce stormwater impacts.

The minimum performance measures include:

- Implement maintenance standards that are as protective, or more protective, of facility function than those specified in the Stormwater Management Manual for Western Washington (SWMMWW) or a Phase I program approved by Ecology.

    i. The purpose of the maintenance standard is to determine if maintenance is required. The maintenance standard is not a measure of the facility's required condition at all times between inspections. Exceeding the maintenance standard between inspections and/or maintenance is not a permit violation.

    ii. Unless there are circumstances beyond the Permittee's control, when an inspection identifies an exceedance of the maintenance standard, maintenance shall be performed:

        - Within one year for typical maintenance of facilities, except catch basins.
        - Within six months for catch basins.
        - Within two years for maintenance that requires capital construction of less than $25,000.

        Circumstances beyond the Permittee's control include denial or delay of access by property owners, necessary permit approvals, and unexpected reallocations of maintenance staff to perform emergency work. For each exceedance of the required timeframe, the Permittee shall document the circumstances and how they were beyond their control.

- Maintenance of stormwater facilities <u>regulated by the Permittee</u>. (Private Facilities, emphasis added)

    i. The program shall include provisions to verify adequate long-term O&M of stormwater treatment and flow control BMPs/facilities that are permitted by the City in accordance with S.5.C.6.c and shall be maintained in accordance with S5.C.7.a.

    Provisions shall include:

    a) Implementation of an ordinance that identifies the party responsibility, requires inspection of facilities, and establishes enforcement procedures.

    b) Annual inspection of all stormwater treatment and flow control BMPs/facilities that discharge to the MS4 and permitted by the City.

    ii. Compliance with the inspection requirement shall be determined by the presence and records for an established inspection program.

- Maintenance of stormwater facilities <u>owned and operated by the Permittee</u>. (Public Facilities, emphasis added).

    i. <u>Each Permittee shall implement a program to annually inspect all municipally owned or operated stormwater treatment and flow control BMPs/facilities, and take appropriate maintenance actions in accordance with the adopted maintenance standards</u> (emphasis added).

    ii. Spot check potentially damaged stormwater treatment and flow control BMPs/facilities after major storm events.

    iii. Inspect all catch basins and inlets owned or operated by the City every two years.

Stormwater Management Manual of Western Washington (SWMMWW)

The Stormwater Management Manual for Western Washington (SWMMWW) provides Permit implementation and management guidance on measures necessary to control the quantity and quality of stormwater. Municipalities use this manual to set stormwater requirements for new development and redevelopment projects. Land developers and development engineers use this manual to design stormwater control plans, pollution prevention plans, and stormwater infrastructure. Businesses use this manual to development their stormwater pollution prevention plans.

The SWMMWW includes maintenance standards and maintenance activities appropriate for different types of stormwater facilities. The maintenance standards are intended to be used during inspections to determine if maintenance actions are required. The City may determine a higher level of maintenance is needed to meet residents' performance expectations or to prevent environmental impacts or reduction in facility lifespan. The City is also expected to adjust inspection and maintenance schedules based on observations during inspections to minimize the length of time that a facility is in a condition that requires maintenance (Ecology, 2019).

Maintenance of stormwater facilities encompasses a wide range of activities intended to ensure the stormwater system components operate as designed to protect ground and surface waters. The City has adopted the current version of the SWMMWW as the primary source of maintenance standards in the Engineering Standards for Public Works Construction (City of Washougal, Revised March 2022). The City also references the SWMMWW in the Washougal Municipal Code enforcement language (Chapter 14.36) as "the stormwater manual."

Washougal Municipal Code

Although the legal interpretation reached in this paper is that orphan facilities are classified as public stormwater facilities, Otak also researched the ability of the City to enforce maintenance on HOAs if the facilities had been found to be classified as private facilities. Washougal Municipal Code (WMC) contains a couple of provisions that are used to enforce maintenance on private stormwater facilities as described in this section.

To address maintenance deficiencies of privately maintained stormwater facilities, the City references the actions as direct violations of Washougal Municipal Code (WMC) Chapter 14.36.110 and includes enforcement in accordance with Chapter 1.04.010. Pertinent excerpts of each chapter are provided below.

Chapter 14.36
Illegal Discharges to Stormwater System and Watercourses

14.36.110 Requirement to prevent, control, and reduce stormwater pollutants by the use of BMPs.

(4) Any person responsible for a stormwater facility or BMP shall maintain, at its own expense, all facility functions in accordance with the maintenance manual associated with said facility. If no maintenance manual is known to exist, the stormwater manual shall be utilized. Any discharges from an unmaintained stormwater facility shall be considered illegal discharges and punishable in accordance with this chapter. (Ord. 1958 § 1 (Exh. A), 2022; Ord. 1657 § 1 (Exh. A), 2010)

Chapter 1.04
General Penalty

1.04.010 Designated.

Any person violating any of the provisions or failing to comply with any of the mandatory requirements of the ordinances of Washougal shall be guilty of a misdemeanor. Any person convicted of a misdemeanor under the City ordinances shall be punishable by a fine of not more than $500.00. Each person shall be guilty of a separate offense for each and every day during any portion of which any violation of any provision of the City ordinances is committed, continued or permitted by such person, and he shall be punished accordingly. Where this chapter is inconsistent with any other ordinance codified in the Washougal Municipal Code, this chapter shall govern, with the exception of WMC 9.08.100; in which case the penalty sections of that section shall control contempt of court violations; and with the exception of WMC 10.08.010, in which case the penalty sections of that section shall control therein; and with the exception of WMC 9.16.030, in which case the penalty shall not exceed $250.00 fine and 90 days in jail, or both fine and jail. (Ord. 708 § 1, 1979; Ord. 571 § 1, 1976; Ord. 432 § 1, 1970)

Technical Assistance and Enforcement

The City staff identified the orphan facilities as part of annual stormwater facility inspections required by the Permit. In response, community development policies were changed after 2009 to require HOAs to have private ownership of stormwater tracts and to privately maintain all facilities. No orphan facilities have been created since that time.

To address the 43 orphan facilities located in 15 subdivisions, the Public Works Stormwater Coordinator met with HOAs or neighborhood representatives to discuss maintenance responsibilities, explained the maintenance process, and provided technical guidance to complete the required maintenance. Some of the subdivisions have completed the required maintenance without issue, and others have not responded to verbal requests and written warnings. For one facility, the City had to perform vegetation management in order to access the site and perform an inspection. Another filter treatment facility had to be cleaned because it was so full of sediment the facility was not functioning.

Section 4. Alternatives Analysis

For the City to effectively address the maintenance deficiencies and bring orphan facilities within acceptable maintenance standards, Otak has evaluated four alternative approaches. Each alternative is based on review of background information, legal considerations, maintenance requirements, and enforcement as discussed in previous sections of this white paper. The alternatives include:

1. Converting the orphan facilities to publicly maintained facilities.
2. Enforcing Chapter 14.36 by pursuing enforcement options against HOAs.
3. Enforcing Chapter 14.36 by pursuing enforcement options against property owners.
4. Performing the overdue maintenance and billing the HOA or property owners.

1. Convert orphan facilities to publicly maintained facilities.

Since the City owns the land that the orphan facilities are located on, they already have the right to maintain these facilities. This alternative would allow the City to immediately take over maintenance

responsibility, bring facilities up to current standards, and ensure consistent long-term maintenance is performed moving forward as required by the Permit.

Pros:

- The City already owns the stormwater tracts and has a right to maintain.
- All facilities will be brought up to current maintenance standards.
- Ensures regulatory compliance with the Permit.
- Avoids the possible negative public perception of requiring HOAs or individual property owners to perform expensive maintenance on publicly owned stormwater facilities and subjecting them to the "punishments" laid out in Chapter 14.36. (see alternatives 2 and 3).
- Removes liability of privately hired maintenance staff conducting work on publicly owned facilities.

Cons:

- The City takes on the workload and the costs associated with facility maintenance as well as eventual asset replacement in perpetuity.
- One-time implementation costs and increases to staff workload would be required to bring the facilities up to current standards.
- Long-term maintenance costs and staffing would be required to perform the routine maintenance moving forward.

2. Enforcing Chapter 14.36 by pursuing enforcement options against HOAs.

If the HOA exists and is currently active, Chapter 14.36 of the WMC could be enforced to get the HOA to perform the overdue maintenance. There are four developments with active HOAs based on the Washington Secretary of State Corporations website. According to the City Attorney, if the plats and CC&Rs delegate the maintenance responsibilities to the HOA, then the City has the option to enforce the stormwater facility maintenance requirements in Chapter 14.36.110(4). City staff would need to confirm that the plat and CC&Rs of each subdivision have the appropriate language before commencing enforcement. Generally, the City's practice would be to provide technical assistance to the HOA prior to attempting enforcement through a notice of violation letter. Progressive enforcement that includes fines may need to be proposed to get the HOA to take the notice seriously and address maintenance deficiencies.

Pros:

- Keeps the maintenance responsibility and associated costs with the HOA.
- The City avoids taking on the cost of facility maintenance and eventual asset replacement in perpetuity.
- Regulatory compliance with the Permit.

Cons:

- Increase to Stormwater Coordinator workload would be required to coordinate with the HOA, provide technical support, implement enforcement, and track progress.
- The public may have a negative perception of requiring HOAs to perform expensive maintenance on publicly owned stormwater facilities and subjecting them to the "punishments" laid out in Chapter 14.36.

After considering the merits of this alternative, Otak and City staff consulted the City Attorney for interpretation of the orphan facilities' status. Because the interpretation is the orphan facilities are

public stormwater facilities, this alternative would be more difficult to justify and implement. Therefore, Otak does not recommend it.

3. Enforcing Chapter 14.36 by pursuing enforcement options against property owners.

This alternative can be considered where the HOA has been dissolved and for developments where the HOA was never formed. If the plats and CC&Rs delegate the maintenance responsibilities to the individual property owners "individually and collectively" when an HOA is disbanded or never forms, then the City may have the option to enforce the stormwater facility maintenance requirements in Chapter 14.36.110(4) on the property owners. City staff would need to confirm the plat and CC&Rs of each subdivision have the appropriate language before commencing enforcement. Generally, the City's practice would be to provide technical assistance to the individual property owners prior to attempting enforcement. Progressive enforcement that includes fines may need to be proposed to get the property owners to perform the required maintenance. The subdivisions that do not have HOAs have between six and 70 lots. The staff time needed to coordinate with roughly 350 property owners in 10 of the subdivisions would be considerable.

Pros:

- Keeps the maintenance responsibility and associated costs with the property owners.
- The City avoids taking on the cost of facility maintenance and eventual asset replacement in perpetuity.
- Regulatory compliance with the Permit.

Cons:

- Additional staff time would be required to coordinate with property owners, implement enforcement, and tract progress.
- Homeowners are held "individually and collectively" requiring more coordination efforts and actions are not likely to occur in a timely manner.
- The public may have a negative perception of requiring individual property owners to perform expensive maintenance on publicly owned stormwater facilities and subjecting them to the "punishments" laid out in Chapter 14.36.

After considering the merits of this alternative, Otak and City staff consulted the City Attorney for interpretation of the orphan facilities' status. Because the interpretation is the orphan facilities are public stormwater facilities, this alternative would be more difficult to justify and implement. Therefore, Otak does not recommend it.

4. City performs the overdue maintenance and bills the HOA or property owners.

In certain situations, the City could perform the overdue maintenance and bill the HOA or property owners. This alternative makes the most sense in emergency situations where flooding or a water quality threat has occurred due to the lack of maintenance.

Pros:

- Immediate threats to water quality or flooding potential can be addressed in a timely manner.
- The stormwater facilities will be brought up to current maintenance standards.
- Regulatory compliance with the Permit.

Cons:

- No guarantee that payment will be received from HOAs or property owners.
- Additional staff time would be required to bill and coordinate with property owners.

Section 5. Preferred Alternative

The preferred alternative is to convert all the orphan facilities to publicly maintained facilities. This option would provide the City with the quickest solution to address maintenance deficiencies and ensure consistent long-term maintenance is performed as required by the Permit. However, there will be one-time implementation costs and additional staffing required to transfer maintenance responsibility, perform the overdue maintenance, and perform routine maintenance moving forward. Both staffing requirements and associated costs will be assessed for both one-time and long-term durations in the following sections.

To spread out initial one-time costs and associated staffing, the transfer of maintenance responsibility is expected to be divided into two or three phases over a few years. The first phase will address facilities that would have the least impact to staff workload, followed by facilities that require additional efforts and can be planned, and the final phase would include taking over maintenance responsibility from active HOAs.

Staffing Requirements

If all 43 orphan facilities are converted from private to publicly maintained facilities, it would require a one-time increase to staff workload followed by an increase to routine maintenance efforts for the long-term. The one-time effort will include notifying property owners of the transfer of maintenance responsibility and performing the overdue maintenance to get these facilities functioning as designed and meeting current maintenance standards. After the initial investment, long-term maintenance of each facility will need to be incorporated into the City's existing maintenance program. Eventual asset replacement will also need to be planned for and budgeted accordingly.

Maintenance

The City currently maintains 202 public stormwater facilities. These facilities have been classified into two sub-types based on manner of function and general maintenance: structural facilities and vegetated facilities. Structural facilities (underground) include treatment facilities such as filter facilities and hydrodynamic separators as well as flow control manholes and detention vaults. Vegetated facilities (aboveground) include bioretention and infiltration treatment facilities as well stormwater detention ponds. Otak has calculated the average staff time per facility per year the City currently allocates to maintaining these as part of the Inspection and Maintenance Staffing Long-Term Management White Paper produced for the SMP. For long-term routine maintenance, the City should expect to spend 19.8 hours per facility annually to maintain vegetated facilities and 7.2 hours per facility annually for structural facilities.

To estimate the increase to staff workload for new stormwater facilities, an inventory of orphan facilities was first performed as is shown in Table 3. There are 16 vegetated (aboveground) and 27 structural (underground) orphan facilities. Six of the structural facilities are proprietary filter facilities with Contech Engineered Solutions (Contech) StormFilter® catch basins and vaults; these are operated and maintained differently than the other structural facilities and are considered separately in the analysis.

Table 3 Inventory of Facility Types

Facility Type	Number of Facilities
Vegetated (Aboveground) Facilities	
Swale	8
Detention Pond	8
Aboveground Subtotal	**16**
Structural (Underground) Facilities	
Hydrodynamic Separators	3
Detention Pipes	5
Flow Control Manhole	13
StormFilter® Catch Basins	3
StormFilter® Vaults	3
Underground Subtotal	**27**
Total	**43**

One-time Administration and Maintenance

A one-time administrative and maintenance staffing requirement will be needed to convert maintenance responsibility from private to public before adding it to its long-term routine maintenance schedule. No legal actions are required to convert maintenance responsibility. This is because the City owns the tracts, so they already have the authority to maintain the facilities on them. The transfer of responsibility will be phased over a few years and the City will notify the HOA and/or property owners of the scheduled change prior to transfer of responsibility with a notification letter. The staffing time required for planning, internal coordination, developing the notification letter, and distributing the letters is estimated at four hours per subdivision or 56 hours total.

To perform the overdue maintenance at each facility, the following assumptions have been made:

- Initial maintenance of the StormFilter® catch basins and vaults will be combined with the City's existing StormFilter ® treatment facilities maintenance program occurring every two years. Next maintenance interval is expected in summer/fall of 2024. No additional staffing will be required.
- City staff will perform the overdue maintenance for 16 vegetated facilities including sediment removal, vegetation management, and potential seeding/replanting.
- City staff will vactor out and clean two hydrodynamic separators, three detention pipe systems, and nine flow control manholes.
- The orphan facilities are not currently imposing any immediate risks to water quality or downstream flooding.
- The City will perform the one-time overdue maintenance for the vegetated and structural facilities to bring them into alignment with current City maintenance; this one-time effort is assumed to

require double the current annual effort as documented in the Inspection and Maintenance Staffing Long-Term Management Recommendations paper:
    - Vegetated facilities: 19.8 hours per facility x 2 = 39.6 hours per facility
    - Structural facilities: 7.2 hours per facility x 2 = 14.4 hours per facility
- Since City staff inspect both public and private stormwater facilities annually, no change to inspection workload is expected.

Total one-time staffing requirements for administration and maintenance are summarized in Table 4. A total of 996 hours will be required.

Table 4 Expected One-time Staffing Needs

Activity	Quantity	Hours / Unit	Total Hours
Administer Phasing, Notification Letter Development, and Distribution	15 (subdivisions)	4	60
Maintain Vegetated Facilities	16	39.6	634
Maintain Structural Facilities (not including StormFilter® structures)	21	14.4	302
Total One-time Staffing Needs			**996**

Long-term Maintenance

The City will add the facilities to its routine annual public facility inspection and maintenance programs using a phased approach described above. As the City begins maintaining each facility, it will add to the annual maintenance workload.

The expected increase to workload is 468 hours per year as shown in Table 5. This increase in annual maintenance workload could be met through seasonal hiring or an additional FTE that is recommended in the Inspection and Maintenance Long-term Management White Paper.

Table 5 Expected Long-term Maintenance Workload

Facility Type	Quantity	Hours / Unit / Year	Total Hours / Year
Vegetated Facilities	16	19.8	317
Structural Facilities (not including StormFilter® structures)	21	7.2	151
Total Annual Long-term Maintenance Workload			**468**

Cost Analysis

The preferred alternative will require both one-time and long-term costs associated with maintenance of the StormFilter® treatment facilities. A summary of the estimated initial and long-term routine maintenance costs is provided below.

One-time Initial Maintenance Costs

The City uses a third-party contractor to perform maintenance on the Contech Engineered Solutions (Contech) StormFilter® treatment facilities. The orphan facilities include three filter catch basins and three vaults with a total of 49 StormFilter® filter cartridges. Initial maintenance of the StormFilter® catch basins and vaults will be combined with the City's existing StormFilter ® treatment facilities maintenance program occurring every two years. Next maintenance interval is expected in fall/winter of 2024. This effort is expected to increase the overall third-party efforts by approximately $15,000 as shown in Table 6. These costs are based on an actual invoice from RC Northwest for similar work performed in October 2022 and communication with the vendor.

Table 6 Costs to Maintain StormFilter® Facilities

Known Issue ID	Subdivision Name	StormFilter® Facility Type	Number of Cartridges	Estimated Cost ($)
KI-54	Rohan Commons	Catch Basin	2	$1,500
KI-60	Myers Addition	Catch Basin	2	$1,500
KI-51	Walnut Valley PH 2	Vault	10	$2,500
KI-52	Summit View PH 1 & 2	Vault	12	$3,000
KI-66	Daniel Park	Vault	19	$3,500
N/A[1]	Krause Meadows PH 2	Catch Basin	4	$3,000
		Totals	**49**	**$15,000**

[1] *Subdivision was added after list of known issues was developed.*

Long-term Routine Maintenance Costs

Routine maintenance of the Contech StormFilter® facilities will be integrated into the City's existing maintenance program moving forward as discussed above. For long-term maintenance costs, routine maintenance could start in 2026 after initial maintenance in 2024. This effort is expected to increase the overall third-party efforts by approximately $15,000 as summarized in Table 6 with a 4% per year inflation rate increase estimated after 2024.

Section 6. Summary of Required Efforts

To convert orphan facilities to publicly maintained facilities, an immediate and long-term increase to staff workload will be required as well as third-party maintenance costs for filter treatment systems as summarized below.

One-time Efforts

- Total implementation workload = 996 hours
- Third-party initial maintenance costs for StormFilter® facilities = $15,000

Long-term Efforts

- Routine maintenance = 468 hours/year
- Third-party maintenance costs for StormFilter® facilities = $15,000 plus 4% inflation rate per year, every two years beginning in 2026

Section 7. References

City of Washougal. (2022, March). *City of Washougal Engineering Standards for Public Works Construction.*

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