Draft

City of Poulsbo Stormwater Comprehensive Plan

Prepared for:
City of Poulsbo
200 NE Moe Street
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ACRONYMS

BMP	Best Management Practice
CIP	Capital Improvement Program
City	City of Poulsbo
Ecology	Washington Department of Ecology
FC	fecal coliform
FTE	Full Time Equivalent (staff)
GFC	General Facilities Charge
GIS	Geographic Information System
IDDE	Illicit Discharge Detection and Elimination
ISU	impervious surface unit
LID	Low Impact Development
LOS	level of service
NKSD	North Kitsap School District
NPDES	National Pollutant Discharge Elimination System
O&M	Operations and Maintenance
OSS	on-site sewage system
Phase II Permit	Phase II Western Washington Municipal Stormwater Permit
PMC	Poulsbo Municipal Code
PTIP	(City of) Poulsbo TMDL Implementation Plan
RCW	Revised Code of Washington
SFDC	South Fork Dogfish Creek
SR	State Route
SWCP	Stormwater Comprehensive Plan
SWMP	Stormwater Management Program
TMDL	Total Maximum Daily Load
UGA	Urban Growth Area
Utility	Poulsbo Storm Water Utility

EXECUTIVE SUMMARY

This Stormwater Comprehensive Plan (SWCP) presents a plan to guide the City of Poulsbo (City) Stormwater Utility (Utility) for the next 6 years (2016 to 2021). The last SWCP was prepared in 2008, and much has changed since that time; stormwater management requirements have increased significantly, the Liberty Bay Total Maximum Daily Load (TMDL) Plan has been completed, and the City's stormwater program has grown in size and complexity.

The City owns and operates an extensive system of drainage pipes, treatment facilities, and other assets that convey and treat stormwater runoff. This infrastructure prevents damage to private property and public infrastructure, and helps to protect water quality and wildlife habitat. The City is faced with the challenge of managing stormwater cost-effectively while also preventing adverse impacts. In addition, recent state and federal stormwater regulations make it technically and financially challenging to address these issues while balancing ratepayer costs.

The purpose and goal of this SWCP is to describe how the City will address these needs and requirements, including program management, operation and maintenance (O&M), capital facilities, and financial elements.

Program and System Description

The City established a stormwater Utility in 1981. The Utility manages, protects, and regulates the built (stormwater) and natural surface water systems in the City. The Utility funds and maintains stormwater facilities and helps assure compliance with applicable regulations.

Level of Service

Stormwater level of service (LOS) criteria are typically used as benchmarks to assess the performance of existing facilities and management decisions related to the administration, operation, maintenance, and capitalization of stormwater assets. Primary LOS goals for the stormwater Utility are to:

1. Manage the storm water system to provide for public safety, minimize property damage, preserve and enhance critical areas, and promote sustainability.
2. Preserve, protect, and (where feasible) restore surface water resources and habitat to provide beneficial uses to humans, fish, and wildlife.
3. Comply with applicable local, state, and federal regulations.
4. Provide adequate funding through an equitable stormwater utility rate structure and outside funding sources.

Based on these broad goals, the following parameters represent the City stormwater LOS standard:

1. Comply with all conditions of Washington Department of Ecology's (Ecology's) NPDES Phase II Western Washington Municipal Stormwater Permit (Phase II Permit).

2. Protect Liberty Bay water quality by implementing applicable sections of the Liberty Bay TMDL Plan in a proactive and timely manner.
3. Resolve historic flooding issues and minimize new flooding impacts to homes, businesses, and other facilities.
4. Protect and restore important aquatic and riparian habitat such as streams, wetlands, and shorelines from the negative effects of stormwater runoff.

Management and Administration, Operation and Maintenance

The Utility is part of both the Engineering and Public Works Department and is managed under the direction of the Director of Engineering and City Engineer. The Utility's services are divided into two functional areas: Management and Administration, and O&M. The management and administration team (2.6 full time equivalent [FTE] staff) oversees the Utility's project planning, regulations, outreach and education, water quality monitoring, reporting, public and private facilities inspection, Capital Improvement Plan (CIP), and financial aspects of the Utility. The Utility's O&M team consists of 3.6 FTE positions who operate and maintain the public storm water system.

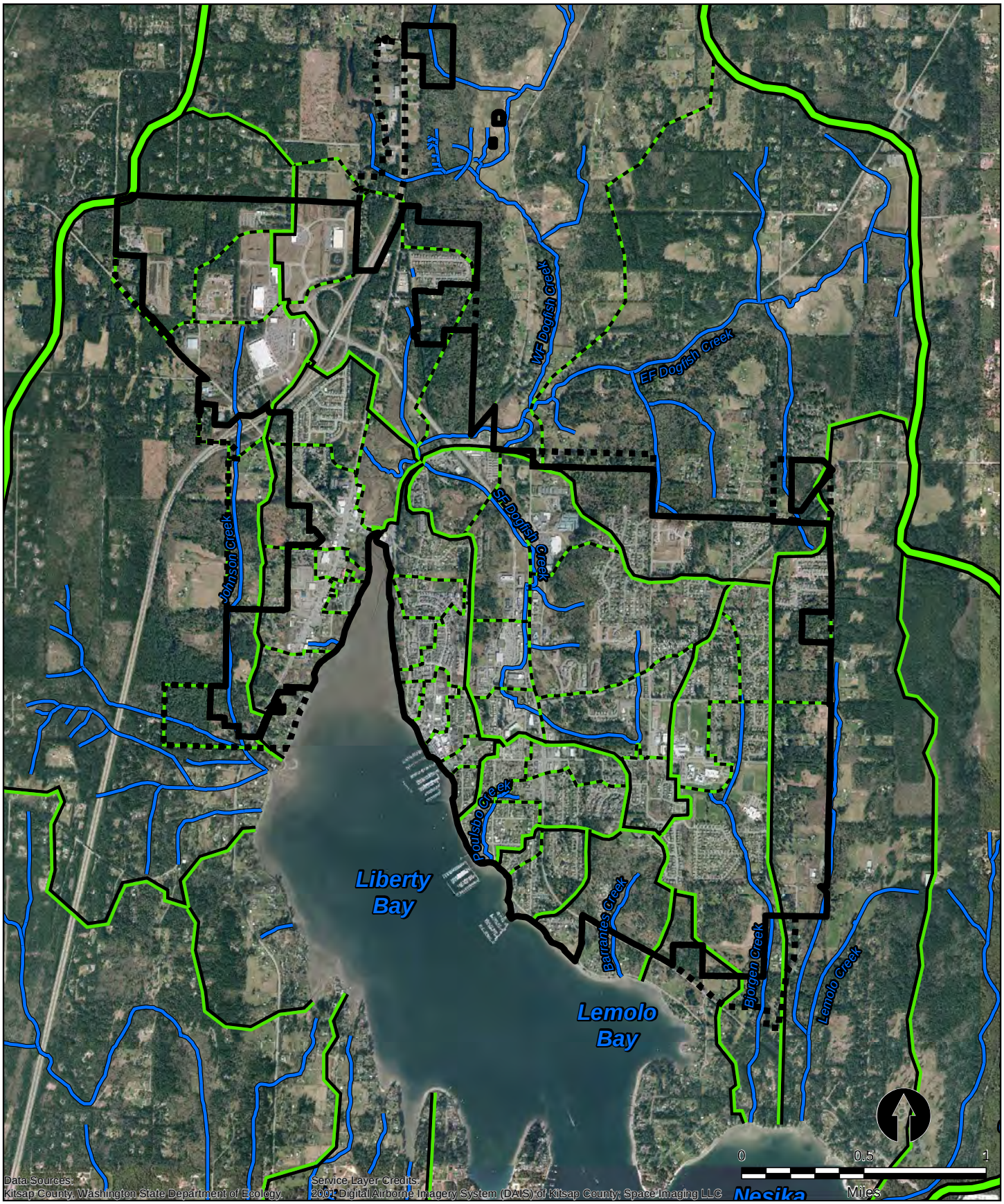
System Description

The City's stormwater system serves an area of approximately 4.6 square miles and a population of approximately 9,915 (2015 Census data). A basin and stormwater infrastructure assessment was performed as part of the Poulsbo TMDL Implementation Plan (PTIP) Watershed Assessment Report project (Sealaska 2016). Basins and sub-basins are shown in Figure ES-1.

The City is currently about 29 percent impervious surfaces, with 51 percent impervious estimated at full build out. About 57 percent of the existing impervious surfaces are treated in accordance with 1992 or 1997 stormwater standards. About four percent of existing impervious surfaces are treated to 2005 stormwater standards.

Water Quality

Liberty Bay water quality data is extensive; over the last 10 years approximately 800 marine water and 1,000 freshwater fecal coliform (FC) samples have been collected. Liberty Bay marine water quality shows a significant long-term improving trend, with all 27 marine water monitoring stations meeting FC water quality standards in 2013, 2014, and 2015. Marine stations with highest FC concentrations are typically located near the head of Liberty Bay and are most influenced by Dogfish Creek. Stream water quality is also improving in all monitored stream basins except Bjorgen Creek, which is showing a slight declining trend. In general, stream water quality, although improving, periodically fails water quality standards.



Prepared by Sealaska Environmental, P:\Production\Fig\PMX-TMDL\New Maps\Watershed Assessment\Fig2b_LBBasins&SubBasinsInPoulsbo.mxd, December 14, 2015.

Data Sources:
Kitsap County, Washington State Department of Ecology

Service Layer Credits:
2007 Digital Airborne Imagery System (DAIS) of Kitsap County; Space Imaging LLC

- Liberty Bay Watershed
- Basin Boundary
- Sub-Basin Boundary
- Streams
- City of Poulsbo
- PUTA

Figure ES-1.
Streams, Basins and Sub-Basins
Stormwater Comprehensive Plan
City of Poulsbo

Stormwater sampling results from 2015 indicate that highest FC loading during wet weather conditions occurs from Dogfish Creek, South Fork Dogfish Creek (SFDC), and Johnson Creek. Figure ES-2 summarizes results of 2015 sampling and analysis. Highest FC concentrations are typically found in stormwater outfall discharges located in middle segment of SFDC, the middle segment of Poulsbo Creek, the Torval Canyon area, and the central and south Viking Avenue basins. Poulsbo Creek has shown significant water quality improvement since Ecology's TMDL study in 2008-09. Overall, while stormwater from Poulsbo outfalls has elevated FC concentrations, values are typically well below the Puget Sound median concentration.

Approximately $6 million in water quality corrective actions have been implemented in the Liberty Bay watershed over the past six years including stormwater retrofit by the City of over 25 acres of impervious area, 47 on-site sewage system (OSS) repairs, and 41 agricultural best management practices (BMPs). The location and time-frame for these corrective actions coincides with observed water quality improvements at many locations including the head of Liberty Bay, Poulsbo Creek, and City stormwater outfalls at Anderson Parkway, Front Street, and Nelson Park.

Habitat Conditions

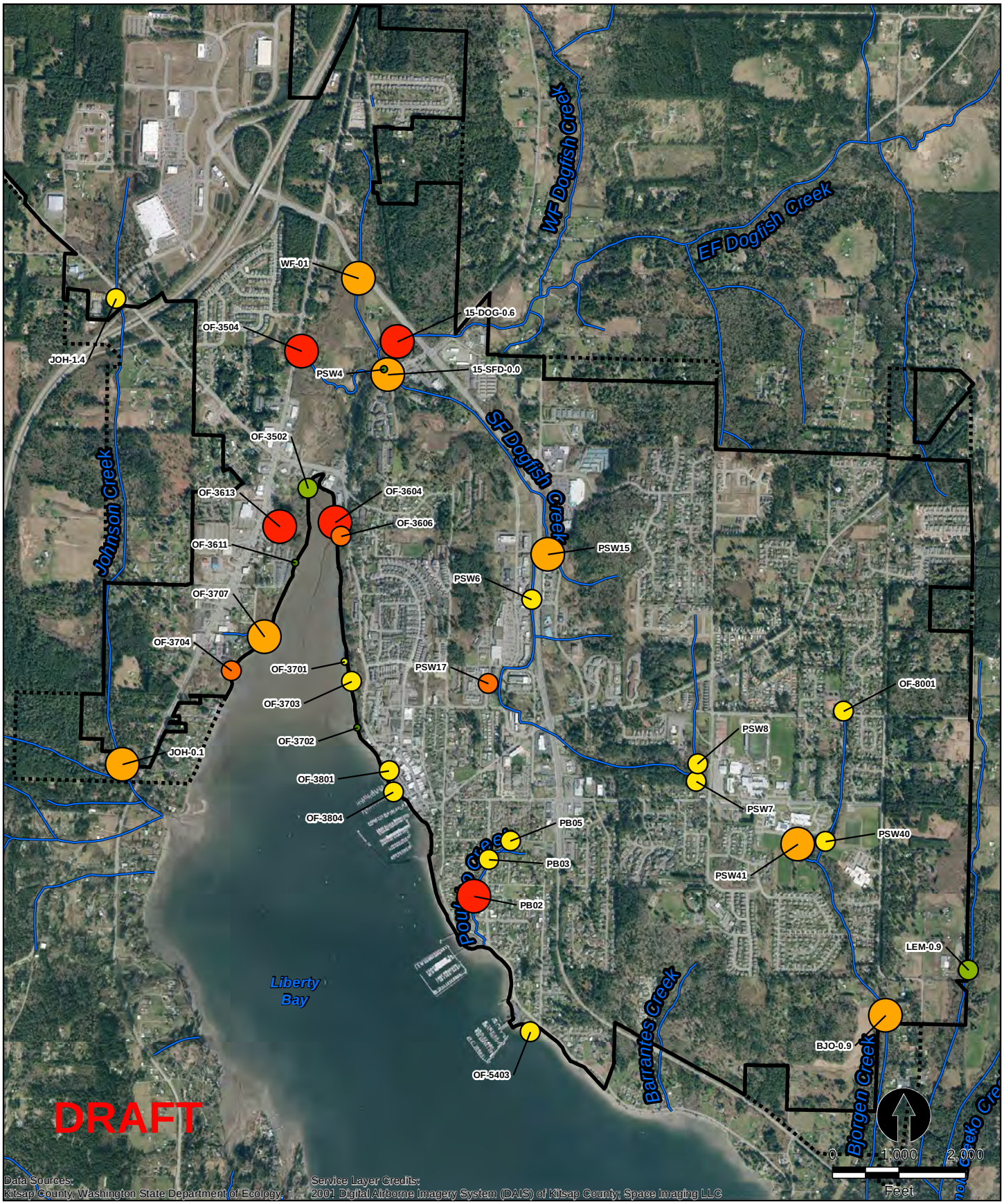
Habitat impacts associated with stormwater are most prevalent in the SFDC and Bjorgen Creek basins where higher density urban development exists with little or no stormwater detention or treatment. Habitat impacts typically include both hydrologic alterations such as streambed scour and aggradation, as well as water quality impacts from sedimentation and low dissolved oxygen. Habitat impacts also result from fish passage barriers on Bjorgen Creek, Lemolo Creek, and SFDC, as well as shoreline armoring and erosion at Poulsbo Creek and several stormwater outfalls in the American Legion Park vicinity.

NPDES Permit Requirements and Compliance

The National Pollutant Discharge Elimination System (NPDES) program allows municipalities to discharge stormwater from municipal systems into "waters of the state" subject to specific terms and requirements. These requirements are detailed in the Phase II Permit issued by the Ecology and include public education elements, illicit detection and enforcement, standards for new and re-development, monitoring and implementation of the Liberty Bay Total Maximum Daily Load (TMDL) Plan.

The City's NPDES compliance program is summarized in the *City of Poulsbo Stormwater Management Program - 2016 Update*, which is updated annually. The City is in compliance with all elements of the NPDES permit, with two elements remaining to be completed in 2016; adoption of Ecology's *2012 Stormwater Management Manual for Western Washington* (2012 Manual), and adoption of updates to Poulsbo Municipal Code (PMC) that address use of Low Impact Development (LID) principles and BMPs.

The NPDES permit has a significant impact on the workload and operational budget of the both the Engineering Division and the maintenance staff within the Public Works Department. Currently, more than 50 percent of the Utility's operational budget is spent on NPDES permit related compliance tasks.



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Streams
City of Poulsbo
PUTA

FC Load
Low
Medium
High

FC Water Quality
Good
Moderate
Poor

Figure ES-2
2015 Water Quality Study Summary
Stormwater Comprehensive Plan
City of Poulsbo

Operation and Maintenance

The City operates and maintains an extensive system of storm drainage infrastructure that includes catch basins, manholes (junction and flow control), stormwater pipes, detention ponds, detention vaults, water quality facilities, ditches and other infrastructure. Operation and maintenance requirements and costs were reviewed as part of the *Stormwater Operations and Rate Evaluation* prepared by the City in 2014. This evaluation identified all City stormwater facilities, maintenance requirements and costs, as well as funding options.

Rates were adjusted in 2014 to reflect O&M requirements and needs. Future O&M needs will be influenced by growth in the City, as well as development of regional facilities and construction of LID facilities such as bioretention that tend to require more O&M resources. O&M costs are reviewed on a periodic basis to ensure that LOS criteria are being met, and that existing rates are sufficient to support needed O&M levels.

Regional Facilities

Regional stormwater facilities serve larger drainage areas and multiple properties and are commonly used at strategic locations to provide the greatest improvement to stormwater in the most economical manner. Benefits of regional facilities include lower cost, better performance and support for economic re-development.

Regional facilities are typically best suited for older developed portions of the City where little stormwater treatment facilities exist. These areas will not be required to meet new stormwater requirements until they re-develop, which could take several decades or more. In the interim, the City must continue to meet NPDES permit requirements, address Liberty Bay TMDL Plan requirements, and provide cost-effective infrastructure that helps to support and encourage re-development. These factors all contribute to a City policy that would support accelerating retrofits of older developed portions of the City via regional facilities that meet current standards, rather than waiting for private re-development. Potential regional facility sites are summarized in Table ES-1.

Table ES-1. Potential Regional Facilities Descriptions and Costs

Project	Description	Total Est. Cost
Viking Avenue Stormwater Park	Water quality treatment for 80-acre basin in south central Viking Avenue corridor	$1,970,000
Poulsbo Village Regional Detention	Detention and potential water quality treatment for 112-acre basin including 7th Avenue and Poulsbo Village	$1,840,000
South Fork Dogfish Creek Restoration	Water quality treatment and detention for 32-acre basin including Public Works site and Library	$1,211,000 [1/]
NKSD/Upper Bjorgen Creek Basin Retrofit	Water quality treatment and detention for 76-acre basin that includes NKSD campus and the Ridgewood/Kevos Pond area	$920,000

Note:
[1/] Stormwater elements only, does not include stream restoration or culvert removal.

Potential drawbacks of regional facilities are property costs and financing. Locating and obtaining property for large facilities is also a challenge due to land availability and property costs. In most cases, the City would also likely provide capital construction funds for a regional facility, including the costs of land acquisition. To address these potential drawbacks and encourage regional facilities, the following policies are recommended:

1. New development or redevelopment projects that are located within a basin that drains to an existing or proposed regional stormwater facility, may be allowed (or required) to contribute toward the cost of constructing that facility in lieu of building onsite improvements.
2. If the regional facility project has been constructed, then payment of the fee will be required and onsite improvements will not be required.
3. If the regional facility project has not been constructed, but the regional facility project is on the City's approved CIP, then payment of the fee in lieu of onsite improvements will be at the discretion of the City Engineer.
4. The amount of the contribution will be proportionate to the amount of impervious area being added to the property relative to the capacity of the regional facility.

Financial feasibility of regional facilities will be dependent on a number of factors including availability of grant funding, whether bond financing will be used, and expectations for timing and type of redevelopment. Financial and engineering feasibility would be addresses as part of engineering design for each regional facility.

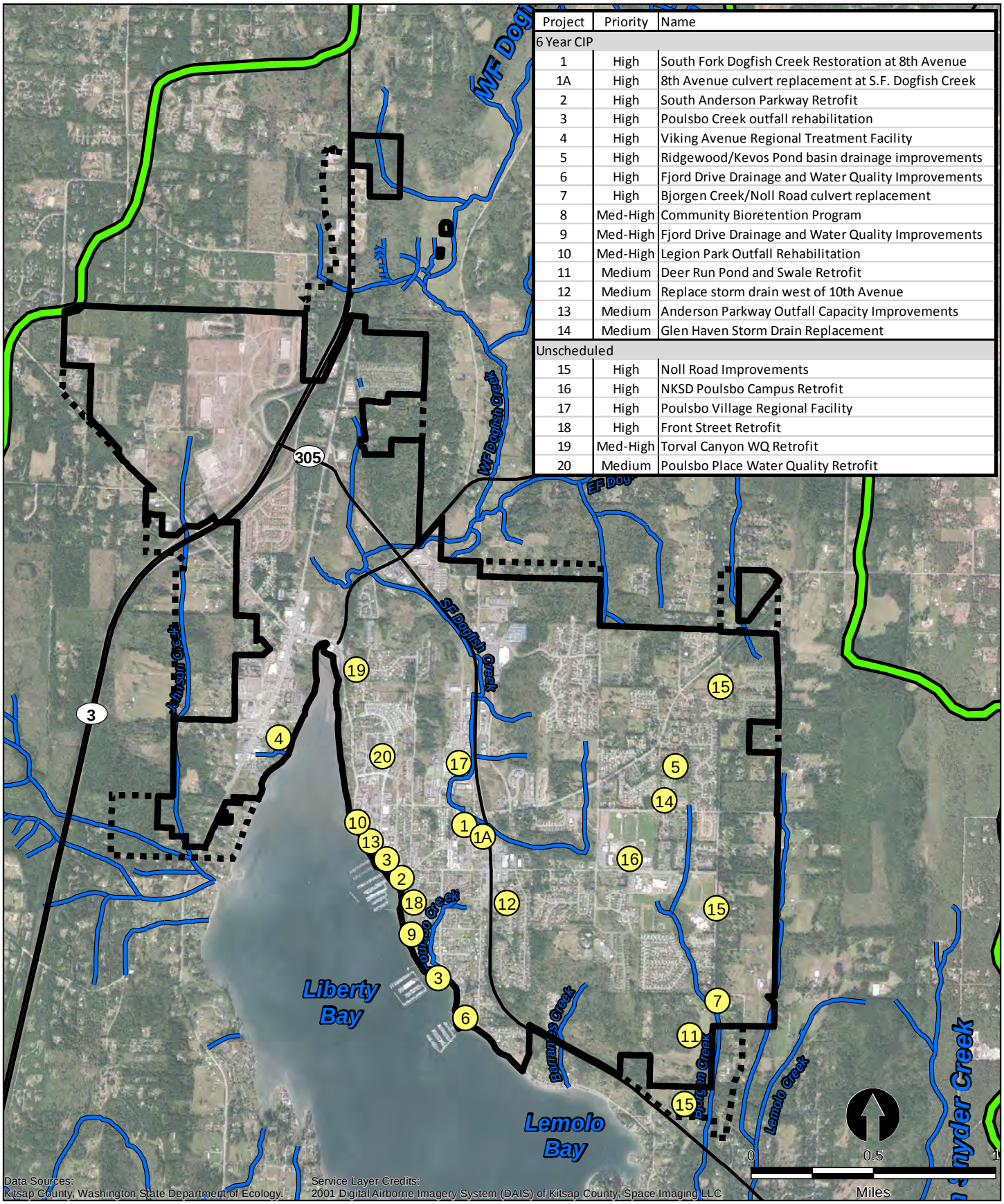
Capital Improvement Plan

The CIP identifies the specific facilities, relative priorities and costs of capital projects that address and implement LOS criteria. Projects were identified via the City's existing stormwater CIP, and supplemented with projects identified via the PTIP Watershed Assessment, which determined corrective action priorities through an integrated evaluation of water quality, habitat, and infrastructure information. Specific projects were developed to address each of the high priority sub-basins identified via the watershed assessment. The combined list of existing CIP projects and proposed PTIP priority projects were then screened, compared and rated relative to water quality, flood control, habitat and community development criteria. Projects were then programmed into a plan and schedule that considered the project cost, potential funding source, and project timing. The resultant CIP is shown in Table ES-2, with project locations shown in Figure ES-3.

Table ES-2. City of Poulsbo Stormwater Utility CIP Summary

CIP Project No.	Priority Level	Project Score	PROJECT	Project Type [1]	YEAR 2016	2017	2018	2019	2020	2021	Total 6 Yr CIP	Not Scheduled
CAPITAL PROJECTS, 6 YEAR PLAN, 2016- 2022												
C-1	High	76	South Fork Dogfish Creek Restoration at 8th Avenue	WQ, H, FC	$25,000	$200,000	$500,000	$500,000	$400,000		$1,625,000	
C-1A	High	69	8th Avenue culvert replacement at S.F. Dogfish Creek	H, FC	$25,000	$25,000		$400,000			$450,000	
C-2	High	69	South Anderson Parkway Retrofit	WQ	$380,000						$380,000	
C-3	High	69	Poulsbo Creek outfall rehabilitation	M/R, H		$25,000	$175,000				$200,000	
C-4	High	63	Viking Avenue Regional Treatment Facility	WQ, ED	$10,000	$700,000	$60,000	$600,000	$600,000		$1,970,000	
C-5	High	62	Ridgewood/Kevos Pond basin drainage improvements	FC	$30,000	$230,000					$260,000	
C-6	High	62	Fjord Drive WQ and Habitat Improvements	WQ, H, M&R	$35,000	$255,000					$290,000	
C-7	High	58	Bjorgen Creek/Noll Road culvert replacement	H, FC	$30,000		$320,000				$350,000	
C-8	Med-High	46	Community Bioretention Program	WQ	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$150,000	
C-9	Med-High	43	Fjord Drive Drainage and Water Quality Improvements	WQ, M/R	$10,000	$210,000					$220,000	
C-10	Med-High	43	Legion Park Outfall Rehabilitation	M/R, H					$120,000		$120,000	
C-11	Medium	37	Deer Run Pond and Swale Retrofit	WQ, M/R					$16,000	$184,000	$200,000	
C-12	Medium	37	Replace storm drain west of 10th Avenue	FC					$40,000		$40,000	
C-13	Medium	34	Anderson Parkway Outfall Capacity Improvements	FC					$15,000	$132,000	$147,000	
C-14	Medium	34	Glen Haven Storm Drain Replacement	FC					$10,000	$100,000	$110,000	
C-15	High	NA	Noll Road Improvements	WQ, H, FC		$930,000	$996,000	$999,000		$1,115,000	$4,040,000	
			Subtotal 6 Year CIP, 2016 - 2021		$570,000	$2,600,000	$2,076,000	$2,524,000	$1,226,000	$1,556,000	$10,552,000	
CAPITAL PROJECTS - NOT SCHEDULED												
C-16	High	75	NKSD Poulsbo Campus Retrofit	WQ, H								$920,000
C-17	High	61	Poulsbo Village Regional Facility	WQ, ED								$1,840,000
C-18	High	56	Front Street Retrofit	WQ, ED								$640,000
C-19	Med-High	44	Torval Canyon WQ Retrofit	WQ, FC								$470,000
C-20	Medium	39	Poulsbo Place Water Quality Retrofit	WQ								$810,000
			Subtotal Unscheduled CIP									$4,680,000
										TOTAL CIP	$15,232,000	
EXISTING FUNDING SOURCES - 6 YEAR CIP												
			WDOE Stormwater Grants - Awarded		$350,000	$125,000					$475,000	
			WDOE Stormwater Grants - Future Applications			$300,000	$300,000	$510,000	$510,000		$1,620,000	
			NTA/PSP/RCO Grants - Future Applications			$162,500	$300,000	$200,000	$200,000		$862,500	
			WSDOT Grants - Pending Award			$1,020,700	$1,133,540	$864,135		$964,475	$3,982,850	
			Subtotal Grants and Other Funding		$350,000	$1,608,200	$1,733,540	$1,574,135	$710,000	$964,475	$6,940,350	
			Stormwater Utility		$294,493	$297,438	$300,412	$303,416	$306,450	$309,515	$3,611,650	
			TOTAL EXISTING 6-YEAR FUNDING, 2016 -2021		$644,493	$1,905,638	$2,033,952	$1,877,551	$1,016,450	$1,273,990	$10,552,000	
			TOTAL EXISTING REVENUES - CAPITAL EXPENSES		$74,493	-$694,362	-$42,048	-$646,449	-$209,550	-$282,010	-$1,799,926	
CAPITAL CONTRIBUTION FROM NEW REVENUE SOURCES												
			Future General Facility Charge		$147,875	$149,354	$150,847	$152,356	$153,879	$155,418	$909,729	
			Future Traffic Impact Fees		$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$900,000	
			TOTAL 6-YEAR CITY NEW REVENUE CONTRIBUTION, 2016 - 2021		$297,875	$299,354	$300,847	$302,356	$303,879	$305,418	$1,809,729	
CAPITAL FUND BALANCE					**$372,368**	**-$395,009**	**$258,799**	**-$344,093**	**$94,330**	**$23,408**	**$9,803**	

Notes: WQ – Water Quality, H – Habitat, FC – Flood Control, ED – Economic Development, M/R – Maintenance and Repair



Project	Priority	Name
6 Year CIP		
1	High	South Fork Dogfish Creek Restoration at 8th Avenue
1A	High	8th Avenue culvert replacement at S.F. Dogfish Creek
2	High	South Anderson Parkway Retrofit
3	High	Poulsbo Creek outfall rehabilitation
4	High	Viking Avenue Regional Treatment Facility
5	High	Ridgewood/Kevos Pond basin drainage improvements
6	High	Fjord Drive Drainage and Water Quality Improvements
7	High	Bjorgen Creek/Noll Road culvert replacement
8	Med-High	Community Bioretention Program
9	Med-High	Fjord Drive Drainage and Water Quality Improvements
10	Med-High	Legion Park Outfall Rehabilitation
11	Medium	Deer Run Pond and Swale Retrofit
12	Medium	Replace storm drain west of 10th Avenue
13	Medium	Anderson Parkway Outfall Capacity Improvements
14	Medium	Glen Haven Storm Drain Replacement
Unscheduled		
15	High	Noll Road Improvements
16	High	NKSD Poulsbo Campus Retrofit
17	High	Poulsbo Village Regional Facility
18	High	Front Street Retrofit
19	Med-High	Torval Canyon WQ Retrofit
20	Medium	Poulsbo Place Water Quality Retrofit

Prepared by Sealaska Environmental, E:\PMX-TMDL\Stormwater Management Plan\MXD\Fig_6-1_CIP_Locations.mxd, February 16, 2016.

Data Sources:
Kitsap County, Washington State Department of Ecology.

Service Layer Credits:
2001 Digital Airborne Imagery System (DAIS) of Kitsap County; Space Imaging LLC

(1) CIP Locations
Liberty Bay Watershed
City of Poulsbo
PUTA
Highway

Figure ES-3
Capital Project Locations
Stormwater Comprehensive Plan
City of Poulsbo

Financial Plan

This financial plan describes the costs, revenues and funding sources associated with implementing the SWCP. The primary source of funds for the Utility come from rate payers, who pay an annual fee based on the extent that their property is developed. Development is measured by impervious surface unit (ISU), which is equivalent to 3,000 square feet. The City's monthly stormwater rate was established in 2014 and is currently set at $16.43 per ISU. Table ES-3 summarizes existing and future expenses and revenues.

Table ES-3. Existing and Future Revenues and Expenses

ELEMENT	2016	2017	2018	2019	2020	2021	Totals
OPERATIONAL EXPENDITURES [1/]							
Salaries, wages, and benefits	$571,577	$577,293	$583,066	$588,897	$594,786	$600,733	$3,516,351
Services and supplies	$239,656	$242,052	$244,473	$246,918	$249,387	$251,881	$1,474,366
Interfund payment for services	$254,606	$257,152	$259,723	$262,321	$264,944	$267,593	$1,566,339
Total Expenditures	$1,065,839	$1,076,497	$1,087,262	$1,098,135	$1,109,116	$1,120,207	$6,557,057
CAPITAL EXPENDITURES							
Grants	$350,000	$1,608,200	$1,733,540	$1,574,135	$710,000	$964,475	$6,940,350
Capital Reserves	$220,000	$991,800	$342,460	$949,865	$516,000	$591,525	$3,611,650
Total Capital Outlay	$570,000	$2,600,000	$2,076,000	$2,524,000	$1,226,000	$1,556,000	$10,552,000
TOTAL REVENUE NEED	$1,285,839	$2,068,297	$1,429,722	$2,048,000	$1,625,116	$1,711,732	$10,168,707
EXISTING REVENUES							
Rates [1/]	$1,360,332	$1,373,935	$1,387,674	$1,401,551	$1,415,567	$1,429,722	$8,368,781
Subtotal Existing Revenue - Expenses	$74,493	-$694,362	-$42,048	-$646,449	-$209,550	-$282,010	-$1,799,926
PROPOSED NEW REVENUE SOURCES							
General Facility Charge [2/]	$147,875	$149,354	$150,847	$152,356	$153,879	$155,418	$909,729
Portion Traffic Impact Fees	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$900,000
TOTAL REVENUE - EXPENSES	**$372,368**	**-$395,009**	**$258,799**	**-$344,093**	**$94,330**	**$23,408**	**$9,803**

Notes:

[1/] Assumes one percent increase per year.

[2/] Assumes General Facilities Charge (GFC) charge of $1183 per ISU, with 125 new ISUs in 2015 increasing one percent per year.

As shown in Table ES-3, existing revenues are not sufficient to fund the proposed capital program. This is a result of the City's PTIP project which was undertaken after the 2014 rate evaluation and increase. The PTIP plan identifies a number of capital improvement projects that are needed to further help the City reach TMDL targets, and the potential cost of these projects exceeds the capital contribution estimated as part of the 2014 rate evaluation. To address this funding gap, two new revenue sources are proposed; a general facility charge, and use of a portion of traffic impact fees.

Proposed General Facility Charge

A general facility charge (GFC) is proposed for new connections to the City stormwater system. A GFC is a one-time charge applied to new development as a condition of service and represents a prorated share of investment in the system infrastructure related to providing system capacity to a new customer. In essence, the GFC enables new customers to purchase a portion of the system's capacity.

The pro rata share of the original cost of existing facilities is determined by dividing the cost of existing Utility assets that will benefit future customers by the number of existing customers. The costs of existing Utility infrastructure assets that will benefit future customers and used in this analysis is the reported amount of fixed assets and work in progress at the end of 2015. The future facility component is calculated by dividing the cost of planned capital improvement costs by the number of benefiting customers. Table ES-4 summarizes potential GFC charges that may be considered by the City based on combined existing and future facility components.

Table ES-4. Calculation of Potential General Facility Charge

Element	Customers	Cost
Existing Facility Component		$7,875,090
Future Facility Component		$9,562,000
Subtotal System Costs		$17,437,090
Number of Customers (ISUs)[1/]		
Potential GFC based on Existing and Future Facility Costs	8,186	$2,130
Potential GFC based on Existing Facility Costs Only		$962

Note:
[1/] Impervious Surface Unit (ISU) = 3,000 square feet. Number of ISUs at end of 2021 assuming 1 percent growth per year.

The upper range of potential GFC charges ($2,460/ISU) is the maximum allowable charge pursuant to state statutes. The City can choose to set the charge below the maximum level based on need, equity with other jurisdictions, and other factors. For comparison purposes, Table ES-5 shows stormwater GFCs for other similar jurisdictions in the Puget Sound region. Using the average GFC per square foot of impervious area results in a GFC for the City of Poulsbo in the amount of $1,183. Given current development trends in the City, it is estimated that this GFC would likely generate between $100,000 and $150,000 annually.

Table ES-5. Comparison of Stormwater GFC in Other Puget Sound Jurisdictions

Municipality	GFC	ISU Size (sq. ft.)	Cost GFC/sq. ft.	Date Adopted
City of Edmonds	$799	3,000	$0.27	2012
City of Issaquah	$1,256	2,000	$0.63	2006
City of Snoqualmie	$350	2,600	$0.13	2015
City of Redmond	$958	2,000	$0.48	2014
City of Gig Harbor	$2,000	2,200	$0.91	2009
City of North Bend	$779	2,920	$0.27	2012
City of Olympia	$1,190	2,528	$0.47	2013
Average	$1,047	2,464	$0.39	
City of Poulsbo (proposed)	**$1,183**	3,000	$0.39	

TRAFFIC IMPACT FEE CONTRIBUTIONS TO STORMWATER UTILITY

Streets and roads have a significant stormwater component, requiring surface water collection, conveyance, treatment and often detention facilities. New traffic developments in the City are required to provide stormwater facilities on a project specific basis, with the developer either constructing the facilities outright, and/or providing traffic impact fees to the City on a pro rata basis that help to pay for both roadway and stormwater portions of transportation facilities that are constructed by the City.

Stormwater management facilities for transportation projects can be developed on a project-by-project basis, or on a regional basis. Under the regional facility scenario, larger centralized detention and treatment facilities would be constructed that would serve multiple development projects. In this situation, it would be appropriate for the City to have the flexibility to apply a portion of the traffic impact fee to the regional stormwater facility. Typically, stormwater management facility costs for roadway projects can be between 25 and 50 percent of the total project costs.

Based on the nexus between transportation and stormwater facilities, the City should consider adopting a policy that allows the City Engineer to allocate to the Utility capital account up to 50 percent of traffic impact fees from development that is served by an existing or proposed regional stormwater facility. Based on the proposed CIP, it is roughly estimated that traffic impact fees could contribute approximately $150,000 per year to stormwater capital projects.

Implementation

Table ES-6 summarizes the proposed SWCP implementation plan.

Table ES-6. Summary of Stormwater Program Implementation Actions

Priority	Description	Required by Regulation	Schedule
Critical	Adopt 2012 Ecology Stormwater Manual	Yes	By December 31, 2016
Critical	Update PMC with LID Requirements	Yes	By December 31, 2016
High	Complete TMDL Implementation Plan	Yes	June 2016
High	Adopt Stormwater General Facility Charge	No	June 2016
High	Implement CIP including grant applications	No	On-going
Medium	Update PMC to allow regional facilities	No	Discretionary
Medium	Update and refine CIP	No	Annually
Medium	Add maintenance staff	No	2016 - 2018

1 INTRODUCTION

This Stormwater Comprehensive Plan (SWCP) presents a plan to guide the City of Poulsbo (City) Stormwater Utility for the next six years (2016 to 2021). The last SWCP was prepared in 2008, and much has changed since that time; stormwater management requirements have increased significantly, the Liberty Bay Total Maximum Daily Load (TMDL) Plan has been completed, and the City's stormwater program has grown in size and complexity.

The City owns and operates an extensive system of drainage pipes, treatment facilities and other assets that convey and treat stormwater runoff. This infrastructure prevents damage to private property and public infrastructure, and helps to protect water quality and wildlife habitat. The City is faced with the challenge of managing stormwater cost-effectively while also preventing adverse impacts. In addition, recent state and federal stormwater regulations make it technically and financially challenging to address these issues while balancing Utility ratepayer costs.

The purpose and goal of this SWCP is to describe how the City will address these needs and requirements, including program management, policies and codes, capital facilities and financial elements.

1.1 PURPOSE AND SCOPE

The purpose of this plan is to guide the City's Stormwater Utility program in a manner consistent with LOS criteria and applicable local, state, and federal regulations while maintaining rates at a reasonable and acceptable level.

This plan helps define the City's surface and stormwater efforts for the 2016-2021 period. It covers the incorporated city area as it exists in 2016, including the urban growth area (UGA). The plan addresses the specific requirements of the NPDES permit, as well as the actions needed to address TMDL Plan requirements.

This SWCP is organized by the following sections:

1. Introduction
2. Program and System Description
3. NPDES Permit Requirements and Compliance
4. Operation and Maintenance
5. Regional Facilities Plan
6. Capital Improvement Plan (CIP)
7. Financial Plan
8. Implementation Plan

Appendices include CIP project descriptions and documentation.

1.2 BACKGROUND AND INFORMATION SOURCES

The City's last SWCP update was completed in 2008. The 2008 plan focused primarily on a compliance strategy for the NPDES Phase II Permit that was issued by Ecology in January 2007. The 2008 Plan also described recommended capital projects to address existing drainage problems.

The 2008 Plan relied primarily on information related to the NPDES permit, as well as historical information regarding drainage and flooding problems. Water quality and habitat, while acknowledged, were not significant elements of the 2008 Plan. In contrast, significant new water quality and habitat information and research was used to develop this plan. This new information includes the Liberty Bay TMDL Plan, as well as other information as described below.

1.2.1 Liberty Bay TMDL Plan

In 2008, Ecology initiated planning for the Liberty Bay Watershed Fecal Coliform Bacteria TMDL and Water Quality Implementation Plan (Ecology TMDL Plan). Ecology started this plan because there was evidence of bacterial contamination affecting beneficial uses in Liberty Bay, such as shellfish harvesting and primary contact recreation. The goal of Ecology's TMDL Plan is to ensure the impaired water will attain Washington State water quality standards. The Plan was completed in 2013.

TMDL evaluations are required to identify the maximum amount of each pollutant to be allowed into water bodies so as not to impair beneficial uses. The TMDL includes an assessment of water quality problems and of the pollutant sources that cause the problem, and determines the amount of a given pollutant (FC bacteria in this case) that can be discharged to the water body and still meet standards (the loading capacity), then allocates that load among the various sources.

Ecology's 2013 TMDL Plan develops FC bacteria TMDLs in the tributaries to Liberty Bay. The TMDLs set water quality targets to meet FC bacteria criteria, identify key reaches for source pollution reduction, and allocate pollutant loads to nonpoint sources. The TMDL Plan identifies specific tasks, responsible parties, and timelines for achieving water quality standards. Responsible parties include the City, Kitsap County, and the Kitsap Public Health District (KPHD).

In response to Ecology's plan, the City has initiated the Poulsbo TMDL Implementation Plan (PTIP). The PTIP will describe the actions that the City will take to implement actions associated with their responsibilities under Ecology's TMDL Plan. The goal of the PTIP is to identify the actions and projects that the City may implement to address the goals and requirements of Ecology's 2013 TMDL Plan.

The first work product from the PTIP is the Watershed Assessment (Sealaska 2016). The intent of the Watershed Assessment is to inform the PTIP by identifying and prioritizing actions that help to preserve, protect, and restore water quality and natural systems, while at the same

time providing infrastructure that supports both existing and future development. The results of the Watershed Assessment are summarized in Chapter 2.

1.3 OTHER PLANS AND REPORTS

The following additional studies, plans and data sets were reviewed for information on drainage, water quality, and aquatic habitat conditions and are summarized in the TMDL Plan Watershed Assessment:

- City of Poulsbo stormwater system and outfall mapping GIS data set (updated 2015)
- *Viking Way Stormwater Retrofit Preliminary Design Report* (Parametrix 2015)
- *Kevos Pond Basin Plan* (Parametrix 2013)
- *City of Poulsbo Shoreline Mater Program Update, Cumulative Impacts Analysis & No Net Loss Summary* (Grette Associates 2011)
- *Hydrography of and Biochemical Inputs to Liberty Bay, a Small Urban Embayment in Puget Sound, Washington* (Takesue 2011)
- *South Fork Dogfish Creek Restoration Master Plan* (ICF International 2010)
- *East Kitsap County Nearshore Habitat Assessment and Restoration Prioritization Framework* (Borde et al. 2009)

To supplement these plans and studies, information on existing facilities, needs, and financial information was obtained from City staff.

2 PROGRAM AND SYSTEM DESCRIPTION

The stormwater Utility manages, protects, and regulates the built (stormwater) and natural surface water systems in Poulsbo. The Utility funds and maintains stormwater facilities and helps assure compliance with applicable regulations. The Utility works in concert with other City departments to manage, protect and restore the city's surface water natural resources.

2.1 LEVEL OF SERVICE

Stormwater LOS criteria are typically used as benchmarks to assess the performance of existing facilities and management decisions related to the administration, operation, maintenance, and capitalization of stormwater assets. The management of stormwater has historically included the reduction of flood risk and the improvement of water quality and aquatic habitat. Other objectives such as the protection of streams and wetlands, or improvement of ground water recharge are also relatively common.

Due to the complexity and dynamic nature of natural systems, no single parameter system (such as that used for transportation systems) that can be reduced to a letter grade from A to F is applicable or appropriate for stormwater systems. Rather, multiple parameters are used to define LOS goals and criteria. Policies and management decisions are then structured to provide for on-going evaluation and adaptive management geared toward attaining and sustaining LOS criteria over time. Primary LOS goals for the Utility are as follows:

Manage the storm and surface water system by combining preservation of natural systems and engineered solutions to provide for public safety, minimize property damage, preserve and enhance critical areas and promote sustainability.

1. Manage the storm water system by combining preservation of natural systems and engineered solutions to provide for public safety, minimize property damage, preserve and enhance critical areas and promote sustainability.
2. Preserve, protect, and (where feasible) restore surface water resources to provide beneficial uses to humans, fish, and wildlife.
3. Comply with applicable local, state, and Federal regulations.
4. Provide adequate funding through an equitable stormwater Utility rate structure and outside funding sources.

Based on these broad goals, the following parameters represent the City stormwater LOS standard:

1. Comply with all conditions of Ecology's NPDES Phase II Permit.
2. Protect Liberty Bay water quality by implementing applicable sections of the Liberty Bay TMDL Plan in a proactive and timely manner.
3. Resolve historic flooding issues and minimize new flooding impacts to homes, businesses, and other facilities.
4. Protect and restore important aquatic and riparian habitat such as streams, wetlands, and shorelines from the negative effects of stormwater runoff.

2.2 PROGRAM DESCRIPTION

The City established a stormwater Utility in 1981. The Utility operates under the general direction of the Mayor, and the Mayor receives policy direction from the City Council who are elected by the citizens. The Utility serves the existing city limits and is primarily funded by all developed properties within the city. The Utility is part of both the Engineering and Public Works Department and is managed under the direction of the Director of Engineering and City Engineer. The Director reports to the Mayor, and the City Engineer to reports to the Director of Engineering.

The Utility's services are divided into two functional areas: Management and Administration, and O&M. These two functional staff groups are supported by other Public Works and City staff (e.g., Legal, Finance) and non-utility support as needed. Each of these functional groups are described below.

2.2.1 Management and Administration

The management and administration team is supervised by the Director of Engineering and City Engineer. The management and administration team oversees the Utility's project planning, regulations, outreach and education, water quality monitoring, reporting, public and private facilities inspection, CIP, and financial aspects of the Utility. The Utility's management and administration team includes one full time position who oversee the City's NPDES permit compliance programs, and part time positions of the City Utilities Engineer and Engineering Technicians. Staffing is summarized in Table 2-1.

Table 2-1. Stormwater Utility Staffing

Position	Current FTEs (2016)	Future FTEs (2018)
Management and Administration Staff		
City Engineer	0.2	
NPDES Permit Coordinator	1.0	
Development Review	0.4	
Water Quality Technician/Maintenance Lead	1.0	
Total Office Staff	2.6	2.6
Operation and Maintenance Staff		
Foreman (Field Supervisor)	0.5	
Field Maintenance Technician	3.0	1.0
Mechanic	0.1	
Total Operation and Maintenance Staff [/1]	3.6	4.6
Totals	**6.2**	**7.2**

Note:

[/1] Does not include 2 summer casual labor employees.

2.2.2 Operations

The Utility's O&M team consists of 3.6 full time equivalent (FTE) positions who operate and maintain the public storm and surface water system. The team maintains public stormwater flow control and water quality facilities; cleans and repairs catch basins, pipes, and ditches; sweeps streets for water quality; and responds to floods and spills. O&M activities are performed by the Public Works Department in coordination with the Engineering Department.

2.3 SYSTEM DESCRIPTION AND EVALUATION

The City's stormwater system serves an area of approximately 4.6 square miles and a population of approximately 9,915 (2015 Census data). Poulsbo is located entirely within the Liberty Bay watershed, and the natural drainage system consists of portions of Dogfish, Lemolo, Johnson, and Bjorgen Creek basins, as well as several other drainage courses that discharge directly to Liberty Bay. Figures 2-1 and 2-2 show the City's regional and watershed context.

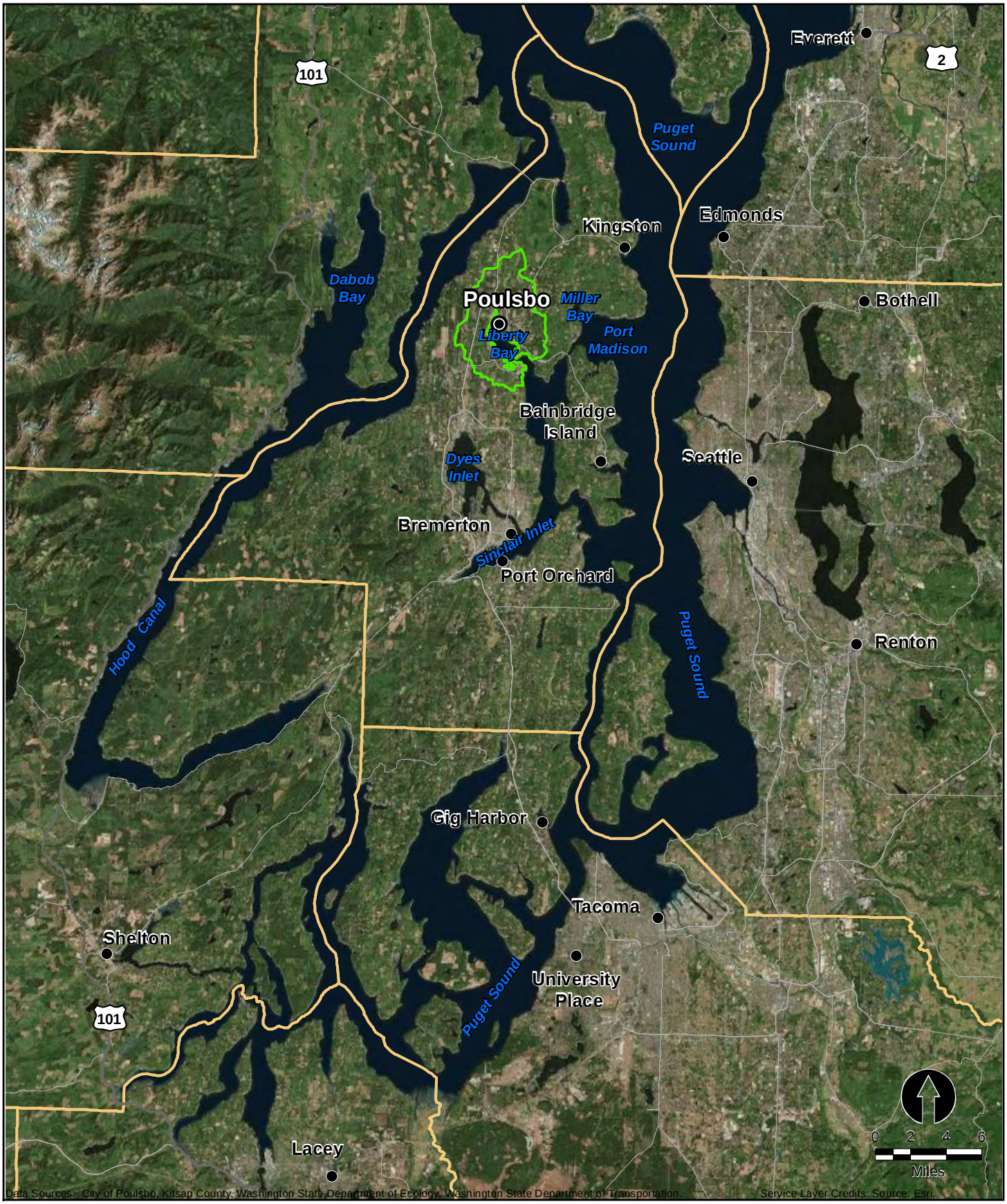
2.3.1 Land Use and Development

Development in Poulsbo began in the late 1880s with the logging industry. By the early 1900s, commercial fishing, shellfish, and agriculture industries were relatively well established. About 200-acres of tidelands around Liberty Bay were used for oyster production. By 1967, water quality had deteriorated to the point that the oyster beds on the eastern shore of Liberty Bay were closed to harvesting. Oyster production ceased entirely with the closing of the Poulsbo oyster plant in 1983.

More highly developed areas in Poulsbo are typically concentrated in commercial areas such as the historic downtown area or College Market Place (Figures 2-3 and 2-4).

2.3.2 Basin and Stormwater Infrastructure Summary

A basin and stormwater infrastructure assessment was performed as part of the PTIP Watershed Assessment Report (Sealaska 2016). The objective of this assessment was to delineate catchment areas, evaluate type and extent of impervious surfaces, and characterize stormwater infrastructure conditions. Basins and sub-basins are shown in Figure 2-5, and existing stormwater infrastructure is shown in Figures 2-6, 2-7, and 2-8.



Prepared by Sealaska Environmental. P:\Production\Fig\PMX-TMDLNew Maps\Fig1_RegionalContext.mxd, October 28, 2015.

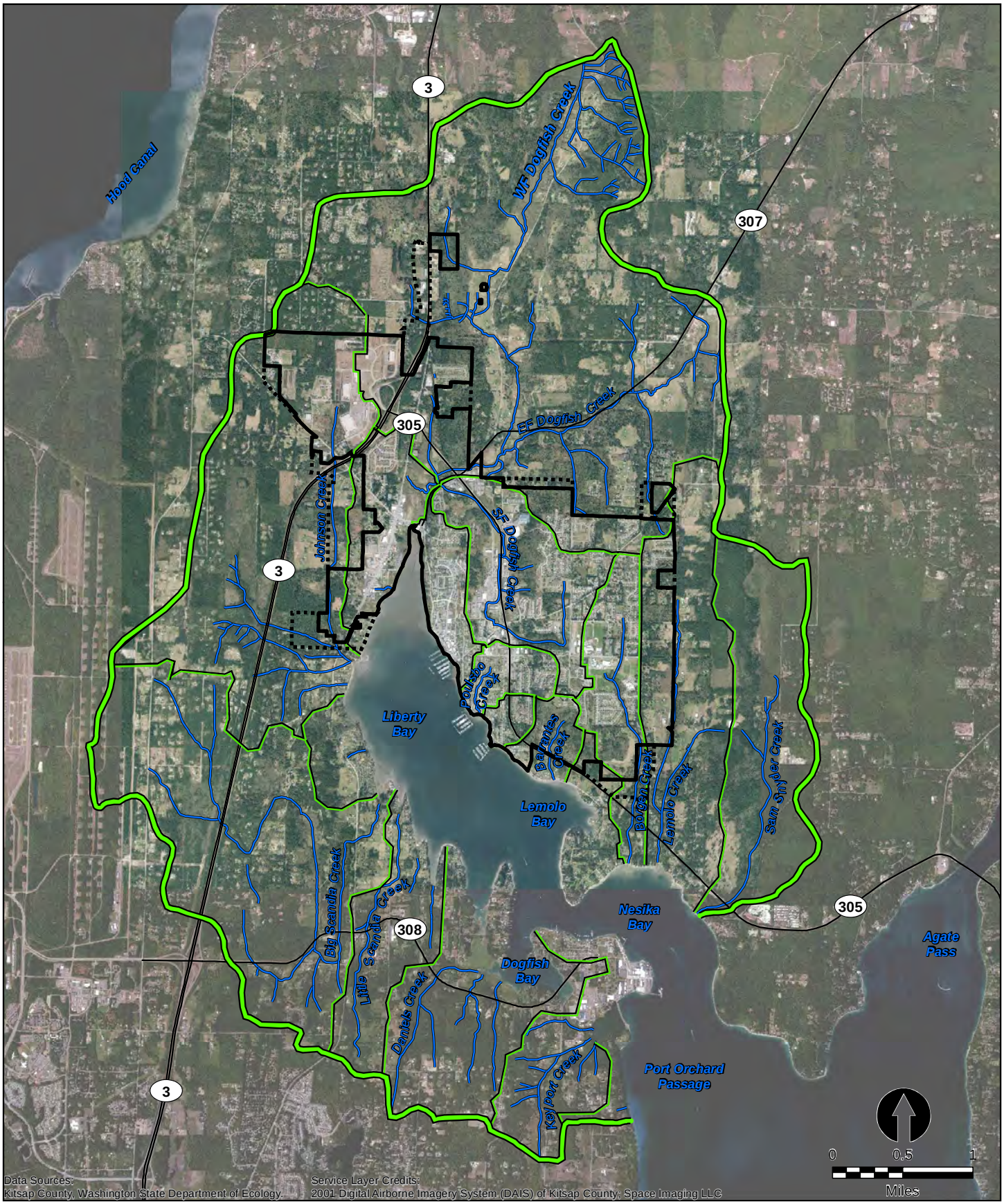
U.S. Route

State Route

Liberty Bay Watershed

County Boundary

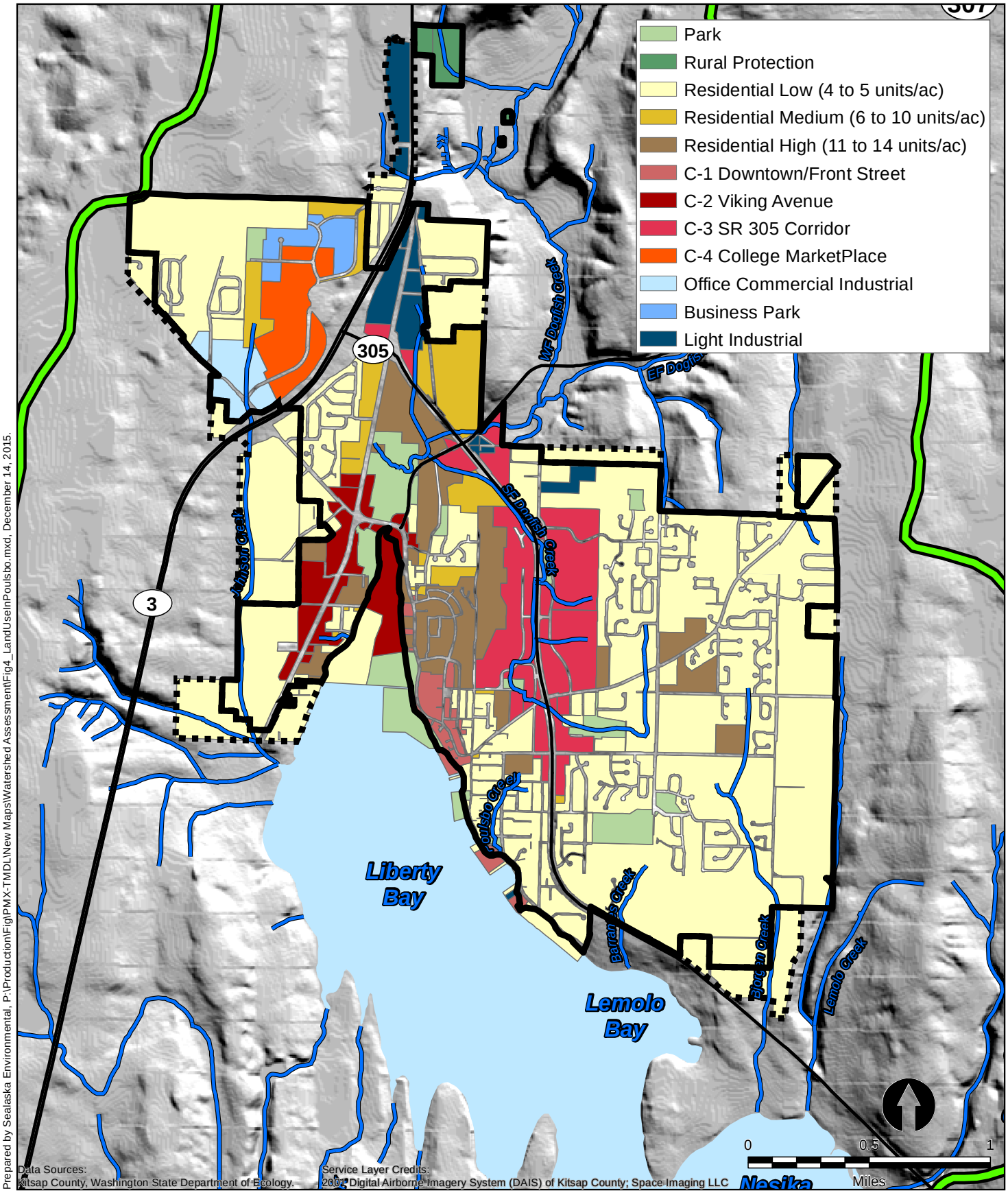
Figure 2-1
City Location and Regional Context
Stormwater Comprehensive Plan
City of Poulsbo



Prepared by Sealaska Environmental, P:\Production\Fig\PMX-TMDL\New Maps\Watershed Assessment\Fig2_LibertyBayWatershed&PrimaryBasins.mxd, December 14, 2015.

Liberty Bay Watershed
Basin Boundary
Streams
City of Poulsbo
Poulsbo Urban Transition Area
Highway

Figure 2-2
Liberty Bay Watershed, Streams and Primary Basins
Stormwater Comprehensive Plan
City of Poulsbo

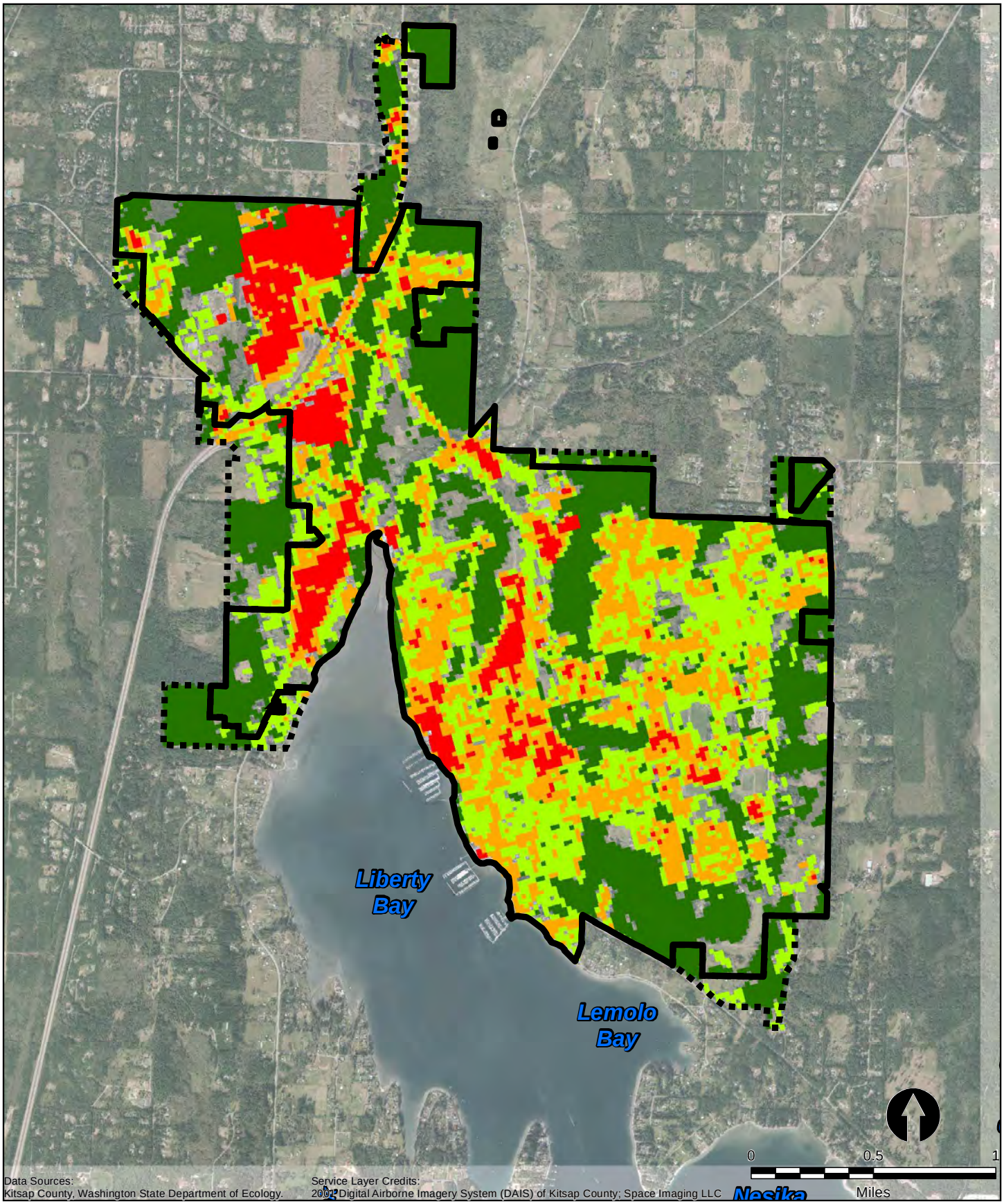


Prepared by Sealaska Environmental, P:\Production\Fig\PMX-TMDL\New Maps\Watershed Assessment\Fig4_LandUseInPoulsbo.mxd, December 14, 2015.

Data Sources:
Kitsap County, Washington State Department of Ecology.

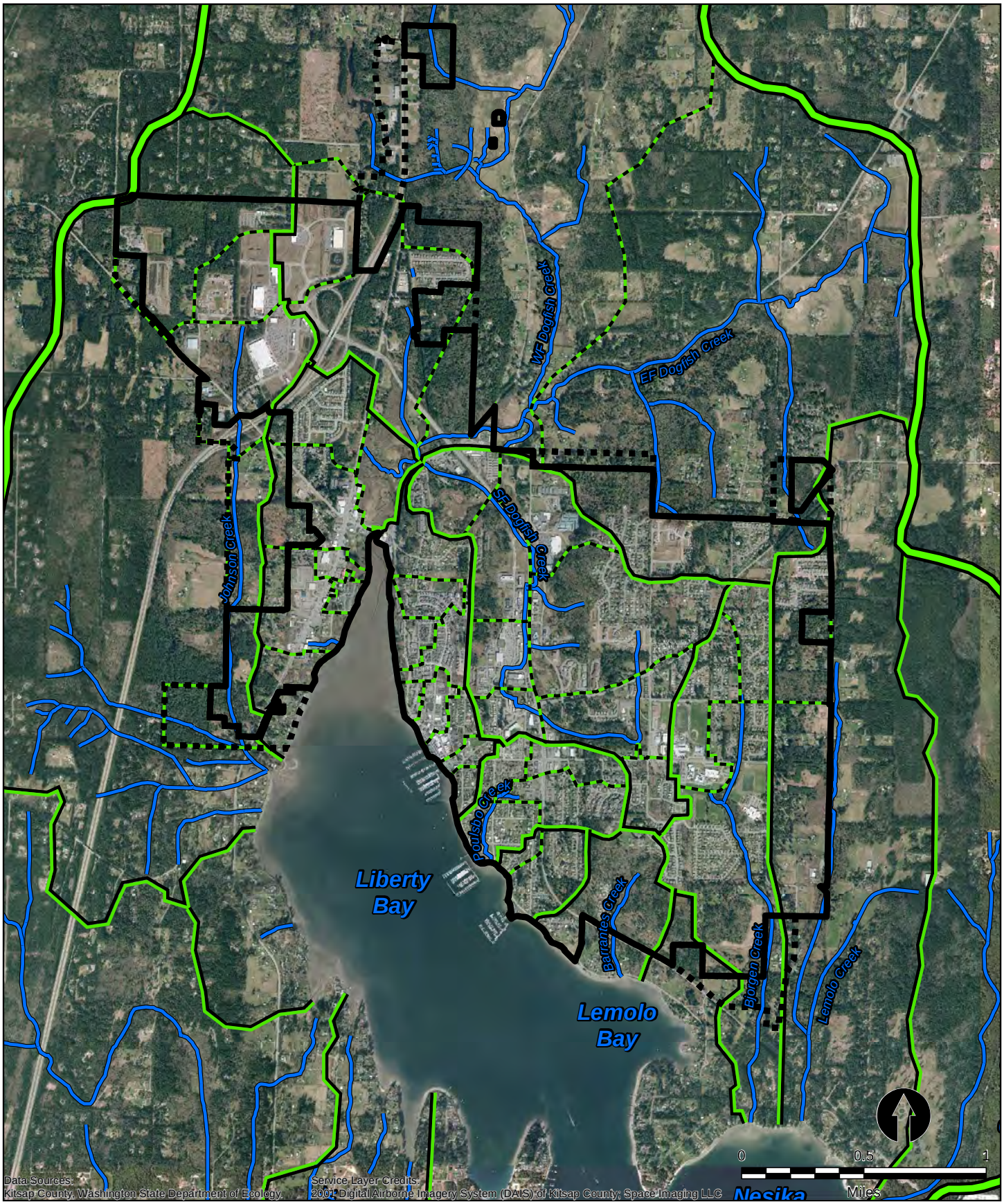
Service Layer Credits:
2001 Digital Airborne Imagery System (DAIS) of Kitsap County; Space Imaging LLC

Figure 2-3.
Zoning In City of Poulsbo
Stormwater Comprehensive Plan
City of Poulsbo



Prepared by Sealaska Environmental, P:\Production\Fig\PMX-TMDL\New Maps\Watershed Assessment\Fig2-3_LandUsePoulsbo.mxd, January 06, 2016.

Figure 2-4
Generalized Land Use, City of Poulsbo
Stormwater Comprehensive Plan
City of Poulsbo



Prepared by Sealaska Environmental, P:\Production\Fig\PMX-TMDL\New Maps\Watershed Assessment\Fig2b_LBBasins&SubBasinsInPoulsbo.mxd, December 14, 2015.

Data Sources:
Kitsap County, Washington State Department of Ecology

Service Layer Credits:
2011 Digital Airborne Imagery System (DAIS) of Kitsap County; Space Imaging LLC

- Liberty Bay Watershed
- Basin Boundary
- Sub-Basin Boundary
- Streams
- City of Poulsbo
- PUTA

Figure 2-5.
Streams, Basins and Sub-Basins
Stormwater Comprehensive Plan
City of Poulsbo

J-05
J-04
Johnson Creek
J-01
J-02
J-03
Poulsbo
V-01
V-02
V-05
V-06
V-04
V-03
WF-02
Liberty Bay
Dogfish Creek Estuary
WF-01
WF Dogfish Creek
WF-03
DF-01
0 375 750
Feet

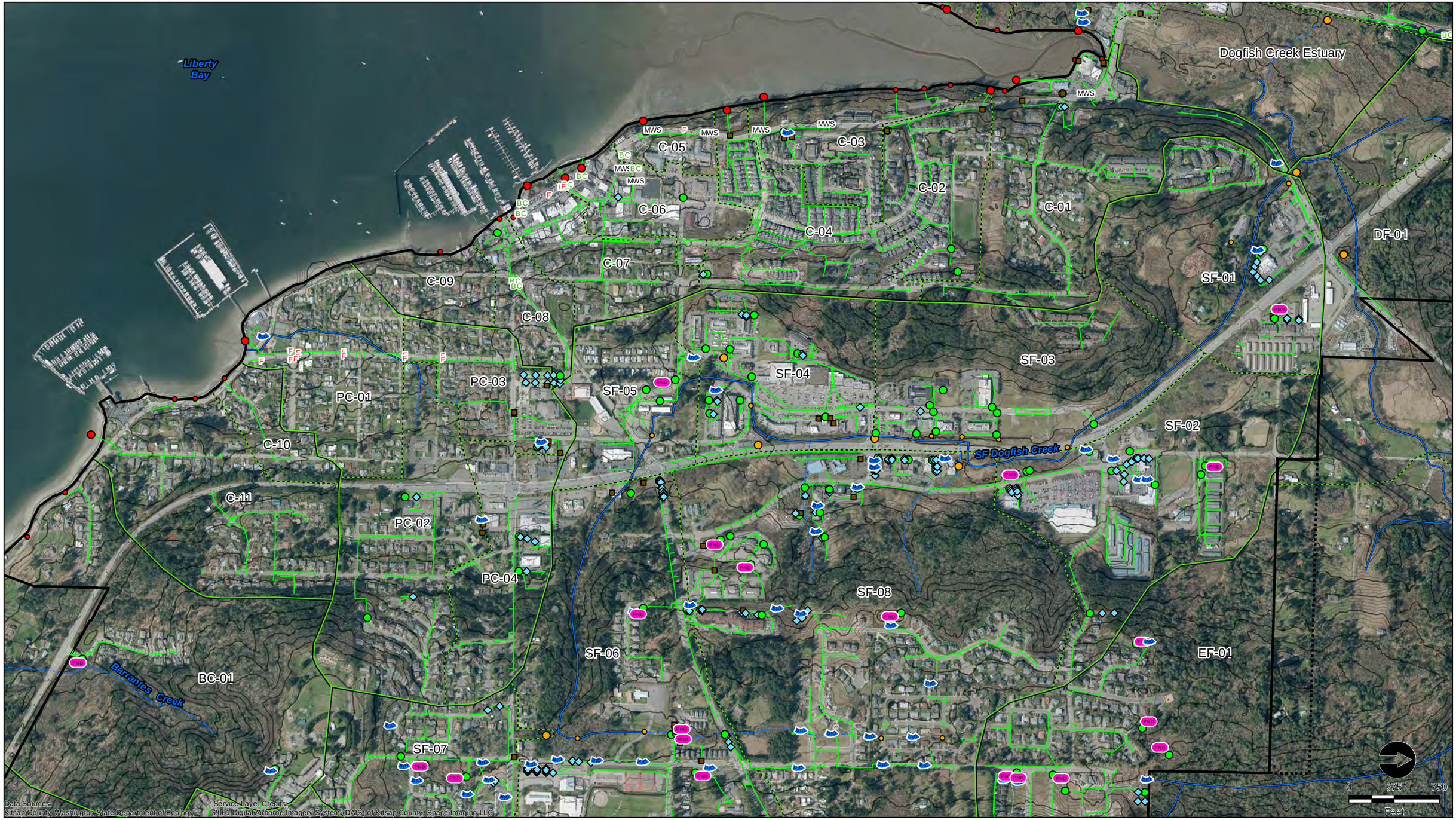
Data Sources:
Kitsap County, Washington State Department of Ecology

Service Layer Credits:
2001 Digital Airborne Imagery System (DAIS) of Kitsap County, Space Imaging LLC

Prepared by Sealaska Environmental, P:\Production\Fig\PMX-TMDL\New Maps\Watershed Assessment\Fig15_StormwaterInfrastructureWest.mxd, December 14, 2015.

- Basin Boundary
- Sub-Basin Boundary
- City of Poulsbo
- PUTA
- Stormwater Pipe
- Stream
- Intermittent Stream
- Control Structure
- Oil Water Separator
- Underground Detention Facility
- Major Marine Outfall
- Minor Marine Outfall
- Major Freshwater Outfall
- Minor Freshwater Outfall
- Filterra Vault
- Modular Wetland System
- Bioretention Cell
- Detention/Retention Pond
- Bioswale
- WF-02 Sub-Basin I.D.

Figure 2-6.
Existing Stormwater Infrastructure and Sub-basins, Poulsbo West
Stormwater Comprehensive Plan
City of Poulsbo



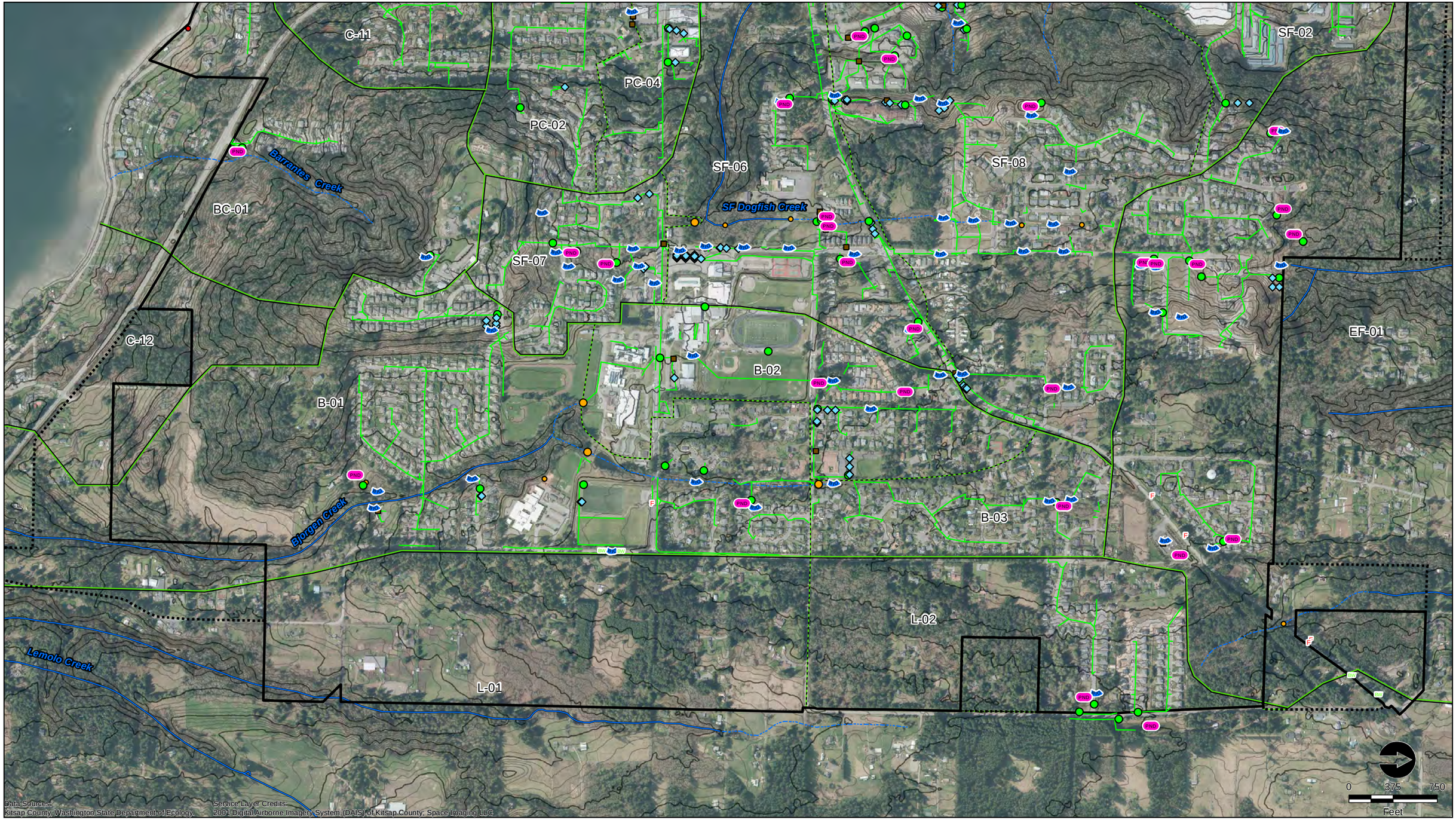
Prepared by Sealaska Environmental, P:\Production\Fig\PMX-TMDL\New Maps\Watershed Assessment\Fig16_StormwaterInfrastructureCore.mxd, December 14, 2015.

Data Sources:
Kitsap County, Washington State Department of Ecology

Service Layer Credits:
2001 Digital Airborne Imagery System (DAIS) of Kitsap County, Space Imaging LLC

- Basin Boundary
- Sub-Basin Boundary
- City of Poulsbo
- PUTA
- Stormwater Pipe
- Stream
- Intermittent Stream
- Control Structure
- Oil Water Separator
- Underground Detention Facility
- Major Marine Outfall
- Minor Marine Outfall
- Major Freshwater Outfall
- Minor Freshwater Outfall
- Filterra Vault
- Modular Wetland System
- Bioretention Cell
- Detention/Retention Pond
- Bioswale
- SF-02 Sub-Basin I.D.

Figure 2-7.
Existing Stormwater Infrastructure and Sub-basins, Poulsbo Central
Stormwater Comprehensive Plan
City of Poulsbo



Basin Boundary
Sub-Basin Boundary
City of Poulsbo
PUTA
Stormwater Pipe
Stream
Intermittent Stream
Control Structure
Oil Water Separator
Underground Detention Facility
Major Marine Outfall
Minor Marine Outfall
Major Freshwater Outfall
Minor Freshwater Outfall
Filterra Vault
Modular Wetland System
Bioretention Cell
Detention/Retention Pond
Bioswale
BC-02 Sub-Basin I.D.

Figure 2-8.
Existing Stormwater Infrastructure and Sub-basins, Poulsbo East
Stormwater Comprehensive Plan
City of Poulsbo

The City is currently about 29 percent impervious surfaces, with 51 percent impervious estimated at full build out. Basin size and impervious area are summarized in Figure 2-9. About 57 percent of the existing impervious surfaces are treated in accordance with 1992 or 1997 stormwater standards. About four percent of existing impervious surfaces are treated to 2005 stormwater standards. The relatively high percentage of treated impervious area is due to several factors, including the number of larger developments constructed since the early 1990s, and the number of major roadway improvements and stormwater retrofits implemented by the City.

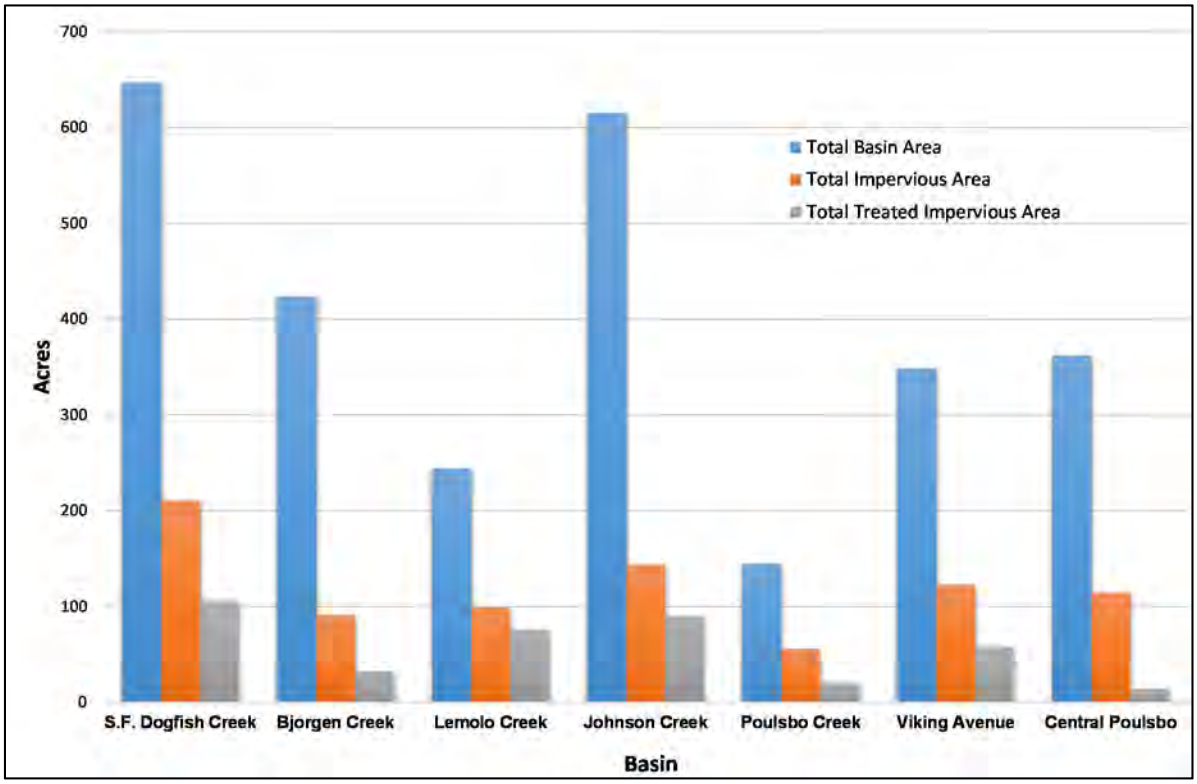


Figure 2-9. Basin Area and Impervious Surface Summary

The watershed assessment shows that most of the City has impervious area of between 20 and 40 percent. Areas of the City that were developed prior to 1992 typically have a lower relative proportion of treated areas, including central Poulsbo (90 percent of impervious area is untreated), Poulsbo Creek (70 percent of impervious area is untreated), and upper Bjorgen Creek (90 percent of impervious area is untreated). In contrast, basins with more recent development have a much higher proportion of treated impervious area, including Lemolo Creek (90 percent of impervious area is treated) and Johnson Creek (80 percent of impervious area is treated).

Treatment area delineation shows that overall, about 60 percent of existing impervious area in the City is treated to standards associated with the either the 1992 Ecology Stormwater Management Manual, or the 1997 Kitsap County Manual. Note that the treatment values are approximate and only cover the portion of the basin that is located within the City.

Table 2-2. Summary of City Stormwater Retrofit Projects

Project	Date Completed	Approx. Area Treated (acres)	Basin	Pervious Pavements			Other Techniques			
				Pervious Parking	Pervious Sidewalk	Pervious Bike Lane	Bioretention	Filterra Vaults	Modular Wetlands	Green Roof
Caldart Avenue Reconstruction, Phase 1	2005	2	SF Dogfish Creek				X			
Caldart Avenue Reconstruction, Phase 2	2007	1	SF Dogfish Creek		X		X			
Viking Avenue Reconstruction, Phase 3A	2009	1.5	Liberty Bay		X	X	X			
Mesford Road Improvements	2010	1	SF Dogfish Creek	X		X				
City Hall	2010	0.25	Liberty Bay							X
Viking Avenue Reconstruction, Phase 3B	2011	2	Liberty Bay		X	X	X			
Noll Road Improvements, Phase 1	2011	1	Bjorgen Creek		X	X	X	X		
Port of Poulsbo Parking Lot	2012	0.5	Liberty Bay	X						
Anderson Parkway LID Retrofit, North	2013	3	Liberty Bay				X	X		
Old-Town LID Retrofit	2013	6	Poulsbo Creek				X	X		
Noll Road Roundabout	2013	1	Lemolo Creek		X		X			
Central Business District Retrofit	2015	3	Liberty Bay				X	X	X	
Lincoln Road Improvements	2015	2	SF Dogfish Creek		X		X	X		
Anderson Parkway LID Retrofit, South	2016	1	Liberty Bay	X					X	

2.3.3 Stormwater Retrofit Summary

The City has implemented a variety of stormwater retrofit projects designed to improve and protect water quality. These projects are summarized in Table 2-2 and shown in Figure 2-10.

Filterra vault used in Anderson Parkway retrofit.

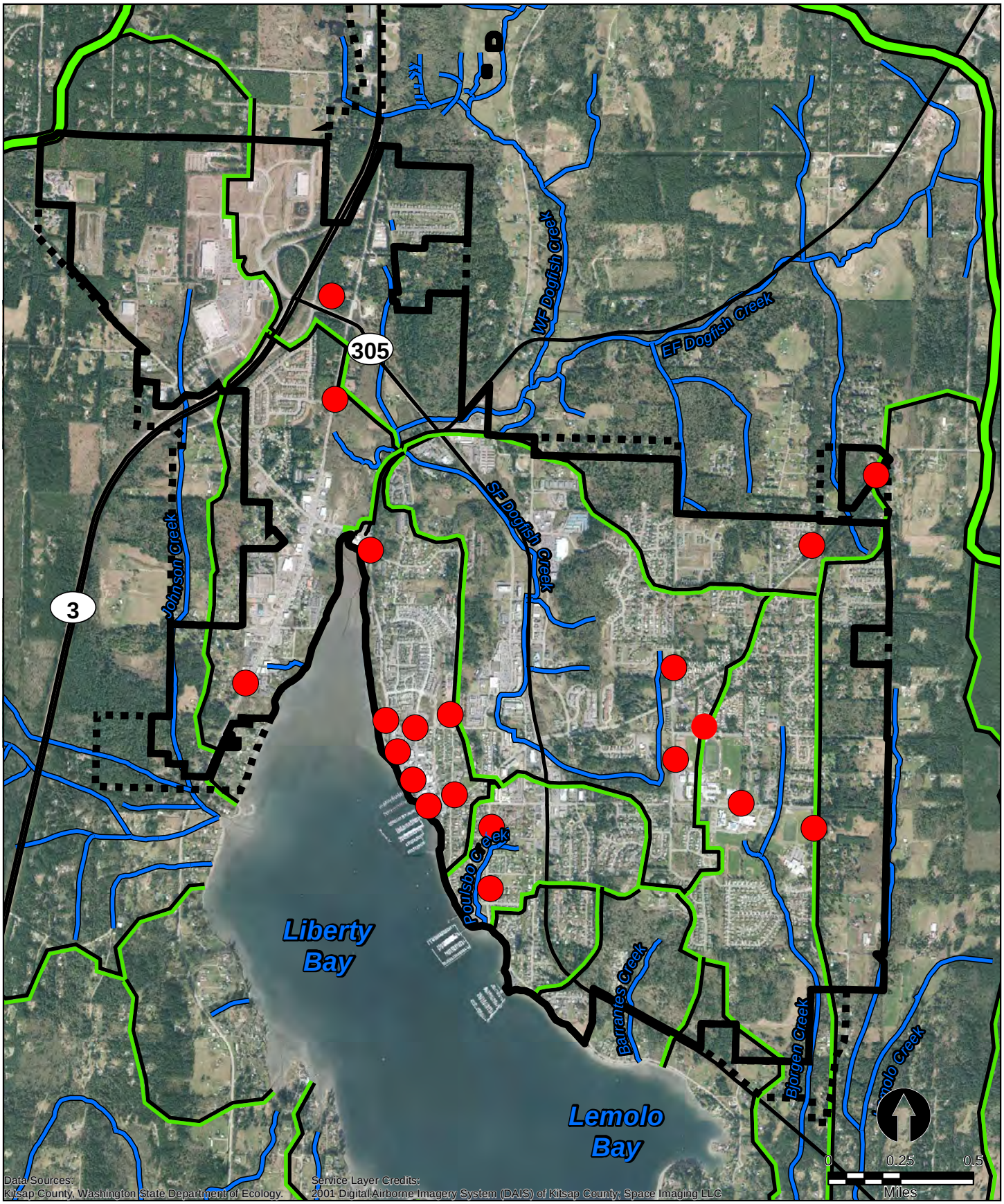
2.3.4 Water Quality Summary

A water quality assessment was performed as part of the PTIP watershed assessment to describe current and historical water quality conditions relative to FC bacteria, which is the parameter addressed by Ecology's TMDL Plan. Liberty Bay is classified as Primary Contact Recreation water and all tributaries flowing into the bay are classified as Extraordinary Primary Contact Recreation waters, which is the most stringent water quality standard in Washington state. Water quality standards for FC are summarized in Table 2-3 below.

Table 2-3. Fecal Coliform Water Quality Standard for Liberty Bay

Freshwater - Extraordinary Primary Contact	**Marine Water - Extraordinary Aquatic, Primary Contact**
Part 1: ≤50 FC/100 ml (geometric mean)	**Part 1:** ≤14 FC/100 ml (geometric mean)
Part 2: Not more than 10% of all samples obtained for calculating a geometric mean >100 FC/100 ml	**Part 2:** Not more than 10% of all samples obtained for calculating a geometric mean >43 FC/100 ml

Current water quality conditions reflect pollutant source control activities in the watershed that have been conducted over the past 10 years. The type and location of source controls provides context for evaluation of water quality monitoring results, and helps to improve the understanding of causality between observed water quality conditions, trends, and pollutant control activities. Source control activities described in this section include stormwater, OSS, and agriculture. Source control activities are summarized in Table 2-4.



Prepared by Sealaska Environmental, P:\Production\Fig\PMX-TMDL\New Maps\Watershed Assessment\Fig3-1_StormwaterRetrofitInPoulsbo.mxd, January 06, 2016.

Data Sources:
Kitsap County, Washington State Department of Ecology.

Service Layer Credits:
2001 Digital Airborne Imagery System (DAIS) of Kitsap County; Space Imaging LLC

- Liberty Bay Watershed
- Basin Boundary
- Streams
- City of Poulsbo
- Poulsbo Urban Transition Area
- Highway
- Stormwater Retrofit Locations

Figure 2-10
Stormwater Retrofit Locations in City of Pouslbo
Stormwater Comprehensive Plan
City of Poulsbo

Table 2-4. Summary of Liberty Bay Source Control Activities, 2005 to 2016

Source Control Element	Actions	Period Implemented	Total Estimated Cost	Lead Agency
Stormwater Retrofits, City of Poulsbo	Retrofitted over 25-acres of parking lot and major streets with bioretention, Filterra vaults, pervious pavement, and Modular Wetland Systems	2005 - 2016	$4,000,000	City of Poulsbo
Stormwater Retrofits, Kitsap County	Retrofitted Washington Avenue in Keyport (2-acres) with bioretention	2015 - 2016	$900,000	Kitsap County Public Works
OSS Repair	Inspected 850 systems, repaired 47	2009 - 2014	$700,000[1/]	Kitsap Public Health District
Agricultural BMPs	Implemented 98 BMPs at 41 locations in the watershed	2009 - 2014	Cost included as part of KPHD project[1/]	Kitsap Conservation District

Notes:
[1/] Costs do not include actual OSS repair or agricultural BMP installation costs.

2.3.4.1 Marine and Stream Water Quality

Water quality data for Liberty Bay and streams is extensive; approximately 800 marine water samples from 27 locations, and 1,000 stream and stormwater samples from over 40 locations over the past 10 years. Liberty Bay marine water quality shows a significant long-term improving trend, with all marine water monitoring stations meeting FC water quality standards in 2013, 2014, and 2015. Marine stations with highest FC concentrations are typically located near the head of Liberty Bay and are most influenced by Dogfish Creek. Figure 2-11 shows the water quality trend for marine station LB-05, which is located at the head of Liberty Bay.

Stream water quality is also improving in all monitored basins except Bjorgen Creek, which is showing a slight declining trend. In general, stream water quality, although improving, periodically fails water quality standards. Figure 2-12 shows water quality trends in the South Fork of Dogfish Creek, which delivers the largest FC load of all tributaries within the City, and the second highest in the watershed after the main stem of Dogfish Creek.

2.3.4.2 Stormwater Quality

Stormwater data for past years is generally limited in terms of frequency, location and runoff condition. Trend analysis for specific stormwater outfalls is therefore not possible.

To evaluate water quality improvements associated with City stormwater retrofits, and to help prioritize additional corrective action efforts, a stormwater quality study was conducted in November and December 2015. The study consisted of two sampling events at 40 locations during both dry conditions and periods of significant rainfall (storm event sampling). All major stormwater outfalls in the City were sampled as part of the study. Sampling locations are shown in Figure 2-13, and results are provided in Table 2-5 and Figure 2-14.

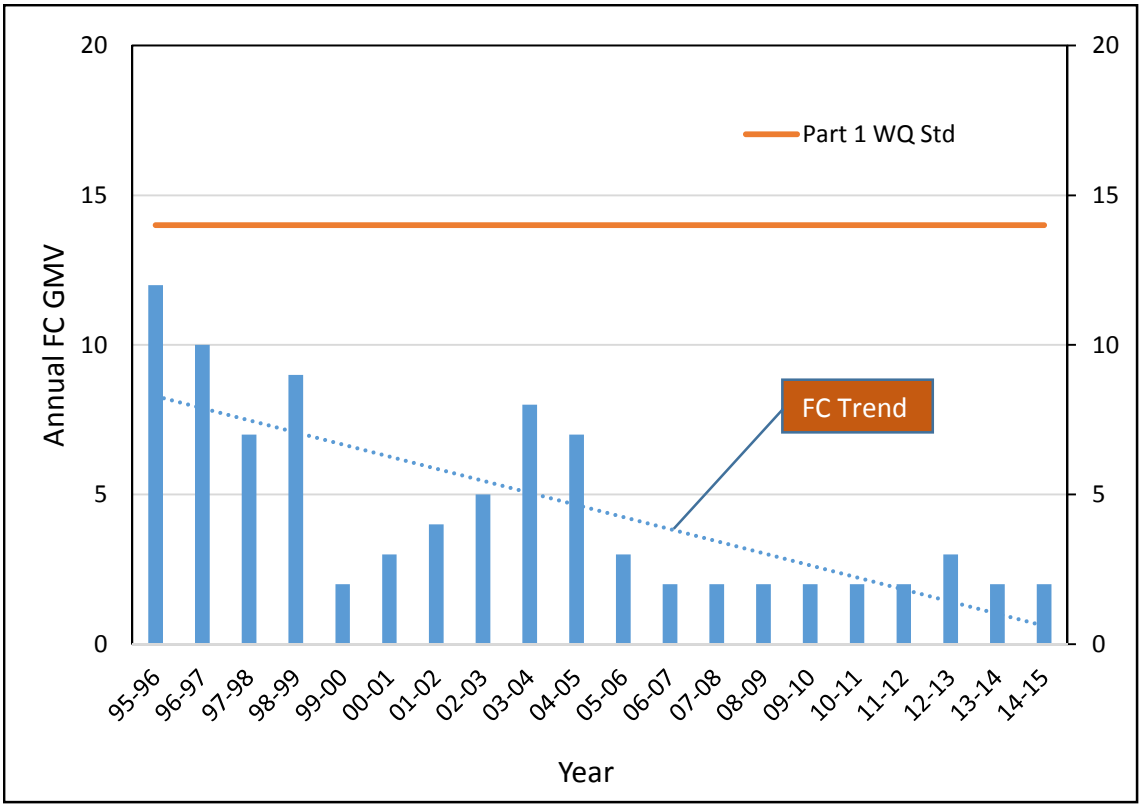


Figure 2-11. Trend for Liberty Bay Marine Station LB05

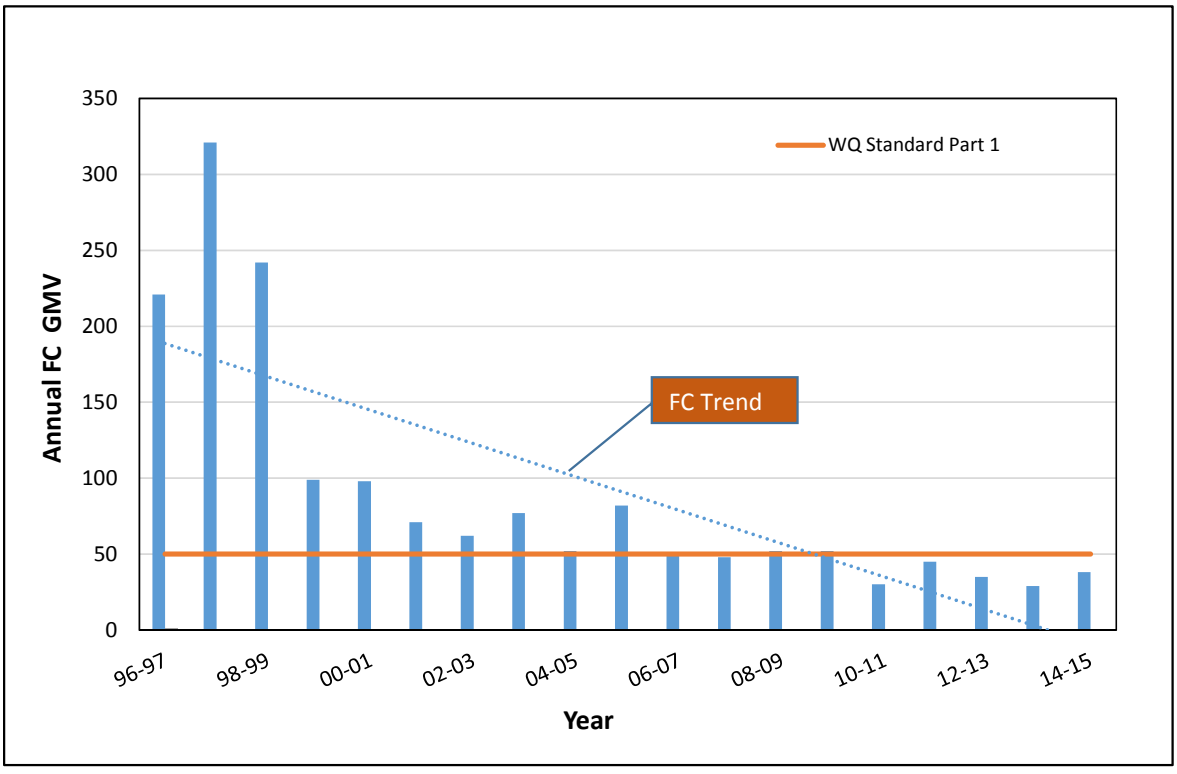


Figure 2-12. South Fork Dogfish Creek Fecal Coliform Trend, 1996-2015

Table 2-5. Summary of 2015 Stormwater Sampling

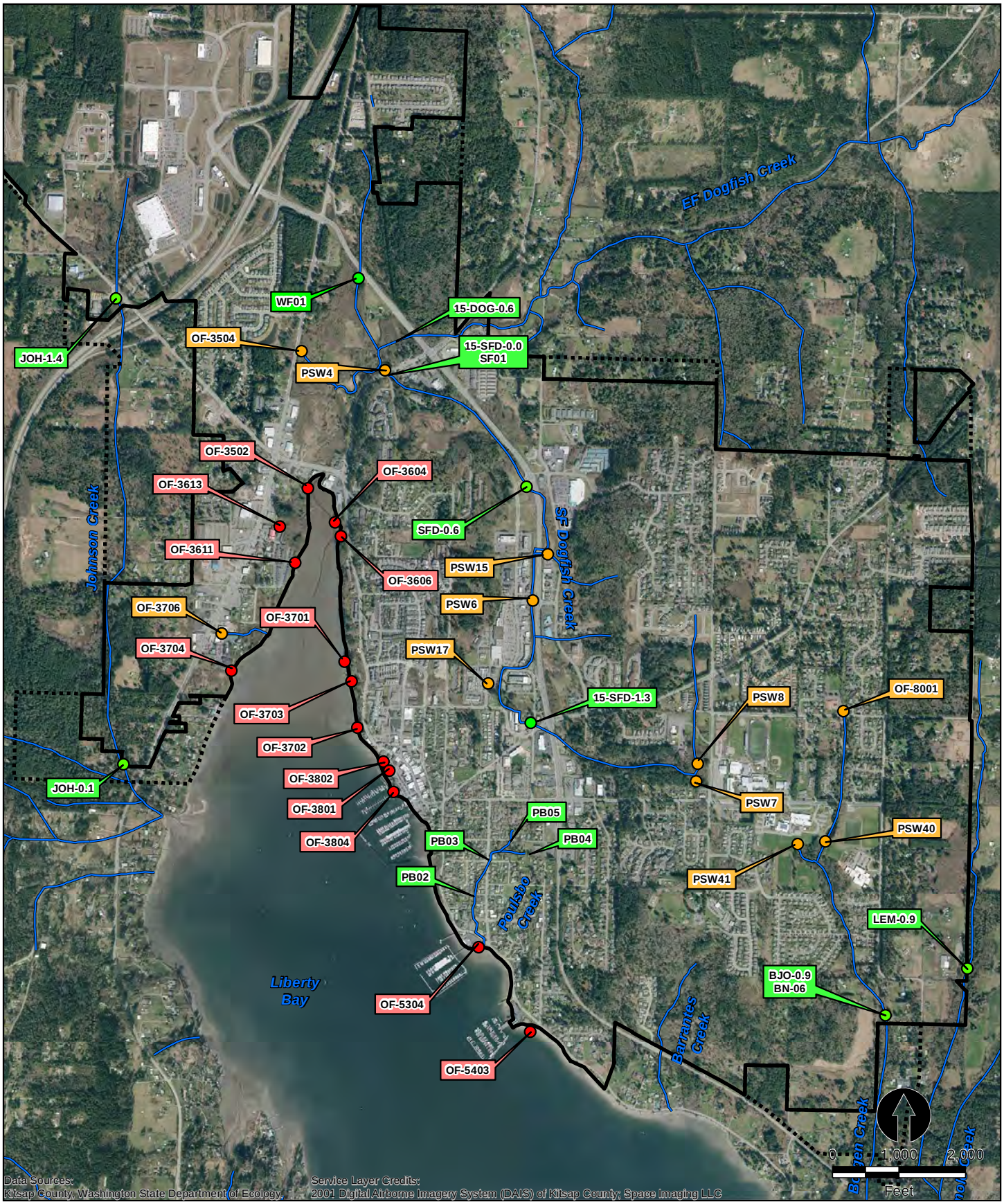
Station ID Streams	Description	11/14/2015 Dry	11/25/2015 Dry	GMV Dry	12/3/2015 Wet	12/10/2015 Wet	GMV Wet
15-DOG-0.6	Mainstem Dogfish Creek	10	20	14	410	1,240	713
15-SFD-0.0	SFDC at Bond Rd. & 1st Ave., downstream of PSW4	140	<10	37	250	140	187
15-SFD-0.6	SFDC at Bond Rd. & 1st Avenue	130	40	72	50	1,040	228
15-SFD-1.3	SFDC at 8th Ave. and Iverson	20	<10	14	380	380	380
WF-01	West Fork of Dogfish Creek, downstream of culvert under SR305	<10	10	10	400	220	297
BJO-0.9	Bjorgen Creek at Storhoff Road culvert	40	10	20	400	180	268
LEM 0.9	Lemolo Creek at Heron Pond Lane	10	20	14	140	40	75
JOH-0.1	Johnson Creek, mainstem at 18931 Viking Avenue	10	10	10	360	240	294
JOH-1.4	Finn Hill Road at Olhava Way	60	10	24	90	160	120
PB-02	Poulsbo Creek, downstream culvert at Sommerseth	60	10	24	420	640	518
PB-02 R	Poulsbo Creek duplicate	70	70	70	340	940	565
PB03	Poulsbo Creek-corner of Ryen & 6th	60	10	24	340	1,460	705
PB03 R	Duplicate of PB03	70	60	65	370	460	413
PB04	Poulsbo Creek behind church	140	<10	37	70	80	75
PB05	Poulsbo Creek, Harrison St. culvert at 709 Harrison St.	<10	<10	<10	170	120	143
OF-5304	Poulsbo Creek outfall	100	60	77	40	60	49
Legend	Low: 0 – 100 Wet GMV						
	Medium: 101 – 499 Wet GMV						
	High: > 500 Wet GMV						

Table 2-5. Summary of 2015 Stormwater Sampling (continued)

Station ID Streams	Description	11/14/2015 Dry	11/25/2015 Dry	GMV Dry	12/3/2015 Wet	12/10/2015 Wet	GMV Wet
		MARINE OUTFALLS					
OF-3502	Nelson Park	<10	40	40	50	120	77
OF-3504	North Central Viking Ave. outfall to Fish Park	<10	90	10	>2,000	1,040	1,442
OF-3604	Liberty Bay Auto-24" CMP	60	10	24	>2,000	540	1,039
OF-3606	South of 20101 Front Street	<10	<10	<10	420	2,200	961
OF-3611	CMP at Windsong Apartments	<10	<10	<10	30	80	49
OF-3613	Nelson Park north of Hidden Cove Apts.	NA*	<10	<10	1,440	880	1,126
OF-3613 R	Duplicate sample of OF-3613	350	<10	59	1,420	280	631
OF-3701	24" CMP at north end of American Legion Park	50	10	22	730	40	171
OF-3702	Cast Iron outfall at south end of American Legion Park	No flow	<10	<10	<10	80	80
OF-3703	24" CMP at American Legion Park	70	<10	70	320	240	277
OF-3703 R	Duplicate sample of OF-3703	40	30	35	280	420	343
OF-3704	Liberty Shores Creek at retirement home	40	20	28	>2,000	180	600
OF-3707	East end of bioswale behind Ken's Auto	30	10	17	380	300	338
OF-3801	Anderson Parkway-south side of Gazebo on beach	<10	<10	<10	>2,000	<20	200
OF-3804	Port of Poulsbo main parking lot, landward of fuel dock gangway	60	<10	24	320	200	253
OF-5403	Outfall on beach near Fjord Drive at 9th Ave.	20	<10	14	240	200	219
Legend:	Low: 0 – 100 Wet GMV						
	Medium: 101 – 499 Wet GMV						
	High: > 500 Wet GMV						

Table 2-5. Summary of 2015 Stormwater Sampling (continued)

Station ID Streams	Description	11/14/2015 Dry	11/25/2015 Dry	GMV Dry	12/3/2015 Wet	12/10/2015 Wet	GMV Wet
	FRESHWATER OUTFALLS						
PSW4	SR305 stormwater outfall @ SFDC	<10	<10	<10	110	20	47
PSW6	Poulsbo Village outfall, SR305 at Liberty Rd., NW corner	10	10	10	380	340	359
PSW7	East Caldart Ave. basin, from culvert east of 1508 Hostmark St.	60	<10	24	160	120	139
PSW8	Photo of bank by high school - new location is on Mesford	No flow	50	50	310	500	394
PSW15	SR305 outfall near O'Reilly's	110	<10	33	550	360	445
PSW17	Ditch near Centennial Park	No flow	No flow	No flow	580	560	570
PSW40	Bjorgen Creek channel below 24" and 18" outfalls	20	<10	14	150	1,200	424
PSW41	Outfall to Bjorgen Creek at spillway below middle school	No flow	20	20	290	180	228
OF-8001	Kevos Pond / Ridgewood basin	No flow	20	20	300	800	490
Legend	Low: 0 – 100 Wet GMV						
	Medium: 101 – 499 Wet GMV						
	High: > 500 Wet GMV						



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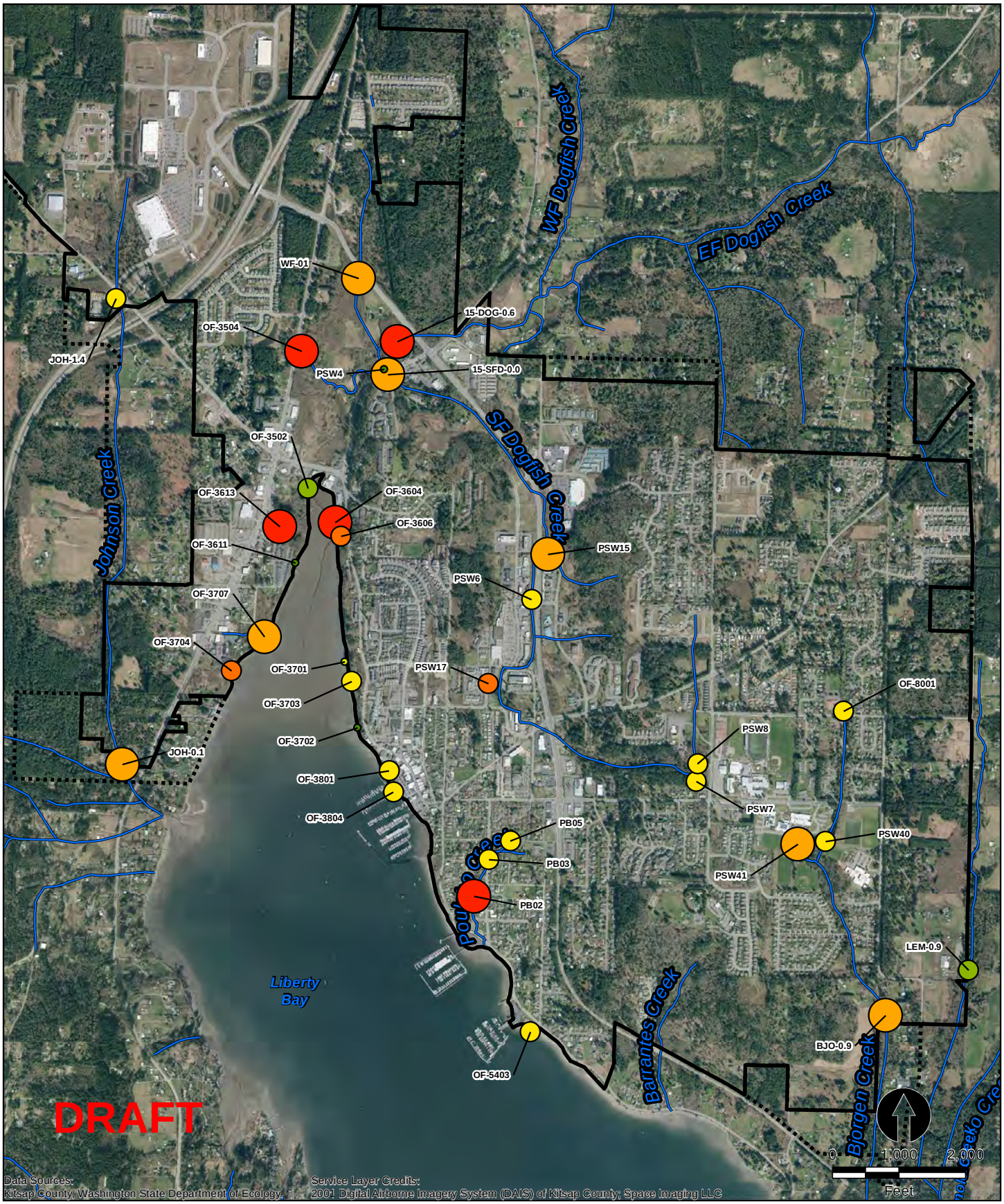
Streams
City of Poulsbo
PUTA

Stream Station
Marine Outfall
Freshwater Outfall

Figure 2-13
2015 Water Quality Monitoring Locations
Stormwater Comprehensive Plan
City of Poulsbo



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Streams
City of Poulsbo
PUTA

FC Load
Low
Medium
High

FC Water Quality
Good
Moderate
Poor

Figure 2-14
2015 Water Quality Study Summary
Stormwater Comprehensive Plan
City of Poulsbo

2.3.4.3 Stream FC Loading Trends and Comparison to TMDL Targets

Load analysis uses flow volume and FC concentration to calculate total number of FC in a discharge per unit of time and is expressed as billions of colony forming units per day (bcfu/day). FC loading data was developed as part of the Ecology's TMDL Plan, and is summarized in 2-6.

Stream sampling from 2015 was compared to data collected as part of Ecology's TMDL study in 2008-09. A direct comparison for wet weather results was not possible due to the lack of rain event data in 2008-2009. Dry weather conditions are compared in Table 2-6 and show that conditions in 2015 appear to be improved compared to 2009; however, this conclusion should be viewed with caution due to the relatively small 2015 data set.

Table 2-6. Comparison of Dry Weather Stream Sampling Results, 2009 to 2015

		FC Concentration			Reduction	
Station ID	**Description**	**2009 FC/100 ml GMV**	**2009 Target Value**	**2015 FC/100 ml GMV**	**Target Reduction**	**Actual Reduction**
PB-02	Poulsbo Creek, downstream culvert at Sommerseth St.	302	27	24	91%	92%
LEM 0.9	Lemolo Creek at Heron Pond Lane	63	11	10	83%	84%
BJO-0.9	Bjorgen Creek at Storhoff Road culvert	276	13	40	95%	86%
15-DOG-0.6	Mainstem Dogfish Creek	93	43	20	53%	78%
15-SFD-0.6	SFDC at Bond Rd. & 1st Avenue	62	31	53	50%	15%
JOH-0.1	Johnson Creek, mainstem at 18931 Viking Avenue	36	15	10	57%	72%

2.3.4.4 Water Quality Conclusions

Approximately $6 million in water quality corrective actions have been implemented in the Liberty Bay watershed over the past six years including stormwater retrofit of over 25 acres of impervious area, 47 OSS repairs, and 41 agricultural BMPs. The location and time-frame for these corrective actions generally coincides with observed water quality improvements at many locations including the head of Liberty Bay, Poulsbo Creek, and City stormwater outfalls at Anderson Parkway, Front Street, and Nelson Park.

Stormwater sampling results and basin analysis indicate that highest FC loading during wet weather conditions occurs from Dogfish Creek, SFDC, and Johnson Creek. Highest FC concentrations are typically found in stormwater outfall discharges located in middle segment of SFDC, the middle segment of Poulsbo Creek, the Torval Canyon area, and the central and south Viking Avenue basins. Poulsbo Creek has shown significant water quality improvement since Ecology's TMDL study in 2008-09. Overall, while stormwater from Poulsbo outfalls has elevated FC concentrations, values are typically well below the Puget Sound median concentration of 4,500 FC/100 ml (Ecology 2011).

2.3.5 Summary of Habitat Conditions

The PTIP Watershed assessment included evaluation of habitat conditions within the City including stream, wetland, shoreline, and riparian areas. The assessment was based primarily on existing studies, with emphasis on potential impacts due to stormwater runoff.

Stormwater can effect fish and wildlife habitat by influencing the physical condition of streams and wetlands, as well as the quality of receiving waters. Numerous studies have linked increases in impervious surfaces such as roofs and parking lots to changes in stream flows and pollutant loading. Significant changes to stream habitat are generally observed when the effective impervious area (the area directly connected via pipes and conveyance systems) in a basin reaches 10 percent. Above the 10 percent impervious threshold, there are substantial increases in stream peak flow frequency and magnitude, channel degradation, and disruption to streambed sediment stability and composition.

All significant perennial stream basins in Poulsbo are over 10 percent impervious area, with South Fork Dogfish Creek and Bjorgen Creek over 20 percent TIA. Figure 2-15 summarizes impervious surfaces in major Poulsbo stream basins under both existing and full build out conditions. Figure 2-16 summarizes existing habitat conditions.

Habitat impacts associated with stormwater are most prevalent in the SFDC and Bjorgen Creek basins where dense urban development exists with little or no stormwater detention or treatment (Figure 2-15). Habitat impacts include both hydrologic alterations such as streambed scour and aggradation, as well as water quality impacts from sedimentation and low dissolved oxygen. Habitat impacts also result from fish passage barriers on Bjorgen Creek, Lemolo Creek, and SFDC, as well as shoreline armoring and erosion at Poulsbo Creek and several stormwater outfalls in the American Legion Park vicinity.

Potential habitat improvements include restoring degraded stream habitat on SFDC near 8th Avenue and Centennial Park, replacing barrier culverts on SFDC and Bjorgen Creeks, and improving stormwater quality and quantity control in the SFDC and Bjorgen Creek basins. Additionally, rehabilitation of deteriorated shoreline stormwater outfalls would improve nearshore habitat by reducing erosion and replacing riprap rock armoring with shoreline stabilization techniques that are more sustainable and provide greater habitat value.

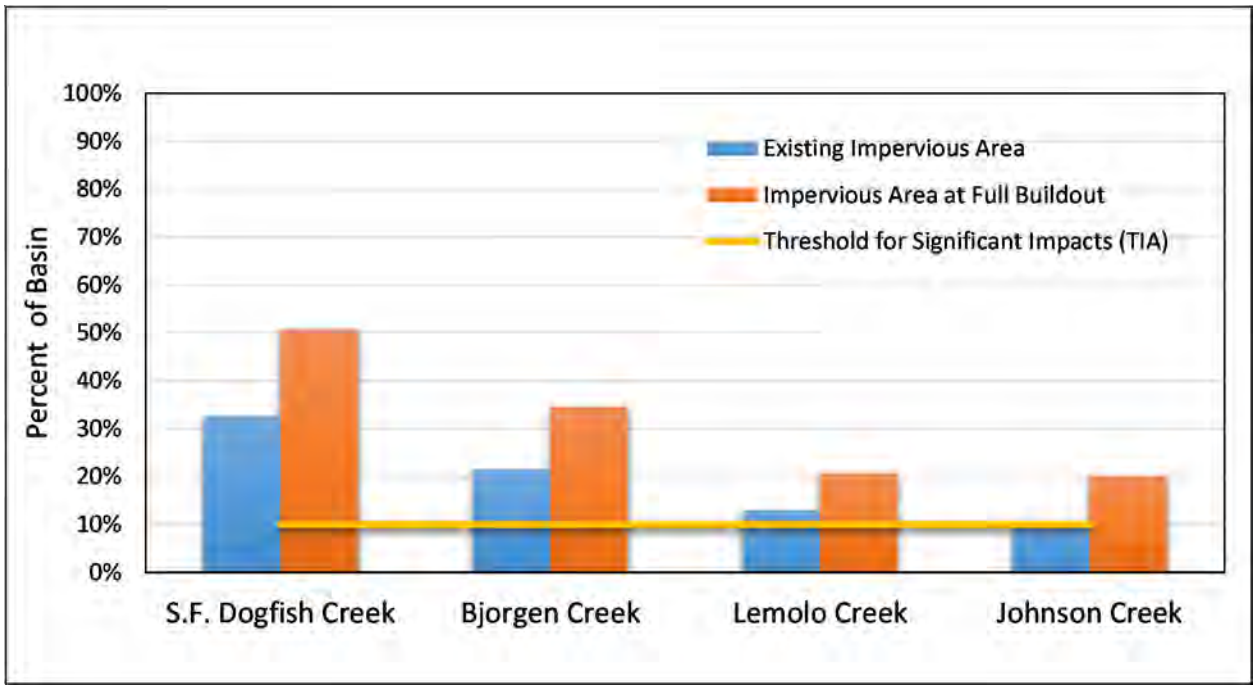
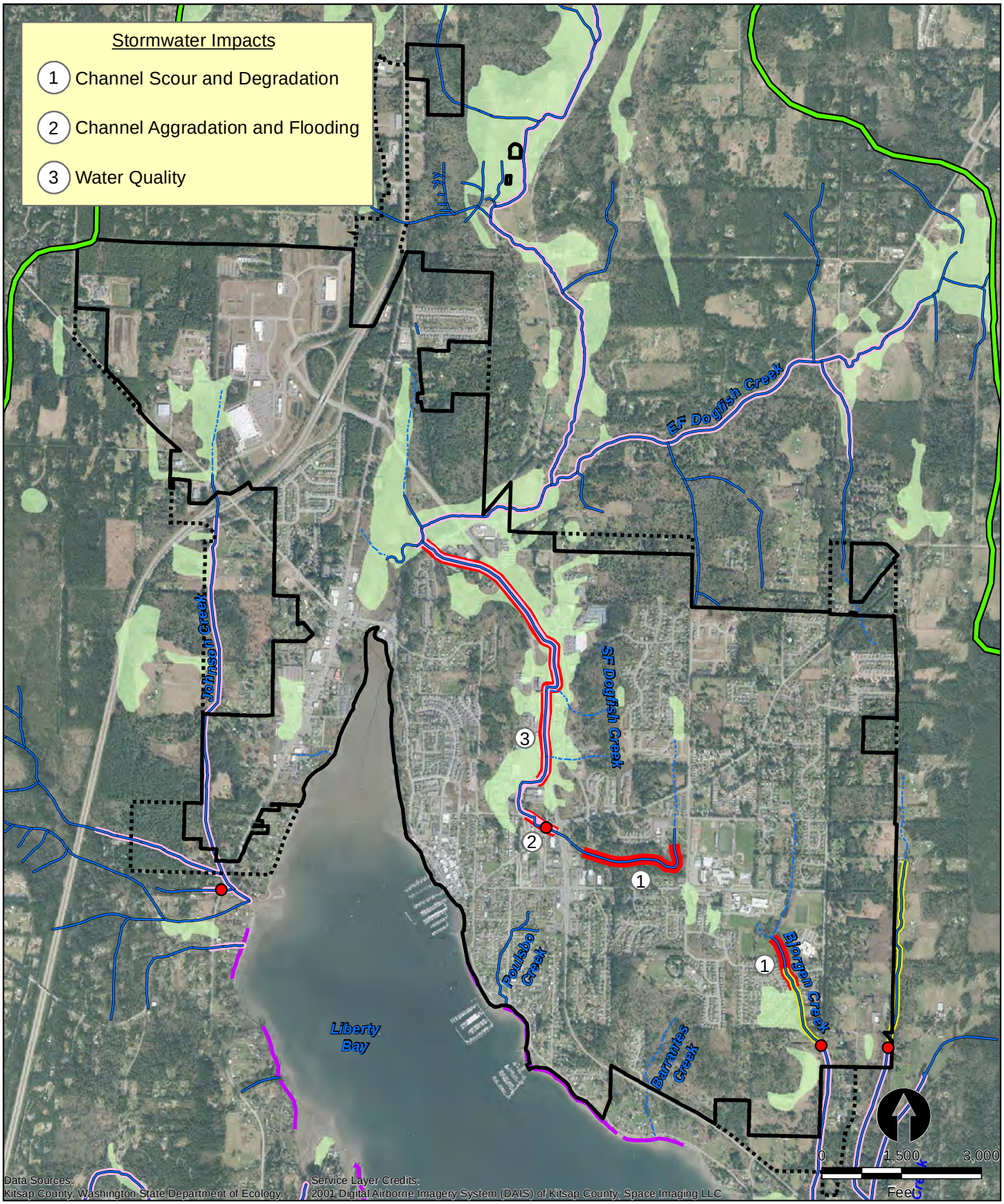


Figure 2-15. Impervious Surfaces in Fish Bearing Streams



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Liberty Bay Watershed
City of Poulsbo
PUTA
Wetlands & Hydric Soils
Intermittent Stream
Stream
Anadromous Salmonids & Resident Cutthroat
Resident Cutthroat Trout
Stormwater Impacts
Forage Fish Spawning Habitat
Fish Passage Barrier
Deteriorated Outfalls

Figure 2-16.
Fish and Wildlife Habitat

Stormwater Comprehensive Plan
City of Poulsbo

3 NPDES PERMIT COMPLIANCE

The federal Clean Water Act of 1972 established water quality goals for the surface waters of the United States. One of the mechanisms for achieving the goals of the Act is the NPDES permit program, which is administered in Washington by Ecology. The NPDES program was to protect and restore water quality in surface waters and to support "beneficial uses" such as shellfishing and swimming.

Governmental and private entities that discharge water or wastewater to surface waters regulated by the Federal Government (Waters of the United States) must obtain an NPDES permit and comply with certain conditions or face fines and other penalties. In 2007, all western Washington "Phase II" cities and counties were issued an NPDES permit for stormwater discharges.

The NPDES permit has a significant impact on the workload and operational budget of the both the Engineering Division and the maintenance staff within the Public Works Department. Currently, it is estimated that more than 50 percent of the stormwater Utility operational budget is spent on NPDES permit compliance related tasks.

3.1 NPDES PERMIT REQUIREMENTS

The NPDES permit allows municipalities to discharge stormwater from municipal systems into "waters of the state" subject to specific terms and requirements. The permit requires programs to be established and implemented on a specific timeframe to reduce pollutants in stormwater to the "maximum extent practicable." The permit requires the creation and implementation of a Stormwater Management Program (SWMP) which addresses permit requirements, including TMDL requirements for Liberty Bay receiving waters.

The City's NPDES compliance program is summarized in the *City of Poulsbo Stormwater Management Program - 2016 Update*, which addresses the following NPDES permit requirements:

- Public Education and Outreach
- Public Involvement and Participation
- Illicit Discharge Detection and Elimination
- Controlling Runoff from New Development, Redevelopment, and Construction Sites
- Pollution Prevention and O&M for Municipal Operations
- Total Maximum Daily Load Requirements (TMDL)
- Monitoring and Assessment

The City is in compliance with all elements of the NPDES permit. Table 3-1 summarizes NPDES permit requirements, implementation measures, and compliance status. Readers desiring more detail on NPDES permit requirements and issues should refer to the *City of Poulsbo Stormwater Management Program - 2016 Update*, available on line at: www.cityofpoulsbo.com/publicworks/publicworks_stormwater_management.htm.

Table 3-1. Summary of NPDES Permit Requirements and Compliance

Permit Element	Requirements	Implementation Activities	Compliance Status	Schedule
Public Education and Outreach	Develop program to reduce behaviors that result in adverse water quality impacts. Create stewardship and partnering opportunities.	Partner with Kitsap County and other local agencies on education and outreach. Distribute educational materials to homeowners, and business.	Complete	Compliance activities on-going
Public Education and Outreach	Provide opportunities for public involvement through advisory councils, committees or other similar activities. Make the Annual SWMP Report available to the public and post on the City's website.	Public involvement opportunities are available at meetings of the City Council, Planning Commission, Public Works Committee (a sub-committee of City Council members and staff), open house meetings, and TMDL Plan stakeholder meetings. The SWMP Annual Report is posted on the City's website	Complete	Compliance activities on-going
Illicit Discharge Detection and Elimination (IDDE)	Develop an ongoing program to detect and identify non-stormwater discharges and illicit connections into the stormwater system. Maintain a storm sewer map that identifies outfalls, receiving waters, stormwater treatment and flow control BMPs owned or operated by the City. Implement an ordinance to prohibit non-stormwater, illicit discharges.	IDDE program developed in 2009 in partnership with the KPHD to monitor, detect and correct illicit connections including annual storm outfall monitoring. Developed private facility maintenance program and ordinance. Completed outfall and storm system mapping in 2014.	Complete	Compliance activities on-going
Controlling Runoff from New Development, Redevelopment, and Construction Sites	Develop, implement, and enforce a program to reduce pollutants in stormwater runoff from new development, redevelopment, and construction site activities. Incorporate LID methods and principles into PMC. Annually inspect all treatment and flow control facilities permitting by the City.	Adopted 2005 Ecology Stormwater Management Manual. Adopted Ordinance 2010-01 updating operation and maintenance requirements. Started LID code update process.	Adopt 2016 Ecology Manual and develop LID updates to PMC by December 31, 2016.	In progress

Table 3-1. Summary of NPDES Permit Requirements and Compliance (continued)

Permit Element	Requirements	Implementation Activities	Compliance Status	Schedule
Municipal Operations and Maintenance	Inspect City owned or operated water quality treatment and flow control facilities and catch basins. Establish and implement practices to reduce stormwater impacts from City owned lands and from road maintenance activities. Develop and implement on-going training program for City staff. Develop and implement a Stormwater Pollution Prevention Plan for all heavy equipment maintenance or storage yards and material storage and material storage facilities owned or operated by the City. Maintain records of inspections and maintenance or repair activities.	The City's Operations and Maintenance (O&M) Program adopts the standards of the 2005 Manual. Training is provided via on-the job skill training by peers/supervisors, classroom-type O&M training, and related education such as IDDE. A Stormwater Pollution Prevention Plan (SWPPP) is in place and operational for all heavy equipment maintenance or storage yards and material storage facilities owned or operated by the City. Records of inspections, maintenance, and repair activities are maintained.	Complete	Compliance activities on-going
Compliance with Total Maximum Daily Load Requirements (TMDL)	Comply with the specific requirements of Liberty Bay TMDL Plan. Maintain records of actions applicable to the TMDL shall and prepared annual reports describing TMDL implementation status and a summary of relevant activities.	The City is preparing a TMDL implementation plan that will be complete in 2016. Plan elements include a watershed assessment; methods for achieving water quality improvements; an effectiveness monitoring plan; a capital improvement plan; updates to City development codes that will help address TMDL requirements; a financial plan; and an implementation plan for meeting TMDL requirements.	Develop TMDL Implementation Plan in 2016	In progress
Monitoring	Participate in region stormwater monitoring program.	The City is participating in the regional stormwater monitoring program.	Complete	Compliance activities on-going

4 OPERATION AND MAINTENANCE

The City operates and maintains an extensive system of storm drainage infrastructure that includes catch basins, manholes (junction and flow control), stormwater pipes, detention ponds, detention vaults, water quality facilities, ditches, and other infrastructure. Table 4-1 summarizes existing City stormwater facilities and O&M requirements.

Table 4-1. Summary of Operation and Maintenance Requirements

Stormwater Facility	Unit	No.	Maintenance Requirement
Conveyance System			
Catch Basins	Ea	2,500	Inspect 1x/yr, clean 25%/yr
Pipe	LF	324,034	Clean 5,000 LF/yr. Replace 1,500 LF/yr
Streets	SF	236,700	Clean 50%/yr
Detention, Infiltration, and Treatment Systems			
Detention and Infiltration Ponds	Ea	22	Inspect and maintain each 3x/yr
Bioswales		31	Mow and clean 3~5x/yr
Ditches	LF	15,000	Mow and clean 1x/yr
Bioinfiltration and bioretention	Ea	11	Clean 3x/yr
Solids removal vaults	Ea	11	Inspect and clean 1x/yr
Tree Box Filterra Vaults	Ea	17	Inspect and clean 1x/yr
Underground facilities	Ea	23	Inspect and clean 1x/yr
Oil/water separators	Ea	2	Inspect and clean 1x/yr

Note: LF = linear feet

4.1 O&M COSTS

O&M costs were reviewed as part of the *Stormwater Operations and Rate Evaluation* prepared by the City in 2014. This evaluation identified all City stormwater facilities, maintenance requirements, and costs, as well as funding options. Table 4-2 summarizes O&M costs under the base year 2015 condition, and anticipated 2018 conditions.

Table 4-2. Summary of Operation and Maintenance Costs

O&M Element	2015 Cost	2018 Cost
Inspections	$39,592	$44,533
Catch basin cleaning and replacement	$38,496	$87,031
Pipe cleaning and repair	$39,000	$39,000
Street cleaning	$31,166	$33,643
Detention and infiltration ponds	$60,690	$68,225
Ditches	$12,400	$12,400
Bioswales	$55,840	$55,840
Bioretention	$33,200	$33,200
Solids separator vaults	$7,373	$12,766
Tree box Filterra vaults	$6,705	$24,995
Underground detention vaults	$34,980	$42,530
Oil/water separators	$1,770	$1,770
Miscellaneous small works	$14,630	$14,630
Training and documentation	$13,015	$13,015
Equipment maintenance	$7,615	$7,615
Totals	**$396,472**	**$491,193**

4.2 FUTURE O&M NEEDS

Future O&M needs will be influenced by growth in the City, as well as development of regional facilities and construction of LID facilities such as bioretention that tend to require more O&M resources. O&M costs should therefore be reviewed on a periodic basis to ensure that LOS criteria are being met, and that existing rates are sufficient to support needed O&M levels.

5 REGIONAL FACILITIES PLAN

Regional stormwater facilities serve larger drainage areas and multiple properties. They typically supplement the stormwater system within a defined area and are used to convey, treat and detain stormwater before it is released to surface receiving waters, or percolates back into the ground. Regional facilities are commonly used at strategic locations to provide the greatest improvement to stormwater in the most economical manner.

Individual, on-site detention ponds or vaults for each development is the most common approach to stormwater management; however, there are disadvantages to individual site facilities:

1. **Cost.** On-site facilities typically cost more per acre of development to construct and to maintain than regional facilities.
2. **Maintenance.** Small facilities or underground vaults are more easily neglected because they are often out of sight and therefore out of mind.
3. **Performance.** When neglected, a facility is less likely to achieve pollutant removal goals and may become unattractive.

A major limitation to the individual site approach is that it is triggered only by new development and redevelopment. In other words, if a section of the City does not redevelop, that area will likely not be upgraded to meet current standards. As the City faces the requirement to address water quality on a basin or watershed (i.e., regional) scale, there becomes a concurrent need to find economically feasible approaches to retrofit those areas. With the City's emerging water quality responsibilities at the regional level, a regional approach to stormwater management may be preferred in some circumstances and has potential to provide both significant water quality and economic (re)development and revitalization benefits.

5.1 BENEFITS OF REGIONAL FACILITIES

In newly developing areas, properties prime for redevelopment, or in portions of the City that need to be retrofitted with stormwater facilities, the City may choose to install strategically located regional facilities. Benefits of regional facilities include:

1. They can be significantly more cost-effective because it is easier and less expensive to build a single large facility than several small ones.
2. The City is able to allocate staff to maintain a few large facilities, rather than review, inspect, and enforce maintenance of multiple private facilities. This results in an increased assurance of continued effectiveness of the facility. Additionally, the high visibility of large, regional ponds helps to ensure they are well maintained.
3. Through careful planning, regional facility construction can be prioritized to focus efforts on the highest priority areas for water quality or quantity control.
4. Construction of regional facilities affords an opportunity to retrofit larger portions of the City that do not have stormwater controls meeting current standards.

5. The lower construction and O&M costs associated with regional facilities can provide an economic incentive for re-development.
6. Regional ponds not only provide benefits for stormwater treatment and flood prevention, but also provide aesthetic benefits and wildlife habitat.

Regional detention pond at Mountain Aire development.

The primary disadvantages of regional facilities are property costs and financing. Locating and obtaining property for large facilities is a challenge due to land availability and property costs. In most cases, the City will also provide capital construction funds for a regional facility, including the costs of land acquisition.

However, if a downstream developer is the first to build, that person could be required to construct the facility and later be compensated by upstream developers for the capital construction costs and annual maintenance expenditures through a late-comers agreement or other similar mechanism. One potential approach is for the City to use a combination of bonds and rates for construction, with revenue from developer contributions to repay those costs as new projects within the basin are developed.

5.2 APPROACH TO DEVELOPMENT OF REGIONAL FACILITIES

Regional facilities are one of several stormwater management approaches/tools that are available and used by the City. Other approaches are the individual lot approach and the LID approach. All three of these approaches have advantages, and they are all part of the City's integrated approach to stormwater management.

Regional facilities are best suited for older developed portions of the City where little stormwater treatment facilities exist. These areas will not be required to meet new stormwater requirements until they re-develop, which could take several decades or more. In the interim, the City must continue to meet NPDES permit requirements, address Liberty Bay TMDL Plan requirements, and provide cost-effective infrastructure that helps to support and encourage re-development.

Manchester Stormwater Park regional facility in south Kitsap County.

These factors all contribute to City policy that favors accelerating retrofits of older developed portions of the City via regional facilities that meet current standards, rather than waiting for private re-development. This approach results in construction of treatment facilities that provide a higher level of water quality protection in streams and Liberty Bay than if development had gone forward using a site-

by-site approach, which expedites compliance with local, state and federal stormwater initiatives such as the Liberty Bay TMDL Plan.

5.3 COMPONENTS OF THE REGIONAL FACILITIES PLAN

The regional facility plan has the following components:

1. Determination of potential regional facility needs.
2. Development of policies governing new and re-development within the service area (contributing basin) of the regional facility.
3. Preparation of the regional facility CIP.
4. Development of code updates to the PMC that describe specific procedures and requirements for the development, construction, and financing of regional facilities.
5. Development of individual engineering and financial plans for specific regional facilities.

Each of these elements is described in greater detail below.

5.3.1 Regional Facility Needs

Potential regional facility needs have been developed based on a combination of prior studies and assessments performed by the City, and priority economic re-development zones. Prior studies consist of:

1. *Watershed Assessment for the Liberty Bay TMDL Implementation Plan* (SES 2016). This study identified potential regional facility locations that would be associated with meeting TMDL Plan requirements.
2. *Viking Avenue Stormwater Retrofit PreDesign Report* (Parametrix 2015). This report evaluated options for retrofitting Viking Avenue and adjacent developed areas.
3. *Poulsbo Village Basin Assessment* (Parametrix 2014). This report assessed options for conveying and treating stormwater from the basin that includes Poulsbo Village.

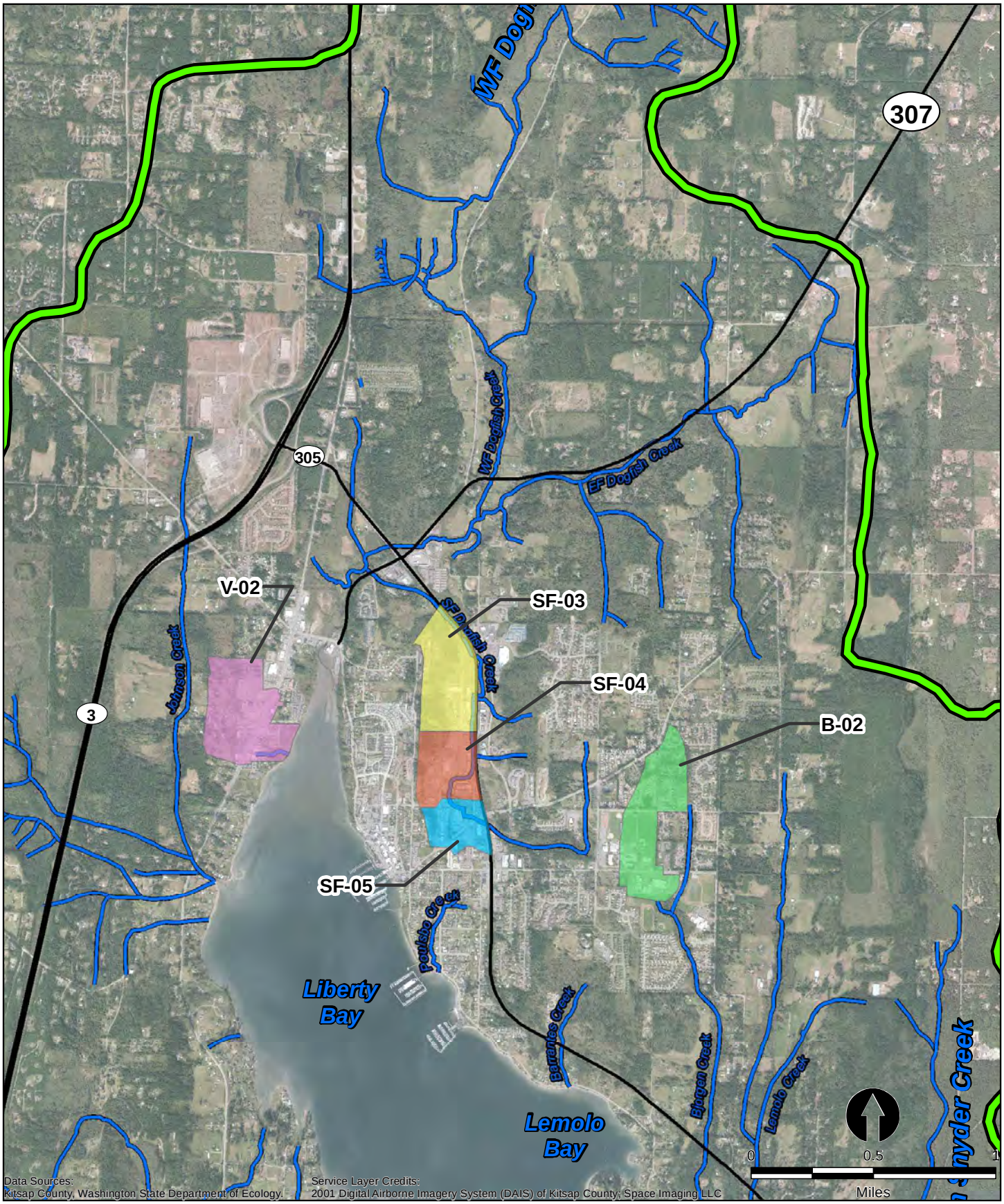
Table 5-1 summarizes potential regional facilities concepts and costs that were developed as part of these studies and are included in the 2016-2021 CIP. Service areas for these contributing basins is shown in Figure 5-1. Refer to schematic design figures in Appendix A for details on potential regional facility type, size, and location.

Table 5-1. Potential Regional Facilities Descriptions and Costs

Project	Description	Total Est. Cost
Viking Avenue Stormwater Park	Water quality treatment for 80-acre basin in south central Viking Avenue corridor	$1,970,000
Poulsbo Village Regional Detention	Detention and potential water quality treatment for 112-acre basin including 7th Avenue and Poulsbo Village	$1,840,000
South Fork Dogfish Creek Restoration	Water quality treatment and detention for 32-acre basin including Public Works site and Library	$1,211,000 1/
NKSD/Upper Bjorgen Creek Basin Retrofit	Water quality treatment and detention for 76-acre basin that includes NKSD campus and the Ridgewood/Kevos Pond area	$920,000

Note:
1/ Stormwater elements only, does not include stream restoration or culvert removal.

Regional facilities shown in Table 5-1 and Figure 5-1 are only those facilities that have been identified to date. Additional regional facilities may be identified in the future by either the City or private developer.



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Liberty Bay Watershed
City of Poulsbo
PUTA
Highway

Figure 5-1
Basins Served by Regional Facilities
Stormwater Comprehensive Plan
City of Poulsbo

5.3.2 Regional Facility Policies

The following policies may be associated with the City's regional stormwater facility program:

1. New development or redevelopment projects that are located within a basin that drains to an existing or proposed regional stormwater facility, may be allowed (or required) to contribute toward the cost of constructing that facility in lieu of building onsite improvements.
2. If the regional facility project has been constructed, then payment of the fee will be required and onsite improvements will not be required.
3. If the regional facility project has not been constructed, but the regional facility project is on the City's approved CIP, then payment of the fee in lieu of onsite improvements will be at the discretion of the City Engineer.
4. The amount of the contribution will be proportionate to the amount of impervious area being added to the property relative to the capacity of the regional facility. For example, a new development that consumes 10 percent of the capacity of the regional facility shall contribute 10 percent of the total facility cost.

Contribution in lieu of providing onsite flow control or water quality treatment is an option for new or redevelopment projects if the following conditions are met:

1. Allowing the contribution in lieu of providing onsite flow control or water quality does not create an unsafe situation.
2. Appropriate onsite source control procedures are implemented (for regional detention facilities).
3. The downstream system shall have adequate capacity to convey the undetained flow for the required maximum return period storm events without causing or aggravating any downstream flow-related problems such as flooding or erosion.
4. Onsite treatment may be required if the regional facility doesn't meet all the requirements mandated for the development (i.e., if a development needs enhanced treatment and the regional facility only provides basic treatment, the regional facility may be the second part of a treatment train).
5. The City Engineer approves the contribution in lieu of onsite improvements as being consistent with the City's stormwater program goals and objectives.
6. The amount of the contribution is proportionate to the amount of impervious area being added to the property.

5.3.3 Financial Considerations

Financial feasibility of regional facilities will be dependent on a number of factors including availability of grant funding, whether bond financing will be used, and expectations for timing and type of redevelopment. At this time, the Viking Avenue and South Fork Dogfish Creek

regional facilities are being considered for grant funding. Assuming grant funding is obtained for a portion of the project, future developer contributions would be associated with the proportionate share of the project funded by the City. The Poulsbo Village and NKSD regional facilities are currently not scheduled. Due to the significant water quality retrofit elements, the NKSD regional facility may be a candidate for future grant funding. The Poulsbo Village regional facility would be primarily detention oriented, and would serve primarily private development and would therefore not be a strong candidate for grant funding. Funding via accumulated rate revenue and/or bonds would likely be necessary.

5.3.4 Regulatory Considerations

Regulatory compliance for grant funded regional projects would be assured by using of the Ecology 2012 Manual for facility design. Regulatory compliance for the Poulsbo Village regional facility would be secured via preparation of a Design Report that documents design criteria, capacity and compliance with Ecology's 2012 Manual. Preparation of a Design Report is included in the estimated project cost.

6 CAPITAL IMPROVEMENT PLAN

The CIP identifies the specific facilities, relative priorities and costs of capital projects that address and implement LOS criteria. This SWCP groups projects into categories that reflect the purpose and potential funding sources for each type of project. Projects are grouped into Water Quality/TMDL, Habitat, Flood Control, and Maintenance and Repair categories to reflect differences in how projects are evaluated, funded, and managed.

1. Water Quality and TMDL projects are associated with correcting a known water quality deficiency or implementing a priority action associated with the Liberty Bay TMDL Plan.
2. Habitat projects include stream enhancement, fish access, and associated wetlands and flood plains restoration. These projects focus on protecting, restoring, and enhancing water quality, fish and wildlife habitat and human-to-nature interface.
3. Flood Control projects address known problem areas that are not adequate to handle storms without flooding. This normally include pipes or ditches that are too small or are regularly clogged by debris or sediment.
4. Maintenance and Repair projects restore or improve the function of existing systems, even though there is no associated flooding. This may be associated with replacement of facilities that have reached the end of their useful life.

6.1 IDENTIFICATION, SELECTION, AND PROGRAMMING OF PROJECTS

Projects were first identified via the City's existing stormwater CIP, and supplemented with the results of the PTIP watershed assessment and other studies. Costs for projects that were on the City's existing CIP were confirmed, and supplemented with projects identified via the PTIP Watershed Assessment, which determined corrective action priorities through an integrated evaluation of water quality, habitat, and infrastructure information. Based on the PTIP watershed assessment, the following basins were determined as the highest priority basins for corrective action:

1. South Fork Dogfish Creek Basin near 8th Avenue and Poulsbo Village

   This 78-acre portion of the SFDC basin is located between the SR305-Lincoln Road intersection, and the 7th Avenue-SR305 intersection. This area includes the Poulsbo Public Works Complex, the Poulsbo Library, and the Poulsbo Village commercial zone. These basins have high FC concentrations, concentrated urban commercial development, and high proportion of untreated impervious surfaces. Stream habitat is degraded by barrier culverts, channel erosion, and channel aggradation. This area is the highest priority for action based on the watershed assessment.

2. South Central Viking Avenue

   This 80-acre basin includes much of the south central Viking Avenue and adjacent commercial area. The basin is approximately 50 percent TIA, with large areas of parking and commercial land use. The majority of impervious area in the basin is untreated, and discharges have high FC concentration and load.

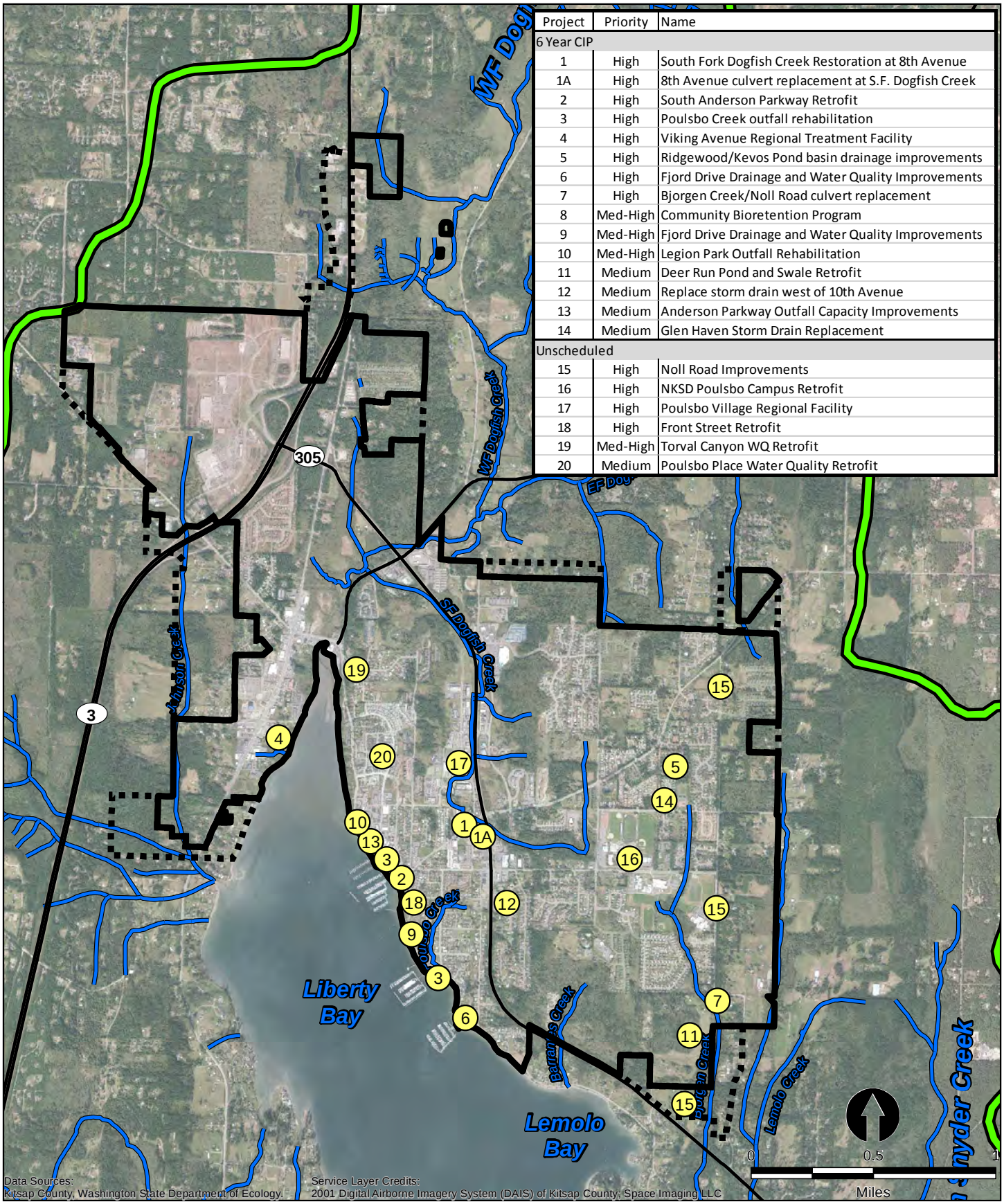
3. Upper Bjorgen Creek Basin above North Kitsap School District Campus

   This 76-acre basin includes much of the NKSD campus, and the Ridgewood and Kevos Pond neighborhoods. There is no significant stormwater treatment in this basin, and discharges have high FC concentration and load. Stream habitat is degraded by channel erosion associated with high peak flows.

Specific projects were developed to address each of the high priority sub-basins identified via the watershed assessment. The combined list of existing CIP projects and proposed PTIP priority projects were then screened, compared, and rated relative to a set of criteria that included water quality, flood control, habitat, and community development criteria. Table 6-1 summarizes scoring criteria, and Appendix A provides ratings of individual projects.

Table 6-1. Summary of Project Rating Criteria

Criteria	Maximum Possible Score
Water Quality	21
Flow Control	18
Flood Reduction	20
Habitat	18
Economic Development and Partnerships	20
Puget Sound Partnership Strategic Initiatives	5
Public Complaints and Perceptions	5
Operation, Maintenance and Infrastructure Replacement	10
Maximum Potential Score	**127**



Project	Priority	Name
6 Year CIP		
1	High	South Fork Dogfish Creek Restoration at 8th Avenue
1A	High	8th Avenue culvert replacement at S.F. Dogfish Creek
2	High	South Anderson Parkway Retrofit
3	High	Poulsbo Creek outfall rehabilitation
4	High	Viking Avenue Regional Treatment Facility
5	High	Ridgewood/Kevos Pond basin drainage improvements
6	High	Fjord Drive Drainage and Water Quality Improvements
7	High	Bjorgen Creek/Noll Road culvert replacement
8	Med-High	Community Bioretention Program
9	Med-High	Fjord Drive Drainage and Water Quality Improvements
10	Med-High	Legion Park Outfall Rehabilitation
11	Medium	Deer Run Pond and Swale Retrofit
12	Medium	Replace storm drain west of 10th Avenue
13	Medium	Anderson Parkway Outfall Capacity Improvements
14	Medium	Glen Haven Storm Drain Replacement
Unscheduled		
15	High	Noll Road Improvements
16	High	NKSD Poulsbo Campus Retrofit
17	High	Poulsbo Village Regional Facility
18	High	Front Street Retrofit
19	Med-High	Torval Canyon WQ Retrofit
20	Medium	Poulsbo Place Water Quality Retrofit

Prepared by Sealaska Environmental, E:\PMX-TMDL\Stormwater Management Plan\MXD\Fig_6-1_CIP_Locations.mxd, February 16, 2016.

1 CIP Locations
Liberty Bay Watershed
City of Poulsbo
PUTA
Highway

Figure 6-1
Capital Project Locations
Stormwater Comprehensive Plan
City of Poulsbo

Projects were then prioritized as either high, medium, or low based on scores. Project prioritization will be reviewed and revised annually based on new information, funding availability, and specific project needs.

The next step in the CIP was to program projects into a plan and schedule that considered the project cost, potential funding source, and project timing. Appendix B provides project programming information.

6.2 PROJECT COST FUNDING ASSUMPTIONS

Project costs are based on planning level estimates that reflect concept design level information. Concept design information is provided in Appendix C, and individual project cost estimates are provided in Appendix D.

Initial project funding assumptions reflected the approach used in the *City's 2014 Stormwater Operations and Rate Evaluation*; capital funding is to be in the range of $900,000 per year, with 50 percent funded via utility rates and 50 percent funded with grants. Following completion of the project identification process, additional funding sources were identified to address potential financial gaps. These funding sources are addressed in greater detail in Chapter 7.

6.3 CIP SUMMARY

The recommended stormwater CIP project plan for 2016 through 2021 is summarized in Table 6-2. Figure 6-1 shows project locations.

Table 6-2. City of Poulsbo Stormwater Utility CIP Summary

CIP Project No.	Priority Level	Project Score	PROJECT	Project Type [1]	YEAR 2016	2017	2018	2019	2020	2021	Total 6 Yr CIP	Not Scheduled
CAPITAL PROJECTS, 6 YEAR PLAN, 2016- 2022												
C-1	High	76	South Fork Dogfish Creek Restoration at 8th Avenue	WQ, H, FC	$25,000	$200,000	$500,000	$500,000	$400,000		$1,625,000	
C-1A	High	69	8th Avenue culvert replacement at S.F. Dogfish Creek	H, FC	$25,000	$25,000		$400,000			$450,000	
C-2	High	69	South Anderson Parkway Retrofit	WQ	$380,000						$380,000	
C-3	High	69	Poulsbo Creek outfall rehabilitation	M/R, H		$25,000	$175,000				$200,000	
C-4	High	63	Viking Avenue Regional Treatment Facility	WQ, ED	$10,000	$700,000	$60,000	$600,000	$600,000		$1,970,000	
C-5	High	62	Ridgewood/Kevos Pond basin drainage improvements	FC	$30,000	$230,000					$260,000	
C-6	High	62	Fjord Drive WQ and Habitat Improvements	WQ, H, M&R	$35,000	$255,000					$290,000	
C-7	High	58	Bjorgen Creek/Noll Road culvert replacement	H, FC	$30,000		$320,000				$350,000	
C-8	Med-High	46	Community Bioretention Program	WQ	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$150,000	
C-9	Med-High	43	Fjord Drive Drainage and Water Quality Improvements	WQ, M/R	$10,000	$210,000					$220,000	
C-10	Med-High	43	Legion Park Outfall Rehabilitation	M/R, H					$120,000		$120,000	
C-11	Medium	37	Deer Run Pond and Swale Retrofit	WQ, M/R					$16,000	$184,000	$200,000	
C-12	Medium	37	Replace storm drain west of 10th Avenue	FC					$40,000		$40,000	
C-13	Medium	34	Anderson Parkway Outfall Capacity Improvements	FC					$15,000	$132,000	$147,000	
C-14	Medium	34	Glen Haven Storm Drain Replacement	FC					$10,000	$100,000	$110,000	
C-15	High	NA	Noll Road Improvements	WQ, H, FC		$930,000	$996,000	$999,000		$1,115,000	$4,040,000	
			Subtotal 6 Year CIP, 2016 - 2021		$570,000	$2,600,000	$2,076,000	$2,524,000	$1,226,000	$1,556,000	$10,552,000	
CAPITAL PROJECTS - NOT SCHEDULED												
C-16	High	75	NKSD Poulsbo Campus Retrofit	WQ, H								$920,000
C-17	High	61	Poulsbo Village Regional Facility	WQ, ED								$1,840,000
C-18	High	56	Front Street Retrofit	WQ, ED								$640,000
C-19	Med-High	44	Torval Canyon WQ Retrofit	WQ, FC								$470,000
C-20	Medium	39	Poulsbo Place Water Quality Retrofit	WQ								$810,000
			Subtotal Unscheduled CIP									$4,680,000
										TOTAL CIP	$15,232,000	
EXISTING FUNDING SOURCES - 6 YEAR CIP												
			WDOE Stormwater Grants - Awarded		$350,000	$125,000					$475,000	
			WDOE Stormwater Grants - Future Applications			$300,000	$300,000	$510,000	$510,000		$1,620,000	
			NTA/PSP/RCO Grants - Future Applications			$162,500	$300,000	$200,000	$200,000		$862,500	
			WSDOT Grants - Pending Award			$1,020,700	$1,133,540	$864,135		$964,475	$3,982,850	
			Subtotal Grants and Other Funding		$350,000	$1,608,200	$1,733,540	$1,574,135	$710,000	$964,475	$6,940,350	
			Stormwater Utility		$294,493	$297,438	$300,412	$303,416	$306,450	$309,515	$3,611,650	
			TOTAL EXISTING 6-YEAR FUNDING, 2016 -2021		$644,493	$1,905,638	$2,033,952	$1,877,551	$1,016,450	$1,273,990	$10,552,000	
			TOTAL EXISTING REVENUES - CAPITAL EXPENSES		$74,493	-$694,362	-$42,048	-$646,449	-$209,550	-$282,010	-$1,799,926	
CAPITAL CONTRIBUTION FROM NEW REVENUE SOURCES												
			Future General Facility Charge		$147,875	$149,354	$150,847	$152,356	$153,879	$155,418	$909,729	
			Future Traffic Impact Fees		$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$900,000	
			TOTAL 6-YEAR CITY NEW REVENUE CONTRIBUTION, 2016 - 2021		$297,875	$299,354	$300,847	$302,356	$303,879	$305,418	$1,809,729	
CAPITAL FUND BALANCE					**$372,368**	**-$395,009**	**$258,799**	**-$344,093**	**$94,330**	**$23,408**	**$9,803**	

Notes: WQ – Water Quality, H – Habitat, FC – Flood Control, ED – Economic Development, M/R – Maintenance and Repair

7 FINANCIAL PLAN

This financial plan describes the costs, revenues, and funding sources associated with implementing the SWCP. The financial plan focuses on the following elements:

1. Overview of the Utility's projected expenses and revenues,
2. Summary of existing rates and revenue sources, and
3. Options for addressing capital program funding gaps including GFCs and transportation impact fees.

7.1 FINANCIAL OVERVIEW OF STORMWATER UTILITY

The primary source of funds for the Utility come from rate payers, who pay an annual fee based on the extent that their property is developed. Development is measured by ISU, which is equivalent to 3,000 square feet. The City's monthly stormwater rate was established in 2014 and is currently set at $16.43 per ISU.

In general, rate revenues first go to annual operating expenses and taxes, with revenues that exceed these annual expenses available to fund capital projects. In 2014, the Utility collected $1,030,000 in rate revenue. By 2021, based on assumed rate increases and growth, rate revenues are expected to be about $1.43 million. Table 7-1 summarizes existing and future expenses and revenues.

As shown in Table 7-1, existing revenues are not sufficient to fund the proposed capital program. This is a result of the City's TMDL Implementation Plan project which was implemented subsequent to the 2014 rate evaluation and increase. The TMDL Implementation Plan has identified a number of capital improvement projects that are needed to further help the City reach TMDL targets, and the potential cost of these projects exceeds the capital contribution estimated as part of the 2014 rate evaluation. To address this funding gap, two new revenue sources are proposed; a GFC, and use of a portion of traffic impact fees. Each of these proposed revenue sources are described in more detail below.

7.2 PROPOSED GENERAL FACILITY CHARGE

A GFC is proposed for new connections to the City stormwater system. The GFC is a one-time charge and includes a pro rata share of the value of existing facilities (existing facility component) and a pro rata share of planned facilities (future facility component). The existing facility component offsets the historical contributions from existing customers used to construct the existing system that is of benefit to a new customer. The future facility component is a new customer's proportional share of the cost of capital improvements required to serve future growth and is intended to minimize the impact to existing customers to fund the construction of growth related facilities.

Table 7-1. Existing and Future Revenues and Expenses

ELEMENT	2016	2017	2018	2019	2020	2021	Totals
OPERATIONAL EXPENDITURES [1/]							
Salaries, wages, and benefits	$571,577	$577,293	$583,066	$588,897	$594,786	$600,733	$3,516,351
Services and supplies	$239,656	$242,052	$244,473	$246,918	$249,387	$251,881	$1,474,366
Interfund payment for services	$254,606	$257,152	$259,723	$262,321	$264,944	$267,593	$1,566,339
Total Expenditures	$1,065,839	$1,076,497	$1,087,262	$1,098,135	$1,109,116	$1,120,207	$6,557,057
CAPITAL EXPENDITURES							
Grants	$350,000	$1,608,200	$1,733,540	$1,574,135	$710,000	$964,475	$6,940,350
Capital Reserves	$220,000	$991,800	$342,460	$949,865	$516,000	$591,525	$3,611,650
Total Capital Outlay	$570,000	$2,600,000	$2,076,000	$2,524,000	$1,226,000	$1,556,000	$10,552,000
TOTAL REVENUE NEED	$1,285,839	$2,068,297	$1,429,722	$2,048,000	$1,625,116	$1,711,732	$10,168,707
EXISTING REVENUES							
Rates [1/]	$1,360,332	$1,373,935	$1,387,674	$1,401,551	$1,415,567	$1,429,722	$8,368,781
Subtotal Existing Revenue - Expenses	$74,493	-$694,362	-$42,048	-$646,449	-$209,550	-$282,010	-$1,799,926
PROPOSED NEW REVENUE SOURCES							
General Facility Charge [2/]	$147,875	$149,354	$150,847	$152,356	$153,879	$155,418	$909,729
Portion Traffic Impact Fee	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$900,000
TOTAL REVENUE - EXPENSES	**$372,368**	**-$395,009**	**$258,799**	**-$344,093**	**$94,330**	**$23,408**	**$9,803**

Notes:
[1/] Assumes one percent increase per year.
[2/] Assumes GFC charge of $1183 per ISU, with 125 new ISUs in 2015 increasing one percent per year.

7.2.1 Purpose and Scope

A GFC is applied to new development as a condition of service and represents a prorated share of investment in the system infrastructure related to providing system capacity to a new customer. In essence, the GFC enables new customers to purchase a portion of the system's capacity. The City currently has a GFC for both water and sewer service. The stormwater GFC would be applied to all new customers in a manner similar to the water and sewer GFC.

A stormwater GFC is typically calculated based on a combination of existing and future planned system costs, divided by the number of equivalent or impervious surface units (ISUs). In Poulsbo, an ISU is defined as the amount of impervious surfaces on a typical residential lot and is set at 3,000 square feet. The number of ISUs in the City is currently 7,635 and is based on measurements performed by the City.

7.2.2 GFC Cost Analysis

The Revised Code of Washington (RCW) addresses how a GFC should be determined. RCW 35.92.025, which authorizes cities and towns to charge for connecting to a water, wastewater, or stormwater system, requires that the charge be an equitable share of the cost of the existing system and may include up to 10 years of interest charges at a rate commensurate with the rate of interest applicable to the City at the time of construction. GFCs also include a pro rata share of the cost of future facilities planned in the next 6 to 10 years.

The pro rata share of the original cost of existing facilities is determined by dividing the cost of existing utility assets that will benefit future customers by the number of existing customers, or ISUs. The costs of existing utility infrastructure assets that will benefit future customers and used in this analysis is the reported amount of fixed assets and work in progress at the end of 2015 which is equal to $7,875,090.

A GFC may also include a pro rata share of the cost of future facilities. The future facility component is calculated by dividing the cost of planned capital improvement costs by the number of benefiting customers (or ISUs). The cost of planned capital improvements is based on the 6-year CIP, less habitat related projects that do not provide tangible system capacity, which is $9,562,000. Table 7-3 summarizes future facility costs.

Table 7-2. Adjusted Future Capital Project Costs for Use in Calculating Stormwater GFC

Element	Cost
Total 6 year CIP Cost	$10,552,000
Less Habitat Projects	
SF Dogfish Creek Restoration /1	$160,000
8th Avenue Fish Passage Barrier Culvert	$450,000
Bjorgen Creek Fish Passage Barrier Culvert	$350,000
Fjord Drive Shoreline Habitat Improvements 1	$30,000
Subtotal Habitat Project Costs	$990,000
Total Future Facility Costs	$9,562,000

Note:
/1 Habitat related portion of project only.

The GFC coincides with the 6-year planning period associated with SWMP, or 2016 through 2021. The number of ISUs benefiting from new facilities is therefore also based on a 6-year forecast of growth. The objective is to match the number of new ISUs with the projects that are scheduled to occur within the same 6-year time span. The City's *Stormwater Operation and Rate Evaluation* (2014) estimated the number of ISUs to increase at an annual rate of 1 percent. Therefore, at the end of 2021 there will be a total of approximately 8,186 ISU in the City.

Table 7-4 summarizes potential GFC charges that may be considered by the City based on combined existing and future facility components. Totals in table 7-4 have been rounded to the nearest $10.

Table 7-3. Calculation of Potential GFC

Element	Cost
Existing Facility Component	$7,875,090
Future Facility Component	$9,562,000
Subtotal System Costs	$17,437,090
Number of ISUs	8,186
Potential GFC based on Existing and Future Facility Costs	$2,130
Potential GFC based on Existing Facility Costs Only	$962

The upper range of potential GFC charges shown in Table 5-4 ($2,130/ISU) is the maximum allowable charge pursuant to the RCW. The City can choose to set the charge below the maximum level based on need, equity with other jurisdictions, and other factors. As shown in Table 5-1, the proposed 6-year CIP assumes a GFC contribution of approximately $150,000 per year. Assuming 1 percent growth in ISUs per year, the GFC would apply to approximately 80 new connections per year on average. Under this scenario, the GFC for each new ISU would be approximately $1,875. Recent development activity in the City suggests that approximately 125

to 150 new homes are being built in Poulsbo per year, which suggests 80 new ISUs per year may be an underestimate.

For comparison purposes, Table 7-5 shows stormwater GFCs for other similar jurisdictions in the Puget Sound region. Using the average GFC per square foot of impervious area results in a GFC for the City in the amount of $1,183. Given current development trends in the City, this GFC would likely generate between $100,000 and $150,000 annually.

Table 7-4. Comparison of Stormwater GFC in other Puget Sound Jurisdictions

Municipality	GFC	ISU Size (sq. ft.)	Cost GFC/sq. ft.	Date Adopted
City of Edmonds	$799	3,000	$0.27	2012
City of Issaquah	$1,256	2,000	$0.63	2006
City of Snoqualmie	$350	2,600	$0.13	2015
City of Redmond	$958	2,000	$0.48	2014
City of Gig Harbor	$2,000	2,200	$0.91	2009
City of North Bend	$779	2,920	$0.27	2012
City of Olympia	$1,190	2,528	$0.47	2013
Average	$1,047	2,464	$0.39	
City of Poulsbo (proposed)	**$1,183**	**3,000**	**$0.39**	

GFCs are required to be based on the original costs of facilities and the future facility component of the GFCs include projected inflation costs. For these reasons, the GFCs determined in this analysis should not be adjusted in the future for the effects of inflation. GFCs need only to be updated when new capital improvements are identified in the City's next comprehensive plan.

7.3 TRAFFIC IMPACT FEE CONTRIBUTIONS TO STORMWATER UTILITY

Streets and roads have a significant stormwater component, requiring surface water collection, conveyance, treatment, and often detention facilities. New development in the City is required to provide stormwater facilities on a project specific basis, with the developer either constructing the facilities outright, and/or providing traffic impact fees to the City on a pro rata basis that help to pay for both roadway and stormwater portions of transportation facilities that are constructed by the City.

Stormwater management facilities for transportation projects can be developed on a project-by-project basis, or on a regional basis. Under the regional facility scenario, larger centralized detention and treatment facilities would be constructed that would serve multiple development projects. In this situation, it would be appropriate for the City to have the flexibility to apply a portion of the traffic impact fee to the regional stormwater facility.

Typically, stormwater management facility costs for roadway projects can be between 25 and 50 percent of the total project costs.

Based on the nexus between transportation and stormwater facilities as described above, the City should consider adopting a policy that allows the City Engineer to allocate to the stormwater utility capital account up to 50 percent of traffic impact fees from development that is served by an existing or proposed regional stormwater facility. Based on the proposed CIP, it is roughly estimated that traffic impact fees could contribute approximately $150,000 per year to stormwater capital projects.

8 IMPLEMENTATION PLAN

This chapter describes the recommended actions for plan implementation, including operation and maintenance, staffing, and CIP elements. Table 8-1 summarizes implementation actions, priorities, and schedule.

Table 8-1. Summary of Stormwater Program Implementation Actions

Priority	Description	Required by Regulation	Schedule
Critical	Adopt 2012 Ecology Stormwater Manual	Yes	By December 31, 2016
Critical	Update PMC with LID Requirements	Yes	By December 31, 2016
High	Complete TMDL Implementation Plan	Yes	June 2016
High	Adopt Stormwater General Facility Charge	No	June 2016
High	Implement CIP including grant applications	No	On-going
Medium	Update PMC to allow regional facilities	No	Discretionary
Medium	Update and refine CIP	No	Annually
Medium	Add maintenance staff	No	2016 - 2018

9 REFERENCES

Ecology (Washing State Department of Ecology), 2001. Draft Western Washington Phase II Municipal Stormwater Permit Fact Sheet. November 2011.

Parametrix, 2013. Kevos Pond Basin Plan. Prepared for the City of Poulsbo. May 2013.

Parametrix, 2015. Viking Way Stormwater Retrofit Preliminary Design Report. Prepared for the City of February 2015.

Poulsbo, City of. 2016. 2016 Update Stormwater Management Program (SWMP). Permit # WAR 04-5537. Draft February 2016.

Poulsbo, City of. 2014. Stormwater Operations and Rate Evaluation. Internal Memorandum dated August 2014.

Sealaska Environmental Services. 2016. Watershed Assessment Liberty Bay TMDL Implementation Plan. Prepared for City of Poulsbo. January 2016.

APPENDIX A
Capital Project Ranking Sheets

APPENDIX B
Capital Project Programming Information

APPENDIX C
Capital Project Design Concepts

APPENDIX D
Capital Project Individual Cost Estimates

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