STORMWATER MANAGEMENT ACTION PLAN TRIBUTARY 0057

Permit # WAR 04-5519

March 31, 2023

City of Kenmore, WA



CONTENTS

Introduction	3
Regulatory	3
Receiving Water Assessment	3
Table 1 – Watershed Inventory	3
Receiving Water Prioritization	4
Table 2 – Receiving Water Prioritization	4
Basin Characteristics	5
Figure 1 – 1936 & 2022 Aerial Photography	5
Table 3 – Impervious Area Distribution	6
Table 4 – Constructed Drainage System Summary	6
Retrofit Analysis	7
Table 5 – Potential Retrofit Location Characteristics	7
Figure 2 – Erosion/Sedimentation Survey	8
Figure 3 – Potential Retrofit Project Locations	9
Fish Passable Culvert Retrofits	10
Table 6 – Potential Stream Bearing Culvert Retrofits	10
Figure 4 – Potential Stream Bearing Culvert Retrofit Locations	11
Land Management & Development Strategies	12
Implementation of Stormwater Management Actions	14
IDDE Field Screening	14
Prioritization of Source Control Inspections	14
O&M Inspections or Enhanced Maintenance	14
Public Education and Outreach Behavior Change Programs	14
Long-Range Plan Impacts	15
Surface Water Element	15
Capital Facilities Element	15
Surface Water Master Plan	15
Proposed Implementation Schedule and Budget	16
Table 7 - Short-Term Actions	16
Table 8 - Long-Term Actions	16
Future Assessment and Feedback Process	17
Table 9 - Assessment and Feedback Schedule	17
Conclusion	18

INTRODUCTION

Regulatory

This document is a Stormwater Management Action Plan (SMAP) as defined in the National Pollutant Discharge Elimination System (NPDES) Western Washington Phase II Municipal Stormwater Permit (Permit) Section S5.C.1, which was issued July 1, 2019 by the Washington State Department of Ecology (Ecology). The Permit became effective August 1, 2019 and expires on July 31, 2024. The Permit complies with the provisions of the State of Washington Water Pollution Control Law Chapter 90.48 Revised Code of Washington (RCW) and the Federal Water Pollution Control Act (The Clean Water Act or CWA) Title 33 United States Code, Section 1251 *et seq*. The Permit is available on Ecology's website at: https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Stormwater-general-permits/Municipal-Stormwater-general-permits/Western-Washington-Phase-II-Municipal-Stormwater.

The SMAP also follows guidance provided by Ecology Publication 19-10-010 *Stormwater Management Action Planning Guidance* published August 2019. This document is available on Ecology's website at: https://fortress.wa.gov/ecy/publications/summarypages/1910010.html.

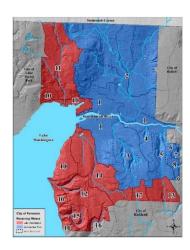
Receiving Water Assessment

This assessment was completed prior to the development of the SMAP and was required per section S5.C.1.d.i of the Permit. It required a receiving water assessment of local receiving waters and contributing area conditions to identify which receiving waters were most likely to benefit from stormwater management planning.

On March 31, 2022, the City submitted the following watershed inventory (Table 1) to Ecology to comply with section S5.C.1.d.i of the Permit.

Table 1 – Watershed Inventory

Map Reference	Receiving Water	Basin Name	Overall Size (sq. mi)	Size within City of Kenmore (sq. mi)	% within Kenmore's jurisdiction	Stormwater Management Influence	Include in prioritization process (S5.C.1.d.i.a)
1	Sammamish River	Shoreline	0.83	0.83	100%	Moderate	No
2	Sammamish River	Swamp Creek	26.88	1.91	7%	Moderate	Yes
3	Sammamish River	Tributary 0057	0.52	0.52	100%	Moderate	Yes
4	Sammamish River	Unnamed Tributary 01	0.1	0.1	100%	Low	No
5	Sammamish River	Unnamed Tributary 02	0.17	0.17	100%	Moderate	No
6	Sammamish River	Unnamed Tributary 03	0.06	0.06	100%	Low	No
7	Sammamish River	Unnamed Tributary 04	0.045	0.021	46%	Low	No
8	Sammamish River	Valhalla Creek	0.11	0.05	41%	Low	No
9	Sammamish River	Waynita Creek	0.79	0.01	1%	Low	No
10	Lake Washington	Shoreline	0.47	0.47	100%	Moderate	No
11	Lake Washington	Tributary 0056	1.09	0.63	58%	Moderate	Yes
12	Lake Washington	Arrowhead Creek	0.4	0.4	100%	Low	No
13	Lake Washington	Juanita Creek	6.82	0.18	3%	Low	No
14	Lake Washington	Tributary 0222	0.56	0.54	96%	Moderate	Yes
15	Lake Washington	Tributary 0226	0.13	0.13	100%	Low	No
16	Lake Washington	Tributary 0227	0.25	0.07	28%	Low	No
17	Lake Washington	Denny Creek	1.33	0.07	5%	Low	No



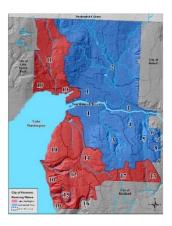
Receiving Water Prioritization

A receiving water prioritization was completed prior to the development of the SMAP and was required per section S5.C.1.d.ii of the Permit. It prioritized which receiving waters would receive the most benefit for implementation of a SMAP.

On June 30, 2022, the City documented the prioritized and ranked list of receiving waters as summarized in Table 2 below to comply with section S5.C.1.d.ii of the Permit.

Table 2 – Receiving Water Prioritization

Map Reference	Receiving Water	Basin Name	Overall Size (sq. mi)	Size within City of Kenmore (sq. mi)	% within Kenmore's jurisdiction	Stormwater Management Influence	Include in prioritization process (S5.C.1.d.i.a)	Ranked Receiving Waters (SS.C.1.d.ii)
1	Sammamish River	Shoreline	0.83	0.83	100%	Moderate	No	
2	Sammamish River	Swamp Creek	26.88	1.91	7%	Moderate	Yes	4
3	Sammamish River	Tributary 0057	0.52	0.52	100%	Moderate	Yes	1
4	Sammamish River	Unnamed Tributary 01	0.1	0.1	100%	Low	No	
5	Sammamish River	Unnamed Tributary 02	0.17	0.17	100%	Moderate	No	
6	Sammamish River	Unnamed Tributary 03	0.06	0.06	100%	Low	No	
7	Sammamish River	Unnamed Tributary 04	0.045	0.021	46%	Low	No	
8	Sammamish River	Valhalla Creek	0.11	0.05	41%	Low	No	
9	Sammamish River	Waynita Creek	0.79	0.01	1%	Low	No	
10	Lake Washington	Shoreline	0.47	0.47	100%	Moderate	No	
11	Lake Washington	Tributary 0056	1.09	0.63	58%	Moderate	Yes	3
12	Lake Washington	Arrowhead Creek	0.4	0.4	100%	Low	No	
13	Lake Washington	Juanita Creek	6.82	0.18	3%	Low	No	
14	Lake Washington	Tributary 0222	0.56	0.54	96%	Moderate	Yes	2
15	Lake Washington	Tributary 0226	0.13	0.13	100%	Low	No	
16	Lake Washington	Tributary 0227	0.25	0.07	28%	Low	No	
17	Lake Washington	Denny Creek	1.33	0.07	5%	Low	No	



The following SMAP was prepared for the Tributary 0057 basin, which contains a small stream discharging to Sammamish River. The SMAP is comprised of this introduction followed by 8 sections, including:

- Basin Characteristics
- Retrofit Analysis (Permit section S5.C.1.d.iii.a)
- Land Management & Development Strategies (Permit section S5.C.1.d.iii.b)
- Implementation of Stormwater Management Actions (Permit section S5.C.1.d.iii.c)
- Long-Range Plan Impacts (Permit section S5.C.1.d.iii.d)
- Proposed Implementation Schedule and Budget (Permit section S5.C.1.d.iii.e)
- Future Assessment and Feedback Process (Permit section S5.C.1.d.iii.f)
- Conclusion

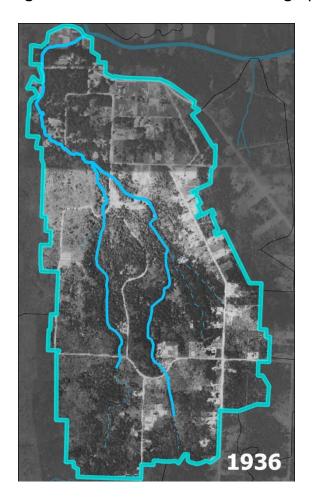
BASIN CHARACTERISTICS

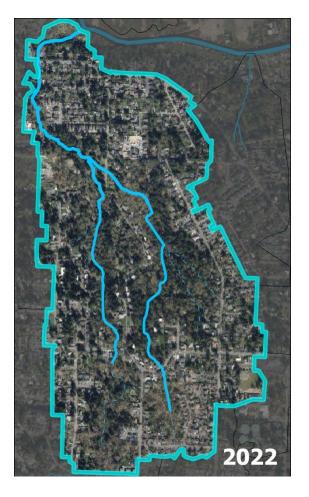
Tributary 0057 is a small stream located within the City of Kenmore and discharges on the south side of Sammamish River. The contributing drainage basin is approximately 0.51 square miles or 325 acres (approximately one mile north/south and half a mile east/west). The stream begins at an elevation of approximately 460 feet at the south end of the basin and descends 440 feet to an elevation of approximately 20 feet where it meets Sammamish River.

The stream is classified as Type F (other water bodies used by or containing habitat suitable for salmonid fish)¹ and provides habitat suitable for Sockeye, Chinook, Coho, Steelhead, Cutthroat trout (Sea-run & Resident), and Bull Trout².

Aerial photography (shown below) reveals that much of the basin had been logged with many of the main arterial streets established by 1936. Large lots with single family homes and a few small farms dotted the area along existing roadways. By 2022, most of the basin was platted for single family residential homes at densities between 4 to 6 dwellings per acre. New construction of single-family homes continues as existing larger parcels are subdivided into smaller lots.

Figure 1 – 1936 & 2022 Aerial Photography





¹ Kenmore Critical Area KMC 18.55.400

² WDFW Fish Passage and Diversion Screening Inventory, August 2021

The following table summarizes impervious area distribution within the basin (updated 2018). The table separates pollution generating (impervious areas that generate polluted runoff, primarily by motorized vehicles) from other types of impervious area. The remaining area of the basin is presumed to be pervious and is calculated by subtracting the total impervious area from the total basin area.

Table 3 – Impervious Area Distribution

Surface Area	Area (Acre)	% of Total Basin
Total Basin	325.3	-
Impervious Area		
Pollution Generating (Roads, Driveways)	39.9	12.3%
Other (Roofs, Decks, Sidewalks, Etc)	46.8	14.4%
Pervious Area	238.6	73.3%

The following table summarizes the constructed drainage system within the basin (updated 2022). Common infrastructure found in drainage systems include catch basins, pipes, and ditches. Additionally, drainage facilities may be constructed that provide flow control and or water quality treatment and include infrastructure such as tanks, ponds, vaults, low impact development (LID) best management practices (BMPs), and proprietary treatment systems.

Table 4 – Constructed Drainage System Summary

Drainage System Component	Number	Length (Feet)
Catch Basins		
City Maintained	323	-
Privately Maintained	115	-
Total	438	-
Enclosed Conveyance (Pipes, Culverts)		
City Maintained	-	30,604
Privately Maintained	-	16,221
Total	-	46,825
Open Conveyance (Ditches)		
City Maintained	-	7,542
Privately Maintained	-	955
Total	-	8,497
Flow Control & Treatment Facilities		
City Maintained	21	-
Privately Maintained	7	-
Total	28	-

RETROFIT ANALYSIS

This section complies with S5.C.1.d.iii.a of the Permit which requires a description of the stormwater facility retrofits needed for the area, including the BMP types and preferred locations. A stormwater retrofit project may include updating existing treatment and/or flow control facilities or constructing new treatment and/or flow control facilities that address impacts from existing development.

There are 47 identified constructed drainage circuits discharging into the Tributary 0057 basin. A drainage circuit includes the discharge point to the stream and all constructed drainage tied to it. To determine preferred locations for retrofit potential four parameters were considered, including the size of the drainage circuit, contributing impervious area, location in basin, and the presence of existing treatment and/or flow control facilities.

Nine drainage circuits were combined into six potential retrofit locations. These locations maximize the impact of adding treatment of pollution generating impervious surface and flow control in areas that have limited to no treatment with existing facilities. Tributary 0057 has known erosion and sedimentation issues³, as shown in Figure 2, therefore areas higher in the basin are prioritized to limit their impact to longer stretches of stream channel. Table 5 summarizes retrofit location characteristics and Figure 3 shows retrofit locations. More precise location of retrofit facilities will be determined during the preliminary design phase of these potential projects to maximize the benefit of flow control and treatment of stormwater.

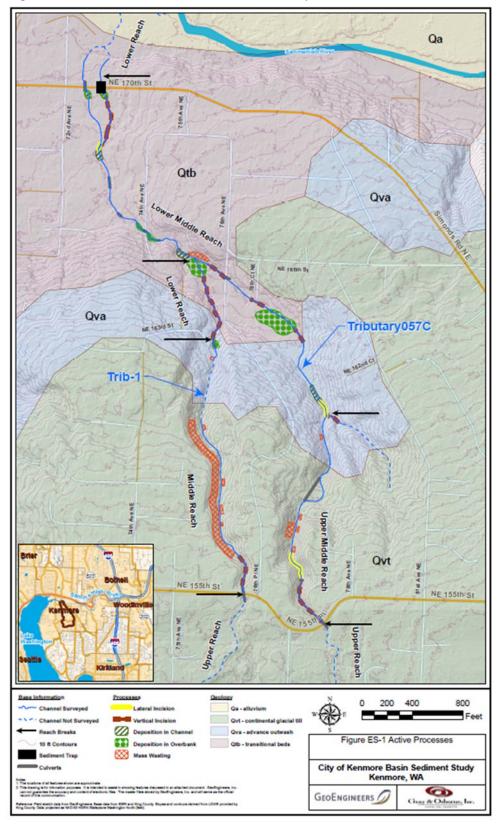
Table 5 – Potential Retrofit Location Characteristics

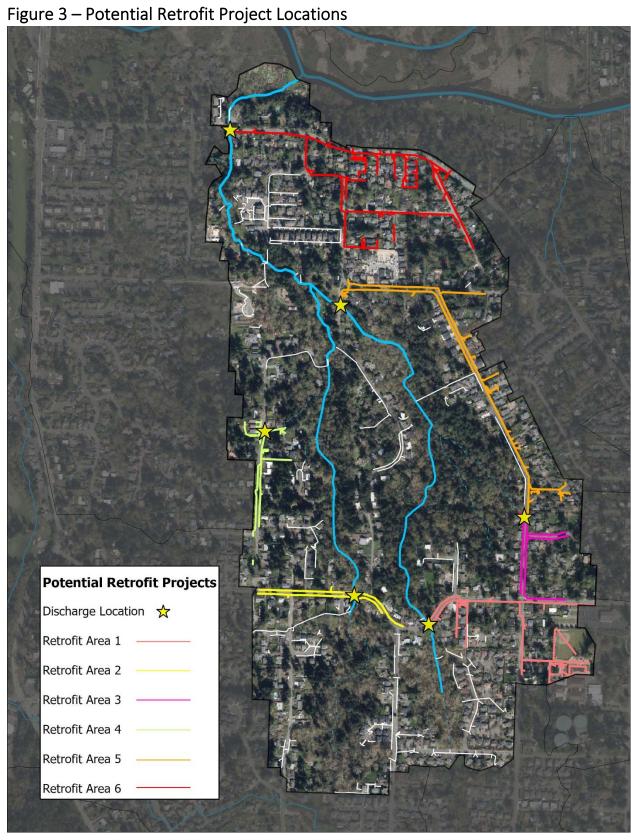
Location	Drainage Circuits	CBs (#)	Conveyance (Feet)	Roadway (Feet)	Existing Treatment	Existing Flow Control
1	00570036 00570037	44	1,705	2,104	Roadway – None Private – Yes	Roadway – None Private – Yes
2	00570015 00570016 00570017	22	2,594	1,302	Roadway – None Private – None	Roadway – None Private – None
3	00570032	14	3,253	1,159	Roadway – None Private – None	Roadway – None Private – None
4	00570012	28	3,374	920	Roadway – None Private – Yes	Roadway – None Private – Yes
5	00570030	50	8,489	3,636	Roadway – Limited Private - Yes	Roadway – Limited Private - Yes
6	00570001	71	9,005	4,601	Roadway – None Private - Yes	Roadway – None Private - Yes

³ Tributary 057 Sediment Study, Gray & Osborn, Inc., June 2010

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Figure 2 – Erosion/Sedimentation Survey





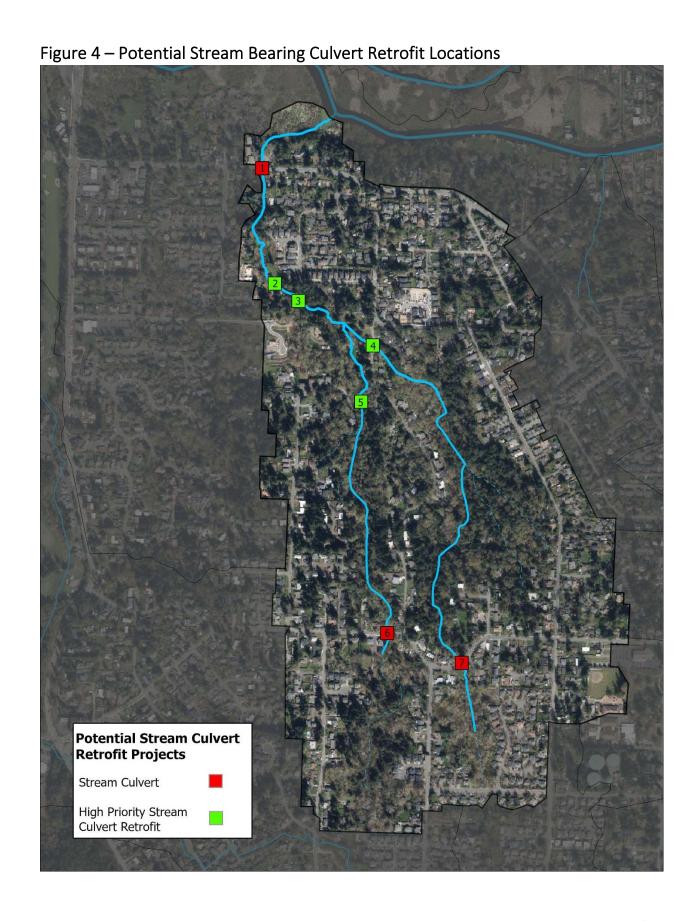
Fish Passable Culvert Retrofits

In addition to retrofitting treatment and flow control facilities, the City recognizes that retrofitting existing stream culverts identified as fish passage barriers is also extremely important for basin planning and resource allocation. Stream culverts convey waters of the state and may not be part of the City's MS4, however, they are still evaluated for retrofit potential in this SMAP.

Tributary 0057 has seven known stream bearing culverts, which are summarized in Table 3 and shown on the map in Figure 4. Stream bearing culverts were prioritized not only in the Tributary 0057 basin, but citywide. Culverts were prioritized using a weighted scoring system that included parameters such as, but limited to, culvert status as fish passage barrier, number of upstream and/or downstream fish passage barriers, accessible channel created upstream, WDFW priority index score, fish usage, and constructability. Culvert rankings are subject to change as new information becomes available.

Table 6 – Potential Stream Bearing Culvert Retrofits

Location	Culvert ID	Description	Prioritized Retrofit
1	SCUL1005	Box culvert installed 2014	No
2	SCUL1006	54-inch diameter metal culvert	Yes, currently ranked top ten in citywide stream culverts to retrofit and second in the Tributary 0057 basin
3	SCUL1007	12-inch and 24-inch dual culverts	Yes, currently ranked top ten in citywide stream culverts to retrofit and fourth in the Tributary 0057 basin
4	SCUL1008	24-inch concrete culvert	Yes, currently ranked top ten in citywide stream culverts to retrofit and third in the Tributary 0057 basin
5	SCUL0009	12-inch concrete and 18-inch metal dual culverts	Yes, currently ranked top ten in citywide stream culverts to retrofit and first in the Tributary 0057 basin
6	SCUL1011	18-inch concrete culvert	No
7	SCUL0012	24-inch concrete culvert	No



LAND MANAGEMENT & DEVELOPMENT STRATEGIES

This section complies with S5.C.1.d.iii.b of the Permit which requires identification of land management/development strategies and/or actions identified for water quality management. This may include identification of lands to protect or conserve from impervious surface conversions or native vegetation removal, and the strategic means for providing the needed protection. It may also include other zoning or land use policy changes deemed necessary to prevent the water body from maintaining its current designated uses.

Land protection and conservation

- Land acquisition for restoration and mitigation will likely be required for facility retrofit and culvert replacement projects. Exact locations will be determined at preliminary design.
- The City has adopted goals to preserve and increase tree canopy. Land within the Tributary 0057 may be identified as potential sites to achieve this goal.

Zoning, land use, or other policies

- The City adopted its first Climate Action Plan in May 2022 which included strategies to protect and enhance natural systems and water resources not only to reduce greenhouse gas emissions but also increase resilience of the City's natural areas to climate impacts. These strategies, also applicable to the Tributary 0057 basin, include the following actions:
 - Utilize educational campaigns to encourage low-impact, drought resistant landscape development and design
 - o Design and install flood prevention projects
 - o Develop an urban landscape strategy or framework
 - o Replace old or degrading culverts
 - Protect, preserve, and restore local waterways
- The City is currently working on a 2024 update to the Comprehensive Plan, which will include development and updates to the following Elements:
 - Climate Action Element (New)
 - Provide climate action goals, objectives and policies including those related to Tributary 0057 actions identified in this plan such as replacement of culverts, restoration of natural habitat and installation of stormwater projects.
 - Capital Facilities Element (Pending Update)
 - Currently includes study focused on updating erosion and sedimentation issues in Tributary 0057 to guide design of future retrofit and restoration projects in the basin.
 - Add stormwater retrofit program
 - Add culvert replacement program (with four Tributary 0057 locations identified in this plan)
 - Surface Water Element & Surface Water Master Plan (Pending Update)
 - Update with actions identified in this plan
 - Land Use Element (Recently Updated)
 - R-4 zoned areas (the majority of the Tributary 0057 basin) are classified as low density residential. This use allows clustering as appropriate in relation to environmental constraints, further protecting Tributary 0057 buffers.

- Added policy to protect environmentally sensitive areas, including wetlands, groundwater, streams, Lake Washington, the Sammamish River and Puget Sound.
- Added policy to support tree preservation whenever possible

IMPLEMENTATION OF STORMWATER MANAGEMENT ACTIONS

This section complies with S5.C.1.d.iii.c of the Permit which requires targeted, enhanced, or customized implementation of stormwater management actions related to permit sections withing S5, including IDDE field screening, prioritization of source control inspections, operations and maintenance or enhanced maintenance, or public education and outreach behavior change programs.

IDDE Field Screening

Field screening is conducted annually on the entire MS4 and on approximately 48% of privately owned drainage systems in the Tributary 0057 basin. Field screening is conducted during catch basin inspections, public facility inspections and private facility inspections. The City plans to continue current field screening levels in the Tributary 0057 basin which exceeds Permit requirements to conduct field screening on 12% of the citywide MS4 annually.

Prioritization of Source Control Inspections

One property partially located in the Tributary 0057 basin is on the City's source control inspection inventory. The property is a public school and maintains a privately operated drainage system. The property is prioritized for source control inspection beginning in 2023.

O&M Inspections or Enhanced Maintenance

Inspections and maintenance are conducted based on the thresholds and standards set forth in the King County Surface Water Design Manual which is deemed equivalent to Ecology's Stormwater Management Manual for Western Washington.

The City annually inspects 7 treatment and flow control BMP/facilities regulated by the City in the Tributary 0057 basin. Two of these privately operated facilities were developed prior to requirements set forth in the initial 2007 Permit. Maintenance needs identified by the City are communicated to the responsible party and enforced annually. Enhanced maintenance needs have not been identified for these facilities.

The City annually inspects and maintains 22 treatment and flow control BMP/facilities owned or operated by the City in the Tributary 0057 basin. Fifteen of these City operated facilities were developed prior to requirements set forth in the initial 2007 Permit. Enhanced maintenance needs have not been identified for these facilities.

The City annually inspects all catch basins owned or operated by the City in the Tributary 0057 basin exceeding Permit requirements to inspect them every two years. Enhanced maintenance is achieved by cleaning applicable catch basins each year instead of every two years.

Public Education and Outreach Behavior Change Programs

The City has not identified specific education and outreach programs targeted for the Tributary 0057 basin community. Education and outreach efforts conducted citywide, particularly for residential property owners, is also applicable for this basin. These include general stormwater management topics, BMP guidance (such as car washing and pet waste), IDDE and facility maintenance (for facility owners).

LONG-RANGE PLAN IMPACTS

This section complies with S5.C.1.d.iii.d of the Permit which requires, if applicable, identification of changes needed to local long-range plans to address SMAP priorities.

The next required update for the City's Comprehensive Plan is in 2024. Each year the City will typically update one or two elements to meet this requirement. The Surface Water Element (last updated 2014) and Capital Facilities Element (last updated 2020) will need to be updated to reflect SMAP priorities.

The Surface Water Master Plan (last updated 2015) will need to be updated to reflect SMAP priorities.

Surface Water Element

Retrofitting goals, objectives and policies are lacking in this element. The next update should include language to support retrofit efforts, including those identified in the SMAP.

Fish passage culvert replacement goals, objectives and policies are lacking in this element. The next update should include language to support fish passage culvert replacement efforts identified in the SMAP.

Capital Facilities Element

The Capital Facilities Element provides a 20-year fiscally unconstrained list of projects and should contain any potential surface water capital improvement projects that the City wants to accomplish. This list will need to be updated to reflect facility retrofit projects and fish passage culvert replacement projects, including those identified in the SMAP.

Surface Water Master Plan

The retrofit analysis provided in 2015 needs to be updated with current data (such as development, completed projects, new infrastructure, emerging issues and shifting priorities. This plan should be updated concurrently with the Comprehensive Plan to align goals and projects.

Fish passage culvert replacement project locations and priorities need to be updated in this plan.

The SMAP process and format should be considered for expanding the 'Basin Characteristic Summary Sheets' in Appendix B to provide consistency in basin planning citywide.

PROPOSED IMPLEMENTATION SCHEDULE AND BUDGET

This section complies with S5.C.1.d.iii.e of the Permit which requires a proposed implementation schedule and budget for short-term actions (within six years) and long-term actions (within seven to twenty years).

Table 7 - Short-Term Actions

Section	Action	Schedule	Budget	Considerations
Land Management & Development Strategies	Comprehensive Plan & Master Plan Updates	2023-2024	\$150,000 - \$175,000	In Progress
Land Management & Development Strategies	Conduct Tributary 0057 Erosion & Sedimentation Study Update	2023-2024	\$25,000 - \$40,000	Planned
	IDDE	2023-2029	Additional 1.0 FTE added 2023	In Progress
Stormwater	Source Control Inspections	2023-2029	Additional 1.0 FTE added 2023	In Progress
Management Actions	O&M Inspections or Enhanced Maintenance	2023-2029	Additional 1.0 FTE added 2023	In Progress
	Public Education and Outreach Behavior Change Programs	2023-2029	Additional 1.0 FTE added 2023	In Progress

Table 8 - Long-Term Actions

Section	Action	Schedule	Budget	Considerations
Retrofit Analysis	Potential Retrofit Projects	2030-2043	\$0.6M - \$1.0M Per Project	Update CIP Update Facilities Element Budget
Retrofit Analysis	Potential Culvert Replacements	2030-2043	\$1.9M - \$2.5M Per Culvert	Update CIP Update Facilities Element Budget
Land Management & Development Strategies	Identification & Acquisition of Lands for Restoration and Conservation	2030-2043	TBD	Update CIP Update Facilities Element Budget Reliant on Conservation Grants

FUTURE ASSESSMENT AND FEEDBACK PROCESS

This section complies with S5.C.1.d.iii.f of the Permit which requires a process and schedule to provide future assessment and feedback to improve the planning process and implementation of procedures or projects. The process to adaptively manage the SMAP will document progress towards meeting goals and reports progress to funders, the public, and Ecology.

Successful implementation of the SMAP will require ongoing evaluation of the actions developed in this plan to ensure that the City continues making informed decisions with the most up to date information and is implementing prioritized actions that have the most beneficial impact. Table 9 summarizes assessment considerations and schedule.

Table 9 - Assessment and Feedback Schedule

Action	Assessment and Feedback	Action Schedule	Assessment Schedule
Comprehensive Plan & Master Plan Updates	 Confirm updates support goals and priorities of SMAP Adapt plan as necessary Council and Public Engagement 	5-10 Years	5-10 Years
Conduct Tributary 0057 Erosion & Sedimentation Study Update	Confirm conclusions support action priorities and adapt plan as necessary	2023-2024	2023-2024
IDDE	 Tracked and reported annually as part of Permit Confirm updates support goals and priorities of SMAP 	Annual	Annual
Source Control Inspections	 Tracked and reported annually as part of Permit Confirm updates support goals and priorities of SMAP 	Annual	Annual
O&M Inspections or Enhanced Maintenance	 Tracked and reported annually as part of Permit Confirm updates support goals and priorities of SMAP 	Annual	Annual
Public Education and Outreach Behavior Change Programs	 Tracked and reported annually as part of Permit Confirm updates support goals and priorities of SMAP 	Annual	Annual
Potential Retrofit Projects	 Update and assess information, as needed, to confirm that project supports action priorities Update Council and Public 	Every 2 Years	Every 2 Years
Potential Culvert Replacements	 Update and assess information, as needed, to confirm that project supports action priorities Update Council and Public 	Every 2 Years	Every 2 Years
Identification & Acquisition of lands for restoration and conservation	 Update and assess information, as needed, to confirm that project supports action priorities Update Council and Public 	Every 2 Years	Every 2 Years

CONCLUSION

The City has identified actions in this SMAP for Tributary 0057 to address impacts from existing and planned development on priority receiving waters. All descriptions and details of the actions in this SMAP are planning level and may change as the development of each action progresses. Therefore, implementation of these proposed actions will be tracked, evaluated, and updated through the assessment and feedback process described in the SMAP to support continued progress toward protection of the Tributary 0057 basin.