



FINAL DRAFT SURFACE WATER PLAN



Prepared for
City of SeaTac

Prepared by
Herrera Environmental Consultants, Inc.
July 2013



Note:

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SURFACE WATER PLAN

Prepared for
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ACRONYMS AND ABBREVIATIONS

This section includes acronyms and abbreviations of common terms used throughout the manual.

BMP	Best Management Practice
CIP	Capital Improvement Program
City	City of SeaTac
Ecology	Washington Department of Ecology
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ESC	Erosion and Sedimentation Control
FTE	Full Time Equivalent
GIS	Geographic Information Systems
GMA	Growth Management Act
IDDE	Illicit Discharge Detection and Elimination
KCSWDM	King County Surface Water Design Manual
LID	Low Impact Development
NFIP	National Flood Insurance Program
NPDES	National Pollutant Discharge Elimination System
O&M	Operations and Maintenance
Phase II NPDES Permit	Western Washington Phase II NPDES Municipal Stormwater Permit
PSP	Puget Sound Partnership
RCW	Revised Code of Washington
RSMP	Regional Stormwater Monitoring Program
SeaTac Airport	Seattle-Tacoma International Airport
SEPA	State Environmental Policy Act
SMA	Shoreline Management Act
SMC	SeaTac Municipal Code
SMP	Shoreline Master Program
STORM	Stormwater Outreach for Regional Municipalities
SWMP	Stormwater Management Program
SWP	Surface Water Plan
SWPPP	Stormwater Pollution Prevention Plan
TMDL	Total Maximum Daily Load
WSDOT	Washington State Department of Transportation

EXECUTIVE SUMMARY

The City of SeaTac (City) Surface Water Utility is managed by and is the responsibility of the Public Works Department. The Surface Water Plan (SWP) is intended to serve as a comprehensive and strategic guide for the City's Surface Water Utility (Utility) programs in a manner consistent with applicable local, state, and federal regulations while providing rate payers a consistent and appropriate level of service. This plan assesses the Utility's needs based upon upcoming regulatory requirements, the challenges of an aging infrastructure, existing drainage and water quality issues, and makes recommendations on how to address these needs. The 2013 Surface Water Utility Rate Study will assess the costs for implementing the different aspects of these recommendations.

The plan identifies the following information:

- Programmatic needs and recommendations necessary to ensure compliance with applicable federal, state, and local requirements, especially the Western Washington Phase II National Pollutant Discharge Elimination System (NPDES) Municipal Stormwater Permit (Phase II NPDES Permit)
- Programmatic needs and recommendations necessary to improve and expand the City's Surface Water Program to address the needs of the community and the aging infrastructure
- Proposed solutions to drainage issues

Recent state and federal stormwater regulations make it technically and financially challenging to address regulatory stormwater management requirements while balancing utility ratepayer costs. One of the primary purposes of this plan is to serve as a strategic guide for meeting these challenges.

- Ecology's Phase II NPDES Permit, originally issued in February 2007, requires cities and counties that manage small municipal separate storm sewer systems to develop a Stormwater Management Program (SWMP) focused on reducing pollutant discharge to the maximum extent practicable, and on protecting water quality.
- A new Phase II NPDES Permit was issued in 2012 and will become effective in August 2013. The 2013-2018 Phase II NPDES Permit will have a significant impact on the workload and operational budgets of the Stormwater Compliance Engineering, and Operations and Maintenance divisions of the Public Works Department.

[Note: Depending on the number and complexity of new development projects, the Community and Economic Development (CED) Department should also prepare to address pending changes in development regulations and demands on staffing. This plan details the specific permit requirements and their impact on the City's SWMP.]

The SeaTac Municipal Code, City Council, citywide City of SeaTac Comprehensive Plan, the City Center Plan, and the Puget Sound Partnership Action Agenda include goals and policies related to the City's Surface Water Program. These goals and policies were used to support the development of this plan, along with surface water management priorities identified by City staff during the SWP development process.

Significant research was conducted to develop the SWP. Past studies were reviewed for information on drainage and water quality problems, and to evaluate the existing SWMP. A workshop was conducted with City staff to supplement existing drainage and water quality problem information and recent documentation of the status of the City's stormwater program. Public involvement is an important component of the SWMP, and was conducted as part of the preparation of this SWP. The City engaged the public in the SWP development process, and plans to continue to seek public views on priorities and issues of concern.

Plan Organization

This SWP covers the following general topics:

- **Section 1** – Introduction (includes plan purpose, regulatory drivers, and development of the plan)
- **Section 2** – History and Goals (includes the history of the City's Surface Water Program and Citywide goals and policies related to surface water)
- **Section 3** – Study Area Characteristics and Applicable Regulations (includes the City's characteristics; existing drainage basin characteristics; a summary of past hydrologic and hydraulic analyses; and applicable federal, state, and City regulations)
- **Section 4** – Surface Water Program Evaluation and Recommendations (includes accomplishments and recommendations for future activities)
- **Section 5** – Drainage and Water Quality Issues and Recommended Solutions (includes identification of drainage and water quality issues as well as priorities for Capital Improvement Program [CIP] projects)
- **Section 6** – Plan Implementation (including interdepartmental and interagency collaboration, next steps [2013 Surface Water Utility Rate Study], and recommendations for integrating stormwater related CIP projects with the City's overall CIP)
- **Section 7** – Conclusions and Recommendations

Background

The City is located in south King County. Bordering jurisdictions include Burien, Tukwila, Renton, and unincorporated King County in the north; Kent in the east; Des Moines in the south, and Normandy Park in the west. The City encompasses approximately 10 square miles (6,505 acres), with development distributed throughout. The City's population (based on the 2010 census) is 26,909 people.

The area where the City is located has been developed significantly since the completion of Interstate 5 and the expansion of Seattle-Tacoma International Airport (SeaTac Airport) in the 1960s, expansion and modernization of SeaTac Airport in the 1960s and 1970s, and an increase in commercial development in the 1980s. The City's economy is strongly tied to the business generated by SeaTac Airport. Airport-related commercial and industrial development surrounds SeaTac Airport and borders SR 99. East of the SeaTac Airport commercial and industrial area is a mix of low, medium, and high-density residential neighborhoods, with the most densely populated area located east of Bow Lake.

The City is comprised of three primary drainage basins: Des Moines Creek Basin, Miller/Walker Creek Basin, and Green/Duwamish River Basin. While the Des Moines Creek and Miller Creek drainage basins discharge directly to the Puget Sound, the Green River flows to the Duwamish River, which in turn discharges to Elliott Bay. Four lakes and two creeks are located within the City limits. These waterbodies lie within the Des Moines Creek Basin, Miller/Walker Creek Basin, and Green/Duwamish River Basin. The City's Surface Water Utility requires a dedicated funding source that is predictable and reliable (SMC 12.10.225). This dedicated funding source is necessary to fund SWMP activities and projects that are required to provide services to residents, maintain existing infrastructure and meet regulatory requirements. This type of utility program is authorized by Revised Code of Washington (RCW) Chapter 35.67. In addition, it has been supported by our courts, including the Washington State Supreme Court, which has upheld the creation of such a utility and the imposition of surface water utility fees.

With the exception of single family residential properties, which have a flat rate, the City's rate structure is determined based on the size of the parcel and percentage of impervious surfaces. The City has only had one rate increase since the Surface Water Utility was established in 1999 (Ord. 99-1042).

Surface Water Program Evaluation and Recommendations

The City has a SWMP that has achieved compliance with the 2007-2013 Phase II NPDES Permit; however, the SWMP will need to expand in the future to meet the requirements of the Phase II NPDES Permit, such as Low Impact Development (LID) requirements. Recommendations are provided in this document for future activities to enhance the City's Surface Water Program and meet the 2013-2018 Phase II NPDES Permit requirements.

This SWP also evaluates the future needs of the Utility that are not driven by regulatory requirements, but are needed to address aging stormwater infrastructure. Portions of the City's stormwater infrastructure are quickly approaching their life expectancy, and in some areas the system components are over 40 years old. The City does not have an accurate assessment of this infrastructure to guide and schedule repair and replacement of this often invisible utility and is therefore currently taking a reactive stance – waiting for stormwater system failure. This exposes the City to inherent risks such as property damage, flooding, erosion, and personal injuries. Surface water program changes are necessary to address these future needs. Based on this needs assessment, the plan makes the following comments and recommendations:

- The City should develop an asset management program and integrate it into Utility work practices by 2016 with a goal of conducting an inventory of at least 12 percent of the City's stormwater system each year. The goal of the asset management program is to evaluate rank and schedule needed stormwater system repairs and replacement, prior to asset failure minimizing the risk of property damage, flooding and personal injuries resulting from failures.
- The City should continue to consider water quality retrofits where feasible in conjunction with Transportation CIP and sidewalk projects, and continue to evaluate the feasibility of water quality improvements as the need arises. Costs related to stormwater in transportation CIP projects range from 16 to 33 percent of the total project cost (average of 26 percent). The City should evaluate the impact of the Surface Water Utility fund contributing to the stormwater-related portion of Transportation CIP projects as part of the 2013 Surface Water Utility Rate Study evaluation.
- The City should consider adopting code language and a decision making process for determining when Surface Water Utility funding should be spent to address individual private property drainage issues.
- The City should add the following stormwater projects to the City's overall CIP:
 - **CIP # 1** – Military Road S – S 150th Street to S 152nd Street Drainage Improvements
 - **CIP #2** – S 204th Street Pond
 - **CIP #3** – Des Moines Memorial Drive Manhole Replacement
 - **CIP #4** – S 182nd Street Catch Basins
 - **CIP #5** – S 138th Street Pipe

Future steps in the SWP implementation process include:

- Finalize analysis of future staffing, training, and equipment needs.
- Develop a Surface Water Utility Rate Study based on analysis of future staffing, training, and equipment needs, and the stormwater CIP project implementation schedule proposed in this plan.
- Use asset management program to identify stormwater CIP projects.
- Integrate stormwater CIP projects into the City's overall CIP.
- Reevaluate stormwater CIP projects on an annual basis and add new projects to the list as additional drainage or water quality issues are identified. Prioritize CIP projects using asset management techniques.

1. INTRODUCTION

This section provides information on the following:

- Purpose of this Surface Water Plan (SWP), including the need for an updated SWP, value of managing stormwater, and important regulatory drivers
- Research and public involvement activities conducted during the development of the SWP
- A brief introduction to the needs assessment conducted as part of the SWP development process
- Overall document organization

1.1. Purpose of This Plan

The SWP is intended to serve as a comprehensive and strategic guide for the City of SeaTac (City) Surface Water Utility (Utility) programs in a manner consistent with applicable federal, state, and local regulations while providing rate payers a consistent and appropriate level of service. This plan assesses upcoming regulatory requirements, the challenges of an aging infrastructure, existing drainage and water quality issues, and the resources needed for the City to fully implement the plan. The plan includes:

- A programmatic needs assessment evaluating changes to address regulatory requirements, infrastructure management, and policy needs
- Actions necessary to ensure compliance with applicable federal, state, and local requirements, especially the National Pollutant Discharge Elimination System (NPDES) Western Washington Phase II Municipal Stormwater Permit (Phase II NPDES Permit)
- Actions recommended for improving and expanding the City's surface water program
- Identification of and proposed solutions to drainage issues

The primary drivers for the recommendations included in this plan were:

- Permit requirements in the 2013-2018 Phase II NPDES Permit related to low impact development (LID)
- Aging infrastructure and lack of a stormwater Capital Improvement Program (CIP) to maintain infrastructure

Recent federal and state stormwater regulations have made it technically and financially challenging for jurisdictions to address upcoming stormwater requirements and existing stormwater drainage and water quality issues while balancing utility ratepayer costs. Because

of the many stormwater challenges facing the City, it must implement and continually improve upon the SWP. This plan addresses upcoming regulatory requirements, existing drainage and water quality issues, and the resources needed for the City to fully implement the plan.

1.1.1. Value and Importance of Managing Stormwater Runoff

Like most jurisdictions in the region, urban development that has occurred in the City over the past century has adversely affected the quantity and quality of stormwater runoff. Development has increased peak flow rates causing erosion of streams, contributed to localized flooding and ponding and increased pollutant loading to streams, wetlands, and lakes. As a result, cities are faced with the challenge of conveying stormwater runoff safely and cost-effectively while preventing or minimizing adverse high flow impacts (erosion, flooding, and sediment deposition), water quality degradation in lakes and streams receiving runoff, and degradation of aquatic habitat caused by high flows and poor water quality.

The benefits of managing stormwater runoff through providing and maintaining a stormwater conveyance system include:

- Maintenance of public spaces and infrastructure
- Ensuring public safety
- Preventing flooding

The benefits of managing stormwater runoff by installing flow control and water quality treatment facilities such as ponds, wetlands, biofiltration swales, and LID include:

- Reduced stormwater flow rates and durations; resulting in reduced occurrence of localized flooding or ponding, streambank erosion, and adverse impacts of high flows on aquatic life
- Reduced level of pollutants carried by stormwater (sediments, nutrients, metals, oil, and other contaminants) from developed areas
- Protected ecosystem functions and recreational uses of receiving waters

The City's stormwater assets are estimated to be valued at over \$26.9 million. The City and its residents are responsible for maintaining the function and value of these assets and constructing new assets as needed.

1.1.2. Regulatory Drivers

The Phase II NPDES Permit will have significant impacts on the workload and operational budgets of the Stormwater Compliance and Public Works Operations and Maintenance. Depending on the number and complexity of new development projects and stormwater CIP projects, the Public Works Engineering Division and Community and Economic Development (CED) Engineering Review departments may also need additional staff support. Section 4 of this plan details the specific permit requirements and their impact on the City's SWMP.

1.2. Surface Water Plan Development

Significant research was conducted to develop the SWP. Past studies and reports were reviewed for information on drainage and water quality problems, and to evaluate the existing SWMP. Herrera Environmental Consultants (Herrera) conducted a workshop with City staff and hosted public involvement events to supplement existing drainage and water quality problem information, and recent documentation of the status of the City's stormwater program. Several follow-up meetings, telephone conversations, and field reconnaissance trips were held with City staff following the initial workshop. The following subsections describe the workshop, public involvement activities, document review, and the needs assessment.

1.2.1. Workshop

To examine the components of the City's SWMP in more detail and to identify previously undocumented issues, City staff members representing all aspects of the City's surface water program participated in a workshop on October 15, 2012, at SeaTac City Hall. A SWP questionnaire was distributed to participants in advance of the workshop to help gather staff input and perspectives on a consistent set of questions. The completed questionnaire was used to facilitate the workshop discussion of Phase II NPDES Permit requirements, other regulatory requirements, staffing and funding needs, and other issues of concern to managers and staff (e.g., drainage and water quality issues, asset management, and private property issues). A list of the workshop attendees is included in Table 1-1.

Table 1-1. City of SeaTac Surface Water Plan Workshop Attendees.		
Staff	Department	Title
Don Robinett	Public Works	Stormwater Compliance Manager
Susan Sanderson	Public Works - Engineering	City Engineer
Florendo Cabudol	Public Works - Engineering	Assistant City Engineer
Lena Kuliczowska	Community & Economic Development	Senior Engineering Technician
Adam McFayden	Public Works	Water Quality Technician
Trudy Olson	Public Works	Resource Conservation/Programs Coordinator
Sean Clark	Public Works - Maintenance	Public Works Maintenance Supervisor
Lau Siva	Public Works - Maintenance	Public Works Maintenance Worker II

1.2.2. Public Involvement and Participation

Public involvement is an important component of the SWMP and was conducted as part of the preparation of this SWP. The City engaged the public in the SWP development process in the following ways:

- Hosted an informational table at the SeaTac YMCA to solicit input on drainage problems, water quality issues, and stormwater retrofit opportunities on November 7, 2012
- Posted an announcement on the City's website regarding the SWP update and invited public input through an online survey

- Posted announcement in the City Manager's Weekly Update

Only a handful of public comments were received prior to publishing the Draft SWP. These comments ranged from concerns over individual private drainage issues to concerns over pet waste to instances of small localized flooding.

The City has sought input from the general public and City officials in several ways:

- Periodic updates on the planning process for the City's website and newsletter
- Invite comments from the general public on the draft SWP from May 30 through July 9, 2013
- Invite comments from stakeholders and adjacent jurisdictions
- Make the final SWP available on the City's website

City and Herrera staff presented the Surface Water Plan to Planning Commission and the City Council in a series of meetings open to the public in June and July of 2013. These presentations were held on the following dates:

- City Council Study Session on June 11, 2013
- Planning Commission on June 18, 2013
- City Council Study Session on June 25, 2013
- City Council Study Session on July 9, 2013

Results of public involvement efforts, including the public survey results, comments on the public review draft of the SWP, and Planning Commission meeting notes are provided in Appendix F.

1.2.3. Document Review

Herrera reviewed all pertinent documents related to the SWMP and the Utility, including drainage basin studies and City planning documents, to provide a foundation for the SWP. The most relevant documents to the SWP development effort are summarized in Table 1-2. In addition to the documents summarized below, information on the existing stormwater drainage system infrastructure was derived mostly from geographic information system (GIS) data provided by the City.

1.2.4. Needs Assessment

The City has a SWMP that has achieved compliance with the 2007-2013 Phase II NPDES Permit. However, given the pending regulatory requirements and the demands on the non-NPDES required utility programs, there is a clear need for program expansion in the future. The SWMP and the Utility will need to grow and expand in the future to accommodate the requirements of the 2013-2018 Phase II NPDES Permit relating to increased inspection frequencies, illicit discharge field screening and LID, support stormwater-specific CIP projects,

Table 1-2. Relevant Documents to Support the City of SeaTac Surface Water Plan Update.

Document Name	Author	Year(s)
1997 SeaTac Surface Water Plan	Earth Tech	1997
Comprehensive Surface Water Rate Study Final Report	Economic and Engineering Services	1999
2009 Surface Water Rate Study Final Tech Memo	Parametrix	2009
2008 Staffing Analysis	Parametrix	2008
2008 through 2013 Annual Report and Stormwater Management Program (SWMP) documents	SeaTac	2008 through 2013
2010 Stormwater Pollution Prevention Plan (SWPPP) for the City Maintenance Facility	SeaTac	2010
City Illicit Discharge Detection and Elimination (IDDE) and Erosion and Sedimentation Control Inspection policies	SeaTac	2011
Addendum to King County Surface Water Design Manual (KCSWDM)	SeaTac	2010
City comments on the draft Phase II NPDES Permit	SeaTac	2012
Draft Capital Improvement Program for 2012-2017	SeaTac	2011
2013-2022 Transportation Improvement Program	SeaTac	2012
Final budget of recently completed or current Transportation projects	NA	NA
Draft Miller/Walker Creek Basin Plan and supporting information	SeaTac	2006
Des Moines Creek Basin Plan	SeaTac, Des Moines, Port of Seattle, King County	1997
City of SeaTac, WA 2012 Resident Survey	National Research Center, Inc.	2012
Angle Lake water quality data and reports from King County website	King County	2010 through 2012
B-IBI Data for Des Moines Creek and Miller Creek	Port of Seattle	2000 through 2010
B-IBI Data for Des Moines Creek, Miller Creek, Walker Creek, and tributaries to the Duwamish River	Puget Sound Stream Benthos	2013
SeaTac Municipal Code (SMC)	SeaTac	2012
Letter sent to property owners offering maintenance services through a third party contractor at a discounted group rate	SeaTac	2012
Geographic information system (GIS) data	SeaTac	2012
SWM Atlas Maps	SeaTac	2012
City of SeaTac Draft Shoreline Master Program	SeaTac	2010
City of SeaTac Comprehensive Plan	SeaTac	2011
SWM Utility Fund Goals (2007 through 2012)	SeaTac	2007 through 2012
Surface Water Utility Presentation to Council	SeaTac	2012

and start a discussion on a documented policy for private stormwater facilities. The City also needs to develop and implement an asset management program to address the needs of the aging infrastructure before system failures occur.

Following the workshop, the City's annual reports, SWMP Plan updates, and other documents listed in Table 1-2 were compared to the 2007-2013 and 2013-2018 Phase II NPDES Permit requirements, other regulatory requirements, and other stormwater-related concerns unique to the City. The findings of this process are presented in Section 4 of this plan.

1.3. Plan Organization

This plan covers the following general topics:

- **Section 2** – History and Goals
- **Section 3** – Study Area Characteristics and Applicable Regulations
- **Section 4** – Surface Water Program Evaluation and Recommendations
- **Section 5** – Drainage and Water Quality Issues and Recommended Solutions
- **Section 6** – Plan Implementation
- **Section 7** – Conclusions and Recommendations

Herrera assisted the City with several aspects of this plan. Herrera conducted a detailed analysis to support the conclusions and recommendations found in Sections 4 and 5 of this plan. This analysis included interviews with City staff and field reconnaissance. This document describes the methods and results of this analysis. Supplementary information is included in the appendices.

2. HISTORY AND GOALS

This section provides information on:

- The history and accomplishments of the Surface Water Utility
- Goals and policies related to surface water in the SeaTac Municipal Code (SMC), City Council vision, citywide City of SeaTac Comprehensive Plan, the City Center Plan, and the Puget Sound Partnership (PSP) Action Agenda
- Current Stormwater Management priorities

2.1. Surface Water Program History

This section details the history and accomplishments of the City's SWMP.

2.1.1. *Surface Water Program Prior to 2007*

2.1.1.1. *Transition Period from King County (1990-1992)*

From 1990 through 1992 following the City's incorporation, the City went through a transition period from King County management of stormwater services, during which the City passed several ordinances related to surface water management summarized in Table 2-1. The first ordinance (90-1016) passed in February 1990 referenced an Interlocal Agreement where King County provided surface water management services and collected surface water utility fees for the City. Code language was updated in August and December of 1990 (Ordinances 90-1046 and 90-1074) to reflect changes in the King County Code and add enforcement language specific to the City. In 1992, Ordinance 92-1004 established that the City would replace King County in providing surface water operations and maintenance services, but that King County would continue to support the City with billing and collection services and technical support as needed. The rate structure was modified slightly with Ordinance 92-1007.

2.1.1.2. *Establishment of Surface Water Utility and Surface Water Utility Fund (1992)*

In 1992, the City's Surface Water Utility and Surface Water Utility fund were officially established through Ordinance 92-1018 to establish and implement a comprehensive approach to surface and stormwater problems. This comprehensive approach includes the following elements (SMC 12.10.220):

- Basin and sub-basin planning
- Land use regulation
- Construction of facilities

Table 2-1. City of SeaTac Ordinances Relating to Surface Water.

Ordinance Number	Date Passed by Council	Topic	Description
90-1016	February 13, 1990	Program Establishment and Utility Rates	The City Council authorized entry into an Interlocal Agreement whereby King County provided comprehensive surface water management services and collection of revenue to support those services within the City.
90-1046	August 14, 1990	Drainage Regulations	The City Council updated code language to reflect King County's updated Surface Water Runoff Policy and Surface Water Design Manual.
90-1074	December 18, 1990	Enforcement	Added a section to Ordinance No. 90-1046 to provide for enforcement and declaring an emergency.
92-1004	February 10, 1992	Program Structure and Utility Rates	Established the City, rather than King County, as providing the drainage and surface water operations and maintenance services to City residents and property owners; retained King County's billing and collection services and technical support services; and holds surface water utility fees at the 1991 rate structure (amends SMC 12.10.210 and 12.10.220, and added new sections to Ch. 12.10)
92-1007	February 25, 1992	Utility Rates	Updated rate calculations in Ordinance 92-1004 (amended SMC 12.10.220 and 12.10.225)
92-1018	May 31, 1992	Program Establishment and Utility Rates	Official creation of the Surface Water Utility and the Surface Water Utility fund (added SMC 12.20.010, 12.25.010, and 12.30.010)
92-1052	December 8, 1992	Utility Rates	Updated Surface Water Utility rate structure for consistency with King County rate structure (amended 12.10.225)
98-1054	December 8, 1998	Drainage Regulations	Adopted the 1998 King County Surface Water Design Manual (amended 12.10.010, 12.10.020, 12.10.170 and 12.10.210; repealed 12.10.030, 12.10.040, 12.10.050, 12.10.060, 12.10.070 and 12.10.090)
99-1042	November 30, 1999	Drainage Regulations and Utility Rates	Amended the Surface Water Management Program and established a new rate structure (added 12.10.165 and 12.10.227; amended 12.10.160, 12.10.220, 12.10.225 and 12.10.230)
00-1015	April 11, 2000	Drainage Regulations	Technical amendments to the Surface and Storm Water Management Program (amended 12.10.100, 12.10.120 and 12.10.150)
05-1012	June 14, 2005	Drainage Regulations	Adopted the 2005 King County Surface Water Design Manual (amended SMC 12.10.010)

- Maintenance
- Public education
- Surface water management services

A new Surface Water Utility rate structure was also established in 1992 with Ordinance 92-1052.

2.1.1.3. Development of a Surface Water Plan (1997)

The City's first and only Surface Water Plan prior to this document was produced in 1997 (EarthTech 1997). The major elements of the planning efforts included:

- Field inventory and electronic mapping of drainage basin boundaries, primary drainage infrastructure, and stream channels
- Hydrologic and hydraulic computer modeling analyses of the major drainages within the City
- Review of City, state, and federal regulations affecting surface water management in the City and providing recommendations to meet current and pending requirements
- Evaluation of existing water quality conditions in the City and recommendations for improving water quality
- Recommended additions to the City's stormwater CIP (10-year plan with a total cost of \$9.43 million)
- Recommended improvements to the City's stormwater Operations and Maintenance (O&M) program (annual budget of \$545,000 and contractor support to perform O&M activities)
- Forecast of future revenues under the current utility rate structure, analysis of revenue requirements, and funding recommendations (recommended raising Surface Water Utility rates from \$5.00 per month for single family residential to \$8.33 in 1998 and to \$10.00 in 2001)

2.1.1.4. Increased Surface Water Utility Rate (1999)

The recommended rate increase in the 1997 Surface Water Plan (EarthTech 1997) was not passed, but a rate study produced in 1999 (Economic and Engineering Services 1999), did succeed in providing justification for an increased Surface Water Utility fee. In November 1999, Ordinance 99-1042 was passed by the City Council, amending SMC 12.10.225 and raising Surface Water Utility rates for a majority of rate categories by 38 percent. This Surface Water Utility rate structure is still in use today.

2.1.2. Surface Water Program from 2007 through 2013

The Phase II NPDES Permit was issued by Ecology in January 2007, with an effective date of February 16, 2007 (see Appendix B) which led to increased regulation and requirements

for the City's surface water program, with a primary focus on stormwater management. The 2007-2012 Phase II NPDES Permit expired on February 15, 2012, and was reissued with minor modifications on August 1, 2012, extending the current permit requirements until July 2013 (thus it is referred to in this plan as the 2007-2013 Phase II NPDES Permit).

Since the 2007-2013 Phase II NPDES Permit became effective, the City has strived to maintain compliance with the requirements of the permit including development and implementation of a SWMP with five primary components: public education and outreach; public involvement and participation; illicit discharge detection and elimination (IDDE); controlling runoff from new development, redevelopment, and construction sites; and municipal operations and maintenance. The City has adopted the following ordinances to address requirements of the Phase II NPDES Permit:

- **Ordinances 09-1024 and 09-1041** (adopted on August 11, 2009, and modified on December 8, 2009) these ordinances created, and then amended the Surface and Stormwater - IDDE code (SMC 12.12), prohibiting and specifying enforcement actions for illicit discharges or illicit connections from non-stormwater flows to the City's stormwater drainage system.
- **Ordinance 09-1042** (adopted on December 8, 2009) amends SMC 12.10.010 and 12.10.020, adopting the King County Surface Water Design Manual (KCSWDM) as amended by the SeaTac Addendum to the KCSWDM.

Other changes to the City's surface water program from 2007 through 2013 include the addition of two staff to support SWMP activities:

- Stormwater Compliance Manager position added in 2009
- Water Quality Technician position added in 2010

2.1.3. Future Surface Water Program

A new permit with updated requirements for the next permit term (2013-2018 Phase II NPDES Permit) was issued on August 1, 2012. Ecology allowed a 1-year grace period before the new permit requirements become effective on August 1, 2013. The 2013-2018 Phase II NPDES Permit contains the same key components of the SWMP as the 2007-2013 Phase II NPDES Permit with slight modifications to language, clarification of deadlines, and some additional requirements.

Major changes in the 2013-2018 Phase II NPDES Permit are focused in the "Controlling Runoff from New Development, Redevelopment, and Construction Sites" section of the permit. Among the major changes included in the new permit are more stringent requirements for implementation of LID and LID BMPs, increased inspection frequencies for catch basin and inlet inspections, stormwater monitoring requirements, and expansion of IDDE field screening requirements as summarized below.

- **Implementation of LID and LID BMPs:** The Controlling Runoff from New Development, Redevelopment, and Construction Sites section of the 2013-2018 Phase II

NPDES Permit requires the use of LID principles and LID BMPs for on-site stormwater management wherever feasible. Along with this, the permit requires the City to revise local development-related codes, rules, standards, and other enforceable documents making LID the preferred and commonly used approach to development by December 31, 2016. The implementation of LID and LID BMPs wherever feasible will be a significant effort for the City and will increase interdepartmental coordination, staffing needs, and equipment needs.

- **Catch Basin and Inlet Inspections:** The Municipal Operations and Maintenance section of the 2013-2018 Phase II NPDES Permit provides three options for catch basin and inlet inspections.
 - **Option 1:** Inspect and clean each catch basin and inlet at least once by 2017 and every 2 years thereafter
 - **Option 2:** Inspect and clean 25 percent of catch basins and inlets on a circuit basis
 - **Option 3:** Clean all pipes, ditches, catch basins, and inlets once during the permit term

It is important to note, however, that given the specific language in the Permit, Options 2 and 3 listed above are not feasible for implementation within the City, therefore the Surface Water Utility is pursuing Option 1. While Option 1 does increase inspection frequencies requirements, the City does not anticipate any problems meeting this requirement with the purchase of a vacuum truck scheduled for 2013.

- **Monitoring Program:** The monitoring section of the 2013-2018 Phase II NPDES Permit describes the option of participating in the Regional Stormwater Monitoring Program (RSMP). The City has decided to participate in the RSMP outlined in the 2013-2018 Phase II NPDES Permit. The total monitoring cost, not including IDDE and TMDL monitoring, will be \$17,832 per year beginning with the first payment on August 15, 2014. If the City had decided to opt-out of the RSMP, the current stormwater monitoring activities would have to be expanded considerably to meet the requirements specified in the 2013-2018 Phase II NPDES Permit; therefore, participation in the RSMP is more cost effective than implementing the opt-out monitoring option.
- **Illicit Discharge Field Screening Requirements:** Develop and implement a field screening program that will field screen 40 percent of the City's stormwater drainage system by December of 2017 and 12 percent of the stormwater drainage system each year thereafter.

2.2. Citywide Surface Water Goals and Policies

The City has several goals and policies related to surface water in the SMC, City Council vision, citywide City of SeaTac Comprehensive Plan, the City Center Plan, and the PSP Action Agenda. The first among these are the goals codified with the creation of the Utility. All of these goals and policies are briefly summarized below.

2.2.1. Surface Water Utility Goals

Section 12.10.220 of the City's Surface and Stormwater Management code identifies the purpose and need for creating the Surface Water Utility. This purpose and need is translated into the following overarching goals of the Utility:

- Promote public health, safety and welfare
- Reduce flooding, erosion and sedimentation
- Prevent and mitigate habitat loss
- Enhance groundwater recharge
- Prevent water quality degradation

2.2.2. SeaTac City Council Goals

The SeaTac City Council is responsible for policy, land use, and budget decisions for each City Department. The vision and goals of the City Council can be found on the City's website: <http://www.ci.seatac.wa.us/index.aspx?page=81>. While these goals are not specifically tied to surface water and stormwater, they provide goals for all programs and projects within the City and as such are used as further guidance for the Utility.

One vision statement and three City Council goals are applicable to development of surface water related projects and programs within the City:

- **Vision:** The City of SeaTac is a premier global community offering a solid, sustainable economy and a healthy, inclusive and vibrant quality of life
- **Goal 1:** Develop and implement programs and projects that help position SeaTac as a healthy community, thereby enhancing quality of life
- **Goal 2:** Foster a positive business environment and aggressively pursue economic development opportunities to attract and retain businesses and jobs while maintaining reasonable laws and regulations
- **Goal 3:** In order to enhance quality of life and public image, enhance code compliance effectiveness within all neighborhoods and areas in the city

2.2.3. Citywide Comprehensive Plan Goals and Policies

The citywide City of SeaTac Comprehensive Plan (SeaTac 2011a) is a growth management and land use planning document developed to provide a comprehensive and cohesive direction for the City, and is the first complete plan to be adopted by the SeaTac City Council. The overarching purpose of the citywide City of SeaTac Comprehensive Plan is to guide the City as it grows and to adopt broad statements of community goals and policies; however, it also provides specific steps for achieving these goals. The citywide City of SeaTac Comprehensive Plan includes goals and policies specifically related to the City's surface water program in the following chapters:

- Environmental Management Element section (Chapter 8)
- Parks, Recreation, and Open Space Element (Chapter 9)

These goals and policies should be used to guide the Surface Water Utility and are summarized in Appendix A.

2.2.4. City Center Plan Goals and Policies

The City Center Plan (SeaTac 2010a) was developed to provide guidance for the design and development of a City Center over a period of 20 years. The City Center, located directly east and adjacent to SeaTac Airport, is described in the City Center Plan as it is envisioned in the citywide City of SeaTac Comprehensive Plan. While the ultimate goal of the City Center Plan is to identify methods to direct development of the City Center from an auto-oriented development to an urban and diverse city center and focuses primarily on methods of transportation, it also includes one goal and two policies related to surface water and stormwater:

- **Goal 1:** To protect and enhance the City’s environmental resources
- **Policy EM-1A:** Encourage water quality improvements to Bow Lake
- **Policy EM-1B:** Coordinate with the private sector to provide adequate stormwater detention and treatment, and to enhance wetlands and other significant environmental resources

2.2.5. Puget Sound Partnership Goals

The PSP is a state agency leading efforts to protect and restore the Puget Sound. The PSP identifies strategies for restoring and protecting the Puget Sound in the PSP Action Agenda. Different strategies have been prioritized for various areas within the Puget Sound. The PSP Action Agenda has identified several stormwater-related goals for the South Central Sound Action Area that apply to the City which are summarized in Appendix B.

2.3. Current Surface Water Management Priorities

The following surface water management priorities were identified by City staff during the initial workshop and follow-up coordination throughout the SWP development process. These priorities were identified to better understand current Utility needs and to help guide the development of this document (discussed in Section 1.2):

- Provide sufficient funding to support existing stormwater management program and meet the demands on the Utility into the future
- Develop and fund a proactive program for prioritizing maintenance or replacement of aging stormwater infrastructure
- Evaluate the need for water quality retrofits to address untreated stormwater runoff from existing public facilities

- Evaluate and develop City policies to address private property stormwater drainage issues
- Expand and enhance public education and outreach programs
- Continue to update the City's stormwater system map to identify and eliminate inaccuracies
- Develop in-house catch basin cleaning and street sweeping programs
- Evaluate staffing, training, equipment, and funding necessary for implementing the upcoming LID requirements
- Maintain compliance with the Phase II NPDES Permit
- Improve internal coordination between City departments on Phase II NPDES Permit requirements

3. STUDY AREA CHARACTERISTICS AND APPLICABLE REGULATIONS

The City incorporated in 1990 and has a land area covering approximately 10 square miles and a population of approximately 26,909 (United States Census Bureau 2010). As a part of its incorporation, the City inherited the majority of its stormwater infrastructure which now includes, but is not limited to, 72 miles of stormwater drainage pipe and over 3,000 catch basins. Its stormwater assets are currently valued at \$26.9 million.

The City's surface waters include five freshwater lakes and several urban stream corridors. The City's area is comprised of the following land use categories: commercial (35 percent), medium density residential (25 percent), high density residential (15 percent), SeaTac Airport (15 percent), and single family residential (10 percent) (SeaTac 2011a).

This section provides information on the following:

- The existing surface water and stormwater system within the City
- The physical environment in the City that affects stormwater management
- Drainage basins within the City limits
- Hydrologic and hydraulic analyses conducted for waterbodies within the City limits
- Benthic Index for Biotic Integrity (B IBI) monitoring data
- Applicable federal, state, and City regulations
- A brief history of the Surface Water Utility fund

3.1. City Surface Water and Stormwater System

The City's Surface Water Utility program manages a stormwater drainage system composed primarily of open ditches and pipes (Table 3-1).

The City currently has several water quality treatment facilities in place to treat stormwater runoff including biofiltration swales, stormwater wetlands, media filters, and StormFilter vaults. The City also uses detention ponds, detention tanks, and detention vaults for flow control. In addition to traditional stormwater facilities, the City has also installed several permeable pavement sidewalks.

Stormwater that is not infiltrated, either due to the lack of stormwater management facilities or poorly infiltrating soils, runs off into surface waterbodies described in Section 3.3. A map of the City's stormwater system is provided in Figure 3-1.

Table 3-1. Summary of City of SeaTac Surface Water and Stormwater System.		
Item	Quantity	Units
Catch basins and storm drains ^a	3,916 ^a	each
Stormwater pipe	72 ^b	miles
Open ditches and manmade channels	17 ^c	miles
Outfalls (discharging to surface waters)	37	each
Water quality treatment facilities (public)	32 ^d	each
Water quality treatment and flow control facilities (private)	96 ^d	each
Municipal streets	182	centerline miles
Permeable pavement areas	1.6	acres
Impervious surface area coverage in the City	45	%

Notes:

^a Catch basins and storm drains include catch basins, manholes, inlets, yard drains, and slot drains owned by City of SeaTac.

^b Stormwater pipes include gravity mains, laterals, culverts, and box culverts that are in the City's ROW or known public easement.

^c Open ditches include daylight ditches, bioswales, and natural water courses that are in the City's ROW or known public easement.

^d Water quality treatment facilities include detention/retention ponds, detention vaults, wetlands, bioswales, and rain gardens.

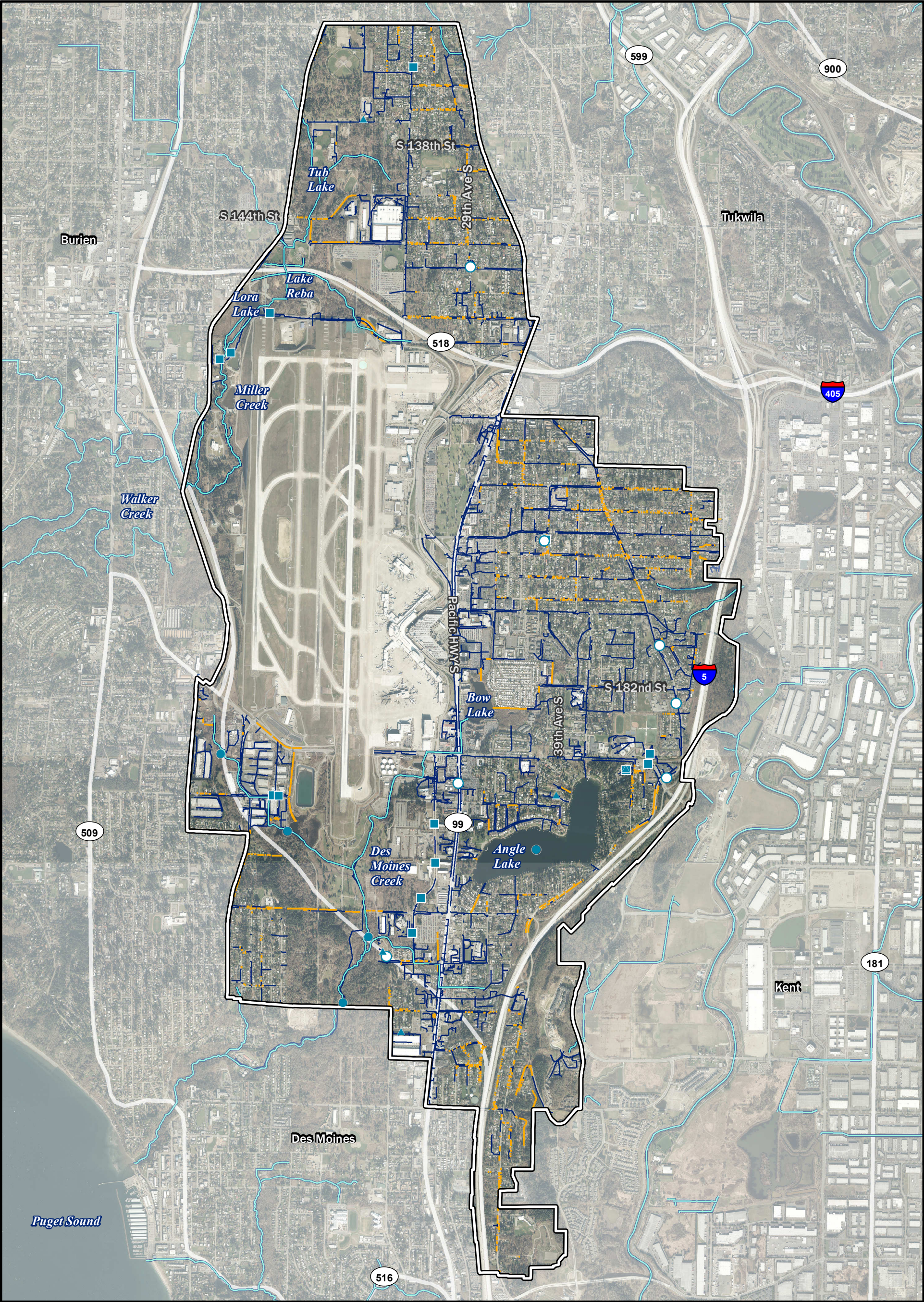
3.2. Study Area Characteristics

The City is located in south King County. Bordering jurisdictions include Burien, Tukwila, Renton, and unincorporated King County in the north; Kent in the east; Des Moines in the south, and Normandy Park in the west. The City encompasses approximately 10 square miles (6,505 acres), with development distributed throughout. Undeveloped areas include steep sloped areas on the west, east, and southeast borders of the City. Seattle-Tacoma International Airport (SeaTac Airport), owned by the Port of Seattle, is a major feature within the City, comprising about 34 percent of the total area within the City limits (SeaTac 2011a).

3.2.1. Land Use

Settlement in the area initially was based on logging and farming, but has shifted to supporting the transportation industry due to increased access, ease of transportation in the City and its vicinity, and the proximity to SeaTac Airport. Major changes in land use include the following:

- **1928** – Highway 99 was completed
- **1940s** – Highline area population tripled in response to growth in defense industry activity in the area
- **1949** – SeaTac Airport began full scale operation
- **1950s** – Highline area population doubled due to regional and national factors, such as post World War II housing
- **1960s** – Completion of Interstate 5 and expansion of SeaTac Airport



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







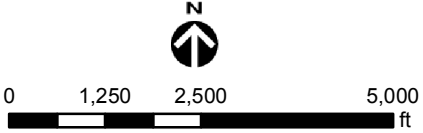

- | | | | | |
|---|----------------------|---|---|----------------------|
|  | City boundary | Water quality treatment facilities |  | Wetland |
|  | Stormwater ditches | |  | Pond |
|  | Stormwater main line | |  | Bioswale/rain garden |
|  | Stream | |  | Vault |

Figure 3-1.
City of SeaTac Stormwater System Map.




Coordinates: NAD 1983
Washington State Plane North FIPS 4601 Feet
Aerial: Seatac (2010)
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- **1960s and 1970s** – Expansion and modernization of SeaTac airport
- **1973** – Port of Seattle noise remedy program initiated
- **1980s** – Increase in commercial development

The City's economy and transportation patterns are strongly influenced by the businesses related to SeaTac Airport. Airport-related commercial and industrial development (e.g., hotels, motels, restaurants, warehousing, and distribution) surrounds SeaTac Airport and borders SR 99. East of the SeaTac Airport commercial and industrial area is a mix of low, medium, and high-density residential neighborhoods, with the most densely populated area located east of Bow Lake (Figure 3-2).

3.2.2. *Soils*

The soils in the City are typical for the south Puget Sound region, consisting of well-drained glacial outwash, intermixed zones of glacial till, and wetland peat bogs. The majority of the City is dominated by hydrologic soil groups A and B (outwash soils) (Figure 3-3). Outwash soils are highly permeable, producing relatively little runoff per unit area. The majority of precipitation falling onto outwash soils enters the local groundwater table. These soils constitute the following percentage of area in the City:

- **Group A soils:** 16 percent
- **Group B soils:** 76 percent

Hydrologic soils groups C and D are sandy or silty soils characterized by low permeability and relatively high runoff potential. These soil groups constitute the following percentage of area in the City:

- **Group C soils:** less than 0.5 percent
- **Group D soils:** 7.5 percent

3.3. *Drainage Basin Descriptions*

The City of SeaTac is comprised of three primary drainage basins: Des Moines Creek Basin, Miller/Walker Creek Basin, Green/Duwamish River Basin (Figure 3-4). Individual drainage basin maps for these primary drainage basins are provided in Appendix C. While the Des Moines Creek and Miller/Walker Creek drainage basins discharge directly to Puget Sound, the Green River flows to the Duwamish River which in turn discharges to Elliott Bay. Four lakes and two creeks are located within the City limits. These waterbodies lie within the Des Moines Creek Basin, Miller/Walker Creek Basin, and Green/Duwamish River Basin. The following drainage basins and waterbodies are summarized below:

- **Des Moines Creek Drainage Basin:**
 - Des Moines Creek
 - Bow Lake

- **Miller/Walker Creek Drainage Basin:**
 - Lake Lora
 - Lake Reba
 - Miller Creek
 - Walker Creek
 - Tub Lake
- **Green/Duwamish River Drainage Basin:**
 - Angle Lake

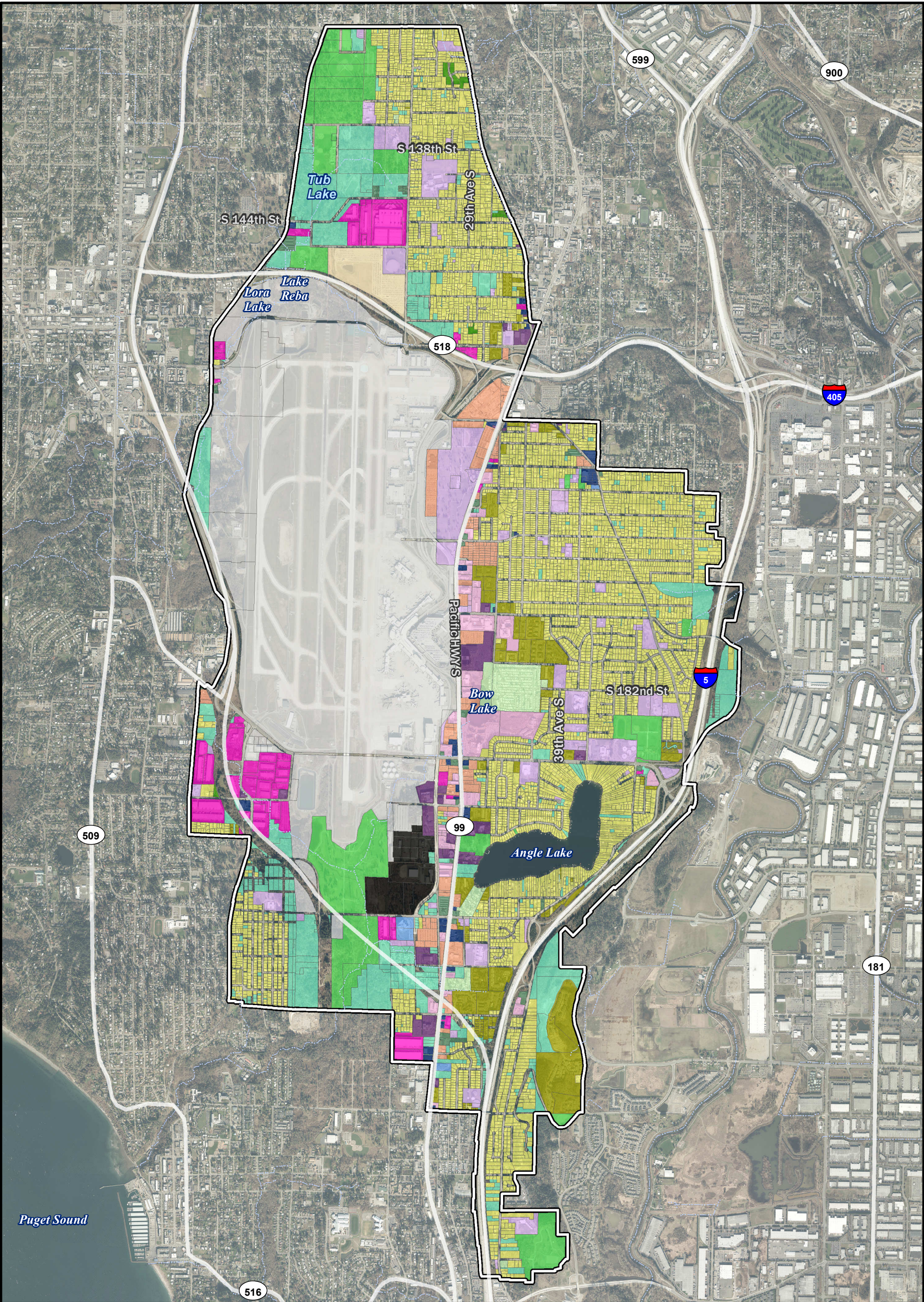
Ecology groups waterbodies into five categories as part of the state water quality assessment. Category 1 (meets tested standards for clean waters), Category 2 (waters of concern), and Category 3 (insufficient data) are not described in this section. Placement in these three categories does not demonstrate that there is a water quality impairment. Category 4 includes three subcategories: Category 4a (has a TMDL), Category 4b (has a pollution control program), and Category 4c (is impaired by a non-pollutant). The City currently does not have any Category 4 listings.

Category 5 is also known as the 303(d) list and identifies impaired waterbodies that have exceeded water quality standards for one or more pollutants. The most recent 303(d) list approved by the United States Environmental Protection Agency (EPA) was developed by Ecology in 2008. TMDLs or water cleanup plans are established for parameters identified on the 303(d) list. The City has a few 303(d) listings summarized below; however, currently, there are no TMDLs or water cleanup plans for any waterbodies in the City. It should be noted; however, that not all water quality data used for these listings were vetted through a quality assurance program, so the accuracy of these listings may vary.

All freshwater waterbodies within the City of SeaTac are protected for the designated uses of salmonid spawning, rearing, and migration; primary contact recreation; domestic, industrial, and agricultural water supply; stock watering; wildlife habitat; harvesting; commerce and navigation; boating; and aesthetic values under WAC 173-201.

3.3.1. Des Moines Creek Drainage Basin

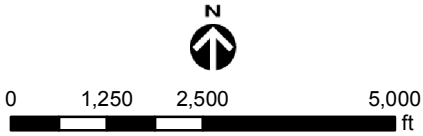
The Des Moines Creek drainage basin occupies a total of 3,800 acres within the City of SeaTac and the City of Des Moines, 74 percent of which (2,806 acres) lies within the City of SeaTac. The basin drains highly urbanized areas of SeaTac and Des Moines (including SeaTac Airport); approximately 40 percent of the total basin area is composed of impervious surfaces (EarthTech 1997). Most of the basin was developed before the City implemented stormwater management and detention requirements, resulting in high flows, erosion, and loss of large woody debris and fish habitat in Des Moines Creek (King County 2004). Two main tributaries to Des Moines Creek drain three subbasins within the Des Moines Creek drainage basin: Plateau, Ravine, and Lower subbasins.



Legend

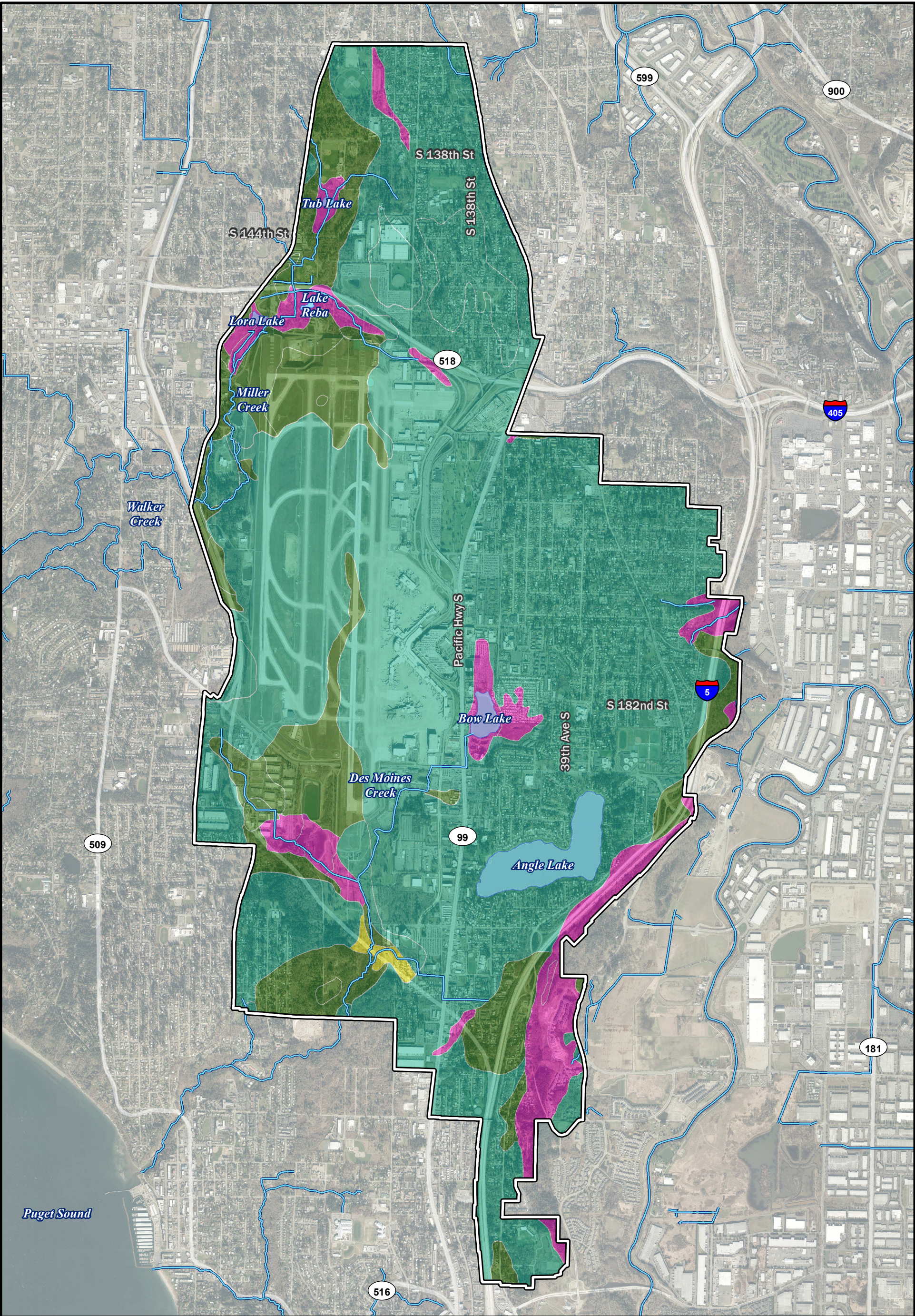
- | | | |
|--------------------------------------|---------------------|------------------------------|
| City boundary | Hotel/Motel | Open Space/Park/Recreation |
| Agriculture | Industrial | Public/Quasi-Public Facility |
| Airport | Institutional | Retail |
| Airport Transition | Mobile Home | Service Activity |
| Commercial Parking/Auto Rental/Sales | Multi-Family | Single-Family |
| Employee Parking | Office/Professional | Vacant |

Figure 3-2.
City of SeaTac Existing Land Uses.



Coordinates: NAD 1983
Washington State Plane North FIPS 4601 Feet
Aerial: Seatac (2010)

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






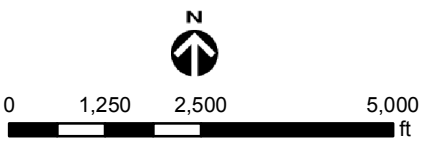
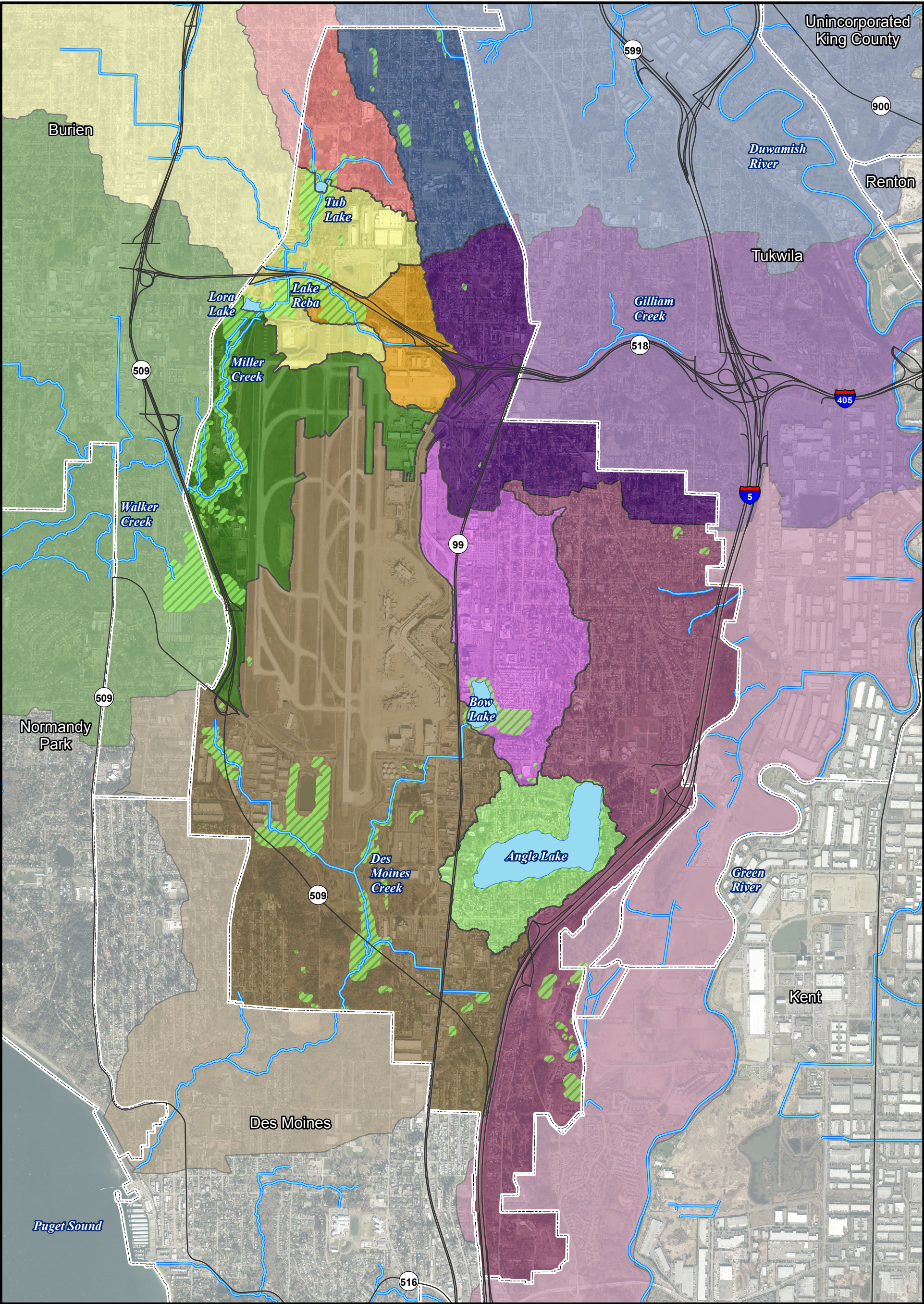
- | | |
|---|---|
|  City boundary | Soil Hydrologic Group |
|  Lake |  A |
|  Stream |  B |
| |  C |
| |  D |

Figure 3-3.
City of SeaTac Hydrologic Soil Groups.



Aerial: SeaTac (2010)

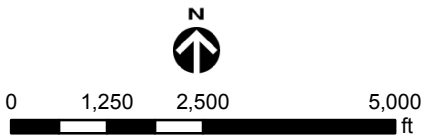
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Legend

- | | | |
|-------------------------|---------------------|---------------|
| Drainage basin boundary | Lake Reba | Highway |
| Angle Lake | Lora Lake | City boundary |
| Bow Lake | Lower Green River | Lake |
| Des Moines Creek | Miller/Walker Creek | Stream |
| Duwamish River | Tub Lake | Wetland |
| Gilliam Creek | | |

Figure 3-4.
Drainage Basins within the City of SeaTac.



Coordinates: NAD 1983
Washington State Plane North FIPS 4601 Feet
Aerial: Seatac (2010)

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3.3.1.1. Des Moines Creek Basin Committee

The Des Moines Creek Basin Committee is involved in a multi-stakeholder effort to improve water quality and salmon habitat in Des Moines Creek. In 1997, the Committee published the Des Moines Creek Basin Plan (Basin Plan) that identified major issues contributing to the declining health of the stream and developed prioritized CIP recommendations (King County 1997). The CIP recommendations identified in the Basin Plan include constructing a combined detention/bypass project to address high flows and erosion in the lower portions of Des Moines Creek; replacing a culvert along Marine View Drive to improve fish passage; improving an outlet to Bow Lake to address high flows, erosion, and water quality issues; and constructing a low flow augmentation facility to provide benefits to increase dissolved oxygen levels and improve aquatic ecosystems. In 2004, the City of SeaTac, City of Des Moines, King County, the Port of Seattle, and WSDOT signed an interlocal agreement that described responsibilities of each party for implementing the CIP projects identified in the basin plan (King County 2010). This interlocal agreement did not include outlet improvements to Bow Lake. The culvert replacement along Des Moines Creek was completed in 2008 as a part of WSDOT's SR 509 Corridor Completion and Freight Improvement Project (WSDOT 2007). WSDOT left the Committee in 2009.

In 2011, the Committee, currently composed of the City of SeaTac, City of Des Moines and Port of Seattle, initiated the Des Moines Creek Water Quality Monitoring Program conducted by King County to evaluate existing water quality, ecological health, causes of environmental degradation, and changes in ecological health and water quality in Des Moines Creek as a result of conservation and restoration actions. Currently, B-IBI monitoring is conducted at two stream locations along Des Moines Creek to evaluate the effect of basin improvements on the benthic macroinvertebrate community (Puget Sound Stream Benthos 2013).

3.3.1.2. Des Moines Creek

Des Moines Creek flows for 3.8 miles from Bow Lake, located east of SeaTac Airport, to Des Moines Beach Park located on Puget Sound. The creek drains a highly urbanized basin of 3,275 acres located in the Cities of SeaTac and Des Moines, 70 percent of which (2,281 acres) lies within the City of SeaTac. Two main branches of the creek, known as the East Fork and the West Fork, run northwest and northeast and converge at a golf course south of SeaTac Airport before heading southwest to Puget Sound. Drainage from Bow Lake is piped into the East Fork through a 60-inch storm drain (EarthTech 1997). The East Fork then flows through Tyee Pond prior to converging with the West Fork. The West Fork of the creek originates near the western edge of the Tyee Golf Course at the Northwest Ponds complex.

The Des Moines Creek Regional Detention Facility and high-flow bypass pipe along the eastern edge of the Tyee Golf Course were constructed in 2007 as a result of the Des Moines Creek Basin Plan (King County 2010). The bypass pipeline routes flows from the East Fork around the creek to discharge into the Puget Sound, and routes high flows through a diversion pipeline that discharges to the Northwest Ponds. The regional detention facility provides storage for the West and East Fork of the creek, and reduces flooding and erosion by controlling discharges from the West Fork through a flow control structure (King County 2008).

Over the years, water quality in the creek has been adversely affected by jet fuel spills, commercial and industrial stormwater runoff, and poorly maintained septic systems (EarthTech 1997). These sources have contributed to elevated concentrations of contaminants in the creek. The East Fork is included on Ecology's 303(d) list (Category 5) for fecal coliform bacteria, dissolved oxygen, and copper. The entire creek is also listed on Ecology's 303(d) list (Category 5) for fecal coliform bacteria, dissolved oxygen, copper, and zinc (Ecology 2008).

3.3.1.3. *Bow Lake*

Located in the north portion of the Des Moines Creek Basin, Bow Lake is a 15.5-acre lake that feeds East Fork of Des Moines Creek prior to its confluence with the West Fork. The 36-inch concrete outlet of Bow Lake discharges to a 60-inch storm drain at International Boulevard (EarthTech 1997). Bow Lake drains approximately 525 acres of primarily residential area in the City of SeaTac.

The shoreline of the lake is surrounded primarily by private commercial development and parking, and the lake itself is inaccessible to the public. The citywide City of SeaTac Comprehensive Plan (SeaTac 2011a), which is required under the Growth Management Act, has set forth Policy 9.9F to seek public access to waterfront areas of Bow Lake.

In 1991, water quality monitoring conducted at the outlet of Bow Lake showed low pH and dissolved oxygen levels in the lake and high fecal coliform bacteria concentrations (EarthTech 1997). Algae blooms were noted in field observations of Bow Lake during the 1990s (EarthTech 1997). No recent water quality data is available for Bow Lake.

3.3.2. *Miller/Walker Creek Drainage Basin*

Miller/Walker Creek drainage basin occupies a total of 5,750 acres, 22 percent of which (1,265 acres) lies within the City of SeaTac. Approximately 22 percent of the total drainage basin area is impervious surface (King County 2006). Bound on the north and east by the Green/Duwamish River drainage basin, the Miller/Walker Creek drainage basin includes area within the cities of Burien, Normandy Park, SeaTac, and unincorporated King County. Although Walker Creek originates in the City of SeaTac, most of Walker Creek lies outside the City limits. A large portion of Miller Creek flows inside the City limits, and Lake Reba and Lake Lora lie completely within the City limits.

Over the past 100 years, development in the basin has increased impervious surface, filled in wetlands, and ultimately resulted in increased peak flood flows, erosion, flooding, and sediment deposition. In addition to these impacts, the increased impervious area has also affected the water quality and fish spawning habitats in the surface waters of the basin. Pollution from businesses, lawn care practices, and road and highway runoff have contributed to declining water quality in Miller and Walker Creeks (King County 2006).

3.3.2.1. *Miller/Walker Creek Planning Committee*

In 2002, six agencies and jurisdictions within the Miller/Walker Creek Basin formed the Miller and Walker Creek Basin Planning Committee through an interlocal agreement. The Committee developed the Miller and Walker Creek Basin Plan in 2006 (King County 2006) which discussed

the existing conditions within the basin, and identified and recommended solutions to current and future problems.

In 2011, WSDOT developed a Miller and Walker Creek Basin Habitat and Stream Restoration Plan (WSDOT 2011). This plan developed restoration actions for both Miller and Walker Creek on a reach-by-reach basis, and identified a total of 26 restoration sites along the creeks. Proposed projects along Miller Creek in this Plan include the placement of in-stream habitat structures, fish passage improvements including repair or replacement of culverts, and construction of flow control structures (WSDOT 2011). However, this plan and the 2006 plan have never been formally adopted or implemented, because consensus could not be reached among the participating jurisdictions. The committee is currently pursuing an alternative basin plan approach.

Many stewardship programs and volunteer opportunities have been developed through the Miller and Walker Creek Basin Plan, including the Community Salmon Investigation (CSI) and the Stream Blog for Miller and Walker Creeks: www.kingcounty.gov/environment/watersheds/central-puget-sound/miller-walker-creeks/stream-blog/stream-blog-2012.aspx.

These stewardship and community engagement programs have increased public awareness and involvement in water quality and habitat restoration efforts within the basin.

3.3.2.2. Miller Creek

The Miller/Walker Creek Basin drains an area of 3,415 acres, 17 percent of which (581 acres) lies within the City of SeaTac. The creek runs for 6 miles through Burien and SeaTac (King County 2006). Miller Creek enters the City limits at S 138th Street and Des Moines Memorial Drive, flows south through Tub Lake, and converges with the western tributary near the intersection of Des Moines Memorial Drive and SR 518. From here, the main stem of the creek gathers flow from a number of tributaries, and winds southward through Lake Reba and Lake Lora. Miller Creek then turns to the east, exits the City limits, and flows through the cities of Burien and Normandy Park before it discharges into Puget Sound. Stormwater runoff from the Hermes Depression in the City of Burien is also piped into Miller Creek.

Miller Creek's natural habitat has been significantly altered in the past 100 years (King County 2006). A stream assessment conducted by King County Staff in 2006 indicated that the Miller Creek habitat lacks buffer areas and large woody debris, contributing to high flows, erosion, and stream corridor alterations. Miller Creek contains some pockets of salmon habitat, but overall does not provide acceptable habitat pools for rearing juvenile salmon (WSDOT 2011).

Flooding along Miller Creek due to increased development along its shoreline initiated the construction of a number of stormwater flow control facilities. Miller Creek Regional Detention Facility at Lake Reba and the Ambaum Regional Detention Facility at 1st Avenue S were constructed to combat this flooding and have since improved flooding issues within the basin (King County 2006). The City of SeaTac Comprehensive Plan (SeaTac 2011a) has set forth Policy 9.9E to preserve the Miller Creek corridor and seek public access along the creek's shoreline.

A water quality analysis of the creek in 1974 reported high concentrations of fecal coliform bacteria, dissolved oxygen, temperature, turbidity, and heavy metals. Today, Miller Creek is included on Ecology's 303(d) list (Category 5) for dissolved oxygen and fecal coliform bacteria (Ecology 2008). No recent water quality data is available for Miller Creek.

3.3.2.3. Walker Creek

Walker Creek originates in a wetland just east of Des Moines Memorial Drive near S 171st Street and S 176th Street. While the creek originates in the City, it flows only 2 miles through SeaTac, Burien, and Normandy Park (King County 2006). The creek enters the City of Burien and flows through a series of wetlands and open water areas before entering the City of Normandy Park and joining with Miller Creek. The two creeks then discharge into Puget Sound near the Normandy Park Community Club (King County 2006). No water quality data is available for Walker Creek.

3.3.2.4. Lake Lora

Lake Lora is a small 2.84-acre lake located just north of SeaTac Airport and west of Lake Reba. Lake Lora drains an area of 317 acres within the City dominated by forest and grass and discharges to Miller Creek (EarthTech 1997). No water quality data is available for Lake Lora.

3.3.2.5. Lake Reba

Lake Reba is a small 1.18-acre lake located just north of SeaTac Airport. Miller Creek Regional Detention Facility is located adjacent to Lake Reba. Lake Reba drains 179 acres within the City. No water quality data is available for Lake Reba.

3.3.2.6. Tub Lake

Tub Lake is a small 1.82-acre lake surrounded by North SeaTac Park property, and is not currently accessible to the public. Tub Lake drains 188 acres within the City. The City of SeaTac Comprehensive Plan (SeaTac 2011a) describes Tub Lake as “a natural peat bog that has existed since prehistoric times”, and has set forth policies 9.9B and 9.9B-1 to preserve the area surrounding Tub Lake as a natural wetland preserve. The City plans to develop environmentally sensitive public trails connecting the North SeaTac Park Community Center to Tub Lake and the adjacent wetlands. No water quality data is available for Tub Lake.

3.3.3. Green/Duwamish River Drainage Basin

3.3.3.1. Lower Green River Drainage Basin

The Lower Green River drainage basin occupies 2,146 acres within the City limits. Approximately 32 percent of the basin within the City is composed of impervious surface. The majority of the basin discharges east under Interstate 5; however, approximately 543 acres in the City discharges north in the direction of SR 518 (EarthTech 1997) to Gilliam Creek in the City of Tukwila.

3.3.3.2. *Angle Lake*

Angle Lake, known for its distinct L-shape and exceptional water quality, drains 336 acres within the City. Located in the center of the City, Angle Lake has a surface area of 102 acres and maximum depth of 52 feet (King County 2013a). Angle Lake discharges under Interstate 5 through an 18-inch stormwater pipe and flow exits the subbasin near International Boulevard (EarthTech 1997).

Markedly low nutrient and sediment levels make Angle Lake a popular destination for recreational activities. A 10-acre public park located on its western shore boasts a large grassy area, boat launch, stage, picnic amenities and swimming. Volunteer forces have regularly monitored the lake since 1980 and have shown the lake is clear, lightly buffered, and low in productivity (King County 2013a). Although Angle Lake is oligotrophic and known for its pristine water quality, it is included on Ecology's 303(d) list (Category 5) for fecal coliform bacteria. Recent water quality monitoring suggests that water levels have been increasing in Angle Lake over the past several years (King County 2011). Water levels in Angle Lake during the 2012 water year were consistently higher than past water level observations. Lake transparency, temperature, nutrients, chlorophyll *a*, and trophic state index measured during the 2012 water year demonstrate that the lake has maintained relatively stable water quality characteristics over the last decade (King County 2013b). Nutrients in the lake remain low and nitrogen to phosphorus ratios are high, making lake conditions unfavorable for blue-green algal blooms. The City plans to continue to monitor water quality and water levels into the future. However, periodic high water levels may be related to maintenance of the lake outlet located on private property in the southeast corner of the lake.

3.3.3.3. *Duwamish River Drainage Basin*

The area within the City that discharges north to the Duwamish River Basin is 364 acres. A portion of the basin discharges to the stream behind the former Glacier High School and is routed to a 36-inch stormwater drainage pipe in 20th Avenue S, while the other portion of the basin discharges through a series of natural drainages to a depression adjacent to S 128th Street before crossing under the street to the north (EarthTech 1997). No waterbodies lie within the Duwamish River drainage basin within the City limits.

3.4. **Hydrologic/Hydraulic Studies and Improvements**

Since 1997, the City has conducted or participated in several analyses and/or studies of the major basins within the City including the Des Moines Creek Basin Plan, the 1997 Surface Water Plan, and the Miller/Walker Creek Basin Plan. As a result of these studies, significant drainage improvements have been made addressing the major stormwater issues within the City, leaving the City with only a few small, localized drainage issues which are identified and discussed in Section 5.3.2. Further, the City continues to participate in the Des Moines Creek Basin Committee and the Miller/Walker Creek Planning Committee to monitor existing drainage improvements and to identify if any further improvements are needed in the basins. Based on these ongoing efforts, as well as the existence of only a few small, localized stormwater issues, additional hydrologic/hydraulic analyses were not necessary for the development of this SWP.

This section briefly summarizes the hydrologic/hydraulic analysis conducted as part of the Des Moines Creek Basin Plan, the 1997 Surface Water Plan, and the Miller/Walker Creek Basin Plan and identifies the improvements made to address drainage issues.

3.4.1. Des Moines Creek Basin Plan

In November 1997, the Des Moines Creek Basin Planning Committee performed a hydrologic analysis of the Des Moines Creek Basin as a part of the development of the Des Moines Creek Basin Plan. The purpose of the hydrologic analysis was to provide options to minimize erosion and degradation of water quality in the channel as a result of increased development in the basin (King County 1997).

As a result of the 1997 analysis and ongoing basin planning efforts, the Des Moines Creek Regional Detention Facility and high-flow bypass pipe along the eastern edge of the Tyee Golf Course were constructed in 2007 (King County 2010). The bypass pipeline routes flows from the East Fork around the creek to discharge into Puget Sound, and routes high flows through a diversion pipeline that discharges to the Northwest Ponds. The regional detention facility provides storage for the West and East Fork of the creek, and reduces flooding and erosion by controlling discharges to the West Fork through a flow control structure (King County 2008).

3.4.2. 1997 Surface Water Plan

In July 1997, following the Des Moines Creek Basin Plan, a hydrologic/hydraulic analysis of the City was performed during the development of the 1997 SeaTac Surface Water Plan (EarthTech 1997). The purpose of this analysis was to:

- Compare simulated model flows to channel and pipe system capacities
- Estimate changes in simulated model flows based on future land use and hydraulic changes, validate and quantify existing flooding problems identified by City staff
- Predict future flooding problems
- Evaluate solutions for flooding problems

As a result of the 1997 Surface Water Plan, the following drainage improvement projects were completed to address flow control and flooding issues in the City, as well as downstream impacts to Des Moines Creek:

- South 204th Street Pond was constructed in 2001 to fully utilize the land area available and to provide capacity to detain greater than a 100-year storm event.
- A 36-inch stormwater drainage pipe segment along 28th Avenue S was replaced with a 54-inch stormwater drainage pipe to eliminate flow restriction and localized flooding.
- The Miller Creek Regional Detention Facility was constructed to resolve flooding issues and downstream channel erosion caused by high flows.
- Conveyance was increased from the outlet of 18-inch culvert under S 224th Street.

While not constructed specifically as a result of the 1997 Surface Water Plan, the Port of Seattle has provided additional on-site detention for its SeaTac Airport property, reducing peak flows and providing water quality treatment to flows discharging to Des Moines Creek and Miller/Walker Creek. The Port of Seattle has also worked to isolate their stormwater flows from the City owned stormwater drainage system where feasible.

3.4.3. Miller/Walker Creek Basin Plan

The Miller and Walker Creek Basin Planning Committee developed the Miller and Walker Creek Basin Plan in 2006 (King County 2006). The majority of the capital facility improvement projects recommended by this study concern area that lies outside the City of SeaTac. The City also occupies a very small percentage of the drainage basin, therefore has a small percent of total cost share in the basin plan project implementation (approximately one percent) (King County 2006).

Following the 2006 Basin Plan, WSDOT developed a Miller and Walker Creek Basin Habitat and Stream Restoration Plan in 2011 (WSDOT 2011). This plan developed restoration actions for both Miller and Walker Creek on a reach-by-reach basis, and identified a total of 26 restoration sites along the creeks; however this plan and the 2006 Basin Plan have never been formally adopted or implemented, because consensus could not be reached among the participating jurisdictions.

In 2007, WSDOT performed a hydrologic and geomorphic analysis of Miller and Walker creeks to determine the appropriate flow control standard for the watershed (WSDOT 2009). The current flow control standard requires that post-development flow durations from 50 percent of the predeveloped 2-year rate to the predeveloped 50-year rate, with the predeveloped condition represented by a forested land use.

WSDOT found that the current rate of stream channel erosion in both the creeks is no greater than historic rates of erosion and that the two streams are in dynamic equilibrium. Because of this, a new flow control standard was proposed that recognized the hydrologic and geomorphic setting of the streams. The proposed flow control standard would maintain post-development flow durations from 50 percent of the predeveloped 2-year rate to the predeveloped 50-year rate, with the predeveloped condition represented by the existing land use (WSDOT 2009).

3.5. Benthic Integrity of Biotic Index

B-IBI is a quantitative method for determining and comparing the biological condition of streams from analysis of benthic macroinvertebrate samples. Benthic macroinvertebrates are stream bugs (i.e., insects, crustaceans, worms, snails, and clams) that live in or near streambeds. Benthic macroinvertebrates are vitally important to stream ecosystems, and as such their presence is monitored to indicate the biological health of streams (Puget Sound Stream Benthos 2013).

B-IBI samples have been collected by King County Department of Natural Resources and the Port of Seattle. An overall B-IBI score was calculated for each collected sample from a series of metrics based on the relative diversity and abundance of invertebrates having different

sensitivities to water quality conditions. The overall B-IBI scores and associated classifications are presented in Table 3-2.

Table 3-2. Benthic Index of Biotic Integrity Data Collected by the King County and the Port of Seattle from 2000 through 2012.

Monitoring Location	Monitoring Station	Monitoring Date(s)	Overall B-IBI Score	B-IBI Classification	Location
Des Moines Creek	DesMoines_PortS_Sep_11	9/13/2011	12	Very Poor	SeaTac
	DM_Wetland	7/29/2010	12	Very Poor	SeaTac
	DM200th	9/10/2012	14	Very Poor	SeaTac
	DM_Ravine_US	7/29/2010	10	Very Poor	Des Moines
	DM_Ravine_DS	7/29/2010	12	Very Poor	Des Moines
	DMmouth	9/10/2012	18	Poor	Des Moines
	WAM06600-000451	7/7/2009	16	Very Poor	Des Moines
	Port of Seattle	2000-2012	15 (average)	Very Poor	SeaTac
Miller Creek	Miller_PortS	9/13/2011	14	Very Poor	SeaTac
	Miller_SWSSD	9/11/2012	18	Poor	Normandy Park
	Miller13thAv	9/30/2006	16	Very Poor	Normandy Park
	Miller Cove	9/11/2012	16	Very Poor	Normandy Park
	MillerCove2	9/30/2006	18	Poor	Normandy Park
	Port of Seattle	2000-2012	20 (average)	Very Poor	SeaTac
Walker Creek	Walker_PortS	9/13/2011	20	Poor	SeaTac
	WalkerPreserve	9/11/2012	20	Poor	Normandy Park
	WalkerSwim	9/21/2008	10	Very Poor	Normandy Park
	Port of Seattle	2000-2012	22 (average)	Poor	SeaTac
Duwamish River Tributaries	09DUW0277	9/17/2012	20	Poor	Tukwila
	09DUW0225	8/8/2012	16	Very Poor	Unincorporated
	E2223	8/25/2010	12	Very Poor	Unincorporated
	09DUW0091	8/27/2012	20	Poor	Unincorporated
	09DUW0144	8/31/2011	16	Very Poor	Unincorporated
	09DUW0024	8/6/2007	12	Very Poor	Seattle

Source: Puget Sound Stream Benthos (2013) and Port of Seattle (P. Maney, personal communication, April 9, 2013) monitoring data.

B-IBI scores in Des Moines Creek are generally classified as very poor (10 to 16) throughout the entire stream reach with the exception of a sampling station near the mouth of the creek which was classified as poor (18). B-IBI scores in Miller and Walker Creek are generally classified as very poor to poor, with sampling stations located upstream near SeaTac Airport and in the downstream reach near the mouth of Miller Creek classified as very poor (10 to 16), and sampling stations in the middle reach classified as poor (18 to 20).

The Port of Seattle has conducted B-IBI sampling along Des Moines Creek, Miller Creek, and Walker Creek since 2000. Samples were collected from three distinct sampling locations along each of the creeks from 2000 through 2002, and have since been collected from a general study area along each creek for each of the subsequent years (2003 to 2012). The general study areas are located south of SeaTac Airport (Des Moines Creek general study area), east of SeaTac Airport near S 168th Street (Walker Creek study area), and east of SeaTac Airport near S 160th Street and Des Moines Memorial Drive (Miller Creek Study Area). All three of these monitoring locations are located in the City of SeaTac.

B-IBI data accrued from the Port of Seattle (P. Maney, personal communication, April 9, 2013) agree with the results obtained from the Puget Sound Stream Benthos database. The results show that Des Moines Creek and Miller Creek are generally classified as very poor, with average B-IBI scores of 15 and 16, respectively; while Walker Creek is generally classified as poor, with an average B-IBI score of 20.

The Duwamish River basin B-IBI scores ranges from poor (20) to very poor (16); however, none of the sampling locations were located inside the City limits. None of the three creeks sampled (Des Moines Creek, Miller Creek, Walker Creek, and tributaries to the Duwamish River) scored above a B-IBI classification of poor (Puget Sound Stream Benthos 2013).

The poor to very poor B-IBI data collected within the City is representative of biological conditions of creeks located in urban settings in the Puget Sound region (Puget Sound Stream Benthos 2013).

3.6. Applicable Regulations

The Surface Water Utility must work with a strict regulatory framework of federal, state, and local regulations. These regulations range from the federal Clean Water Act to City codes, such as sensitive area ordinances. Several sections of the City's SWMP govern aspects of stormwater management for new development and redevelopment projects. Appendix B provides more detailed information on federal and state stormwater-related regulations which are the drivers for City regulations and programs.

3.6.1. *Applicable Federal Regulations and Programs*

The following federal regulations apply to the City:

- The Clean Water Act Sections 404 and 401 regulate activities near and within waters of the United States, including wetlands.
- Ecology's Phase II NPDES Permit, originally issued in February 2007 requires cities and counties that manage small municipal separate storm sewer systems to develop a SWMP focused on reducing discharge of pollutants to the maximum extent practicable and on protecting water quality. A new Phase II NPDES Permit was issued in 2012 and is scheduled to become effective in August 2013. While NPDES permits are component of the Clean Water Act, it is issued and administered by the state.

- The federal Endangered Species Act (ESA) prohibits the take of all listed species, including a take that could result from the City’s stormwater facility operations or private development stormwater management activities that are permitted by the City. Take is defined as to “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in such conduct” and also includes “significant modification or degradation of critical habitat.” Currently, there are no documented ESA-listed fish species or critical habitat within the City’s primary aquatic resources.
- The National Flood Insurance Policy (NFIP) is a federal program enabling property owners in participating communities to purchase insurance as protection against flood losses, in exchange for floodplain management regulations that reduce future flood damages. The NFIP requires the City to develop a flood control ordinance and explicit code for development in flood hazard areas.

3.6.2. Applicable State Regulations and Programs

The following state regulations apply to the City:

- The PSP, formerly the Puget Sound Action Team, is the regional organization that the governor has charged with restoring the health of the Puget Sound by 2020 (PSP 2012). The PSP has published an Action Agenda which includes surface and stormwater management goals and priorities. While these goals and priorities are not mandates, they do align with the purpose and intent of the Utility, therefore the Utility should focus on the major stormwater-related issues that PSP highlights for action to assist in this critically important regional effort.
- The Washington State Growth Management Act (GMA) includes requirements for cities and counties to inventory and protect environmentally critical areas (such as steep slopes, wetlands, and streams) (Chapter 36.70A of the Revised Code of Washington). The GMA also requires the City to develop comprehensive plans in order to ensure environmentally responsible and economically sustainable development, including planning for stormwater-related capital facilities.
- The State Environmental Policy Act (SEPA) ensures that environmental impacts are considered during decision making by the state or local agencies. The SEPA review process evaluates any possible environmental impact that may be associated with issuing permits for private projects, construction of public facilities, or adoption of regulations, policies, or plans.
- The Shoreline Management Act (SMA) regulates the shorelines of the state by requiring that each city and county with shorelines of the state prepare and adopt a Shoreline Master Program (SMP) to regulate land use and activities allowed on shorelines.
- Surface water quality standards describe the quality of water expected to support beneficial surface water uses. Section 303(c) of the Clean Water Act states that water quality standards are the responsibility of states and qualified tribes. Ecology administers water quality standards in Washington state to be “consistent with public health and

public enjoyment of the waters and the propagation and protection of fish, shellfish, and wildlife” (WAC 173-201A).

3.6.3. Applicable City Regulations and Programs

In addition to surface and stormwater codes SMC 12.10 and 12.12 (relating to the Surface Water Utility and IDDE), the following City codes contain regulations that affect the Utility:

- SMC 15.30 Environmentally Sensitive Areas: implements the goals and policies of the Washington SEPA and the citywide SeaTac Comprehensive Plan that require protection of the natural environment and public health. This chapter affects the Utility as it establishes development standards, protects members of the public, protects elements of the environment, requires mitigation of impacts on environmentally sensitive areas, and prescribes means to prevent impacts on water availability, water quality, wetlands, and streams.
- SMC 13.190 Clearing and Grading Code: regulates clearing and removal of vegetation, excavation, grading, and earthwork construction in order to protect public health, safety and welfare. This chapter affects the Utility as it includes regulations for minimizing impacts of stormwater generated by removal of vegetation and pervious areas, protecting water quality from erosion and earthwork, minimizing aquatic and terrestrial wildlife habitat loss, and protecting sensitive areas.

3.7. Surface Water Utility Fund

Creating a Surface Water Utility and imposing service charges is authorized by RCW Chapter 35.67. Pursuant to that statute, the City’s Surface Water Utility was created in 1992 (SMC 12.30) to establish and implement a comprehensive approach to surface and stormwater problems (SMC 12.10.220). The goals of the Surface Water Utility are to:

- Promote public health, safety and welfare
- Reduce flooding, erosion and sedimentation
- Prevent and mitigate habitat loss
- Enhance groundwater recharge
- Prevent water quality degradation

This comprehensive approach includes the following elements (SMC 12.10.220):

- Basin and sub-basin planning
- Land use regulation
- Construction of facilities
- Maintenance

- Public education
- Surface water management services

The City's Surface Water Utility requires a dedicated funding source that is predictable and reliable (SMC 12.10.225). This charge is necessary to fund Utility activities and projects that are required to provide services to residents, support development and meet regulatory requirements. This type of utility program is authorized by RCW Chapter 35.67. and has been supported by our courts, including the Washington State Supreme Court, which has upheld the creation of such a utility and the imposition of surface water utility fees.

The City's rate structure is based on the relative contribution of increased surface and storm water from a parcel and is determined based on the size of the parcel and percentage of impervious surfaces. One exception is Single Family Residential parcels which have a flat rate. The City has only had one rate increase since the establishment of the Surface Water Utility. This rate increase occurred in 1999 (Ord. 99-1042). The Single Family Residential rate was \$5.00 per month or \$60.00 annually when the Surface Water Utility was established and is currently \$6.90 per month or \$82.80 annually. The current and historic utility rate structure and percent of the total Surface Water Utility funding provided from each rate category in 2012 are summarized in Table 3-3.

Table 3-3. City of SeaTac Surface Water Utility Rate Structure Summary.				
Rate Category	Impervious Surface (%)	Surface Water Utility Funding Provided in 2012 (%)	Rate (1992-1999)	Rate (1999 to present)
Residential (R)	NA	23.6%	\$60.00/parcel/year	\$82.80/parcel/year ^a
Very Light (VL)	0-10%	< 0.4%	\$60.00/parcel/year	\$49.50/acre/year ^b
Light (L)	10-20%	1.3%	\$122.11/acre/year	\$168.50/acre/year ^c
Moderate (M)	20-45%	37.0%	\$295.95/acre/year	\$349.00/acre/year ^c
Moderate Heavy (MH)	45-65%	7.7%	\$488.45	\$674.00/acre/year ^c
Heavy (H)	65-85%	11.1%	\$619.29	\$855.00/acre/year ^c
Very Heavy (VH)	85-100%	18.9%	\$811.17	\$1,120.00/acre/year ^c
Port of Seattle	NA	TBD	\$252.95/acre/year	\$349.00/acre/year
City Roads, State Highways	NA	TBD	Determined in accordance with RCW 90.03.525	
Public School District	NA	NA	Exempt pursuant to Section 9.08.060(B) of the King County Code	

NA = not applicable

TBD = to be determined

^a The low income senior citizen rate or a low income disabled citizen rate for a residential parcel is \$29.89/parcel/year.

^c The minimum service charge for parcels within the VL class is \$49.50/parcel/year.

^c The minimum service charge for parcels within the L, M, MH, H, and VH classes is \$82.80/parcel/year.

The City offers a 25 percent rebate of the Surface Water Utility fee for nonresidential parcels which contain one or more retention/detention facilities or equivalent that are designed, engineered, and maintained to the standards of the KCSWDM.

4. SURFACE WATER PROGRAM EVALUATION AND RECOMMENDATIONS

This section summarizes the City's Surface Water Utility programs and includes both the City's NPDES SWMP activities and other non NPDES related surface water program activities. Section 4.1 includes a summary of past and current activities for each Phase II NPDES Permit component, as well as recommendations for addressing needs and upcoming Phase II NPDES Permit requirements. Section 4.2 evaluates Utility programs outside the NPDES regulatory framework and the programs needed to maintain the stormwater infrastructure and levels of service into the future. Detailed information on regulatory requirements for each permit component is included in Appendix B.

4.1. NPDES Stormwater Management Program Activities

The City has achieved compliance with the requirements of the 2007-2013 Phase II NPDES Permit through implementation of their SWMP; however, City staff are continuing to evaluate the City's compliance efforts looking for potential program efficiencies and ways to improve the services provides to the community. Key stormwater program accomplishments are summarized below followed by recommendation for meeting the 2013-2018 Phase II NPDES Permit requirements. The recommendations were developed based on a needs assessment conducted in 2012 and 2013 to evaluate specific components of the City's SWMP with respect to Phase II NPDES Permit requirements.

The section is organized by the five major SWMP components identified in the Permit:

1. Public education and outreach
2. Public involvement and participation
3. Illicit Discharge Detection and Elimination (IDDE)
4. Controlling runoff from new development, redevelopment, and construction sites
5. Municipal operations and maintenance

In addition to the five SWMP components, this section also includes a summary of the accomplishments and recommendations for the following Phase II NPDES Permit requirements:

- Compliance with TMDLs
- Monitoring
- Reporting

A summary of the accomplishments and recommendations for each permit section are summarized in this document, and requirements of each permit section are summarized in Appendix B. Additional staffing needs to support upcoming 2013-2018 Phase II NPDES Permit requirements will be evaluated as part of a separate 2013 Surface Water Utility Rate Study.

4.1.1. Public Education and Outreach

The City currently has a well-developed public education and outreach program that meets the 2007-2013 Phase II NPDES Permit requirements. The specific permit requirements for public education and outreach are listed in Appendix B. A summary of the accomplishments and recommendations of the public education and outreach program are provided below.

4.1.1.1. Accomplishments

The City currently provides the following public education and outreach forums:

- **Printed materials:** City of SeaTac Newsletter and Weekly Reports, brochures, posters, flyers and fact sheets
- **Media:** City web pages, educational videos and programs, local government access channel (SeaTV)

The City created and/or participates in the following public education and outreach activities:

- **School program support:** class presentations, school project support
- **Workshops and events:** community events and festivals, City recycle events, natural lawn care classes, rain barrel classes and events, pervious pavement demonstrations, Fish Friendly Car Wash Program
- **City Council Meetings:** Staff provided annual updates on Phase II NPDES Permit compliance and the developing SWMP
- **Stewardship activities:** Des Moines Creek Basin Plan, Miller and Walker Creek Basin Stewardship Program, Angle Lake monitoring, and the catch basin curb marker program designed to raise awareness of stormwater impacts
- **Business outreach:** participation in 4C Poster campaign, Environmental Coalition with South Seattle (ECOSS) outreach with spill kits
- **Create stewardship opportunities:** The City coordinates with King County to encourage the public to participate and volunteer in Angle Lake water quality monitoring. Multiple stream stewardship events are also provided in coordination with the Miller/Walker Creek Committee and Des Moines Creek Basin Committees. The City is working to increase public awareness of the restoration efforts and volunteer activities in the Des Moines Creek watershed.
- **Regional programs:** Stormwater Outreach for Regional Municipalities (STORM) forum and its regional campaign, “Puget Sound Starts Here”

In 2012, the City was the first in the state to receive a citywide 5-Star EnviroStars Certification. The 5-Star certification signifies that the City demonstrates the attributes of a proactive governmental and business leader, spreading by example an ethic of environmental stewardship and greener practices. To attain this level of certification the City had to demonstrate that the day to day operations and activities by all departments and City-owned facilities were in compliance with strict environmental practices. The operations and activities under review included, but were not limited to:

- Hazardous materials/waste storage and disposal practices
- Energy efficient practices
- Landscaping and park maintenance activities
- Stormwater programs – spill kits, curb makers, natural yard care
- Solid waste, recycling and composting
- Pollution prevention and best management practices
- Efforts to reduce overall environmental impact of business operations

4.1.1.2. Recommendations

Most of the new public education and outreach requirements of the 2013-2018 Phase II NPDES Permit are already being addressed. However, the following program modifications are recommended to meet the pending Phase II NPDES Permit requirements and to improve or expand education and outreach to the community:

- **Expand public education and outreach program:** Improvements and expansion of the City's public education and outreach is a valuable investment of time and energy, as public education is one of the most effective means of preventing illicit discharges before they occur.

Under the 2013-2018 Phase II NPDES Permit, this requirement can be met by the City alone or can be addressed through participation in a regional group (such as STORM) as long as the City contributes a meaningful level of effort, implements the educational approach in the City, and ensures that the message is applicable to City audiences and issues. However, due to existing staffing levels, City staff have not been able to adequately participate in the regional effort to date.

- It is recommended that the City develop new educational materials or workshops and/or promote educational materials or workshops developed by other jurisdictions to benefit the following target audiences:
 - Home-based and mobile businesses
 - BMPs for use and storage of automotive chemicals, hazardous cleaning supplies, carwash soaps, and other hazardous materials

- Impacts of illicit discharges and how to report them
- Engineers, contractors, and developers designing and building projects in the City:
 - Technical standards for stormwater site and erosion control plans
 - LID techniques, including site design, pervious paving, and retention of forests and mature trees
 - Stormwater treatment and flow control BMPs
- Slight modifications will need to be made to the current public education and outreach program to address new subject areas (equipment and dumpster maintenance) that have been added to the permit.
- Consider translating existing printed education materials into Spanish (second most commonly spoken language in the City) in order to reach an additional segment of the City's population.
- Evaluate staffing levels necessary to address program needs.
- **Provide stewardship opportunities:** All of the examples of stewardship opportunities listed in the 2013-2018 Phase II NPDES Permit (stream teams, catch basin curb marking, volunteer monitoring, and riparian plantings) are currently provided by the City, thus the City is already meeting this permit requirement and should continue advertising and supporting these stewardship opportunities.
- **Measure the understanding and adoption of target behaviors:** The City will need to develop an ongoing evaluation program to measure the understanding and adoption of targeted behaviors and targeted audiences. The City will then need to modify the evaluated public education program to address the results of the evaluation. The results should be used to direct education and outreach resources and evaluate changes in adoption of targeted behaviors by February 2, 2016.
- **Track and maintain records:** The City should continue to maintain detailed records of all public education and outreach activities and summarize them on an annual basis.

4.1.2. Public Involvement and Participation

The City's current Public Involvement and Participation Program currently meets all the required elements of the 2007-2013 Phase II NPDES Permit requirements, and will continue to meet the 2013-2018 Phase II NPDES Permit requirements.

Specific permit requirements for public involvement and participation are listed in Appendix B. A summary of the public involvement and participation accomplishments and recommendations are provided below.

4.1.2.1. Accomplishments

The City encourages the residents and interested parties to participate in the decision making processes and updates related to the City's SWMP through advisory councils, watershed committees, stewardship programs, and permit stakeholder committee involvement.

4.1.2.2. Recommendations

No gaps were identified for this SWMP component for the 2013-2018 Phase II NPDES Permit; however, the City should continue to promote public involvement and participation through the City's website, as well as through printed media. The City's current SWMP and annual report are posted on the City's website by March 31 of each year.

4.1.3. Illicit Discharge Detection and Elimination

IDDE is a very important aspect of the City's stormwater program, as it helps prevent potential stormwater contaminants from reaching local lakes and streams. Specific permit requirements for IDDE are listed in Appendix B. A summary of the accomplishments and recommendations of the City's IDDE program are provided below.

4.1.3.1. Accomplishments

The City has met the following 2007-2013 Phase II NPDES Permit IDDE requirements:

- **Storm sewer map:** The City has a GIS database and a Surface Water Management (SWM) Atlas that contains all known outfalls, including 24-inch diameter pipes or larger, receiving waters, and structural BMPs.
- **Illicit discharge ordinance and related codes:** The City has adopted and implemented an illicit discharge ordinance (SMC 12.12) which provides a list of prohibited, allowable, and conditional discharges and enforcement procedures.
- **Spill (illicit discharge) hotline:** The City maintains a spill response hotline (206.973.4770) for citizens to call and report illicit discharges or spill complaints. The hotline is advertised on the City's website (<http://www.ci.seatac.wa.us/index.aspx?page=189>), in brochures, articles, and on magnets, business cards, and the City's local access channel (SeaTV).
 - The City's Click N Request web form (created in 2011) and smart phone application (launched in 2013) provides additional avenues for citizens to report spills and illicit discharges
- **IDDE education:** IDDE education is provided as part of the City's ongoing public education program, and covers small business consultations, numerous IDDE related programs and activities, and IDDE awareness and hotline information.
- **IDDE implementation plan:** The City published an IDDE Policies and Procedures Manual in 2011, which includes areas at high risk of illicit spills and discharges, and procedures for illicit discharge characterization, source tracing, and removal. The City also hired a water quality technician to investigate potential illicit discharges.

- **Dry weather outfall screening:** Dry weather outfall screening field assessments were conducted in 2010 and 2011. However, no illicit discharges or connections were found, likely due to the intermittent nature of illicit discharges.
- **Staff training:** The ongoing IDDE training program provides IDDE Level A (General Awareness) Training for all municipal field staff involved in IDDE investigation, clean up, or reporting; IDDE Level B (Response and Enforcement) Training for all municipal field staff who may come in contact or observe illicit discharges; and Spill Response and Reporting Training for municipal field staff.
- **Recordkeeping:** Tracking of illicit discharges has previously been achieved through the use of a modified Citizen Action Request (CAR) Form and keeping hard and digital copies of each report. In December 2011, the City implemented an asset management database system to track IDDE and Maintenance program requirements.
- **Small business consultations:** The City has partnered with ECOSS to conduct small business inspections in the City. This program provides technical assistance, educational materials, and a spill kit to small businesses to promote the adoption of sustainable practices.

4.1.3.2. *Recommendations*

The City's 2007-2013 IDDE program addresses most of the ongoing requirements specified in the 2013-2018 Phase II NPDES Permit including mapping, an illicit discharge hotline, staff training, implementation of the IDDE program, and recordkeeping. To improve program efficiency and meet the 2013-2018 Phase II NPDES Permit requirements, it is recommended that the City do the following:

- **Illicit discharge ordinance:** Minor edits to the illicit discharge ordinance to address updated permit language
- **IDDE implementation:**
 - Review and update, as necessary, the City's IDDE Policies and Procedures Manual
 - Develop and implement a field screening program that will field screen 40 percent of the stormwater drainage system by December of 2017 and 12 percent of the stormwater drainage system each year thereafter. If an asset management program is incorporated into the City's Surface Water Program (see Section 4.2.1), then the City should consider using video inspections to meet all or a portion of the illicit discharge field screening requirement.
- **IDDE education:** Expand the City's current IDDE program to include updated means of notifying and educating the public to recognize illicit discharges, connections, or illegal dumping

4.1.4. Controlling Runoff from New Development, Redevelopment, and Construction Sites

The City currently has a well-developed stormwater runoff control program. Specific Phase II NPDES Permit requirements for controlling runoff from new development, redevelopment, and construction sites are listed in Appendix B. A summary of the accomplishments and recommendations of this portion of the SWMP are provided below.

4.1.4.1. Accomplishments

- **Stormwater management guidance:** The City adopted the KCSWDM as amended by the SeaTac Addendum to the KCSWDM, which includes minimum requirements for stormwater treatment, conveyance, storage, and disposal consistent with Ecology's Stormwater Management Manual for Western Washington (Ecology 2005). The City's addendum to the KCSWDM is available on the City's website (<http://www.ci.seatac.wa.us/index.aspx?page=189>), and adopts the following standards and guidance documents:
 - Stormwater maintenance standards
 - King County Stormwater Pollution Prevention Manual used for water quality BMPs and source control
 - 2005 LID Technical Guidance Manual for supplemental reference
 - Regional Road Maintenance-Endangered Species Act Program Guidelines for supplemental reference
 - City of SeaTac Integrated Pest and Vegetation Management Plan
- **Stormwater site plan review:**
 - Project application and permitting procedures, standard notes and details, and other Public Works considerations are specified in the KCSWDM. Certain forms and worksheets in the KCSWDM are not applicable to the City of SeaTac and have been modified for application within City of SeaTac. Any deviations from the KCSWDM can be found in the City's Addendum to the KCSWDM.
 - Development review and inspections are achieved through coordination between the Community & Economic Development and Public Works departments
 - NPDES General Construction Permits are provided to representatives of proposed new development and redevelopment projects and are available in the Permit Center
- **Stormwater management ordinance:**
 - **Ordinance 05-1012 (SMC 12.10)** adopts the KCSWDM to meet requirements of the Clean Water Act, the Endangered Species Act and the State Growth Management Act.

- **Ordinance 09-1042 (SMC 12.10)** amends the City's adoption of the KCSWDM to include the SeaTac Addendum to the KCSWDM. These changes became effective in 2010 and include minor revisions to the KCSWDM to address the differences between King County's and the City's organization and processes.
- **Staff training:** The City trains inspection and/or updates development review staff on revised stormwater review standards, inspection and escalating enforcement procedures, and tracking/reporting responsibilities, as necessary.
- **Inspections:**
 - Developed and implemented Erosion and Sedimentation Control (ESC) Inspection and Escalating Enforcement Policies and Procedures
 - Pre-construction ESC conference and inspection conducted on all development sites except single family residential
 - Construction site runoff and erosion control inspections during the construction phase
 - Post construction inspections of private facilities according to the KCSWDM inspection standards
 - Incentivizing maintenance of private facilities through the following:
 - Providing a 25 percent rebate of the Surface Water Utility fee for nonresidential parcels, when the parcel has one or more retention/detention facilities or equivalent that are designed, engineered, and maintained to the standards of the KCSWDM
 - Providing contractor services for stormwater facility maintenance at a discounted rate. A total of 48 businesses took advantage of this program in 2012.
- **Recordkeeping and enforcement:**
 - Inspections, corrective actions, and enforcement procedures are recorded through permit tracking software
 - Escalating enforcement procedures and fines for inadequate operation and maintenance of stormwater facilities are provided in the SMC 1.15 and SMC 13.190.080, respectively and are detailed in the above mentioned ESC policy and procedures document.

4.1.4.2. Recommendations

The City's current and ongoing new development, redevelopment, and construction sites program addresses most of the ongoing requirements specified in the 2013-2018 Phase II NPDES Permit including plan review, construction site inspections, and staff training. The new requirement for watershed-scale stormwater planning does not currently apply to the City, since the watersheds identified in the Phase I NPDES Permit are not located in the City.

Updating codes, rules, standards, and other enforceable documents, such as the SeaTac addendum to the KCSWDM, to incorporate new site thresholds, LID principles, and LID BMPs will require a significant effort in terms of staff time and resources. This effort will require stormwater program staff time, but will also need to involve staff from other City departments including, Fire and CED. Training for staff, contractors, and developers will also be necessary to educate City staff and local companies on how to implement the new LID requirements in particular, and how they should be applied to new development and redevelopment projects.

The City plans on continuing all the activities summarized above related to controlling runoff from new development, redevelopment, and construction sites, and enhancing the existing program through the following:

- **Stormwater management guidance:**

- Short Term: Provide clarification of SeaTac's addendum to the KCSWDM requirements
 - Provide clarification on soil amendment standards, where they are applied and how they are implemented
 - Update with new LID requirements
- Long Term: Evaluate and update SeaTac's adoption of the KCSWDM after the new King County manual is released, as needed, to keep equivalent with Ecology's Stormwater Management Manual for Western Washington (Ecology 2012) or equivalent
- Revise and adopt post-construction private drainage system maintenance standards for new approved facility types

- **Stormwater site plan review:**

- Evaluate engineering review policies for development in areas with steep slopes and groundwater seeps (e.g., west of Orillia Road S)
- Increase efficiency and accuracy when verifying stormwater facility performance during plan review by developing sizing table tools and checklists for City staff

- **Stormwater management ordinance:**

- Review and revise local development codes, rules, standards, and other enforceable documents (including the SeaTac Addendum to the KCSWDM, the Growth Management Plan, and the Shoreline Master Plan) to incorporate and require LID principles and LID BMPs, as necessary.

- **Staff training:**

- Identify LID training opportunities for plan review staff and inspectors
 - Provide additional construction oversight and inspections when implementing LID projects

- Inform City contractors, developers, and designers regarding the City's exceptions to and revisions to the KCSWDM
- **Inspections:** Modify inspection frequency of flow control BMPs and catch basins as needed to comply with Phase II requirements
- **Recordkeeping and enforcement:** Continue tracking inspections, corrective actions, and enforcement procedures with permit tracking software

4.1.5. *Municipal Operations and Maintenance*

The City currently conducts O&M activities at City-owned facilities and in the ROW. Specific permit requirements for municipal O&M are listed in Appendix B. A summary of the accomplishments and recommendations for municipal O&M are provided below.

4.1.5.1. *Accomplishments*

- **O&M Program:** Catch basin inspection and cleaning, street sweeping, stormwater facility cleaning and maintenance, and flooding response and repair
- **Inspections:**
 - Annual inspection of required public and high-priority private stormwater facilities
 - Spot checks of potentially damaged permanent treatment and flow control facilities (other than catch basins) after major storm events
- **Stormwater pollution prevention plan (SWPPP):** A SWPPP was developed and implemented for the SeaTac Maintenance Facility
- **Stormwater policies and procedures:**
 - Adopted the following documents:
 - KCSWDM maintenance standards for catch basin maintenance; culvert, ditch, and swale maintenance; equipment maintenance; and tank, wet vault, and wet pond maintenance
 - King County Stormwater Pollution Control Manual describes and regulates use of BMPs for managing stormwater on residential or commercial properties
 - ESA Regional Road Maintenance Standards
 - City of SeaTac Integrated Pest and Vegetation Management Plan
- **Staff training:** Provided ongoing O&M staff training through the following programs:
 - Regional Road Maintenance ESA Training
 - Spill Response and Reporting Training

- Stormwater System Inspection Training
- **Tracking and recordkeeping:**
 - Tracking and response to stormwater-related problems (i.e., plugged drain grates, failed facilities, and localized flooding) in Cityworks
 - Maintenance of records of inspections and maintenance or repair activities

4.1.5.2. *Recommendations*

The City's current O&M program addresses the majority of the ongoing requirements specified in the 2013-2018 Phase II NPDES Permit including annual inspections of municipally owned or operated permanent stormwater treatment and flow control BMPs/facilities, spot checks of potentially damaged permanent stormwater treatment and flow control BMPs/facilities after major storm events, staff training, SWPPP implementation, and recordkeeping.

Updating maintenance standards to be consistent with those in Ecology's 2012 Stormwater Management Manual for Western Washington (Ecology 2012) or approved equivalent and modifying O&M practices, policies, and procedures should not involve a significant amount of effort, with the exception of updating the City's addendum to the KCSWDM (also discussed under *Controlling Runoff from New Development, Redevelopment, and Construction Sites*).

A key issue facing the Utility is the 2013-2018 Phase II NPDES Permit requirement to annually inspect and enforce maintenance of new flow control and treatment facilities on both private and public property. This requirement, combined with more stringent site thresholds requiring LID included in the 2013-2018 Phase II NPDES Permit, will cause a significant increase the workload of O&M staff as new LID facilities are constructed. Workload impacts will be seen in the increased number of inspections and enforcements and the increased complexity of these LID inspections. As LID is implemented, small localized stormwater BMPs will be constructed over a single development in place of a few large, centralized facilities. In the case of subdivisions, these LID facilities will likely be spread over several private properties, rather than in common area tracts, making enforcement of maintenance more difficult.

To improve program efficiency and meet the Phase II NPDES Permit requirements, it is recommended that the City do the following:

- Continue to work cooperatively with other jurisdictions to share experiences, strategies and tools to help meet NPDES requirements, as well as implementing and maintaining LID BMPs
- Implement an in-house catch basin inspection program
- Implement an in-house street sweeping program
- Additional training and clarification, as needed, on standards and procedures for inspections and maintenance
- Update maintenance standards as necessary for consistency with the 2012 Stormwater Management Manual for Western Washington (Ecology 2012) or equivalent

- Obtain tools, equipment and training necessary to inspect, maintain, and repair LID facilities
- Given the anticipated increase in the number of inspections and enforcement activities for private drainage facilities, as well as the complexity of LID facility inspections required under the 2013-2018 Phase II NPDES Permit, staffing needs should be evaluated in the 2013 Surface Water Utility Rate Study.

The City is in the process of purchasing a vactor truck and plans to implement an in-house catch basin inspection program, therefore no issues related to meeting the increased inspection frequency required by the 2013-2018 Phase II NPDES Permit are anticipated.

4.1.6. Compliance with TMDLs

The City is not affected by any TMDLs listed in Appendix 2 of the 2008-2013 Phase II NPDES Permit. However, several receiving waters within the City limits (Angle Lake, Des Moines Creek, and Miller Creek) are listed for water quality impairments under Category 5 of Ecology's Clean Water Act Section 303(d) list (impaired waters exceeding water quality standards that require a TMDL). The 303(d) listings for these waterbodies are described in Appendix B.

4.1.7. Monitoring

The City's stormwater monitoring program is currently in its planning stages, as was required under the 2007-2013 Phase II NPDES Permit. The City's monitoring program is designed to address two components: monitoring stormwater discharges and SWMP effectiveness. Specific permit requirements for monitoring are listed in Appendix B. A summary of the accomplishments and recommendations for monitoring are provided below.

4.1.7.1. Accomplishments

The City's Stormwater Monitoring Plan (Appendix of SWMP) (SeaTac 2010b) included the following monitoring plans or activities:

- **Stormwater monitoring planning:**
 - Identification of sites for long-term stormwater monitoring
 - Identification of two SWMP effectiveness questions
- **Existing receiving water monitoring programs:**
 - Des Moines Creek Basin Plan monitoring
 - Angle Lake water quality monitoring and stewardship program
 - Miller and Walker Creek Basin Plan

4.1.7.2. Recommendations

The monitoring section of the 2013-2018 Phase II NPDES Permit describes the option of participating in the RSMP. The City has decided to participate in the RSMP outlined in the 2013-2018 Phase II NPDES Permit. The total monitoring cost will be \$17,832 per year beginning with the first payment on August 15, 2014. If the City had selected the opt-out option, the current stormwater monitoring activities would have to be significantly expanded to meet the requirements specified in the 2013-2018 Phase II NPDES Permit, therefore participating in the RSMP is more cost effective than implementing the opt-out monitoring option.

4.1.8. Reporting

The City is required to submit an annual report and SWMP update to Ecology each year in March. Specific permit requirements for reporting are listed in Appendix B. A summary of the accomplishments and recommendations for reporting are provided below.

4.1.8.1. Accomplishments

The City submitted an annual report and SWMP update to Ecology each year in March from March 2008 through March 2013. The annual report submitted to Ecology in March 2011(SeaTac 2011b) included the following additional information related to reporting:

- Stormwater Monitoring Plan
- LID Report which discussed barriers to LID acceptance and use, as well as LID practices, goals, planned actions, and timelines

4.1.8.2. Recommendations

No gaps were identified for this SWMP component for the 2013-2018 Phase II NPDES Permit since the City has met the deadlines for the reporting requirement to date. The additional reporting requirement in the 2013-2018 Phase II NPDES Permit related to providing a written description of internal coordination mechanisms to be submitted with the March 2015 annual report is not expected to require significant additional effort.

4.2. Other Surface Water Program Activities

This section provides an evaluation of other surface water program activities that are not explicitly tied to Phase II NPDES Permit requirements. These surface water program activities include asset management, water quality retrofits, stormwater components of transportation CIP projects, and private property policies. These activities support City Council goals and Surface Water Utility goals, as summarized in SMC 12.10.225b:

“The surface water management program is necessary in order to promote public health, safety and welfare by establishing and operating a comprehensive approach to surface and storm water problems which would reduce flooding, erosion and sedimentation, prevent and mitigate habitat loss, enhance groundwater recharge and prevent water quality degradation. This comprehensive approach includes the following elements: basin and subbasin planning, land use regulation, construction of facilities,

maintenance, public education, and provision of surface water management services. The most cost effective and beneficial approach to surface water management is through preventative actions and protection of the natural drainage system. In approaching surface water problems the surface water management program shall give priority to methods which provide protection or enhancement of the natural surface water drainage system over means which primarily involve construction of new drainage facilities or systems.”

4.2.1. Asset Management

4.2.1.1. Existing Approach

The City is currently responsible for stormwater assets valued at over \$26.9 million. These assets include, but are not limited to, 3,916 catch basins, 72 miles of stormwater pipe, and 32 structural water quality treatment facilities. The majority of these assets were transferred to the City from King County when the City incorporated in 1990. These assets are aging and have a limited life expectancy. In some areas stormwater drainage pipes are over 40 years old. With the exception for stormwater drainage systems within or directly adjacent to Transportation CIP projects, the City currently uses a reactionary approach to asset management. Because the City lacks the equipment and staff needed to accurately and consistently visually inspect and assess underground stormwater facilities, such as pipes and vaults, City staff currently have to wait for failure to occur before they can schedule needed repairs or replacement. There are risks associated with this reactionary approach, including additional costs accrued from property damages, public safety, flooding, and traffic impacts. Further, using the reactionary approach does not allow the City to proactively schedule and budget for stormwater asset repair and replacement activities, which can result insufficient funding to address failures and emergency repairs. The risks and costs associated with this reactionary approach will likely increase as the system ages and system failures become more frequent. If the City decides not to implement an asset management program, additional funding will still be necessary to cover repair and replacement of stormwater drainage infrastructure as the system ages. These additional Surface Water Utility costs will be evaluated as part of the 2013 Surface Water Utility Rate Study.

4.2.1.2. Asset Management Program

An effective asset management program is essential component of a Surface Water Utility that ensures that assets continue to function over the long term and significantly reduces the potential for system failure. Asset management is a system for maintaining the desired level of service while minimizing the life cycle cost of the assets (in this case, stormwater drainage system infrastructure). It is implemented through an asset management program, that typically includes inventorying the assets, assessing their condition, implementing a GIS-based asset management data information tracking system, prioritizing maintenance projects based on assessing the likelihood of failure and consequences of failure for each asset, and a mindset shift from focusing on short-term capital costs towards focusing on complete life-cycle costs of assets.

The overarching goal of asset management is to move a utility from a reactive mode of operation where rehabilitation and work activities are driven by imminent failures or floods, to a proactive

mode of operation where rehabilitation and replacement projects are prioritized to minimize life cycle costs and reduce failure risk.

Other advantages of a mature asset management program include:

- Prolonging asset life and aiding in rehabilitation, repair and replacement through efficient and focused operation and maintenance
- Meeting level of service with a focus on sustainable operation
- Setting utility rates based on sound operational and financial planning
- Budgeting focused on activities central to sustained performance
- Meeting service expectations of the community, rather than waiting for a system failure
- Helping to meet some NPDES regulatory requirements
- Increasing knowledge of system mapping and infrastructure characteristics can improve emergency response

4.2.1.3. SeaTac Program Goals

The City's goals for an asset management program are currently:

- **Asset inventory goal:** conduct an inventory of at least 12 percent of the City's stormwater system each year, beginning in 2016, using video inspection equipment
- **Asset management goals:**
 - Adopt and maintain an asset management program to provide cost effective level of service to City residents and property owners
 - Preemptively identify segments of the system that need maintenance and take action before asset deterioration causes flooding, erosion, and sedimentation

Achieving these asset management program goals would help the City in meeting the following overarching Surface Water Utility goals:

- **Promote public health, safety and welfare:** Proactively scheduling repair and maintenance of stormwater assets would help to reduce and prevent flooding, reduce and prevent traffic issues, improve emergency response time, and ultimately increase public safety.
- **Reduce flooding, erosion and sedimentation:** Consistent inspection and maintenance of stormwater assets would prevent flooding, erosion and sedimentation before they occur.
- **Prevent water quality degradation:** Conducting maintenance of stormwater assets would decrease stormwater asset off-line time and allow the stormwater drainage system to function as designed and provide sufficient water quality and/or flow control prior to entering receiving water bodies.

4.2.1.4. *Program Structure*

This section describes and presents the following components of an asset management program:

- Steps involved in implementing an asset management program
- A list of activities planned for 2013, 2014, and 2015 to achieve full implementation by 2016

The primary steps in implementing the asset management program are defined and described in the following sections and are briefly outlined here to provide a framework for the proposed program structure. Some of these steps can occur simultaneously.

- Define asset inventory attributes, condition ratings, and risk ratings (Cityworks forms)
- Activate/test database to accept real-time data entry from asset inventory
- Conduct asset inventory:
 - Assess condition
 - Determine residual life
 - Assess likelihood of failure
 - Assess consequences of failure
- Prioritize maintenance and capital program based on minimizing life cycle cost and reducing risk of failure or not meeting level of service
- Achieve full implementation of asset management program

Full implementation of an asset management program would require several years. If approved, the City could have the process fully functional and integrated into Utility work practices by 2016. Completing an asset inventory for the entire system is expected to take 3 to 8 years (depending on the number of days per week that video inspections will occur). Major activities to be conducted in each year are listed below:

- **2013:**
 - Determine whether to conduct asset inventory in-house or through contractor
- **2014:**
 - Obtain program funding approval
 - Initiate development of the program
 - Contract with database consultant to develop attributes, condition ratings, risk ratings and Cityworks forms
- **2015:**
 - Obtain necessary equipment, staff, and/or contracts

- Integrate software and database forms for asset management evaluation and tracking
- Begin asset inventory in the highest priority area
- Update standard operating protocols, other documentation to reflect asset management program
- Conduct staff asset management training
- Inventory 4 percent of system
- Assess/refine attribute, condition ratings, and risk ratings based on field experience
- **2016:**
 - Inventory at least 12 percent of system
 - Conduct pilot test of prioritization scheme using the first 10 percent of the system inventoried
 - Continue testing and refining
- **2017:**
 - Inventory at least 12 percent of system
 - Implement prioritization scheme and asset management program into CIP development
- **2018-ongoing:**
 - Inventory at least 12 percent of system annually
 - Conduct annual assessment of asset management program implementation – cost, level of service performance, number and severity of flooding issues

4.2.1.4.1. Develop Asset Inventory

One of the most resource intensive aspects of implementing an asset management program is the initial asset inventory. An asset inventory involves collecting information on the City's stormwater drainage system assets (e.g., stormwater pipes, manholes, inlets, and catch basins) and developing a database of asset characteristics (e.g., age, size, and material condition). Since a majority of the City's stormwater drainage infrastructure was installed prior to the City's incorporation in 1990, the City does not have as-built or record drawings for a large portion of the stormwater drainage system. Consequently, many stormwater drainage system infrastructure asset characteristics in the City are unknown. Due to the large effort required for the asset inventory, two options are being considered by the City: 1) perform asset inventory in-house and 2) contract out asset inventory. The costs of these options will be evaluated in detail as a part of the 2013 Surface Water Utility Rate Study.

Option 1: Performing Asset Inventory In-House

For Option 1, the City would purchase software and video inspection equipment in order to perform all of the asset inventory and assessment in house.

An asset inventory can be performed in-house with a minimum of a two-person crew working on video inspections for at least 2 days each week. Field crews can also conduct field screening for illicit connections and illicit discharges during the asset management data collection effort. In addition to video inspections, it is also helpful to have 1 to 2 days per week for the following activities:

- Prioritizing and scheduling inspections
- Coordinating pipe/structure cleaning (using vactor/jet rodding) to facilitate video inspections
- Coordinating work by maintenance staff to uncover buried catch basins and outfalls and provide supplemental traffic control
- Entering data collected in the field (e.g., inspection reports, GIS data)
- Preparing work orders to correct deficiencies

Advantages of an in-house asset inventory include multiple uses for video inspection equipment including illicit discharge field screening, inspections, and transportation CIP projects.

Disadvantages of an in-house asset inventory include a higher upfront cost (cost of software, video inspection equipment, and information tracking system) and a large demand on staff time.

Option 2: Contract out Asset Inventory

For Option 2, the City would hire a contractor to perform the asset inventory. Advantages of this approach include a lower capital cost and lower workload for City staff. The inventory could be completed more quickly as a contractor could assign multiple resources to the effort.

Disadvantages to hiring a contractor include less carryover of insights gained during the inspections to other aspects of the City's maintenance program and that the City staff would still need to manage the database portion of the asset management program.

4.2.1.4.2. Asset Condition

In addition to the asset characteristics (e.g., age, size, and material) collected during the asset inventory, information on asset condition should also be collected in order to assist with prioritizing which portions of the system need to be repaired or replaced. Field crews should focus on conditions that may influence the useful life of the asset (e.g., rust, broken parts, cracks or breaks due to vegetation intrusion). Some jurisdictions address this by simply assigning a rudimentary condition grade of good, fair, poor, or very poor. Other jurisdictions have implemented a more complicated ranking system that includes a number ranking along within each of the grades presented previously: 0 to 1 (good), 2 to 4 (fair), 5 to 7 (poor), and 8 to 9 (very poor).

4.2.1.4.3. Determine Residual Life

Data should also be collected during an asset inventory to help estimate the residual life of stormwater assets. An asset's residual life is defined as its remaining useful life. Usually, there are two steps to estimating useful life:

1. Determine the expected useful life by using the manufacturer's recommendations or the following estimates:
 - Metal drainage pipe life expectancy = 35 years
 - Concrete or PVC drainage pipe life expectancy = 70 to 100 years

Adjust these numbers based on the specific conditions and experiences of the system.

2. Calculate an adjusted useful life by taking into account the service history and current condition of the asset.

4.2.1.4.4. Determine Risk

Determining risk involves answering the following two questions:

1. How likely is the asset to fail?
2. What are the consequences of failure?

The asset condition and residual life described in previous sections are the primary factors in determining how likely the asset is to fail. Factors considered to determine the consequences of failure include effects on public infrastructure, private infrastructure, and community natural resources assets. Questions to consider for the consequences of failure include the following:

1. What damage would occur if the pipe, ditch, catch basin, detention vault, or manhole failed?
2. Could failure cause flooding?
3. Could failure result in sinkholes and/or traffic impacts?
4. Would flooding cause public safety issues such as water over the roadway or sinkholes?
5. Would flooding cause economic damage by shutting down a business or cause significant transportation impacts?
6. Would flooding deposit sediment and ruin a restoration area or damage a community asset such as a park?
7. What is the dollar value of those consequences?

The answers to the above questions are used to prioritize asset replacement and rehabilitation in a qualitative risk-based prioritization scheme, likelihood and consequences are both rated as high medium or low. Prioritization of projects is based on addressing all "high-high" first, followed by the "medium-high" and "high-medium" issues, and so forth.

In a quantitative risk based prioritization scheme, the likelihood of failure is typically assigned a probability value, and the consequences of failure are assigned a dollar value. The probability of failure and the consequences of failure are then multiplied to determine the overall rating. Prioritization is based on numerically ranking the scores.

4.2.1.4.5. Implementation of Asset Management Program

Implementation of the asset management program is considered “final” when it transitions from being considered a project to being standard operating procedure.

Originally, the City plans to house the asset management program in what is currently called the Stormwater Compliance Division (proposed to be renamed to the Stormwater Management Division).

The City plans to use the asset management methodology to prioritize all projects, based on two tiers:

- **Small Works:** One location (or multiple locations) and less than \$100,000; consistent with current \$100,000 funding in budget for spot drainage repairs
- **CIP project:** over \$100,000; once identified issues become Stormwater CIP projects, they will shift to the Public Works Engineering Department for development

Successfully implementing the asset management program will be a major effort for the Utility for the next 3 years and is critical to achieving the Utility goals cost effectively.

4.2.2. Water Quality Retrofit Program

This section includes information regarding water quality retrofit projects that may be required by future regulatory drivers. The City is currently covered by the Phase II NPDES Permit (described previously and in detail in Appendix B); however, comparisons in this section are made to the Phase I NPDES Permit which has slightly more stringent requirements than the Phase II NPDES Permit and applies to larger jurisdictions in the state of Washington including the City of Seattle, City of Tacoma, Clark County, King County, Pierce County, and Snohomish County.

4.2.2.1. Anticipated Future Permit Requirements

Ecology’s intent over time is to make the Phase I and Phase II NPDES Permit requirements more similar. Currently, the Phase I Permit includes a retrofit component for existing development. Water quality retrofits are not currently included in the Phase II NPDES Permit, but may be included in the next 5-year permit cycle.

The 2013-2018 Phase I Permit requires each permittee to implement a Structural Stormwater Control Program (S5.C.6). The goal of this program is to mitigate impacts of stormwater discharges from areas of existing development (including runoff from highways, streets, and roads owned or operated by the permittee) as well as areas of new development. Projects to consider include new flow control and water quality facilities, retrofit of existing flow control and water quality facilities, acquisition of property for water quality or flow control benefits, or

maintenance of water quality or flow control facilities with capital construction costs greater than \$25,000.

4.2.2.2. Benefits of a Water Quality Retrofit Program

Water quality benefits obtained through new or retrofitted water quality facilities as a part of the Structural Stormwater Control Program is quantified in the Phase I Permit as the estimated total suspended solids (TSS) reduction in pounds per year. This is calculated based on the land use draining to the retrofit facility, median annual TSS loading rate associated with each land use, and the removal efficiency of the facility.

The Phase I Structural Stormwater Control Program also seeks to improve hydrologic conditions of the basin. Hydrologic conditions may be improved by providing increased flow control. Benefits are quantified in the Phase I Permit based on flow control provided by the retrofit project compared to the flow control required if the project had to meet the flow control or LID performance standards.

Besides anticipating future permit requirements, a water quality retrofit program would help the City proactively assess and prioritize stormwater problem areas. These water quality retrofit areas can be identified through the City's proposed asset management program (Section 4.2.1) or the stormwater CIP (Section 5.2). Maintaining a list of known problem areas and potential solutions with quantified benefits would also help the City proactively pursue grant funding for potential water quality retrofit projects.

4.2.2.2.1. Identifying Problem Areas

Water quality issues are typically most apparent if receiving surface water has known water quality issues. Other aspects to consider for water quality retrofits are the area draining to each facility, land use of the drainage area, and proximity to surface waters.

Multiple lakes and streams in the City are listed on Ecology's 303(d) list (Category 5) for pollutants that exceed state water quality standards. This pollution is likely caused by multiple sources, including stormwater runoff, incidental spills (as is the case in Des Moines Creek), and poorly maintained septic systems. The B-IBI, which indicates the biological condition of streams, classifies Des Moines Creek, Miller Creek, and Walker Creek as very poor to poor biological condition.

4.2.2.3. Prioritizing Retrofit Projects

Once the City has developed their proposed asset management and stormwater CIP further, potential water quality retrofit projects could be incorporated as part of the assessment and prioritization process. Prioritization criteria should consider site feasibility, environmental benefits, economic considerations, and social and community benefits. The following are considerations for prioritization of potential water quality retrofit projects:

- **Site feasibility:** available space, infiltration potential, site slope, utility conflicts, opportunity to fix the problem

- **Environmental benefits:** impervious area contribution, anticipated treatment effectiveness for different BMP options, treatment benefit for stream or wetland, treatment addresses 303(d) listing or other major water quality issue, benefits for ESA listed species or designated critical habitat areas
- **Economic considerations:** cost of reconfiguring the existing drainage system, mitigation expense, constructability, funding sources
- **Social and community benefits:** educational opportunity, aesthetics, recreational benefits, supports goals in SeaTac SWP

4.2.3. Stormwater Components of Transportation CIP Projects

The City's CIP program currently includes a variety of transportation CIP projects. During the majority of these projects, the City's stormwater drainage system is upgraded or improved. Currently, City streets are charged a reduced Surface Water Utility rate (30 percent) due to the benefit of these improvements to the stormwater drainage system. Although the stormwater drainage system was upgraded or replaced during these projects, the Surface Water Utility fund has not contributed to the transportation CIP projects. The amount of the transportation CIP project cost that can be attributed to stormwater system updates and replacements was analyzed to support the 2013 Surface Water Utility Rate Study, and to determine whether the Surface Water Utility fund should financially support the stormwater components of transportation CIP projects.

Four past transportation CIP projects were used to approximate the stormwater-related project expenses compared to the overall cost of the transportation CIP project. A summary of the transportation CIP projects analyzed and stormwater-related costs is provided in Table 4-1.

Table 4-1. Summary of Stormwater Improvement Costs Associated with Transportation CIP Projects.

Project	Total Project Cost	Cost Related to Stormwater Improvements	Percent of Total Cost Related to Stormwater Improvements
ST-078 – Military Road S (S 176th through S 188th)	\$5,615,000	\$ 910,500	16%
ST-130 – S 154th St. Improvements	\$4,545,000	\$1,114,000	25%
ST-827 – S 138th St. Pedestrian Improvements	\$1,046,000	\$ 352,200	34%
ST-828 – S 164th St. Sidewalk Improvements	\$ 688,500	\$ 189,800	28%
Average	\$2,973,600	\$ 641,600	25%

General stormwater-related items considered in this analysis included:

- Items, excavation, and connections related to drainage structures (catch basins, manholes, inlets, clean outs) and pipes (storm sewer pipes and underdrain pipes)

- Quarry spalls
- Vaults
- Pervious concrete
- Erosion and sediment control items required due to stormwater drainage system improvements

A complete list of stormwater-related items is included in Appendix D.

4.2.3.1. Recommendation

At issue is whether it is appropriate and/or preferable to continue to allow a 30 percent utility rate reduction for City roads, provided stormwater improvements needed for transportation CIP projects continue to be paid by transportation funds; or to have the Utility fund all stormwater improvements and subsequently charge transportation funds a full utility rate. The costs and benefits of both scenarios are planned to be evaluated in the 2013 Surface Water Utility Rate Study.

4.2.4. Private Property Drainage Issues

All jurisdictions across the Puget Sound face receive requests from the public to resolve drainage issues on private property. While private drainage issues are not frequently brought to the City, it is an issue that is raised several times a year. In addition, concerns over private property drainage issues were raised as part of the public participation component for the development of the SWP. This section summarizes how the City currently addresses private property drainage issues and what policy changes are recommended. Current private drainage issues have been identified through a review of City documentation, a public survey, and visits to problem sites.

4.2.4.1. Existing Approach

The City receives calls from property owners each year requesting that the City resolve stormwater issues on their property. Unfortunately, the City is limited in its ability to respond to issues on private property for several reasons:

- The City is prohibited from spending public funds on private property, unless there is a clear public benefit (SMC 12.10.160).
- The City stormwater code prohibits the City from taking over maintenance of a private drainage facility, except in the case of subdivisions, and only then if specific conditions are met. (SMC 12.10.160).
- The City stormwater code requires property owners or managers to repair or replace private stormwater drainage facilities that are impacting other properties (SMC 12.10.170). The City enforces this requirement through its private stormwater system maintenance inspection program.
- The Surface Water Utility has limited funds and needs to focus these funds on projects with the greatest public benefit.

4.2.4.2. Private Property Policy Issue

From a legal perspective, the City is not responsible for solving drainage issues on private property; however, there may be certain situations where there is an overriding public benefit and the City should consider spending Surface Water Utility funding to address the issue.

The City's current practices stipulate that stormwater infrastructure on private property is owned by the property owner unless there has been an easement dedicated to, and accepted by, the City. If there is no easement then the City does not accept responsibility for any necessary maintenance or repairs. Facilities or problem areas must be City-owned lands, ROW, or easements for the City to spend public stormwater or other public funds on the issue.

While the City has made exceptions for drainage issues on private property, the City wishes to develop a policy that will specify responsibility for all cases. Some current drainage issues on private property are identified below.

4.2.4.3. Document Review, Public Survey, and Site Visits

Private drainage issues were identified through a review of City documents and a public survey. The private drainage issues identified from City documents primarily were outstanding or unresolved issues identified in the 1997 SeaTac Surface Water Plan (EarthTech 1997). A written questionnaire was provided at a public outreach event at the SeaTac YMCA in November 2012. A total of 12 responses were received from the SeaTac YMCA and the online survey in November 2012; however, the survey responses did not result in additional private drainage issues requiring follow-up investigation. One additional survey response was received in June 2013 and will be evaluated for inclusion as a future stormwater CIP project. The responses from these public surveys are included in Appendix F.

Locations were selected for further investigation and site visits were conducted in January 2013. Details of the site-specific drainage issues are described below in Table 4-2.

4.2.4.4. Site-Specific Problem Descriptions

Since the identified problems summarized in Table 4-2 are private drainage issues, the City will not be developing CIP projects for these sites; however, recommended actions are provided for private property landowners and for City policy decisions. Flooding problems were the most commonly identified issue.

4.2.4.5. Proposed Code Language and Decision Guidelines

The City has made exceptions to its existing unwritten policy for conducting work on private property to resolve a drainage issue where there is clear public benefit. However, the Utility has no clear criteria or written policy in place to guide these decisions. The following is example code language (adapted from Pierce County and the City of Shoreline) that provides a template for a future City policy for making decisions on when Surface Water Utility funding should be spent to address private property drainage issues. Figure 4-1 also provides a flow chart summarizing the decision making process.

Table 4-2. City of SeaTac Known Private Property Drainage Issues.

Location	Description of Problem	Recommended Action(s)
S 182nd Street and 39th Avenue S	Localized flooding next to apartment building. Buildup of trash and debris on trash rack at the trash rack near the southeast corner of the apartment complex site.	Potential solutions include: <ul style="list-style-type: none">• Increase maintenance frequency for trash rack• Upgrade trash rack for better performance• Add a debris barrier to the upstream channel• Replace pipe or segment of the pipe to reduce the water level in the ditch/stream upstream of S 182nd Street; however, this may not alleviate flooding without also increasing capacity• Install a parallel pipe• Expand floodplain connection to increase storage and potentially reduce flooding elevations
S 204th Street and 34th Place S	Drainage issue was included in the 1997 SeaTac Surface Water Plan (EarthTech 1997). No problems were observed in the field in January 2013 and the City has not received any recent complaints regarding this location.	Remove site from private property drainage issues list unless further information suggests that this issue still needs to be addressed.
S 204th Street and 28th Avenue S	This property is a former mobile home park that was purchased for noise abatement and is now owned by the Port of Seattle. Large sinkholes have been opening up along the stormwater drainage mainline. Sediment generation is increasing in the regional pond's flow control structures.	Potential solutions include: <ul style="list-style-type: none">• Cut and cover pipe installation• Replace existing pipe with a surface channel• Charge a maintenance fee for downstream sedimentation
S 142nd Street and 28th Avenue S	Surface drainage runs across private property and into old Glacier High School property. No clear evidence of scour, erosion, or flooding was observed in the field in January 2013, and the City has not received any recent complaints regarding this location.	Remove site from private property drainage issues list unless further information suggests that this issue still needs to be addressed.

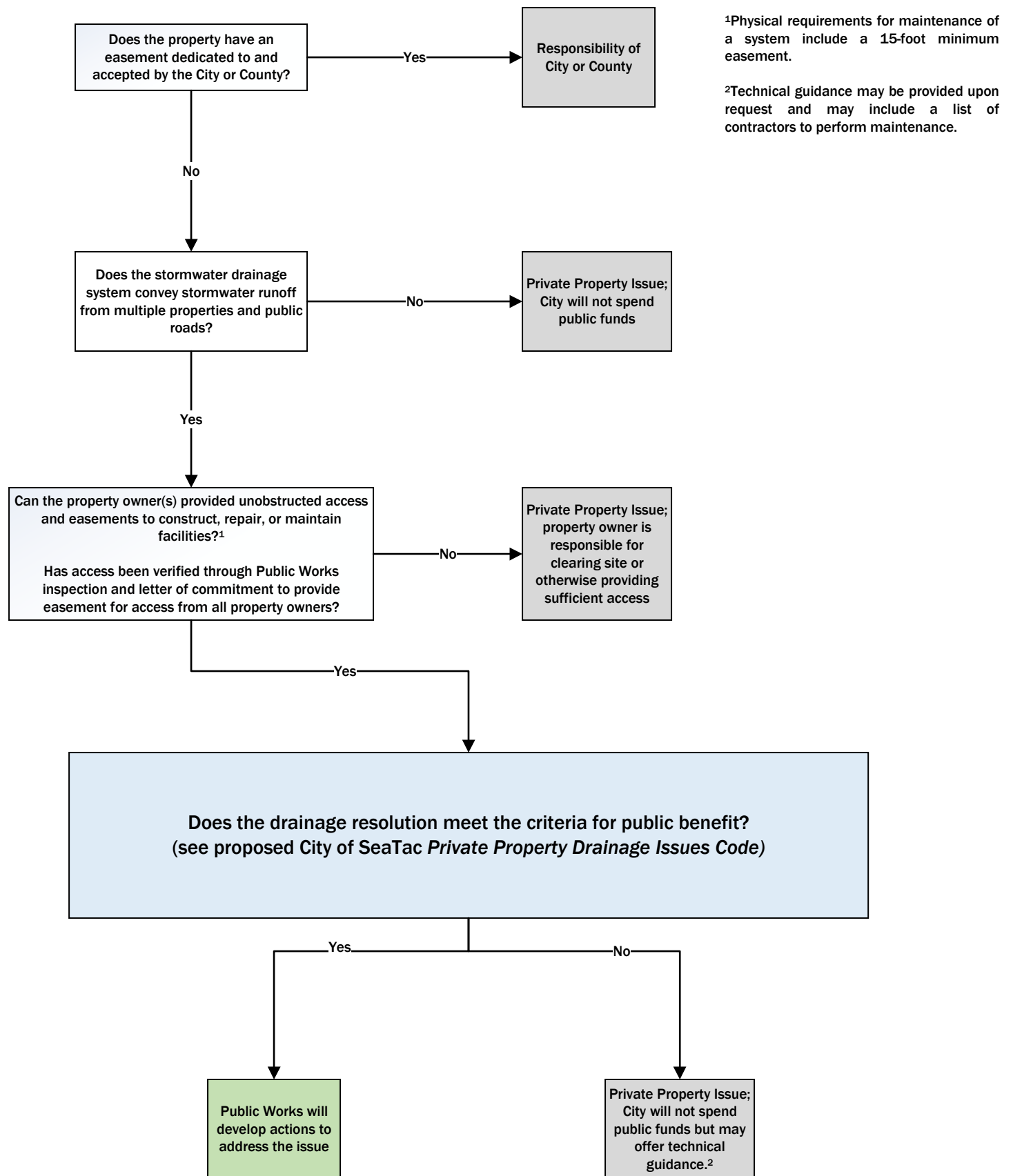


Figure 4-1. Recommended Guidelines for Use of Surface Water Utility Funds on Individual Private Property.

The City may spend Surface Water Utility funding on a private property drainage issue or assume maintenance of a pre-existing drainage facility only after the following conditions have been met:

- All necessary easements or dedications entitling the City to properly maintain the stormwater facility have been conveyed to, and accepted by, the City
- The City must have clear, unobstructed, 15-foot wide access to the drainage features to perform necessary construction, maintenance, and repairs
- The private drainage facility must convey stormwater from both multiple properties and public roads
- An inspection by the Director of Public Works has determined that existing stormwater facilities are properly maintained and functioning as designed
- The Director of Public Works has determined and declared in writing that the correction of the private property drainage issue will significantly contribute to protecting or improving the environment, health, safety, and welfare of the community based upon review of the following criteria:
 - Existence of, or potential for, flooding
 - Existence of, or potential for, downstream erosion
 - Existence of, or potential for, property damage due to improper function of the facility
 - Existence of, or potential for, safety hazard associated with the facility
 - Existence of, or potential for, degradation of surface or groundwater quality or natural waterways from water quality or high flow impacts
 - Existence of, or potential for, degradation to the general welfare of the community
- A private property drainage issue which does not meet the criteria of this section shall remain the responsibility of the persons holding title to the property where the stormwater drainage facility is located.

5. DRAINAGE AND WATER QUALITY ISSUES AND RECOMMENDED SOLUTIONS

This chapter includes a background section summarizing the hydrologic/hydraulic analyses performed for the City, citywide flooding and water quality problems, recommendations for solving these problems, and site-specific flooding and water quality problems developed based upon interviews with City staff and field reconnaissance. The prioritization process for the CIP project is described, followed by the final CIP project list. Summary sheets for CIP solutions to site-specific problems and itemized cost estimates for the recommended projects are provided in Appendix E. Stormwater neighborhood improvement areas are also discussed at the end of this chapter.

5.1. Citywide Drainage and Water Quality Issues

Citywide problems are primarily issues that result from local or regional factors, such as trends in development and behavior of the public, unfavorable site conditions, or aging infrastructure. For example, conversion of forestland to residential development is a regional development trend that has caused increases in stormwater quantity, flooding of the public right-of-way and private property, and stream erosion and sedimentation problems around the region. Identification of citywide problems was primarily based on information provided by City staff, and review of relevant background documents.

The primary citywide drainage problems are localized flooding and replacement of deteriorating infrastructure. The primary citywide water quality problems are nonpoint source pollution from older development, including residential and commercial development, from vehicle use in the City-owned rights-of-way, and potentially illicit discharges and illicit connections to the stormwater drainage system.

5.1.1. Localized Drainage Issues

Increased impervious surfaces are the result of urbanization in the City that has occurred since European settlers arrived. Conventional development disrupts the natural hydrology of the landscape by converting natural, permeable surfaces (such as meadows or forests) into impermeable surfaces (such as streets and roofs). Impervious surfaces typically deliver precipitation directly to the stormwater system and the stream channel rather than allowing it to be collected by vegetation and infiltrate into the soil. Therefore, increased impervious surfaces cause higher peak flow rates in the stormwater system and stream channels to which the stormwater system discharges, resulting in flooding, erosion, and sedimentation in streams.

Residential development in the Puget Lowland has been shown to increase peak flow rates by as much as 10 times compared to forested conditions (Burgess et. al. 1998). Peak runoff flows can be expected to increase even more in commercial or industrial development areas where a greater proportion of the landscape is converted to impervious surfaces or otherwise compacted, reducing infiltration of stormwater into the natural soil.

The science of stormwater management has evolved significantly in the Puget Sound region. Stormwater facility designs frequently employ computer modeling software to simulate existing and proposed site conditions, and stormwater management solutions are commonly integrated into the development site planning process. Effective stormwater management can control runoff to make a developed landscape behave more like a forest by retaining runoff with flow control facilities (e.g., LID, storage pipes, detention vaults, detention ponds, and infiltration facilities). Unfortunately, like most cities and counties concentrated urban development occurred in much of the City before strict stormwater management standards were put in place, so a significant percentage of the land area in the City sheds rainfall runoff quickly to pipes, ditches, streams, and wetlands. Many older developments in the region that have stormwater drainage systems exhibit drainage problems either because the systems were not designed to current standards, or need rehabilitation.

5.1.1.1. Recommendations

The City should consider the following activities to address potential flooding and erosion issues identified above:

- Initiate an asset management program to proactively identify, maintain, and repair public stormwater assets before they fail
- Develop and maintain a list of known drainage issues, assign staff responsible for maintaining the list, and encourage field staff to contribute to the list on a quarterly basis, especially after storm events when they may have noted problems in the field
- Consider flow control retrofits through modification of existing facilities or LID when opportunities arise during Transportation CIP projects
- Continue to implement the requirements of the KCSWDM and the SeaTac Amendment to the KCSWDM for private and public development projects to the maximum extent practicable as allowed by state and federal case law

5.1.2. Water Quality Issues

Nonpoint source pollution is a common water quality issue in developed urban settings, and one of the main water quality issues in the state and the country (Ecology 2008). Some nonpoint sources of pollution in the City include:

- Pesticides and fertilizers from residential and commercial property landscaping
- Oil, grease, metals, and toxic organic pollutants from industrial/commercial areas and roadways

- Sediment transport from eroding stream banks
- Sediment transport from construction sites
- Bacteria from pet waste
- Soaps and detergents from car washing or other cleaning activities

Stormwater runoff from urban areas carrying these nonpoint sources of pollution can contribute to declining water quality in lakes, streams, rivers, and oceans. The following waterbodies located within the City limits are on Ecology's Section 303(d) list of impaired waters (Ecology 2008); however, a TMDL implementation plan has not yet been developed for these waterbodies:

- Angle Lake – fecal coliform bacteria
- Des Moines Creek – copper, zinc, fecal coliform bacteria, dissolved oxygen
- Miller Creek – fecal coliform bacteria, dissolved oxygen

Illicit discharges and illicit connections to the stormwater system are also identified as a primary concern in the Phase II NPDES Permit. Within the City, the most common examples of illicit discharges include vehicle fluids from accidents (particularly vehicles entering and exiting SeaTac Airport) and illegal dumping. Other examples of potential illicit discharges include inadvertent connections of sanitary sewer pipes to the stormwater drainage system; leaks and spills at commercial storage and maintenance facilities; and unregulated discharges of washwater from mobile businesses such as carpet cleaners, internal building drains, sump overflows, process wastewater discharges, or sanitary sewer pipes (i.e., toilets, sinks, appliances, showers, bathtubs) that are incorrectly plumbed to the stormwater drainage system. The City has an existing IDDE program which actively investigates and removes illicit discharges and illicit connections to the City's stormwater drainage system

5.1.2.1. Recommendations

The City should consider the following activities to address the citywide water quality problems identified above:

- Implement the IDDE recommendations in Section 4.1.3 of this plan
- Expand public outreach to businesses regarding source control
- Consider water quality treatment retrofits through modification of existing facilities or LID when opportunities arise for Transportation CIP projects
- Continue to implement the requirements of the KCSWDM and the SeaTac Amendment to the KCSWDM for private and public development projects to the maximum extent practicable as allowed by state and federal laws

5.2. Stormwater Capital Improvement Program

The City evaluated several site-specific problems to develop planning level solutions and cost estimates for use in establishing the City's stormwater CIP plan. Problems were identified by conducting interviews with City staff and performing field reconnaissance. Solutions were developed to address the problems in a cost effective manner, and were prioritized based on several criteria (described below). This section of the plan identifies the problems, solutions, and prioritization process. CIP project summary sheets and itemized planning level cost estimates for the proposed solutions are provided in Appendix E.

5.2.1. Document Review, Workshop, and Site Visits

Information related to the City's stormwater management program, surface water resources, and capital improvement program needs was collected through a review of applicable data, reports, studies, and maps. A workshop with City staff, including representatives from CED Engineering Review, Public Works Engineering, Stormwater Management, and Stormwater Operations and Maintenance, provided site-specific stormwater problems including areas and stormwater facilities in need of rehabilitation, and flooding and water quality issues. Five identified sites were visited and evaluated for potential improvements.

5.2.1.1. Stormwater CIP Project Prioritization

CIP projects were prioritized based on the results of a qualitative evaluation that considered multiple criteria. The prioritization process input data include findings from field reconnaissance, input from City staff, and review of background documents (e.g., GIS data).

The objective of the prioritization process was to identify the most important projects and develop a schedule for project implementation (design and construction). Based on this information, each project was assigned a design year and construction year; in general, high priority projects were scheduled to occur sooner than low priority projects. During the prioritization process, each project was assigned a classification category (i.e., maintenance, replacement, upgrade, or expansion of the existing system), and the following prioritization factors were evaluated as high, moderate or low:

- Problem risk
- Data quality
- Funding potential
- Program efficiency (including feasibility)

Each of the prioritization factors is described in more detail below.

5.2.1.2. Problem Risk

The assessment of risk includes a qualitative consideration of problem probability/frequency and severity of losses resulting from the problem. Problems that occur frequently and have major potential losses have higher risk, and thus are typically assigned a higher priority. Problems that

occur infrequently with minor potential losses have less risk, and thus are typically assigned a lower priority. Potential losses resulting from surface water problems vary greatly. The highest potential losses are assigned to problems that cause a significant public safety hazard or extreme property damage, such as flooding of a major intersection that creates hazardous conditions. Problems with minor potential losses could have limited negative effects on property and result in only a minor loss of use, such as flooding in the parking lane of a residential street. These minor losses only result in a public nuisance, but no economic losses or public safety hazards.

5.2.1.3. Data Quality

The quality of data used to assess the prioritization factors, especially problem risk, is also important to consider during prioritization. For example, problem risk can be evaluated primarily based on information from City staff and field observations, so problems with better data quality (e.g., more or better field observations, more complaints, video or photo documentation), may be identified as higher priority. The quality of the proposed solution can also be considered. Projects with a higher level of design definition may be identified as higher priority because the cost estimates are more accurate, and there is more certainty in the size and scope of these solutions. For example, a project with an engineering pre-design report may have a higher priority than a project with only a basic conceptual design.

5.2.1.4. Funding Potential

Project funding opportunities can also play a role in project prioritization. Projects with likely cost sharing or grant opportunities may be assigned a higher priority. For example, grant funding is regularly available for water quality improvement projects and some flood improvement projects qualify for cost sharing with WSDOT.

5.2.1.5. Program Efficiency

There are often opportunities to reduce costs or increase project efficiency by implementing multiple projects at once. For example, a storm drain replacement or extension project can be scheduled to coincide with other ROW improvements, such as an asphalt overlay, or construction of other utilities, such as replacement of a water main. Significant cost savings may be realized in these cases because the cost of surface removal or re-surfacing may be minimized or performed at a larger scale producing economies of scale. Economies of scale can also be realized in reduced mobilization costs. Combining projects can minimize the loss of service, such as reducing the amount of time that traffic is disrupted or that a road is out of service. In some instances, lower risk projects may be scheduled to occur earlier to take advantage of opportunities to gain efficiency through combining projects.

5.2.1.6. Prioritization Process Summary

Table 5-1 presents a qualitative assessment of the factors listed above. Problem risk was considered the primary factor during this evaluation, and other factors were considered secondary in importance.

5.2.2. Stormwater CIP Project Development

Five site-specific problems were identified as good candidates for CIP projects. A cost-effective solution was developed to address each. The project summary sheets can be found in Appendix E. The details of the CIP projects are listed in Table 5-2. A map of the CIP project locations is provided in Figure 5-1.

5.2.2.1. Recommendations

- Continue to investigate and evaluate the stormwater projects identified in Table 5.1 and incorporate them as applicable into the spot drainage repair list (for small projects less than \$100,000) or on the Stormwater CIP list.
- Seek opportunities to integrate the projects identified in Table 5.1 with future transportation project to minimize costs
- Continue to prioritize and update CIP project budget estimates
- Develop a Stormwater CIP for the 2015-2016 Budget

5.3. Stormwater Neighborhood Improvement Areas

Public input was received during development of this plan requesting that economies of scale be studied to encourage future development, such as creating stormwater neighborhood improvement areas. Stormwater improvements would be made in these areas to address existing issues and create capacity for future development. Projects could be implemented in neighborhoods where the City is currently encouraging development, such as the 154th Street Station Area.

This concept aligns with City Council goals related to encouraging development and merits further exploration. Issues that need to be evaluated before this program progresses include:

- **Feasibility** - Identify project areas where the City would like to encourage new growth that have available land area where neighborhood stormwater improvements can be constructed and receive stormwater from future development.
- **Costs** – Evaluate the costs associated with projects of this nature. Costs would include, but are not limited to: feasibility analysis, land/right of way acquisition, design, project administration, construction, and materials.
- **Funding Mechanisms** - Evaluate funding mechanisms that would fairly and equitably recover the costs associated with these projects.

5.3.1. Recommendations

Evaluate potential costs and funding mechanisms for stormwater neighborhood improvement areas as part of the 2013 Surface Water Utility Rate Study.

Table 5-1. City of SeaTac Stormwater CIP Project Prioritization.															
Project No.	Project Name	Problem Type	Project Classification		Risk		Data Quality		Funding Potential		Program Efficiency		Overall Priority		
			Rating	Reason for Rating	Rating	Rating	Rating	Reason for Rating	Rating	Reason for Rating	Rating	Reason for Rating	Rating	Reason for Rating	
1	Military Road S – S 150th Street to S 152nd Street Drainage Improvements	Drainage	Upgrade	New storm drain pipe along Military Road	High	Flooding in ROW and private parking lots	Medium	Observations by City staff. 1997 Surface Water Plan modeling indicates larger pipe is needed.	High	Funded as part of Transportation CIP ST-125	High	Will be addressed with Transportation CIP ST-125	High	High risk problem, will be addressed with Transportation CIP	
2	S 204th Street Pond	Flow Control	Upgrade	Increase utilization of storage capacity in existing pond	High	Cumulative high flow impacts observed in downstream stream reach within Des Moines	Medium	Observations by City staff of pond underutilitization. Input received from Des Moines Creek Basin Committee regarding flow impacts.	High	Contender for water quality grant funding. Although flow control is the primary issue being addressed; directing more flow to pond storage should also result in a water quality benefit for Des Moines Creek.	Medium	Could be addressed in conjunction with the 28th Ave S/ 24th Ave S Transportation CIP project in 2015.	Medium-High	High risk problem	
3	Des Moines Memorial Drive Manhole Replacement	Drainage	Replacement	Replace manhole structure	High	Manhole failure could affect arterial street and would affect Miller Creek	High	Observations by City maintenance staff during previous repairs	Medium	Manhole failure could affect water quality in Miller Creek	Low	Complex construction, additional permitting required	Medium	High risk problem	
4	S 182nd Street Catch Basins	Drainage	Expansion	New catch basins	Low	Minor nuisance flooding	Medium	Observations by City staff, included in 1997 Surface Water Plan	Low	Conveyance only	Medium	May be addressed through the spot drainage repair program in conjunction with an overlay project	Low-Medium	Low risk problem	
5	S 138th Street Pipe	Drainage	Upgrade	New catch basin and pipes	Low	Pipe is partially filled with concrete. No known flooding issues.	Medium	Observations by City staff and video inspection	Low	Conveyance only	Low	NA	Low	Low risk problem	

NA = not applicable



Legend



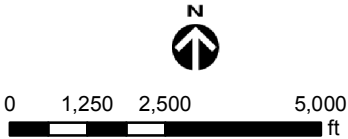
-  City boundary
-  CIP location

Figure 5-1.
City of SeaTac Stormwater CIP
Project Locations.



Coordinates: NAD 1983
Washington State Plane North FIPS 4601 Feet
Aerial: Seatac (2010)

K:\Projects\Y2012\12-05401-000\Project\CIP_locations.mxd (6/26/2013)

Table 5-2. City of SeaTac Site-specific Problems, Solutions, and Relevant Policies.

Project No.	Project Name	Problem Description	Proposed Solution	Relevant Goals and Policies
1	Military Road S - S 150th Street to and S 152nd Street Drainage Improvements	Flooding occurring in ROW and private parking lots.	Upgrade storm drainage along Military Road.	Goal 8.1
2	S 204th Street Pond	High flow impacts observed in nearby reach of Des Moines Creek. Existing pond storage volume is not being fully utilized.	Modify the outlet of the bypass control structure to increase utilization of existing pond detention capacity.	Goal 8.1 (Policy 8.1A, 8.1E), Goal 8.2 (Policy 8.2I)
3	Des Moines Memorial Drive Manhole Replacement	Sinkholes and failures occurring on multiple sides of existing manhole. Manhole is close to a pedestrian path and private commercial property.	Replace manhole structure.	Goal 8.2
4	S 182nd Street Catch Basins	Catch basin is clogging with organic debris and/or being bypassed by flow, which is causing localized flooding on private property and in the ROW.	Replace the clogging catch basin with a double inlet catch basin and install a new catch basin on the southwest corner of the intersection.	Goal 8.1
5	S 138th Street Pipe	Drainage pipe under road is partially filled with concrete.	Abandon pipe under road in place, install new pipe and structure connecting to downstream stormwater pipes.	Goal 8.1 (Policy 8.1D, 8.1E, 8.1H), Goal 8.2 (Policy 8.2H)

6. PLAN IMPLEMENTATION

6.1. Interdepartmental Collaboration

The stormwater management program is led by the City's Stormwater Compliance Manager in the Public Works Department. The Stormwater Compliance Manager works closely with other City departments and divisions, including Public Works Engineering, CED Engineering Review, and Stormwater Operations and Maintenance, to implement surface water program activities.

6.2. Interagency Collaboration

To address ongoing regional coordination needs, the City will continue to work with regional stakeholder groups and other local governments in shared drainage basins to protect groundwater and surface water quality and to manage and treat stormwater effectively.

Neighboring jurisdictions that the City should continue to coordinate with include:

- City of Burien
- City of Des Moines
- City of Kent
- City of Normandy Park
- City of Renton
- City of Tukwila
- King County

Other major property owners that the City should coordinate with include:

- Port of Seattle
- WSDOT

Ongoing basin plan committees that the City will continue to participate in include:

- Des Moines Creek Basin Committee
- Miller/Walker Creek Basin Committee

6.3. Surface Water Utility Rate Study

One of the next steps in the SWP implementation process is to develop a Surface Water Utility Rate Study based on an analysis of future staffing, training, and equipment needs, and the stormwater CIP project implementation schedule proposed in this plan.

6.4. Integration of Stormwater CIP projects into Citywide CIP

The City does not currently have a fully developed stormwater CIP, thus the stormwater CIP projects described in this plan will provide the basis for the City's stormwater CIP program. These CIP projects should be incorporated into the City's overall CIP. These projects should be reevaluated on an annual basis and new stormwater CIP projects added to the list as additional drainage or water quality issues are identified.

7. CONCLUSIONS AND RECOMMENDATIONS

The information presented in this document is intended to evaluate the City's current Surface Water Program and identify future needs in relation to the Phase II NPDES Permit requirements and other Surface Water Program goals and priorities.

7.1. NPDES Stormwater Management Program

Although the City is currently complying with the 2007-2013 Phase II NPDES Permit requirements, the following recommendations have been identified to address future SWMP needs:

- **Public education and outreach:**
 - Expand public education and outreach program to include additional target audiences and subject areas
 - Translate existing printed education materials into Spanish (second most commonly spoken language in the City)
- **IDDE:**
 - Continue to update the City's stormwater system map to identify and eliminate inaccuracies
 - Implement catch basin/manhole inspections (and possibly video inspections from asset management program) to screen 40 percent of the City's stormwater drainage system by December 31, 2017, and, on average, 12 percent each year thereafter
 - Expand the City's current IDDE program to include updated means of notifying and educating the public to recognize illicit discharges, connections, or illegal dumping
- **Controlling runoff from new development, redevelopment, and construction sites:**
 - Evaluate and update SeaTac's addendum to the KCSWDM requirements. Educate City contractors, developers, and designers regarding the City's exceptions to and revisions to the KCSWDM
 - Evaluate and update SeaTac's adoption of the KCSWDM after the new King County manual is released as needed to keep current with the Stormwater Management Manual for Western Washington (Ecology 2012) or equivalent

- Increase efficiency and accuracy when verifying stormwater facility performance during plan review by developing sizing table tools and checklists for City staff
- Review and revise local development codes, rules, standards, and other enforceable documents (including Zoning Code, development codes, the Growth Management Plan, and the Shoreline Master Plan) to incorporate and require LID principles and LID BMPs
- Develop or provide a LID training program for plan review staff and inspectors
- Provide additional construction oversight and inspections when implementing LID projects
- **Municipal O&M:**
 - Implement an in-house catch basin inspection program
 - Implement an in-house street sweeping program
 - Additional training and clarification, as needed, on standards and procedures for inspections and maintenance
 - Update maintenance standards as necessary for consistency with the 2012 Stormwater Management Manual for Western Washington (Ecology 2012) or equivalent
- **Reporting:**
 - Provide a written description of internal coordination mechanisms in the March 31, 2015, annual report
 - Submit a summary of the review and revision process for incorporating LID principles and LID BMPs into local development codes, rules, standards, and other enforceable documents in the March 31, 2017, annual report

7.2. Other Surface Water Program Activities

Other surface water program activities not required under the NPDES Permit that were evaluated in this document include asset management, water quality retrofits, funding stormwater-related portions of transportation CIP projects, developing a policy for spending Surface Water Utility funding on private property drainage issues, and stormwater CIP projects. The following recommendations have been identified to address future Surface Water Utility needs:

- **Asset management program:**
 - Develop a program and integrate into Utility work practices by 2016
 - Asset inventory goal: conduct an inventory of at least 12 percent of the City's stormwater system each year, beginning in 2015, using video inspection equipment
 - Asset management goals:

- Adopt and maintain an asset management program to provide cost effective level of service to City residents and property owners
 - Preemptively identify segments of the system that need maintenance and take action before asset deterioration causes flooding, erosion, sedimentation, or safety issues
- Select one of the following options based on the 2013 Surface Water Utility Rate Study:
 - **Option 1** – Performing Asset Inventory In-house
 - **Option 2** – Contract out Asset Inventory
- Use the asset management methodology to group projects into two tiers:
 - **Small Works** – One location (or multiple locations) and less than \$100,000
 - **CIP project** – over \$100,000
- **Water quality retrofit program:**
 - Continue to consider water quality retrofits where feasible in conjunction with Transportation CIP and sidewalk projects, and continue to evaluate the feasibility of water quality improvements as the need arises.
 - Use results from the 2013 Surface Water Utility Rate Study to evaluate the impact of the Surface Water Utility fund contributing to the stormwater-related portion of Transportation CIP projects
- **Private property policy:**
 - Adopt a private property drainage policy to establish criteria for when the City can spend Utility funds on private property.
- **Stormwater CIP projects:** The following five CIP projects have been developed as part of the SWP:
 - **CIP #1** – Military Road S – S 150th Street to S 152nd Street Drainage Improvements
 - **CIP #2** – S 204th Street Pond
 - **CIP #3** – Des Moines Memorial Drive Manhole Replacement
 - **CIP #4** – S 182nd Street Catch Basins
 - **CIP #5** – S 138th Street Pipe

- **Stormwater neighborhood improvement areas:** Evaluate potential costs and funding mechanisms for stormwater neighborhood improvement areas as part of the 2013 Surface Water Utility Rate Study.

Future steps in the SWP implementation process should include:

- Finalizing analysis of future staffing, training, and equipment needs
- Developing a 2013 Surface Water Utility Rate Study based on an analysis of future staffing, training, and equipment needs, and the stormwater CIP project implementation schedule proposed in this plan
- Integrating stormwater CIP projects into the City's overall CIP.
- Reevaluating stormwater CIP projects on an annual basis and adding new projects to the list as additional drainage or water quality issues are identified

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APPENDIX A

City of SeaTac Comprehensive Plan Surface Water Related Goals and Policies

City of SeaTac Comprehensive Plan

Goals and policies related to surface water in the citywide City of SeaTac Comprehensive Plan can be found in the Environmental Management Element section (Chapter 8) and the Parks, Recreation, and Open Space Element (Chapter 9).

Goal 8.1

Provide for the preservation of select environmental resources, enhancement of the urban environment, and resource conservation.

Water Quality

- **Policy 8.1A:** Protect and enhance water quality. Preserve the amenity and ecological functions of water features through land use plans and innovative land development.
- **Policy 8.1B:** Manage water resources for multiple uses, including recreation, fish and wildlife, flood protection, erosion control, water supply, energy production, and open space.
- **Policy 8.1C:** Work with adjacent jurisdictions and other affected entities to enhance and protect water quality in the region.

Drainage Systems

- **Policy 8.1D:** Preserve and protect the water quality of natural surface water storage sites that help regulate stream flows and recharge groundwater.

Streams and Waterbodies

- **Policy 8.1E:** Protect the water quality, natural drainage, fish and wildlife habitat, and aesthetic functions of streams, creeks, and lakes.
- **Policy 8.1F:** Preserve an undisturbed corridor wide enough to maintain natural functions between new development and streams, creeks, and lakes. When impacts from new development are unavoidable, ensure that those impacts result in stream and creek corridors that are wide enough to maintain natural functions between the new development and streams, creeks and lakes.
- **Policy 8.1G:** Development within designated shoreline environments should:
 - Preserve the resources and ecology of the water and shorelines
 - Avoid natural hazards
 - Promote visual and physical access to the water
 - Preserve navigation rights

Wetlands

- **Policy 8.1H:** Preserve or enhance wetlands important for flood control, drainage, water quality, aquifer recharge, visual or cultural values or habitat functions.
- **Policy 8.1I:** Public access to wetlands for scientific and recreational use is desirable when sensitive habitats are protected. Careful planning of access trails, for example, can allow public enjoyment of wetlands while assuring safety and preventing environmental problems.

Aquifers

- **Policy 8.1J:** Identify and protect aquifers, aquifer recharge areas, and wellhead protection areas used for domestic water supply from contamination. Recharging streams, wetlands, and lakes should also be protected.

Goal 8.2

- Protect, preserve and enhance those features of the natural environment which are most sensitive to human activities such as steep slopes, wetlands, sensitive areas, streams, and air quality, and provide adequate mitigation of adverse environmental impacts.

Steep Slopes, Landslide, Erosion, and Seismic Hazards

- **Policy 8.2A:** Design land use development to prevent property damage and environmental degradation, and enhance greenbelt and wildlife habitat values.
- **Policy 8.2B:** Decrease development density as slopes increase to mitigate problems of drainage, erosion, siltation, and landslides. Retain slopes of 40 percent or more in a natural state, free of structures and roads. Ensure that developments that create slopes of 40 percent or more provide appropriate drainage, erosion, siltation, and landslide mitigation measures.
- **Policy 8.2D:** Retain or replace native ground cover in development areas subject to erosion hazards. Use special construction practices or reduce site coverage of development to prevent erosion and sedimentation. Consider time limitations on construction work to reduce erosion and sedimentation.

Drainage Systems

- **Policy 8.2G:** Consider entire watersheds in surface water management plans, with responsibility shared between SeaTac, other cities, and the county.
- **Policy 8.2H:** Maintain and enhance natural drainage systems to protect water quality, reduce public costs, and prevent environmental degradation. Do not alter natural drainage systems without acceptable mitigation measures which eliminate the risk of flooding or negative impacts to water quality.

- **Policy 8.2I:** Protect water quality and natural drainage systems by controlling the quality and quantity of stormwater runoff.
- **Policy 8.2J:** Do not increase peak stormwater runoff from new development. Do not increase total runoff quantity from new development in critical drainage, erosion or flood hazard areas.
- **Policy 8.2K:** Design site plans and construction practices to minimize on-site erosion, and sedimentation during and after construction
- **Policy 8.2L:** Protect steep hillsides or ravines from runoff from new development to prevent gully erosion or landslides. Diffuse runoff so that flows do not create erosion of ravines or steep hillsides.
- **Policy 8.2M:** Use management practices that prevent erosion and sedimentation by resource industries, and prevent pollutants from entering ground or surface waters.

Streams and Waterbodies

- **Policy 8.2N:** Preserve, protect and enhance natural stream channels for their hydraulic, ecological and aesthetic functions through development regulations, land dedications, easements, incentives, acquisition, and other means.
- **Policy 8.2O:** Do not culvert stream and creek channels unless absolutely necessary for property access. Bridges are preferred for stream and creek crossings, and crossings should serve several properties, to reduce disruption to streams and creeks and their banks. When culverts are necessary, oversized culverts with gravel bottoms that maintain the channel's width and grade should be used.

Wetlands

- **Policy 8.2P:** Allow the reasonable use of property containing existing or former wetlands if the following criteria can be met.
 - If existing sensitive area regulations prohibit any use on the property
 - Either due to a court decision or by provision of the codes, a reasonable use of the property is required
 - The development of the wetland is limited to only that portion of the property to allow a reasonable use
 - A soil analysis shows that construction measures can successfully mitigate potential hazards of unstable soil and drainage problems
- **Policy 8.2Q:** Relate land fill proposals affecting wetlands to specific development projects or needs. Prohibit land fill for speculative purposes within wetland areas.

Floodplains

- **Policy 8.2R:** Preserve the natural flood storage function of floodplains. Emphasize non-structural methods in planning for flood prevention and damage reduction. Design new developments or land modifications in the 100-year floodplains to maintain natural flood storage functions and minimize hazards.
- **Policy 8.2S:** Protect 100-year floodplains by restricting residential development to rural residential densities, encouraging low-impact uses such as open space, trails, and parks, discouraging high-impact development, locating roads and structures above the 100-year flood level, and requiring new development to replace existing flood storage capacity lost due to filling.
- **Policy 8.2T:** Allow no permanent structures within the floodway due to risks associated with deep and fast-flowing waters, unless appropriate flood control measures have been taken. Allow no land uses in a floodway that would divert water from the floodway, change flood elevation or obstruct natural flow, unless appropriate flood control measures have been taken such that there are no additional offsite impacts and no degradation of water quality. Allow no development in the floodway that would reduce the existing level of flood storage.
- **Policy 8.2U:** Along small streams, for which the floodway has not been identified, the entire floodplain should be treated as a floodway and no permanent structures, grading or filling should be allowed.

Goal 8.3

- Promote the protection of native wildlife habitats and species, recognizing that the human species is but one of many within the SeaTac area.

Streams and Waterbodies

- **Policy 8.3A:** Rehabilitate degraded stream and creek channels, and banks by using public programs and new development, where conditions permit. Maintain water quality and prevent further erosion problems. Restore stream and creek banks and channels to their natural state where conditions permit. Any necessary relocation of creeks shall include mitigation and ongoing maintenance which at a minimum addresses water quality, flood plain protection, fish and wildlife habitat, channel stability, vegetative cover, and maintenance of instream flows. Alteration of watercourse shall not diminish the capacity of the watercourse, raise the base flood elevation, or cause adverse effects on adjacent, cross-channel, upstream or downstream property owners.
- **Policy 8.3B:** Maintain adequate flows in streams and creeks by private and public development actions to protect fisheries and recreation resources.

Wetlands

- **Policy 8.3C:** Preserve and enhance unique/outstanding, peat/sphagnum bog, forested, or significant wetlands from adjacent new development by providing an undisturbed buffer

around the wetland adequate to protect its natural functions. Encroachments into significant wetlands may be allowed when no feasible alternative exists and enhancements are provided to replace the lost wetland's functions and values.

- **Policy 8.3D:** Maintain water level fluctuations in wetlands used as stormwater detention sites at fluctuations similar to natural conditions, unless plants and animals in the wetland can adapt to new levels as documented by a wetland biologist.

Wildlife Habitat

- **Policy 8.3E:** Maintain wildlife through the preservation and enhancement of fish and wildlife habitat. Preserve, through acquisition, incentives, and other techniques, habitat for species that have been identified as endangered or threatened.
- **Policy 8.3F:** Establish fish and wildlife habitat corridors where steep slopes, wetlands, stream ravines, or stream corridors provide a continuous corridor that provides food, shelter, and water, and where there are minimal impacts due to human intrusion.
- **Policy 8.3G:** Encourage development on forested property adjacent to steep slopes, wetlands, stream ravines, or stream corridors to provide additional buffer areas to provide additional wildlife and fisheries habitat. Incentives for additional buffers may include but are not limited to:
 - Density Bonuses
 - Lot Clustering
- **Policy 8.3H:** Preserve and enhance fish and wildlife habitat by fostering native vegetation and controlling invasive species.

Goal 9.9

To develop community-wide recreational resources which respond to and are consistent with the unique characteristics of the site and community desires.

North SeaTac Park

- **Policy 9.9A:** Develop North SeaTac Park in accordance with the North SeaTac Park Master Plan and Airport land use and safety guidelines.
- **Policy 9.9B:** Preserve the area surrounding Tub Lake as a natural wetland preserve, and increase opportunities for public enjoyment of the area. Tub Lake provides the opportunity for interpretive interaction, passive use boardwalks, and wildlife viewing.
- **Policy 9.9B-1:** Develop environmentally sensitive public trails connecting the West-side Trail to North SeaTac Park Community Center, and to natural features such as to Tub Lake and adjacent wetlands.

The Westside Trail will connect nearby natural features, such as Tub Lake, adjacent wetlands, Lake Lora, and Miller Creek. Environmentally sensitive trails could also be included as appropriate.

Des Moines Creek

- **Policy 9.9C:** Preserve Des Moines Creek area, purchased with Forward Thrust funds for open space and recreation, and extend the Des Moines Creek Trail north to Miller Creek and North SeaTac Park, with connections to regional trail systems.

The trail will add recreational benefit along the creek, and will also enhance the importance of the Creek's fish and wildlife habitat area.

- **Policy 9.9D:** Work with the Port of Seattle to dedicate portions of Port-acquired land south of 200th Street as open space for the enjoyment of local residents and prohibit traffic from these open space areas.

Miller Creek Corridor

- **Policy 9.9E:** Preserve the creek corridor for open space and recreation, should acquisition or redevelopment of private properties occur.

Public access to Miller Creek will allow for the protection of the creek environment and its fish and wildlife habitat value.

Bow Lake

- **Policy 9.9F:** Seek public access to waterfront areas(s) of Bow Lake.

Bow Lake is surrounded by a private commercial development and parking, making it inaccessible to the public; however, it is the potential to provide a recreational resource with acquisition or negotiation of public access.

APPENDIX B

Applicable Regulations

Introduction

This appendix summarizes regulations related to surface water management, water quality, flood protection, and habitat protection that affect the City of SeaTac's (City) surface water program.

Federal and state regulations drive many aspects of the City surface water program. Recent significant regulatory changes, initiated by the Federal Water Pollution Control Act of 1972 (the Clean Water Act), include:

- National Pollutant Discharge Elimination System (NPDES) municipal stormwater permit requirements
- Revised state water quality standards

Additional federal and state regulations that apply to the City's surface water management program include the National Flood Insurance Program (NFIP), administered by the Federal Emergency Management Act (FEMA); the federal Endangered Species Act (ESA); the State Salmon Recovery Planning Act; Growth Management Act (GMA); State Environmental Policy Act (SEPA); and Shoreline Management Act (SMA).

Acronyms and Abbreviations

AKART	All Known, Available and Reasonable methods of prevention, control and Treatment.
BMP	Best Management Practice
City	City of SeaTac
CFR	Code of Federal Regulations
Ecology	Washington Department of Ecology
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FEMA	Federal Emergency Management Act
FIRM	Flood Insurance Rate Maps
GMA	Growth Management Act
HPA	Hydraulic Project Approval
JARPA	Joint Aquatic Resource Application
LID	Low Impact Development
MR	Minimum Requirement

MTCA	Model Toxics Control Act
NFIP	National Flood Insurance Program
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NWP	Nationwide Permits
OHWM	Ordinary High Water Mark
O&M	Operations and Maintenance
Phase II Permit	Western Washington Phase II Municipal Stormwater Permit
PSP	Puget Sound Partnership
RCW	Revised Code of Washington
RSMP	Regional Stormwater Monitoring Program
SEPA	State Environmental Policy Act
SMA	Shoreline Management Act
SWMP	Stormwater Management Program
SMP	Shoreline Master Program
TMDL	Total Maximum Daily Load
USACE	United States Army Corps of Engineers
USC	United States Code
USFWS	United States Fish and Wildlife Services
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WDNR	Washington Department of Natural Resources
WRIA	Water Resources Inventory Area
WSDOT	Washington State Department of Transportation
WSU	Washington State University

Current Regulations and Regulatory Policies

This section highlights the requirements of the current Western Washington Phase II Municipal Stormwater Permit (Phase II Permit), water quality standards, recommendations in the Puget Sound Action Agenda, flood protection, and species and habitat protection.

2013-2018 Phase II Permit Requirements

Section 402 of the Clean Water Act requires some municipalities to obtain an NPDES permit for municipal stormwater discharges to receiving waters. In Washington State, the Washington State Department of Ecology (Ecology) is responsible for issuing and renewing these permits.

Discharges from municipal separate storm sewer systems (MS4s) are regulated by Ecology under the NPDES program. An MS4 is a system designed to collect and convey stormwater runoff (from road drainage, constructed channels, and storm drains). The municipal NPDES permit program seeks to control or reduce pollutant discharge to the maximum extent practicable, through primarily programmatic efforts.

The City is regulated by Ecology as a Phase II permittee. The Phase II Permit became effective for the City and numerous other jurisdictions in western Washington on February 16, 2007. The 2007-2012 Phase II Permit expired on February 15, 2012. Ecology reissued the Phase II Permit with minor modifications on August 1, 2012, extending the current permit requirements until July 2013 (thus it is referred to in subsequent sections as the 2007-2013 Phase II Permit). A new permit with updated requirements for the next permit term (2013-2018 Phase II Permit) was also issued on August 1, 2012. Ecology plans to allow a 1-year grace period before the new permit requirements are in effect beginning on August 1, 2013.

The Phase II Permit has nine special conditions (S1 through S9) and 21 general conditions (G1 through G21). Requirements for the City's stormwater management program (SWMP) are presented under special condition 5 (S5) of the permit:

- Develop and implement a SWMP
- Prepare and maintain written documentation of the SWMP (SWMP Plan)
- Gather, track, maintain, and use information to evaluate SWMP implementation
- Incorporate mechanisms for interjurisdictional and interdepartmental coordination
- Design the SWMP to reduce discharge of pollutants to the maximum extent practicable; meet all known, available, and reasonable methods of prevention, control and treatment (AKART) requirements; and protect water quality
- Address the following components in the stormwater management program:
 - Public education and outreach
 - Public involvement and participation
 - Illicit discharge detection and elimination
 - Controlling runoff from new development, redevelopment, and construction sites
 - Municipal operations and maintenance

The City is also required to comply with the following special conditions:

- S7 – Compliance with Total Maximum Daily Load (TMDL) requirements
- S8 – Monitoring
- S9 – Reporting

The requirements of the S5 and S7 through S9 requirements are summarized below. The City is not required to meet any S7 permit requirements for the 2013-2018 Phase II Permit.

Public Education and Outreach

Section S5.C.1.a-c of the 2013-2018 Phase II Permit is fairly similar to the 2007-2013 Phase II Permit with the following changes:

- The general public audience has been expanded to include school age children.
- The following subject areas were added:
 - General public and businesses
 - Impacts of illicit discharges and how to report them
 - Prevention of illicit discharges
 - Equipment maintenance
 - Residents, landscapers, and property managers/owners
 - Vehicle, equipment, and home/building maintenance
 - Pet waste management and disposal
 - Dumpster and trash compactor maintenance
- The following subject areas were modified:
 - “Environmental stewardship actions and opportunities” has been modified to “Opportunities to become involved in stewardship activities” (for general public and businesses).
 - “Low Impact Development (LID) techniques, including site design, pervious paving, retention of forests and mature trees” has been modified to “LID principles and LID best management practices (BMPs)” (for general public, businesses, residents, landscapers, property managers/owners, engineers, contractors, developers, and land use planners).
 - “Stormwater pond maintenance” has been modified to “Stormwater facility maintenance” (for residents, landscapers, and property managers/owners).
- Stewardship opportunities such as stream teams, storm drain marking, volunteer monitoring, riparian plantings, and education activities are better defined and are now

included in this section (formerly in the Public Involvement and Participation section of the 2007-2013 Phase II Permit).

- Clarification and deadlines have been added to the requirement for measuring understanding and adoption of targeted behaviors (at least one target audience in at least one subject area; use results to direct education and outreach resources; and evaluate changes in adoption of targeted behaviors by February 2, 2016).
- Clarification was added that measurement of understanding and adoption of targeted behaviors can be performed by an individual permittee or as a member of a regional group.

Notable ongoing requirements in the 2013-2018 Phase II Permit include the following:

- Provide an education and outreach program targeting the following audiences:
 - General public and businesses (including home-based and mobile businesses)
 - Residents, landscapers, and property managers/owners
 - Engineers, contractors, developers, and land use planners

Public Involvement and Participation

Section S5.C.2.a-b of the 2013-2018 Phase II Permit is fairly similar to the 2007-2013 Phase II Permit with the following changes:

- Stewardship programs and environmental activities have been moved to the Public Education and Outreach section of the permit.
- A deadline has been added for posting the SWMP Plan and annual report on the City's website (May 31st of each year).
- Clarification was added to the permit that all other submittals should be available to the public upon request, but are not required to be posted on the City's website.

Notable ongoing requirements in the 2013-2018 Phase II Permit include the following:

- Create opportunities for the public to participate in the decision-making processes involving the development, implementation, and update of the SWMP.
- Post the SWMP Plan and annual report submitted to Ecology on the City's website.

Illicit Discharge Detection and Elimination

Section S5.C.3.a-f of the 2013-2018 Phase II Permit is fairly similar to the 2007-2013 Phase II Permit with the following changes:

- New permit language to address concerns with homeland security policies regarding requests for maps

- Minor text edits to the allowable and conditionally allowable discharges to be included in the illicit discharge ordinance (by February 2, 2018)
- New permit language for conditionally allowable discharges from spas and hot tubs (discharges shall be thermally controlled in addition to dechlorination)
- Modification of the “enforcement strategy” to “compliance strategy” and clarification provided on what this strategy should include
- Modification of the field screening methodology from dry weather outfall reconnaissance to field screening (based on methods selected by the City) of 40 percent of the City stormwater drainage system (i.e., roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, storm drains, and outfalls) by December 31, 2017 and, on average, 12 percent each year thereafter

Notable ongoing requirements in the 2013-2018 Phase II Permit include the following:

- Ongoing mapping requirement
- Ongoing implementation of the illicit discharge hotline, IDDE public education, staff training, IDDE program, and recordkeeping

Controlling Runoff from New Development, Redevelopment, and Construction Sites

Section S5.C.4.a-g of the 2013-2018 Phase II Permit contains a few minor edits and a few major edits compared to the 2007-2013 Phase II Permit. The major changes include:

- Elimination of the 1-acre threshold (the lower threshold is now 2,000 square feet [sf] of impervious area or 7,000 sf of land disturbing activity); ordinances shall be revised by December 31, 2016
- New language for On-site Stormwater Management (Minimum Requirement [MR] #5) that includes detailed and involved requirements to meet either a specific LID BMP performance standard, or one of two lists of BMPs depending on the project types and locations (see permit for full details on new LID requirements)
- Clarification and deadline added for provisions to verify adequate long-term operations and maintenance (O&M) of stormwater treatment and flow control facilities (by December 31, 2016)
- New requirement to review and revise local development-related codes, rules, standards, and other enforceable documents to incorporate and require LID principles and LID BMPs by December 31, 2016
- New requirement to summarize the results of the code review and revision process in the annual report due no later than March 31, 2017
- New requirement for watershed-scale stormwater planning (not applicable to the City since it is not located in any of the proposed Phase I basins in King County)

The 2013-2018 Phase II Permit includes the following minor changes:

- Removal of the Erosivity Waiver
- Clarification of the inspection frequency for new stormwater treatment and flow control BMPs/facilities and catch basins for residential developments (every 6 months until 90 percent of the lots are constructed, or when construction is stopped and the site is fully stabilized)

Notable ongoing requirements in the 2013-2018 Phase II Permit include the following:

- Inspect all permitted development sites prior to clearing and construction, during construction, and again upon completion of construction; annual inspections of stormwater treatment and flow control facilities permitted by the City
- Ongoing recordkeeping and staff training

Municipal Operations and Maintenance

Section S5.C.5.a-i of the 2013-2018 Phase II Permit has been renamed to Municipal Operations and Maintenance, but contains similar requirements to the 2007-2013 Phase II Permit. The 2013-2018 Phase II Permit includes the following changes:

- Establishes a deadline (December 31, 2016) for updating maintenance standards to be consistent with those in Ecology's revised Stormwater Management Manual for Western Washington (Ecology 2012)
- There are now three options for catch basin and inlet inspections:
 - Option 1: Catch basins and inlets must be inspected at least once no later than August 1, 2017, and every 2 years thereafter (instead of once before the end of the permit term [every 5 years] in the 2007-2013 Phase II Permit).
 - Option 2: Inspections and cleaning of catch basins may occur on a "circuit basis" with inspections of 25 percent of catch basins and inlets within each circuit to identify maintenance needs.
 - Option 3: Clean all pipes, ditches, catch basins, and inlets within a circuit once during the permit term instead of following the specified inspection schedule or conducting inspections on a "circuit basis".
- Modifications to the practices, policies, and procedures include:
 - "Development of nutrient management and integrated pest management plans" has been modified to "reducing nutrients and pesticides using environmentally friendly alternatives".
 - "Pet waste" has been added to "Trash management".

Notable ongoing permit requirements in the 2013-2018 Phase II Permit include the following:

- Annual inspections of municipally owned or operated permanent stormwater treatment and flow control BMPs/facilities
- Spot checks of potentially damaged permanent stormwater treatment and flow control BMPs/facilities after major storm events
- Staff training
- SWPPP implementation
- Recordkeeping

Compliance with Total Maximum Daily Load Requirements

Since the City is not affected by any TMDLs listed in Appendix 2 of the 2013-2018 Phase II Permit, the City does not have any specific requirements that need to be met for this permit component.

Monitoring and Assessment

Section S8 of the 2013-2018 Phase II Permit has been completely changed from the requirements in the 2007-2013 Phase II Permit. Monitoring required by the 2013-2018 Phase II Permit includes the following three components:

1. Water quality monitoring required for compliance with TMDLs (summarized in the previous section of this document)
2. Sampling or testing required for characterizing illicit discharges (summarized in the IDDE section [S5.C.3] of this document)
3. Regional Stormwater Monitoring Program (RSMP) or opt-out monitoring

The RSMP includes the following three major components along with the requirements for the opt-in and opt-out options:

- Status and Trends Monitoring:
 - **Opt-in Option:** Pay into a collective fund (annual dues of \$6,322 beginning August 15, 2014) to implement the Puget Sound marine nearshore and small streams status and trends component of the RSMP.
 - **Opt-out Option:** Conduct wadeable stream water quality, benthos, habitat, and sediment chemistry monitoring for four potential RSMP stream sites within the City boundaries; conduct sediment chemistry, mussels, and bacteria monitoring at four potential RSMP marine nearshore sites; and report data and analyses annually.
- Effectiveness Studies:

- **Opt-in Option:** Pay into a collective fund (annual dues of \$10,553 beginning August 15, 2014) to implement the effectiveness studies component of the RSMP.
- **Opt-out Option:** Select two sites for stormwater discharge monitoring, submit a QAPP to Ecology, and fully implement monitoring by October 1, 2014, in accordance with Appendix 9 of the 2013-2018 Phase II Permit.
- Source Identification and Diagnostic Monitoring Information Repository:
 - **Opt-in Option:** Pay into a collective fund (annual dues of \$977 beginning August 15, 2014) to implement the source identification and diagnostic monitoring component of the RSMP.
 - Opt-out Option: None provided

Reporting

Section S9 of the 2013-2018 Phase II Permit is similar to the 2007-2013 Phase II Permit with the following changes:

- Permittees shall submit annual reports electronically; no printed copies of annual reports are required to be submitted to Ecology.
- The annual report submittal shall include a copy of the SWMP Plan (description of activities and actions for the upcoming calendar year), the annual report form provided by Ecology (description of activities and actions for the previous calendar year), and attachments to the annual report form, if applicable.
- The LID reporting requirements have been removed since the permittees will be addressing the LID requirements in Section S5.C.4 during the 2013-2018 permit term. Two new reporting requirements in the 2013-2018 Phase II Permit include:
 - Provide a written description of internal coordination mechanisms in the March 31, 2015 annual report (Section S5.A.5.b).
 - Submit a summary of the review and revision process for incorporating LID principles and LID BMPs into local development codes, rules, standards, and other enforceable documents with the March 31, 2017 annual report (Section S5.C.4.g.ii).

Water Quality Standards

Various federal and state laws related to water and sediment quality significantly affect stormwater management in the City. The primary regulatory influences are the federal Clean Water Act and several state-administered water quality programs, including Ecology's surface water quality standards set forth in Washington Administrative Code (WAC) 173-201A, and TMDLs that may be implemented in the near future to address water quality management for surface water bodies listed on the State's Clean Water Act Section 303(d) list.

State Surface Water Quality Standards

Surface water quality standards describe the quality of water expected to support beneficial surface water uses. Section 303(c) of the Clean Water Act states that water quality standards are the responsibility of states and qualified tribes. Ecology administers water quality standards in Washington state to be “consistent with public health and public enjoyment of the waters and the propagation and protection of fish, shellfish, and wildlife” (WAC 173-201A).

Effective July 2003, Ecology restructured its surface water quality standards to more explicitly define water quality requirements for aquatic life, recreation, water supply, and other miscellaneous uses. For example, designated uses for aquatic life include: *char spawning and rearing; core summer salmonid habitat; salmonid spawning, rearing, and migration; salmonid rearing and migration only; non-anadromous interior redband trout; and indigenous warm water species*. There are now 18 designated uses in WAC 173-201A, and Ecology has established water quality criteria (such as maximum temperature and fecal coliform bacteria levels) for each of them.

303(d) Listings

The following receiving waters in the City are currently listed under Category 5 of Ecology’s 303(d) list for water quality impairments (Ecology 2008), but do not yet have a TMDL:

- Angle Lake - fecal coliform bacteria
- Des Moines Creek – copper, zinc, fecal coliform bacteria, dissolved oxygen
- Miller Creek - fecal coliform bacteria, dissolved oxygen

Applicability

The City is responsible for regulating surface water discharges to receiving waters in its jurisdiction to meet Ecology’s surface water quality standards. None of the receiving waters in the City or downstream of the City are explicitly addressed in Ecology’s water quality standards. However, in accordance with the Phase II Permit, the City needs to manage stormwater discharges from its municipal drainage systems in a manner that supports achieving the water quality standards for all surface waters to the best of its ability.

The 303(d) listings summarized above do not currently have a TMDL study or TMDL implementation plan in place; however, the City should consider activities and local requirements that could proactively reduce pollutant loading, and position the City to take action if a TMDL is developed in the future.

Puget Sound Partnership Action Agenda

The Puget Sound Partnership (PSP) was established by Washington State statute in 1983 as the Puget Sound Water Quality Authority, later becoming the Puget Sound Action Team, and eventually the PSP in 2007. This group was directed to identify pollution-related threats to Puget Sound’s resources, conduct risk assessments, and coordinate and report on information relating to water quality in Puget Sound.

In December 2008, the PSP published an Action Agenda for restoration and protection of Puget Sound which was revised in May 2009 (PSP 2009). This sweeping document supersedes the previous water quality management plan, encompassing a wider range of ecological, social, and economic issues in addition to water quality. The Action Agenda calls on all governments and citizens in the Puget Sound basin to support its priorities and initiatives. In the 2011 update to the Action Agenda, the PSP added a list of ecosystem recovery targets to aid in achieving substantial restoration and recovery of the Puget Sound by the year 2020 (PSP 2011). The 2012 Action Agenda identifies strategies and actions to help reduce the effect of five main pressures on the ecosystem: land development, shoreline alteration, runoff from the built environment, wastewater, and loss of floodplain function (PSP 2012). Decisions are based on science, focusing on actions that have the biggest impact, and hold people and organizations accountable for results. The City is located in the South Central Sound Action Area, which includes the following priority action area strategies (PSP 2012):

- Protect intact ecosystem processes, structure, and functions:
 - Acquire and/or protect high value habitat and land at immediate risk of conversion
- Change SMA statutes and regulations to limit residential shoreline armoring and overwater coverage, and promote *green* shoreline replacements:
 - Implement green shoreline replacement
 - Fund and implement shoreline restoration plans
- Develop a strategic funding proposal for habitat restoration and protection priorities:
 - Discuss funding across Watershed Resource Inventory Areas (WRIAs) and review potential funding mechanisms
 - Coordinate with PSP and the Ecosystem Coordination Board Subcommittee to develop an integrated funding strategy for Puget Sound recovery
- Fund and implement stormwater retrofits, improvements to O&M of existing stormwater infrastructure, and additional source control measures:
 - Fund and implement municipal Stormwater Management Programs (SWMPs) that include structural stormwater retrofits, O&M of existing stormwater infrastructure, source control, incorporation of LID requirements into stormwater codes, development and implementation of LID incentives, and incentives for business to help
 - Identify and analyze funding mechanisms
 - Advocate for ongoing funding for retrofits and operations
- Implement salmon recovery habitat protection and restoration recommendations

- Incorporate LID requirements into stormwater codes, and develop and implement LID incentives
- Keep toxics and excess nutrients out of stormwater runoff and wastewater:
 - Develop Puget Sound wide effort for source control
- Restore floodplains to recreate ecosystem functions
- Restore and protect Local Toxics Control Account funding under the Model Toxics Control Account (MTCA) for local toxics cleanup activities:
 - Educate legislators about the importance of assuring adequate state funding is available to move remedial actions forward in a timely manner
- Work with local governments to develop and implement policies and regulations that advance Action Agenda implementation

As noted above, the PSP added a list of ecosystem recovery targets in the 2011 Action Agenda Update to aid in the restoration of the Puget Sound by 2020. These targets identify actions that reflect the region's commitment to human health and quality of life, species and food webs, protection of habitats, water quality and ecosystem health. The following targets have been identified and approved:

- Monitor and improve water quality at swimming beaches
- Maintain summer stream flows
- Monitor water insects (benthic invertebrates) in freshwater as a measure of water quality and ecosystem health
- Improve dissolved oxygen levels by reducing human-related nitrogen contributions
- Reduce toxics in fish to below threshold levels
- Monitor fresh water quality and achieve a decrease in number of impaired [303(d) list] fresh waterbodies in Puget Sound
- Improve salmon-recovery in deltas and estuaries
- Improve quality of marine sediment to meet Sediment Quality Standards set by Washington state
- Restore degraded floodplain areas
- Increase population of wild Chinook salmon
- Monitor shoreline armoring and alterations
- Improve operations of on-site sewage systems
- Recover populations of orca whales

- Increase spawning biomass of herring

As noted above, the 2012 Action Agenda identifies strategies and actions to help reduce the effect of land development, shoreline alteration, runoff from the built environment, wastewater, and loss of floodplain function (PSP 2012). The South Central Action Area identified related local issues, solutions and opportunities for improvement in relation to these recovery targets.

- Land Development:
 - Local Problems:
 - Residential, commercial, port, and shipyard development has resulted in loss of high value habitat, impaired ecological function, and watershed alterations
 - Ineffective local government comprehensive plans, and lack of state or federal standards that affect land development and habitat protection have resulted in loss of critical ecosystem functions
 - Solutions:
 - Protect highest priority habitats identified in watershed-based salmon recovery plans
 - Update existing policies and regulations, and develop best practices and model policies to support habitat restoration and protection priorities
 - Identify areas where vested development regulations most limit capacity to meet recovery targets; reform the vesting law to be at time of permit issuance, and avoid re-extension of vesting rights
 - Refer to the targets for Puget Sound Recovery when developing land use comprehensive plans, Shoreline Master Program (SMP) updates, stormwater regulations, local flood plans, and floodplain development
- Shoreline Alteration:
 - Local problems:
 - Residential shoreline armoring, and lack of protective regulatory updates and enforcements to address shoreline armoring
 - Conflicting land use practices and environmental goals
 - Local governments need support, guidance and funding to better align local SMPs and meet Puget Sound recovery targets
 - Few examples of green saltwater shoreline development
 - Solutions:
 - Promote green shoreline techniques for property owners

- Request clear definition from Ecology of SMP updates and provisions
- Change legislation to improve state shoreline regulations and address issue of armoring
- Update Critical Area Ordinances
- Pursue watershed based analysis of habitat needs and implement the Salmon Recovery Plans
- Implement Puget Sound Nearshore Ecosystem Restoration Program projects and Shoreline Acquisition and Protection Projects
- Refer to Puget Sound recovery targets when developing Shoreline Master Program updates
- Stormwater:
 - Local problems:
 - Surface water loading and runoff containing pollutants from the built environment
 - Insufficient stormwater infrastructure and need for more stormwater retrofits
 - Solutions:
 - Utilize LID techniques and integrate LID into local codes
 - Coordinate with the Washington State Department of Transportation (WSDOT) on stormwater mitigation issues and contact Washington State University (WSU) for natural drainage approaches to stormwater management
 - Implement Watershed Action Plans
 - Pursue watershed based municipal stormwater permits
 - Seek federal and state funding support for stormwater retrofit projects and monitor Environmental Protection Agency (EPA) grant funded work in WRIA 9 to provide guidance on identifying and prioritizing stormwater retrofit needs
 - Maintain existing stormwater infrastructure
 - Update SMPs and Critical Areas Ordinances
 - Reduce pollution from industrial areas and conduct business inspections
 - Share best practices through coordination with other local governments
 - Continue to address stormwater runoff through land use and zoning, stormwater regulations and design standards, clearing standards, public

outreach, monitoring, maintenance of stormwater infrastructure, and capital investments in new facilities and facility retrofits

- NPDES permit will include requirements for LID

- Loss of Floodplain Function:

- Local problems:

- Habitat loss due to habitat conversion from historic conditions and levee vegetation maintenance issues
 - Conflicting regulations and goals (National Flood Insurance Program and Endangered Species Act; agriculture and salmon recovery for ecologically significant highly productive land)
 - Recreational safety concerns and policies on floodplain restoration efforts for salmon recovery and flood management

- Solutions:

- Implement watershed-based salmon habitat restoration and protection projects, seek EPA Ecosystem Restoration and Protection grants for local projects
 - Discuss regional variance to the Corps levee vegetation maintenance standards
 - Allow agricultural and working forest uses that do not damage floodplain function or salmon recovery options
 - Request clarification and assistance in complying with the National Flood Insurance Program
 - Update the Critical Areas Ordinance and SMPs
 - Buy out frequently flooded land and construct setback levees

The City should closely monitor implementation of the Action Agenda, as this may lead to opportunities for grant funding, partnering with other local governments, and assistance with technical guidance that is of interest to the City.

Applicability

A key theme of the Action Agenda is stormwater pollution. The Action Agenda and other work by the PSP is not legally binding on the City. However, because the City is located within the Puget Sound drainage basin, many of the provisions of PSP's plan will affect the decisions of regulatory authorities in the region, indirectly affecting the City's SWMP.

Flood Protection

The U.S. Congress established the NFIP with the passage of the National Flood Insurance Act of 1968. The NFIP is a federal program enabling property owners in participating communities to purchase insurance as protection against flood losses, in exchange for floodplain management regulations that reduce future flood damages. Participation in the NFIP is based on an agreement between local communities and the federal government. If a community adopts and enforces a floodplain management ordinance to reduce future flood risk for new construction, the federal government will make flood insurance available within the community as a financial protection against flood losses. This insurance is designed to provide an alternative to disaster assistance to reduce the escalating costs of repairing damage to buildings and their contents caused by floods. FEMA is currently responsible for the NFIP.

On September 22, 2008, the National Marine Fisheries Service (NMFS) issued a Biological Opinion that required changes to the implementation of the National Flood Insurance Program in order to meet the requirements of the ESA in the Puget Sound watershed (NMFS 2008). FEMA offers several ways to meet this ESA requirement:

- Prohibit all development in the floodway and other areas as specified by the Reasonable and Prudent Alternatives in the Biological Opinion
- Enact regulations that allow development that meet the criteria specified in the Biological Opinion by either:
 - Adopting a Model Ordinance, or enforce the same requirements in other ordinances, such as growth management, zoning, or critical areas regulations, or
 - Showing compliance with ESA on a permit-by-permit basis. This will typically involve requiring applicants for floodplain development permits to develop in the Special Flood Hazard Area to submit permit applications to the National Marine Fisheries Service. If this option is chosen, NFIP communities must ensure that permit applicants have demonstrated compliance with ESA before issuing a floodplain development permit.

Applicability

Section 1315 of the National Flood Insurance Act prohibits FEMA from providing flood insurance unless a community adopts and enforces floodplain management regulations that meet or exceed floodplain management criteria established under Section 1361(c) of the act. These floodplain management criteria are specified in the Code of Federal Regulations (CFR), Title 44, Part 60, Criteria for Land Management and Use. The emphasis of the NFIP floodplain management requirements is focused on reducing threats to lives and the potential for damages to property in flood-prone areas.

In addition to providing flood insurance and reducing flood damages through floodplain management regulations, the NFIP identifies and maps the nation's floodplains. Mapping of floodplains creates broad-based awareness of the flood hazards and provides the data needed for floodplain management programs and for determining flood insurance rates for new construction.

The City complies with the NFIP with a flood control ordinance and explicit code requirements for development in flood hazard areas which include floodplain, flood fringe, zero-rise floodway, and FEMA floodway (SMC 15.30.210). The City currently manages floodplain hazards through its Flood Hazard Area Code (SMC 15.30.210 through 15.30.250), which address areas of special flood hazard as identified by the Federal Insurance Administration in *The Flood Insurance Study for the King County, Washington and Unincorporated Areas*, dated January 1989. This study includes flood profiles and accompanying Flood Insurance Rate Maps (FIRMs). Mapped floodplains in the City include flood hazard areas within FIRM Boundaries.

The flood hazard area code is also consistent with the requirements of the Growth Management Act wherein local governments are required to designate and protect five types of *critical areas*, including flood hazard areas. Wetlands and streams and their buffers are also protected as critical areas and generally correspond with FEMA floodplains. The combination of development restrictions for floodplains, wetlands, and streams limit development within the FEMA designated floodplains. See the *Growth Management Act* section for an understanding of development regulations as they relate to public facilities (i.e., stormwater facilities) maintenance and/or construction within critical areas.

Currently, there are no documented ESA-listed fish species or critical habitat within the City's primary aquatic resources consisting of Miller Creek, Des Moines Creek, Angle Lake, Bow Lake, Tub Lake, and Lora Lake. Therefore, development in the floodplain would likely have no effect on ESA-listed species or critical habitat and would not be subject to ESA review in accordance with the NMFS-issued Biological Opinion. Should ESA-listed fish species or critical habitat become listed in the future, the City would need to demonstrate ESA compliance on a permit-by-permit basis or by updating their regulations.

Species and Habitat Protection

This section summarizes the requirements of the ESA, State Salmon Recovery Planning Act, GMA, SEPA, Shoreline Management Act, and other applicable regulations.

The Endangered Species Act

The 1973 ESA is a federal act administered by the U.S. Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS) (i.e., the Services) that provides for protection of species determined to be threatened or endangered or becoming extinct, and their habitat (i.e., critical habitat). The USFWS is responsible for predominant freshwater species (e.g., Puget Sound bull trout), terrestrial wildlife, and plants, whereas NMFS is responsible for predominant marine species (e.g., Puget Sound Chinook). The Services consider a species endangered when it is "in danger of extinction throughout all or a significant portion of its range" and threatened when it is "likely to become endangered within the foreseeable future throughout all or a significant portion of its range."

The ESA prohibits take of listed species defined as to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in such conduct." Take also includes "significant modification or degradation of critical habitat." The take prohibition applies to all persons including private citizens and federal, state, and local government entities. Proponents of activities with a federal nexus (e.g., carried out by a federal agency, federally funded, or require

a federal permit) are required to consult with the Services according to Section 7 of the ESA unless they are exempted according to a Section 4(d) rule as discussed below.

For species listed as *endangered*, Section 9 take prohibitions are applied. The Services protect threatened species through a more flexible ESA Section 4(d) rule that prohibits take. On July 10, 2000, NMFS published a final rule under Section 4(d), which prohibits actions that result in take of Puget Sound salmon species listed as *threatened*. On September 25, 2008, NMFS included Puget Sound steelhead within this rule based on its recent listing as threatened. The rule follows the standard practice of prohibiting the take of a threatened species without written authorization. However, the rule does not prohibit all take. The rule exempts certain activities from take prohibitions if the take occurs as the result of a program approved by NMFS that adequately protects listed species and their habitat. NMFS specifies 13 categories of activities that can limit the situations in which take prohibitions apply, known as 4(d) limits. By providing limitation from take liability, NMFS encourages governments and private citizens to adjust their programs and activities to be salmon safe.

Applicability

Currently, there are no documented ESA-listed fish species or critical habitat within the City's primary aquatic resources consisting of Miller Creek, Des Moines Creek, Angle Lake, Bow Lake, Tub Lake, and Lora Lake. Within City limits, the Puget Sound/Georgian Strait Evolutionarily Significant Unit (ESU) of coho salmon (*Oncorhynchus kisutch*) is documented by the Washington Department of Fish and Wildlife (WDFW 2013a) as occurring in Miller Creek and Des Moines Creek. Coho salmon was identified by NMFS (2009) as a *species of concern* in 1997 due to declines in abundance and productivity, reduced distribution, and threats to its genetic diversity. The species of concern status does not carry protections under ESA, rather it indicates that NMFS has concerns regarding status and threats, but for which insufficient information is available to indicate a need to list the species under ESA.

Beyond City limits, Miller Creek and Des Moines Creek drain to the Puget Sound within the neighboring cities of Normandy Park and Des Moines, respectively. The Puget Sound supports several ESA-listed fish species including threatened Chinook salmon (*Oncorhynchus tshawytscha*), threatened steelhead trout (*Oncorhynchus mykiss*), threatened bull trout (*Salvelinus confluentus*), endangered bocaccio (*Sebastes paucispinis*), threatened canary rockfish (*Sebastes pinniger*), threatened yelloweye rockfish (*Sebastes ruberrimus*), endangered southern resident killer whale (*Orcinus orca*), and endangered Steller sea lion (*Eumetopias jubatus*). Furthermore, the Puget Sound is listed as critical habitat for Chinook salmon and southern resident killer whale, and is proposed for steelhead trout.

In addition, there are no documented ESA-listed wildlife species or critical habitat within the City (WDFW 2013b) as well as no records of ESA-listed plants, based on information in the Washington Department of Natural Resources Natural Heritage Program database (WDNR 2013).

State Salmon Recovery Planning Act

The State has responded to the ESA listings described above by enacting legislation authorizing (but not requiring) local governments, and other stakeholders to take certain actions to promote

salmon recovery. The Washington state legislature established the Salmon Recovery Planning Act (Revised Code of Washington [RCW] 77.85) through House Bill 2496 for the improvement and recovery of salmonid fish runs throughout the state. This act established a Salmon Recovery Office within the Office of the Governor to coordinate a state strategy for salmon recovery to healthy sustainable population levels with the purpose of coordinating and assisting the development of salmon recovery plans.

Applicability

The City is located within WRIA 9, referred to as the Green/Duwamish and Central Puget Sound Watershed. The City is located within the nearshore subwatershed of WRIA 9. The City is a watershed partner government that ratified the Salmon Habitat Plan for WRIA 9, which is a local habitat related chapter of the Puget Sound Salmon Recovery Plan. The Salmon Habitat Plan contains salmon recovery actions and policies for each subwatershed.

Growth Management Act

The GMA was passed by the Washington state legislature in 1990. The GMA was enacted in response to rapid population growth and concerns about suburban sprawl, environmental protection, and quality of life. The GMA has been amended several times and is codified primarily in Chapter 36.70A of the Revised Code of Washington. Under the requirements of Section 4 of the GMA, the City must develop and adopt comprehensive plans and development regulations that prevent the adverse effects of uncontrolled development, and poor land use practices. One of the key directives of the GMA is to use *best available science* to support effective land use planning that can avert environmental degradation.

Applicability

Environmentally Sensitive Areas

In accordance with the GMA, the City established Environmentally Sensitive Areas regulations contained in Chapter 15.30 of the SeaTac Municipal Code (SMC). Environmentally sensitive areas within the City include erosion hazard areas, flood hazard areas, landslide hazard areas, seismic hazard areas, steep slope hazard areas, wetlands, streams, critical recharge areas, and fish and wildlife habitat conservation areas. The City is responsible for updating these regulations as best available science is developed.

Comprehensive Plan

In addition, the City developed a Comprehensive Plan (SeaTac 2011), which is the City's blueprint for growth and development. It contains a future land use map, and goals and policies that provide guidance to the City as it grows and changes to meet the demands of a growing region. The Comprehensive Plan outlines the City's policy with respect to growth in land use, housing and neighborhoods, transportation, capital facilities, utilities, community image, economic vitality, environmental management, human services, and parks, recreation and open space.

State Environmental Policy Act

SEPA (Chapter 43.21C RCW) was adopted in 1971 to ensure that environmental values were considered during decision-making by state and local agencies. SEPA provides a way to identify possible environmental impacts that may result from government decisions. These decisions may be related to issuing permits for private projects, constructing public facilities, or adopting regulations, policies or plans. Information provided during the SEPA review process helps agency decision-makers, applicants, and the public understand how a proposal will affect the environment. This information can be used to change a proposal to reduce likely impacts, or to condition or deny a proposal when adverse environmental impacts are identified.

Applicability

Under SMC 16A.23.010, the City adopts SEPA, RCW 43.21C.120, and the SEPA Rules, WAC 197-11-904. Under SEPA, the City assumes the role of *lead agency* responsible for environmental review of private and City proposals, with the exception of other public agencies that have SEPA authority. SMC 16A.23 contains the City's SEPA rules and procedures.

Shoreline Management Act

The SMA was passed by the Washington state legislature in 1971 (RCW 90.58). The primary goal of the SMA is *to prevent the inherent harm in an uncoordinated and piecemeal development of the state's shorelines*. Under the SMA, each city and county with *shorelines of the state* must prepare and adopt a SMP that is based on state laws and rules but is tailored to the specific geographic, economic and environmental needs of the community. All SMPs must satisfy the requirements of WAC 173-26, state master program approval and amendment procedures, master program guidelines, and WAC 173-27.

Applicability

The City completed a comprehensive SMP update in May 2010 (SeaTac 2010), which is implemented through the City's Shoreline Management Code (SMC Title 18). The SMP and SMC Title 18 are applicable to the shoreline environment of Angle Lake, which is the only *shoreline of the state* within City limits. The regulated shoreline applies to all parcels surrounding Angle Lake extending from the ordinary high water mark (OHWM) to 200 feet landward. The City's SMP is essentially a shoreline-specific combined comprehensive plan, zoning ordinance, and development permit system. In the City, shoreline permitting and enforcement procedures are summarized as follows:

1. All development and use of shorelines of the state shall be carried out in a manner that is consistent with this SMP and the policy of the Act as required by RCW 90.58.140(1), and applicable state regulations whether or not a shoreline permit or statement of exemption is required.
2. No substantial development shall be undertaken within jurisdiction of the Shoreline Management Act by any person without first submitting a shoreline substantial development permit, and being granted permission to proceed by the proper authority.

3. All provisions of the Master Program shall be enforced by the Shoreline Administrator, and the SMP adopts all enforcement procedures and penalties contained in WAC 173-27 and RCW 90.58.
4. Permit processes and fees related to implementation of this SMP are contained within SMC Title 18. The processes outlined in Title 18 follow the requirements of state law and provide a local process for implementation of the City's SMP.

The type of shoreline permit can vary depending on the type of activity and the shoreline environment where work is proposed. Unless exempted, a development, use, or activity shall not be undertaken within the jurisdiction of the SMA unless a shoreline substantial development permit has been obtained. SMC 18.705 identifies those activities that are considered exempt (e.g., normal maintenance and repair) from the requirement to obtain a shoreline substantial development permit. However, regardless of an exemption, activities that occur in the shoreline are required to adhere to the conditional development standards. A development or use that is listed as a conditional use or unlisted use must obtain a conditional use permit even though a substantial development permit is not required.

The following describes the shoreline environmental designations that reflect the type of development that has or should take place in a given area. These categories represent a relative range of development from high to low intensity land use:

- **High intensity** is appropriate for areas of high intensity water oriented commercial, transportation, and industrial development.
- **Medium intensity** is appropriate for areas of medium density development.
- **Shoreline residential** is intended to accommodate residential development, and appropriate public access and recreational uses consistent with other elements of shoreline management.
- **Urban conservancy** is a designation designed to protect and restore ecological functions of open space, floodplain and other sensitive lands where they exist in urban and developed settings, while allowing a variety of compatible uses.
- **Aquatic** is a designation intended to protect, restore, and manage the unique characteristics and resources of the areas waterward of the ordinary high-water mark.

For each shoreline environmental designation, SMC Title 18 specifies shoreline dimension standards (e.g., structure height, shoreline setback), allowed uses, prohibited uses, allowed shoreline modifications, and permitting requirements. In general, utilities (including stormwater management facilities) are allowed within all of the shoreline environmental designations (with the exception of Aquatic) if the underlying zoning allows the modification and no other feasible option exists (see SMC 18.565 and 18.570). Utilities proposed in the Aquatic shoreline designation may be allowed subject to variances and Conditional Use Permits.

Other Regulations

In addition to local requirements, wetland and stream regulations are imposed by federal and state agencies. These regulations require permitting and mitigation for impacts on wetlands and streams. The Clean Water Act sections 404, 401, and Hydraulic Permit Approval are the most common permits that would be required for work associated with surface water management projects. The following describes the permits in greater detail.

Clean Water Act Sections 404 and 401

Section 404 of the federal Clean Water Act regulates activities in waters of the United States, including wetlands (33 United States Code [USC] 1344), but not wetland buffers. The US Army Corps of Engineers (USACE) administers the permitting program under this law. Such permits include nationwide (general) permits or individual permits. Nationwide permits (NWP) cover a category or categories of activities that are either similar in nature and cause only minimal individual and cumulative adverse impacts. Individual permits are intended for projects where activities have more than minimal adverse impacts and evaluation of the permit application involves more thorough review of the potential effects of the proposed activity. Close coordination with USACE to confirm the type of review necessary is an integral part of project planning. The difference in review timeframes for an individual permit versus a nationwide permit could have implications on schedule.

Section 401 of the Clean Water Act requires that proposed dredge and fill activities permitted under Section 404 be reviewed and certified by Ecology to ensure that the project meets state water quality standards. These regulations will be applicable if any portion of the onsite wetlands are filled, dredged, or otherwise affected by project activities.

Joint Aquatic Resources Permit Application (JARPA)

Several types of aquatic permits can all be applied for through a streamlined permit application called the Joint Aquatic Resource Application (JARPA) including Clean Water Act permits (Section 404, Section 10, Section 401), City shoreline permits, other City permits (e.g., critical areas), Hydraulic Project Approvals, and Aquatic Use Authorizations. Activities that trigger these permits are associated with work in a surface water body (e.g.; streams, lakes, tidal waters) or a wetland (e.g.; bogs, riverine wetlands, salt marshes).

Surface waters and wetlands are also considered as Environmentally Sensitive Areas under the GMA, and thereby are subject to City regulations (SMC Chapter 15.30). For both the purposes of local regulations and those of state and federal entities (e.g.; Ecology, Corps of Engineers), it is important that the extent of the surface water body or wetland be properly defined, rated by professional scientists, and the amount of dredge or fill be appropriately calculated by certified engineers.

Finally, it is also important to understand that although this is one permit application, the typical review schedules vary among the regulatory authorities reviewing the application. It is also important to understand where there may be a need for prior approval for a separate permit or authorization before approval under the JARPA. For example, the Hydraulic Project Approval (HPA) permit (WDFW) is typically reviewed in a shorter timeframe than a Section 404 permit

(Corps); however, the HPA permit cannot be approved until the SEPA determination is finalized. To avoid project delays, it is recommended to meet with the regulatory agencies making permitting decisions. Oftentimes they will require more information or materials not specifically required in the JARPA. Early coordination with all of the regulatory agencies may prevent delays in the processing of the JARPA.

Evolving Regulations and Policies

The City faces several evolving regulations relevant to stormwater management. These regulations are expected to increase the City's obligations to protect water quality and fish habitat, and require greater integration and coordination between programs aimed at improving environmental protection. This section focuses on upcoming state water quality standards that the City will need to accommodate in its ongoing stormwater management program.

Upcoming state water quality standards

Following is a summary of upcoming revisions to the state water quality standards based on evolving human health criteria, and methods for compliance with the revised standards.

Washington State Surface Water Quality Standards (WAC 173-201A)

Ecology is working on the following updates to the Surface Water Quality Standards (WAC 173-201A) [<http://www.ecy.wa.gov/programs/wq/swqs/Currsqwgsruleactiv.html>]:

1. Establishing new human health criteria
2. Providing new implementation and compliance tools for dischargers

Prior to adoption of the new final rule, Ecology has implemented a water quality policy forum to educate and obtain feedback from municipal stormwater permittees and other stakeholders on these updates. Presently, Ecology has conducted four of the seven planned policy forums across the state, and expects to publish rule language by December 2013, and adopt the final rule by March 2014.

Human Health Criteria

Washington's surface water quality standards include aquatic life criteria for toxic substances, but lack human health criteria for toxic substances. EPA requested that Washington use new science and information to update the standards with human health criteria for toxic substances to protect people who consume water, fish, and shellfish. Ecology has been using the 1992 National Toxics Rule mandated by EPA for developing 303(d) lists of impaired waters, TMDLs, and discharge permits to protect human health from toxic substance consumption. This rule is outdated and EPA has since recommended national human health criteria for 114 toxic substances [<http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm>]. These EPA criteria recommend maximum concentrations of toxic substances in surface waters (or fish tissue for methylmercury only) that vary by designated uses of the surface water for protection from consumption of either 1) water and organism (fish/shellfish) or 2) organism only.

Human health criteria for organism (fish/shellfish) consumption are of primary concern for stormwater dischargers. These criteria vary directly with the reference dose (daily intake), relative source contribution (from other sources), and human body weight, vary inversely with the fish consumption rate and bioconcentration factor, and can also vary by the carcinogen risk factor. Criteria adopted by Ecology will likely be lower than the EPA criteria due to the high fish consumption rate of tribal and other populations in Washington State.

Mercury and PCBs are examples of persistent bioaccumulative toxins that will be most challenging for human health criteria development, and discharge permit compliance because they are commonly associated with 303(d) listings and TMDLs, and largely originate from out-of-state sources of atmospheric deposition. For example, Oregon recently adopted human health criteria in 2011 for methylmercury and polychlorinated biphenyls (PCBs) that are 10 times lower than EPA criteria because they are based on a 10 times higher fish consumption rate (175 versus the 17.5 grams per day used for EPA criteria, and compared to only 6.5 grams per day currently used by Washington from the 1992 National Toxics Rule) [<http://www.deq.state.or.us/wq/standards/toxics.htm>]. The majority (74 percent) of current 303(d) listings for freshwater fish tissue are for two carcinogens: PCBs and dichloro-diphenyl-trichloroethane (DDT; including dichlorodiphenyldichloroethylene [DDE] and dichlorodiphenyldichloroethane [DDD] degradation products). Ecology may choose to use a lower risk factor for some carcinogens, such as the risk factor of 10^{-5} used by Great Lakes states versus EPA's and Washington's current risk factor of 10^{-6} , which would increase criteria for carcinogens and possibly negate a decrease from a revised consumption rate.

Implementation and Compliance Tools

New human health criteria may result in lower discharge permit limits that will be challenging for municipalities and industries to achieve. Recognizing this, Ecology is concurrently revising the water quality standards rule to allow permit compliance while toxic substance source control efforts and technologies are improved. At water quality policy forums, Ecology has provided examples of permitting scenarios for various types of dischargers to 303(d) listed or unlisted waterbody segments. These forums include the following response to a question on the potential impact of new human health criteria to municipal stormwater permittees:

“The most immediate impact would likely be additional 303(d) listed waterbody segments as criteria are implemented (under the current 303(d) listing policy). The current permits contain requirements for discharges to 303(d) listed waterbody segments for which TMDL studies have been completed and approved by EPA. These requirements contain a series of actions for permittees to take if the TMDL identifies municipal stormwater discharges as a cause of or contributor to the impairment, and if the actions for the stormwater system go beyond the regular permit requirements. Ecology incorporates them when reissuing the permit, unless there is a compelling reason to bring them in sooner. Actions required in the permits provide a path for permittees to address situations where criteria are exceeded in waters. Permittees that follow this path are not in violation of the permit.”

Initially, increased listings of impaired water body segments would not require additional actions by municipal stormwater permittees unless Ecology determines that stormwater treatment requirements currently defined as AKART in stormwater manuals are no longer protective of

water quality. However, new TMDL implementation plans resulting from those listings ultimately may require additional source control, treatment, and monitoring by municipal stormwater permittees.

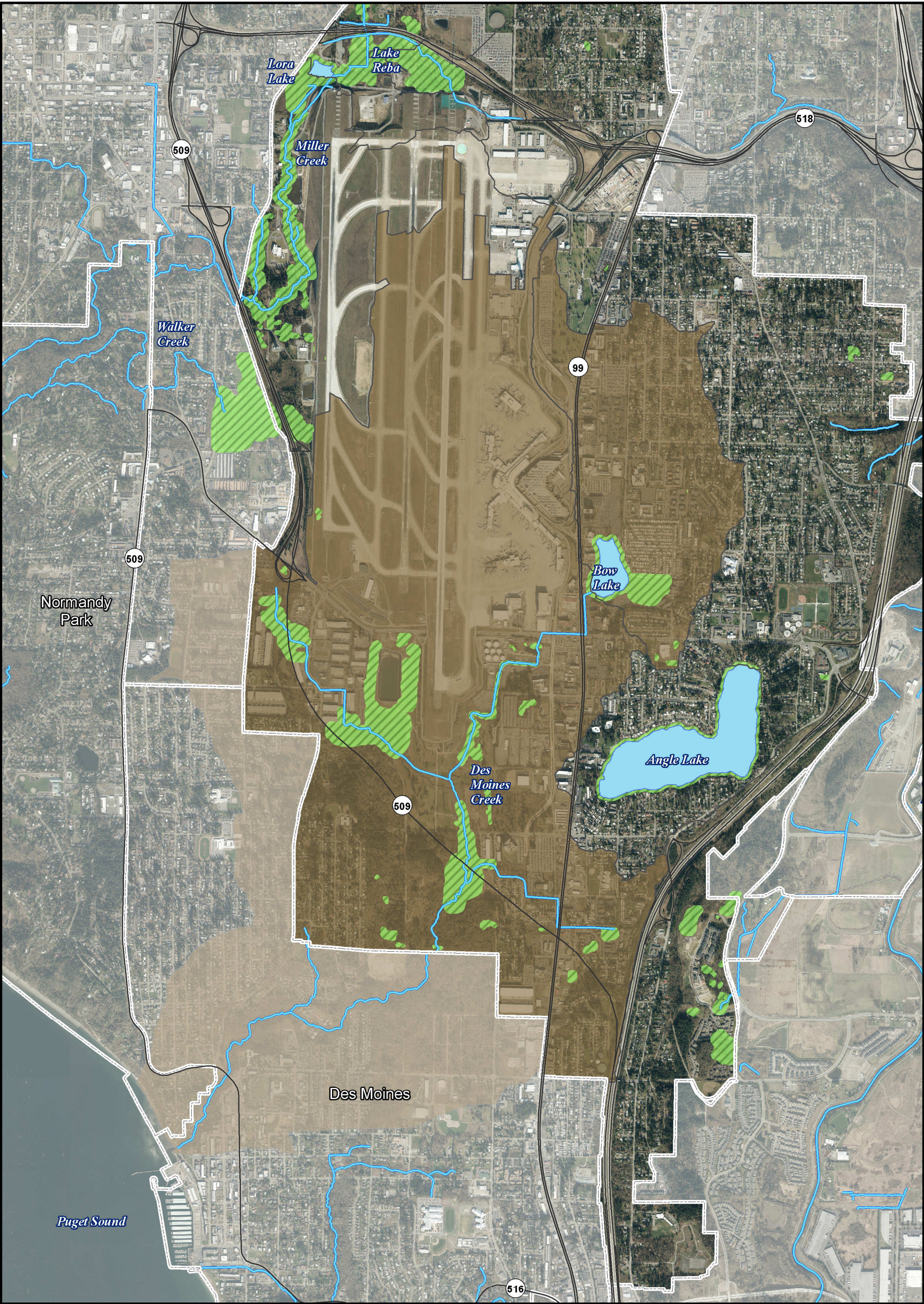
Adoption of human health criteria is not likely to increase 303(d) listings for conventional, microbial, and inorganic substances because either these parameters do not have human health criteria or the human health criteria are higher than the aquatic life criteria. Exceptions include arsenic that typically exceeds EPA human health criteria but not aquatic life criteria in surface waters, and manganese that often exceeds human health criteria in surface waters and has no aquatic life criteria. Adoption of human health criteria is likely to increase 303(d) listings for some organic chemical substances that are detected in surface waters, and either do not have aquatic life criteria or the human health criteria are lower than the aquatic life criteria, and commonly observed concentrations. Examples (and the associated human health criterion for organism only) include bis(2-ethylhexyl) phthalate (2.2 micrograms per liter [$\mu\text{g/L}$]), several polycyclic aromatic hydrocarbons (0.018 $\mu\text{g/L}$), and total PCBs (0.000064 $\mu\text{g/L}$).

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APPENDIX C

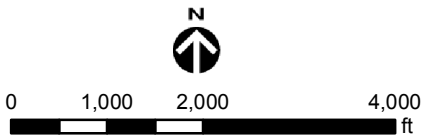
Drainage Basin Maps



Legend

- Highway
- City boundary
- Lake
- Stream
- Wetland
- Des Moines Creek

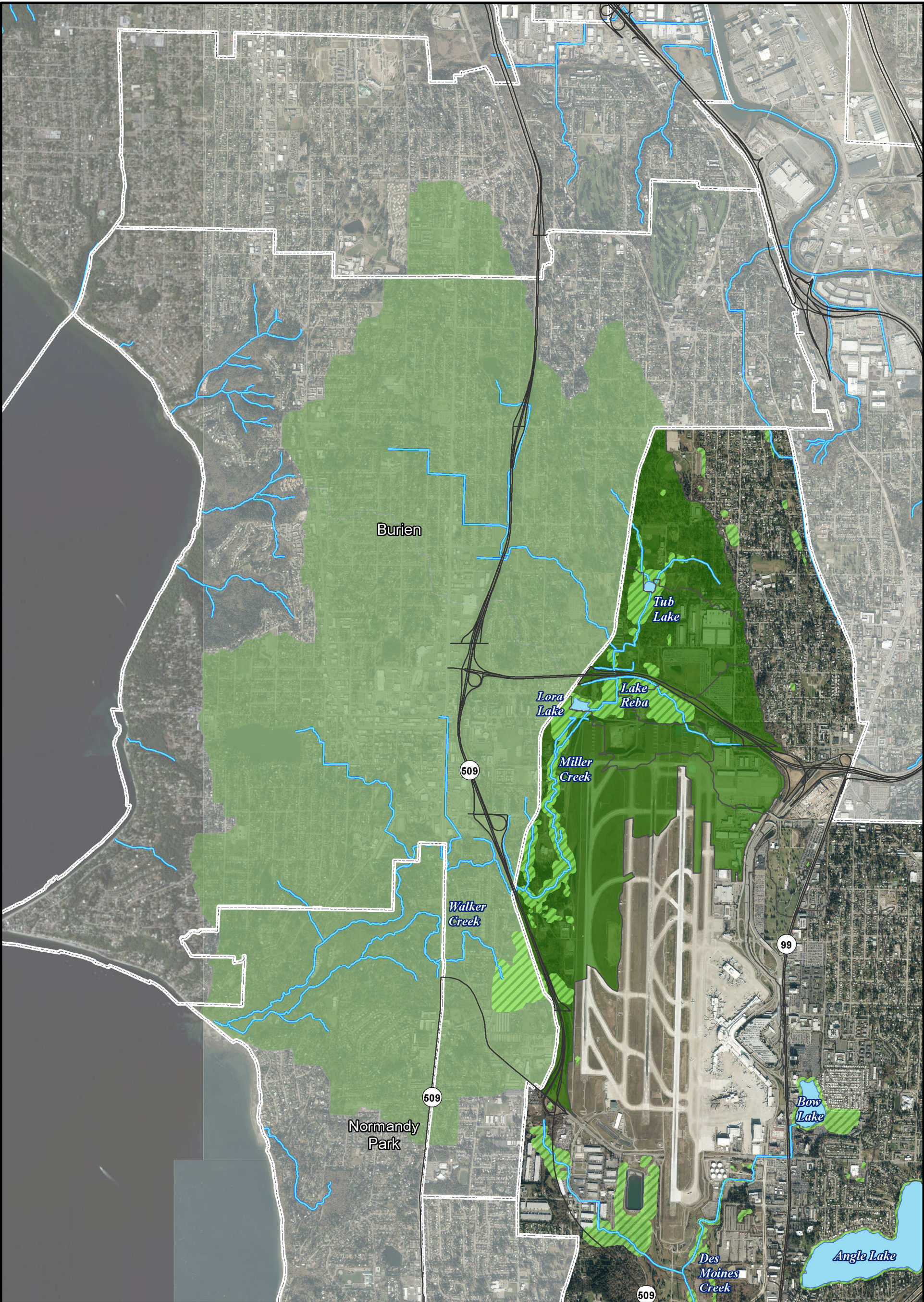
Figure C-1.
Des Moines Creek Drainage Basin.



HERRERA

Coordinates: NAD 1983
Washington State Plane North FIPS 4601 Feet
Aerial: Seatac (2010)

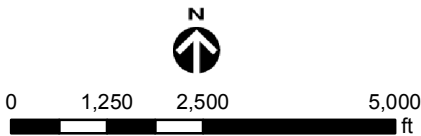
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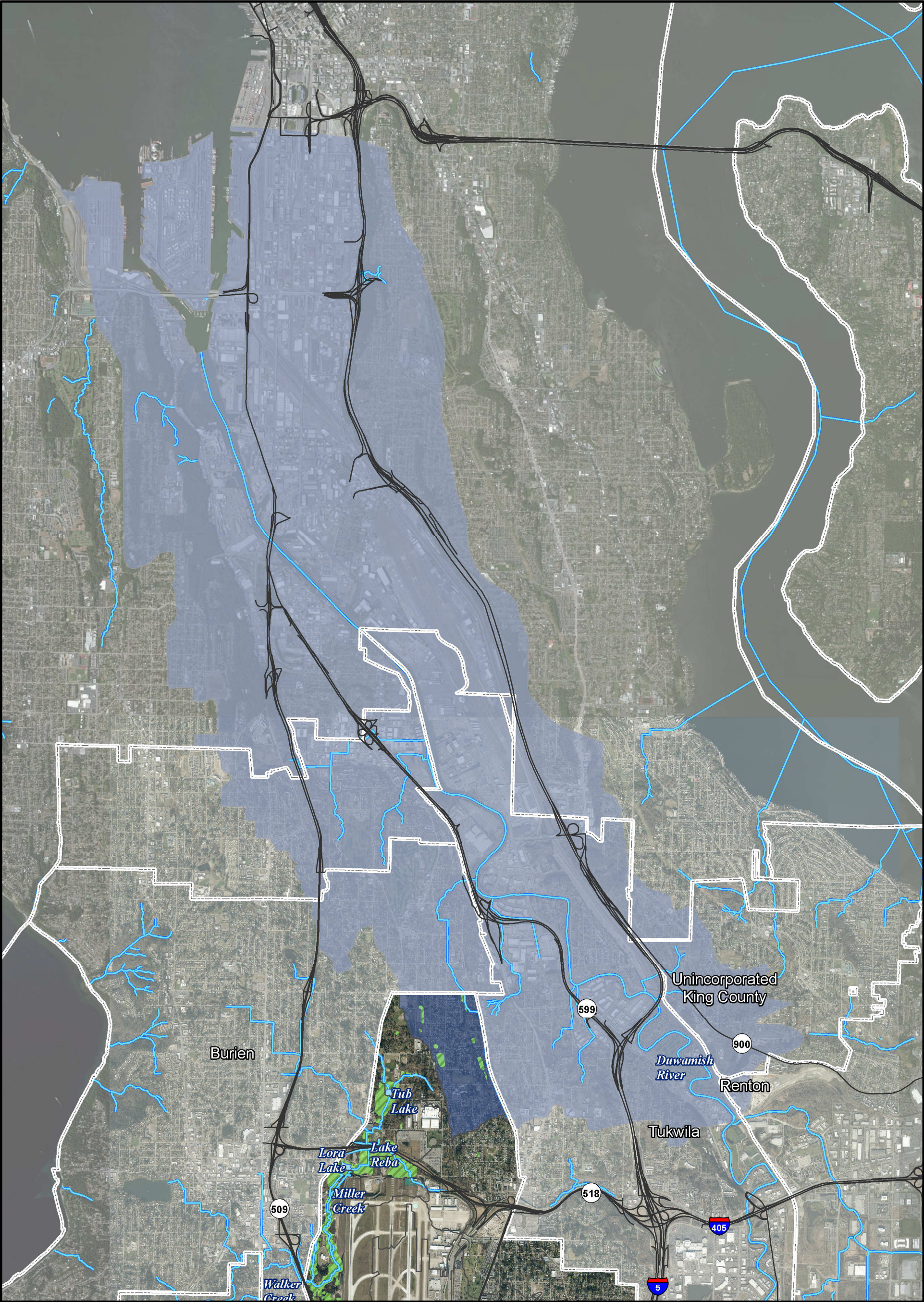
- Highway
- City boundary
- Lake
- Stream
- Wetland
- Miller/Walker

Figure C-2.
Miller/Walker Drainage Basin.




Coordinates: NAD 1983
Washington State Plane North FIPS 4601 Feet
Aerial: Seatac (2010)

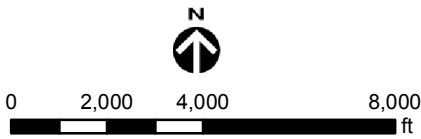
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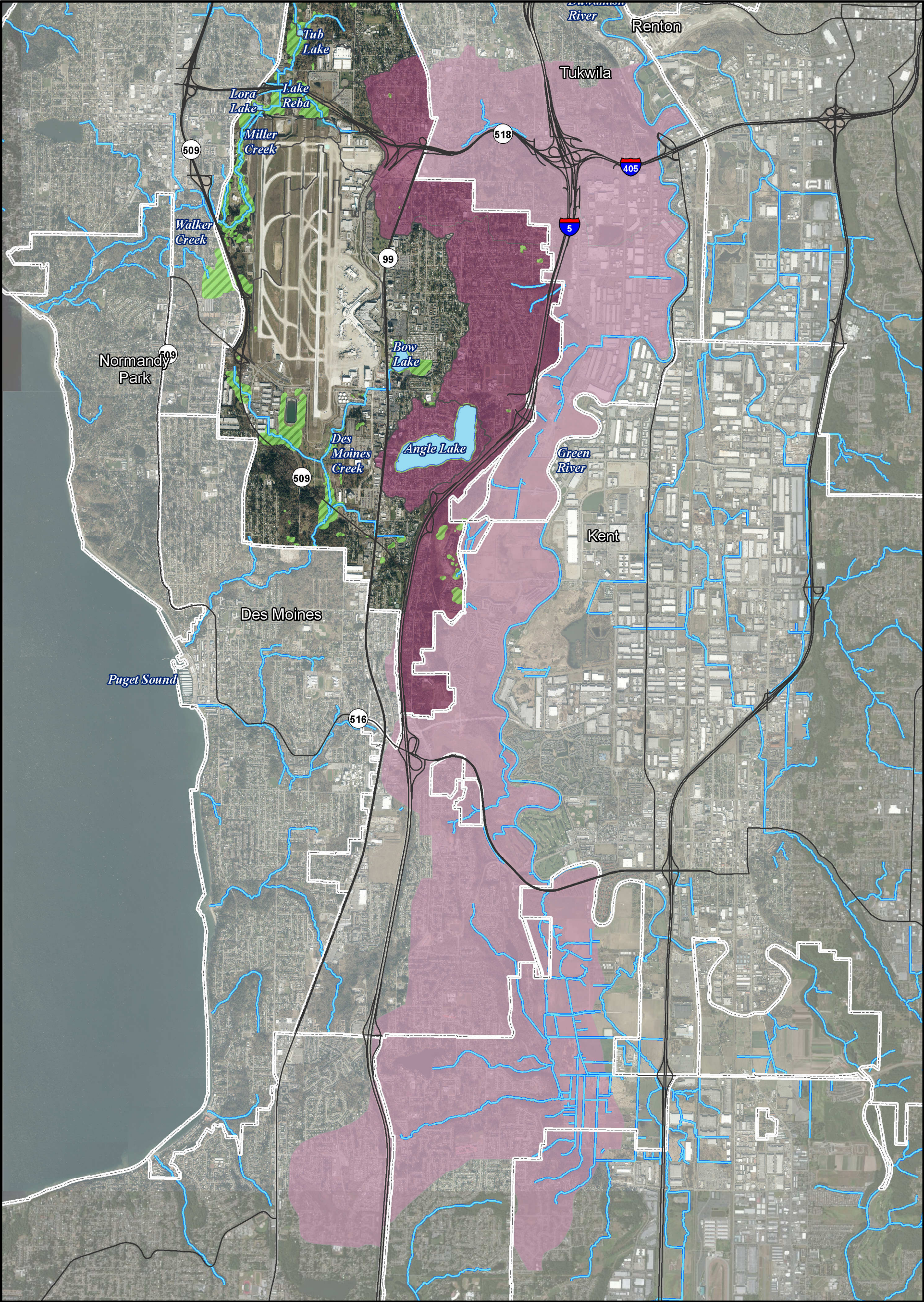
- Highway
- City boundary
- Lake
- Stream
- Wetland
- Duwamish River

Figure C-3.
Duwamish River Drainage Basin.




Coordinates: NAD 1983
Washington State Plane North FIPS 4601 Feet
Aerial: Seatac (2010)

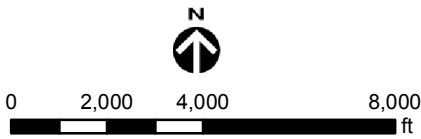
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Legend

- Highway
- City boundary
- Lake
- Stream
- Wetland
- Lower Green River

Figure C-4.
Lower Green River Drainage Basin.




Coordinates: NAD 1983
Washington State Plane North FIPS 4601 Feet
Aerial: Seatac (2010)

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APPENDIX D

Analysis of Stormwater Related Expenses in Transportation CIP Projects

This appendix summarizes an analysis performed on City of SeaTac (City) transportation capital improvement program (CIP) projects to determine the portion of the total cost that can be attributed to stormwater-related improvements. The City will use this information to determine whether the surface water utility should contribute funds to the stormwater-related portion of transportation CIP projects. The four projects analyzed in this effort include:

- ST-078 – Military Road S (S 176th through S 188th) (Table D-1)
- ST-130 – S 154th St. Improvements (Table D-2)
- ST-827 – S 138th St. Pedestrian Improvements (Table D-3)
- ST-828 – S 164th St. Sidewalk Improvements (Table D-4)

The following general components are considered stormwater-related in the above projects:

Earthwork

- Removing drainage structures and pipes
- Shoring and extra excavation for vaults
- Storm sewer pipes
- Adjust manhole and catch basins
- Quarry spalls

Structures

- Vaults

Drainage Structures ¹

- Catch basin, manhole, inlet, clean out and associated items
- Storm sewer pipe and underdrain pipe
- Connections to existing stormwater structures
- Pervious concrete

¹ Drainage structures include all structures through which stormwater is meant to flow. Installation of porous concrete driveways and sidewalks was considered a stormwater improvement and contributed to the percentage of stormwater related project costs. This is also a transportation improvement, however, porous concrete was used to increase stormwater infiltration, and may not have been used in this project had the intent been solely based on transportation purposes.

Erosion Control and Water Pollution Control ²

- Erosion and Sediment Control (ESC) Lead
- Erosion/Water Pollution Control
- Preparation of the Stormwater Pollution Prevention Plan (SWPPP)
- Silt fence
- Inlet protection and catch basin inserts
- Wattle

The unit cost and total quantity of the above items for each of the four transportation CIP projects were used to calculate the contribution of stormwater-related improvements for each project.

Stormwater related expenses from these four transportation CIP projects ranged from 16 to 34 percent of the total project cost, averaging 25 percent of the total transportation CIP project cost.

² Temporary erosion and sediment control related to stormwater items only includes items that are specific to the construction of stormwater improvements.

Table D-1. Stormwater-Related Components of ST-078 – Military Road S (S 176th through S 188th).

Item #	Item Description	Unit	Quantity	Unit Cost	Total Cost
A-23	Shoring or Extra Excavation Class A, North Vault	LS	1.00	\$93,350.00	\$93,350.00
A-24	Shoring or Extra Excavation Class A, South Vault	LS	1.00	\$183,100.00	\$183,100.00
A-25	Shoring or Extra Excavation Class B	SF	7,307.08	\$0.25	\$1,826.77
A-26	Gravel Borrow Incl. Haul for Storm Drainage	TON	229.13	\$54.25	\$12,430.30
A-37	Schedule A Storm Sewer Pipe 12 In. Diam.	LF	2,418.50	\$47.00	\$113,669.50
A-38	Suctile Iron Storm Sewer Pipe, 12 In. Diam. CI 52	LF	1,198.70	\$59.35	\$71,142.85
A-39	Adjust Manhole	EA	8.00	\$275.00	\$2,200.00
A-40	Adjust Catch Basin	EA	3.00	\$275.00	\$825.00
A-41	Concrete Inlet	EA	28.00	\$925.00	\$25,900.00
A-42	Catch Basin Type `	EA	23.00	\$950.00	\$21,850.00
A-43	Catch Basin Type 2- 48 In. Diam.	EA	13.00	\$2,285.00	\$29,705.00
A-44	Catch Basin Type 2- 54 In. Diam. W/ Flow Cntl. Structure	EA	2.00	\$5,525.00	\$11,050.00
A-45	Connection to Drainage Structure	EA	20.00	\$858.00	\$17,160.00
A-46	Solid Locking Cover	EA	4.00	\$490.00	\$1,960.00
A-47	Stormwater Quality Filter, North	LS	1.00	\$24,300.00	\$24,300.00
A-48	Stormwater Quality Filter, South	LS	1.00	\$30,800.00	\$30,800.00
A-49	Stormwater Vault, North	LS	1.00	\$126,000.00	\$126,000.00
A-50	Stormwater Vault, South	LS	1.00	\$120,000.00	\$120,000.00
A-52	Erosion/ Water Pollution Control	FA	0.24	\$25,000.00	\$5,930.00
A-53	Inlet Protection	EA	31.00	\$75.00	\$2,325.00
A-55	Silt Fence	LF	490.00	\$6.00	\$2,940.00
A-57	Preparation and Maintenance of SWPPP	LS	1.00	\$12,000.00	\$12,000.00
Storm Drainage Total					\$910,500
Project Total					\$5,615,000
% Stormwater-Related					16%

Table D-2. Stormwater-Related Components of ST-130 – S 154th St. Improvements.

Item #	Item Description	Unit	Quantity	Unit Cost	Total Cost
20	Removing Drainage Structure	EA	8	\$400.00	\$3,200.00
21	Removing Storm Drainage Pipe	LF	1,323	\$10.00	\$13,230.00
32	Shoring or Extra Excavation Class B for Storm Drainage	SF	15,110	\$0.40	\$6,043.80
33	Shoring for Detention Vault 1	LS	1	\$37,000.00	\$37,000.00
34	Shoring for Detention Vault 2	LS	1	\$48,000.00	\$48,000.00
35	Shoring for Detention Vault 3	LS	1	\$48,000.00	\$48,000.00
48	Detention Vault #1	LS	1	\$150,000.00	\$150,000.00
49	Detention Vault #2	LS	1	\$184,657.00	\$184,657.00
50	Detention Vault #3	LS	1	\$174,808.00	\$174,808.00
53	Underdrain Pipe	LF	1223	\$25.00	\$30,575.00
54	Clean Out	EA	15	\$300.00	\$4,500.00
55	Trash Rack	EA	1	\$500.00	\$500.00
56	Concrete Inlet	EA	2	\$600.00	\$1,200.00
57	Catch Basin Type 1	EA	19	\$750.00	\$14,250.00
58	Catch Basin Type 2-48 In. Diam.	EA	15	\$3,000.00	\$45,000.00
61	Corrugated Polyethylene Storm Sewer Pipe 12 In. Diam.	LF	2596	\$35.34	\$91,742.64
62	Corrugated Polyethylene Storm Sewer Pipe 18 In. Diam.	LF	136.5	\$50.00	\$ 6,825.00
63	Ductile Iron Storm Sewer Pipe 12 In. Diam.	LF	410	\$40.00	\$16,400.00
64	Connect to Existing Drainage Structure	EA	2	\$500.00	\$1,000.00
65	Adjust Catch Basin	EA	4	\$300.00	\$1,200.00
66	Adjust Manhole	EA	32	\$700.00	\$22,400.00
67	Plug Existing Bridge Drain	EA	8	\$250.00	\$2,000.00
68	Water Quality Manhole 1	LS	1	\$40,000.00	\$40,000.00
69	Water Quality Manhole 2	LS	1	\$62,000.00	\$62,000.00
70	Cleaning Existing Drainage Structures	LS	1	\$3,000.00	\$3,000.00

Table D-2 (continued). Stormwater-Related Components of ST-130 – S 154th St. Improvements.

Item #	Item Description	Unit	Quantity	Unit Cost	Total Cost
71	Gravel Backfill for Foundation	CY	2,019.74	\$24.00	\$48,473.76
72	Plugging Existing Pipe	EA	5	\$250.00	\$1,250.00
74	ESC Lead	DAY	3.73	\$70.00	\$260.75
75	Erosion/ Water Pollution Control	EST	0.37	\$30,000.00	\$10,961.68
77	TESC/ SWPPP	LS	1	\$5,000.00	\$5,000.00
78	Silt Fence	LF	1,474	\$7.00	\$10,318.00
80	Wattle	LF	736	\$6.00	\$4,416.00
81	Catch Basin Insert	EA	24	\$60.00	\$1,440.00
179	(CO #3) Detention Vault Changes	LS	1	\$24,811.42	\$24,811.42
Storm Drainage Total					\$1,114,000
Project Total					\$4,545,000
% Stormwater-Related					25%

Table D-3. Stormwater-Related Components of ST-827 – S 138th St. Pedestrian Improvements.

Item #	Item Description	Unit	Quantity	Unit Cost	Total Cost
3	Removing Drainage Structure	LS	12	\$261.00	\$3,132.00
5	Remove Existing Pip	LF	1890	\$10.45	\$19,750.50
9	Concrete Inlet	EA	8	\$1,013.00	\$8,104.00
10	Quarry Spalls	TON	10.87	\$34.90	\$379.36
11	Underdrain Pipe 6 In Diam.	LF	110	\$18.85	\$2,073.50
12	Cleanout	EA	8	\$127.00	\$1,016.00
13	Yard Drain	EA	1	\$1,564.00	\$1,564.00
14	Catch Basin Type 1	EA	11	\$1,226.00	\$13,486.00
15	Catch Basin Type 2- 54 In.	EA	7	\$2,574.00	\$18,018.00
16	Polyvinyl Chloride SDR-35, 8 In. Diam	LF	473	\$23.85	\$11,281.05
17	Corrugated Polyethylene Storm Sewer Pipe 12 In. Diam.	LF	1068	\$38.50	\$41,118.00
18	Corrugated Polyethylene Storm Sewer Pipe 18 In. Diam.	LF	428.5	\$53.00	\$22,710.50
19	Ductile Iron Storm Sewer Pipe 12 In. Diam.	LF	326	\$51.90	\$16,919.40
20	Ductile Iron Storm Sewer Pipe 18 In. Diam.	LF	18	\$106.80	\$1,922.40
21	Ductile Iron Storm Sewer Pipe 24 In. Diam	LF	52	\$106.60	\$5,543.20
22	Media Filter Catchbasin With Two 27 In. Cartridges	EA	1	\$15,689.00	\$15,689.00
23	Media Filter Catchbasin With Two 18 In. Cartridges	EA	1	\$12,701.00	\$12,701.00
24	Media Filer Catch Basin with Three 27 In. Cartidges	EA	1	\$19,006.00	\$19,006.00
25	Structure Excavation Class A Incl. Haul	CY	23	\$36.20	\$832.60
38	Silt Fence	LF	3178	\$3.08	\$9,788.24
39	ESC Lead	DAY	12	\$19.00	\$228.00
41	Inlet Protection	EA	19	\$41.95	\$797.05
42	Erosion/Water Pollution Control	LS	0.1913	\$16,000.00	\$3,060.80
55	Adjust Manhole	ES	11	\$288.00	\$3,168.00
56	Adjust Catch Basin	ES	3	\$288.00	\$864.00

Table D-3 (continued). Stormwater-Related Components of ST-827 – S 138th St. Pedestrian Improvements.

Item #	Item Description	Unit	Quantity	Unit Cost	Total Cost
66	Porous Cement Conc. Driveway Entrance	SY	699.38	\$41.60	\$29,094.21
77	Connection to Drainage Structure	ES	5	\$172.00	\$860.00
80	Porous Concrete Sidewalk	SY	1328.09	\$38.50	\$51,131.47
81	Drain Rock Base Course	TON	1087.7	\$34.90	\$37,960.73
Storm Drainage Total					\$352,200
Project Total					\$1,046,000
% Stormwater-Related					34%

Table D-4. Stormwater-Related Components of ST-828 – S 164th St. Sidewalk Improvements.

Item #	Item Description	Unit	Quantity	Unit Cost	Total Cost
26	CPEP Storm Sewer Pipe, 12 In. Diam.	LF	1108	\$20.43	\$22,636.44
27	CPEP Storm Sewer Pipe, 36 In. Diam.	LF	90	\$110.00	\$9,900.00
28	DI CI 50 Storm Sewer Pipe, 8 In. Diam.	LF	38	\$65.00	\$2,470.00
29	DI CI 50 Storm Sewer Pipe, 12 In. Diam.	LF	514	\$58.59	\$30,115.26
32	Concrete Inlet	EA	3	\$650.00	\$1,950.00
33	Catch Basin Type 1	EA	15	\$770.00	\$11,550.00
34	Storm Manhole, 48 In. Diam. w/ Treatment	EA	0.8	\$21,000.00	\$16,800.00
35	Catch Basin Type 2, 60 In. Diam.	EA	1	\$3,000.00	\$3,000.00
36	Catch Basin Type 2, 60 In. Diam. w/ Flow Control	EA	1	\$4,000.00	\$4,000.00
37	Connection to Drainage Structure	EA	2	\$700.00	\$1,400.00
38	Adjust Catch Basin	EA	1	\$300.00	\$300.00
39	Adjust Manhole	EA	1	\$500.00	\$500.00
40	Trench Excavation Safety System	SF	1872.5	\$2.00	\$3,745.00
45	Stormwater Permit Compliance	LS	0.5	\$3,500.00	\$1,750.00
46	Erosion/Water Pollution Control	FA	0.04	\$15,000.00	\$618.57
47	Inlet Protection	EA	25	\$55.00	\$1,375.00
48	Silt Fence	LF	1100	\$6.50	\$7,150.00
55	Pervious Concrete Driveway Entrance	SY	898.07	\$44.94	\$40,359.27
60	Pervious Concrete Sidewalk	SY	976.67	\$30.45	\$29,739.60
62	Quarry Spalls	TN	10.1	\$40.00	\$404.00
Storm Drainage Total					\$189,800
Project Total					\$688,500
% Stormwater-Related					28%

APPENDIX E

CIP Project Summary Sheets and Cost Estimates

CITY OF SEATAC

2014 - 2019 CAPITAL IMPROVEMENT PROGRAM

PROJECT STATUS (Check all that apply) :

Conceptual Est	<input checked="" type="checkbox"/>	P.S.E. Complete	<input type="checkbox"/>
Design	<input type="checkbox"/>	Construction	<input type="checkbox"/>

PROJECT NUMBER:

SD CIP #1

Department	Public Works
Program	Storm Water
Prepared By	
Department Priority	1 of 5
City Priority	of

PROJECT TITLE: Military Road S – S 150th Street to S 152nd Street Drainage Improvements

LOCATION: Military Road S between S 150th Street and S 152nd Street

DESCRIPTION: Spot drainage problems along Military Road S and in parking lots between Taco Time, Alhidaya Halal Grocery, and Marwa. The recommended solution is to implement a long term solution for the flooding problems in the ROW and private parking lots in conjunction with the transportation project ST-125. The 1997 SeaTac Surface Water Plan recommended upsizing the storm drain pipe along Military Road to 24-inch diameter.



BARS NO.:

EXPENDITURE SCHEDULE

Capital Costs	Total Prior Years	2014	2015	2016	2017	2018	2019	2014-2019 TOTAL	Total Future Years	Total Project
Plng/Design/Eng	-	90,000		-	-	-	-	90,000	-	90,000
Land Acquis/Impr	-	-	-	-	-	-	-	-	-	-
Construction/Impr	-	-	550,000	-	-	-	-	550,000	-	550,000
Other/Equipment	-	-	-	-	-	-	-	-	-	-
Sales Tax (9.5%)	-	-	-	-	-	-	-	-	-	-
Contingency (20%)	-	-	110,000	-	-	-	-	110,000	-	110,000
Total Capital	-	90,000	660,000	-	-	-	-	750,000	-	750,000
Operating Costs/Revenue Adjustments										
Salaries/Benefits	-	-	-	-	-	-	-	-	-	-
Supplies	-	-	-	-	-	-	-	-	-	-
Utilities	-	-	-	-	-	-	-	-	-	-
Equipment	-	-	-	-	-	-	-	-	-	-
Other: _____	-	-	-	-	-	-	-	-	-	-
Chg in Revenues	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Total Op/Rev Adj	-	-	-	-	-	-	-	-	-	-
New FTE's	-	-	-	-	-	-	-	-	-	-

FINANCING SCHEDULE

Funding Source	Total Prior Years	2014	2015	2016	2017	2018	2019	2014-2019 TOTAL	Total Future Years	Total Project
Asset Sales	-	-	-	-	-	-	-	-	-	-
GMA Impact Fees	-	-	-	-	-	-	-	-	-	-
Parking Taxes	-	-	-	-	-	-	-	-	-	-
REET - 1st Qtr %	-	-	-	-	-	-	-	-	-	-
REET - 2nd Qtr %	-	-	-	-	-	-	-	-	-	-
Sales Taxes	-	-	-	-	-	-	-	-	-	-
Storm Drainage Fees	-	-	-	-	-	-	-	-	-	-
Fed Grt: _____	-	-	-	-	-	-	-	-	-	-
St Grt: _____	-	-	-	-	-	-	-	-	-	-
Loc Grt: _____	-	-	-	-	-	-	-	-	-	-
Fund Balance # _____	-	-	-	-	-	-	-	-	-	-
Total Funding	-	-	-	-	-	-	-	-	-	-

POLICY BASIS: Comprehensive Plan: Goal 8.1

CRITERIA	PROJECT IMPACTS	CRITERIA RANKING (<i>Check One</i>)
Problem Risk	Minor improvements have been made which has reduced the frequency of flooding in the ROW, however a long term fix is still needed to address flooding along this arterial street.	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low
Data Quality	Observations by City Staff.	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Low
Funding Potential	Funding available through Transportation CIP (TIP) ST-125.	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low
Program Efficiency	Included in Transportation CIP (TIP) ST-125 in an effort to minimize overall cost.	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low
Project Classification	<input type="checkbox"/> Maintenance <input type="checkbox"/> Replacement <input checked="" type="checkbox"/> Upgrade <input type="checkbox"/> Expansion	

CONSTRAINTS / ASSUMPTIONS

TRIGGERS (<i>Project Prerequisites</i>)

ADDITIONAL PROJECT INFORMATION/JUSTIFICATION (<i>As Needed</i>)
Transportation CIP ST-125 will widen existing roadway, construct sidewalks, pavement overlay, street lighting, undergrounding of aerial utilities, landscaping, and storm drainage.

Herrera Environmental Consultants, Inc.

12-05401-000

CLIENT: City of SeaTac**PROJECT:** Surface Water Comprehensive Plan - CIP Cost Estimates**Description:** Replace storm drain**Site ID:** SD CIP #1

Prepared by: K. Matsumura

6/26/2013

Checked by: M. Fontaine

6/28/2013

Table E-1. Conceptual Design Cost Estimate.

Item	Quantity	Unit	Unit Cost	Amount	Source	Notes
Replace 12-inch storm drain pipe with 18-inch	1	LS	\$550,000	\$550,000	City direction	
<i>TOTAL CONSTRUCTION</i>				\$550,000		
<i>OTHER PROJECT COSTS</i>						
Planning/Design/Engineering			16%	\$90,000		
Contingency			20%	\$110,000		
<i>TOTAL ESTIMATED PROJECT COST</i>				\$750,000		

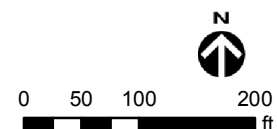


Legend

- Unknown Type CB/MH
- CB Type 1/1L
- CB Type 2/3
- MH
- Main Pipes
- Culverts
- Laterals
- Ditch
- Parcel boundary
- 20-ft Contour (KCGIS)

Figure E-1.

Stormwater Infrastructure at Site 1 -
Military Road S and S 152nd Street,
SeaTac, Washington.



Aerial (Bing, 2012)
K:\Projects\Y2012\12-05401-000\Project\vicinity_map.mxd (7/1/2013)

CITY OF SEATAC

2013 - 2018 CAPITAL IMPROVEMENT PROGRAM

PROJECT STATUS (Check all that apply) :

Conceptual Est	<input checked="" type="checkbox"/>	P.S.E. Complete	<input type="checkbox"/>
Design	<input type="checkbox"/>	Construction	<input type="checkbox"/>

PROJECT TITLE: S 204th Street Pond

LOCATION: S 204th Street and 28th Avenue S

DESCRIPTION: This City-owned pond is located near the intersection of S 204th Street and 28th Avenue S. The recommended solution is to modify the outlet of the pond to maximize the pond detention volume.

PROJECT NUMBER: SD CIP #2

Department	Public Works
Program	Storm Water
Prepared By	
Department Priority	2 of 5
City Priority	of



BARS NO.:

EXPENDITURE SCHEDULE

Capital Costs	Total Prior Years	2014	2015	2016	2017	2018	2019	2014-2019 TOTAL	Total Future Years	Total Project
Plng/Design/Eng	-	30,000	-	-	-	-	-	30,000	-	30,000
Land Acquis/Impr	-	-	-	-	-	-	-	-	-	-
Construction/Impr	-	-	200,000	-	-	-	-	200,000	-	200,000
Other/Equipment	-	-	-	-	-	-	-	-	-	-
Sales Tax (9.5%)	-	-	-	-	-	-	-	-	-	-
Contingency (20%)	-	-	40,000	-	-	-	-	40,000	-	40,000
Total Capital	-	30,000	240,000	-	-	-	-	270,000	-	270,000
Operating Costs/Revenue Adjustments										
Salaries/Benefits	-	-	-	-	-	-	-	-	-	-
Supplies	-	-	-	-	-	-	-	-	-	-
Utilities	-	-	-	-	-	-	-	-	-	-
Equipment	-	-	-	-	-	-	-	-	-	-
Other: _____	-	-	-	-	-	-	-	-	-	-
Chg in Revenues	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Total Op/Rev Adj	-	-	-	-	-	-	-	-	-	-
New FTE's	-	-	-	-	-	-	-	-	-	-

FINANCING SCHEDULE

Funding Source	Total Prior Years	2014	2015	2016	2017	2018	2019	2014-2019 TOTAL	Total Future Years	Total Project
Asset Sales	-	-	-	-	-	-	-	-	-	-
GMA Impact Fees	-	-	-	-	-	-	-	-	-	-
Parking Taxes	-	-	-	-	-	-	-	-	-	-
REET - 1st Qtr %	-	-	-	-	-	-	-	-	-	-
REET - 2nd Qtr %	-	-	-	-	-	-	-	-	-	-
Sales Taxes	-	-	-	-	-	-	-	-	-	-
Storm Drainage Fees	-	-	-	-	-	-	-	-	-	-
Fed Grt: _____	-	-	-	-	-	-	-	-	-	-
St Grt: _____	-	-	-	-	-	-	-	-	-	-
Loc Grt: _____	-	-	-	-	-	-	-	-	-	-
Fund Balance # _____	-	-	-	-	-	-	-	-	-	-
Total Funding	-	-	-	-	-	-	-	-	-	-

POLICY BASIS: Comprehensive Plan: Goal 8.1, Policy 8.1A, 8.1E, Goal 8.2, Policy 8.2I

CRITERIA	PROJECT IMPACTS	CRITERIA RANKING (<i>Check One</i>)
Problem Risk	High flow impacts have been observed in downstream reaches of Des Moines Creek.	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low
Data Quality	Problem observed by City staff of pond underutilization. Input received from Des Moines Creek Basin Committee regarding high flow impacts in lower reaches.	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Low
Funding Potential	Contender for water quality grant funding. Although flow control is the primary issue being addressed; the expanded pond storage should also result in a water quality benefit for Des Moines Creek.	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low
Program Efficiency	This pond retrofit could be addressed in conjunction with the upcoming 28th Ave S/ 24th Ave S Transportation CIP project in 2015/2016.	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Low
Project Classification	<input type="checkbox"/> Maintenance <input type="checkbox"/> Replacement <input checked="" type="checkbox"/> Upgrade <input type="checkbox"/> Expansion	

CONSTRAINTS / ASSUMPTIONS

TRIGGERS (*Project Prerequisites*)ADDITIONAL PROJECT INFORMATION/JUSTIFICATION (*As Needed*)

Herrera Environmental Consultants, Inc.

12-05401-000

CLIENT: City of SeaTac**PROJECT:** Surface Water Comprehensive Plan - CIP Cost Estimates**Description:** Add height to outlet, replace birdcage**Site ID:** SD CIP #2

Prepared by: K. Matsumura 4/8/2013

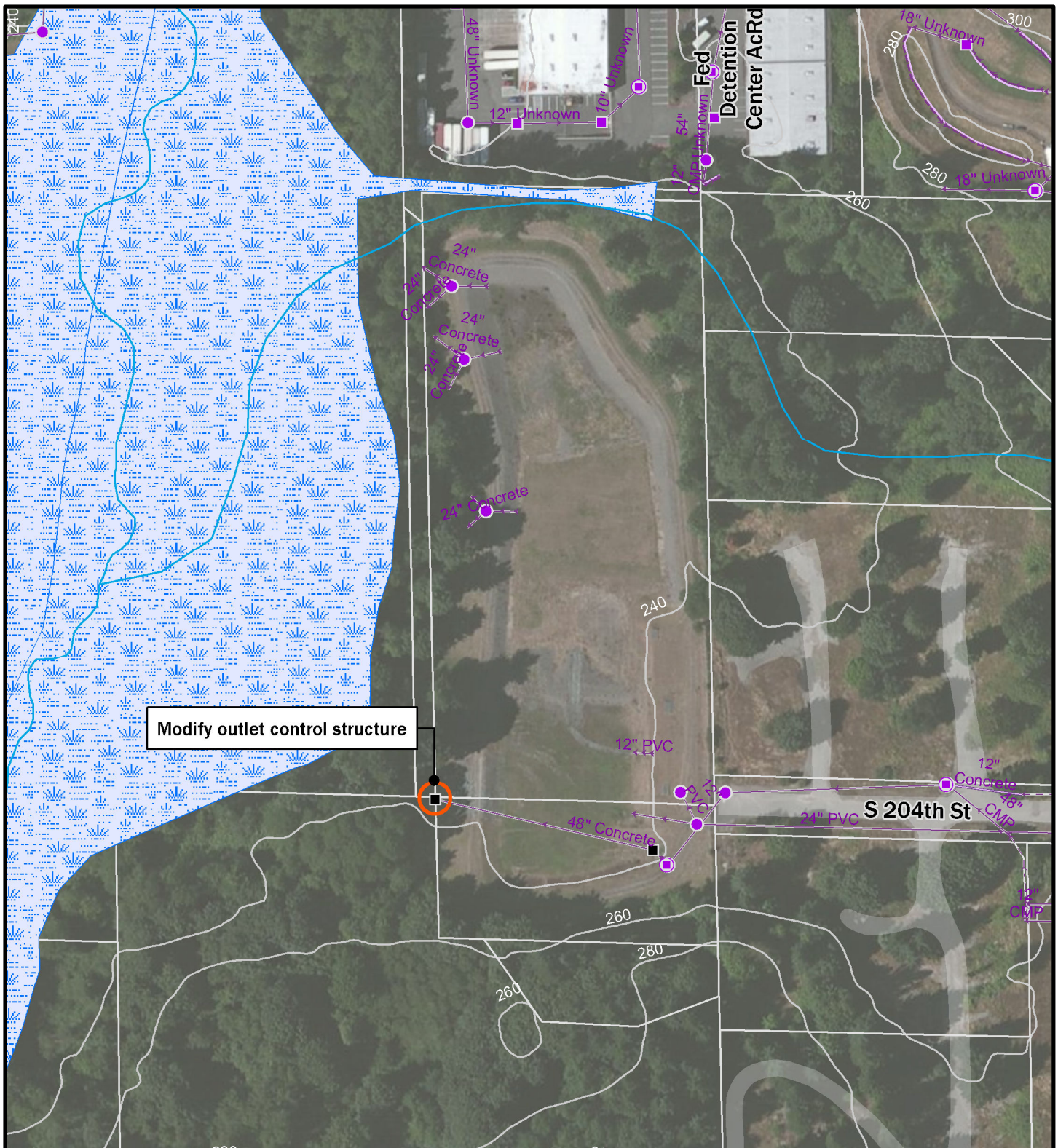
Checked by: M. Ewbank 4/10/2013

Revised by: K. Matsumura 5/28/2013

Checked by: M. Fontaine 5/28/2013

Table E-2. Conceptual Design Cost Estimate.

Item	Quantity	Unit	Unit Cost	Amount	Source	Notes
Modify Outlet	1	LS	\$200,000	\$200,000	City direction	Includes accessibility, clearing, restoration, stormwater bypass, dewatering, and coordination with Des Moines Creek Committee
<i>TOTAL CONSTRUCTION</i>				\$200,000		
<i>OTHER PROJECT COSTS</i>						
Planning/Design/Engineering			15%	\$30,000	City direction	Includes permitting
Contingency			20%	\$40,000	City direction	Extensive modification may be necessary
<i>TOTAL ESTIMATED PROJECT COST</i>				\$270,000		



Legend















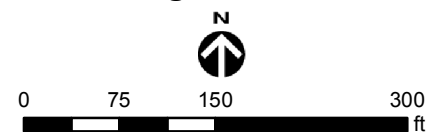
-  Proposed improvement
-  Unknown Type CB/MH
-  CB Type 1/1L
-  CB Type 2/3
-  MH
-  Main Pipes
-  Culverts
-  Bioswales
-  Ditch
-  Stream (KCGIS)
-  Class 2 Stream - Perennial;
Salmonids Use Present
(100' Buffer)
-  Wetland Class 1 (100' Buffer)
-  Parcel boundary
-  20-ft Contour (KCGIS)

Figure E-2.

**Stormwater Infrastructure at Site 2 -
S 204th Street and 39th Avenue S,
SeaTac, Washington.**



Aerial (Bing, 2012)
K:\Projects\Y2012\12-05401-000\Project\vicinity_map.mxd (6/26/2013)

CITY OF SEATAC

2014 - 2019 CAPITAL IMPROVEMENT PROGRAM

PROJECT STATUS (Check all that apply) :

Conceptual Est	<input checked="" type="checkbox"/>	P.S.E. Complete	<input type="checkbox"/>
Design	<input type="checkbox"/>	Construction	<input type="checkbox"/>

PROJECT TITLE: Des Moines Memorial Drive Manhole Replacement

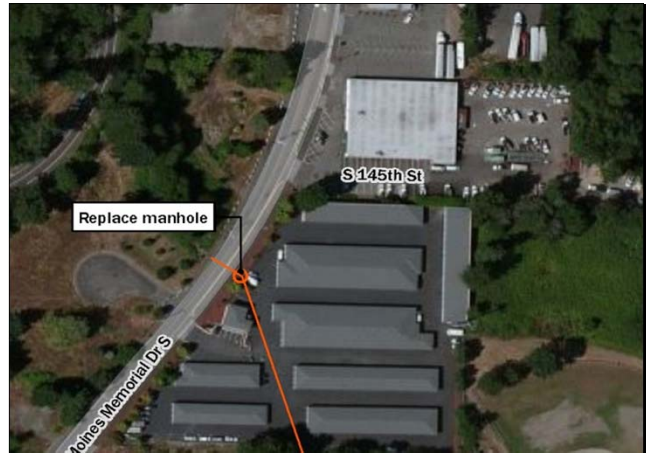
LOCATION: 14460 Des Moines Memorial Drive

DESCRIPTION: Deteriorated manhole structure located between a walking/ biking path and private property in front of 14460 Des Moines Memorial Drive. The recommended solution is to replace the manhole.

PROJECT NUMBER:

SD CIP #3

Department	Public Works
Program	Storm Water
Prepared By	
Department Priority	3 of 5
City Priority	of



BARS NO.:

EXPENDITURE SCHEDULE

Capital Costs	Total Prior Years	2014	2015	2016	2017	2018	2019	2014-2019 TOTAL	Total Future Years	Total Project
Plng/Design/Eng	-	-	-	-	-	30,000	-	30,000	-	30,000
Land Acquis/Impr	-	-	-	-	-	-	-	-	-	-
Construction/Impr	-	-	-	-	-	-	200,000	200,000	-	200,000
Other/Equipment	-	-	-	-	-	-	-	-	-	-
Sales Tax (9.5%)	-	-	-	-	-	-	-	-	-	-
Contingency (20%)	-	-	-	-	-	-	40,000	40,000	-	40,000
Total Capital	-	-	-	-	-	30,000	240,000	270,000	-	270,000
Operating Costs/Revenue Adjustments										
Salaries/Benefits	-	-	-	-	-	-	-	-	-	-
Supplies	-	-	-	-	-	-	-	-	-	-
Utilities	-	-	-	-	-	-	-	-	-	-
Equipment	-	-	-	-	-	-	-	-	-	-
Other: _____	-	-	-	-	-	-	-	-	-	-
Chg in Revenues	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Total Op/Rev Adj	-	-	-	-	-	-	-	-	-	-
New FTE's	-	-	-	-	-	-	-	-	-	-

FINANCING SCHEDULE

Funding Source	Total Prior Years	2014	2015	2016	2017	2018	2019	2014-2019 TOTAL	Total Future Years	Total Project
Asset Sales	-	-	-	-	-	-	-	-	-	-
GMA Impact Fees	-	-	-	-	-	-	-	-	-	-
Parking Taxes	-	-	-	-	-	-	-	-	-	-
REET - 1st Qtr %	-	-	-	-	-	-	-	-	-	-
REET - 2nd Qtr %	-	-	-	-	-	-	-	-	-	-
Sales Taxes	-	-	-	-	-	-	-	-	-	-
Storm Drainage Fees	-	-	-	-	-	-	-	-	-	-
Fed Grt: _____	-	-	-	-	-	-	-	-	-	-
St Grt: _____	-	-	-	-	-	-	-	-	-	-
Loc Grt: _____	-	-	-	-	-	-	-	-	-	-
Fund Balance # _____	-	-	-	-	-	-	-	-	-	-
Total Funding	-	-	-	-	-	-	-	-	-	-

POLICY BASIS: *Comprehensive Plan: Goal 8.2*

CRITERIA	PROJECT IMPACTS	CRITERIA RANKING (<i>Check One</i>)
Problem Risk	Manhole failure could affect arterial street and would affect Miller Creek.	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low
Data Quality	Observations by City staff during previous repairs.	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low
Funding Potential	Manhole failure could affect water quality in Miller Creek.	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Low
Program Efficiency	Complex construction, additional permitting required	<input type="checkbox"/> High <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Low
Project Classification	<input type="checkbox"/> Maintenance <input checked="" type="checkbox"/> Replacement <input type="checkbox"/> Upgrade <input type="checkbox"/> Expansion	

CONSTRAINTS / ASSUMPTIONS

Installation of a new manhole will require (1) additional permitting for work in and near Miller Creek, (2) a high capacity bypass system for flow underneath the structure, (3) construction sequencing to ensure alternate flow pathway around construction, (4) careful construction near pedestrian path, roadway, and private property with possible shoring of roadway.

TRIGGERS (*Project Prerequisites*)

Potential failure of manhole and associated impacts to Miller Creek.

ADDITIONAL PROJECT INFORMATION/JUSTIFICATION (*As Needed*)

This project will prevent further erosion and failures on the neighboring private property (Des Moines Way Self Storage) and the Des Moines Memorial Drive roadway structure.

Herrera Environmental Consultants, Inc.

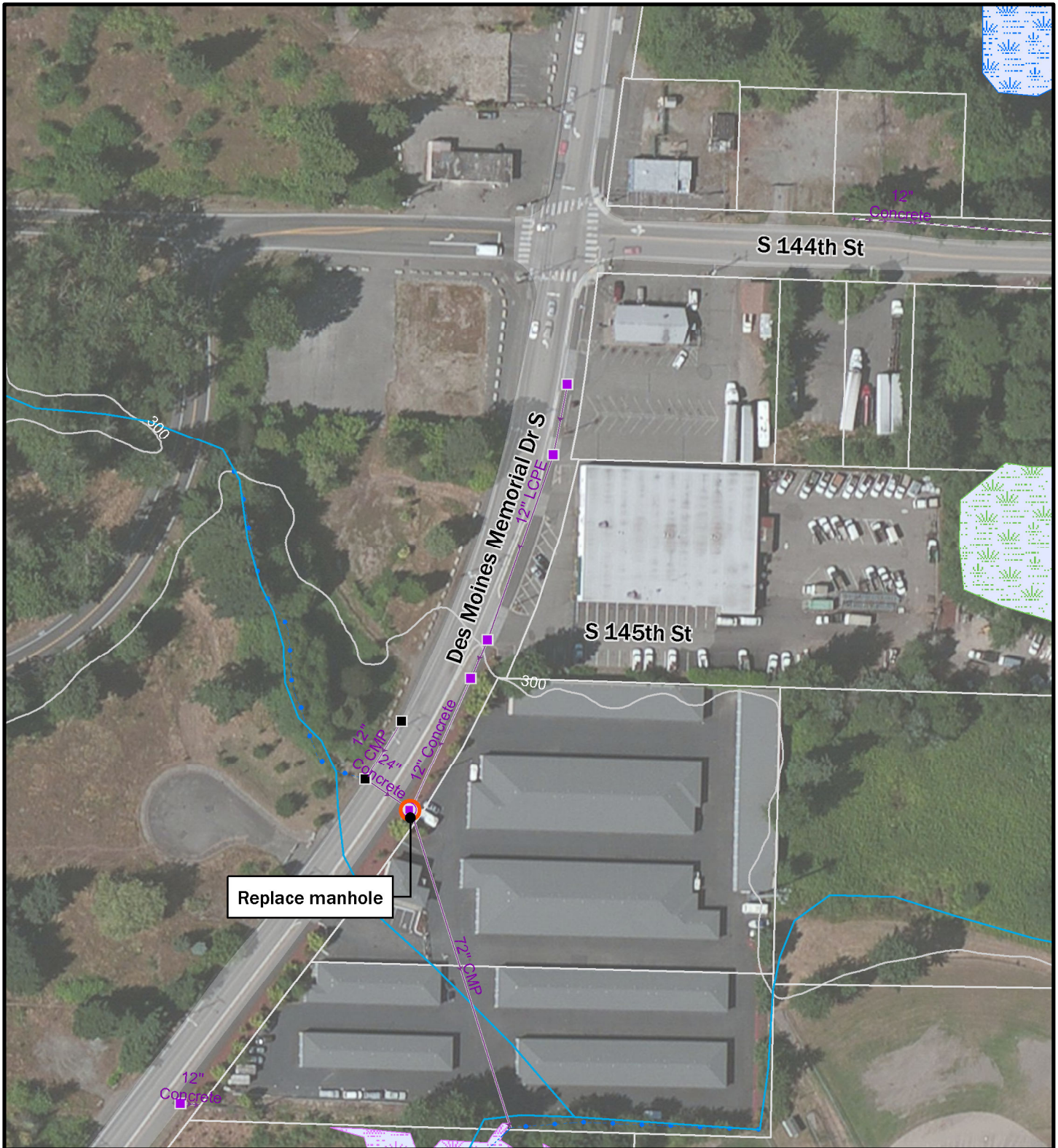
12-05401-000

CLIENT: City of SeaTac**PROJECT:** Surface Water Comprehensive Plan - CIP Cost Estimates**Description:** Replacement of manhole that conveys creek at 14460 Des Moines Memorial Dr**Site ID:** SD CIP #3

Prepared by: K. Matsumura 4/8/2013
Checked by: M. Ewbank 4/10/2013
Revised by: K. Matsumura 5/28/2013
Checked by: M. Fontaine 5/28/2013

Table E-3. Conceptual Design Cost Estimate.

Item	Quantity	Unit	Unit Cost	Amount	Source	Notes
Manhole replacement	1	LS	\$200,000	\$200,000	City direction	Includes traffic control, creek bypass, dewatering, custom manhole structure, and seasonal work limitations
TOTAL CONSTRUCTION				\$200,000		
OTHER PROJECT COSTS						
Planning/Design/Engineering			15%	\$30,000	City direction	Includes permitting for creek and stormwater discharge
Contingency			20%	\$40,000	City direction	Creek bypass complexity, constrained site, and adjacent highway
TOTAL ESTIMATED PROJECT COST				\$270,000		



Legend

- Proposed improvement
- Unknown Type CB/MH
- CB Type 1/1L
- CB Type 2/3
- Main Pipes
- Culverts
- Ditch
- Stream (KCGIS)
- Class 2 Stream - Perennial; Salmonids Use Undetermined (50' Buffer)
- Unclassified Stream (Buffer to be Determined)
- Wetland Class 1 (100' Buffer)
- Wetland Class 2 (50' Buffer)
- Wetland Class 3 (35' Buffer)
- Parcel boundary
- 20-ft Contour (KCGIS)

Figure E-3.
Stormwater Infrastructure at Site 3 -
14460 Des Moines Memorial Drive,
SeaTac, Washington.



Aerial (Bing, 2012)
 K:\Projects\Y2012\12-05401-000\Project\vicinity_map.mxd (6/26/2013)

CITY OF SEATAC

2014 - 2019 CAPITAL IMPROVEMENT PROGRAM

PROJECT STATUS (Check all that apply) :

Conceptual Est	<input checked="" type="checkbox"/>	P.S.E. Complete	<input type="checkbox"/>
Design	<input type="checkbox"/>	Construction	<input type="checkbox"/>

PROJECT TITLE: S 182nd Street Catch Basins

LOCATION: S 182nd Street and 39th Ave S

DESCRIPTION: This site is located at the SE corner of S 182nd Street and 39th Avenue S. Recommended solution includes replacing the catch basin on the SE corner with a double inlet catch basin and installing a new catch basin on the SW corner of the intersection.

PROJECT NUMBER: SD CIP #4

Department	Public Works
Program	Storm Water
Prepared By	
Department Priority	4 of 5
City Priority	of



BARS NO.:

EXPENDITURE SCHEDULE

Capital Costs	Total Prior Years	2014	2015	2016	2017	2018	2019	2014-2019 TOTAL	Total Future Years	Total Project
Plng/Design/Eng	-	2,000	-	-	-	-	-	2,000	-	2,000
Land Acquis/Impr	-	-	-	-	-	-	-	-	-	-
Construction/Impr	-	-	9,000	-	-	-	-	9,000	-	9,000
Other/Equipment	-	-	-	-	-	-	-	-	-	-
Sales Tax (9.5%)	-	-	-	-	-	-	-	-	-	-
Contingency (20%)	-	-	2,000	-	-	-	-	2,000	-	2,000
Total Capital	-	2,000	11,000	-	-	-	-	13,000	-	13,000
Operating Costs/Revenue Adjustments										
Salaries/Benefits	-	-	-	-	-	-	-	-	-	-
Supplies	-	-	-	-	-	-	-	-	-	-
Utilities	-	-	-	-	-	-	-	-	-	-
Equipment	-	-	-	-	-	-	-	-	-	-
Other: _____	-	-	-	-	-	-	-	-	-	-
Chg in Revenues	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Total Op/Rev Adj	-	-	-	-	-	-	-	-	-	-
New FTE's	-	-	-	-	-	-	-	-	-	-

FINANCING SCHEDULE

Funding Source	Total Prior Years	2014	2015	2016	2017	2018	2019	2014-2019 TOTAL	Total Future Years	Total Project
Asset Sales	-	-	-	-	-	-	-	-	-	-
GMA Impact Fees	-	-	-	-	-	-	-	-	-	-
Parking Taxes	-	-	-	-	-	-	-	-	-	-
REET - 1st Qtr %	-	-	-	-	-	-	-	-	-	-
REET - 2nd Qtr %	-	-	-	-	-	-	-	-	-	-
Sales Taxes	-	-	-	-	-	-	-	-	-	-
Storm Drainage Fees	-	-	-	-	-	-	-	-	-	-
Fed Grt: _____	-	-	-	-	-	-	-	-	-	-
St Grt: _____	-	-	-	-	-	-	-	-	-	-
Loc Grt: _____	-	-	-	-	-	-	-	-	-	-
Fund Balance # _____	-	-	-	-	-	-	-	-	-	-
Total Funding	-	-	-	-	-	-	-	-	-	-

POLICY BASIS: Comprehensive Plan: Goal 8.1

CRITERIA	PROJECT IMPACTS	CRITERIA RANKING (<i>Check One</i>)
Problem Risk	Catch basin on SE side of intersection is suspected of clogging. Resulting flooding is a private property drainage issue, however it can be addressed in the ROW. Localized flooding does not appear to be significant.	<input type="checkbox"/> High <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Low
Data Quality	Problem observed by City staff. Problem included in the 1997 Surface Water Plan.	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Low
Funding Potential	Conveyance only.	<input type="checkbox"/> High <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Low
Program Efficiency	May be addressed through the spot drainage repair program in conjunction with a pavement overlay transportation CIP project.	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Low
Project Classification	<input type="checkbox"/> Maintenance <input type="checkbox"/> Replacement <input checked="" type="checkbox"/> Upgrade <input type="checkbox"/> Expansion	

CONSTRAINTS / ASSUMPTIONS

TRIGGERS (*Project Prerequisites*)ADDITIONAL PROJECT INFORMATION/JUSTIFICATION (*As Needed*)

Herrera Environmental Consultants, Inc.

12-05401-000

CLIENT: City of SeaTac

PROJECT: Surface Water Comprehensive Plan - CIP Cost Estimates

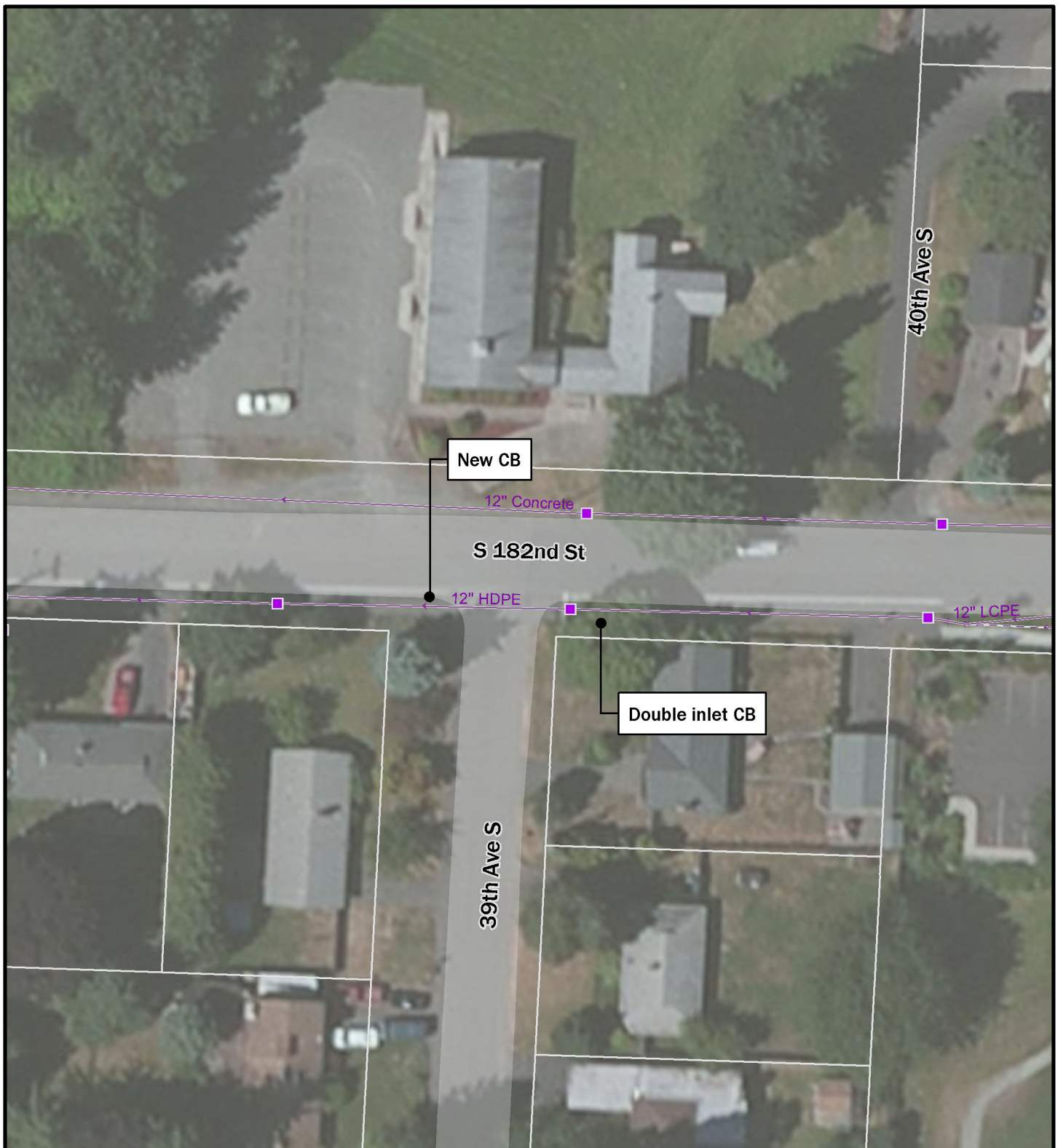
Description: Replace catch basin with larger inlet, add new catch basin downstream

Site ID: SD CIP #4

Prepared by: K. Matsumura 4/8/2013
 Checked by: M. Ewbank 4/10/2013
 Revised by: K. Matsumura 5/28/2013
 Checked by: M. Fontaine 5/28/2013

Table E-4. Conceptual Design Cost Estimate.

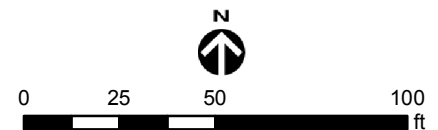
Item	Quantity	Unit	Unit Cost	Amount	Source	Notes
Removing Asphalt Conc. Pvmnt., Incl. Haul	8	SY	\$35	\$293	Seattle Public Utilities (SPU) Unit Cost Report (2007)	High end for small qty. Cost resource from 2007, 20% added for inflation.
Structure Excavation, Class B	11	CY	\$43	\$479	Puget Sound Stormwater BMP Cost Database (Herrera 2013)	
Removing Drainage Structure	1	EA	\$416	\$416	SeaTac ST-130, ST-827	Removal of existing CB. Project cost from 2011, 4% added for inflation.
Haul	11	CY	\$50	\$559	City of Lacey recent bids	
Catch Basin Type 1	1	EA	\$1,056	\$1,056	SeaTac ST-078, ST-828	Project cost from 2009, 11% added for inflation.
Catch Basin Double Wide	1	EA	\$1,275	\$1,275	SeaTac ST-827	Catch Basin Type 1. Project cost from 2011, 4% added for inflation.
Connection to Drainage Structure	2	EA	\$700	\$1,400	SeaTac ST-828	Connection to two new CBs.
HMA for Pavement Repair	3	TN	\$300	\$820	WSDOT Unit Bid Analysis (UBA) and City of Lacey recent bids	High end for small qty.
TOTAL DIRECT COSTS				\$7,000		
MARKUPS						
Mobilization			8%	\$560		
Temporary Erosion and Sediment Control			5%	\$350		
Traffic Control			5%	\$350		
Construction Management:			10%	\$700		
Sales Tax				\$0	City direction	
TOTAL CONSTRUCTION				\$9,000		
OTHER PROJECT COSTS						
Planning/Design/Engineering			15%	\$2,000		
Contingency			20%	\$2,000		
TOTAL ESTIMATED PROJECT COST				\$13,000		



Legend

- CB Type 1/1L
- CB Type 2/3
- Main Pipes
- Ditch
- Parcel boundary

Figure E-4.
Stormwater Infrastructure at Site 4 -
S 182nd Street and 39th Avenue S,
SeaTac, Washington.



Aerial (Bing, 2012)
 K:\Projects\Y2012\12-05401-000\Project\vicinity_map.mxd (6/26/2013)

CITY OF SEATAC

2014 - 2019 CAPITAL IMPROVEMENT PROGRAM

PROJECT STATUS (Check all that apply) :

Conceptual Est	<input checked="" type="checkbox"/>	P.S.E. Complete	<input type="checkbox"/>
Design	<input type="checkbox"/>	Construction	<input type="checkbox"/>

PROJECT TITLE: S 138th Street Pipe

LOCATION: S 138th St. and 29th Ave S

DESCRIPTION: The stormwater pipe crossing S 138th Street near 29th Ave. S is partially filled with concrete. Recommended solution includes abandoning the pipe under S 138th Street and installing a new pipe.

PROJECT NUMBER:

SD CIP #5

Department	Public Works
Program	Storm Water
Prepared By	
Department Priority	5 of 5
City Priority	of



BARS NO.:

EXPENDITURE SCHEDULE

Capital Costs	Total Prior Years	2014	2015	2016	2017	2018	2019	2014-2019 TOTAL	Total Future Years	Total Project
Plng/Design/Eng	-	-	-	20,000	-	-	-	20,000	-	20,000
Land Acquis/Impr	-	-	-	-	-	-	-	-	-	-
Construction/Impr	-	-	-	-	100,000	-	-	100,000	-	100,000
Other/Equipment	-	-	-	-	-	-	-	-	-	-
Sales Tax (9.5%)	-	-	-	-	-	-	-	-	-	-
Contingency (20%)	-	-	-	-	20,000	-	-	20,000	-	20,000
Total Capital	-	-	-	20,000	120,000	-	-	140,000	-	140,000
Operating Costs/Revenue Adjustments										
Salaries/Benefits	-	-	-	-	-	-	-	-	-	-
Supplies	-	-	-	-	-	-	-	-	-	-
Utilities	-	-	-	-	-	-	-	-	-	-
Equipment	-	-	-	-	-	-	-	-	-	-
Other: _____	-	-	-	-	-	-	-	-	-	-
Chg in Revenues	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Total Op/Rev Adj	-	-	-	-	-	-	-	-	-	-
New FTE's	-	-	-	-	-	-	-	-	-	-

FINANCING SCHEDULE

Funding Source	Total Prior Years	2014	2015	2016	2017	2018	2019	2014-2019 TOTAL	Total Future Years	Total Project
Asset Sales	-	-	-	-	-	-	-	-	-	-
GMA Impact Fees	-	-	-	-	-	-	-	-	-	-
Parking Taxes	-	-	-	-	-	-	-	-	-	-
REET - 1st Qtr %	-	-	-	-	-	-	-	-	-	-
REET - 2nd Qtr %	-	-	-	-	-	-	-	-	-	-
Sales Taxes	-	-	-	-	-	-	-	-	-	-
Storm Drainage Fees	-	-	-	-	-	-	-	-	-	-
Fed Grt: _____	-	-	-	-	-	-	-	-	-	-
St Grt: _____	-	-	-	-	-	-	-	-	-	-
Loc Grt: _____	-	-	-	-	-	-	-	-	-	-
Fund Balance # _____	-	-	-	-	-	-	-	-	-	-
Total Funding	-	-	-	-	-	-	-	-	-	-

POLICY BASIS: *Comprehensive Plan:* Goal 8.1, Policy 8.1D, 8.1E, 8.1H, Goal 8.2, Policy 8.2H

CRITERIA	PROJECT IMPACTS	CRITERIA RANKING (<i>Check One</i>)
Problem Risk	Drainage pipe crossing road is partially filled with concrete. No known flooding issues.	<input type="checkbox"/> High <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Low
Data Quality	Observations by City staff and video inspection	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Low
Funding Potential	Conveyance only.	<input type="checkbox"/> High <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Low
Program Efficiency		<input type="checkbox"/> High <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Low
Project Classification	<input type="checkbox"/> Maintenance <input type="checkbox"/> Replacement <input checked="" type="checkbox"/> Upgrade <input type="checkbox"/> Expansion	

CONSTRAINTS / ASSUMPTIONS

Additional design work will be necessary before more accurate costs can be estimated.

TRIGGERS (*Project Prerequisites*)

ADDITIONAL PROJECT INFORMATION/JUSTIFICATION (*As Needed*)

This project will prevent localized flooding during high flow events that may cause flooding on the roadway.

Herrera Environmental Consultants, Inc.

12-05401-000

CLIENT: City of SeaTac**PROJECT:** Surface Water Comprehensive Plan - CIP Cost Estimates**Description:** New pipe and structure along road, abandoning pipe under road**Site ID:** SD CIP #5

Prepared by: K. Matsumura 4/8/2013
Checked by: M. Ewbank 4/10/2013
Revised by: K. Matsumura 5/28/2013
Checked by: M. Fontaine 5/28/2013

Table E-5. Conceptual Design Cost Estimate.

Item	Quantity	Unit	Unit Cost	Amount	Source	Notes
Stormwater pipe replacement	1	LS	\$100,000	\$100,000	City direction	Includes abandoning existing pipe, new stormwater structures, new storm sewer pipes, and restoration
TOTAL CONSTRUCTION				\$100,000		
OTHER PROJECT COSTS						
Planning/Design/Engineering			20%	\$20,000	City direction	
Contingency			20%	\$20,000	City direction	Unknown utility conflicts
TOTAL ESTIMATED PROJECT COST				\$140,000		



Legend












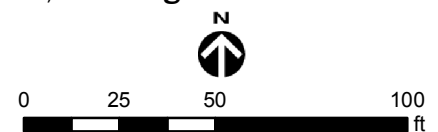
-  Proposed structure
-  CB Type 1/1L
-  CB Type 2/3
-  Inlet/Yard Drain/Slot Drain
-  Main Pipes
-  Culverts
-  Ditch
-  Wetland Class 2 (50' Buffer)
-  Wetland Class Unknown (Buffer to be determined)
-  Parcel boundary
-  20-ft Contour (KCGIS)

Figure E-5.
Stormwater Infrastructure at Site 5 -
S 138th Street and 29th Avenue S,
SeaTac, Washington.



Aerial (Bing, 2012)
K:\Projects\Y2012\12-05401-000\Project\vicinity_map.mxd (6/26/2013)

APPENDIX F

Public Involvement

PUBLIC INVOLVEMENT

Public involvement is an important component of the Stormwater Management Program (SWMP) and was conducted as part of the preparation of this Surface Water Plan (SWP). The City of SeaTac (City) engaged the public in the SWP development process in the following ways:

- Hosted an informational table at the SeaTac YMCA
- Posted an announcement on the City's website regarding the SWP update and invited public input through an online survey
- Posted announcement in the City Manager's Weekly Update
- Presented the SWP update to the Planning Commission and general public

Public Surveys

The City hosted an informational table at the SeaTac YMCA on November 7, 2012, from 9 am to 12 pm. A public survey was distributed to residents entering and exiting the YMCA in an effort to gather input on local drainage and water quality issues. Copies of the survey were available in English and Spanish. Informational brochures were also available for residents and other interested parties. The survey questions are provided in Attachment F-1.

A total of 13 surveys were completed. Eight surveys were completed by City residents, three surveys were completed by residents of other surrounding jurisdictions that pass through the City frequently, and two responses were received from the online survey. One potential water quality problem noted in Grandview Off-Leash Dog Park with people not picking up dog feces, and one potential flooding problem was noted at 200th Street near the school (this most likely refers to Aviation High School which is located in the City of Des Moines, not in the City of SeaTac). A survey response was also received in June 2013 that noted a localized flooding issue on Military Road S between S 170th Street and S 172nd Street. Since this comment was received after the Capital Improvement Program (CIP) development process, this drainage issue will not be included in this SWP, but will be evaluated for inclusion as a future stormwater CIP project. Responses to survey questions are provided in Attachment F-1.

Comments on Draft Surface Water Plan

The City has sought input from the general public and City officials in several ways:

- Periodic updates on the planning process for the City's website and newsletter
- Invite comments from the general public on the draft SWP from May 30 through July 9, 2013

- Invite comments from stakeholders and adjacent jurisdictions
- Make the final SWP available on the City's website

Comments received on the Draft SWP are provided in Attachment F-2.

Public Meetings

City and Herrera staff presented the Surface Water Plan to Planning Commission and the City Council in a series of meetings open to the public in June and July of 2013. Notes from the Planning Commission meeting on June 18, 2013, are provided in Attachment F-3.

ATTACHMENT F-1

Final Survey Questions and Responses for SWM Public Involvement



The City of SeaTac Wants Your Input on Stormwater

Please take a few minutes to provide input that will help us in updating our Surface Water Comprehensive Plan.

1. Have you noticed any flooding or stormwater issues (excessive amounts of ponded water) in your neighborhood or in other locations in the City?

If yes, please describe and provide an intersection or address of where flooding was observed.

2. Have you noticed any water quality issues (illegal dumping, pet waste, discolored water, stormwater with strong odors) in your neighborhood or in other locations in the City?

If yes, please provide an intersection or address of where the water quality issue was observed.

3. Are you aware of or have you used SeaTac stormwater programs or services?

a. If yes, which program or service are you aware of or have used?

b. How was the program or service that was provided? *(Circle one of the following options)*

Poor

Fair

Good

Great

4. Are there any stormwater programs or services that you would like to see expanded or improved?

If yes, please describe.

5. Stormwater in my neighborhood drains to: *(Check one of the following)*

- ☐ A lake or stream
- ☐ The wastewater treatment plant
- ☐ I don't know

6. Is there a stormwater drain on your street? *(Check one of the following)*

- ☐ Yes
- ☐ No
- ☐ Don't know



La Ciudad de SeaTac Quiere su Opinión en Relación al Drenaje de Aguas de Lluvia o Pluviales

Por favor, tómese unos minutos para proporcionar información que nos ayudará en la actualización de nuestro plan integral para el manejo de redes de evacuación y drenaje de la escorrentía de aguas pluviales.

1. ¿Ha notado alguna inundación o problemas de aguas pluviales (cantidades excesivas de agua estancada) en su barrio o en otros lugares de la ciudad?

En caso afirmativo, por favor describa el problema y provea una intersección de calles o la dirección del lugar donde se observó la inundación.

2. ¿Ha notado algún problema de calidad del agua (el vertido ilegal de residuos, material fecal de animales domésticos, agua turbia, escorrentía de aguas pluviales con olores fuertes) en su barrio o en otros lugares de la ciudad?

En caso afirmativo, sírvase proporcionar una intersección de calles o la dirección del lugar donde se observó el problema de la calidad del agua.

3. ¿Esta usted enterado de, o ha usado los programas o servicios de SeaTac relacionados con el manejo de redes de evacuación y drenaje de la escorrentía de aguas pluviales?

a. En caso afirmativo, ¿qué programa o servicio conoce o ha usado?

b. ¿Cómo fue el programa o servicio que SeaTac proporcionó? (*Marque una de las siguientes opciones*)

Malo

Regular

Bueno

Excelente

4. ¿Hay algún programa o servicios de aguas pluviales que le gustaría ver ampliado o mejorado?

En caso afirmativo, por favor describa:

5. Las aguas pluviales en mi barrio drena a: (*Marque una de las siguientes opciones*)

- ☐ Un lago o arroyo
- ☐ La planta de tratamiento de aguas residuales
- ☐ No sé

6. ¿Hay un drenaje de aguas pluviales en su calle? (*Marque uno de las siguientes opciones*)

- ☐ Si
- ☐ No
- ☐ No sé



The City of SeaTac Wants Your Input on Stormwater

Please take a few minutes to provide input that will help us in updating our Surface Water Comprehensive Plan.

1. Have you noticed any flooding or stormwater issues (excessive amounts of ponded water) in your neighborhood or in other locations in the City?

yes...not as bad as some areas but I do notice
it is a problem at some times

If yes, please describe and provide an intersection or address of where flooding was observed.

I have not kept track of exact locations

2. Have you noticed any water quality issues (illegal dumping, pet waste, discolored water, stormwater with strong odors) in your neighborhood or in other locations in the City?

no... not in recent years

If yes, please provide an intersection or address of where the water quality issue was observed.

n/a

3. Are you aware of or have you used SeaTac stormwater programs or services?

NO I have not used

- a. If yes, which program or service are you aware of or have used?

n/a

- b. How was the program or service that was provided? (Circle one of the following options)

Poor

n/a

Fair

Good

Great

4. Are there any stormwater programs or services that you would like to see expanded or improved?

~~I would like anything that helps~~

If yes, please describe.



5. Stormwater in my neighborhood drains to: *(Check one of the following)*

- ☐ A lake or stream
- ☐ The wastewater treatment plant
- ☒ I don't know

6. Is there a stormwater drain on your street? *(Check one of the following)*

- ☐ Yes
- ☒ No
- ☐ Don't know



The City of SeaTac Wants Your Input on Stormwater

Please take a few minutes to provide input that will help us in updating our Surface Water Comprehensive Plan.

1. Have you noticed any flooding or stormwater issues (excessive amounts of ponded water) in your neighborhood or in other locations in the City?

NO

(Sandy)

If yes, please describe and provide an intersection or address of where flooding was observed.

2. Have you noticed any water quality issues (illegal dumping, pet waste, discolored water, stormwater with strong odors) in your neighborhood or in other locations in the City?



Grand View Park problem people dump poo

If yes, please provide an intersection or address of where the water quality issue was observed.

3. Are you aware of or have you used SeaTac stormwater programs or services?

Nope

- a. If yes, which program or service are you aware of or have used?

- b. How was the program or service that was provided? (Circle one of the following options)

Poor

Fair

Good

Great

N/A

4. Are there any stormwater programs or services that you would like to see expanded or improved?

If yes, please describe.





5. Stormwater in my neighborhood drains to: *(Check one of the following)*

- ☒ A lake or stream
☐ The wastewater treatment plant
☐ I don't know

6. Is there a stormwater drain on your street? *(Check one of the following)*

- ☒ Yes w/ signage (f.dod)
☐ No
☐ Don't know



The City of SeaTac Wants Your Input on Stormwater

Please take a few minutes to provide input that will help us in updating our Surface Water Comprehensive Plan.

1. Have you noticed any flooding or stormwater issues (excessive amounts of ponded water) in your neighborhood or in other locations in the City?

~~NO~~ Y

If yes, please describe and provide an intersection or address of where flooding was observed.

200TH St. near School

2. Have you noticed any water quality issues (illegal dumping, pet waste, discolored water, stormwater with strong odors) in your neighborhood or in other locations in the City?

N

If yes, please provide an intersection or address of where the water quality issue was observed.

3. Are you aware of or have you used SeaTac stormwater programs or services?

N

a. If yes, which program or service are you aware of or have used?

b. How was the program or service that was provided? (Circle one of the following options)

Poor

Fair

Good

Great

4. Are there any stormwater programs or services that you would like to see expanded or improved?

Y

If yes, please describe.



5. Stormwater in my neighborhood drains to: *(Check one of the following)*

- ☐ A lake or stream
- ☐ The wastewater treatment plant
- ☒ I don't know

6. Is there a stormwater drain on your street? *(Check one of the following)*

- ☐ Yes
- ☒ No
- ☐ Don't know



The City of SeaTac Wants Your Input on Stormwater

Please take a few minutes to provide input that will help us in updating our Surface Water Comprehensive Plan.

1. Have you noticed any flooding or stormwater issues (excessive amounts of ponded water) in your neighborhood or in other locations in the City?

No

If yes, please describe and provide an intersection or address of where flooding was observed.

2. Have you noticed any water quality issues (illegal dumping, pet waste, discolored water, stormwater with strong odors) in your neighborhood or in other locations in the City?

No

If yes, please provide an intersection or address of where the water quality issue was observed.

3. Are you aware of or have you used SeaTac stormwater programs or services?

No

- a. If yes, which program or service are you aware of or have used?

- b. How was the program or service that was provided? *(Circle one of the following options)*

Poor

Fair

Good

Great

4. Are there any stormwater programs or services that you would like to see expanded or improved?

Yes

If yes, please describe.

I have seen ~~4~~ locations with lots of leaves and sticks on the drains



5. Stormwater in my neighborhood drains to: *(Check one of the following)*

- ☐ A lake or stream
- ☒ The wastewater treatment plant
- ☐ I don't know

6. Is there a stormwater drain on your street? *(Check one of the following)*

- ☒ Yes
- ☐ No
- ☐ Don't know



The City of SeaTac Wants Your Input on Stormwater

Please take a few minutes to provide input that will help us in updating our Surface Water Comprehensive Plan.

1. Have you noticed any flooding or stormwater issues (excessive amounts of ponded water) in your neighborhood or in other locations in the City? *No*

If yes, please describe and provide an intersection or address of where flooding was observed.

N/A

2. Have you noticed any water quality issues (illegal dumping, pet waste, discolored water, stormwater with strong odors) in your neighborhood or in other locations in the City?

No

If yes, please provide an intersection or address of where the water quality issue was observed.

No

3. Are you aware of or have you used SeaTac stormwater programs or services?

No

- a. If yes, which program or service are you aware of or have used?

- b. How was the program or service that was provided? *(Circle one of the following options)*

Poor

Fair

Good

Great

4. Are there any stormwater programs or services that you would like to see expanded or improved?

If yes, please describe.



5. Stormwater in my neighborhood drains to: *(Check one of the following)*

- ☐ A lake or stream
- ☐ The wastewater treatment plant
- ☒ I don't know

6. Is there a stormwater drain on your street? *(Check one of the following)*

- ☒ Yes
- ☐ No
- ☐ Don't know



The City of SeaTac Wants Your Input on Stormwater

Please take a few minutes to provide input that will help us in updating our Surface Water Comprehensive Plan.

1. Have you noticed any flooding or stormwater issues (excessive amounts of ponded water) in your neighborhood or in other locations in the City? *NO*

If yes, please describe and provide an intersection or address of where flooding was observed.

2. Have you noticed any water quality issues (illegal dumping, pet waste, discolored water, stormwater with strong odors) in your neighborhood or in other locations in the City? *NO*

If yes, please provide an intersection or address of where the water quality issue was observed.

3. Are you aware of or have you used SeaTac stormwater programs or services? ~~no~~ *yes*

a. If yes, which program or service are you aware of or have used?

b. How was the program or service that was provided? *(Circle one of the following options)*

Poor

Fair

Good

Great

4. Are there any stormwater programs or services that you would like to see expanded or improved?

If yes, please describe.



5. Stormwater in my neighborhood drains to: *(Check one of the following)*

- ☐ A lake or stream
- ☒ The wastewater treatment plant
- ☒ I don't know

6. Is there a stormwater drain on your street? *(Check one of the following)*

- ☒ Yes
- ☐ No
- ☐ Don't know



The City of SeaTac Wants Your Input on Stormwater

Please take a few minutes to provide input that will help us in updating our Surface Water Comprehensive Plan.

1. Have you noticed any flooding or stormwater issues (excessive amounts of ponded water) in your neighborhood or in other locations in the City?

no

If yes, please describe and provide an intersection or address of where flooding was observed.

2. Have you noticed any water quality issues (illegal dumping, pet waste, discolored water, stormwater with strong odors) in your neighborhood or in other locations in the City?

no

If yes, please provide an intersection or address of where the water quality issue was observed.

3. Are you aware of or have you used SeaTac stormwater programs or services?

no

a. If yes, which program or service are you aware of or have used?

b. How was the program or service that was provided? *(Circle one of the following options)*

Poor

Fair

Good

Great

4. Are there any stormwater programs or services that you would like to see expanded or improved?

no

If yes, please describe.



5. Stormwater in my neighborhood drains to: *(Check one of the following)*

- ☐ A lake or stream
- ☐ The wastewater treatment plant
- ☒ I don't know

6. Is there a stormwater drain on your street? *(Check one of the following)*

- ☒ Yes
- ☐ No
- ☐ Don't know



The City of SeaTac Wants Your Input on Stormwater

Please take a few minutes to provide input that will help us in updating our Surface Water Comprehensive Plan.

1. Have you noticed any flooding or stormwater issues (excessive amounts of ponded water) in your neighborhood or in other locations in the City?

NO

If yes, please describe and provide an intersection or address of where flooding was observed.

/

2. Have you noticed any water quality issues (illegal dumping, pet waste, discolored water, stormwater with strong odors) in your neighborhood or in other locations in the City?

NO

If yes, please provide an intersection or address of where the water quality issue was observed.

3. Are you aware of or have you used SeaTac stormwater programs or services?

NO

- a. If yes, which program or service are you aware of or have used?

NO

- b. How was the program or service that was provided? *(Circle one of the following options)*

Poor

Fair

Good

Great

4. Are there any stormwater programs or services that you would like to see expanded or improved?

If yes, please describe.



5. Stormwater in my neighborhood drains to: *(Check one of the following)*

- ☒ A lake or stream
- ☐ The wastewater treatment plant
- ☐ I don't know

6. Is there a stormwater drain on your street? *(Check one of the following)*

- ☒ Yes
- ☐ No
- ☐ Don't know



DOES
NOT LIVE
IN SEATAC

The City of SeaTac Wants Your Input on Stormwater

Please take a few minutes to provide input that will help us in updating our Surface Water Comprehensive Plan.

1. Have you noticed any flooding or stormwater issues (excessive amounts of ponded water) in your neighborhood or in other locations in the City? *No*

If yes, please describe and provide an intersection or address of where flooding was observed.

2. Have you noticed any water quality issues (illegal dumping, pet waste, discolored water, stormwater with strong odors) in your neighborhood or in other locations in the City? *No*

If yes, please provide an intersection or address of where the water quality issue was observed.

3. Are you aware of or have you used SeaTac stormwater programs or services? *No*

a. If yes, which program or service are you aware of or have used?

b. How was the program or service that was provided? *(Circle one of the following options)*

Poor

Fair

Good

Great

4. Are there any stormwater programs or services that you would like to see expanded or improved? *No*

If yes, please describe.



5. Stormwater in my neighborhood drains to: *(Check one of the following)*

- ☒ A lake or stream
- ☐ The wastewater treatment plant
- ☐ I don't know

6. Is there a stormwater drain on your street? *(Check one of the following)*

- ☒ Yes
- ☐ No
- ☐ Don't know



DOES NOT
LIVE IN
SEATAC

The City of SeaTac Wants Your Input on Stormwater

Please take a few minutes to provide input that will help us in updating our Surface Water Comprehensive Plan.

1. Have you noticed any flooding or stormwater issues (excessive amounts of ponded water) in your neighborhood or in other locations in the City? **NO**

If yes, please describe and provide an intersection or address of where flooding was observed.

2. Have you noticed any water quality issues (illegal dumping, pet waste, discolored water, stormwater with strong odors) in your neighborhood or in other locations in the City? **NO**

If yes, please provide an intersection or address of where the water quality issue was observed.

3. Are you aware of or have you used SeaTac stormwater programs or services? **NO**

a. If yes, which program or service are you aware of or have used?

b. How was the program or service that was provided? *(Circle one of the following options)*

Poor

Fair

Good

Great

4. Are there any stormwater programs or services that you would like to see expanded or improved? **NO**

If yes, please describe.



5. Stormwater in my neighborhood drains to: *(Check one of the following)*

- ☐ A lake or stream
- ☐ The wastewater treatment plant
- ☒ I don't know

6. Is there a stormwater drain on your street? *(Check one of the following)*

- ☐ Yes
- ☒ No
- ☐ Don't know



DOES NOT
LIVE IN
SEATAC

The City of SeaTac Wants Your Input on Stormwater

Please take a few minutes to provide input that will help us in updating our Surface Water Comprehensive Plan.

1. Have you noticed any flooding or stormwater issues (excessive amounts of ponded water) in your neighborhood or in other locations in the City? *no*

If yes, please describe and provide an intersection or address of where flooding was observed.

no

2. Have you noticed any water quality issues (illegal dumping, pet waste, discolored water, stormwater with strong odors) in your neighborhood or in other locations in the City?

no

If yes, please provide an intersection or address of where the water quality issue was observed.

3. Are you aware of or have you used SeaTac stormwater programs or services? *no*

a. If yes, which program or service are you aware of or have used?

b. How was the program or service that was provided? (Circle one of the following options)

n/a

Poor

Fair

Good

Great

4. Are there any stormwater programs or services that you would like to see expanded or improved? *no*

If yes, please describe.



5. Stormwater in my neighborhood drains to: *(Check one of the following)*

- ☐ A lake or stream
- ☐ The wastewater treatment plant
- ☐ I don't know

6. Is there a stormwater drain on your street? *(Check one of the following)*

- ☐ Yes
- ☐ No
- ☐ Don't know



The City of SeaTac Wants Your Input on Stormwater

Please take a few minutes to provide input that will help us in updating our Surface Water Comprehensive Plan.

1. Have you noticed any flooding or stormwater issues (excessive amounts of ponded water) in your neighborhood or in other locations in the City? *YES, (From 170th to 172nd Sts on military around the corner of 172nd to an open ditch at 4438 So. 172nd, Flooding occurs)*

If yes, please describe and provide an intersection or address of where flooding was observed.

2. Have you noticed any water quality issues (illegal dumping, pet waste, discolored water, stormwater with strong odors) in your neighborhood or in other locations in the City?

YES

If yes, please provide an intersection or address of where the water quality issue was observed.

Discolored water, rats that dies in the storm drains

3. Are you aware of or have you used SeaTac stormwater programs or services?

YES

- a. If yes, which program or service are you aware of or have used?

I have asked how to prevent flooding on the open ditch.

- b. How was the program or service that was provided? (Circle one of the following options)

Poor

Fair

Good

Great

4. Are there any stormwater programs or services that you would like to see expanded or improved?

NO

If yes, please describe.



5. Stormwater in my neighborhood drains to: *(Check one of the following)*

- ☐ A lake or stream
- ☐ The wastewater treatment plant
- ☒ I don't know

6. Is there a stormwater drain on your street? *(Check one of the following)*

- ☒ Yes
- ☐ No
- ☐ Don't know

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Displaying 1 of 1 respondents

Response Type:
Normal Response**Custom Value:**
*empty***Response Started:**
Thursday, November 15, 2012 12:53:11 PM**Collector:**
Web Link
(Web Link)**IP Address:**
12.72.241.200**Response Modified:**
Thursday, November 15, 2012 12:58:13 PM

1. Have you noticed any flooding or stormwater issues (excessive amounts of ponded water) in your neighborhood or in other locations in the City? If yes, please describe and provide an intersection or address of where flooding was observed.

Yes. Caused by the City of SeaTac

2. Have you noticed any water quality issues (illegal dumping, pet waste, discolored water, stormwater with strong odors) in your neighborhood or in other locations in the City? If yes, please provide an intersection or address of where the water quality issue was observed.

By the City

3. Are you aware of or have you used SeaTac stormwater programs or services? If yes, which program or service are you aware of or have used?

5 years to get drain pipe

4. If you answered yes to question 3: How was the stormwater program or service that was provided?

Poor

5. Are there any stormwater programs or services that you would like to see expanded or improved? If yes, please describe.

That the City of SeaTac stop diverting THEIR stormwater and street runoff over private property without easements or rights.

6. Stormwater in my neighborhood drains to: (Check one of the following)

A stream or a lake

7. Is there a stormwater drain on your street?

Yes

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ATTACHMENT F-2

Comments on Draft SWP

City of SeaTac
2013 Stormwater Plan
Review Comments
By D. G. Monaghan, P.E.

Does the segregation of transportation and storm water cost include the allocation of design, engineering, administration, right-of-way, taxes and construction management costs?

There does not appear to be any nexus between the City of Burien and project SD #2 for the City to participate in the cost for project SD #2.

The SD #1 project should analyze the opportunity for increasing the capacity of the pond.

The topographical maps for SD #1 and SD #4 are reversed in the pdf circulated for review.

The Plan does not address how to deal with the operation, maintenance, expansion and repair of private systems such as:

- The box culvert through the Kilroy Property
- The Executel Pond
- Controls on the Bow Lake outfall
- 36" pipe through Nursery west of Military Road

A small portion of the City drains to Gilliam Creek south of SR 18.

The Des Moines Creek Water Quality Monitoring began in 2011 and covered the 2011/2012 water year.

Page 27 last paragraph should be "... controlling discharges from the west fork ...".

King County was a member of the Des Moines Creek Basin Committee besides being the facilitator. King County's membership in the Committee ended in approximately 2010.

In 3.3.1.1 Port of Seattle is listed twice as signing the 2004 ILA.

Drainage from the Airport no longer enters the 60" culvert in Intl Blvd.

Comments on Draft Surface Water Comp Plan

By Earl Gibson

1. I have a problem with creation of policy documents that are partially redundant in nature (see SeaTac Comprehensive Plan) and the addition of "soft law" policies. The necessity has not been proven to my satisfaction for a City this size and the cost of maintaining the plan exceeds its benefits including recurring consultant costs. Good for the consultants, bad for the budget.
2. Third party review needed by experts/consultants who are NOT associated with government agencies bent on regulating everything i.e. Department of Ecology and Herrera (document authors). This document should have been written internally if at all and one hell of a lot shorter.
3. Two weeks is not enough time for review of 172 pages of regulatory policy for the Council, Planning Commission, and/or the public.
4. I also write regulatory/compliance documents but ONLY if Clients are required by law to have them (and I try to combine as much as possible). I see no law requiring this document unlike the SeaTac Comprehensive Plan. This is great for job security but the need has still not been proven/justified.
5. It was stated that this document has no regulatory authority nor legal mandate. It takes one line in the Comp Plan or SMC to change that so it should be stated that the document cannot supersede the Municipal Code and/or Comprehensive Plan nor be referenced therein as a requirement. It should further be noted it cannot be revised without consent and approval of the Council and changes must be approved by the Council.
6. Policies in the document are in conflict with the new Fire Code. LID would reduce impervious surfaces whereas the Fire Code increases impervious surfaces (roadway width/expansion).
7. This document has "boiler plate" data in it and that should be eliminated and its size reduced to SeaTac specific items. Better yet, combine affected jurisdictional resources to reduce staffing in the area of Storm Water for the drainage basins. Does each adjacent/abutting municipal jurisdiction need their own Storm Water Manager etc.? The storm water doesn't care about jurisdictional boundaries.
8. The inspection and/or testing of the City's catch basins should coincide with the vacuuming and cleaning of same. There is no reason to have two policies/procedures/intervals.
9. This document appears to be a justification to raise SWM rates and nothing more. I can't wait to see the rate study.
10. I recommend the Public Comment period for this document be extended to at least the end of August as I (and others) want to dissect every aspect of it from a regulatory/cost point of view. I also recommend this document, its maintenance, its revision be eliminated if policies exist in the Comp Plan and other existing documents.

SeaTac Surface Water Plan – Comments

Daryl Tapio

City of SeaTac
4800 South 188th St.
SeaTac, WA 98188

June 24, 2013

RE: Comments on Surface Water Plan

Attn: Public Works Director and Stormwater Compliance Manager

The following is a list of comments regarding the City of SeaTac Surface Water Plan that the Council should be made aware of prior to acceptance. Although this is not a regulatory document it raises a red flag as to the numerous regulatory issues coming in the near future that may significantly affect the cost and feasibility of development.

Rate Study and Increases in Surface Water Management Utility Fees

1. This plan will drive a rate study predictably recommending a surface water fee increase for both residential and commercial property owners. This fee is collected for each property with the real estate property taxes.
2. How the city directs the consultant performing the rate study and the timeline for implementing all of the plans will affect the proposed utility rates.

New Expenses and Purchases Recommended or Implied in the Plan

1. Vector truck
2. Camera/Video Inspection Equipment for surface water system inspection
3. Software used to manage surface water assets: *Cityworks* or equivalent
4. Develop a surface water Asset Inventory – City or Contractor
5. Inspections and Monitoring
6. FTEs – Public Works
7. FTEs – CED
8. CIP – Capital Improvement Projects
9. Additional work identified during the video inspections

NPDES Ph2 Permit Requirements, Effective August 2013

1. LID Mandate – This may limit development in the city as a result of increased costs and limitations in drainage designs that work with SeaTac soils.
 - a. It is unknown what LID design options will be mandated and how successful they will be in the soils in SeaTac.

SeaTac Surface Water Plan – Comments

Daryl Tapio

- b. Requiring LID designs without an overflow to the city storm water system at the appropriate invert elevation may cause localized flooding and specifically in crawl spaces under houses due to perched water tables.
2. This proposes city inspections of LID/BMPs on private property
3. Requires new Storm Water Site Plan for new developments, even small sites
4. Requirements are being written for inclusion in the 2015 surface water manuals and it is unknown what the requirements will be even though the NPDES Ph2 permit goes into effect in August 2013.
5. A group of approximately 23 cities are currently appealing some of the Dept. of Ecology Ph 2 permit requirements. The success of this appeal is critical to future development.

Dept. of Ecology, King Co. SWDM Requirements

1. The Public Works Department should bring awareness to new requirements and allow the stakeholders, elected officials, and citizens to influence excessive policy expectations.
2. The city should provide feedback to DOE and King Co. on problems with the surface water manuals that will impact development in SeaTac. The city could amend the manuals for site or soil specific conditions. Form coalitions with other cities as necessary to provide feedback to DOE.
3. Stormwater Managers from various cities should work together and provide feedback to the Dept. of Ecology and King County to ensure workable drainage options that do not unnecessarily impede development.

Affect on Small Business

1. The requirements of the NPDES Ph 2 Permit may have a detrimental effect on small businesses performing residential development and building.

Basin Analysis

1. Drainage basins extend beyond city boundaries. It would be beneficial to include basin maps for all three basins showing the outfalls into Puget Sound, the Green River and the Duwamish Rivers.
2. The Des Moines Creek Basin was improved by a coalition of cities and agencies working together. This will benefit property owners that develop in this basin because of reduced storm water facility requirements at the parcel level. However, the other two basins have not had these improvements and development costs will be higher for property owners due to the requirement of designing to forested flow conditions.
3. Evaluate the costs and benefits of storm water management facilities that benefit neighborhoods in the other two drainage basins to utilize economies of scale and reduce costs for property in the other basins.

SeaTac Surface Water Plan – Comments

Daryl Tapio

Public Outreach

1. Keeping stakeholders and the Planning Commission updated regularly is important. SeaTac has an NPDES Advisory Committee that should be kept informed.
2. Provide LID/BMP tip sheets or design details for property owners to assist in learning new methods. Share lessons learned to shorten the learning curve.

40-Year-Old Infrastructure

1. The plan states that SeaTac has some infrastructure that is 40 years old. SeaTac is not unique in this situation. Many cities have infrastructure older than 40 years and do not have the funding to replace it. Although corrugated metal pipe may be at risk in this time period, components made of concrete and PVC have a life much longer than 40 years.

Future Surface Water Plans and Rate Studies

1. It is likely that SeaTac staff without the assistance of consultants could prepare this plan and calculate new rates that would improve our surface water system on an incremental basis as funding allows.

Thank you for the opportunity to provide comments.

Sincerely,



Daryl Tapio

ATTACHMENT F-3

Planning Commission Meeting Notes

**Planning Commission Comments on Surface Water Plan
from
June 18, 2013 Meeting**

The following comments were provided by the Planning Commission at the June 18, 2013 meeting during the presentation of the Surface Water Plan. These comments have been broken into two categories to distinguish between comments on the Plan and comments and concerns over the pending NPDES Permit requirements and their potential impacts on land use: 1) Comments on the Surface Water Plan; and 2) Comments on the National Pollutant Discharge Elimination System (NPDES) Permit Development Regulations.

1) Comments on the Surface Water Plan

- Suggested that City staff consult with other larger cities and counties already using low impact development techniques, so we can take advantage of their knowledge and experience (successes and mistakes).
- Indicated that staff should have sought input from areas where stormwater problems are occurring.
- Concerns were raised over potential increases in surface water rates and a suggestion was made that staff do what they can to keep rates down.
- It was suggested that the use economies of scale be studied to try to encourage future development, such as creating neighborhood improvement areas where stormwater improvements are made to address existing issues and create capacity for future development. These could be done in neighborhoods where the City is currently trying to encourage development such as the 154th Street Station Area.

2) Comments on NPDES Development Regulations

- The Commission thanked staff for their efforts on the appeal of the NPDES Permit. They also expressed concerns if the coalition of cities and counties were not successful in winning the appeal.
- Based on a request made prior to the Commission meeting, staff identified that they would bring a presentation to Planning Commission later this year on the NPDES regulations affecting development and land use. [That presentation is currently scheduled for September 3, 2013.]
 - Include examples for both large and small sites that comparing existing regulations versus new NPDES Permit regulations.
- Concerns were expressed over the size of all of the documents and manuals included with, or referenced within the NPDES Permit, as well as City Council's and a layman's ability to review and understand the impacts of these documents. [Examples include: NPDES Phase II Permit - 82 pages, 2012 Ecology Stormwater Management Manual for Western Washington - >1000 pages, LID Technical Guidance Manual for the Puget Sound – 365 pages.] Staff clarified that the referenced manuals have not been adopted the City yet, and these manuals or their equivalents do not have to adopted and in place until January 1, 2017.
- It was requested that the NPDES Permit Stakeholders Group be consulted/utilized when the City updates land use and development regulations are drafted to meet the new NPDES Permit requirements.

