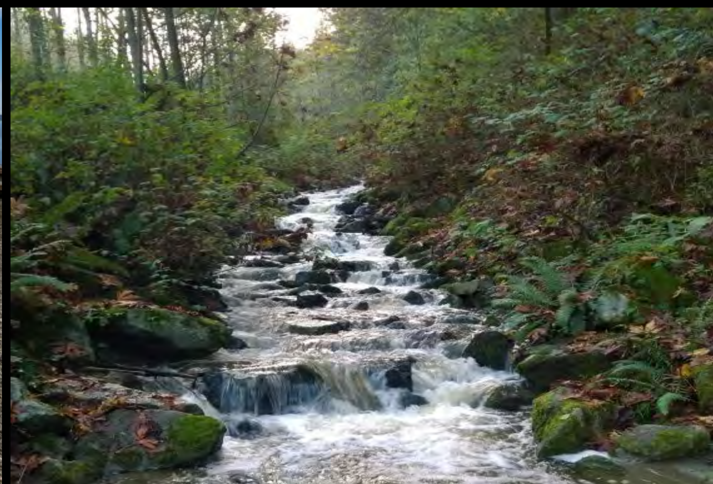
CITY OF MUKILTEO

Comprehensive Surface Water Management Plan Update

2015-2021



August 2015

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Acknowledgments

The Comprehensive Surface Water Management Plan Update was prepared by City staff, with supporting work contracted through Brown & Caldwell. A special thanks goes out to the Citizen Advisory Committee who donated their time and helped shaped the vision for the Utility.

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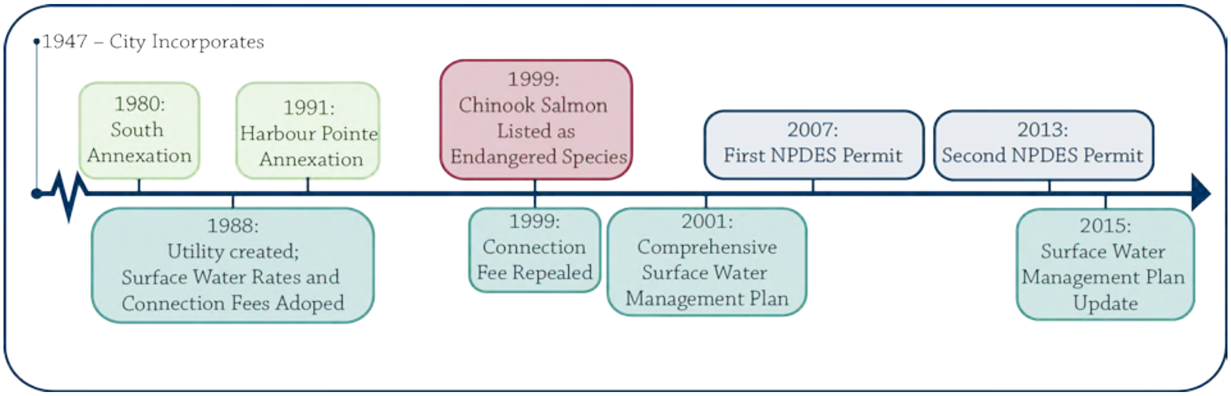
Chapter 1: Introduction

1.1 Evolution of the Surface Water Program



Mukilteo's Surface Water Drainage Utility was formed in July 1988 by Ordinance 611, under the authority granted by Chapter 35.67 of the RCW. In 2001, the first Comprehensive Surface Water Management Plan (2001 Plan) was written. The 2001 Plan studied the physical and hydrologic characteristics of the City's 13 watersheds, identified drainage problems, and made programmatic recommendations. Since the formation of the Utility and the 2001 Plan, the way in which surface water and stormwater are managed has changed on both a regional and national scale. There is now a clearer recognition of stormwater impacts to natural resources and aquatic species.

Historically, the goal of stormwater management was to move stormwater off a property as quickly as possible through a series of pipes and, eventually, to a natural water body. This method of stormwater management has proven to degrade natural waterways. Increased peak flows scour and incise stream channels, and contribute to instream instability. Reduced summer flows, through loss of storage and recharge areas (wetlands and groundwater sources, for example), also contribute to loss of flows during summer months.

Surface Water and Stormwater: What is the difference?

Surface water is all the water at the surface of the landscape – streams, lakes, ditches, ponds, and stormwater. Stormwater is a subset of surface water. Stormwater is precipitation that flows off the landscape during or immediately after rain or snow events.

Hard surfaces, like roads and roof tops, change the timing and rate of stormwater flows. Stormwater also picks up pollutants and carries them to surface waters. These altered flow patterns and pollutants on the landscape create problems in the City's streams and Puget Sound.

Pollutants enter our surface waters when stormwater picks up sediment and oils from roadways, washes excess nutrients off fertilized lawns, and then carries these pollutants to our streams and Puget Sound.

In the Pacific Northwest, some of the direct impacts to aquatic habitat are seen as a decline of local salmon populations. In 1999 the Puget Sound Chinook salmon was listed as a threatened species under the Endangered Species Act (ESA). This listing resulted in widespread regional surface water management changes in order to prevent the further decline of the species, and to promote salmon population recovery.

Because there is a better understanding of the drivers of habitat loss and degraded water quality, surface water programs are moving toward on-site stormwater management. For the region, low impact development (LID) methods (including methods that infiltrate stormwater and retain it onsite before being released to receiving waters), have become mandatory for development projects. The goal is to protect our surface waters from pollutants and to mimic a more natural hydrology by managing stormwater as a renewable resource, rather than a waste product.

The City's Surface Water Utility remains committed to preserving the City's freshwaters and Puget Sound to meet the criteria for all beneficial uses of these valuable resources. This commitment is portrayed in programs that reduce flooding by attempting to mimic natural flow patterns, reduce pollutant loads to stormwater, and provide technical assistance to residents and developers in best management practices for stormwater.

1.2 Need for the Plan Update

There are five areas of need to be addressed in this update.

1) A reevaluation of the City's accomplishments and changing stormwater needs in the past 14 years.

2) An assessment of new and growing regulatory requirements, and the City's capacity to meet those requirements.

3) A new definition of goals and performance measures for the Utility.

4) A method to conduct proactive watershed planning, including an asset management component.

5) An analysis to assure that the surface water utility rate supports a defined level of service.

1.2.1 Accomplishments and Changing Needs

Since the 2001 Plan was written, the City has:

- Completed a number of capital improvement projects identified in the 2001 Plan.
- Adopted surface water management ordinances, including enforcement mechanisms.
- Adopted a Stormwater Design Manual.
- Enhanced the Public Education Program.

The City has made progress in meeting some of the identified needs of the 2001 Plan. As noted in Section 1.1, stormwater management methods and techniques have shifted since the 2001 Plan. This Update considers past accomplishments and the changing approach to stormwater management.

Currently, the City manages over 55 miles of stormwater pipe, 4,700 catch basins, and 120 water quality and/or flow control facilities. The City has many areas of localized flooding, and has experienced recent catastrophic failures in its aging infrastructure. In 2014, over 47 problem areas were identified by City residents and City staff. To complete only eleven of the most pressing projects would require an estimated $26 million. While a few of these projects may qualify for outside funding, the majority will need to be funded by the City's Surface Water fund.

1.2.2 Regulatory Requirements

While the 2001 Plan anticipated changes to stormwater regulations, there was not yet a National Pollutant Discharge Elimination System Phase II Municipal Stormwater

Permit (NPDES Permit). The NPDES Permit requirements help support the Utility's goal in preserving our freshwaters and Puget Sound. The first NPDES Permit came into effect in 2007 and a second issuance became effective on August 1, 2013.

An analysis to assure that there is capacity to meet these requirements is warranted. Permit requirements have increased efforts in operations, including higher frequency facility inspections. Development standards and development project review requirements have also changed, requiring more staff review time.

Many of these changes are beneficial to the City. The program changes can allow the City to be more proactive in protecting water quality and maintaining stormwater infrastructure. Identifying maintenance needs on a proactive level can be more cost effective than responding in a reactive mode. However, current City staffing levels and equipment may not support the workload associated with performing many of these new responsibilities.

1.2.3 Define Goals and Performance Measures

Clear performance measures give an understanding of expectations for the Utility. Through annual evaluation of the performance measures, the Utility will be able to recognize whether programmatic changes may be required to meet performance goals. This is a new addition since the 2001 Plan.

1.2.4 Conduct Proactive Watershed Planning

The City has begun some proactive watershed planning with the original hydrologic analysis in the 2001 Plan, the *Mukilteo Watershed-Based Stormwater Strategies Plan* (ESA 2013) (*Strategies Plan*), and the *Mukilteo Stormwater Retrofit Project Identification and Prioritization Report* (ESA 2014) (Retrofit Project). Some implementation strategies have been explored under the *Strategies Plan* through a grant from the Washington State Department of Ecology (Ecology), however, a more comprehensive assessment to operationalize the *Strategies Plan* is recommended.

Low impact development methods relying on infiltration have proven challenging in Mukilteo due to underlying geology and the presence of steep slopes. An understanding is needed of where infiltration will safely work and where other solutions are warranted. Mukilteo is committed to low impact development, but site evaluations may prove that underlying geology combined with landslide hazard areas severely limit areas of feasibility, as was the case in the pre-design field investigations done for the Retrofit Project (ESA, 2015) (Retrofit Pre-Design Report). More information on the Retrofit Project can be found on the City's website page at http://www.ci.mukilteo.wa.us/Page.asp?NavID=336.

The City's aging stormwater infrastructure should be evaluated. Some of this infrastructure may date back to the turn of the 20th century. The average life expectancy for stormwater infrastructure is 50 years. Most of the Utility's pipe network has not been systematically inspected, and the condition of the infrastructure is unknown. From recent emergency capital projects, it is known that some of the infrastructure is reaching the end of its useful life. A good tool to forecast a maintenance and replacement schedule is via video inspection. Information from this evaluation should be incorporated into a proactive watershed planning process.

Through a proactive and comprehensive watershed planning process, the Utility should be able to target approaches that address specific problem areas. Ecology is currently drafting guidance on a Stormwater Control Transfer program. This program will be an alternative way to manage stormwater under NPDES Permit requirements for flow control and low impact development. The program will allow jurisdictions to target priority watersheds and direct actions to those watersheds to achieve a more immediate benefit. Jurisdictions must get Ecology approval prior to implementing this alternative program. By identifying priorities and directed actions, the City will be poised to take advantage of this new program.

1.2.5 Surface Water Utility Rate

The Surface Water Utility fee should provide the financial resources needed for the Utility to meet its commitment by managing polluted runoff, providing outreach to local residents and businesses, and maintaining the City's stormwater infrastructure. The Utility should fund all maintenance and operations of the utility (including federal and state requirements) as well as fund capital projects that will repair and/or improve the City's stormwater system and improve surface waters, as they relate to stormwater impacts.

Currently, residential properties in the City of Mukilteo pay $7.85 per month per equivalent residential unit (the base rate charged to a single family residential property) in surface water utility fees. This rate has remained unchanged since 2006.

This SWMP Update is needed to guide the City's Utility considering the above mentioned factors.

1.3 Goals for the Plan Update

The goals for the Plan Update are to:

- Serve as a management tool to more efficiently manage the capital and maintenance and operations (including NPDES permit compliance) programs of the Surface Water Utility for the next five years.
- Evaluate level of service and existing staffing levels to identify gaps between those required and recommended level of service and staffing levels.
- Evaluate Utility expenses and project surface water management fees for the next five years to ensure the financial viability of the Utility.

1.4 Surface Water Utility Program Transformation

The City's Surface Water Management Program began as a small part of the Engineering Division, designed to provide minimal development plan review, and complete capital stormwater infrastructure projects. The needs of the Surface Water Management Program have grown to encompass a more robust set of duties, including: long range operational and planning capacities; environmental education and outreach; and intensive development review and inspections.

The need for additional staff and the tools to develop more purposeful utility programs have grown with the expansion of the Utility responsibilities. The Surface Water Program must adapt to the changing requirements and techniques of surface water management to more efficiently address capital, maintenance, and NPDES Permit compliance.

The following are examples of how the Utility can make this transition:

- Provide a higher level of sophistication in managing the stormwater infrastructure by developing an asset management system, including information gathered from pipe inspections. This provides better information to cost effectively manage the City's aging infrastructure, and maximize the return on the City's investment.
- Manage surface waters on a watershed basis, to identify needs, limitations, and opportunities.
- Better identify the staffing needs, including technical competencies, to support an improved operations and management program, and development review.

1.5 Process for Plan Update Development & Review

Work on the Comprehensive Surface Water Management Plan Update (SWMP Update) began in July 2013. The City engaged Brown and Caldwell for technical assistance and invited public participation on several levels, including a formation of a continuing Citizen Advisory Committee. Two Open Houses, Four City Council Work Sessions and one City Council Meetings were held during the course of the SWMP Update process. An additional City Council Meeting will be held after finalization of the SWMP Update to address Utility rate changes. Table 1-1 gives a brief timeline of the process.

TABLE 1-1: PROCESS FOR SWMP UPDATE DEVELOPMENT & REVIEW TIMELINE

July 2013	RFQ for Consultant Selection Invitations sent for Citizen Advisory Committee
August 2013	Citizen Advisory Committee (CAC) is formed and meets monthly
December 2013	Brown & Caldwell selected through competetive process and approved by Council
December 2013	Surface and Stormwater Problem Identification Survey mailed to all Mukilteo residents
January 2014- January 2015	Brown & Caldwell and subconsultants provide 3 technical reports
May 2014	Surface and Stormwater Problem Identification Survey results compiled
August 2014	Open House held at City Hall Survey results shared Additional citizen input received regarding existing stormwater issues within the City
September 2014	Stormwater Capital Project List created and ranked
September 2014	Council Work Session on Overview of Stormwater Management Plan
April 2015	Council Work Session on NPDES Permit and CIPs
May 2015	Council Work Session on Rate Study conducted by FCS
June 24, 2015	Open House held to present and receive public input on the Draft Comprehensive Surface Water Management Plan Update
July 6-20 2015	Draft SWMP Update posted for public review and comment SEPA review period begins Submitted to Ecology for Review
July 27, 2015	Council Work Session on Draft Comprehenseive SWMP Update
September 21, 2015	Comprehensive Surface Water Management Plan Update Adopted by Council Resolution

1.5.1 Technical Support – Consultant Selection

Through a competitive process, Brown & Caldwell was selected as the consultant for the SWMP Update in December 2013. The technical tasks included assistance with ranking drainage issues, evaluation of geomorphic conditions, evaluation of infiltration feasibility, providing planning level cost estimates for up to 10 Capital Improvement Projects (including hydrologic modeling – Appendix E), and a Utility rate analysis.

Prior work completed in support of the SWMP Update included the *Strategies Plan* in 2013. As a follow on to the *Strategies Plan*, and with the support of Ecology funding, the City completed the *Retrofit Project*, including a pre-design report.

1.5.2 Citizen Advisory Committee

The City established a Citizen Advisory Committee (CAC) in the summer of 2013 to ensure an opportunity for public input throughout the entire SWMP Update process. The CAC met monthly and worked with staff to help establish utility policies and priority direction for this SWMP Update. The insightful input and feedback from the CAC on how the SWMP Update might affect Mukilteans helped shaped the final SWMP Update. The Committee originally consisted of seven Mukilteo residents. Six of those residents stayed with the CAC through the 2-year process.

1.5.3 Open House Events

<u>First Open House – Problem Area Identification:</u> On August 26, 2014, an Open House was held at City Hall to discuss the role of the City's Surface Water Utility, current challenges in stormwater management, and gather public input on stormwater issues within the City. Over 100 residents attended. City staff addressed any questions.

The City presented maps of known stormwater issues (primarily flooding issues) and invited attendees to report additional stormwater issues. An interactive GIS mapping tool was used to more effectively communicate known problems and locations. Information on the operations program and pollution problems was also addressed.

Opportunities to provide comments on stormwater issues electronically or via mail were given through the City's website and through direct mailings. One hundred thirteen (113) response sheets were received by the City. These responses were incorporated into the list of Identified Surface Water Issues (Appendix A).

Second Open House - Draft SWMP Update: On June 24, 2015, a second open house was held at City Hall to present and receive public input on the draft SWMP Update. The SWMP Update was presented in poster board style, including an overview of the Utility goals, operations programs, engineering programs, and the financial analysis. Approximately 12 residents attended. Opportunities for comment were made available at the Open House and on the City's website.

1.5.4 SEPA

The State Environmental Policy Act (SEPA) requires state and local agencies to consider the likely environmental impacts of a proposal before approving or denying the proposal. This process requires an agency to complete an environmental checklist that identifies and describes potential adverse environmental impacts. The checklist is then made available for other agencies and the public to review and comment. The checklist for the draft SWMP Update was prepared and made available for review and comment on July 6, 2015.

A determination of non-significance (DNS) was issued on July 1, 2015 for the SWMP Update. A copy of the SEPA checklist and DNS is included in Appendix B.

1.5.5 Draft Comprehensive SWMP Update Public Review

Concurrent with the SEPA environmental checklist, the Draft SWMP Update was posted on the City's website on July 6, 2015 and made available for public review. The 14-day review and comment period required by the SEPA process began on July 6, 2015. Every comment received during this period was reviewed and responded to by City staff. Comments and City responses are included as Appendix B. Where appropriate, changes generated by the review comments were incorporated into the Final SWMP Update.

1.5.6 City Council Work Sessions and Meetings

During the course of the SWMP Update, City staff communicated with City Council at four Work Sessions. The goal of these Work Sessions was to provide City Council with information on the process for and the drivers of the SWMP Update, including NPDES permit requirements, identified capital projects, and the proposal for a proactive management approach.

TABLE 1-2: COUNCIL WORK SESSIONS DATES AND TOPICS

Date	**Work Session Topic**
September 8, 2014	NPDES Permit requirements and their impacts to the Surface Water Program
April 13, 2015	Review programs and operational areas that impact Utility expenses, including NPDES permit requirements, results of an internal NPDES Permit gap analysis, and the list of proposed Stormwater Capital Improvement Projects (CIPs) (Chapter 6).
May 11, 2015	Current surface water utility rates, current and future expenses, and proposed funding strategy for the next five years. Four different rate scenarios were presented by FCS, the City's consultant. Pros and cons of each scenario were discussed
July 27, 2015	Draft SWMP Update Review

Adoption of the SWMP Update is scheduled to occur at the regular City Council Meeting of September 21, 2015. A Public Hearing on the surface water rates is scheduled to occur at a Special City Council meeting of November 9, 2015, followed by formal adoption of Ordinance 1372.

Chapter 2: Watershed Characteristics

The City of Mukilteo is in western Snohomish County on the eastern shore of Puget Sound, between Seattle and Everett (Figure 2-1). It is just over 6 square miles in area. The City is unique in that it has 14 separate fresh water streams and the Puget Sound within its boundaries. These natural features contribute to the high quality of life that Mukilteo residents enjoy. With an understanding of how these water bodies function, and the storm drainage network that contributes to them, the Utility can weigh the potential impacts to the waterbody and make more informed management decisions. A discussion of the current understanding of Mukilteo's surface waters, stormwater infrastructure, natural resources, and geologic conditions follows.

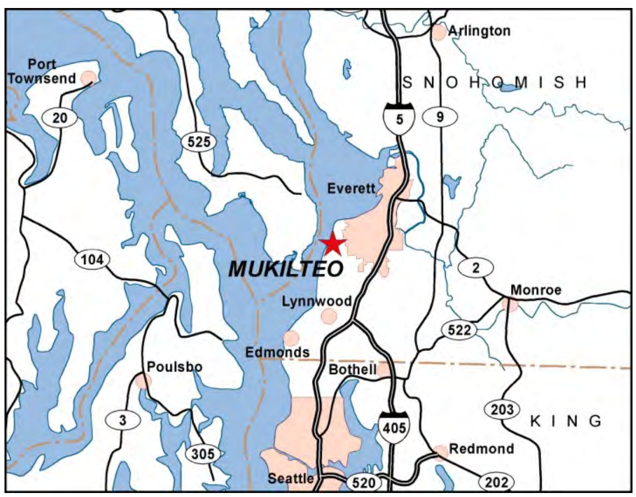


FIGURE 2-1: MUKILTEO VICINITY

2.1 Natural Drainage Basin Characteristics

2.1.1 2001 Watershed Delineation

The City first delineated 13 drainage basins in the 2001 Plan, all of which discharge to Puget Sound. The 13 contributing basins were given basin letters along with the stream names. For example, Basin H contributes to Big Gulch stream. At that time, all of the basins were named, with the exception of Basin E. It has since been named Olympic

View. A City-wide hydrologic analysis was completed for each watershed at that time. Because there were often data gaps on the stormwater infrastructure, topography was often used as a proxy in developing the hydraulic models.

2.1.2 2013 Watershed Delineation

In 2013, as part of the *Strategies Plan*, the basins were re-delineated, using updated mapping of the stormwater network and better local understanding of the basin boundaries. The 2013 delineations encompassed entire drainage basins in order to obtain a complete understanding of the contributing areas. This means that some areas outside of Mukilteo were included in the analysis. As a result of a stormwater pond on the airport, the current mapping shows Swamp Creek as part of the City's inventory. However, that mapping is incorrect. The pond is piped to Big Gulch. The maps will continue to be updated as they are field verified. Table 2-1 outlines the differences in basin areas from the 2001 Plan compared to the 2013 *Strategies Plan*.

TABLE 2-1: BASIN AREA COMPARISONS

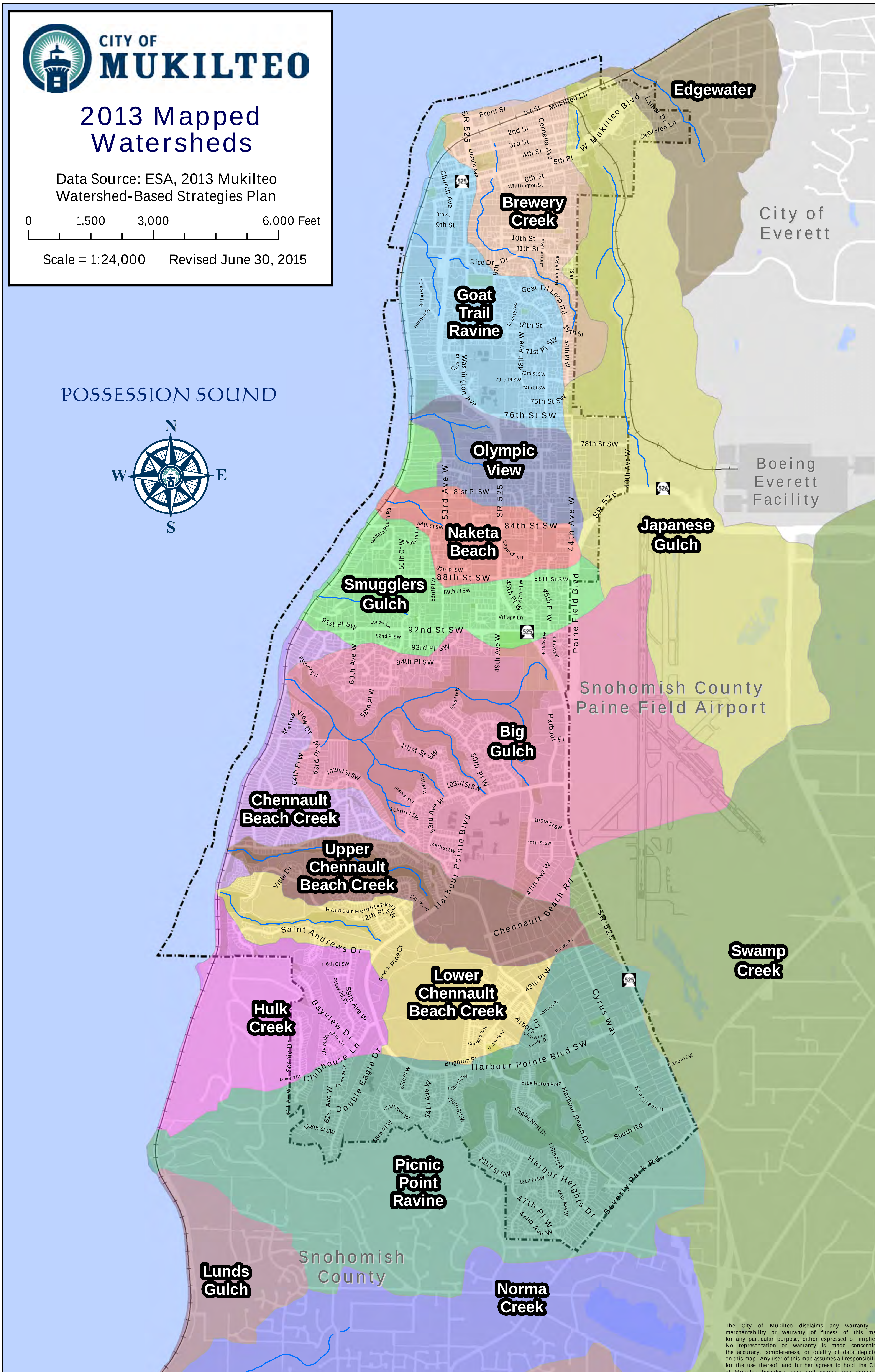
	2001 Plan	**2013 Study**
BASIN NAME (2001 basin ID)	**BASIN SIZE (ACRES)**	
Big Gulch (H)	1600	1550
Brewery Creek (C)	292	304
Chennault Beach (I)*	125	184
Upper Chennault (J)	145	278
Lower Chennault (K)	507	337
Edgewater (A)	360	340
Goat Trail Ravine (D)	274	382
Hulk Creek (L)	280	375

Japanese Gulch (B)**	615	1149
Naketa Beach (F)	164	160
Olympic View (E)	262	173
Picnic Point Cr (M)	1455	1417
Smugglers Gulch (G)	293	332
*placed portion in Big Gulch in 2013		
**additional acreage mapped is largely outside Mukilteo		

A map of the current watershed delineations is found in Figure 2-2.

In 2014, four stream channels (Brewery Creek, Upper Chennault Creek, Lower Chennault Creek and Smugglers Gulch Creek) were evaluated with regard to the potential for influence of stormwater management actions as part of the *Geomorphology and Critical Slope Evaluation*, (Geomorphic Study) (Appendix C). As part of that effort, a stream walk was conducted for each of the four basins.

All of the streams or stream segments within the City are fairly small (classified as 1st order in the Strahler system) with many of the drainages beginning in low gradient headwaters (the plateau area) and becoming steeper in the ravines, before discharging to the Puget Sound. Edgewater, Japanese Gulch, and Big Gulch, and small portions of Smugglers Gulch and Brewery Creek have headwaters that lie outside of Mukilteo. Goat Trail Ravine, Olympic View Ravine, Naketa Beach, Chennault, Upper Chennault, and Lower Chennault lie entirely within Mukilteo; with the exception of the outfalls. All streams discharging to Puget Sound cross over the Burlington Northern San Francisco Railroad jurisdiction at some point. Brewery Creek, Edgewater Creek and Japanese Gulch cross under the railroad tracks, but have some piped flow path between the BNSF right-of-way and the Puget Sound. The outfall pipes of the remaining 10 Puget Sound streams lie under the BNSF right-of-way.


CITY OF MUKILTEO
2013 Mapped Watersheds
Data Source: ESA, 2013 Mukilteo Watershed-Based Strategies Plan
0 1,500 3,000 6,000 Feet
Scale = 1:24,000
Revised June 30, 2015
POSSESSION SOUND
N
E
S
W
Edgewater
Brewery Creek
Goat Trail Ravine
Olympic View
Naketa Beach
Japanese Gulch
Smugglers Gulch
Big Gulch
Chennault Beach Creek
Upper Chennault Beach Creek
Lower Chennault Beach Creek
Hulk Creek
Swamp Creek
Picnic Point Ravine
Lunds Gulch
Norma Creek
City of Everett
Boeing Everett Facility
Snohomish County Paine Field Airport
Snohomish County
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2.1.3 Watershed Processes

In-stream hydrology is driven by rain events and the condition of the surrounding watershed (for example: geology, effective impervious surface, and tree canopy cover). When rain falls in forested conditions, the vegetation and soils provide water storage. When the land is converted to impervious areas, groundwater recharge is diminished and surface flows are increased. During the dry summer months, the lack of recharge results in decreased stream base flows, which translates to dry streambeds. In winter months, during heavy rain events, surface flows reach streams more quickly and with higher peaks, which translate to scoured stream beds, and undercut ravines.

FIGURE 2-3: HYDROLOGY OF PRE-DEVELOPED CONDITIONS

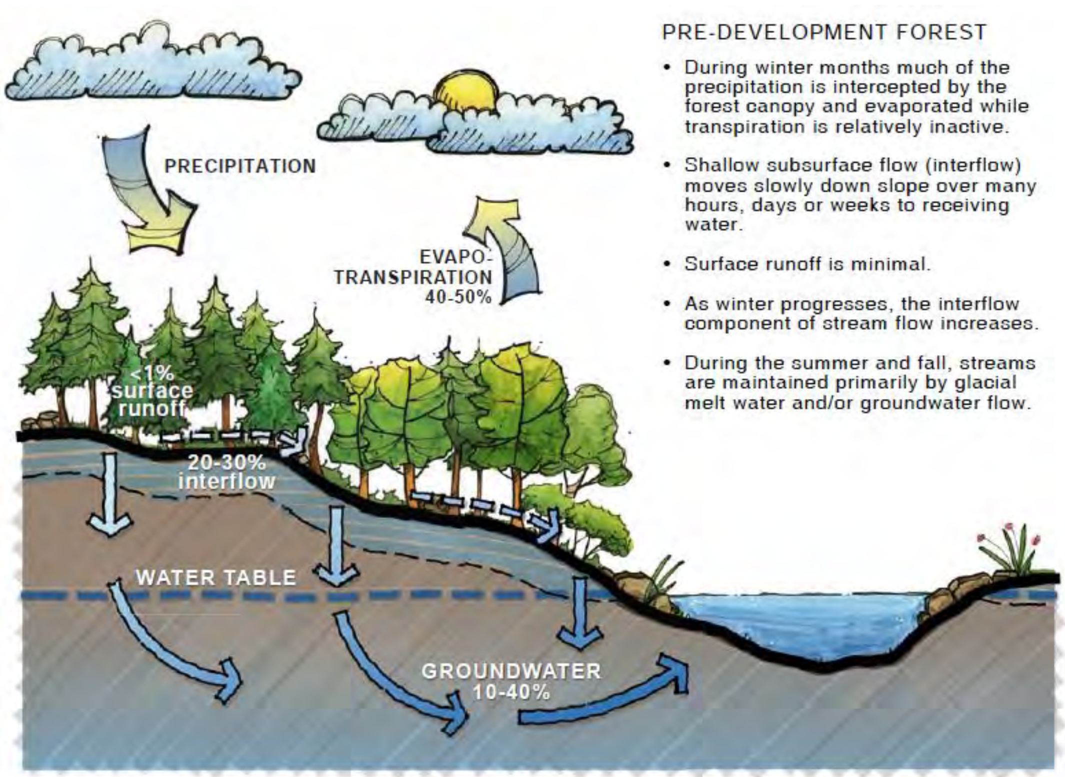
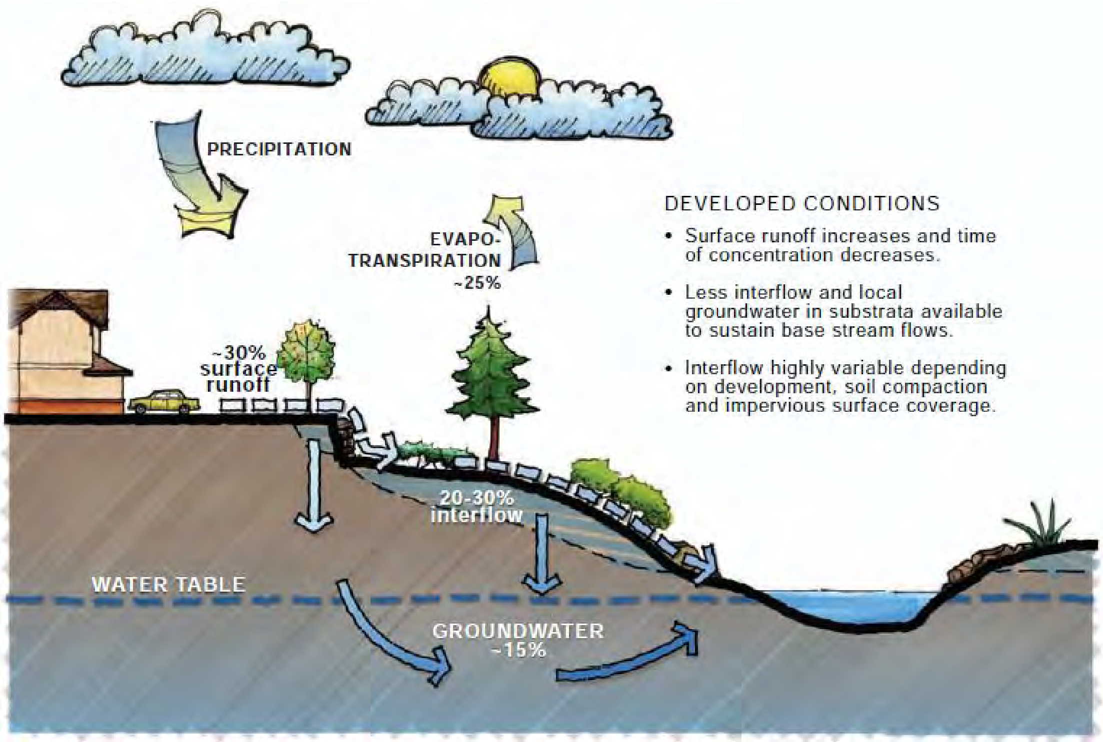


FIGURE 2-4: HYDROLOGY OF DEVELOPED CONDITIONS



The 2013 *Strategies Plan* is based on how watershed processes change in relation to the stream's position on the landscape. Typically, plateau areas are important for storage and recharge. Bluff areas and ravines are important for recharge and discharge. Because Mukilteo's streams are very short in length and much of the surrounding watersheds are developed, the streams respond quickly to heavy rain events. Several of the streams have cut deep ravines and gullies through the underlying glacial deposits.

Recharge processes are an important component to preserving and restoring watersheds. These processes are influenced by groundwater movement, especially in the plateau areas. However, groundwater movement is not well understood in Mukilteo. Because of this, the *Strategies Plan* was unable to evaluate recharge processes as part of their analyses for any of the basins. If recharge is an important driver for the basin, it would not have been identified in the *Strategies Plan*.

2.1.4 Instream Flow Impacts

Many of the drivers of drainage problems discussed in the 2001 Plan remain the same today. The conversion of forested landscape to an urbanized setting changes flow patterns in surface waters. Problems such as increased stream bed scour, sediment loading, increased pollutant loading, and localized flooding are common in urban areas as a result of the conversion of soil and vegetation to impervious surfaces. Urban development results in converting previously forested land to large impervious areas such as roof tops, driveways, parking lots, and roads. This converted landscape results in increased peak flows and reduced base flows.

2.1.5 Water Quality Impacts

Urbanization also impacts water quality. Pollutants such as copper from car brake pads, oils from leaking vehicles, soapy car washing, herbicides, pesticides, and others are deposited on lawns and impervious areas. When rain water falls on these impervious surfaces, it picks up the pollutants and carries them directly to the streams. In addition, anything that is accidentally spilled or purposefully poured into the storm drain system directly impacts surface waters.

The City does not test any streams for water quality. However, Snohomish County has been monitoring Picnic Point Creek over several years for Benthic Index of Biotic Integrity (B-IBI). B-IBI uses in-stream biological communities as an indicator of the health of the stream. When the biotic communities are depleted or not robust, it is an indicator that there is an impairment to the stream. The types and ratios of biota can help determine what is driving the impairment. Snohomish County's B-IBI testing shows two sampling events with low scores, leading Department of Ecology to recommend listing Picnic Point Creek as an impaired water body. As such, in 2015, Ecology recommended putting Picnic Point on EPA's 303(d) list for impaired water bodies. Snohomish County takes exception to this proposed listing, and provided comment to that effect. Additionally, the City of Everett does water quality sampling in Japanese Gulch.

2.1.6 Stormwater Solutions

Stormwater's impact on natural drainage basins can be mitigated to some extent through best management practices during development. Many stormwater solutions are currently moving toward infiltration as a preferred (and required) alternative. The intention is to restore recharge processes and slow the peak flow rates during heavy rain events. Infiltration through a soil column has also proven to reduce some pollutant loads to receiving waters. These methods should improve natural drainage basins. However, challenges for infiltration solutions are not applicable everywhere in Mukilteo (See Section 2.4 for further discussion).

2.2 Stormwater Infrastructure

The City's stormwater system is a network of pipes, catch basins, swales, ditches, flow control facilities and water quality facilities. The stormwater conveyance systems ultimately discharge to a stream or to Puget Sound (the receiving waters). This built infrastructure requires maintenance, repairs, and replacement over time in order to preserve its function, but also to protect the receiving waters.

2.2.1 Conveyance

- *Pipes.* The City has mapped approximately 55 linear miles of stormwater pipe 12" or greater in diameter (not included privately owned pipes) within the City's current boundaries. Pipes are basic conveyance systems. They provide no flow control or water quality. Once stormwater is directed to a piped infrastructure, it is carried downstream.

- *Culverts.* The City has mapped 114 culverts, totaling 8,823 feet. These are most likely undercounted in the City's mapping, because many culverts under private driveways would not be included in large scale mapping. Culverts are generally defined as a structure (typically pipe or concrete box) that drains open channels, swales or ditches under a section of roadway or embankment. As examples, culverts can pipe sections of stream under roads, or pipe sections of ditch under driveways.

- *Ditches.* The City has mapped 270 ditches, totaling 7.2 miles. Like pipes, ditches provide stormwater conveyance, moving water downstream. An advantage to ditches is they can provide some water quality treatment as flows pass through vegetation and / or discharge to groundwater, providing recharge.

- *Swales.* The City has mapped 29 swales. Swales are designed to infiltrate water as the primary purpose, with some water also discharging downstream.

- *Catch Basins / Inlets.* The City has over 4,700 catch basins and inlets mapped within the City's boundaries. These are the drains, visible on the surface, often in the right of way (Figure 2-5). Inlets capture stormwater and move it into the stormwater system. Catch basins can also have a sump to capture pollutant-laden sediment.

FIGURE 2-5: CATCH BASIN IN RIGHT OF WAY

2.2.2 Stormwater Flow Control and Water Quality Treatment Facilities

The City is responsible for 115 known stormwater flow control and/or water quality treatment facilities. There are as many as 100 additional privately owned flow control and/or water quality facilities. While the City is not responsible for maintaining privately owned systems, they do contribute to the overall function of the stormwater network.

Flow control facilities are engineered to release high flows at a slower rate. Water quality treatment facilities can be as simple as an oil/water separator that suspends oil at the top, for easy recapture in the event of a spill. Other water quality treatment facilities include bioinfiltration facilities, where the stormwater is filtered through a soil media; or other proprietary treatment technologies. Facility types that the City owns include: detention vaults, detention ponds, detention pipes, and bioretention facilities.

The City has two regional detention facilities: a centralized regional detention facility around Harbour Pointe Golf Course and small interspersed wetlands throughout the Harbour Pointe area. The Golf Course regional facility is a collection of manmade ponds and wetlands joined by a network of creeks and swales. A list of the known City operated facilities is included as Appendix F. This list is currently under review to verify accuracy, and is subject to change. The City has many design plans for previously installed privately owned facility, but does not currently have them mapped or have a cataloged list.

2.2.3 Hydraulic Modeling

Hydraulic modeling was done for 13 watersheds as part of the 2001 Plan in order to identify areas with potential lack of capacity in the stormwater network. Basin scale hydraulic modeling was completed for Brewery Creek in 2014 as part of the Mukilteo Lane CIP project. Targeted hydraulic models were updated in 2014 as part of the CIP Summary Description and Cost Estimates (CIP Costs) (Appendix E), and as part of the work for the Retrofit Project completed in 2015.

2.3 Related Natural Resources

2.3.1 Shorelines

In 2011, the City adopted a *Shoreline Master Program* (SMP) (City 2011). The SMP identified three shoreline segments within the City's current boundaries (Segment A, Segment B, and Segment C). These segments total 4.9 miles and were classified based on broad levels of ecosystem function and existing land uses within the segments. Two additional segments within the Mukilteo Urban Growth Area (MUGA) were also identified based on ecosystem function and land uses (Segment D and Segment E). Segments A through D are all marine shorelines; Segment E is Lake Serene Shoreline.

Each segment has identified land use, critical habitat, and public access components. Further, work was done to identify potential opportunities and potential constraints within each segment. The City's surface water programs should help support opportunities in shoreline areas that also serve to improve surface water functions. Known projects are incorporated into the Utility's ranked CIP list.

2.3.2 Mapped Floodplains

The 2011 SMP identifies only a small area within the 100-year floodplain within the City. The floodplain is found within and around Mukilteo Lighthouse Park and the Urban Waterfront Area of downtown.

2.3.3 Wetlands

There are 142 mapped wetlands, totaling 163.7 acres, in the City. (This covers approximately 5% of the City's total area.) In addition to these wetlands, the City has designated 29 "dual function" wetlands, totaling 30.2 acres. These dual function wetlands are used to manage stormwater runoff. It is often the case that wetlands are not accurately mapped. As a result, the City's maps may underestimate the total wetland area.

Wetlands provide numerous ecological functions to the City, including water quality improvement, floodwater storage, fish and wildlife habitat, aesthetic value, and biological productivity. Not all wetlands perform the same functions or at the same level. However, taken together, these are important surface water components on the landscape. Over time, many of the City's wetlands have been replaced with developed land uses. The City's Wetland Regulations (Municipal Code Chapter 17B.52B) help protect important wetlands.

Historically, there is evidence that some estuarine wetlands existed at the outfalls of creeks, such as Japanese Gulch and Brewery Creek. These have since been piped and the hydrology no longer exists to support the wetland (SMP, 2011). The Waterfront Master Plan envisions daylighting these two outfalls, with the possibility of reestablishing some estuarine wetland functions. These are currently unfunded projects through the Surface Water Utility.

2.4 Geologic Conditions

2.4.1 Geology / Topography

Puget Sound regional topography and geologic formations were shaped by long cycles of erosion and non-glacial sedimentation, punctuated by multiple glacial advances into the Puget Sound lowland. The glacial deposits are derived from several regional glaciations; the most recent, called the Vashon Stade of Fraser glaciation, ended about 13,000 years ago. These glaciers sculpted the landscape, and waterways of Puget Sound. Post-glacial erosion has locally incised the area, creating steep-sided ravines and steep bluffs in coastal areas. Human alterations and activities also influence the existing geologic processes.

The shape of the land defines where runoff goes. Its soils and geology define how fast it gets there. Many of the City's watersheds begin in broad upland plateaus, notably the areas around Harbour Pointe and Paine Field. These plateaus quickly drop through Mukilteo's hilly topography, sloping west and north toward Puget Sound. Many of the hills terminate in bluffs and steep slopes overlooking the Sound. Running through this landscape are many wooded gulches and streams.

The makeup of the soils determines the amount of stormwater infiltration and runoff. The shallow permeability of soils derived from till deposits are moderately rapid in weathered zones and very slow through unweathered, hard glacial till. It is very common for water to infiltrate the surficial, weathered till, and then 'perch' on the underlying unweathered layers, flow laterally, and resurface as springs on slopes, or creek banks. Additional stormwater input to these slope and streambank springs add to the burden on landslide areas.

The primary surface soil type in the Mukilteo area, as shown in the U.S. Soil Conservation Service (SCS) Soil Survey for Snohomish County, is in the Alderwood series, derived from glacial till. Drainage is restricted by the underlying geology, the Vashon Till, so this soil is classified as generating moderately high runoff. The combination of the moderately high runoff and the steep marine bluffs creates many areas of high landslide hazards.

Mukilteo has published a landslide hazard map (Ordinance 987, 6 March 2000) which shows steep areas in three categories:

- Moderate Landslide Hazard: areas with 15-40 percent slope underlain by sand, gravel bedrock or till
- High Landslide Hazard: areas with 15-40 percent slope underlain by silt and clay and any area with slope greater than 40 percent
- Very High Landslide Hazard Area: areas of known landslide deposits

In addition to landslide hazards along Puget Sound bluffs, the geologic and soil characteristics can affect the volume of runoff and the erosive potential of streambanks. Because many of Mukilteo's streams flow through steep ravines, the potential for landslides also exists around steep stream channels.

2.4.2 Impact of Underlying Geology and Landslide Hazards on Infiltration as a Stormwater Management Technique

The City is committed to implementing all stormwater management techniques that will work to preserve our surface water quality and habitat, including infiltration, where feasible. In an effort to better understand where infiltration as a stormwater management technique will work, the City conducted studies to gain a more complete understanding of the City's geology. The updated geologic information from the 2014 Mukilteo reconnaissance is especially important as it relates to infiltration potential and implementation of low impact development (LID) stormwater solutions. Both shallow and deep infiltration potential were considered as options in the City.

Shallow infiltration relies on stormwater moving vertically through a soil column in a LID facility (such as bioretention) and would be best applied in the City's plateau (flat) areas. Shallow infiltration requires surface soils to be relatively permeable and some separation to the groundwater table (1-foot separation for small facilities and 3-foot separation for larger facilities).

Deep infiltration does not require permeable surface soils. Instead, the water can be carried through impermeable surface soils to deeper permeable layers. These types of facilities are generally more expensive to construct and require approval from Ecology's Underground Injection Control (UIC) program. (UICs are not required as part of development.)

Field reconnaissance during the Geomorphic Study was conducted in four drainage basins. The reconnaissance showed that the Vashon advance glacial outwash (the Qva layer) is both thinner and more laterally restrictive than indicated on the DNR maps. In some areas, the advance outwash was entirely missing. As a result of an evolving understanding by geologists of geologic units and recent seismic movements, previously understood descriptions and State Department of Natural Resources' (DNR) 2014 maps may be inadequate to describe conditions in Mukilteo.

As an example, from the DNR maps, it was thought that the geology in the Brewery Creek basin included an extensive layer of Vashon advance glacial outwash (the Qva layer), suggesting an infiltrative layer. The impermeable layer of silty and clayey beds (Qtb layer) appears to match the general extent of the DNR maps. However, the field work indicates that the Qva layer is much thinner (50 feet as opposed to 150 feet) than first mapped; and may be only locally present. This sparse coverage of an infiltrative layer reduces potential areas for stormwater infiltration techniques. The City will continue to explore infiltration opportunities through site specific PITs, as required by the *Stormwater Management Manual for Western Washington*.

Originally, it was assumed that there would be an advance outwash available for deep infiltration potential, somewhere between 350 and 400 feet. Based on reconnaissance and localized boring efforts, this assumption was revised to assume that, if present, the advance outwash is deeper than 350 feet or possibly already saturated.

Additional work in the *2015 Mukilteo Infiltration Feasibility Assessment* (Infiltration Assessment) (Appendix D) groundwater, combined with facility size and lateral permeability out of the facility sides, can cause mounding on the glacial till. Mounding can reduce the infiltration capacity of an LID facility over the longer term stormwater loading. These findings may further restrict (in conjunction with steep slopes) locations where infiltration is feasible.

The Infiltration Assessment also found that “Most of the City is not suitable for shallow infiltration due to the presence of low-permeability glacial till soils at the surface and/or proximity to steep slope hazards including landslides. There are small areas considered moderate to good for shallow infiltration throughout the City.”

Based on the findings of the Infiltration Assessment, and through evidence of the City’s Pilot Infiltration Tests and borings, opportunities for infiltration appear to be limited in Mukilteo. Steep slopes (over 20%) and their associated 50 foot buffer in Mukilteo cover approximately 25% of the City. (Infiltration is not recommended within 50 feet of steep slopes). As the City has explored areas for infiltration through PITs, there is ever-growing evidence of an impermeable glacial till (PIT infiltration rates of zero are reported). Groundwater movement, even if over 50 feet away from steep slopes, might still impact landslide hazard areas, but it is not well understood how.

Because the recharge process and how groundwater affects steep slopes are vital to identifying solutions for many of the impacts on natural drainage basins, the City should explore these processes further. The City needs to understand the effects of infiltration on steep slopes, exhaust opportunities for infiltration projects, and/or begin to identify alternative solutions. Some exploration work was completed with the Retrofit Project in 2014. This work should be expanded through a Basin Planning process (See Chapter 7).

Upon review of the Infiltration Assessment, Ecology commented that “the presence of glacial till does not in itself make a site infeasible for LID” under new development and redevelopment requirements. Ecology additionally cautioned that even though the Infiltration Assessment provides a baseline understanding of the City’s geology, that this does not “take the place of the required site specific investigations required as part of new and redevelopment requirements under the current [NPDES] permit.”

As stated previously, the City is committed to exploring infiltration options to solve stormwater issues, and will continue to follow the regulations for site-specific exploration for new development and redevelopment. The City’s initial assessment indicates that many areas may require more creative solutions to these problems.

Chapter 3: Environmental and Regulatory Factors

The City of Mukilteo's surface water program must comply with a number of state, federal, and local regulations that are pertinent to stormwater. Based on ongoing research related to stormwater runoff impacts on water quality and to native fish populations, the regulations have become more stringent.

3.1 Federal Clean Water Act – NPDES Phase II Municipal Separate Storm Sewer Permit

As authorized by the Federal Clean Water Act, the NPDES Permit is a federal requirement that regulates stormwater and wastewater discharges to waters of the United States. In Washington State, the NPDES Permit program is administered by Ecology. In Western Washington, the Phase II permit requires at least 80 Municipal Separate Storm Sewer System (MS4) operators with populations under 100,000 to implement programs and practices to control polluted stormwater runoff.

In the City of Mukilteo, all stormwater is discharged to surface waters or waters of the state (ground water is included and regulated by Ecology in the State of Washington). Municipalities are required to obtain NPDES permits if their stormwater discharges go directly to surface waters. The programs and practices are clearly spelled out in the Permit (Ecology 2013). By implementing these programs, the municipalities are allowed to continue to discharge stormwater to surface waters.

The first Phase II NPDES Permits were issued in 2007, and the City has operated under a Phase II Permit since that time. The current Phase II NPDES Permit was effective on August 1, 2013 and runs through July 31, 2018. It is expected that another 5-year permit cycle will become effective in August 2018. It is unknown at this time what will be required under any upcoming permits.

3.1.1 Current Permit (2013 - 2018)

The City of Mukilteo is covered under a NPDES Phase II Municipal Stormwater Permit issued by Ecology. The permit has five required program elements under Section 5:

1. Public Education and Outreach
2. Public Involvement
3. Illicit Discharge Detection and Elimination (IDDE)
4. Runoff Controls for New Development, Redevelopment and Construction Sites
5. Municipal Pollution Prevention, Operation and Maintenance

Other requirements include administrative duties, participation in monitoring programs, and coordination with other jurisdictions. While the Permit went into effect in August of 2013, the Permit itself phases new program implementation requirements through July of 2018 (the five-year permit term). This phasing allows jurisdictions to plan and prepare for the new requirements and allocate the appropriate staffing and equipment necessary to meet compliance. Table 3-1 summarizes major components of the permit and the associated deadlines for meeting those components.

Each year, Permittees must complete activities to meet Permit requirements, and complete annual reports on those activities. These documents are made available to the public on the City's Surface Water Management web page. The activities vary in complexity and length of time to complete. The activities can effect entire City operations. Some are ongoing, some activities are one-time actions, and others require new program implementation.

3.1.2 Future Permit Cycles (2018 and beyond)

It is anticipated that Ecology will start drafting the next permit cycle in the next two years. Ecology follows a public review process, at which time City staff will review the proposed requirements and provide comment as necessary. City staff will continue to communicate with Ecology and prepare for any new requirements that may stem from future permit cycles. Additionally, staff will remain engaged in local work groups that help to shape permit requirements.

TABLE 3-1: WESTERN WASHINGTON PHASE II MUNICIPAL STORMWATER NPDES PERMIT OVERVIEW – 2013 TO 2018

S5 Program Component	August 1, 2013 Ongoing program implementation	2014	2015	2016	2017	Jan-July 31, 2018
A. Stormwater Management Plan	Continue to track costs, actions and activities. Continue required internal and suggested external coordination and SWMP Plan submittal w/annual report. Update SWMP Plan annually.		By March 31: annual rpt includes description of internal coordination			
C.1 Public Education and Outreach	Continue public education and outreach program. Measure changes in behavior for 1 audience & 1 topic.	Create or partner w/others to create stewardship.		By February 2:use measures of behavior changes to improve program.		
C.2 Public Involvement	Continue to provide ongoing opportunities for the public to participate in SWMP decision-making. Post online annual reports and SWMP Plan for previous calendar year by 5/31 of each year.					
C.3 Illicit Discharge Detection and Elimination (IDDE)	Continue implementing the enforceable mechanism to prohibit illicit discharges, compliance strategy, IDDE and municipal staff training, citizen hotline and IDDE response, and maintain map of MS4.				By Dec 31: Field screen at least 40% of MS4 & on average 12% each year thereafter.*	By Feb 2: Updateordinance if needed. Storm system map is complete and maps are kept updated.
C.4.a-f Control Runoff from New Develop't, Redevelop't Construction Sites	Continue to implement ordinance addressing construction/post- construx runoff controls; make NOIs for construction, industrial stormwater permits available; site plan review & permitting, requiring long-term maintenance; inspections; training; and enforcement.			By Dec 31: Update SW code to revised Appx 1 standards; review, revise, make effective development codes to make LID preferred approach. **	By March 31:Submit summary of review & revision of codes to reduce impervious surface, protect vegetation, minimize SW.	Achieve at least 80% of scheduled inspections.
C.4.g Water- shed scale stormwater planning (selected permittees***)	By Oct. 31, 2013 Phase I permittee notifies Ecology of selected basin and affected Phase II permittees***		By Aug 13: Submit documentation of the coordination approach for watershed-scale planning. By Nov. 4: Submit scope of work and schedule for the complete watershed-scale planning process			By Apr.4: Submit final watershed-scale stormwater plan
C.5 Municipal Pollution Prevention, Operation and Maintenance	Continue implementation of MS4 maintenance; annually inspect SW trtmt & flow control BMPs/facilities; spot checks; O&M & SWPPPs for municipal lands & facilities; staff training			By Dec 31: Update maintenance standards to revised manual/ code standards.**	By August 1: Inspect all catch basins or document alternatives if used. Plan to complete inspections every 2 years thereafter.*	Achieve 95% of inspections for municipal stormwater treatment/flow control BMPs/facilities and catch basins.

The timelines provide an overview of major program components deadlines (**By Date** means"...no later than...") for implementing permit requirements of S5 Stormwater Management Program (SWMP) for Continuing City, Town and County Permittees. Other permit elements are listed on the next page. This is guidance only: please see the permit for additional detail and related requirements. [January 2015 version]

S8 Monitoring and Assessment

S8 Monitoring	August 1, 2013	2014	2015	2016	2017	July 31, 2018
S8.A	Continue to provide description in each annual report of stormwater monitoring or stormwater- related studies conducted by permittee or others (except if related to S8.B or S8.C.					
S8.B Status and Trends Option #1	PS Permittees ONLY: By Dec 31: Notify Ecology which option selected for status and trends monitoring.	*PS Permittees ONLY* : By Aug 15: First annual payment to RSMP.				
S8.B Status and Trends Option #2		By October 31: Begin monitoring wadeable streams.	Oct 1: Begin monitoring nearshore marine (if applicable).	Annual reporting as per Ecology-approved QAPP.		
C. Effectiveness Option #1	By Dec 31: Notify Ecology which option selected for effectiveness monitoring.	By Aug 15: Option #1 first annual payment to RSMP.				
C. Effectiveness Option #2		By Feb 2: Submit QAPP to Ecology. By Oct 1: Begin flow monitoring.	Oct 1: Stormwater monitoring program fully implemented.	Annual reporting as per Appendix 9.		
S8.D Source ID & Diagnostic Monitoring		By Aug 15: First annual payment to RSMP.				

Other significant elements of the permit

S1 Application for coverage	Co-Permittees can end or amend agreements at any time.
S4.F Response to violations of Water Quality Standards	Notification and possible adaptive management may occur at any time.
S7 Compliance with Total Maximum Daily Load (TMDL) Requirements	Comply with applicable TMDL requirements listed in Appendix 2 per individual timelines.
S9 Reporting	Keep all records related to the permit for at least five years. Beginning March 31, 2015, submit a report for the previous calendar year using WAWebDMR or form provided by Ecology.
G3 Notification of Discharge Including Spills	Report to Ecology within 24 hours any discharge into or from the MS4 which could constitute a threat to human health, welfare or the environment.
G.18 Duty to Reapply	Apply for permit renewal no later than Feb. 2, 2018 (180 days before permit expiration).
G20 Non-compliance Notification	Notify Ecology within 30 days of becoming aware of permit non-compliance.

This is guidance only: see the permit for additional detail and related requirements.

*City of Aberdeen completes requirement by 6/30/2018. Report in fifth year annual report.

**Lewis/Cowlitz county permittees complete requirement by 6/30/2017; City of Aberdeen by 6/30/2018. Report in next annual report.

***Watershed-scale Planning applies to Phase II Permittees within King County's selected watershed: cities of Redmond and Woodinville

3.2 Federal Clean Water Act – Total Maximum Daily Load (TMDL) Plans

Under section 303(d) of the Clean Water Act, states, territories, and authorized tribes are required to develop lists of impaired waters. These are waters that are too polluted or otherwise degraded to meet the water quality standards set for beneficial uses. The law requires that priority rankings and cleanup plans be made for waters on the 303(d) list. Clean up plans often specify a Total Maximum Daily Load or TMDL for the water body. A TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards.

What are "beneficial uses"?

The Washington State Legislature has designated uses for protection in fresh surface waters of the state and Marine waters. Beneficial uses include Aquatic Life and Recreational Uses. Different criteria are set in WAC 173-201A-200 for specific water bodies, based on historic use.

Mukilteo does not currently have any listed water bodies on the 303(d) list. However, as of early 2015, Ecology has presented a proposed 303(d) list of impaired water bodies that includes a Category 5 listing for Picnic Point Creek for biotic integrity. A Category 5 listing requires a cleanup plan such as a TMDL. Department of Ecology usually writes the plans, but the City should be working to identify possible causes of, and solutions for the impairment.

Additionally, the beaches at Picnic Point Creek and Lighthouse Park have history of past advisories and closures due to bacterial contamination, particularly after large rain events. These advisories are not the same as 303(d) listings; however they are an indication of degraded water quality.

3.3 Federal Endangered Species Act

The Endangered Species Act (ESA) provides for both the conservation and protection of plant and animal species that face the threat of extinction as well as for the ecosystems upon which they depend. To prevent further decline of the species and to encourage restoration, the ESA prohibits "take" of listed animals. Take includes any disturbance of the population, including significantly modifying its habitat.

ESA requires a review of listed species every five years. The National Oceanographic and Atmospheric Administration (NOAA) conducts this review. The most recent status review was completed in 2011. In that review, all West Coast salmon and steelhead species retained their previous listing classifications. This means that for the Puget Sound species, Chinook salmon (*Oncorhynchus tshawytscha)* and Steelhead (*Oncorhynchus mykiss)* were found to be at moderate risk of extinction. Both remain listed as threatened species.

To reflect local conditions, individual Watershed Resource Inventory Areas (WRIAs) were created. The WRIAs develop salmon recovery plans for NOAA's approval. The City of Mukilteo spans two WRIAs, WRIA 7: Snohomish Basin to the north, and WRIA 8: Cedar-Sammamish Basin to the south. The majority of the City lies within WRIA 8. These are very large WRIAs and are dominated by large river systems, none of which themselves pass through Mukilteo. Instead, the City's contribution to the WRIAs consists of 13 small coastal watersheds, and one Lake Washington tributary.

In 2001, 27 local governments in King and Snohomish counties, including Mukilteo, signed an Interlocal Agreement (ILA) to create the Water Resource Inventory (WRIA) 8 Forum. The most recent update covers 2007-2015 and jointly funds the development of a conservation plan to protect and restore Chinook salmon.

After the development of the WRIA 8 Chinook Salmon Conservation Plan (the Conservation Plan) in 2005, the WRIA 8 Salmon Recovery Council (SRC) was created to oversee the implementation of the Conservation Plan. In the past, Mukilteo Councilmembers have held positions on the WRIA 8 SRC. Currently the seat is vacant.

3.4 Tribal Agreements Related to Case Law

In March 2013, the U.S. District Court ruled that Washington State is not fulfilling obligations to remove barriers that impede fish movement and thus is violating Tribal treaty fishing rights. This has become known as the "culvert case," and requires the State to accelerate its program to upgrade and replace State-owned culverts. If the ruling stands, it is anticipated that future rulings may trickle down and apply at a local level. WDFW shows three culverts with fish presences as total barriers in the City. Two are owned by the State and cross under SR525. The third is owned by the City.

3.5 Hydraulic Code – RCW 77-55 (Construction Projects in State Waters)

WDFW requires a Hydraulic Project Approval (HPA) for construction activities that use, divert, obstruct, or change the natural flow or bed of any waters of the state. The purpose of the requirements, which are administered through the HPA permit process, is to protect fish habitat in stream channels, to prevent erosion, and to protect freshwater and nearshore marine aquatic life. Any construction activity such as bridge painting, channel improvements, stream restoration, or culvert replacements within the ordinary high water mark of any stream would fall under the HPA permit requirements.

On March 28 2014, the Governor approved Senate House Bill (SHB) 2251 that requires all fish barrier removal projects sponsored by local governments to use a streamlined HPA permit review process in Revised Code of Washington (RCW) 77.55.181. The bill also establishes a fish barrier removal board to coordinate efforts to identify and prioritize fish barrier removals.

3.6 Floodplain Management RCW 86.16

Chapter 86.16 RCW Floodplain Management establishes statewide authority Ecology for the floodplain management regulation elements of the National Flood Insurance Program (NFIP). Under Chapter 173-158 WAC, local governments must adopt and administer regulatory programs compliant with the minimum standards of the NFIP. Ecology provides technical assistance to local governments for both identifying the location of the 100-year (base) floodplain and in administering their floodplain management ordinances.

The National Flood Insurance Program's (NFIP) Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. The City currently does not participate in the Community Rating System (CRS) as the City's only FEMA mapped floodplains are located in a very small area of the Puget Sound coastline of the City.

3.7 Other Related Regulations and Drivers

3.7.1 Shoreline Management Act

The Washington State Shoreline Management Act (SMA) of 1972 (RCW 90.58), as implemented through WAC 173-26, requires all counties and municipalities located along the shorelines of Washington or with waters of statewide significance to develop Shoreline Master Programs (SMPs). The legislation required certain counties and their municipalities to update their SMPs as set forth in SSB 6012, with additional updates to be conducted every seven years thereafter.

The City's Shoreline Management Program was updated in 2011 with the adoption of City of Mukilteo Ordinance 1295. Many of the goals and policies identified in the plan relate to surface water management and support the protection of water quality. In addition to updating the SMP, the Ordinance:

- Created a new MMC Title 17B - Waterfront Development and Shoreline Management Regulations;
- Amended certain sections of MMC Title 17 - Zoning; and
- Repealed MMC 16.28 - First Class Tidelands and Shorelands and MMC 16.28 - Shoreline Management.

3.7.2 Puget Sound Partnership

The Puget Sound Partnership is a state agency created by the Washington State Legislature in 2007. The Partnership works collaboratively with all levels of government, tribes, businesses and citizen groups to lead and coordinate efforts to restore Puget Sound.

The Puget Sound Partnership:

- Has a firm deadline for its efforts—recovery of the Sound by 2020.
- Has lead responsibility for salmon recovery in the Puget Sound basin and the duty to ensure a sufficient water supply for people and wildlife.
- Has authority to establish and update an Action Agenda with actions and benchmarks needed for all levels of government and watershed groups.
- Is required to oversee the work toward these priorities, with tools and the responsibility to hold entities accountable.
- Geographic scope includes the entire Puget Sound basin.
- Has the responsibility to collaborate with local watershed groups and work within the existing watershed framework.
- Must use independent science advice and expertise in its work.

The Partnership created a long-term plan called the Action Agenda. The Action Agenda, first developed in 2008, explains what a healthy Puget Sound is, describes the current state of Puget Sound, prioritizes cleanup and improvement efforts, and highlights opportunities for federal, state, local, tribal and private resources to invest and coordinate. By statute, the near-term strategies and actions described in the Action Agenda must be updated every two years.

3.7.3 Climate Change & Sea Level Rise

Based on the findings of ongoing studies of current trends in climate change, winter rain events are becoming more severe, and summers are tending toward more drought. Increases in winter precipitation would likely have an effect on localized flooding frequency and also result in an increase of stream flows and susceptibility to erosion in natural water courses. Summer droughts will result in dry stream beds, unless groundwater sources are recharged (UW Climate Group).

Coastal zones are particularly vulnerable to changing conditions. Coastal hazards are associated with higher sea levels during El Nino winter and spring events, more precipitation, and increased southwesterly storms. Impacts include bluff erosion, shifting beach berms and flooding of coastal areas. Modeling efforts have shown that climate-induced drivers of changes in coastal water quality are also expected.

Key concerns with sea level rise include land loss and increased flooding of coastal areas. Most of the western Mukilteo shoreline is bordered by the BNSF railroad tracks and steep hillside bluffs. These bluffs are at increased risk for erosion and landslides due to climate change. Portions of the northern Mukilteo shoreline, particularly at and around Lighthouse Park lie at a relatively low sea level and climate change is predicted to increase the likelihood of flooding and could have an effect on property in those areas.

3.7.4 Growth Management Act

The State of Washington mandates that the City must periodically review and, if needed, revise its comprehensive plan and development regulations - every eight years - to ensure that they comply with the GMA, as per the schedule provided in RCW 36.70A.130. Cities planning under RCW 36.70A.040 must complete such a periodic update for their entire comprehensive plan and development regulations.

The City's most recent The *City of Mukilteo Comprehensive Plan 2035* (*Comprehensive Plan*) update is expected to be adopted in August 2015. Due to the fact that there are only a few remaining undeveloped parcels in the City, the focus of the *Comprehensive Plan* has shifted from managing rapid growth towards sustaining and enhancing the City as it currently exists. The *Comprehensive Plan* sets the goals and policies to ensure that Mukilteo remains safe, vibrant, and sustainable for the next twenty years. Surface Water Utility Policy Priorities are identified in the *Comprehensive Plan*.

3.7.5 Critical Areas

Critical areas include: (a) wetlands, (b) areas with a critical recharging effect on aquifers used for potable water, (c) fish and wildlife habitat conservation areas, (d) frequently flooded areas, and (e) geologically hazardous areas. These critical areas are often explicitly linked to the built and natural surface water and stormwater system. The City's wetlands, streams, and open spaces provide beneficial surface water functions, and stormwater regulations are designed to protect these important functions.

Some of the City's most problematic areas from a surface water and stormwater operation and maintenance standpoint are located in or adjacent to geologically hazardous areas, such as steep slopes. These areas are prone to erosion and landslides, especially when the earth becomes saturated from prolonged or heavy rain events.

3.7.6 City Land Use Codes and Requirements

Land use activities conducted in Mukilteo directly affect surface water and stormwater management through the creation of impervious surfaces and pollution-generating activities. The City's development code is designed to ensure that development is carried out in locations using methods that are safe, do not negatively impact public resources, and fit within the City goals and visions. Chapters 13.12 and 13.16 of the Mukilteo Municipal Code (MMC) outline the Surface Water Management, Storm Drainage Design Standards and Storm Drainage System code elements. The City has adopted the most recent version of Ecology's *Stormwater Management Manual for Western Washington* (SWMMWW) as the standard for storm water development requirements. The City of Mukilteo follows standard plans in the City's Development Standards.

The City's codes and development standards are required to be reviewed, under Section 5.4.f of the NPDES Permit. The City has begun its review of the code and anticipates adoption of any code modifications as they pertain to LID by the required date of December 31, 2016.

Chapter 4: Achievements since the 2001 Plan

In 2001, the Utility was required to adopt *basic* and *comprehensive* stormwater programs under the 1987 Puget Sound Water Quality Management Plan (the PSWQ Management Plan). The PSWQ Management Plan directed the Department of Ecology to develop minimum standards for controlling stormwater discharges. Even though the regulatory mechanism has changed through the adoption of an NPDES Permit process, many of the general categories of requirements have remained the same.

The *basic* program outlined areas of prevention, stressing source control as a first priority. The *comprehensive* programs added inspections, enforcement, and adequate funding, among other program elements. The 2001 Plan analyzed the Utility's programs at the time and compared them to the basic and comprehensive programs that were required. In the 2001 analysis, the City had met some of Ecology's requirements through its Drainage Management Code (Chapter 13.12 of MMC), but it was noted that many elements were deficient.

Since the 2001 Plan, many requirements have evolved, and the Surface Water Management code has been revised several times. Because of this, no comparison of accomplishments to rectify the deficiencies is made here. Since 2001, many Program accomplishments were made, maintenance goals were met, and capital improvement projects were completed.

4.1 Staffing

The Utility hired its first Surface Water Technician in 2013 to help meet the 2007-2013 NPDES Permit requirements and assist with development review for stormwater. In 2015, a full time Senior Administrator was hired in Public Works; 0.5 FTE is allocated to Surface Water. Additionally, since 2001, the Surface Water Utility began supporting a 0.25 FTE GIS / CAD Technician.

4.2 Surface Water Program Achievements

The City has accomplished a number of noteworthy advances in surface water management since 2001.

Accomplishments are categorized under:

- Stormwater Management Program Plan
- Coordination among NPDES Permittees and Other Agencies
- Public Education and Outreach
- Public Involvement and Participation
- Water Quality Hotline Calls and Illicit Discharge Detection and Elimination
- Stormwater Regulation Updates and Development Review
- Municipal Operations and Maintenance

4.2.1 Annual Stormwater Management Program Plan

An Annual SWMP Plan is developed, per NPDES Permit requirements. The Annual SWMP Plan outlines a set of actions and activities which the City intends to accomplish within the year to meet NPDES Permit requirements. Each year, a draft of the Annual SWMP Plan is posted on the City's website and is available for public comment for at least 60 days. After public comment and Ecology submittal, the final SWMP Plan is posted at http://www.ci.mukilteo.wa.us/Page.asp?NavID=292. The SWMP Plan addresses the requirements of each NPDES Permit component (see Section 3.1).

4.2.2 Coordination with NPDES Permittees and Other Agencies

Permit coordination with other NPDES Permittees is essential to surface water management. Through sharing of ideas and combining resources, the Utility is able to leverage regional efforts and provide input to future Permit requirements. The City actively participates on the NPDES Permit Coordinators Group, NPDES North Sound Coordinators Group, Stormwater Outreach for Regional Municipalities (STORM), Snohomish County Stormwater Outreach for Regional Municipalities (SnoSTORM)

Group, and the Stormwater Working Group Caucus. The intent of these groups is to share resources, lessons-learned, and coordination efforts on a regional basis.

In addition, the City is part of the Landslide Working Group which is a partnership between BNSF, WSDOT, Sound Transit, and the Cities of Everett and Edmonds. This facilitates the combination of resources. Resource sharing for steep slope stabilization projects benefits the railway operators and the Utility. Additionally, because many of the steep bluffs are directly managed by private landowners, the education of homeowners on private stormwater system maintenance and BMP's is beneficial to all of the entities. Recently, there has been a sharing of outreach materials and resources directed at private bluff property owners.

The City has an excellent working relationship with the Mukilteo Water and Wastewater District which has enabled us to complete joint capital projects, as well utilize their vactor truck for investigation and emergency situations.

4.2.3 Public Education and Outreach

The 2001 Plan identified the need for a more active Public Education program. The Utility has made great strides in this area; often by partnering with other regional programs. The Utility uses behavior change strategies and educational opportunities to complete its education and outreach programs.

Behavior Change

<u>Scoop the Poop</u>: In 2007, the City began public education and outreach surrounding pet waste management and disposal. The City posted "Scoop and Bag" signs in public access areas around the City, and installed "Mutt Mitt" pet waste stations at City parks. The City partnered with Snohomish County in a regional program to provide "scoop your poop" materials to the public. Staff provided materials to local veterinarians for their clients, and offered materials at the opening of the City's off-leash park adjacent to Japanese Gulch. In addition, the City passes out doggie bags and bone carriers at City events and has them available during the summer at the front counter at City Hall.

Natural Yard Care: In 2013, the City partnered with Snohomish County and neighboring municipalities to apply for the FY2013 Municipal Stormwater Grants of Regional or Statewide Significance (GROSS) grant funding. The grant was awarded, and is being managed through Snohomish County and an Interlocal Agency Agreement with all of the participating municipalities. The grant's goal is to measure residents' understanding and adoption of natural yard care techniques by comparing and evaluating two stormwater management outreach and education approaches specific to natural yard care practices targeting homeowners. North Puget Sound partner communities will conduct lecture series, while South Puget Sound partners will host small group workshops. The partnership allows for sub-regional evaluation, fielding, and refinement to administer an effective program for natural yard care practices.

In 2013, the City entered into an Interlocal Agency Agreement with the Snohomish Conservation District to provide public outreach activities using natural yard care practices and low impact development techniques. This partnership continued into 2015 with the addition of educational outreach to teachers and students through the use of the Snohomish County's Water Lessons in 2014.

Public Awareness

Puget Sound Starts Here: In 2009 the Puget Sound Starts Here (PSSH) public awareness campaign began as a result of STORM and the Puget Sound Partnership through funding from the Washington State Department of Ecology and the Puget Sound Partnership's Action Agenda for the recovery of Puget Sound. The City is part of this collaborative effort of over 750 organizations, which include federal, state and local governments, tribes and non-governmental organizations dedicated to protecting Puget Sound. The goal of the PSSH is to raise awareness of how everyday actions impact the Puget Sound and demonstrate how each individual has a vital role in the regional goal of improving the health of Puget Sound.

Telephone Survey: The City conducted a telephone survey in 2010 to measure the public's knowledge and practices regarding stormwater in Mukilteo. The goal of this survey was to understand the public's comprehension of stormwater and determine which areas could use more public outreach to educate the public on stormwater issues. Results of this survey indicated that Priority 1 issues for public outreach should be focused on how individual actions affect water quality.

Beach Watchers: In 2015, the City connected with the Snohomish County Beach Watchers to integrate stormwater messaging into its existing program, conducted at Lighthouse Park. The Beach Watchers already provided outreach and education services for City residents primarily around the marine environment. They now incorporate a stronger stormwater message into the program.

Newsletter: The City has a quarterly newsletter which has been used to get the word out about the practices that benefit stormwater.

Public Involvement and Participation

The City encourages involvement in surface water issues. The City established a Citizen Advisory Committee made up of 7 residents who were actively involved in the development of this Plan. As part of this plan, a citizen survey was sent out to all City residents to inquire about their stormwater issues and ideas, and several open houses were held to gather additional input.

Each year the City solicits public input on the Annual SWMP Plan prior to finalizing the SWMP Plan.

4.2.4 Technical Assistance

Water Quality Hotline Calls / Illicit Discharge Detection and Elimination

In 2009, the City Council adopted Ordinance 1222 which included Title 13.12.080 *Discharge of polluting matter – Illicit Connections – prohibited* and Title 13.12.310 *Enforcement.* With these regulations in place, and as required by the NPDES Permit, the City set up an Illicit Discharge Detection and Elimination (IDDE) hotline for the public to report suspected illicit discharge activities. In 2009, we received one hotline

IDDE related call and it has increased only slightly to three in 2014. Staff followed up on each of these calls. Often the only response required is outreach to the spiller. However, in some cases, clean-up of the spill is required.

Drainage / Flooding Service Requests

The City has provided technical assistance to private property owners, Homeowner's Associations, and businesses to help solve stormwater and surface water issues. The number of service requests has only begun to be tracked, during dry months in 2015. In that time period, the City responded to an average of 5 drainage complaints per month. This is presumed to be a low estimate since it encompassed some of the driest months on record.

4.2.5 Engineering - Stormwater Regulation Updates and Development Review

The City's Development Standards were updated in July 2009 by Resolution 2009-15. In addition, the MMC Chapter 13.12 *Drainage Management* was repealed in its entirety and MMC 13.12 *Surface Water Management* was adopted and MMC 17.08.020 *Definitions* was amended through Ordinance 1222.

In 2001, the Utility had no way to track its plan review and development inspection program. The Utility now uses a database (SmartGov) to track both of these. The Engineering Development staff reviewed 78 site plans in 2014, and performed 97 inspections during construction. In 2013, 55 site plans were reviewed and 79 inspections were done during construction. From 2009 to 2012, staff reviewed 35 site plans, and performed 89 inspections during construction. One reason for the increasing number of reviews since 2009 is the economic recovery from the 2008-10 recession.

Another driver of increased staff time is that the required reviews have increased. Under the Development Standards, the MMC Amendments, and the *2012 Stormwater Management Manual for Western Washington* (SWMMWW), smaller projects require stormwater review and stormwater project designs have become more complex (see Chapter 6 for further discussion). This has translated to an increase in the number of hours spent on review per site plan as well as an increase in the number of site plans reviewed.

4.2.6 Municipal Operations and Maintenance

The Stormwater Operations Division of Public Works cleans and maintains the stormwater infrastructure. One of the deficiencies noted in the 2001 Plan was a lack of documentation for maintenance activities. Because of the lack of documentation, data is only available since 2007. The division has conducted the following activities since 2007:

- Cleaned and inspected 6,381 catch basins;
- Maintained 36 detention ponds, including vegetation management and sediment removal;
- Inspected 73 structural BMPs, including ponds and vaults

In addition, the division has constructed small localized improvements to the City's drainage system.

4.2.7 Stormwater Infrastructure - GIS Database

With assistance from a Consultant, the City created a geodatabase of the stormwater assets in the City and the surrounding growth area. The City followed up with a geodatabase of the known outfalls located in the City. The information in the database has never been field verified, and is being continually updated. The City posts a Stormwater Atlas on the City's website, making maps of the public stormwater infrastructure available to the public. This is often useful to developers as a starting point for designing their stormwater project.

Benefits of the database to the City include collection and storage of key attributes for each asset in the system. The mapped network can help City staff trace suspected illicit discharges. Finally, the City can use the geodatabase to model stormwater and understand the hydrologic impact of management decisions. For example, the geodatabase was used in modeling the Capital Projects for this Plan Update.

4.2.8 Stormwater Pollution Prevention Plan (Public Works Shop)

In 2011, the City developed a Stormwater Pollution Prevention Plan (SWPPP) for the Public Works Shop. The objectives of the SWPPP are to:

- Identify locations of all materials that could cause pollution if spilled or otherwise released into the environment;
- Identify all storm conveyances, treatment facilities, and discharge points to aid in the isolation of contaminants should any be spilled into the system;
- Identify locations of spill containment equipment and materials;
- Implement and maintain best management practices (BMPs) that identify, reduce, eliminate, and/or prevent the discharge of stormwater pollutants;
- Prevent violations of State surface water quality, groundwater quality, and sediment management standards;
- Eliminate unpermitted discharges and other illicit discharges to storm drainage systems;
- Provide information to staff on BMPs for the Public Works Facility.

4.2.9 Capital Projects Completed

The 2001 Plan identified 74 problem areas, and ranked nine of the "Top-priority Citywide Problems," shown in Table 4-1. This table has been updated to reflect the current status of the previously identified high-priority projects. In some cases, the problem areas were not mapped or documented with exact locations. With the change in personnel, it is unknown whether the project was completed. These are noted as "unknown." Projects identified as "not completed" since 2001 were rolled into the Capital Project analysis for this Plan Update. Conversely, the City has completed several capital projects that were not on the original high-priority list.

TABLE 4-1: 2001 RANKING OF TOP-PRIORITY CITYWIDE PROBLEMS

2001 Problem ID	Description from 2001 Plan	Current Status
M1	At 126th Street SW cul-de-sac, in ravine below, there is erosion from outfall. Water from outfall flows along road into creek. Road is eroding causing siltation in creek.	Development project resolved the problem.
E1	At 53rd Avenue W, north end of street past 80th Street SW, the area floods due to lack of drainage.	Not addressed
M4	West of Cyrus Way, upper end of creek, there is vehicular traffic across creek bed.	Unknown
CB11	At intersection of First Street and the Mukilteo Speedway, storm water flow off ferry holding area in front of Ivar's is a problem. Stormwater flows east down the middle of road to Park Ave. No water quality control or oil/water separator. Type 2 on First St. inadequate capacity, which all connects to State Park next to bulkhead on First St. Floods street and parking on First St. up to Buzz Inn.	Addressed through Ivar's remodel and other development projects
CB10	No tide gate on the Park Street outfall. Water depth of 1.5 feet at high tide and runoff. Water backs up to First Street during high tide events (only).	Currently on Tier 2 list for 2015
I19	Pipe collapsing or groundwater transporting the pipe bedding material. Creating pond on 59th Ave. W.	Maintenance of local detention pond solved this issue
D13	There is no outfall on the system. It dead-ends at the Bell property.	Completed in 2001 as part of Horizon Heights
G11	Inadequate capacity due to open ditch, shallow pipe, steep grade, and small pipes.	Not addressed
H12	Sheet flow over all properties west of 63rd Place W.	Completed 2004

Completed projects are described below in table format, for the following categories:

- Flood Reduction Projects
- Emergency Projects
- Water Quality Improvement Projects
- Habitat Improvement Projects
- Other Projects

TABLE 4-2: FLOOD REDUCTION PROJECTS SINCE 2001

YEAR	PROJECT TITLE	PURPOSE / DESCRIPTION
2001	Horizon Heights Outfall	Install detention pipe, storm drain pipe and outfall at the northernmost portion of East and West Horizon Drive, conveying down the adjacent steep slope.
2001	2nd Street / Prospect Ave to 3rd St / Cornelia Ave	Install storm drainage on Cornelia Avenue and Prospect Avenue from the alley south of 3rd Street to the existing storm drainage facilities on 2nd Street.
2002	Olympic View	Install new control structure and redirected flow to new pipe system on Clover. Extended curb on Mukilteo Speedway from Clover Lane to Horizon Heights. Inlet pipe upsized on 19th Court to reduce flooding.
2002	64th Place W	Install infrastructure to collect stormwater from 64th Pl W and surrounding residences; conveyed to facilities on Marine View Drive.
2002	89th Place SW	Enclosed open ditch and upgraded existing system to match the downstream system on 89th Place SW. Installed a new control structure and improved access to a detention pond on 46th Place W.
2004	63rd Pl West	Enclosed existing drainage ditches along 63rd Place West; conveyed it to the bottom of the adjacent steep slope and Big Gulch Creek through an energy dissipater. Extruded curb installed to direct roadway surface water to catch basins.
2004	19th Drive	Enclosed drainage ditches along the north side of 19th Dr. Installed extruded curb.
2004	46th Place W	Installed storm drain lines and a slight swale along the back of properties abutting 46th Place W.
2005	2393 MSW	Replaced and extended an existing outfall pipe, and installed an energy dissipater at the outlet at 2393 Mukilteo Speedway.

2005	91st Pl SW	Intercepted the storm drainage pipe under 91st Place SW. Conveyed it along the roadway to the existing outlet point for the 'decorative' ponds. Installed energy dissipater at the outlet of the system to minimize erosion.
2005	Webster Way, 63rd Pl W / 64th Pl W	Installed piping and a stormwater outfall to convey stormwater off of Webster Way, 63rd Place West, and 64th Place West to the bottom of the adjacent steep slope and Big Gulch Creek.
2006	Misc. Pipe installation	Installed stormwater pipe and new pavement on45th Place, 48th Avenue W., and 49th Avenue W to better capture runoff. Routed it to the City's 76th Street storm system.
2006	Bayview Pond Pipe	Installed new storm drainage pipe to provide better runoff conveyance to the Bayview Detention pond, and to help alleviate erosion in the existing ravine.
2006	Pine Crest Detention Pond	Expand and retrofit the Pine Crest North detention pond (1000 Block of Hill Street) to increase the storage capacity and reduce downstream flooding.
	92nd Street Park Drainage Improvements	Installed drainage to capture the water and direct it to the existing storm drainage system, reducing local flooding problem.

FIGURE 4-1: FLOOD REDUCTION PROJECT - PINE CREST DETENTION POND

TABLE 4-3: EMERGENCY PROJECTS SINCE 2001

YEAR	PROJECT TITLE	PURPOSE / DESCRIPTION
2007	Big Gulch Emergency Sewer Line Repair Project	200 feet of exposed sewer pipe was damaged during a November storm and posed an imminent threat to Big Gulch. The Mukilteo Water and Wastewater District reconstructed the sewer line and enhanced Big Gulch Creek through the addition of appropriate embankment materials, hydraulic controls, woody debris, and riparian vegetation.
	Mukilteo Lane Slide Repair	Installed a soldier pile wall to correct a road base failure; fill behind the wall; and repave the road. Installed curbing and storm drainage conveyance facilities.
	63rd Street Slide Repair	A slide off the end of 63rd Street SW above the Mukilteo Water and Wastewater District's Wastewater Treatment Plan put the City's storm drain line and the District's sewer line at risk. The District and the City entered into an ILA and shared in the cost of the cost of the project. Added an additional storm drain line and swale to catch water prior to the slide area.

2013	Edgewater Outfall	Installed catch basins, above ground HDPE piping, and an outfall with energy dissipation at Edgewater Creek. Emergency declared by Council in October of 2013 for the slide repairs at Mukilteo Boulevard and Edgewater Creek.
2013	Wastewater Treatment Plant Road Drainage Improvements	On August 29, 2013, a large storm event caused the road to the Wastewater Treatment Plant to wash out. Installed new piping, catch basins and a culvert under the road into Big Gulch Creek; changing the drainage route to prevent future occurrences.
	92nd Street Slide	The project installed a soldier pile wall to prevent failure of the roadway in the 6100 block of 92nd Street. Enclosed an open ditch and installation of an interceptor pipe.
2015	Harbour Heights Parkway	The 36” stormwater pipe was impacted by a small slide within the ravine. The project stabilized the pipe throughout the entire section of the ravine.

FIGURE 4-2: EMERGENCY PROJECTS

Big Gulch High Flow Pipe
Treatment Plant Road Drainage

TABLE 4-4: WATER QUALITY IMPROVEMENT PROJECTS SINCE 2001

YEAR	PROJECT TITLE	PURPOSE / DESCRIPTION
2012	Watershed-Based Stormwater *Strategies Plan*	Developed the *Strategies Plan* Outreach effort to help combat increased erosion in gulches, degradation of habitat and deterioration of the health of Puget Sound related to high stormwater flows.
	Lighthouse Park Phase II	Constructed LID features to treat stormwater from Lighthouse Park, as part of the Park Improvement project.

2012	Mukilteo Estates Pond Retrofit (Smugglers Gulch LID Projects)	Graded pond to increase capacity. Water quality enhancement made. Funded by Ecology to retrofit pond and construct LID projects within the Smuggler's Gulch drainage basin (the Smugglers Gulch Grant).
2015	50th Place Pond Retrofit (Smugglers Gulch LID Projects)	Retrofit an existing stormwater pond located in the 9000 block of 50th Place W. Redirected streamflow around the detention pond and increased the capacity of the pond, improving flow control and enhancing water quality. Two of 4 constructed with the Smugglers Gulch Grant.
2015	44th Ave W. and 49th Ave W. Bioretention Swales (Smugglers Gulch LID Projects)	Retrofit existing ditches with bioretention swales, increasing the capacity and providing water quality treatment. Third and 4th of four projects with the Smugglers Gulch Grant. Design phase paid with 2013 Stormwater Capacity Grant from Ecology.
2013	Olympic View Middle School Bioretention Swales (Design only)	Designed bioretention swale to be located on the west side of the property, between the drive lane and the development to the west through the 2013 Stormwater Capacity Grant from Ecology.
2013	56th Ave. W. Bioretention Swales (Design Only)	Designed bioretention swale to be located on the 56th Avenue West within the existing shoulder on the west side just south of the intersection with 92nd Street SW.

FIGURE 4-3: WATER QUALITY IMPROVEMENT PROJECTS

Lighthouse Park Phase II
Mukilteo Estates Pond
50th Place Pond Retrofit

TABLE 4-5: HABITAT IMPROVEMENT PROJECTS SINCE 2001

YEAR	PROJECT TITLE	PURPOSE / DESCRIPTION
2009	Japanese Gulch Fish Passage – Phase I: Box Culvert Improvements	In 2009, the City, Snohomish County Airport, and WDFW partnered to remove fish passage barriers in Japanese Gulch. Phase I added a combination of baffles and boulder placements to concentrate and deepen the flow of water through the existing box culvert.
	Japanese Gulch Fish Passage – Phase II: Fish Ladder	Phase II of the project was located at a perched culvert approximately 260 feet upstream of the railroad crossing. Installed a fish ladder to provide access to the perched culvert under the Boeing Railroad spur. Placed baffles in the culvert to make fish-passable.
2011	Japanese Gulch Fish Passage – Phase III : Stream Relocation/Reconstruction	Phase III of the project realigned the stream south of the Boeing Railroad spur. Moved the creek from the engineered channel to the historical, included placing cobble substrate and Large Woody Debris (LWD) for fish habitat.
2010	Japanese Gulch Fish Passage – Phase IV: Fish Passage Weirs to the Pond	Reports of salmon in the creek were made during the fall of 2010. The Tribes requested investigation of the possibility of connecting the Japanese Gulch wetland, just south of Mukilteo Lane, to Japanese Gulch Creek to further improve salmon rearing habitat. The project built a fish ladder out of natural log materials on the upland sides of the outfall.

FIGURE 4-4: JAPANESE GULCH HABITAT IMPROVEMENT PROJECTS

TABLE 4-6: OTHER PROJECTS SINCE 2001

YEAR	PROJECT TITLE	PURPOSE / DESCRIPTION
2015	Bayview Stormwater Pond Fence Replacement	The project replaced an existing fence surround the detention pond. The fence provides safety and security for the facility.
	Fence Replacement 108th St. & 53rd Ave. Pond	The City replaced an existing wooden fence around a .33 acre detention pond.
	Fence Replacement 107th St. & Chennault Beach Pond	The project replaced a rotten fence around a detention pond.
2012	GPS Field Equipment	The City purchased a GPS Trimble Unit and a Tablet Computer which allows staff to collect data in the field and input it into our GIS base map. This equipment has helped track maintenance efforts over the past three years.

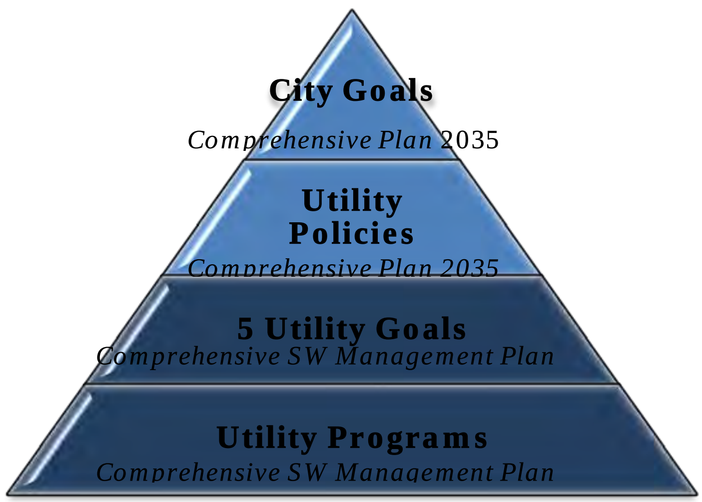
FIGURE 4-5: BAYVIEW POND FENCE

Chapter 5: Surface Water Utility Policies and Goals

5.1 Surface Water Utility Policies

The *Comprehensive Plan* lays out seven Goals to Achieve a Livable Mukilteo, and identifies seven Utility Policies, three of which apply to the Surface Water Utility. This Plan Update directly supports several City-wide goals and operationalizes the Policies. Figure 5-1 shows how the Utility has a direct role in supporting the City Goals outlined in the *Comprehensive Plan*.

FIGURE 5-1: HOW UTILITY PROGRAMS SUPPORT CITY GOALS



The Utility Supports a FLOURISHING NATURAL ENVIRONMENT. The Utility strives to ensure the natural environment flourishes and thrives. The Utility works to *protect environmental resources & habitat* through development review and implementing and enforcing local and regional stormwater regulations. The Utility's Stewardship, Outreach and Involvement program provides Mukilteans direct access to information on how they can reduce their negative environmental impacts *through minimizing the* *use of toxic products*. Staff training includes procedures on best management practices that *model environmentally-friendly practices.*

<u>The Utility Supports a HEALTHY BUILT ENVIRONMENT.</u> As part of the stormwater operations and maintenance, the Utility proposes to evaluate and maintain existing infrastructure to achieve and *maintain a quality built environment*. This means that new infrastructure is built to appropriate standards, ensuring that our surface waters are managed as a renewable resource.

<u>The Utility Supports a VIBRANT ECONOMY.</u> The Surface Water Utility is funded through stormwater utility fees, paid by residents and businesses. The Utility strives to keep the fees as low as possible, while still meeting the Utility's needs in a fiscally responsible manner. This is achieved through a planning process yielding a *budget that manages long term revenues & expenditures.* The Utility evaluates the resources required to provide stormwater services that benefit the public, plan for the future, and appropriately balance risks with costs. The Utility *supports and promotes innovative industries* through the use of emerging technologies in stormwater.

<u>The Utility Supports AUTHENTIC PARTICIPATION</u>. Public involvement and education is an integral part of stormwater management in Mukilteo. City staff actively solicit public feedback on the direction of the Utility through a *collaborative community planning* process that included Open Houses and a Citizen Advisory Committee. The Utility strives to provide opportunities, both large and small, for public engagement in surface water issues. Many of the defined performance standards and processes recommended in this plan support a *transparent and responsive leadership*.

<u>The Utility Supports a HEALTHY COMMUNITY</u>. A healthy community should have *clean water*. The Utility's goal is to manage surface water and stormwater water so that it doesn't negatively impact the City's aquatic natural resources. The Utility also provides outreach and tools for residents to make behavior changes that can help reduce water pollution. The utility promotes stewardship over water resources.

The Utility Supports INNOVATION: The Utility can set an example of *creative problem solving partnerships.* Examples include working with residents to solve issues to the City's surface waters, considering innovative development proposals, and partnering with neighboring jurisdictions working toward the same goals of sustainability and clean water.

The Surface Water Utility adopts the following Policies found in the *Comprehensive Plan*.

UT1: The location, construction, operation, and maintenance of utilities shall minimize impacts to the natural and human environment by using current best management practices to ensure safety and protection of public health, safety, and welfare.

UT6: Surface water management planning and operations shall comply with City, State, and Federal surface water regulations and be consistent with the City of Mukilteo *Comprehensive Plan*.

UT6a: New and reconstructed stormwater collection, conveyance, and treatment systems and the construction and reconstruction of streets shall comply with all NPDES requirements and City design standards.

UT6b: Periodic updates of the City of Mukilteo Surface Water Management Plan (or its equivalent) shall be undertaken as needed to ensure the stormwater management utility is effective and rates are adequate to finance the operation of the utility.

UT6c: Only stormwater shall be allowed to be discharged into the stormwater system

UT6d: Drainage, flooding, and stormwater run-off impacts shall be minimized to the maximum extent practicable in land use development proposals and City operations.

UT7: Streams and wetlands should be an integral part of the stormwater management system provided they are protected from the negative impacts created by altered flow regimes and pollutant sources.

UT7a: A stormwater management program using best management practices should be implemented for flow control and water quality treatment that protects wetlands and streams from impacts generated by upstream development and should include planning at the watershed basin scale.

UT7b: The preferred development and redevelopment stormwater management alternatives are low impact development strategies and the protection of critical areas, major wetlands and drainage functions.

UT7c: Techniques that protect wetlands and other critical areas which play a positive role in improving water quality and mitigating peak flows should be considered, including but not limited to, delineating their locations, adopting additional land use regulations to protect them, and purchasing of development rights.

5.2 Surface Water Utility Goals

The Surface Water Utility supports the City's goals and policies through operational, technical, and outreach programs that are geared toward stewardship of the Utility and of the City's surface waters. This stewardship is realized through achievement of the Utility's six goals explained below.

5.2.1 Reduce Localized Flooding

Flood reduction involves reducing flood hazard safety risks, flood damage to public and private properties from public drainage, and disruption of critical City services. Contributing factors for flooding can include each of the following, either separately or in conjunction, depending on the event:

- Changing hydrology due to development

- Deferred maintenance of the stormwater infrastructure
- Storm events that exceed the designed capacity of the stormwater infrastructure

The Utility can reduce the risk of flooding through its Operations and Maintenance Program, Engineering Development Services, and Capital Projects by:

- Completing scheduled maintenance on the stormwater infrastructure
- Regulating development and redevelopment projects in a sustainable fashion
- Identifying opportunities for improvements of the stormwater network, and establish a financially sustainable plan for capital projects

5.2.2 Mitigate Stormwater Impacts to Steep Slope Areas

Mitigating stormwater impacts to steep slope areas involves maintaining the stormwater network to its design and maintenance standards, and reducing upstream localized flood hazard safety risks. Contributing factors for stormwater impacts to steep slope areas can include each of the following, either separately or in conjunction, depending on the event:

- Changing hydrology due to development
- Deferred maintenance of the stormwater infrastructure
- Storm events that exceed the designed capacity of the stormwater infrastructure
- Underlying geology and steep slopes

The Utility can reduce the impact of stormwater on steep slopes through its Operations and Maintenance Program, Engineering Development Services, and Capital Projects by:

- Regulating development and redevelopment projects in compliance with State regulations
- Completing scheduled maintenance on the stormwater infrastructure
- Providing technical assistance to property owners on stormwater facility maintenance and stormwater management on steep slopes

- Identifying areas of risk based on underlying geology

5.2.3 Protect and Improve Water Quality

The protection and improvement of water quality is a complex undertaking for the Utility, and requires a multi-pronged approach. To add to the complexity of addressing the problem, the Utility must also be sure to meet regulatory requirements, especially as they relate to protecting Beneficial Uses and its NPDES Phase II Permit. Examples of contributing factors to degrading water quality include cumulative deleterious impact from:

- Unregulated and/or unmonitored industrial practices
- Residential practices such as fertilizer application
- Pet waste left unattended
- Unmaintained stormwater infrastructure (both public and private)
- Illicit spills and dumping down storm drains

The Utility can protect and improve water quality through it Operations and Maintenance Program and Public Outreach by:

- Conducting technical assistance to businesses whose practices may impact stormwater
- Operating a comprehensive outreach program on how individuals can effect change
- Completing scheduled maintenance on Public stormwater facilities
- Ensuring that Private stormwater facilities are maintained
- Operating a comprehensive Illicit Discharge Detection and Elimination Program

5.2.4 Educate Public on Surface Water Issues

Because many of our surface water pollution issues are a direct result of every day actions taken by individuals, it is important to have a robust public outreach program. The outreach program should address a number of specific issues, and should reach the entire community, through different avenues. Efforts should:

- Be socially equitable
- Promote behavior change (not just education)
- Provide positive alternatives to promote behavior change

The Utility's Community Stewardship, Outreach and Involvement Program should have outreach programs focused on:

- Pet waste clean up
- Natural yard care
- Business outreach
- Mobile business outreach
- Others as identified and as partnerships arise

5.2.5 Protect and Enhance Stream and Wetland Functions

The City has many areas with streams, wetlands, and natural habitat that provide value to the City's surface water Utility, water quality, and the City's residents. While there are many regulations related to stream and wetland habitat enhancement, especially where salmon habitat is concerned, the Utility benefits from preservation of native vegetation, natural habitat, and habitat enhancement projects. Efforts should continue to:

- Identify and preserve existing healthy habitat,
- Enforce development standards that mimic natural hydrology and preserve native species and habitats, and
- Provide public education and help coordinate efforts to protect or enhance habitat.

The Utility may support stream and wetland enhancement capital projects where there is a direct linkage to stormwater flooding, water quality, or erosion.

5.2.6 Manage Programs with Long Term Planning

The Utility's Programs should be managed through long term planning processes. Basin analyses can provide long term solutions to identified problems. Asset management can increase infrastructure longevity. Regular inspections and maintenance can assure structural integrity of stormwater facilities to assure the designed flow control and pollution control objectives are being met. Pipe maintenance assures flow is directed into predicted flow paths, reducing flooding. With regular maintenance, the City will require fewer capital improvement projects over the long term. Financial planning assures that the Utility's rates meet the Utility's needs and that the dollars are aligned with Utility goals.

Long term basin planning, financial planning, and asset management of stormwater infrastructure benefit the City by:

- Prolonging the life of the infrastructure,
- Identifying emerging issues prior to failure,
- Reducing the overall cost of improvement projects,
- Providing a financially sustainable rate structure for the Utility, and
- Reducing negative impacts to water quality.

Long term planning efforts should include:

- Routine maintenance programs with defined schedules and standards,
- Watershed basin planning to identify opportunities and barriers to stormwater improvements,
- Asset management program to prioritize asset repairs and define a replacement schedule,

- Annual evaluation of the Utility's Performance Measures, including appropriate adjustments to meet changing needs, and
- Evaluation of the Utility rate structure in 2021.

5.3 Relationship between Utility Goals and Programs

The Utility supports the *Comprehensive Plan* by meeting the Utility's specific goals outlined above. These goals are met through various programs and activities conducted by the Utility. These programs are outlined in Chapters 6 and 7. Chapter 8 then outlines a method to evaluate the Utility's program achievements through Performance Measures. The Utility expects that if it has met the Performance Measures, as laid out in Chapter 8, during the term of this Plan, it will have met the goals above.

There is overlap between the different goals, policies, and programs outlined above, but Table 5-1 below highlights the major points of intersection among them.

TABLE 5-1: RELATIONSHIP BETWEEN CITY GOALS, POLICIES, AND SW UTILITY GOALS

City Goal	City Utility Policy	Utility Goal	Utility Programs
Flourishing Natural Environment	UT1: Minimize impacts to human and natural environment UT6c: Only rain down the drain UT6d: Reduce negative stormwater impacts UT 7: Protect streams and wetlands from negative impacts of surface water	1: Reduce Localized Flooding 2: Mitigate Stormwater Impacts to Steep Slopes 3: Protect and Improve Water Quality	→ Operations and Maintenance → Engineering Development Services → Technical Assistance → Capital Projects → Community Stewardship, Outreach and Involvement → Capital Projects
Healthy Built Environment	UT1: Minimize impacts to human and natural environment UT6a: Stormwater development must meet City and State standards	1: Reduce Localized Flooding 2: Mitigate Stormwater Impacts to Steep Slope	→ Operations and Maintenance → Engineering Development Services → Technical Assistance → Community Stewardship, Outreach and Involvement → Capital Projects
Vibrant Economy	UT6b: Update Comp SW Plan Update and evaluate surface water rates	6: Manage Programs with Long Term Planning	→ Basin Planning → Asset Management
Authentic Participation	UT6c: Reduce negative stormwater impacts	4: Educate Public on Surface Water Issues	→ Community Stewardship, Outreach and Involvement
Healthy Community	UT1: Minimize impacts to human and natural environment	3: Protect and Improve Water Quality	→ Operations and Maintenance → Engineering Development Services → Technical Assistance → Community Stewardship, Outreach and Involvement
Innovation	UT7c: Use all methods available to protect streams and wetlands	1-6: Incorporated into all Goals	→ Incorporated into all Programs

Chapter 6: Level of Service Analyses to Meet Utility Goals

This section includes an evaluation of level of service (LOS) alternatives for the Utility's current programs. For many, but not all, of the programs within the Utility, staff examined two LOS alternatives. The two levels of service are referred to as Level of Service 1 (LOS 1) and Level of Service 2 (LOS 2).

LOS 1 options are defined as meeting the NPDES Permit requirements, or keeping up with basic maintenance. LOS 2 options include meeting NPDES Permit requirements, and include a long range programmatic approach. A financial analysis was run for all LOS options considered. In programs where a higher level of service was needed to bring the current program up to a LOS 1 standard, a LOS 2 option was not considered. This decision was made to reduce the financial impact to the rate payers. Expanding the Utility's program to meet NPDES requirements is mandatory. Any current LOS that did not meet minimum regulatory requirements was not considered a viable option.

6.1 Introduction

The LOS options were weighed against the Utility goals outlined in Chapter 5. Recommendations are made that meet those Goals. This chapter only reviews LOS options for existing programs. Any proposed new programs are included in Chapter 7.

This analysis was conducted based upon the current (2013-2018) NPDES Phase II permit requirements. In 2018, there will be a new NPDES Phase II Permit. It is possible that new permit requirements could vary from this analysis. The Utility should reevaluate the programs impacted by the Permit. If the revised permit requirements significantly differ from the current Permit, the Utility should make appropriate adjustments.

The following sections describe the Utility's existing programs and a LOS analysis for each of the Utility's major programs. The identification of what each LOS included was developed by Utility staff. The cost implications are evaluated in Chapter 9, Financial Analysis.

The Surface Water Utility manages a suite of programs that reduce flooding, protect and improve water quality, and protect and enhance aquatic streams and the Puget Sound. Meeting these surface water management goals as well as compliance with the NDPES Phase II Permit requires coordination of activities in several City departments. For this report, the collection of current surface water management activities are organized into the following programs, with staffing considerations included at the end of the Chapter:

- Operations and Maintenance
- Engineering Development Services
- Technical Assistance and Code Enforcement
- Community Stewardship, Outreach & Involvement
- Monitoring and Research
- Capital Improvement Program
- Staffing

These programs are carried out largely by the Public Work Department, with assistance from Planning and Community Development and Finance.

6.2 Operations and Maintenance (O&M)

The Public Works Department provides operations and maintenance services to the City's Utility. The operations staff identify needs and respond to citizen drainage concerns. Infrastructure maintenance needs are identified by staff through regular maintenance activities and citizen reports.

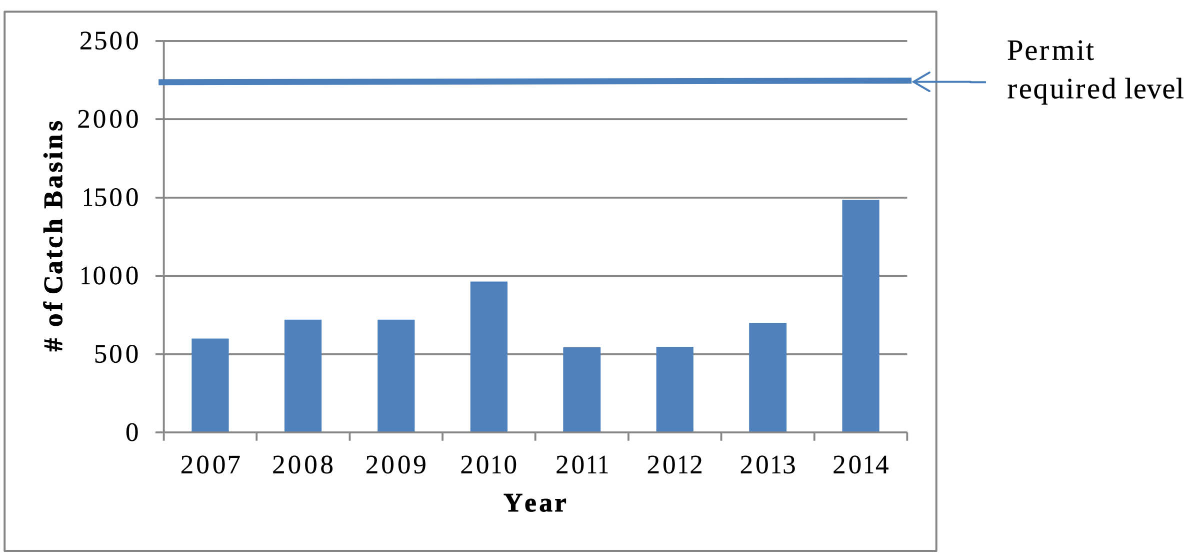
An emphasis on asset management, pipe inspections, and maintenance of the infrastructure is a major change proposed for the Utility. Chapter 7 includes a summary of the benefits of an asset management program and a level of service analysis for this program element.

6.2.1 O&M Existing Program

The existing O&M Program is largely reactive in nature. Maintenance and repairs are handled on a complaint driven basis. Often, a resident will create a Service Request and, upon inspection, it will be determined whether the Utility has the resources to repair or remedy the maintenance issue. Projects are handled on a case-by-case basis and priorities are made based on whether staff has capacity to complete the project combined with how large of an impact the issue has on roads, private property, and other infrastructure. There are no written procedures on when Utility funds are spent on drainage issues and when they are not, leading to an appearance of inconsistency.

Catch Basin Inspections: The City is responsible for approximately 4,700 catch basins. Since record keeping began in 2007, an average of 17% of the City's catch basins have been have inspected (and cleaned) per year (see Figure 6-1). The City rents a vactor truck annually to complete this work. Because of the condensed timeframe of the vactor truck rental, staff are dedicated to only catch basin work during the rental time period. This leads to inflexibility in staff to attend to other items for up to two months per year.

FIGURE 6-1: PUBLIC CATCH BASIN ANNUAL INSPECTION



Publicly Owned or Operated Flow Control/Water Quality Facilities: Some of the City's ponds have had regular vegetation maintenance and a few have had sediment removal over the past several years to return them to their design function. In 2014, it was recognized that there was outdated and inconsistent documentation of existing Public stormwater flow control and water quality facilities.

In early 2015, the Utility compiled a comprehensive list of public flow control and water quality facilities for annual inspections, including ponds, vaults, and detention tanks (Appendix F). This list may evolve as further investigations are conducted. In the 2001 Plan, there were a total of 69 facilities identified; with only 23 positively identified as belonging to the City. Currently, there are 115 identified publicly owned or maintained facilities; at least doubling the Utility's responsibility for maintenance and repairs.

Ditch Maintenance: From 2001 to 2014, ditch maintenance was not a high priority for the Utility. In 2014, the Utility changed direction and removed excess sediment from many of the City's ditches that had reduced capacity. The goal of the 2014 effort was to address all ditches in need of maintenance. It is anticipated that no major maintenance will be required over the next two years. Scheduled inspections to determine maintenance needs are not completed at this time.

Street Sweeping: In 2008, the City purchased a street sweeper. In 2011, a sweeping plan was drafted for the City, which outlines sweeping frequencies based on road type. In 2014, the street sweeper operated 502 hours and cleaned 2,554 lane miles of roads in Mukilteo. No records were kept prior to 2014, but it is estimated that 2014 was approximately a 25% increase over past sweeping efforts.

GIS Stormwater Inventory – Field Operations: The City first mapped its stormwater infrastructure in GIS in 2011. The O&M Program began using mobile GIS devices to track catch basin inspection and cleaning efforts in 2013. With the infrastructure mapped in GIS, field staff have the ability to make on-the-spot map changes as part of a regular inspection routine. This allows for easy reporting on annual maintenance efforts (an NPDES Permit requirement).

6.2.2 O&M Program Level of Service Alternatives

The current level of service does not meet the metric for LOS1. Because the Utility was striving to keep costs low, only one level of service alternative was considered for O&M. LOS 1 includes augmenting the current program outlined above to be NPDES compliant. Table 6-1 summarizes the elements of LOS 1.

Catch Basin Inspections: The LOS 1 program increases the catch basin inspection and maintenance program to be consistent with the NPDES requirement of 50% per year (currently 17% per year). It considers maintaining consistent documentation of work done. Tracking of sediment loading should be implemented to further refine an inspection and maintenance program. Tracking helps understand where source control measures may be a more effective tool than sediment removal. Tracking also helps identify how resources can be best allocated to areas with higher sediment loading rates. This is an increased level of effort and will require additional staffing.

Public Stormwater Facilities: The LOS 1 program would increase the inspection program of flow control and water quality facilities to an annual program. The NPDES Permit requires that all publically owned facilities be inspected annually; with maintenance deficiencies to be rectified within 6 months of discovery. The intent of the requirement is to identify maintenance issues early to assure that the facilities are functioning as designed.

This inspection approach is beneficial to the utility for three reasons. First, the Utility is able to rectify small maintenance needs at little cost, but with great benefit to water quality or flow control. For example, often flow control structures need minor repair to function properly. Properly functioning structures help protect the downstream receiving water from scouring flows. Secondly, recognizing and repairing minor maintenance needs can prevent larger system failures in the long term. Finally, aging infrastructure or other deficiencies are more likely to be recognized with a consistent inspection program. These larger deficiencies can then become part of a repair and replacement program.

There are several stormwater vaults on SR525 that were installed as part of a WSDOT road project. WSDOT has provided its interpretation of RCW 47.24.020, subsequent clarification provided by the Association of Washington Cities, and WAC 468-18-050. The City should continue to work with WSDOT and come to a final decision on whether it agrees with WSDOT's claim that the City is responsible for inspection and maintenance of these vaults. If the City agrees with this interpretation, this will be an increased level of effort, and require additional staffing, and potentially additional equipment.

Ditch Maintenance: Over time, sediment loading from roads can fill in ditches, decreasing conveyance capacity. Ditch maintenance assures that the design capacity of the conveyance system is operating properly. The City should evaluate the need for a ditch inspection and maintenance program. Based on initial inspections, a rotating schedule of some percentage of the City could be inspected and maintained each year. This is an increased level of effort.

Street Sweeping: While street sweeping provides benefits to street maintenance, and City aesthetics, it is also an important part of stormwater management. By picking up sediment before it enters stormwater infrastructure, it reduces the need for more labor intensive removal with a vactor truck. Sweeping also helps improve water quality. Many pollutants are picked up in road sediment, and the sweeper keeps those pollutants from entering the stormwater system. Sweeping in the fall months removes leaf litter that can plug stormwater inlets, reducing localized flooding. Sweeping can also be a good response tool to an unanticipated spill in the City.

It is recommended to review the current level of service outlined in the 2011 Street Sweeper Plan and determine whether the plan still fits the City's needs. The 2014 efforts exceeded the total hours outlined in the 2011 Sweeping Plan. Staffing levels for the street sweeper function should be adequate to meet any sweeper needs during the next five years.

Pipe Maintenance Program: The City currently does not have a pipe maintenance program. A comprehensive inspection is recommended in Chapter 7. Once this is complete, the Utility should develop a pipe maintenance program. This will not result in a higher level of service, until the inspections are complete. It is recommended that the initial pipe inspection be conducted via contract because the inspections are an infrequent event, equate to a large enough temporary increase in workload to strip staffing capacity, require specialized training, and expensive specialized equipment, and software programs for analysis.

GIS Field Programs: Continue to support field staff with GIS-based technologies to track and report inspection and maintenance efforts. This will require an analysis of software that has a field component, or of programming the GIS to be field friendly. See Section 6.5 below for more discussion on GIS needs.

Other NPDES Requirements – Trainings: Complete regular trainings for O&M staff on inspection and maintenance of Low Impact Development projects, and BMP implementation for City operations.

TABLE 6-1: O&M - LEVEL OF SERVICE SUMMARY

LOS 1 - Current Program Plus Meet Regulatory Requirements
Current Program: Maintain current O&M program including: • Annual city owned catch basin inspection & maintenance (approximately 17% of system per year) • Water quality and flow control facilities: Inspection/maintenance as identified and budget allowed • Ditch maintenance (no programmatic approach) • Street sweeping (per 2011 plan) • Maintain new infrastructure as it is constructed • GIS field applications; used for catch basin maintenance records LOS1 Program Elements: • Update maintenance practices/frequencies to meet NPDES requirements (catch basins 50% of system per year; public water quality and flow control facilities annually) • Develop ditch inspection and maintenance program that identifies need and standards for maintenance. • Street sweeping – Analyze level of service outlined in 2011 Sweeper Plan • Adopt infiltration facility inspection and maintenance practices to meet new LID facility requirements (vegetation management, soil replacement) • Develop regular pipe cleaning program resulting from video inspection

program element of Asset Inventory and Management. Implementation of this program should be considered as part of the next financial evaluation of the Utility.

- Provide required trainings to staff for best management practices for clean water in City operations
- Add 2.0 FTE Maintenance Level I

6.2.3 O&M Recommended Level of Service

LOS 1 is recommended for the O&M Program. This option helps achieve the Utility goals of meeting current regulations. It emphasizes preservation of the existing infrastructure while balancing the desire to keep utility rates low by avoiding new costs. Due to the increased level of inspections and maintenance work, it is recommended that 2.0 FTE Maintenance Level I positions be added to stormwater operations.

6.3 Engineering Development Services

The Engineering Development Services programs provide assistance, review, and inspections services to the development community for projects with stormwater components. The level of service options are discussed below and summarized in Table 6-2.

6.3.1 Engineering Development Services Existing Programs

Stormwater Development Standards: Chapter 13.12 Surface Water Management of the City of Mukilteo Municipal Code and the City's Development Standards guide and define stormwater development requirements for the City. In Chapter 13.12.040, the City has adopted the most recent version of Ecology's SWMMWW as the standard to which all development projects need to comply. Because the SWMMWW and the City's Development Standards are not updated concurrently, the City defers to the SWMMWW as the prevailing document. The Development Standards were last updated in August 2012, prior to the release of the 2012 SWMMWW. The 2012 SWMMWW has some significant differences from the 2005 version; therefore there is a gap between the City's Development Standards and the 2012 SWMMWW.

Development Review and Inspections: The City's Surface Water Technician reviews the stormwater components of permit applications. With the Assistant City

Engineer, the Surface Water Technician develops new surface water design regulations and presents them to Council for adoptions. The Engineering Division, in coordination with the Planning and Community Development Division, develops methods, tools, and policies for increasing implementation of Low Impact Development in the City.

Depending on the level of development activity in any given year, surface water staff may review over 75 applications. Due to the fact that Mukilteo is nearly built out, many of the applications are smaller single family residences, commercial tenant improvements, additions and deck permits, engineering or right-of-way permits, or redevelopment projects. On the surface, these may not seem to trigger heavy review. But staff has had increase in workload for permit review for the following reasons:

- The current NPDES Permit requires stormwater review of smaller projects. This increases the number of project types that require review.
- The City's development standards have made low impact development (LID) the preferred alternative. Many project applicants are not familiar with the newer requirements. As a result, projects frequently require several no-charge pre-application meetings and increased review time due to incomplete or inaccurate first submittals.
- The project sites themselves can present development challenges. Many of the available parcels for development left in the City have unique stormwater characteristics and challenges. Often properties have wetlands, geologic hazards, or other constraints that increase review time. The geologic hazards coupled with the new low impact development standards require staff to provide detailed review and comments.

Engineering staff strives to complete review of development permits within four weeks of receiving the files. The typical review takes 6 to 12 hours, and, increasingly, reviews take more time as explained above.

As development projects go to construction, the Surface Water Technician provides inspection services. Typical stormwater inspections include initial temporary erosion and sedimentation control (TESC) inspection and clearing and grading limit inspection. All stormwater infrastructure and connections are also inspected. Many times, additional inspections are required when permit requirements aren't being met.

Recently the City's Building Official and an Assistant Planner in the Planning and Community Development (P&CD) Department completed training to become Certified Erosion and Sediment Control Leads (CESCLs). They now provide assistance to the Engineering division in the required TESC inspections for small projects.

Low Impact Development Code Review and Update: The current NPDES Permit requires the City to evaluate its Code and all development documents to assure that they are not in conflict with the principles of LID. The P&CD Department has taken the lead on this task. It is required to be completed by December 31, 2016. This review will require increased participation by the Surface Water Utility to meet the timeline and Permit requirements, including review by Council.

6.3.2 Engineering Development Services Level of Service Alternatives

The 2012 SWMMWW is 5 volumes thick, and over 1,000 pages. There is a recognized need for the City to provide project applicants with clear guidance sheets on regulations, but currently Engineering lacks the capacity to create these documents. Examples of guidance sheets include: a Stormwater Pollution Prevention Plan template for small projects and guidance on LID requirements. The Utility should also consider a Stormwater Covenant and Grant of Easement template to allow staff to inspect private facilities for proper maintenance, per the NPDES requirement.

It is the recommendation of the Utility to create a separate Stormwater Connection Permit, as allowed in Chapter 13.12.160 of Mukilteo Municipal Code. Currently, the Stormwater Permit is combined with the Engineering Permit. Due to the newer complexities of stormwater review, the Engineering Permit does not adequately cover stormwater requirements and, in some instances, a stormwater permit may be required without a full engineering permit.

Currently, the City has one stormwater review staff (the Surface Water Technician) responsible for review tasks alongside multiple other surface water activities. Development review has strict timelines, and is susceptible to public pressures. This results in review taking precedence over other work, decreasing the level of service elsewhere in stormwater, including NPDES Permit required programs.

The current level of service for Development Services was determined to be LOS 1, meeting Permit requirements. However, there is a need to provide better information to the public. This can be achieved, in part by, providing better templates and guidance documents. Including this service to the public is considered a LOS 2 option.

6.3.3 Engineering Development Services Recommended Program

Increase to a LOS2 program. The Development Services Program is aligned with Section 5.4 of the NPDES Permit. It is recommended that the City's Stormwater Development Standards be updated, and new templates and guidance documents be created.

Because other Utility programs are being sacrificed to meet the level of service for Development Services, there is a staffing need in other areas to meet this LOS2 recommendation. If the additional staff are not hired to alleviate other pressures, then a lower level of service for Development Services should be reconsidered, which may include longer review times. With the overall proposed recommended staffing, the Utility should be able to meet this level of service.

TABLE 6-2: ENGINEERING DEVELOPMENT SERVICES LOS SUMMARY

LOS 2 - Current Program Plus Provide Public with Guidance Documents
Current Program: Maintain current Engineering Development Services Program • Provide timely project proposal review • Revise development standards, as necessary • Implement regulations found in the most current SWMMWW • Conduct timely development inspections on erosion control practices to assure compliance with SWPPPs • Conduct timely development inspections on stormwater infrastructure to assure construction is according to plans LOS2 Program Elements: • Update Development standards to be consistent with State requirements • Provide guidance documents to project applicants • Create template covenant and access for inspection of permanent stormwater facilities • No additional staffing considered, if other areas are more fully staffed

6.4 Technical Assistance

The existing technical assistance and code enforcement program led by the Utility has seven areas of service; NPDES Permit coordination, staff training programs, GIS stormwater inventory, private stormwater facility inspections, IDDE, assistance with drainage issues/service requests, and code enforcement. The level of service options are described below and summarized in Table 6-3 below.

6.4.1 Technical Assistance Existing Programs

NPDES Permit Coordination: The Utility is responsible to ensure that City programs necessary for regulatory compliance (such as the NPDES Phase II Permit) are understood, and provide guidance when needed, on how to achieve compliance. The Surface Water Utility staff coordinate the City's efforts, and meet regularly with staff from other departments to insure that on-going and planned activities meet Permit requirements. Several areas of the NPDES Permit also require coordination among other jurisdictions. The Surface Water Technician is responsible for this coordination and annual reporting.

Reporting requires tracking results of any program required by the NPDES Permit. Some examples include: all development related inspections, and all O&M programs. Because Engineering is under-resourced, some of this effort has been taken by the P&CD Department over the years. For example, the Low Impact Development Code review is being led by Planning.

Staff training programs: The NPDES Permit requires that the City has a training program for municipal staff. The City does not currently have a training program. The training program covers illicit discharge identification and tracing, Best Management Practices for all City operations, and trainings associated with development review and inspections. Some pieces of the training program have been completed since the 2001 Plan and the Utility will be providing additional trainings in 2015. Due to inadequate staffing, these programs will be completed by a contractor. The Utility has made implementation of a training program a high priority to be completed by first quarter 2016.

GIS Stormwater Inventory: The GIS serves as a database, housing details regarding assets in a spatial and network context. The City contracts out large GIS efforts to map the stormwater network. These efforts have created a good starting place, based on flow models. However, at the site level, the models do not provide enough detail to effectively manage the network. In the past year, some ground truthing of the network has been completed by operations staff during inspections. There is currently no operational method for getting updates from staff into the GIS.

Staff and field personnel consult a static map book to locate assets. This map book is available online to residents and developers; however it is often found that the map book is incorrect. Even if staff record changes in the field, the published map book is not easily updated, even if new information is known.

The GIS is important for the field staff for catch basin inspections. They use a mobile device to conduct inspections, using script that was written within the GIS software by a contractor for that purpose.

Private Stormwater Facility Inspections: The NPDES Permit requires that the City has an inspection program for private stormwater facilities permitted after July 29, 2009. The intent of the program is to assure that the required maintenance is being completed on these private facilities. The Utility is working on developing a program, and anticipates implementation of the program by August 31, 2015. This program would only cover the bare minimum of inspections on private stormwater facilities, and not include any facilities permitted before 2009. Currently, the Surface Water Technician runs the program and will complete the inspections.

Illicit Discharge Detection and Elimination (IDDE): The City has a Spill Hotline and an IDDE program. The Surface Water Technician, with assistance from the Public Works crews, is responsible for following up on any reports of suspected illicit discharge and/or illicit connections. The Utility does not have its own source tracing equipment. Instead, the Utility operates under an Interlocal Agreement with the Mukilteo Water and Wastewater District to provide services in source tracing. Services include laboratory analysis of fecal coliform samples, analysis of other chemical and pH samples, closed circuit TV inspections of suspected illicit connections, and limited vactoring services in emergency situations. The City is required under the NPDES Permit to inspect 40% of its MS4 for illicit connections and discharge by the end of 2016. This will be accomplished as part of the catch basin inspection program.

Drainage issues / service requests: The Surface Water Technician and the Public Works crew respond to resident drainage issues and concerns. No records are kept to record average response time to service requests. Drainage issues that are the City's responsibility (carry right of way run off or are part of a Public stormwater facility) are maintained by the City. If maintenance deficiencies or minor infrastructure deficiencies of the public system are found to be the source of the problem, then City staff remedies them. Where major infrastructure deficiencies are found, the Utility determines the best course of action. When drainage issues are determined to be private property issues, City staff offers technical assistance and can provide avenues for resources.

Code Enforcement: Code enforcement pertaining to the Utility typically involves improper stormwater management and illicit discharges and illicit connections. Currently, the Utility assists the P&CD Department with Code Enforcement cases by reviewing drainage records, conducting site visits, and providing technical opinions on the drainage issue in question. Escalating measures of enforcement are required for IDDE under the NPDES Permit. Section 13.12.310 Enforcement of the City of Mukilteo Municipal Code states that any violation of Chapter 13.12 is treated as a misdemeanor and is subject to the provisions of Chapter 1.32, General Penalties.

6.4.2 Technical Assistance Level of Service Alternatives

Because a LOS 1 option is an increase over the current level of service, the Utility only considered the basic Level of Service for this Program (LOS 1).

NPDES Permit Coordination: More effort should be put into effectively meeting NPDES Permit requirements and developing programs that can easily track and report the City's efforts towards compliance. While cooperation with other City departments is essential for the City to maintain compliance, the Utility should be fully staffed to lead the effort. Currently, the Surface Water Technician is responsible for this effort. Due to

Engineering Development Services' needs, it is recommended to augment staffing in this area.

Staff Training Programs: Augment the current level of service by adding the required training program that is managed and coordinated through a new position in the Surface Water Utility. This training program should identify all staff who require training under the NPDES Permit, provide training programs for IDDE and Spill response, and document all staff trainings that apply to the program. Each Department should understand their training requirements and seek out appropriate trainings to fulfill these requirements. Trainings should be tracked in a central location.

GIS Inventory: The NPDES Permit requires updated maps of the stormwater infrastructure, including a new requirement to map all known discharge points to waters of the state, including groundwater. The database has the capacity to conduct hydrologic analysis, provide infrastructure information to developers and citizens, and track asset information. The current GIS staffing level does not meet the operational needs of the Utility. The Utility requires additional GIS support for consistent data management and better defined processes for updates.

Future asset management will be heavily reliant upon the GIS as the backbone upon which it will be built. The Utility should update the existing GIS asset inventory to include all private and public stormwater facilities. In addition, the inventory needs to be ground truthed. The Utility should research and develop a recommendation on how to best track maintenance efforts, service requests, and asset condition information. Options include a GIS-centric software or using existing mobile capabilities by writing code within the GIS. By using a GIS-centric application, the information can meaningful to field staff and help schedule work.

It is recommended to add an additional 0.5 FTE GIS Technician and a 0.25 GIS Coordinator to support the Utility's infrastructure database and program field data collection interface systems.

Private Stormwater facility inspections: The Utility should implement the program that was developed in 2015. Once this program is implemented, the Utility should explore the possibility of expanding the inspection program to include all private stormwater facilities within the City to provide equitable application of the program, and to help assure better water quality for the City.

Illicit Discharge Detection and Elimination (IDDE): The Utility should augment the current level of service from a reactive to proactive level. One advantage of the proposed pipe inspections is that the City will be better able to identify illicit connections. The Utility should also invest in simple sampling devices to be able to conduct in situ testing for suspected illicit discharges.

Assistance with drainage issues / service requests: The current level of service should be augmented with more clear direction on the Utility's response to situations where no easement exists on private property for public drainage. This will require review by City Counsel.

Code Enforcement: The Utility should augment its current level of service. The Utility should review its Enforcement Code to determine whether it is administratively the best alternative for enforcing accidental spills. One alternative to consider is a simple fine, to be determined based on the threat posed by the spill.

TABLE 6-3: TECHNICAL ASSISTANCE - LEVEL OF SERVICE SUMMARY

LOS 1 - Current Program Plus Meet Regulatory Requirements
Current Program: Maintain current Technical Assistance program including: • Internal and inter-jurisdictional coordination of NPDES Permit requirements • Intermittent staff trainings on Permit requirements • Large-scale contracted mapping of the stormwater infrastructure • IDDE Hotline and spill response • Respond to drainage service requests • Assist in drainage code enforcement cases **LOS1 Program Elements:** • Coordinate better tracking mechanisms for NPDES Permit reporting • Develop staff training program, as required by NPDES Permit • Field verify stormwater network • Provide mechanism to continually update stormwater network, making it available in "real time" to staff and public • Prepare GIS data for "GIS-centric" asset management approach • Conduct private stormwater facility inspections

- Track service request responses
- Provide clear procedure on how service requests are prioritized
- Determine whether current enforcement mechanism is best approach
- Add 1.0 FTE Engineering Staff (Stormwater Programs Coordinator)
- Add 0.5 FTE GIS Technician
- Add 0.25 FTE GIS Coordinator

6.4.3 Technical Assistance Recommended Program Level of Service

Upgrade to a LOS 1 program, which includes the Existing Programs and adds the components discussed under Level of Service Alternatives. Only LOS 1 was considered, but that is an increase in service from the current program. The Technical Assistance Program covers several areas of the NPDES Permit, but also specifically applies to Section 5.3 of the NPDES Permit. This LOS1 option requires 1.75 additional FTE. 1.0 FTE will be required to manage the surface water program elements (including Section 6.5 below) and 0.75 FTE is recommended to manage the GIS needs.

6.5 Community Stewardship, Outreach and Involvement

The Engineering Division provides outreach services regarding stormwater to the residents of Mukilteo. Many of the program elements are a result of partnerships with other agencies. A level of service analysis is discussed below.

6.5.1 Community Stewardship Existing Programs

The current LOS is a LOS 1 alternative.

The Utility has three areas for stewardship and outreach: water quality, drainage issues, and bluff management. Several programs meet NPDES requirements to help residents and business owners understand stormwater pollution as a significant water quality concern. The Utility provides outreach to residents, schools, businesses, and its employees on ways to reduce impacts to our environment. The Utility is involved in education programs both locally and regionally, leveraging other successful outreach campaigns. This method assures continuity of message across the region, and reduces City costs to create programs and materials. The City tailors existing programs to fit the needs of our residents and stormwater needs. Examples of continuing partnerships include: Snohomish County Health Department, Snohomish County, Snohomish

Conservation District, Burlington Northern Santa Fe (BNSF) Railway, Washington Department of Transportation (WSDOT), Sound Transit, and neighboring municipalities. The Utility has outlined Outreach programs to meet Permit requirements for the term of the NDPES Permit, shown in Table 6-4.

Topic	2015	2016	2017	2018
Audience: General Public and Businesses				
Pet Waste Management and Disposal				
Car Washing				
Natural Yard Care				
Youth Stormwater and Water Quality Awareness Education				
Bluff and Vegetation Management				
Low Impact Development Techniques				
Private Stormwater System Maintenance and BMPs				
Prevention of Illicit Discharge				
Audience: Engineers, Contractors, Developers, and Land Use Planners				
Low Impact Development Techniques				
Stormwater Treatment and Flow Control BMPs				
Technical Standards for Stormwater Site and Erosion Control Plans				

Key:
Research and Development
Implementation
Adaptive Management

6.5.2 Community Stewardship Level of Service Alternatives

A LOS 2 alternative would include development of a technical assistance and/or incentive program for existing properties to retrofit their stormwater to provide higher water quality or flow control treatment. Options could include a rain garden program for homeowners or businesses. This need was identified due to Mukilteo's unique geology. Because steep slopes and existing geology can present risks caused by misplaced infiltration facilities, the Utility should provide guidance to those wishing to retrofit their properties with infiltration facilities (rain gardens, for example).

The NPDES Permit requires that education be provided to a specific group. Additionally, Phase 1 Permittees were required in the last permit cycle to include a Local Source Control / Business Outreach program. The combination of this program with a proactive IDDE program has proven to lead to successful source tracing in other jurisdictions. It is sometimes the case that if Phase 1 jurisdictions have program success, the subsequent Phase II NPDES permit will requires similar programs. The LOS 2 alternative includes a technical assistance program for small quantity waste generators in the City.

The Utility should explore partnering with the Department of Ecology's Local Source Control (LSC) Program to assist with funding and structure for this program. Ecology's LSC Program is a partnership where the jurisdiction applies for funding. Staff salary or a contractor can be supported through the funding. The intent of the LSC program is to provide businesses with a site visit and follow up on recommendations for waste management and handling practices that may have an impact on stormwater, as well as other regulatory implications related to waste storage and handling. Often, the technical assistance is as simple as providing a Spill Plan and a Spill Kit.

6.5.3 Community Stewardship Recommended Program

The LOS 2 alternative is recommended by Utility staff. The Utility recommends providing assistance and oversight to infiltration retrofit projects, not covered under the development review process. Additionally, the Local Source Control program has proven to have a positive impact on water quality. The staffing recommendation for Technical Assistance incorporates the additional needs for Outreach under stormwater programs management.

6.6 Monitoring and Research

6.6.1 Monitoring and Research Existing Programs

The current program is a LOS 1. The City does not currently have any programmatic monitoring or research related to stormwater. Under Section S7 of the current NPDES Permit, the City can choose to run its own monitoring programs and studies, or to opt-in to Regional programs in three categories: Status and Trends, Effectiveness, and Source Identification and Diagnostic Monitoring. The City has opted-in to the NPDES

Regional Stormwater Monitoring Program (RSMP). The current rate for the opt-in option is $13,787 per year for the Permit term.

The City conducts infrequent opportunistic monitoring around stormwater illicit discharge tracing. This is considered under the Technical Assistance section.

Snohomish County conducts Benthic Index of Biotic Integrity (B-IBI) monitoring in Picnic Point Creek, both at the headwaters and at the mouth. Currently, the B-IBI indicates that there is compromised water quality in this watershed. The City of Everett monitors several water quality parameters and B-IBI near the mouth of Japanese Gulch since 2008. These efforts indicate poor to very poor water quality in this watershed.

Currently, several partners are conducting monitoring on steep slopes along the railroad. This monitoring includes rain gage stations and soil monitoring to help better understand slope movement during rain events.

Utility staff are involved in the Stormwater Group Caucus, which helps shape the monitoring requirements under the NPDES Permit.

6.6.2 Monitoring and Research Level of Service Alternatives

No Level of Service Alternatives were considered for this program.

6.6.3 Monitoring and Research Recommended Program

The Current LOS 1 Alternative is recommended by the Utility staff. This level of service allows the Utility to take part in regional efforts and reduce costs to the Utility. During the next Permit Cycle, the City should review this level of service and determine whether the opt-in option is still the best alternative for the Utility, or if these programs should be brought in-house.

6.7 Capital Improvement Program

6.7.1 Capital Program Existing Program

The existing capital program has made accomplishments since the 2001 Plan. There have been a wide array of projects, including flood hazard reduction, stream improvement projects, and retrofit of water quality and flow control facilities. (See Chapter 4 for a complete list of projects.) From 2002 to 2014, the existing program has spent, on average, approximately $330,000 per year on capital projects. The existing program has relied on grant funding and outside partnerships to implement many of the projects.

6.7.2 Capital Program Level of Service Alternatives

During the next several years, the Utility will be exploring basin planning, maintenance programs and asset management programs that should reduce capital expenditures. Currently, however, some capital projects are required that address capacity and misaligned infrastructure. The City developed a list of capital projects in 2014. These projects were identified by reviewing the 2001 Plan, conducting staff interviews, residential surveys, and comments received at an Open House.

Two hundred thirteen (213) issues were identified. Of these, 125 were determined to be City responsibility. Sixty of these were maintenance issues; and the remaining sixty-four (64) required public capital. In 2014, 17 of the projects had been completed, or were in process. Working with the Citizen Advisory Committee, the City developed a weighted scoring scheme (matrix) to determine priority for the remaining 47 projects. The matrix considered flooding hazard reduction, environmental improvement, community support, impacts to the maintenance program, and risk associated with the projects. The projects were assigned a "Rank #" based on the results of the matrix. The matrix can be found in Appendix H. The results of the ranked projects are in Table 6-5.

TABLE 6-5: RANKED CAPITAL IMPROVEMENT PROJECTS

RANK #	Capital Improvement Project	Total Matrix Score	Planning Level Estimated Costs (2015 Dollars)
In Progress*	Decant facility, Naketa Beach, 61st culvert	N/A	$3,309,824
1	Chennault Beach Street Drainage Improvements	60.392	$3,811,000

2	Mukilteo Lane Storm Drainage Improvements	58.56	$6,591,000
3	84th St SW (West) Storm Drainage Improvements	57.064	$1,240,000
4	64th Pl W Street Drainage Improvements	55.888	$1,202,000
5	66th Pl W Street Drainage Improvements	55.384	$1,425,000
6	Central Drive Storm Drainage Improvements for Big Gulch Basin	55.056	$5,267,000
7	62nd Pl W/Canyon Drive Storm Drainage Improvements	54.384	$2,852,000
8	10th & Loveland Storm Drainage Improvements	48.88	$794,000
9	Horizon Heights Storm System Extension	48.72	$150,000
10	Lighthouse Park Storm Drainage Improvements	47.544	$581,000 (not in financial analysis)
11	Whisper Wood Pond W	47.048	$190,000 (not in financial analysis)
12	Upper Chennault Culvert Improvement (Access Road)	45.552	not in financial analysis
13	Central Drive Storm Drainage Improvements for Chennault Beach Basin	43.208	not in financial analysis
14	92nd/Hargreaves Storm Drain Extension	38.872	not in financial analysis
15	88th St (East) Storm Drainage Improvements	38.536	not in financial analysis
16	5th Street Storm Drainage Improvements	37.536	not in financial analysis
17	Park Avenue Storm Drainage Improvements	31.032	not in financial analysis
18	Park Avenue Tide gate	29.192	not in financial analysis
19	63rd Pl W Storm Drainage Improvements for Big Gulch Basin	27.528	not in financial analysis

20	63rd Pl W Storm Drainage Improvements for Chennault Beach Basin	27.36	not in financial analysis
21	Japanese Gulch/Brewery Creek Headwater Wetland Creation/Enhancement	25.36	not in financial analysis
22	88th St (West) Storm Drainage Improvements	25.36	not in financial analysis
23	Goat Trail Pipe Restoration	25.024	not in financial analysis
24	Lamar Drive Road Reconstruction	25.024	not in financial analysis
25	2nd Street Pipe Restoration	24.856	not in financial analysis
26	Smugglers Gulch/Big Gulch Basin Analysis	23.528	not in financial analysis
27	Centralized Storm Drainage Facilities for Bluff properties - formed through LID	23.36	not in financial analysis
28	Cornelia/3rd Storm System Extension	23.36	not in financial analysis
29	63rd Pl W Slope Stabilization	22.528	not in financial analysis
30	53rd Ave Traffic Calming Improvements	20.52	not in financial analysis
31	Brewery Creek Outfall	20.52	not in financial analysis
32	92nd St Park Wetland Restoration & Expansion	18.688	not in financial analysis
33	Daylight Japanese Gulch Creek	18.352	not in financial analysis
34	2nd Street Storm Drainage Extension	18.184	not in financial analysis
35	92nd/50th Pl Wetland Restoration & Expansion	17.016	not in financial analysis
36	102nd St SW Storm Drainage Improvements	13.848	not in financial analysis
37	Upper Smugglers Gulch Restoration	11.68	not in financial analysis
38	Upgrade Culverts for Fish Passage (Japanese, Big Gulch, Picnic Pointe) - Include Evaluation of culverts for fish passage in those Basins not currently designated as fish bearing streams	11.512	not in financial analysis

39	Bioremediation Site	10.84	Not in financial analysis
40	North Fork of Big Gulch Stream Restoration & Wetland Creation (privately owned)	9.68	not in financial analysis
41	44th Ave Storm Drainage Improvements	9.512	not in financial analysis
42	53rd Ave Storm System Extension	8.848	not in financial analysis
43	Purchase vacant property @ 106xx 56th Ave W (work with Mukilteo School District)	5.68	not in financial analysis
44	Lower Big Gulch Creek Restoration (privately owned)	5.512	not in financial analysis
45	Cyrus Way Wetland Preservation (privately owned)	3.008	not in financial analysis
46	Purchase vacant land to restore natural detention areas (can apply to all basins)	0.504	not in financial analysis
47	Harbour Pointe Blvd & 47th Pl W Stream Corridor Enhancement (privately owned)	0.504	not in financial analysis

* PROJECTS IN PROGRESS: The financial plan includes projects that were already underway or had secured funding at the time this ranking was completed. These projects are not included in the ranking, but are projected to be completed. Other projects initially considered were not ranked because they were determined to not be the Utility's responsibility.

*	61st Culvert Replacement	IN PROGRESS
*	City Decant Facility retrofit	IN PROGRESS
*	Naketa Beach Outfall	IN PROGRESS

*	49th Ave W Bioretention Swale	Complete
*	44th Ave W Bioretention Swale	Complete

Not ranked	56th Ave W Bioretention Swale	Initial project scope exceeded budget; need grant funding
Not ranked	86th Place Evaluation	Complete as Roads project
Not ranked	61st Pl W Road Stabilization	Determined to be roads project

The City had previously prepared planning level cost estimates for three projects (Ranks 10, 11, and 12). Additional planning level cost estimates were completed by Brown & Caldwell for the top 8 ranked projects, and projects that were already in process, but not completed (Appendix E). These figures are represented in Table 6-7 and discussed further in the financial analysis in Chapter 9. Implementation of the CIP projects is planned over a 15 year timeframe, to reduce increases to the Utility rate. A map of the project locations is included as Figure 6-2.

The capital project list should be continually re-evaluated to determine whether higher levels of maintenance and asset management will help resolve identified localized flooding areas. A summary of the LOS alternatives for this program area is provided in Table 6-6.

TABLE 6.6: CAPITAL PROGRAM - LEVEL OF SERVICE SUMMARY
LOS 1 – Implement CIPs in next 15 years
Capital Program Current program has included an average of $330,000 per year to solve critical flooding problems, and to a much lesser extent water quality problems, and stream/wetland enhancements. Maintain proposed level of CIP funding for next six years. Reevaluate the CIP list as basin planning comes on board. The intent is that with an asset management plan, the Utility would not be responding reactively to as many emergency repairs. Eventually, regular maintenance practices and projects in the basin plans may override the need for the current CIP list. Staffing: Funding for staffing is included within the CIP project in the Financial Analysis.

6.7.3 Capital Program Recommended Program

The minimum LOS 1 is recommended by staff. LOS 1 was considered to address the projects with highest need. The recommended program does not include any debt service, but instead spreads out the cost of the CIPs over 15 years. The LOS1 provides capital projects at a rate that is sustained by the new Surface Water Utility rate. With the proposed basin planning (see Chapter 7), the CIP list should be reevaluated with each completed basin plan.

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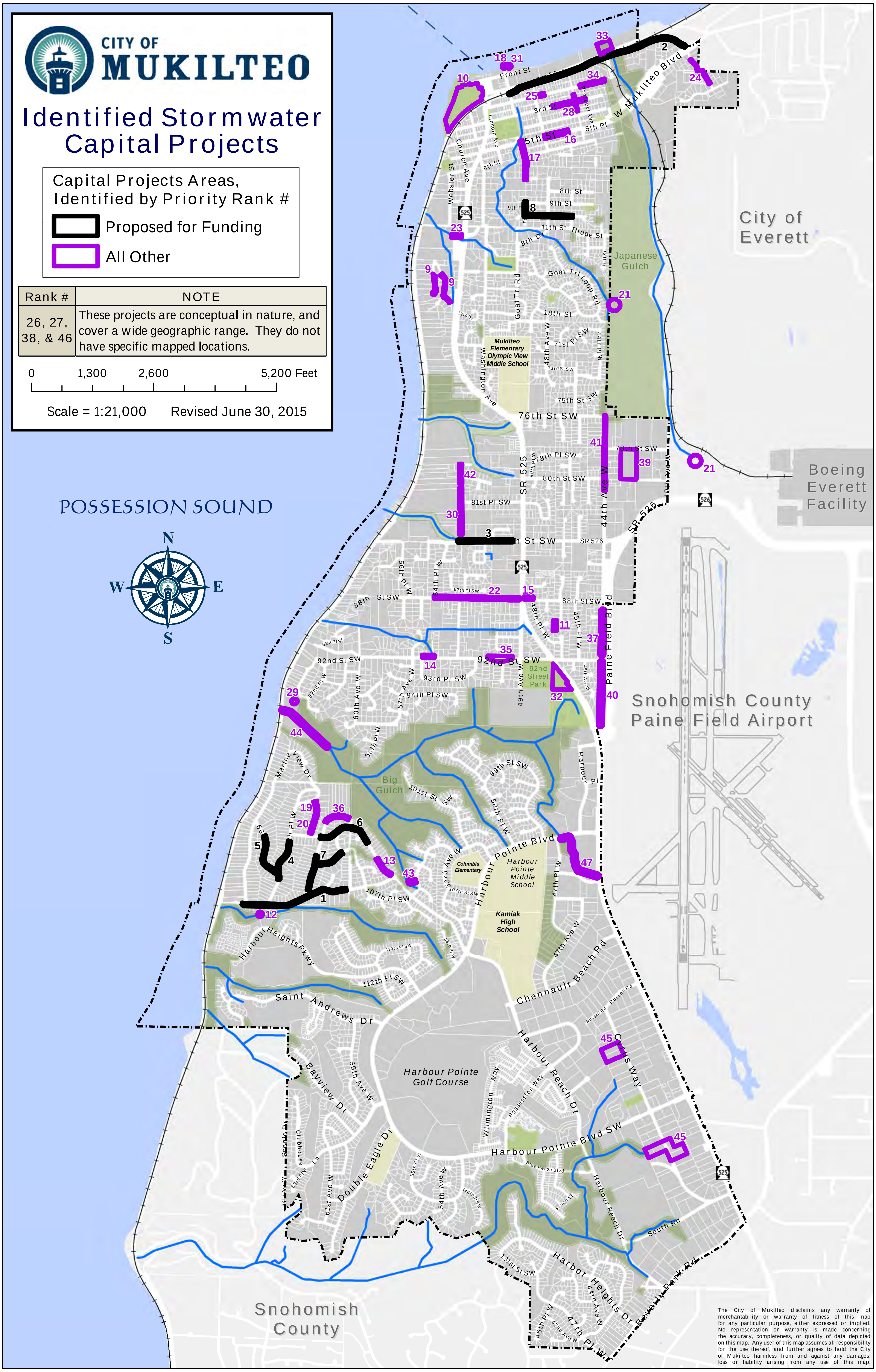
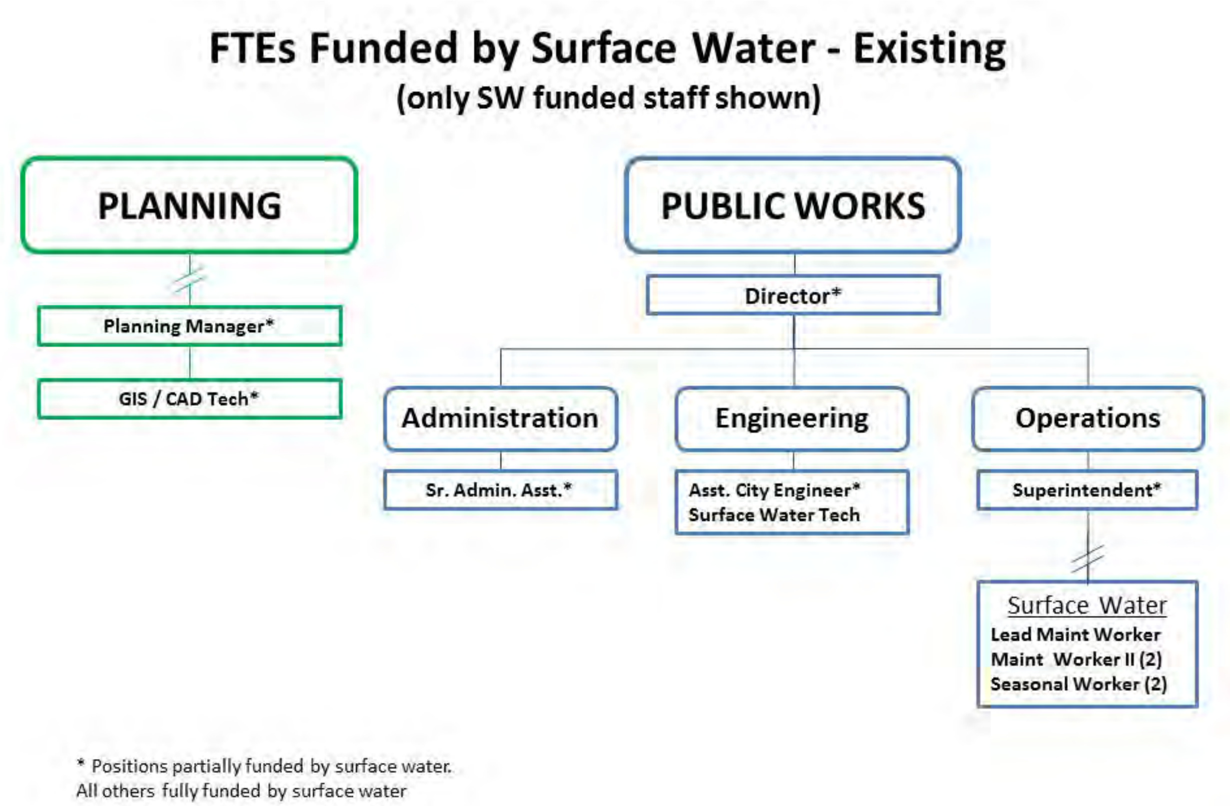

CITY OF MUKILTEO
Identified Stormwater Capital Projects
Capital Projects Areas, Identified by Priority Rank #
Proposed for Funding
All Other
Rank # | NOTE
26, 27, 38, & 46 | These projects are conceptual in nature, and cover a wide geographic range. They do not have specific mapped locations.
0 1,300 2,600 5,200 Feet
Scale = 1:21,000
Revised June 30, 2015
POSSESSION SOUND
N
S
E
W
City of Everett
Boeing Everett Facility
Snohomish County Paine Field Airport
Snohomish County
Japanese Gulch
Big Gulch
Harbour Pointe Golf Course
Mukilteo Elementary
Olympic View Middle School
Columbia Elementary
Harbour Pointe Middle School
Kamiak High School
92nd Street Park
Front St
W Mukilteo Blvd
5th St
76th St SW
SR 525
SR 526
44th Ave W
88th St SW
92nd St SW
Paine Field Blvd
Harbour Pointe Blvd
Marine View Dr
Harbour Heights Pkwy
Saint Andrews Dr
Chennault Beach Rd
Harbour Reach Dr
Harbour Pointe Blvd SW
Harbour Heights Dr
Beverly Park Rd
Double Eagle Dr
Bayview Dr
The City of Mukilteo disclaims any warranty of merchantability or warranty of fitness of this map for any particular purpose, either expressed or implied. No representation or warranty is made concerning the accuracy, completeness, or quality of data depicted on this map. Any user of this map assumes all responsibility for the use thereof, and further agrees to hold the City of Mukilteo harmless from and against any damages, loss or liability arising from any use of this map.

6.8 Utility Staffing and Organization

6.8.1 Current Staffing

The Surface Water Utility is staffed in the Public Works Department which provides management and administrative support, engineering, capital project delivery; NPDES permit monitoring and reporting, and field operations. The Surface Water Utility fund also supports staff in the Planning and Community Development Department.

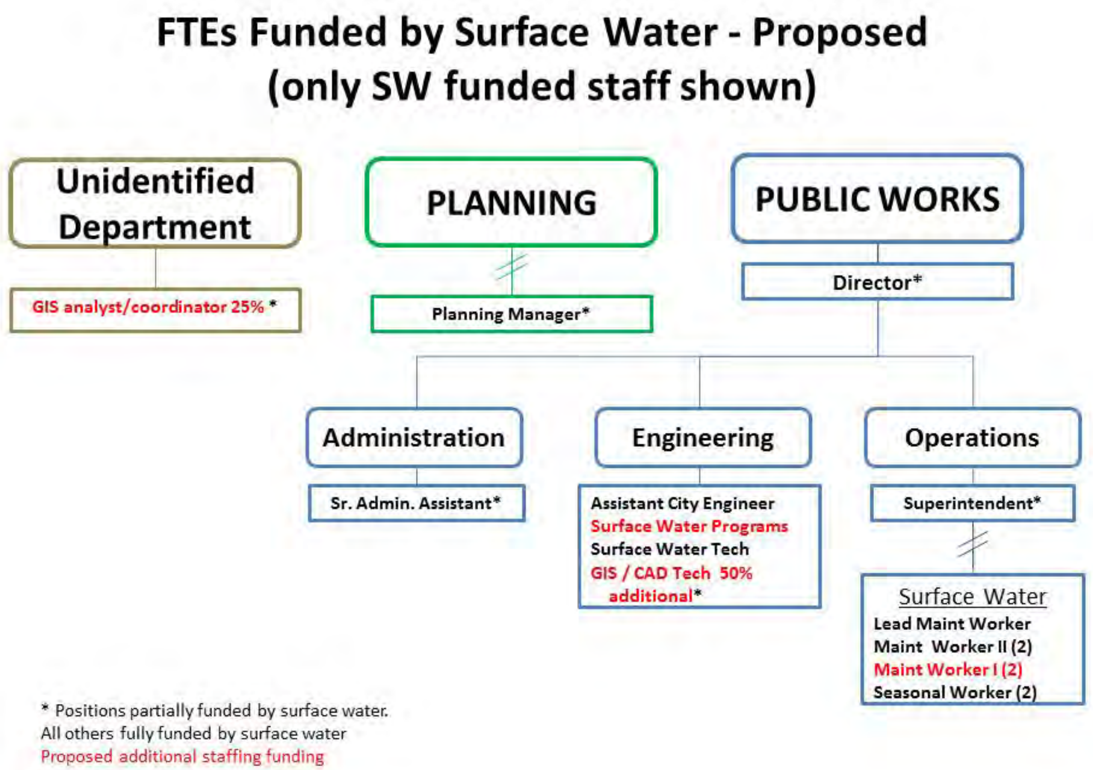
FIGURE 6-3: FTES FUNDED BY SURFACE WATER – EXISTING



6.8.2 Proposed Staffing

The Surface Water Utility staff in 2014 prepared a gap analysis for the current NPDES Phase II requirements. Staff identified numerous areas within the permit requirements where the City had difficulty meeting minimum requirements with the current staff level. As a result of this analysis, staff is recommending 3.75 FTE be added to the Surface Water Utility. This analysis fits within the Financial Analysis in Chapter 9.

FIGURE 6-4: FTES FUNDED BY SURFACE WATER - PROPOSED



Operations and Maintenance: Due to the increase in inspection and maintenance responsibilities (discussed in Section 6.2), it is recommended that 2 additional Level 1 Maintenance Staff be added.

Engineering: In order to allow the Surface Water Technician to focus on engineering development services, conduct facility inspections, and business outreach, it is recommended that a new 1.0 FTE position be created. This position would manage many of the surface water programs, act as coordinator for the NPDES Permit, provide technical support to residents and staff, and manage the outreach program. This position would report to the Assistant City Engineer.

GIS: In order to support the growing GIS needs for the Utility, it is recommended that the Utility support an additional 0.5 FTE GIS Technician. It is also recommended the Utility support a 0.25 FTE GIS Coordinator (or equivalent). The GIS Coordinator would be instrumental in developing appropriate GIS asset management tools and supporting the Utility GIS infrastructure by developing processes for version updates and published data. If the Utility managed the GIS Technician, the position would report to the Assistant City Engineer. The Utility does not anticipate managing the GIS Coordinator because it is assumed this position will provide City-wide GIS support, with 0.25 FTE being paid for by the Utility. Table 6.5 gives an overview of the proposed staffing plan.

TABLE 6-7: OVERVIEW OF PROPOSED STAFFING PLAN

Position	**Division**	**Additional Surface Water FTE**	**Total Surface Water FTE**	**Major Responsibilities**
GIS Technician*	Undetermined *	0.5	0.75	• Georeference public and private stormwater facilities • Maintain GIS stormwater database • Make GIS asset updates • Assist with asset management implementation • Create stormwater maps
GIS Coordinator*	Undetermined *	0.25	0.25	• Create GIS Program • Manage stormwater database structure • Recommend asset management implementation solutions
Surface Water Programs Manager	Engineering	1.0	1.0	• NPDES Permit coordination • Manage Outreach programs • Manage Technical Programs • Coordinate NPDES related trainings
Maintenance Staff	Operations	2.0	5.0	• Perform inspections and maintenance on stormwater assets

* Currently, the City staffs a 0.75 FTE GIS /CAD Technician. How the additional Surface Water GIS positions are integrated into the City's larger GIS Program remains to be determined. The Surface Water GIS needs require both basic and advanced skill sets.

In addition to the recommended 3.75 FTE for existing operations, the implementation of the Capital Project program may require additional staffing to support project development, permitting, engineering, contract administration and construction inspection. Funding for this effort has been budgeted separately for each proposed CIP project. A staffing capacity analysis should be reviewed at the time the Capital Projects are scoped.

6.9 Summary of Recommended Programs Level of Service

The recommended level of service for each program is one that balances the Surface Water Utility needs over the next six years and the desire to minimize the financial impacts to the residents and businesses of Mukilteo. The recommended level of service, LOS 1, reflects the minimum programs necessary to meet NPDES requirements.

For Utility programs, the current level of service and a LOS 1 alternative were considered. In two instances, a LOS 2 alternative was considered. Only these few options were considered in order to balance the increase in regulatory requirements with utility costs. Utility staff recommends implementation of LOS1 for all program areas, with the exception of Public Outreach and Engineering Development Services, where a LOS 2 option is recommended. Another factor in selecting LOS 1 is the Utility will be collecting significant information about the future needs throughout the City after completing the basin plans and asset condition assessments. After compiling and assessing all of this data, the Utility will have much better information to prioritize needs.

Chapter 7: New Programs to Meet Utility Goals

7.1 Introduction

The City and the Utility value a flourishing natural environment, a healthy built environment, and clean air and water as evidenced in the Goals set forth in the *Comprehensive Plan*. The Surface Water Utility plays a major role in developing sustainable strategies for the City's natural resources. As mentioned in Chapter 5, by managing surface waters as a renewable resource, the City can support the goal of a flourishing natural environment

Several additional programs to achieve sustainability are outlined in Sections 7.2-7.8. The Utility's intent is to formalize these programs, with appropriate funding levels to provide a framework for future operations. These programs are necessary to achieve the Goals outlined in Chapter 5, and will eventually bring many of the City's stormwater programs to a LOS2 alternative. Appropriate Performance Measures for each of these Programs are outlined in Chapter 8.

7.2 Basin Planning

Chapter 13.12.070 Studies and basin plans of City of Mukilteo Municipal Code outlines that:

> The city may, as appropriate or necessary, conduct studies and develop basin plans for review and adoption by the city council. Basin plans shall be developed according to adopted engineering standards. Once a basin plan has been adopted and implemented, such plan shall supersede the requirements of this chapter; provided, that the basin plan and basin-specific requirements provide an equal or greater level of water quality and stormwater control protection. (Ord. 1222 § 2 (Exh. A) (part), 2009)

There are several factors that make basin planning a compelling approach for the City:

- The City is largely built out, with few large areas remaining for development stormwater facilities that meet today's standards.

- The preferred method for stormwater management is through onsite infiltration. While the City fully supports infiltration as a preferred alternative, the City's recent experience with exploring infiltration indicate that these methods may be of limited value in Mukilteo due to steep slopes and our understanding of underlying geology.
- The Department of Ecology recently released draft guidance on a Stormwater Control Transfer Program that is applicable to Phase I and Phase II NDPES Permittees. The Transfer Program will require a watershed planning process.

Each of these factors is considered in more detail below.

7.2.1 Limited Stormwater New Development Opportunities

The *Comprehensive Plan* gives a detailed analysis of the development potential within the City. Generally speaking, new development potential is limited in the City as many parcels have been developed. Some redevelopment projects will be required to meet the current development standards. However, there are few opportunities to address stormwater issues through the development process.

7.2.2 Onsite Infiltration

The City will continue to explore infiltration as its first option, but the geologic studies conducted by Aspect Consulting and the City's retrofit project PITs indicate that the original geologic classification of soils is outdated. Where mapping originally assumed Vashon Basal Till of being few tens of feet thick, the field explorations have shown Subglacial Meltout Till that is over 100 feet thick, making even deep infiltration infeasible in the tested areas. The City intends to follow the 2012 SWMMWW for infiltration feasibility testing at the site level. If the results of these site-scale tests continue to show that infiltration is infeasible, other options will need to be identified and considered to reduce flows and protect water quality.

7.2.3 Stormwater Control Transfer Program

From Ecology's website:

> The draft guidance document lays out features of an alternative program (a Stormwater Control Transfer Program) that Western Washington State municipal stormwater Permittees (Permittees) can implement to satisfy permit requirements associated with flow control, runoff treatment,

> and/or low impact development triggered at new and redevelopment sites. This stormwater management approach directs rehabilitation efforts to watersheds within a jurisdiction (referred to as priority watersheds) where they will provide more immediate environmental benefit. Permittees establishing a Stormwater Control Transfer Program that includes out-of-basin transfers must seek Department of Ecology (Ecology) approval of their alternative program (through Appendix 1, Section 7 of the Western Washington Municipal Stormwater Permits).
>
> Ecology does not propose relaxing the requirements, but allowing local governments to use a strategy to shift stormwater improvements triggered by the existing requirements to higher priority watersheds. The anticipated advantage of this type of program is that efforts will focus on priority watersheds at a rate greater than the default site-by-site application of the municipal permits' minimum requirements.

If Mukilteo chooses to use this approach, basin plans will need to be developed to identify higher priority watersheds. The *Strategies Plan* is a good start to this work.

In 2013, the City began a basin-wide approach to stormwater management when it developed the *Strategies Plan*. *The Strategies Plan* used Department of Ecology's Puget Sound Characterization (Stanley et al. 2011) and further divided each watershed into 36 Project Analysis Units (PAUs) in Mukilteo (and several in surrounding jurisdictions). Each PAU was ranked into management categories of "Preserve," "Repair," and "Targeted Management." The *Strategies Plan* then recommends a suite of actions for each PAU based on the rankings.

The recommended suite of actions are general and do not identify specific projects for implementation. In 2014, the City began to implement the *Strategies Plan* with the *Retrofit Project.* The Retrofit Project identified, prioritized, and selected stormwater retrofit projects in three PAUs; Big Gulch North, Big Gulch South, and Picnic Point Ravine. These PAUs had been identified as the highest priority for stormwater retrofits in the *Strategies Plan*.

Ecology funded the design of the retrofit projects. During site specific explorations through Pilot Infiltration Tests (PITs), it was discovered that the sites do not infiltrate. Even deep infiltration was deemed infeasible after explorations up to 100 foot depths.

The basin plans should continue to build on the *Strategies Plan* and continue to use an integrated approach to evaluate and address problems related to flooding, water quality and stream degradation. These plans will require more detailed system assessments, a comprehensive analysis of existing infrastructure conditions, localized flooding problems, steep slopes, and potential for regional facilities, both large and small.

7.3 Asset Inventory (Address Aging Infrastructure)

The City's stormwater infrastructure is of varying age and, presumably, of varying condition. The average life expectancy of stormwater infrastructure is 50 years. Parts of Old Town have infrastructure that dates back to the original settlements. Even though some of the newer portions of Mukilteo were incorporated in the 1980s, the infrastructure was in place long before that, making it 40 to 50 years old. The Utility does not currently project future needs for asset replacement. As a result, the Utility responds to infrastructure failure in a largely reactive approach. This means that when the Utility responds to unexpected failures, the funding is pulled from other projects or programs.

The Utility has never done a comprehensive analysis of pipe conditions. The Utility recognizes the need to move toward proactive asset management as a higher level of service and to provide better financial management of the Utility. The initial steps to building an asset management program include data gathering, documentation of the system, and condition assessment. The City has made efforts over the past several years to inventory its assets in GIS. However, much of the work has not been field verified. A new GIS Technician, in combination with the Public Works crews can begin to verify stormwater asset mapping.

7.3.1 Condition Assessments

Condition assessment of the City's infrastructure is the first step to building an asset management program. The condition assessment would include videoing the Utility's underground stormwater pipes. These videos would provide the age and condition of pipes, catch basins, manhole structures and culverts. This information can then be used to provide condition rating scores on the assets. The condition rating scores are then used to determine risks associated with failure and a prioritization list can be developed for replacement, which would include a recommended schedule. Based on the prioritization and recommended schedule, a long term plan will be built. The condition assessment data would be housed in the GIS. This effort would help update the City's stormwater inventory maps to locate the Utility's entire drainage infrastructure.

The condition assessment will inform the basin plans by providing a comprehensive look at the needs within the basins and should be done as part of the basin planning efforts. Additionally, the mapped infrastructure will help better define basin boundaries, as they have shifted with development. The condition ratings will further help identify possible solutions to existing water quality problems and act as a tool in completing illicit connection inspections.

The Utility should research tools to incorporate asset management planning, including the purchase of GIS-based asset management software, with mobile field applications. Other options could include writing programs within the GIS, but this alternative requires high-level GIS staffing. The GIS-based software allows for updates to condition assessments through regular inspections, and gives staff the access to the most recent data. As noted in Chapter 6, field staff currently use outdated paper map books to trace lines and complete their work.

The objective is for the Utility to perform inventory and condition assessments over the next five to ten years, through contracted services. This information would allow the Utility to better schedule repairs and replacements of existing infrastructure. This method of managing aging infrastructure would be more cost effective in the long term.

Table 7-1: What is Asset Management and What Does it do for the City?

Asset Management is a suite of practices that maximizes the cost-effective use of capital assets over the life of the asset. It gives the Utility the ability to get the most use of an asset at the lowest long-term cost. It allows the Utility to provide the defined level of service at the lowest cost. Asset Management is not just an evaluation tool. It helps preserve the system by reducing premature failure through regular maintenance.

An Asset Management Program Can:

1. Outline consequences of funding shortfalls and associated risks
2. Give predictability, transparency, and easily understood funding needs
3. Give sound basis for prioritizing work
4. Identify the risk exposure by asking what is the probability of failure and the consequence of failure?

7.3.2 Balance Maintenance and Preservation of Existing Infrastructure with Capital Projects

The Utility has identified over 45 capital improvement projects, 11 of which are proposed for implementation during the term of this Plan. As the Utility moves to a more proactive level of service and begins to implement an asset management plan, the Utility should begin to reevaluate the current capital improvement projects. Many Utilities that adopt a proactive asset management program find that the improved maintenance solves some of the previous flooding issues. Revisiting the list of capital projects and conducting follow up interviews is recommended before beginning any capital project. It should be recognized that some of the effects of an asset management program may take 5 years or more to be realized.

7.4 Low Impact Development

While low impact development is not new to the City of Mukilteo, it was not a program considered in the 2001 Plan. It's incorporation into City practices are shown throughout this document, especially in Chapter 6. It is highlighted here to give more comprehensive guidance for the Utility.

7.4.1 Preferred Alternative

Low impact development is the preferred alternative for all new development and redevelopment projects. The City follows the most current SWMMWW. The Utility supports this as the preferred development alternative. However, underlying geologic conditions within the City may make many areas unsuitable for infiltration. Additionally, many areas within the City have landslide hazards due to steep slopes, precluding infiltration as an option. In these areas, amended soils and appropriate vegetation may be a viable alternative.

Through site specific PITs, it is commonly been the case that an impermeable glacial till prevents adequate infiltration. For these reasons, the Utility recommends that all low impact development or retrofit projects are carefully vetted prior to implementation. Suitable soils and PITs should be verified prior to implementation.

7.4.2 Rain Gardens and Natural Yard Care Incentive Programs

The Utility supports rain garden retrofit projects, in appropriate areas, where no risk of landslides exist. The Utility may consider a no-cost rain garden permit in order to provide technical assistance to residents wishing to retrofit their property with a rain garden. This Rain Garden Permit would help residents identify areas of steep slopes and other factors that may pose risks to the Utility, a downslope landowner, or the project proponent.

The Utility fully supports natural yard care techniques and recommends future consideration of incentive programs for compost amended soil applications, native plantings, and large conifer tree retention. The City partnered with Snohomish County and other jurisdictions to conduct a behavior change study on yard care practices. The results of this study will be used in any future programs. These incentive programs would not be available to development projects, where these techniques are required as part of the development project.

7.4.3 Emerging Technologies

Low impact development includes use of emerging technologies to help manage surface water. Much of the emphasis for emerging technologies is focused on urban drainage water quality treatment. Recent research provides compelling evidence that stormwater run through a column of bioretention media is an effective water quality treatment option (McIntyre et al 2015). Many LID practices such as bioretention and rain gardens use this as a primary method for effectiveness. Additionally, there are new proprietary systems coming on the market every year. These proprietary systems are tested through Department of Ecology's Technology Assessment Protocol – Ecology (TAPE).

The Utility should consider the use of technologies under the General Use Level Designations (GULD) and, in some cases the Conditional Use Level Designations (CULD), if the CULD technology is in the current process of approval for GULD and has enough field evidence of effectiveness. The Utility should look for opportunities to use the full suite of emerging technologies in its own applications and in private development projects. Because of the nature of Mukilteo's geology, every option should be considered, including:

- Pervious pavements (both asphalt and concrete),
- Several types of water quality filter systems available through different manufacturers. One type includes underground vaults and above ground plantings of trees and shrubs to filtrate stormwater through a soil/plant media.
- Chemical treatment of construction site runoff to help sediment drop out from turbid water (now being evaluated by Ecology's C-TAPE program)
- Underground injection of stormwater into the ground after sufficient water quality treatment
- Small, dispersed infiltration projects in public right of way.

The objective of the Utility is to allow the best stormwater treatment possible, while recognizing that infiltration in Mukilteo may present design challenges.

7.4.4 Staffing

These new program areas will require additional staff in some areas in the short term, especially in GIS. The additional staff are considered in Chapter 6 and have been accounted for in the Financial Analysis (Chapter 9). Once the initial investigations and results are complete for each of these new programs, the City should determine whether staffing levels are appropriate.

7.5 Private Property and Public Drainage Systems

Historically, there has been uncertainty regarding the City's responsibilities with respect to drainage on private property. The uncertainty is most often created because of incomplete system ownership records. In cases where the City has drainage easements, it is clear the City is responsible for maintenance of these systems. Conversely, where the City has no easements, these systems are considered private (i.e., there is a presumption that the system is not publicly owned if there is no easement). Some of these systems carry primarily (if not entirely) right-of-way water through private properties. Other systems enter and exit city right-of-way, with the network traveling through private property.

City staff routinely receive questions from citizens when problems occur on these private drainages. Most often, a citizen or a group of citizens will request that the City solve a problem that exists on private property. From a legal perspective, when there is no easement granted to the public entity, the City is not responsible for solving problems on private property. However, there may be situations where there is an overriding public benefit to the City maintaining these segments (such as solving flooding for an entire neighborhood, or a City street). In these cases, the City should consider accepting improvements on private property as a public work and assume responsibility, if not ownership, of the system for future maintenance.

As part of the asset inventory process described in Section 7.3, the Utility should begin to record in the GIS database where easements exist currently. This process will help assist staff in answering public questions. Further evaluation of areas where the system carries public water with no easements could then be made. This evaluation would allow the Utility to determine whether it is in the public interest for the City to obtain easements and take on the responsibility. These determinations would be based on clear and consistent decision guidelines. These guidelines require attorney review, but a draft guidance policy has been created for consideration below.

Three decision outcomes are considered, and should be applied to each situation:

1. There is clear documentation of an easement and City responsibility: Use of utility funds is appropriate.
2. There is no clear documentation of an easement AND there is public benefit to providing assistance:
    a. An operational decision is made that use of utility funds is appropriate AND
    b. A formal easement is pursued at no cost to the City.

3. There is no public benefit to providing assistance: Use of utility funds is not appropriate.

The Draft Decision Guidelines presented above can help determine the three possible decision outcomes. These draft guidelines should consider the financial impact to the Utility and be reviewed further by the City Attorney and City Council. It is anticipated this will not happen until after completion of this Plan Update.

7.6 Looking Forward

The following is a list of other recommendations to guide the Utility beyond the next five years, plus some areas that the Utility has explored since 2001 and should continue to explore:

- Incentive programs for surface water retrofits (e.g. rain gardens)
- Tree canopy as a surface water benefit in the Urban Forestry Management Program Plan; incentive program for tree retention
- Continue to support and implement green stormwater infrastructure
- Continue green stormwater infrastructure use (e.g. rain gardens) in the right-of-way
- Have clear decision guidelines regarding the use of Utility funds for work on private property
- Have clear decision guidelines on use of public funds to correct illicit connections
- Continue to pursue grant funds for capital projects

Chapter 8: Surface Water Utility Performance Measures

8.1 Introduction

This section describes performance measures to assess the Surface Water Utility's progress towards meeting the goals outlined in Chapter 5, the level of service recommendations made in Chapter 6, and new program recommendations made in Chapter 7. Performance measures are a tool for the Utility to assess whether or not it is achieving its goals, and to provide an opportunity to address any identified needs. The performance measures are intended to be assessed by the Utility annually. Based on these annual assessments, the Utility can make any necessary program adjustments to better meet the performance measures. Programs and performance measures that are regulatory requirements are indicated with an asterisk.

Performance measures are identified as either qualitative or quantitative, as dictated by the type of program being assessed. Some programs lend themselves well to quantitative measurements, while other programs can be assessed with qualitative measures. For qualitative performance measures, the evaluation may simply be whether work items identified in the plan were completed. Some performance indicators are set out as one-time goals (for example, implementing a new program). Some performance measures have a target deadline within the planning timeframe.

Performance measures are outlined by Utility Program areas, and are aligned with the level of service analyses in Chapter 6 and new programs in Chapter 7.

8.2 Operations and Maintenance (O&M)

The performance measures for operations and maintenance are primarily based on comparing inspection and maintenance activities scheduled for each asset type versus the actual maintenance accomplished, and the timeframe within which it was accomplished. Specific key performance measures are as follows:

8.2.1 O&M Implementation Measures

- Research and make recommendation on GIS-based software that allows field tracking and reporting of inspection and maintenance work that is tied to the asset (by December 2018)
- * Restore decant facility to be in compliance with regulatory requirements (by December 2017)
- * Revise and update Stormwater Pollution Prevention Plan (SWPPP) for Public Works facility, within 3 months of decant facility being operational (March 2018)
- Add two additional Stormwater maintenance staff by December 2018, or sooner
- Develop regular ditch inspection and maintenance program
- One-time field verify GIS locations and vertical data for 50% of catch basins per year as part of inspection program (by end of 2018)
- One-time field verify GIS locations and vertical data for permanent stormwater treatment and flow control BMPs/facilities at 50% per year (by end of 2018).
- * Re-evaluate program status upon issuance of the new NPDES Permit to assure continued compliance, anticipated in 2018

8.2.2 O&M Annual Key Performance Indicators

- * Inspect ½ of City-owned catch basins per year, maintaining those that exceed the maintenance threshold.
- Document sediment levels in catch basins in order to build a database that captures sediment loading rates. This data will help build evidence for adjusted maintenance frequencies specific to those assets, rather than generic standards.
- * Record street sweeping efforts (in lane miles per year) and identify which streets are swept at which frequencies.
- * Record inspections of publically owned or operated permanent stormwater treatment and flow control BMPs/facilities, maintaining those that exceed the maintenance threshold. Permit requires records of 95% of completed inspections.
- * Record ditch inspection and maintenance efforts
- * Track and record number of stormwater service requests completed (that are not part of regular maintenance items)

- Track and record length of time to initial response on service requests
- * Record spot check of potentially damaged permanent stormwater treatment and flow control BMPs/facilities after major storm events.

Items noted with an asterisk are a current regulatory requirement. Maintenance frequencies may need to be adjusted to meet any new frequency requirements in the upcoming 2018-2023 NPDES Permit.

8.3 Engineering Development Services

Performance indicators for Development are primarily based on adequate standards that comply with regulatory requirements, providing guidance to the developers, and reasonable response time in development review.

8.3.1 Engineering Development Services Implementation Measures

- Revise the Mukilteo Development standards and Mukilteo Municipal Code for stormwater to be consistent with the SWMMWW (by December 2017).
- Update standard plan designs, to be consistent with new standards, where necessary (by December 2017).
- Develop tools for City staff and the development community to use in determining LID feasibility (ongoing, as part of Basin Planning, at rate of 1 basin per year).
- Revise development inspection schedule tracking to align with regulatory requirements for easier tracking (by December 2016).
- Develop a separate stormwater permit (by December 2016).
- Develop a short-form Stormwater Pollution Prevention Plan for small projects (by December 2016).
- Develop guidance documents for development on stormwater requirements (ongoing; by December 2016)
- Research and consider a no-cost retrofit rain garden permit.
- * Complete review of Development Codes and Standards to assure there are no barriers, or unnecessary competing needs, to implementing Low Impact Development (LID) as the preferred alternative (by December 2016).

8.3.2 Engineering Development Services Annual Key Performance Indicators

- * Track number of development projects needing stormwater review
- * Track number of stormwater inspections on development projects
- * All development permit applications meet the most current SWMMWW
- Track and record review time of development permit applications. Standard is stormwater review completed within 4 weeks of receipt by Engineering Department.

8.4 Technical Assistance

Technical assistance is provided both internally and externally. Performance measures for regulatory requirements are based on the NPDES Permit minimum requirements versus actual implementation. In some cases, the Utility may find it beneficial to establish program elements that are beyond minimum requirements.

8.4.1 Technical Assistance Implementation Measures

- * Purchase and implement training on Illicit Discharge Detection and Elimination (IDDE) equipment to fully implement the City's current IDDE Guidance document Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments, Center for Watershed Protection, October 2004 (by July 2017)
- * Implement training programs for City staff in areas identified in the Permit (e.g. IDDE, BMPs) (March 2016)
- Develop and implement a Local Source Control Program (December 2017)
- Review and implement business outreach program (December 2017)
- Research potential to join Department of Ecology's Local Source Control Partnership to supplement Business Outreach program (December 2017)
- * Evaluate City programs in light of new NPDES Permit, anticipated in 2018, and adjust performance measures, if necessary
- Hire and train a 0.75 FTE in Engineering (in conjunction with the 0.25 FTE identified in Outreach)

8.4.2 Technical Assistance Annual Key Performance Indicators

- * Track and record number of NPDES deadlines and requirements not met (as specified in the NPDES Annual Report to Ecology). The target is zero
- * Number of meetings with other City Departments to review permit compliance (for example Public Works, Planning). Target is 6 per year per department
- * Complete Ecology's required Annual Surface Water Management Program Plan and post on website annually by March 31
- * Track and record number of surface water service requests where technical assistance is provided
- * Track and record time it takes to respond to surface water service requests where technical assistance is provided
- * Track and record number of investigations (and initial responses) to all non-emergency (i.e. non-spill related) water quality and drainage complaints
- * Track and record number of investigations (and initial responses) to all emergency (i.e. spill related) water quality events
- * Track and record the response time to abate emergency water quality events
- * Track and record number of water quality code enforcement cases
- * Track and record number of drainage code enforcement cases
- per year)
- * Continue to attend Stormwater Working Group Caucus meetings (as scheduled)
- * Continue coordination with City departments to ensure other departments are meeting NPDES Permit requirements (monthly meetings with Public Works; through Planning/Engineering meetings)
- * Continue to attend quarterly NPDES Permit Coordinators meetings (at least 3 per year)

8.5 Community Stewardship*

Over the past several years, the City has participated in regional and local outreach efforts designed to educate and foster behaviors that protect the environment. A recommendation of this plan is to enhance programs that provide a direct link to protection and improvement of water quality.

8.5.1 Community Stewardship Implementation Measures

- Adapt regional outreach examples to develop a comprehensive stormwater outreach program for Mukilteo
- Partner with groups already active in the community, such as BeachWatchers and Snohomish Conservation District to integrate stormwater messaging into their existing programs
- Develop a business outreach program (Local Source Control)
- Support natural yard care techniques
- Support tree retention and preservation programs in the City
- Support low impact development retrofits in areas that are suitable
- * Implement recommendations found in the study completed in partnership with Snohomish County on Natural Yard Care
- Hire and train a 0.25 FTE (in conjunction with the 0.75 FTE identified in Technical Assistance)

8.5.2 Community Stewardship Annual Key Performance Indicators

- Number of residents involved in outreach programs

8.6 Monitoring and Research*

The City primarily participates in monitoring and research through contribution to the Regional Monitoring Program through the NPDES Permit.

8.6.1 Monitoring and Research Implementation Measures

- * During the 2018 Permit cycle, the City should evaluate the Opt-in option for the RSMP Program to assure that the regional program is providing locally relevant information
- * At the next NPDES Permit cycle, the City should evaluate the RSMP Program and whether it wants to continue to opt-in to the RSMP
- Collaborate with neighboring jurisdictions in their monitoring program, where possible
- * Help identify and implement solutions to degraded water quality

8.6.2 Monitoring and Research Annual Key Performance Indicators

- * Contribute to Regional Water Quality Monitoring efforts under the Permit

- Continued partnership and meeting attendance with Landslide Working Group

8.7 Capital Improvement Program

This program includes capital projects to reduce flood hazards, protect and improve water quality, and enhance aquatic stream/wetland areas that are impacted by stormwater runoff. The performance measures for capital projects will be to compare recommended projects with those that have been completed. Project priorities may shift from year to year due to a number of factors. The performance indicators should always be evaluated against the current priorities.

8.7.1 Capital Improvement Program Implementation Measures

- Annually review and rank the existing CIP list to assure that newly identified projects are added (July, or during draft budget preparation)
- Periodically solicit input from community about stormwater issues in their neighborhoods (every five years)
- Determine method to assure equitable distribution of projects across the City (December 2020)

8.7.2 Capital Program Annual Key Performance Indicators

- Number of identified drainage projects completed
- Number of water quality projects (including LID) completed
- Number of stream / wetland enhancement projects completed

8.8 Basin Planning

Basin planning is a new program area for the Utility. Implementation measures for this program are considered below.

8.8.1 Basin Planning Implementation Measures

- Conduct basin plans that follow the *Strategies Plan* (average of 1 per year, although cost savings are realized by combining efforts)
- Develop basin plans in a way that capitalizes on existing information
- Complete basin plans in a timely manner, so that existing information does not age out and become obsolete (requiring additional cost to re-create)

- The basin plans reflect the uniqueness of each basin and include specific recommendations that address the unique needs of each basin
- The basin plans identify opportunities, large and small to address problems

8.9 Asset Inventory

Asset inventory and management is a new area for the Utility. The performance measures are mostly tied to the recommendations of this plan, capitalizing on existing resources and other NPDES inspection requirements.

8.9.1 Asset Inventory Implementation Measures

- Review and recommend a GIS-centric asset management software system (proprietary or in-house) that meets the needs of the Utility (both in Operations and Engineering) (December 2020)
- Implementation of an inventory and condition assessment program (can be as part of a basin plan) (December 2021)
- Update GIS mapping to include all stormwater facilities (public and private) (December 2017)
- Update GIS mapping to include stormwater easement information (December 2019)
- Develop a process that captures newly developed stormwater facilities in the GIS (December 2017)
- Utility has hired an additional 0.5 FTE for GIS Technician- level position (December 2016)
- Utility supports a 0.25 FTE for GIS Coordinator-level position
- An electronic map book (or alternative) with asset information that is available to field staff in real time (December 2020)
- *Update GIS mapping to include all discharge points (February 2018)

8.9.2 Asset Inventory Annual Key Performance Indicators

- Lineal feet of storm assets inventoried with condition assessments
- Number of stormwater facilities mapped in the GIS
- Number of easements mapped in the GIS

8.10 Low Impact Development

8.10.1 Low Impact Development Implementation Measures

- Support tree retention and preservation programs in the City
- Support LID retrofits in areas that are suitable
- * Complete Code review
- * Implement recommendations found in the study completed in partnership with Snohomish County on Natural Yard Care

8.10.2 Low Impact Development Annual Key Performance Indicators

- Number of LID retrofit projects installed in the City

8.11 Private Property and Public Drainage Systems

8.11.1 Private / Public Implementation Measures

- Development of a clear process (by October 2016)
- Identify all major stormwater pipes carrying right of way runoff with no easement (December 2019)
- Map all easements in GIS (December 2021)
- Development of an easement acquisition process, with no cost to the Utility (by December 2018)

8.11.2 Private / Public Annual Key Performance Indicators

- Number of easements mapped
- Number of easements acquired

Chapter 9: Financial Plan

9.1 Introduction

This financial plan is intended to ensure the viability of the surface water management program during the planning period. This financial plan considers the historical financial condition, current and identified future financial and policy obligations, operations and maintenance needs, and the capital projects identified in this Comprehensive Surface Water Management Plan (SWMP) Update. Furthermore, this chapter provides a review of the utility's current rate structure with respect to rate adequacy and customer affordability. Appendix H presents backup documentation related to this financial plan.

The City's Surface Water Utility (Utility) is responsible for funding all of its costs. The primary source of funding is derived from ongoing monthly charges for service, with nominal additional revenues coming from interest earned on the reserves. The City controls the level of user charges and, subject to City Council approval, can adjust user charges as needed to meet financial objectives.

The financial plan can only provide a qualified assurance of financial feasibility if it considers the total system costs of providing stormwater services, both operating and capital. This financial plan considers resources from rate revenues and reserve interest only. The following elements have been completed for this financial plan:

1. **Capital Funding Plan**. Identifies the total capital improvement plan (CIP) obligations of the planning period. The plan defines a strategy for funding the CIP including an analysis of available resources from rate revenues, existing reserves, general facilities charges, debt financing, and any special resources that may be available (e.g. grants, developer contributions, etc.). The capital funding plan impacts the financial plan through the use of the assumed rate revenue available for capital funding.
2. **Financial Forecast**. Identifies future annual non-capital costs associated with the operating, maintenance and administration of the stormwater system. Included in the financial plan is a reserve analysis that forecasts cash flow and fund balance activity along with testing for satisfaction of actual or recommended minimum fund balance policies. The financial plan ultimately evaluates the sufficiency of utility revenues in meeting all obligations, including cash uses such as operating expenses, capital outlays, and reserve contributions. The plan also identifies the future adjustments required to fully fund all utility obligations in the projection period.

9.2 Available Funding Assistance and Financing Resources

Long-term capital funding strategies must be defined to ensure that adequate resources are available to fund the CIP identified in this SWMP Update. In addition to the City's resources such as accumulated cash reserves, capital revenues, and rate revenues designated for capital purposes, capital needs can be met from outside sources such as grants, low-interest loans, and bond financing. Although the City currently only funds capital from rate revenues, all resources will be discussed. The following is a summary of the internal and external resources available to the City.

9.2.1 City Resources

Resources appropriate for funding capital needs include accumulated cash in the construction fund, rate revenues designated for capital spending purposes, and capital-related charges such as the General Facilities Charge (GFC). The first two resources will be discussed in the Fiscal Policies section (9.3.2) of the Financial Forecast. Capital-related charges are discussed below.

9.2.1.1 General Facilities Charges

A connection charge such as the GFC refers to a one-time charge imposed on new customers as a condition of development. The purpose of the GFC is two-fold: to promote equity between new and existing customers and to provide a source of revenue to fund capital projects. Revenue can only be used to fund utility capital projects or to pay debt service incurred to finance those projects. The City does not currently charge a stormwater GFC. Since the City is near build-out it would not be a sustainable revenue source if the City began to charge new customers.

9.2.1.2 Local Improvement Districts

A local improvement district (LID) is another mechanism for funding infrastructure that assesses benefited properties based on the special benefit received by the construction of a specific facility. Most often used for local facilities, some LIDs also recover related general facilities costs. Substantial legal and procedural requirements can make this a relatively expensive process, and there are mechanisms by which an LID can be rejected. LIDs have proven to be an awkward fit for surface water facilities because of the challenge of linking the special benefit to specific properties. The City may want to consider LIDs for bluff properties in the future, where there may be a more direct link of the benefit.

9.2.2 Outside Resources

This section outlines various grant, loan and bond opportunities available to the City through federal and state agencies to fund the CIP identified in the SWMP Update.

9.2.2.1 Grants and Low Cost Loans

Historically, federal and state grant programs were available to local utilities for capital funding assistance. However, these assistance programs have been mostly eliminated, substantially reduced in scope and amount, or replaced by loan programs. Remaining miscellaneous grant programs are generally lightly funded and heavily subscribed. Nonetheless, even the benefit of low-interest loans makes the effort of applying worthwhile. The major funding sources are as follows:

Department of Ecology Grants and Loans – The Washington Department of Ecology (Ecology) administers an integrated funding program for projects that improve and protect water quality throughout the state. The combined funding cycle generally begins September 1, and applicants must submit the final application by the first week of November. Ecology rates and ranks applications based on the highest-priority needs. Projects include stormwater control and treatment, nonpoint pollution abatement and stream restoration activities, and water quality education and outreach. The amount of available grant and loan funding varies from year to year based on the state’s biennial budget appropriation process and the annual congressional federal budget. The sources of funding for water quality projects include:

- Centennial Clean Water Fund State Grant Program
- Clean Water Act Section 319 Federal Grant Program

- Clean Water State Revolving Fund (CWSRF) Loan Program
- Stormwater Financial Assistance Program (SFAP) beginning in FY2016

Further detail is available at http://www.ecy.wa.gov.

Public Works Trust Fund (PWTF) – Cities, counties, special purpose districts, public utility districts, and quasi-municipal governments are eligible to receive loans from the PWTF. Eligible projects include repair, replacement, and construction of infrastructure for domestic water, sanitary sewer, stormwater, solid waste, road, and bridge projects that improve public health and safety, respond to environmental issues, promote economic development, or upgrade system performance. Due to current funding restrictions and funding allocations, the Public Works Board has suspended the non-Construction Programs. As the economy builds, it is hoped that the Board will attempt to re-institute these programs.

PWTF loans are available at interest rates ranging from 1.28 percent to 2.55 percent depending on the repayment term, with reduced interest rates available for all projects located in "distressed" communities. The standard loan offer is 2.55 percent interest repaid over a 5 to 20 year term. All loan terms are subject to negotiation and Board approval. Currently no local match is required and the maximum loan amount is $7 million per jurisdiction per biennium. Information regarding the application process as well as rates and terms are posted on the PWTF website in early spring.

Further detail is available at http://www.pwb.wa.gov.

9.2.2.2 Bond Financing

General Obligation Bonds – General Obligation (G.O.) bonds are bonds secured by the full faith and credit of the issuing agency, committing all available tax and revenue resources to debt repayment. With this high level of commitment, G.O. bonds have relatively low interest rates and few financial restrictions. However, the authority to issue G.O. bonds is restricted in terms of the amount and use of the funds, as defined by Washington constitution and statute. Specifically, the amount of debt that can be issued is linked to assessed valuation.

RCW 39.36.020 states:

> *"(ii) Counties, cities, and towns are limited to an indebtedness amount not exceeding one and one-half percent of the value of the taxable property in such counties, cities, or towns without the assent of three-fifths of the voters therein voting at an election held for that purpose.*
>
> *(b) In cases requiring such assent counties, cities, towns, and public hospital districts are limited to a total indebtedness of two and one-half percent of the value of the taxable property therein."*

While bonding capacity can limit availability of G.O. bonds for utility purposes, these can sometimes play a valuable role in project financing. A rate savings may be realized through two avenues: the lower interest rate and related bond costs; and the extension of repayment obligation to all tax-paying properties (not just developed properties) through the authorization of an ad valorem property tax levy. The Utility does not anticipate issuing any general obligation bonds in this financial forecast.

Revenue Bonds – Revenue bonds are commonly used to fund utility capital improvements. The debt is secured by the revenues of the issuing utility. With this limited commitment, revenue bonds typically bear higher interest rates than G.O. bonds and also require security conditions related to the maintenance of dedicated reserves (a bond reserve) and financial performance (added bond debt service coverage). The City agrees to satisfy these requirements by resolution as a condition of bond sale.

Revenue bonds can be issued in Washington without a public vote. There is no bonding limit, except perhaps the practical limit of the utility's ability to generate sufficient revenue to repay the debt and provide coverage. In some cases, poor credit might make issuing bonds problematic. The Utility does not anticipate issuing any revenue bonds in this financial forecast.

9.3 Financial Forecast

The financial forecast, or revenue requirement analysis, forecasts the amount of annual revenue that needs to be generated by user rates. The analysis incorporates operating revenues, operations and maintenance (O&M) expenses, debt service payments (if applicable), rate-funded capital needs, and any other identified revenues or expenses related to operations. The objective of the financial forecast is to evaluate the sufficiency of the current level of rates. In addition to annual operating costs, the revenue needs to also include any applicable debt covenant requirements and specific fiscal policies and financial goals of the City.

The analysis determines the amount of revenue needed in a given year to meet that year's expected financial obligations. For this analysis, two revenue sufficiency tests have been developed to reflect the financial goals and constraints of the City: cash needs must be met, and debt coverage requirements must be realized. In order to operate successfully with respect to these goals, both tests of revenue sufficiency must be met.

Cash Test – The cash flow test identifies all known cash requirements for the City in each year of the planning period. Typically these include O&M expenses, debt service payments, depreciation funding or directly funded capital outlays, and any additions to specified reserve balances. The total annual cash needs of the City are then compared to projected cash revenues using the current rate structure. Any projected revenue shortfalls are identified and the rate increases necessary to make up the shortfalls are established.

Coverage Test – The coverage test is based on a commitment made by the City when issuing revenue bonds and some other forms of long-term debt. As a security condition of issuance, the City would be required per covenant to agree that the revenue bond debt would have a higher priority for payment (a senior lien) compared to most other expenditures; the only outlays with a higher lien are O&M expenses. Debt service coverage is expressed as a multiplier of the annual revenue bond debt service payment. For example, a 1.0 coverage factor would imply that no additional cushion is required. A 1.25 coverage factor means revenue must be sufficient to pay O&M expenses, annual revenue bond debt service payments, plus an additional 25 percent of annual revenue bond debt service payments. The excess cash flow derived from the added coverage, if any, can be used for any purpose, including funding capital projects. Targeting a higher coverage factor can help the City achieve a better credit rating and provide lower interest rates for future debt issues.

In determining the annual revenue requirement, both the cash and coverage sufficiency test must be met and the test with the greatest deficiency drives the level of needed rate increase in any given year. Since the Utility does not have any current or forecast debt, the cash test drives the level of needed rate increases in all years of this financial forecast.

9.3.1 Current Financial Structure

The City maintains a fund structure and implements financial policies that target management of a financially viable and fiscally responsible stormwater system.

9.3.2 Fiscal Policies

A brief summary of the key financial policies employed by the City, as well as those recommended and incorporated in the financial program are discussed below.

Operating Fund Reserves – Operating reserves are designed to provide a liquidity cushion to ensure that adequate cash working capital will be maintained to deal with significant cash balance fluctuations such as seasonal fluctuations in billings and receipts, unanticipated cash expenses, or lower than expected revenue collections. The City's current policy is to maintain a minimum balance in the Operating Fund equal to 60 days, or about 16 percent, of O&M expenses.

Capital Fund Reserves – A capital contingency reserve is an amount of cash set aside in case of an emergency should a piece of equipment or a portion of the utility's infrastructure fail unexpectedly. The reserve also could be used for other unanticipated capital needs including capital project cost overruns. Industry practices range from maintaining a balance equal to 1 to 2 percent of fixed assets, an amount equal to a 5-year rolling average of CIP costs, or an amount determined sufficient to fund equipment failure (other than catastrophic failure). The final target level should balance industry standards with the risk level of the City. This forecast is based on maintaining a minimum balance in the Capital Fund equal to $300,000. Although this balance is higher than industry standards, it is consistent with the cost of emergency repairs incurred in the last several years.

Currently the Surface Water Utility revenue is grouped under one line item; however, it is recommended that the City set up a separate Capital Fund for this utility, and this forecast has assumed that this will be done.

System Reinvestment – System reinvestment funding promotes system integrity through reinvestment in the system. Target system reinvestment funding levels are commonly linked to annual depreciation expense as a measure of the decline in asset value associated with routine use of the system. Particularly for utilities that do not already have an explicit system reinvestment policy in place, implementing a funding level based on full depreciation expense could significantly impact rates. This impact can be mitigated by phasing the funding in over a multi-year period, or by establishing a lower upfront funding target. A common alternative benchmark is annual depreciation expense net of debt principal payments on outstanding debt. This approach recognizes that customers are still paying for certain assets through the debt component of their rate, and intends to avoid simultaneously charging customers for an asset and its future replacement. The specific benchmark used to set system reinvestment funding targets is a matter of policy that must balance various objectives including managing rate impacts, keeping long-term costs down, and promoting "generational equity" (i.e. not excessively burdening current customers with paying for facilities that will serve a larger group of customers in the future). A separate financial policy for ongoing system reinvestment is not contemplated at this time. It is recommended to review this option once the asset inventory is complete.

Capital Funding - The City will fund prioritized capital projects on a pay-as-you-go basis, without the use of debt. In the financial forecast, these monies will be put directly into the Capital Fund and will be made available for capital project costs. We recommend that the City add a separate line item for capital in the budget to show this amount as projected. More specifically, the capital funding strategy developed to fund the CIP identified in this SWMP assumes the following funding resources:

- Accumulated cash reserves
- Transfers of excess cash (over minimum balance targets) from the Surface Water Operating Fund to the Surface Water Capital fund.
- Annual cash from rates earmarked for rate funded capital

- Interest earned on Capital Fund balances and other miscellaneous capital resources

Debt Management – It is prudent to consider policies related to debt management as part of broader utility financial policy structure, in case the City ever chooses to use debt. Debt management policies should be evaluated and formalized including the level of acceptable outstanding debt, debt repayment, bond coverage and total debt coverage targets. Generally bond covenants require a minimum 1.25 debt coverage test, however since there are no current or forecasted bonds, this is not applicable in the current study.

9.3.3 Financial Assumptions

The financial forecast is developed from 2015 budget documents along with other key factors and assumptions to develop a complete portrayal of the utility's annual financial obligations. The following is a list of the key revenue and expense factors and assumptions used to develop the financial forecast:

- **Revenue** – The utility has two general revenue sources: revenue from charges for service (rate revenue) and miscellaneous (non-rate) revenue. In the event of a forecasted annual shortfall, rate revenue can be increased to meet the annual revenue requirement. Non-rate revenues are forecast to not escalate based on the nature of the revenues.
- **Growth** – Rate revenue is escalated based on 0.25 percent customer growth per year, which is just over half of the 0.40 percent growth rate provided in the City's *Comprehensive Plan*, and allows for more conservative financial forecasting.
- **Expenses** – O&M expense projections are based on the 2015 budget and are forecast to increase with general cost inflation of 2.50 percent, construction cost inflation of 3.26 percent, labor cost inflation of 2.87 percent and benefit cost inflation of 3.91 percent. Budget figures were used for 2015 taxes; future taxes are calculated based on forecasted revenues and prevailing tax rates. All scenarios prioritize NPDES compliance in 2016 and forecast the General Fund Reserve reimbursement to cut in half in 2016 and zero out in 2017.
- **Existing Debt** – The City's Surface Water Utility Fund currently has no outstanding debt.
- **Future Debt** – The capital funding strategy developed for this SWMP indicates no new debt issuance is required.
- **Transfer to Capital** – Any Operating Fund balance above the minimum requirement is assumed to be available to fund capital projects and is projected to be transferred to the Capital Fund each year. In order to allow a transfer of $234,000 to the Capital Fund, the 2015 Operating Fund balance is expected to end the year below the target of 60 days of O&M expenses. With currently secured grant revenue and capital expenses, the Capital Fund balance is expected to be approximately $13,000 at the end of 2015. The length of time it takes to replenish both the operating and capital funds to their target balances is dependent on the City's actions (i.e., rate increases) in subsequent years.

9.4 Level of Service Analysis

The City considered four scenarios in the financial analysis. Each analysis considered all funding resource options, the Utility's financial policies and targets, and current operating needs. The forecast scenarios only considered options that were compliant with current regulatory requirements. The current surface water rate is $7.85 per Equivalent Residential Unit (ERU). Resulting rate revenue is projected to be $1.33 million in 2015. Total 2015 budgeted expenses for the utility are $1.52 million, which shows that the utility is currently underfunded.

9.4.1 Level of Service Options

The financial plan developed for this SWMP identifies four scenarios. Consistent in all four scenarios are:

- The $646,000 that was included in the 2015 adopted capital budget
- The $302,000 Smuggler's Gulch LID project that was carried over from 2014 to 2015
- Additional O&M costs that are necessary to meet NPDES regulatory requirements
- Discontinuation of the transfer from the Surface Water Fund to the General Fund by the end of 2017
- Secured grant funding in 2015

Cash funding for the remaining costs would increase or decrease as needed for each scenario. The scenarios are briefly described below, with details found in Appendix H.

- Scenario #1 does not include any additional capital within in the forecast and assumes receiving supplemented funding from other areas of Public Works, resulting in a reduced level of service in Parks, such as limiting irrigation, discontinuing portable toilet services, and reducing landscaping services.
- Scenario #2 includes the eight highest priority capital projects, beginning in 2018, and completed in 2032 and assumes receiving supplemented funding from other areas of Public Works, resulting in a reduced level of service in Parks, such as limiting irrigation, and discontinuing portable toilet services, and reducing landscaping services.
- Scenario #3 includes the eight highest priority capital projects, beginning in 2017, and completed in 2031 and assumes no supplemental funding
- Scenario #4 includes the eight highest priority capital projects beginning in 2016 and completed in 2030 and assumes no supplemental funding

All scenarios with capital (#2, #3, and #4) also include a one-time pipe inspection and basin planning costs spread evenly over each year; these costs begin the same year as the other projects in each scenario and are to be completed by 2025 regardless of when they start.

A summary of the four scenarios is shown in Table 9-1. Further detail for each of the scenarios can be found in the following section.

TABLE 9-1: LEVEL OF SERVICE (LOS) OPTIONS

Scenario	Description
1 - Supplemented - No CIP	NPDES Compliant, 2016 Supplemented Funding
2 - Supplemented - 2018-2032 CIP	NPDES Compliant, 2016 Supplemented Funding
3 - Utility Funded - 2017-2031 CIP	NPDES Compliant
4 - Utility Funded - 2016-2030 CIP	NPDES Compliant

Operating Fund at 60 days of O&M Expenses
All scenarios prioritize NPDES compliance in 2016
No General Fund Transfer after 2017
CIP includes top 8 capital projects

9.4.2 Level of Service Results

The following tables summarize the annual revenue requirements based on the forecast of revenues, expenditures, fund balances, and fiscal policies.

Scenario #1

Scenario #1 would require supplemental funding or cuts in service equal to $273,000 in 2016 along with rate increases of $3.61 in 2016, $1.15 in 2017, $1.26 in 2018, and $0.28 per year in 2019 and 2020. Table 9-2 shows a summary of Scenario #1.

TABLE 9-2: SCENARIO #1 – 6-YEAR FINANCIAL FORECAST

Revenue Requirement	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Revenues						
Rate Revenues Under Existing Rates	$ 1,334,000	$ 1,337,284	$ 1,340,576	$ 1,343,877	$ 1,347,185	$ 1,350,502
Non-Rate Revenues	3,000	125	57	283	323	324
Total Revenues	**$ 1,337,000**	**$ 1,337,409**	**$ 1,340,634**	**$ 1,344,159**	**$ 1,347,508**	**$ 1,350,825**
Expenses						
Cash Operating Expenses	$ 1,521,995	$ 1,505,954	$ 1,397,960	$ 1,436,054	$ 1,425,270	$ 1,465,642
O&M (NPDES) Expenses	-	505,000	517,625	530,566	543,830	557,426
Rate Funded Capital	-	-	-	-	-	-
Total Expenses	**$ 1,521,995**	**$ 2,010,954**	**$ 1,915,585**	**$ 1,966,620**	**$ 1,969,100**	**$ 2,023,067**
Total Surplus (Deficiency)	**$ (184,995)**	**$ (673,545)**	**$ (574,951)**	**$ (622,460)**	**$ (621,591)**	**$ (672,242)**
Annual Rate Adjustment		**46.00%**	**10.00%**	**10.00%**	**2.00%**	**2.00%**
Net Cash Flow After Rate Increase	**(184,995)**	**(67,622)**	**225,252**	**392,302**	**442,554**	**442,463**
Monthly Rate per ERU	**$ 7.85**	**$ 11.46**	**$ 12.61**	**$ 13.87**	**$ 14.15**	**$ 14.43**

Cash Deficiency	$ 67,622
Stormwater Fund Balance Deficiency	205,568
Additional Funding or Cuts Needed	$ 273,189

Scenario #2

Scenario #2 would also require supplemental funding or cuts of $273,000 in 2016 along with rate increases of $3.61 in 2016, $2.18 in 2017, $2.59 in 2018, $3.08 in 2019, and $3.67 in 2020. Table 9-3 shows a summary of Scenario #2.

TABLE 9-3: SCENARIO #2 – 6-YEAR FINANCIAL FORECAST

Revenue Requirement	2015	2016	2017	2018	2019	2020
Revenues						
Rate Revenues Under Existing Rates	$ 1,334,000	$ 1,337,284	$ 1,340,576	$ 1,343,877	$ 1,347,185	$ 1,350,502
Non-Rate Revenues	3,000	125	57	315	323	324
Total Revenues	**$ 1,337,000**	**$ 1,337,409**	**$ 1,340,634**	**$ 1,344,191**	**$ 1,347,508**	**$ 1,350,825**
Expenses						
Cash Operating Expenses	$ 1,521,995	$ 1,505,954	$ 1,397,960	$ 1,436,054	$ 1,425,270	$ 1,465,642
O&M (NPDES) Expenses	-	505,000	517,625	530,566	543,830	557,426
Rate Funded Capital	-	-	140,000	750,000	1,250,000	1,750,000
Total Expenses	**$ 1,521,995**	**$ 2,010,954**	**$ 2,055,585**	**$ 2,716,620**	**$ 3,219,100**	**$ 3,773,067**
Total Surplus (Deficiency)	**$ (184,995)**	**$ (673,545)**	**$ (714,951)**	**$ (1,372,428)**	**$ (1,871,591)**	**$ (2,422,242)**
Annual Rate Adjustment		**46.00%**	**19.00%**	**19.00%**	**19.00%**	**19.00%**
Net Cash Flow After Rate Increase	**(184,995)**	**(67,622)**	**258,762**	**40,649**	**66,236**	**142,196**
Monthly Rate per ERU	**$ 7.85**	**$ 11.46**	**$ 13.64**	**$ 16.23**	**$ 19.31**	**$ 22.98**

Cash Deficiency	$ 67,622
Stormwater Fund Balance Deficiency	205,568
Additional Funding or Cuts Needed	$ 273,189

Scenario #3

Scenario #3 would require rate increases of $6.99 in 2016, $2.45 in 2017, $1.90 in 2018, $2.01 in 2019, and $2.23 in 2020. Table 9-4 shows a summary of Scenario #3.

TABLE 9-4: SCENARIO #3 – 6-YEAR FINANCIAL FORECAST

Revenue Requirement	2015	2016	2017	2018	2019	2020
Revenues						
Rate Revenues Under Existing Rates	$ 1,334,000	$ 1,337,284	$ 1,340,576	$ 1,343,877	$ 1,347,185	$ 1,350,502
Non-Rate Revenues	3,000	125	331	315	323	324
Total Revenues	**$ 1,337,000**	**$ 1,337,409**	**$ 1,340,907**	**$ 1,344,191**	**$ 1,347,508**	**$ 1,350,825**
Expenses						
Cash Operating Expenses	$ 1,521,995	$ 1,505,954	$ 1,397,960	$ 1,436,054	$ 1,425,270	$ 1,466,490
O&M (NPDES) Expenses	-	505,000	517,625	530,566	543,830	557,426
Rate Funded Capital	-	-	1,000,000	1,250,000	1,500,000	1,750,000
Total Expenses	**$ 1,521,995**	**$ 2,010,954**	**$ 2,915,585**	**$ 3,216,620**	**$ 3,469,100**	**$ 3,773,916**
Total Surplus (Deficiency)	**$ (184,995)**	**$ (673,545)**	**$ (1,574,678)**	**$ (1,872,428)**	**$ (2,121,591)**	**$ (2,423,091)**
Annual Rate Adjustment		**89.00%**	**16.50%**	**11.00%**	**10.50%**	**10.50%**
Net Cash Flow After Rate Increase	**(184,995)**	**498,785**	**12,326**	**39,092**	**135,171**	**216,447**
Monthly Rate per ERU	**$ 7.85**	**$ 14.84**	**$ 17.28**	**$ 19.19**	**$ 21.20**	**$ 23.43**

Scenario #4

Scenario #4 would require rate increases of $10.28 in 2016, $1.63 in 2017, $1.68 in 2018, $1.72 in 2019, and $1.27 in 2020. Table 9-5 shows a summary of Scenario #4.

TABLE 9-5: SCENARIO #4 – 6-YEAR FINANCIAL FORECAST

Revenue Requirement	2015	2016	2017	2018	2019	2020
Revenues						
Rate Revenues Under Existing Rates	$ 1,334,000	$ 1,337,284	$ 1,340,576	$ 1,343,877	$ 1,347,185	$ 1,350,502
Non-Rate Revenues	3,000	125	331	315	323	324
Total Revenues	**$ 1,337,000**	**$ 1,337,409**	**$ 1,340,907**	**$ 1,344,191**	**$ 1,347,508**	**$ 1,350,825**
Expenses						
Cash Operating Expenses	$ 1,521,995	$ 1,505,954	$ 1,397,960	$ 1,436,054	$ 1,426,098	$ 1,466,490
O&M (NPDES) Expenses	-	505,000	517,625	530,566	543,830	557,426
Rate Funded Capital	-	750,000	1,250,000	1,500,000	1,750,000	2,000,000
Total Expenses	**$ 1,521,995**	**$ 2,760,954**	**$ 3,165,585**	**$ 3,466,620**	**$ 3,719,928**	**$ 4,023,916**
Total Surplus (Deficiency)	**$ (184,995)**	**$ (1,423,545)**	**$ (1,824,678)**	**$ (2,122,428)**	**$ (2,372,419)**	**$ (2,673,091)**
Annual Rate Adjustment		**131.00%**	**9.00%**	**8.50%**	**8.00%**	**5.50%**
Net Cash Flow After Rate Increase	**(184,995)**	**302,020**	**179,660**	**170,148**	**215,817**	**137,384**
Monthly Rate per ERU	**$ 7.85**	**$ 18.13**	**$ 19.77**	**$ 21.45**	**$ 23.16**	**$ 24.44**

9.4.3 Summary

All four scenarios were considered. Staff recommends scenario #3 because it is NPDES compliant, it is projected to be fully utility-funded, and initial rate increases are projected to be lower because no capital is planned for 2016.

9.5 Recommended Funding Plan (Scenario #3)

The Utility prioritized O&M and permit compliance over capital projects. As a result, capital projects other than those in the 2015 budget are scheduled to begin in 2017. This meets the City goals of issuing no debt and retaining a reasonable rate. The eight highest priority capital projects, as well as the additional capital that is included in all scenarios that include capital (which are described in more detail in section 9.4.1), are forecast to be completed in a 15 year window beginning in 2017.

The eight highest priority capital project costs in the Brown & Caldwell planning level cost analysis (in Appendix E) as well as the 2015 budgeted capital and the additional capital that is included in all scenarios that include capital, are provided in 2015 dollars and summarized in Table 9-6. Table 9-7 compares these 2015 costs to inflation adjusted costs in the expected year of construction. The inflation rate was assumed to be 3.26% per year in the financial analysis.

TABLE 9-6: SCENARIO #3 - CIP COST SUMMARY

CIP Rank No.	Funding Year Modeled	Project Name	Total CIP Cost 2015$
Not ranked	2015	Lighthouse Park Tidegate Stormwater Repairs	$50,000
Not ranked	2015	61st Culvert Replacement	$262,500
Not ranked	2015	Naketa Beach Storm Pipe Repairs & Slope Rehab	$333,500
Not ranked	2015	Smuggler's Gulch LID	$302,384
Not ranked	2017	Decant facility	$320,000
Not ranked	2017-2025	Pipe Inspections	$629,640
Not ranked	2017-2025	Basin Planning	$1,561,800
1	2020	Chennault Beach Drive Drainage Improvements	$3,811,000
2	2024	Mukilteo Lane Drainage Improvements	$6,591,000
3	2026	84th Street SW (West) Storm Drainage Improvements	$1,240,000
4 and 5	2026	64th Place W Street Drainage Improvements	$1,202,000
	2026	66th Place W Street Drainage Improvements	$1,425,000
6	2029	Central Drive Storm Drainage Improvements for Big Gulch Basin	$5,267,000
7	2030	62nd Place W/Canyon Drive Storm Drainage Improvements	$2,852,000
8	2031	10th Street and Loveland Avenue Storm Drainage Improvements	$794,000

TABLE 9-7: SCENARIO #3 CIP

Year	2015$	Inflated
2015	$ 948,384	$ 948,384
2016	-	-
2017	563,493	600,870
2018	243,493	268,117
2019	243,493	276,866
2020	4,054,493	4,760,638
Subtotal	**$ 6,053,357**	**$ 6,854,874**
2021 - 2031	20,588,467	28,753,908
Total	**$ 26,641,824**	**$ 35,608,782**

9.5.1 Capital Financing Strategy

Based on information provided by the City, the Utility began 2015 with $544,000 in the Operating Fund. Additional funds beyond the Operating Fund target of sixty days of O&M expenses are transferred to the Capital Fund in the financial forecast and range from $28,000 in 2017 up to $3.52 million in 2034, based on Scenario #3.

The cash resources described above are forecasted to fund 100 percent of the 2015 budgeted capital, the additional capital that is included in all scenarios that include capital, and the eight highest priority capital projects in the financial forecast. Table 9-8 presents the corresponding financing strategy for Scenario #3.

TABLE 9-8: SCENARIO #3 - CAPITAL FUNDING STRATEGY

Year	Capital Expenditures 2015$	Capital Expenditures Inflated	Secured Grant Funding	Cash Funding	Total Financial Resources
2015	$ 948,384	**$ 948,384**	$ 727,600	$ 220,784	**$ 948,384**
2016	-	**-**	-	-	**-**
2017	563,493	**600,870**	-	600,870	**600,870**
2018	243,493	**268,117**	-	268,117	**268,117**
2019	243,493	**276,866**	-	276,866	**276,866**
2020	4,054,493	**4,760,638**	-	4,760,638	**4,760,638**
Subtotal	**$ 6,053,357**	**$ 6,854,874**	**$ 727,600**	**$ 6,127,274**	**$ 6,854,874**
2021 - 2031	20,588,467	**28,753,908**	-	28,753,908	**28,753,908**
Total	**$ 26,641,824**	**$ 35,608,782**	**$ 727,600**	**$ 34,881,182**	**$ 35,608,782**

The capital funding plan identifies 2.04 percent grant funding for capital projects based on already secured grant funding. The remaining capital costs are projected to be covered by cash funding. This type of planning looks at average growth over the financial planning period and does not take into consideration the current economic conditions, which can have a negative impact on annual growth. It is assumed that if growth is not occurring at the planned rate, the timing of capital projects would be adjusted accordingly.

9.5.2 Utility Funds and Reserves

Table 9-9 shows a summary of the projected Operating Fund and Capital Fund ending balances through 2020 based on the rate forecasts presented above in Table 9-4. The Operating Fund has a minimum target balance of 60 days of O&M expenses and remains above that throughout the forecast. The Capital Fund target balance is set at $300,000 per year. The ending Capital Fund balance is below target in 2015, but escalates back above target levels by the end of 2016.

TABLE 9-9: SCENARIO #3 - ENDING CASH BALANCE SUMMARY

Ending Fund Balances	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Operating Fund	$ 125,000	$ 330,568	$ 314,891	$ 323,280	$ 323,688	$ 332,699
Capital Fund	12,872	306,102	733,542	1,746,861	3,106,505	306,410
Total	**$ 137,872**	**$ 636,670**	**$ 1,048,433**	**$ 2,070,141**	**$ 3,430,193**	**$ 639,108**
Combined Minimum Target Balance	*425,000*	*630,568*	*614,891*	*623,280*	*623,688*	*632,699*

9.6 Current and Projected Rates

9.6.1 Current Rates

The City's current rate is based on impervious surface area and is charged per equivalent residential unit (ERU). One ERU is equal to 2,500 sq. ft. of impervious surface area. All single family residences are assigned one ERU, regardless of actual impervious surface area. Other developed property is charged based on its measured impervious area, expressed as a number of ERUs. Table 9-10 shows the existing rate structure.

TABLE 9-10: 2015 EXISTING RATE STRUCTURE

Monthly Rate	
Per ERU	$ 7.85

9.6.2 Projected Rates

The analysis for this SWMP shows the need for rate increases of $6.99 in 2016, $2.45 in 2017, $1.90 in 2018, $2.01 in 2019, and $2.23 in 2020 based on CIP Scenario #3.

Table 9-11 shows the proposed rates for the 6-year planning period for Scenario #3. Table 9-12 shows monthly residential bill comparisons for Scenario #3.

TABLE 9-11: SCENARIO #3 – 6-YEAR PROPOSED RATES

Monthly Rates	Existing	2016	2017	2018	2019	2020
Per ERU	$ 7.85	$ 14.84	$ 17.28	$ 19.19	$ 21.20	$ 23.43

TABLE 9-12: SCENARIO #3 – MONTHLY BILL COMPARISONS

Residential	Existing	2016	2017	2018	2019	2020
Monthly Bill	$ 7.85	$ 14.84	$ 17.28	$ 19.19	$ 21.20	$ 23.43
$ Difference		$ 6.99	$ 2.45	$ 1.90	$ 2.01	$ 2.23
Rate Increase		89.00%	16.50%	11.00%	10.50%	10.50%

Note: Assumes 1 ERU

9.7 Affordability

The Department of Health and the Department of Commerce Public Works Board use an affordability index to prioritize low-cost loan awards depending on whether rates exceed 2.0 percent of the median household income for the service area. The average median household income for Mukilteo was $93,717 in 2009 – 2013 according to the U.S. Census Bureau. The 2013 figures are escalated based on the assumed 2.50 percent general cost inflation to show the median household income in future years. Table 9-13 presents the City's rates with the projected rate increases for the forecast period, tested against the 2.0 percent monthly affordability threshold.

TABLE 9-13: SCENARIO #3 – AFFORDABILITY TEST

Year	Inflation	Median HH Income	2% Monthly Threshold	Projected Monthly Bill	Total Utility Monthly Bill [a]	% of Median HH Income
2013		$ 93,717	$ 156.20			
2014	2.50%	96,060	160.10			
2015	2.50%	98,461	164.10	$ 7.85	$ 102.93	1.25%
2016	2.50%	100,923	168.20	14.84	113.70	1.35%
2017	2.50%	103,446	172.41	17.28	118.62	1.38%
2018	2.50%	106,032	176.72	19.19	123.06	1.39%
2019	2.50%	108,683	181.14	21.20	127.67	1.41%
2020	2.50%	111,400	185.67	23.43	132.56	1.43%

[a] Includes water (based on 6,600 gallon average monthly usage) and wastewater rates for Mukilteo Water & Wastewater District (actual for 2015-16, then escalated with inflation)

Applying the 2.0 percent test, the City's rates are forecasted to remain within the indicated affordability range through 2020 for all scenarios.

Additionally, according to Mukilteo Municipal Code 13.16.030D, there is a 50% discount available for low-income seniors and low-income disabled property owners.

9.8 Conclusion

The City considered four scenarios in the financial analysis. Each analysis considered all funding resource options, the Utility's financial policies and targets, and current operating needs. Scenarios #2 through #4 included the current capital project list; while Scenario #1 considered no capital projects. A funding gap was identified in all scenarios under the current rate structure. Rate increases under Scenarios #1 and #2 resulted in lower level of service in other areas for Public Works, including the potential of some park closures to meet the funding gap, even with increased rates. Scenario #4 showed a rate increase of nearly $4 more than Scenario #3 in 2016 in order to start the capital projects one year earlier.

The results of this analysis indicate the need for rate increases to fund ongoing operating needs and CIP. Implementation of the proposed rate increases should provide for continued financial viability while maintaining generally affordable rates.

Scenario #3 is recommended because it is projected to be fully utility-funded, and rate increases are projected to be lower since no capital is planned for 2016. It is imperative that the City revisit the proposed rates every 2 to 3 years to ensure that the rate projections developed remain adequate. Any significant changes should be incorporated into the financial plan and future rates should be adjusted as needed.

9.9 Staff Recommendations

1) Adopt rate structure presented under Scenario #3 of the Financial Analysis
2) Revise the current budget line items within Surface Water to include:
    a) Surface Water Capital Project Fund
    b) Operating Fund 60-day Reserve
    c) Capital Fund Reserve ($300,000)
3) Review rates and current operational and capital needs annually
4) Conduct new financial analysis in 2020 to assure projected rates are in line with Utility expenses

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University of Washington's Climate Impacts Group

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Appendix A

2014 Identified Surface Water Issues

2014 Identified Surface Water Issues
for
2015-2021 Surface Water Management Plan Update

Address	Basin	Source of Information	Problem Type	Location	Reported Problem	Responsible Party	Solution Type	2014 Staus	Comments
10429 59th Ave W - 2	I	2001 Plan	Pipe	Canyon Dr & 59th Ave W	Pipe collapsing or groundwater transporting the pipe bedding material. Creating pond on 59th Ave W.	Public	Maintenance	Complete	Annual maintenance
1507 Mukilteo Blvd	B	2001 Plan	Ditch	South side of Mukilteo Blvd., SW of Lamar Dr.	Property slips into culverts. No slope in ditches. Could adjust hydraulic grade line.	Public	Maintenance	Completed	Yearly maintenance of ditches.
203 Lamar Drive	A	Survey	Surface Water	Lamar Dr & Mukilteo Blvd	Surface water flows down Lamar Drive during heavy rains and ponds at the lower portion of Lamar near the "T" in the road. No place for pedestrians to walk except in the middle of the road.	Public	Maintenance	Completed	Annually clean ditches and inspect pipe to make sure it is free of debris.
402 Lamar Drive	A	2001 Plan	Surface Water	Lamar Drive	No drainage structures on Lamar Drive; Drainage runs off onto adjacent properties. Requires total road reconstruction. Very narrow and very steep.	Public	Maintenance	Completed	If total road re-construction occurs, incorporate storm drainage upgrades at that time. An LID could also be formed by those served by Lamar.
1320 Goat Trail Road	D	Survey	Surface Water	1320 Goat Trail Road	Surface water flows from the 8th Drive to the east end of the house, and from Goat Trail Road to the west end of the house. Both problems have increased since the latest addition of seal coat to the roads. The edge berm to keep the water at the edge of the road is no longer directing the water.	Public	Maintenance	Completed	Added berms
1808 19th Dr SW	D	2001 Plan	Ditch	North side of 19th Dr, between fourth lot up hill and bottom of hill at Mukilteo Speedway	Paved swale on steep grade. Water moves too fast. Picks up two drainage basins via catch basins in backyards connected to school drainage. Plugs a lot.	Public	Maintenance	Completed	The system is now piped. School drainage is private.
5353 92nd ST SW	G	Survey	Surface Water	5353 92nd St SW	During significant rain events, surface water comes into our driveway (shared with 5335 92nd ST SW) and causes erosion in our yard and then runs down through Hargreaves Place.	Public	Maintenance	Completed	Installed raised edge along pavement to direct flow to CB in street.
8614 54th PL W	G	Survey	Surface Water	8614 54th Pl W	One time event, Aug 29, 2013, the rain wasn't able to go down the drains, so it flowed onto private property from the City street and there was standing water on the roadway.	Public	Maintenance	Completed	One time, was over a 100 year rain event.
9380 45th Ave W	G	2001 Plan	Detention Pond	Mukilteo Speedway, just north of 44th Ave W	Detention Pond not being maintained (end of 45th Ave W) City responsibility?	Public	Maintenance	Completed	Crews cleaned out in 2013. Needs annual maintenance.
10121 63rd PL W	H	Survey	Surface Water	63rd Place West	Surface water flows onto pavement and freezes. It is a problem only when it freezes. The city replaced the open ditch drains along 63rd Place W, with underground pipes a fews years back but it was never completely fixed.	Public	Maintenance	Completed	Annual maintenance of ditches
10123 53rd Ave W	H	2001 Plan	Pipe	53rd Ave W (cul-de-sac)	Pipe full of concrete slurry	Public	Maintenance	Completed	
10127 48th Ave W	H	2001 Plan	Surface Water	East of 102nd Pl SW & 48th Ave W	Scattered trash near outfall to Big Gulch, and water freezes and poses hazard to traffic	Public	Maintenance	Completed	
9211 63rd PL W	H	2001 Plan	Surface Water	West of 63rd Pl W & south of 92nd St SW	Sheet flow over all properties west of 63rd Pl W	Public	Maintenance	Completed	
10220 50th PL W	H	Survey	Catch Basin	10220 50th PL W	There is a hole in the asphalt near the drain.	Public	Maintenance	Completed	
10214 Marine View Dr	I	Survey	Surface Water	10214 Marine View Dr	After a heavy rainfall water flows from street into driveway and runs down the property to the garage/basement and continues on each side of the property and goes to the backyard.	Public	Maintenance	Completed	Added berm around Catch Basin on 66th Pl W to capture flow and direct to CB, before going to Marine View Drive. Routine maintenance.
10226 Marine View Dr	I	Survey	Surface Water	10226 Marine View Dr	When there is a hard rain or several days of rain, surface water comes down 66th PL. W, crosses Marine View Drive and flows down my driveway. It then flows between our homes and over the bluff.	Public	Maintenance	Completed	Added berm around Catch Basin on 66th Pl W to capture flow and direct to CB, before going to Marine View Drive. Routine maintenance.
9928 Marine View Dr	I	Survey	Surface Water	9928 Marine View Dr	Surface water is not properly collected by storm drains, water is seeping through asphalt road and stamped cement (entrance to Bluff) and entering Edwards, Javid and Becker property. Turf can be very wet. We all have had mud slide issues in past. Sidewalk is sinking in one or two areas. Possible storm drain under our street (Marine View Drive) is seeping water down hill. Storm Drains need to be inspected in detail.	Public	Maintenance	Completed	Storm drainage inspections. No leaks in system. Natural ground water surfacing in area.
11804 59th Ave W	L	Survey	Surface Water	11504 59th Ave W	One time event on Aug. 29, 2013, water crested berm and destroyed landscaping.	Public	Maintenance	Completed	over 100 year rain event
7303 48th Ave W	D	2001 Plan	Catch Basin	73rd PL SW & 48th Ave W.	Maintenance access restricted, cherry tree over manhole.	Public	Maintenance	Completed	
910 Mukilteo Speedway	D	2001 Plan	Catch Basin	Mukilteo Speedway, between 11th & 9th; east side of road	Catch basin may plug and cause flooding. Open creek flows into round grate catch basin. Catch basin has riprap around it; may be a problem in the future.	Public	Maintenance	Completed	
7924 49th PL W	E	2001 Plan	Surface Water	NE of 80th St SW & 49th Pl SW	Inadequate drainage, always saturated but resident no longer complaining.	Public	Maintenance	Completed	
10101 63rd PL W	H	2001 Plan	Pipe	Webster Way & 63rd Pl W	Elephant pipe that has been temporarily repaired. Low spot flows over road and into pipe. Damaged drainage structure.	Public	Maintenance	Completed	
12308 Mukilteo Speedway	M	2001 Plan	Erosion	Mukilteo Speedway (no address)	Brackish water from culvert under Mukilteo Speedway.	Public	Maintenance	Completed	
5005 84th ST SW	F	2001 Plan	Pipe	North of 84th St SW, between Mukilteo Speedway and Graham Way	Pipe has inadequate capacity for the 25-year and 100-year storm events. Flooding may also be caused by problems with detention facilities in the area.	Public	Maintenance		Annual maintenance in fall
10302 62nd PL W	H	Survey	Catch Basin	10302 62nd PL W	During moderate rain fall the backyard catch basin backed up, causing the street drain to back up. The city has since cleaned the storm drain, and the problem has not happened again. Would like the city to clean the storm drain lines once per year, so that the flooding problem does not happen again.	Public	Maintenance		Annual Maintenance

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Address	Basin	Source of Information	Problem Type	Location	Reported Problem	Responsible Party	Solution Type	2014 Staus	Comments
1512 Debrelon Lane	A	Open House	Catch Basin	Debralon Lane and development outside of City Limits	Stormwater misses all storm drains on the survace of the road. Would like appropriate drainage and slope protection during and after new 4 lot development off of 3rd Lane, and would like development from outside of City limits to not impact the City.	Public	Maintenance		Annual inspection and maintenance of catch basins.
1601 Debrelon Lane	A	Open House	Catch Basin	Debrelon Lane	Existing storm drains are non-effective, due to street not being completed and brought to grade during development.	Public	Maintenance		Drop CB's down to match grade of roadway or paving half street.
1610 Debrelon Lane	A	Open House	Catch Basin	Debrelon Lane	Existing storm drains are non-effective, due to street not being completed and brought to grade during development.	Public	Maintenance		Drop CB's down to match grade of roadway or paving half street.
906 3rd St	B	Open House	Catch Basin	Corner 3rd and Loveland and property line between 2nd and 3rd	Stormwater flows down and misses the catch basins because of the gravel built up on them.	Public	Maintenance		Annual maintenance of catch basin, removing rock and reshaping gravel to keep water from ponding or piling up onto the catch basin.
904 4th Street	C	Survey	Surface Water	904 4th Street	Surface water flows along 4th St, and into landscaping after a heavy rain or a consistent rain over several days. Would like a gutter along 4th.	Public	Maintenance		Install raised edge along 4th and Loveland to direct water to catch basins.
946 6th St.	C	Open House	Catch basin	In the Alley between 6th and 5th and on 6th Street	Standing water in alley due to paving of alley, new drain installed, but did not grade to drain. On 6th, storm drains get blocked and wash rock and soil into yard.	Public	Maintenance		Maintenance of catch basin on the 6th, possibly adding CB to alley.
1228 Goat Trail Rd - 1	D	2001 Plan	Catch Basin	Mukilteo Speedway, where Washington Ave. curves into Mukilteo Speedway; west side of street.	No access to outfall, old catchbasin possibly inadequate. Old brick catch basin in gulch. No way to access for cleaning and erosion at outfall.	Public	Maintenance		
1228 Goat Trail Rd - 2	D	2001 Plan	Pipe	Mukilteo Speedway where Washington Ave. curves into Mukilteo Speedway; south of intersection.	Inlet collecting Elliot Point stormwater needs a trash rack or protection - carries a significant amount of water. Structure may plug and cause flooding; pipe undersized?	Public	Maintenance		
404 9th Street	D	Survey	Surface Water	404 9th Street	Water runs down 9th Street, since there is no storm drainage system on the east side, and the west side drain fills with debris and overgrowth.	Public	Maintenance		
2391 Mukilteo Speedway	E	Survey	Pipe	2391 Mukilteo Speedway	Culvert under SR525 flows into open ditch, then into drainage pipe, which goes down over steep bank. Water flowing onto private property from insufficient stormwater drainage system, open ditch overflows because pipe system cannot handle volume of stormwater. Occurs 1 - 2 times per year.	Public	Maintenance		Annually clean ditches and inspect pipe to make sure it is free of debris.
4501 80th Street SW	E	Survey	Catch Basin	4501 80th Street SW	Water does not flow into catch basin. There is a berm across driveway, but surface water enters to the southeast of property.	Public	Maintenance		Add berm or raised edge along 80th where water flows onto private property.
7720 46th PL W	E	Open House	Surface Water	End of cul-de-sac	Would like City to add a catch basin at the end of the cul-de-sac and connect it to the existing system to catch runoff from houses above.	Public	Maintenance		Possibly tie into existing system to the north.
7810 49th PL W	E	2001 Plan	Catch Basin	49th Pl W, end of cul-delsac & 78th Pl SW	Structures plugged in past and caused problems. Maintenance issue or inadequate capacity?	Public	Maintenance		
7913 53rd Ave W	E	Survey	Surface Water	7913 53rd Ave W	Owner contacted City 10 years ago about water flowing onto private property from street. Owner installed channel drain and drainage system in driveway. City said they would install a berm to the edge of the driveway to divert water, this was never done. Happens every rainfall.	Public	Maintenance		Install berm to edge of driveway.
8006 45th Ave W	E	2001 Plan	Catch Basin	80th St SW & 45th Ave W	Control structure inside catch basin broken	Public	Maintenance		Fix control structure inside catch basin
5334 84th ST SW	F	2001 Plan	Catch Basin	53rd Ave W & 84th St SW, SE corner	Catch Basin - pipes aren't grouted into structure. Pipes are settling around catch basin.	Public	Maintenance		84th Street SW (West) Storm Drainage Improvements OR Maintenance crew can grout pipes (if not already done).
5802 86th PL SW	G	2001 Plan	Surface Water	86th Pl SW & 59th W	Always wet	Public	Maintenance		Semi-Annual maintenance
8702 48th PL W	G	Survey	Catch Basin	8702 48th PL W	Catch basin is overwhelmed when there is a heavy rain. There is a berm around the catch basin but the water crests the berm and water comes down driveway and floods garage.	Public	Maintenance		Maintenance of catch basin and pipe to make sure it is clear of debris.
9120 Hargreaves	G	Survey	Surface Water	9120 Hargreaves	After a few hours of heavy rain, standing water on Hargreaves at the lowest point creates a 2-4 inch pool that drains slowly, taking days at a time. Standing water/poor drainage/the pervious pavement surface seems susceptible to moss growth, which has the result of making the surface very slippery. Water comes into development from 92nd.	Public	Maintenance		Annual maintenance of pervious pavement.
10226 64th PL W	H	Survey	Ditch	10226 64th PL W	City re-directed surface water in catch basin to ditch across the street, since ditch is not kept clear of debris, it does not drain as intended. States neighbor's existing pipe was not closed off (Which it was at the catch basin), therefore water continues to flow through the pipe when the ditch is not clear.	Public	Maintenance		Routine maintenance
10300 64th PL W	H	Survey	Ditch	10300 64th PL W	Water flowing onto private property. Street storm water had emptied into a catch basin in front of our home and then emptied into an 8" pipe down through our property, this functioned well for us over the years but because of concerns for properties below us (see survey submitted above) the City diverted the water from the catch basin across 64th Pl W to the east side of the street. The ditch does not function properly when it is full of debris (ex: maple leaves gather each year blocking driveway culverts and ditch conveyance). Also there is an abundance of grass growing in the drain ditch.	Public	Maintenance		Routine maintenance
5001 97th PL SW - 1	H	Survey	Surface Water	5001 97th PL SW	Surface water flows onto private property from city street, non-funcitoning storm drainage.	Public	Maintenance		Routine maintenance
5001 97th PL SW - 2	H	Open House	Surface Water	5001 97th PL SW	Surface water flows onto private property from city street, non-funcitoning storm drainage.	Public	Maintenance		Routine maintenance

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5228 107th ST SW	H	Survey	Catch Basin	5228 107th ST SW	The catch basin has build up around it so water does not flow into the drain, the water continues down the street accumulates in front of my driveway (5232 107th AT SW), and then to the catch basin at the end of 107th ST SW.	Public	Maintenance		Routine maintenance
5628 101st ST SW	H	Survey	Catch Basin	5628 101st St SW	Single storm drain at the bottom of the hill clogs easily with leaves/debris and backs up until it overflows onto driveway and makes it way into the gulch. Water also runs down 5627 101st St SW and spills over north end of property into the gulch.	Public	Maintenance		Routine maintenance
6310 Webster Way	H	2001 Plan	Surface Water	6310 64th Pl	Existing road drainage system discharges onto lawn of 6310 Webster Way; water flows across yard to native growth protection area.	Public	Maintenance		Install raised edge along roadway.
10018 64th PL W	I	Survey	Catch Basin	10018 64th PL W	The catch basin and the slot drain across the roadway fill up with leaves and debris every year. When full of material the water flows down the driveway.	Public	Maintenance		Routine Maintenance
10208 Marine View Dr	I	Open House	Erosion	Easement between 10208 Marine View Dr and neighbor to the south	Would like the easement maintained between properities	Public	Maintenance		Determine if a pipe is running through, if no stormdrainage goes through easement, let property owner know.
10502 64th PL W	I	Survey	Catch Basin	10502 64th Place W	There is a catch basin in front of the property that does not collect all of the water during heavy rainstroms, the water bypasses the storm drain and runs down the driveway.	Public	Maintenance		Already a raised edge in place to capture stormwater, possilby a larger one. The CB is located after a gravel shoulder.
10524 60th Ave W	I	Survey	Surface Water	10524 60th Ave W	Surface water coming down the driveway. Installation of storm drain detention at the top of street has helped with the issues, however the property still get a lot of water, could a similar system be installed south of the existing one.	Public	Maintenance		Annual maintenance
6007 Chennault Beach Dr	I	Open House	Surface Water	Corner of 60th and Chennault Beach Dr	Surface water washes gravel on northside of Chennault Beach Dr, in addition water does not flow into catch basin	Public	Maintenance		Possibly add berm around CB and crushed rock and roll it along north side of Chennault Beach - it held up well until big storm hit last August, property owner said it would probably hold up well again.
6022 Chennault Beach Dr - 2	J	Open House	Surface Water	6022 Chennault Beach Dr	Hole developing in road.	Public	Maintenance		
5924 117th PL SW	L	Survey	Catch Basin	5924 117th PL SW	During heavy rainfall storm drain between 5919 117th PL SW and my house, storm drains do not adequatley carry water resulting in water flooding our front yards. There is also one more catch basin adjacent to the one in front of 5915 117th PL SW.	Public	Maintenance		Annual maintenance. Replace with vaned grates.
4338 Harbour Pointe Blvd SW	M	2001 Plan	Erosion	Harbor Beach Dr & Harbour Pointe Blvd.	Silt deposition at outfall of 42" pipe into ravine.	Public	Maintenance		Obtain HPA permit to clean around outfalls and culverts on City owned property.
5101 126th ST SW	M	2001 Plan	Erosion	126th St SW cul-de-sac, in ravine below	Erosion from outfall. Water from outfall flows along road into creek. Road is eroding causing siltation in creek.	Public	Maintenance		Obtain HPA permit to clean around outfalls and culverts on City owned property.
12230 Cyrus Way	M	2015 Plan	Pipe	Cyrus Way, south of Harbour Pointe Blvd, in the lower portion of the dip	Flooding 4 to 5 times per year, upsize pipes on downstream side of Cyrus Way. Currently 18-inch pipes are conveyed to 12-inch pipe. A beehive grate was added to CB in 2013. At this time no flooding events have occurred during the 2014 fall/winter season.	Public	Capital		Installed beehive grate. No problems in winter of 2013. Will see if solved the problem.
1401 Horizon Dr	D	2001 Plan	Pipe	Horizon Heights at the intersection of W. Horizon Dr. and E. Horizon Dr.	No outfall. It dead ends at the Bell property.	Public	Capital	Completed	Installed storm drainage system and outfall at the Northern end of Horizon Heights.
4675 Harbour Pointe Blvd	H	2001 Plan	Pipe	Outfall (no address listed)	Eroding ravine near 54" outfall	Public	Capital	Completed	Big Gulch Storm Drainage Improvments (with MWWD Big Gulch Sewer Improvements)
4514 84th ST SW	F	2001 Plan	Pipe	Between end of 85th Pl SW & 46th Pl W	Long run of stormwater pipe without catchbasins (Windsong Vista Div 3) No access to pipes.	Public	Capital	Completed	
1508 Mukilteo Blvd	A	2001 Plan	Surface Water	Mukilteo Blvd.	Ponding along Mukilteo Boulevard	Public	Capital	Completed	PW Crew installed CB and Pipe, routed to existing system installed with the widening of Mukilteo Blvd.
1565 Mukilteo Lane	A	2001 Plan	Surface Water	Mukilteo Lane & Mukilteo Blvd. at bridge	Edgewater Creek is undermining City of Everett Bridge. Pick up pipe flows with a catch basin then pipe downhill. Erosion, no drainage structures.	Public	Capital	Completed	2013 Edgewater Bridge Stormwater Outfall Repair (Emergency Repair)
202 Lamar Drive	A	2001 Plan	Pipe	Mukilteo Blvd. & Mukilteo Lane	Erosion damaging pipe. Running water on a steep slope was in a pipe, but hillside slippage is opening pipe.	Public	Capital	Completed	2013 Edgewater Bridge Stormwater Outfall Repair (Emergency Repair)
7728 44th Ave W	B	2001 Plan	Pipe	44th Ave. between 76th Street SW & 84th Street SW	New sidewalk has pipe underneath with no access to it (no catch basins).	Public	Capital	Completed	Catch Basins have solid lids, in sidewalk.
10006 64th PL	I	2001 Plan	Surface Water	North end of 64th Pl W	Cul-de-sac floods. No drainage system.	Public	Capital	Completed	Drainage system installed
5706 86th PL SW	G	2001 Plan	Pipe	56th Pl W & Naketa	Inadequate capacity due to open ditch, shallow pipe, steep grade, and small pipes. Collect water on top of hill and hard-line down to bottom.	Public	Capital	In Progress	86th Place Evaluation, will be done with roadway.
5725 86th PL SW	G	Survey	Surface Water	5725 86th PL SW	During the Aug 29, 2013 storm, there was surface water flowing across the property. This is the only time it was a problem. The street drainage further up the hill easily overflows. It needs more frequent maintenance.	Public	Capital	In Progress	86th Place Evaluation, will be done with roadway.

Address	Basin	Source of Information	Problem Type	Location	Reported Problem	Responsible Party	Solution Type	2014 Staus	Comments
6026 88th ST SW - 1	G	Survey	Surface Water	61st Place	Where the City roadway ends the water comes down the hill and/or emerging from the hill side and is not being captured in a storm drainage system. This creates mud to accumulate on roadway.	Public	Capital	In Progress	61st Culvert Replacement
6026 88th ST SW - 2	G	2001 Plan	Pipe	61st Pl W	Culvert too small, frequently plugs. Spawning fish cannot pass, design for repair exists but there's no money. Possible solutions: upsize pipe, add headwall arch. No passage for spawning salmon.	Public	Capital	In Progress	61st Culvert Replacement. There is no known fish, it is not listed as a fish bearing stream.
6026 88th ST SW - 3	G	2015 Plan	Pipe	61st Place Culvert	Culvert crossing is very small (18 " diameter). Debris plugs culvert and water goes over the road.	Public	Capital	In Progress	6st Culvert Replacement.
8912 46th PL W	F	2001 Plan	Detention Pond	Windsong Vista Div 3, and 46th Pl W neighborhood	Detention pond not function for the systems in neighborhoods.	Public	Capital	In Progress - 30% Design	Whisper Wood Pond W
8912 46th PL W - 2	G	2015 Plan	Detention Pond	Whispering Woods Pond, 46th Place West Detention Pond	Existing detention pond is overgrown and hard to maintain. No capacity. Plans have been developed to replace pond with detention pipes.	Public	Capital	In Progress - 30% Design	Whisper Wood Pond W
9116 50th PL W	G	2015 Plan	Detention Pond	Detention Pond to the north of this address	Stream is routed through detention pond that wasn't designed for that flow. Pond is always full. This pond is scheduled for a retrofit that will be grant funded in 2014. Not on CIP.	Public	Capital	In Progress - 90% Design	50th Pl Pond Retrofit
9116 50th PL W - 1	G	2001 Plan	Detention Pond	50th Pl W & 91st Pl SW	Detention Pond undersized. Water backs up from pond and makes swamp because not enough slope. Pond designed only for development, but gets water from Mukilteo Speedway and east of Speedway. No spillway, so pond overflows everywhere.	Public	Capital	In Progress - 90% Design	50th Pl Pond Retrofit
10511 64th PL W	I	Survey	Surface Water	10511 64th Place W	During heavy rainfall water will flow down driveway unless drainage channel property owner has created is kept clear of debris.	Public	Capital		64th PL W Storm Drainage Improvements
920 5th Street	C	Survey	Catch Basin	920 5th Street	Lowest point home on 5th Street, catch basin is overpowered from the run off from all the new houses built up on 6th ST, the storm system cannot handle the runoff from a strong storm. Water shoots up out of catch basin across the street. Creates water over roadway.	Public	Capital		5th Street Storm Drainage Improvements
926 5th St - 1	C	Survey	Catch Basin	926 5th St	During a heavy rain water erupts from the catch basin across from 920 and 926 5th Street, and a large pond forms on the street across from my house. Since 2004, there have been three occasions where the water has crested the street and flooded the property.	Public	Capital		5th Street Storm Drainage Improvements
926 5th St - 2	C	2015 Plan	Pipe	at 920 and 926 5th Street	Water erupts from catch basin and flows across the road and ponding occurs.	Public	Capital		5th Street Storm Drainage Improvements
804 10th Street	C	Survey	Surface Water	804 10th Street	Surface water on 10th Street, between Loveland and Park, flood neighbors yard, garages and basement during heavy or steady rain. There is an open ditch on the south side of 10th Street which is a safety concern and attracts animals and insects.	Public	Capital		10th & Loveland Storm Drainage Improvements
1547 Mukilteo Lane	B	Survey	Surface Water	Mukilteo Lane	In heavy rain, stones wash out of south shoulder onto road and into open gutter and catch basin. The rocks block the catch basin and the water overflows across the street and creates standing water on the roadway.	Public	Capital		Mukilteo Lane Storm Drainage Improvements
111 Park Ave	C	2001 Plan	Pipe	Outfall of Brewery Creek	Outfall has inadequate capacity for the 100-year storm event.	Public	Capital		Brewery Creek Outfall
315 Cornelia Ave	C	Survey	Surface Water	315 Cornelia Ave	Water flowing from street onto property during heavy rainfall. Hundreds of worms on the driveway, presumably from the over-saturation of the ground from water runoff.	Public	Capital		Install pipe and CB's on Cornelai and 3rd to close the gap in system.
516 Park Street	C	2015 Plan	Ditch	Park Avenue between 5th and 6th	Asphalt ditch that the City would like to pipe.	Public	Capital		Extend larger pipe up to ravine. Park Avenue SD Improvements
609 Front Street	C	2015 Plan	Pipe	Lighthouse Park	Parking lot floods during high tides and heavy rains, a tide gate was installed but doesn't seem to mitigate the situation.	Public	Capital		Possibly add a detention system
710 Front Street	C	2015 Plan	Pipe	Front Street flooding	Combination of high tides and heavy rain, Park Ave Tidegate from 2001 Plan should solve this problem.	Public	Capital		Park Avenue Tidegate
718 Front Street	C	2001 Plan	Pipe	Intersection of Front Street and Park Street	No tide gate on the Park Street outfall. Water depth of 1.5 feet at high tide and runoff. Water backs up to First Street during high tide events (only).	Public	Capital		Park Avenue Tidegate
801 Mukilteo Lane	C	2015 Plan	Pipe	Mukilteo Lane	Ponding on street, sand covers CBs and ditches fill in, possibly adding detention pipes.	Public	Capital		Mukilteo Lane Storm Drainage Improvements. Possibly add detention pipes.
808 10th Street	C	Survey	Surface Water	10th St and Loveland	During heavy rains flooding occurs to the houses on 10th, below Loveland. Would like extruded curbs, sidewalks, and storm drains.	Public	Capital		10th & Loveland Storm Drainage Improvements
904 10th Street	C	2015 Plan	Surface Water	10th and Loveland	Property flooding when system backs up during historic events. Piecemeal pipe replacement (8 " to 12") on 10th. Additional infrastructure needed where none currently exists.	Public	Capital		10th & Loveland Storm Drainage Improvements
905 10th Street	C	2001 Plan	Ditch	10th Street between Park Ave. and Campbell Ave.	Runoff not directed to ditches, ditches on wrong side of street.	Public	Capital		10th & Loveland Storm Drainage Improvements
910 2nd Street	C	2015 Plan	Pipe	2nd Street and Loveland	Concrete pipe under road is broken. Replace Pipe, or sleeve.	Public	Capital		2nd Street Pipe Restoration. Replace pipe or sleeve.
507 15th Pl	D		Detention Pond	15th Place Pond, to the north of address	Enlarge pond and add in a wall so it doesn't flow directly from the inlet to the outlet.	Public	Capital		15th Place Detention Pond Improvements
4410 80th ST SW	E	2001 Plan	Ditch	Suncrest Heights Point, Phase 1 on 44th Ave W	Driveways all flood. Unsafe sidewalk next to open ditch. Enclose ditch.	Public	Capital		Some of this has been completed. Pipe remaining open ditches along 44th.
5307 Eagle Bluff Ln	E	2001 Plan	Surface Water	53rd Ave W, north end of street past 80th St SW	Area flood due to lack of drainage. Put in a catch basin and pipe into gulch.	Public	Capital		Possibly tie into existing system to the south.
5029 84th ST SW - 1	F	2001 Plan	Pipe	North of 84th SW, just west of Graham Way	Flooding in a series of 12" pipes for both the 25-year and 100-year storm events.	Public	Capital		84th Street SW (West) Storm Drainage Improvements

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5029 84th ST SW - 2	F	2015 Plan	Ditch	Ditch on 84th St SW	Pipe ditch?	Public	Capital		84th Street SW (West) Storm Drainage Improvements
4800 92nd ST SW	G	2015 Plan	Detention Pond	4800 92nd ST SW	Creating a potential large detention pond or bioswale at this location to help improve stormwater runoff.	Public	Capital		92nd St Park Detention Pond/LID Facility
8726 48th PL W	G	2015 Plan	Ditch	88th and Mukilteo Speedway	Lots of water coming from upstream in ditch that gets clogged in the fall and floods Mukilteo Speedway. Convert ditch to pipe?	Public	Capital		88th Street (East) Storm Drainage Improvements
9126 Hargreaves Pl	G	2015 Plan	Pipe	North side of 92nd just west of Hargreaves Road	Drainage is not connected to anything in Control Structure. Water backs up and floods road. Connect to system on Hargreaves.	Public	Capital		92nd/Hargreaves Storm Drain Extenstion
9140 50th PL W	G	2001 Plan	Surface Water	92nd St SW at 50th Pl W	Ponding along 92nd St SW because of a low spot with no outlet.	Public	Capital		92nd/50th Pl W Detention Pond Retrofit
9142 50th PL W	G	Survey	Surface Water	9142 50th PL W	Water accumulation in back yard and some in front yard. A small pool develops in our SE corner of yard (detention pond to the south of property). The problem seems to have become worse over the last few years. Surface water runoff at the corner 92nd and 49th. We have a stormdrain and manhole cover in the NE corner of our lot. Neighbors also have issues with excessive water in their yards.	Public	Capital		92nd/50th Pl W Detention Pond Retrofit
10219 63rd PL W	H	Survey	Surface Water	10219 63rd Pl W	Water collects at base of the hill in front of the house during any sustained precipitation or downpour event. It doesn't drain for several hours after the precipitation stops. It is a collection of run-off from the front yard as well as run-off from the street. In the backyard we get standing water on the lawn and landscaped areas. Backyard water drains into crawl space. It does not look like house is connected to any stormdrain system.	Public	Capital		63rd Pl W Storm Drainage Improvements
6001 102nd ST SW	H	Survey	Surface Water	6001 102nd St SW	Both sides of street have no drainage ditches for the last two houses, ditches exist below that to collect runoff. When there is heavy rainfall it runs down the street and runs into yards. There is City property above and adjacent to the end of 102nd St, all of which drains down the street and onto private property. If a ditch was installed it would carry the water away from the property and into the stormwater system.	Public	Capital		102nd St. SW Storm Drainage Improvements
6011 Central Dr	H	2001 Plan	Ditch	Central Drive	Gravel lined ditch eroding, possibly capacity problem.	Public	Capital		Central Drive Storm Drainage Improvements
6213 Central Drive	H	Survey	Surface Water	6213 Central Drive	Surface water coming from Central Drive flows down the hillside adjacent to the residence and causes side yard to be saturated with water which in turn has started to seep under the driveway.	Public	Capital		Added berm to help alleviate problem. Central Drive Storm Drainage Improvements
10210 63rd PL W	I	2015 Plan	Surface Water	Ponded Area	Ponded area, not a problem, but residents don't like the ponding.	Public	Capital		63rd Pl W Storm Drainage Improvements
10430 62nd PL W - 1	I	2001 Plan	Surface Water	10430 62nd Pl W	Inadequate wooden catchbasins by lot 10430 62nd Pl W. No method of conveyance for drainage along west side of 62nd Pl W.	Public	Capital		62nd Pl W/Canyon Drive Storm Drainage Improvements
10430 62nd PL W - 2	I	2015 Plan	Pipe	62nd Pl W	Upgrade infrastructure, easements for maintenance.	Public	Capital		62nd Pl W/Canyon Drive Storm Drainage Improvements
10505 66th Pl Dr	I	2001 Plan	Ditch	10505 & 10514 66th Pl Dr	Ditch along north side of 66th Pl Dr by 10505 badly eroded. Catch basin by 10514 66th Pl Dr is in wrong place, missing flow.	Public	Capital		66th Pl W Storm Drainage Improvements
10506 62nd PL W - 1	I	Survey	Ditch	Canyon Dr & 62nd Place W	Surface water runs above ground and carries large amount of water and debris to the intersection of Canyon Dr & 62nd Place W. Occasionally happens during a light rainfall, but always with a heavy rainfall.	Public	Capital		62nd Pl W/Canyon Drive Storm Drainage Improvements
10506 62nd PL W - 2	I	2015 Plan	Pipe	62nd PL W and Canyon Dr	Road shoulder erosion, plugged culvert, water flows over road to properties on the west side of 62nd PL W. Entire stormwater system in this neighborhood is an old mixed system. Is it a natural ravine that we cannot pipe or can the City install piping and upgrade the entire neighborhood?	Public	Capital		62nd Pl W/Canyon Drive Storm Drainage Improvements
6002 Central Drive	I	Survey	Pipe	6002 Central Drive	The pavement is breaking away because the soil washed away. Would like culvert replaced and piping installed to fill in ditch.	Public	Capital		Central Drive Storm Drainage Improvements
6101 Canyon Dr	I	2001 Plan	Ditch	Canyon Dr	Deep ditches are a safety issue	Public	Capital		Central Drive Storm Drainage Improvements
6131 Canyon Dr	I	2001 Plan	Pipe	Canyon Dr east of 62nd Pl W, north side of street	Driveway culvert made out of 5-gallon buckets with end cut out	Public	Capital		62nd Pl W/Canyon Drive Storm Drainage Improvements
10720 Marine View Dr	J	Survey	Surface Water	10720 Marine View Dr	During heavey rainfall water will flow: 1. down the hill and along the side of the property; 2. the flow of water and debris from our neighbors in front of us and across the street from us flows directly down our driveway and into our yard. Concerned about erosion on bluff and in gulch.	Public	Capital		Chennault Beach Drive Storm Drainage Improvements
6022 Chennault Beach Dr - 1	J	Survey	Surface Water	6022 Chennault Beach Dr	During a moderate to heavy rain fall there is an inadequate storm drainage system, which cannot handle the flow of water, causing erosion and gravel to flow onto the road. Would like a covered storm drain system with a a side walk/gutter system.	Public	Capital		Chennault Beach Drive Storm Drainage Improvements
6300 Chennault Beach Dr	J	Survey	Ditch	6300 Chennault Beach Dr	Current street culvert (driveway culverts) and ditches cannot handle the street runoff water during severe rainstorms.	Public	Capital		Chennault Beach Drive Storm Drainage Improvements
6610 Chennault Beach Dr	J	Survey	Catch Basin	6610 Chennault Beach Dr	The catch basin between address and the neighbors on the east is non-functional. The section of the shoulder is not paved, and the gravel is higher than the street. The catch basin doesn't collect water, so the water runs off of the street washing the gravel down the hill.	Public	Capital		Chennault Beach Drive Storm Drainage Improvements
8710 56th PL W	G	Survey	Catch Basin	8710 56th PL W	Catchbasin at the corner of 56th and 88th flows over after a day of heavy rain, floods property. Catchbasin near power pole at north end of property only seen overflow during storm event on Aug. 29, 2013. Water flowed down sttep bank at the north end of property.	Public	Both	In Progress	86th Place Evaluation, will be done with roadway.
9015 61st PL W	G	Survey	Ditch	9015 61st PL W	Small ditch along street is damaged by traffic, water flows across street onto private property at the bottom of driveway. In cold weather this overflow turns to ice and mud and is dangerous for foot/auto traffic. Would like a pipe installed along side of the city road.	Public	Both	In Progress	61st Place West Road Stabilization
8910 44th Ave W	G	2001 Plan	Surface Water	44th Avenue W at 89th Pl SW	Flooding during 100-year storm event	Both	Maintenance	Completed	WSDOT needs to maintain detention ponds along 44th Ave W. City installed additional piping in 2003.

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Address	Basin	Source of Information	Problem Type	Location	Reported Problem	Responsible Party	Solution Type	2014 Staus	Comments
8906 44th Ave W	G	2001 Plan	Pipe	Between 45th Pl W & 89th Pl SW and in cul-de-sac	Inadequate capacity, drainage from Paine Field. Small pipes have no capacity for local drainage. CH2M Hill is working on big problem.	Both	Maintenance	Completed	Paine Field Dreamlifter Construction created a larger detention pond (private). WSDOT needs to maintain pond along 44th Ave W. City installed additional piping in 2003.
12401 Harbour Reach Dr	M	2001 Plan	Erosion	South of Harbor Reach Dr & Harbour Pointe Blvd.	Major landslide area.	Both	Maintenance		Annual maintenance. May be on both public and private property. Work with private property owner to maintain system.
12521 Harbour Reach Dr	M	2001 Plan	Catch Basin	Outlet Control Structure/South bend of South Rd	This location could experience minor flooding during the 100-year storm event. This location corresponds to a detention pond.	Both	Maintenance		Annual maintenance. May be on both public and private property. Work with private property owner to maintain system.
4825 91st CT SW	G	Survey	Surface Water	4825 91st CT SW	Cul-de-sac catch basin floods during the rain. There is a sink hole in the backyard, which is bordered by the Mukilteo Speedway.	Both	Maintenance		Notify HOA of responsibilites of system. Sink hole is caused by root ball of tree decomposing.
648 6th St ?????	B	Open House	Catch Basin	6th Street	Large water from flow on 10th, down through ravine and onto 6th plugs catch basins.	Both	Capital	Completed	Pine Crest North and South Detention Pond Retrofits
4505 84th ST SW	F	2001 Plan	Surface Water	North end of 45th PL W	Sheet flow from property at 84th St SW and 44th Ave W to the 45th Pl W cul-de-sac, inadequate drainage.	Both	Capital	Completed	Curb, gutter, and drains in place in ROW. Private prepery issue with sheet flow.
529 Park Ave	C	Survey	Catch Basin	529 Park Ave	During big storms and snow melt the open culvert on Park cannot handle drainage from new home on hillside above, worse when catch basin on hill above plugs and over flows onto street. Would like bigger driveway culvert to handle the volume of water.	Both	Capital		Extend larger pipe up to ravine. Park Avenue SD Improvements
10218 63rd PL W	H	Survey	Surface Water	10218 63rd PL W	1. Water flowing onto private property from City street 2. Standing water on property (pond) 3. Non-functioning storm drainage. Existing drainage system eventually passes through a culvert at the point where 63rd PL W intersects Webster Rd, and then it drains on the surface across the yards of the houses on the short extension road off of 63rd PL W and into Big Gulch. From time to time locals have blocked the culvert to pretent this drainage forcing the retention of more stormwater. The City has stated it is on private property, it is property owners belief if the culvert was kept open it would be a first step to resolving the problem, but the drainage system will remain inadequate.	Both	Capital		1. Natural drainage area on west side of peroperty. 2. Install additional CB's of storm drainage system in street (63rd PL W Storm Drainage Improvements). 3. Private property issues.
6131 Bayview Dr - 1	L	Survey	Surface Water	6131 Bayview Dr	Water has cut a gorge into hillside and a temporary fix has been installed by the city crews. In 2014 Budget to install permanent system.	Both	Capital		Bayview Storm Drainage Improvements
6131 Bayview Dr - 2	L	2015 Plan	Erosion	Behind 6131 Bayview Drive	During the most recent 100-year plus rainfall in August 2013, there was erosion from the stormwater flow out of two pipes. The City added a temporary infrasturcture -- flexible 12" lines with energy dissipation (gabion) at the end of the pipe. Need a permanent solution, permanent piping?	Both	Capital		Bayview Storm Drainage Improvements
12724 49th Ave W	M	2001 Plan	Pipe	126th St SW & 49th Ave W	Several culverts make fish passage difficult.	Both	Capital		Upgrade various culverts for fish passage
1125 2nd Street	B	Survey	Surface Water	1125 2nd Street	Surface water off of the street into the front yard. Parking area becomes a lake.	Both	Capital		2nd Street Storm Drainage Extension
9116 50th PL W - 2	G	2001 Plan	Surface Water	West of detention pond on 50th Pl W & 90th Pl SW	Sedimentation problem, creek needs to be cleaned out.	Both	Both	In Progress - 90% Design	50th Pl Pond Retrofit. In addition, obtain HPA Permit for maintenance for cleaning culverts. The creek is on private property. With permit we would only be allowed to clean out outfall from detention pond on City property.
1205 Mukilteo Speedway - 2	D	2015 Plan	Pipe	West side of Mukilteo Speedway at Goat Trail Road	Separated pipes, cannot access.	Both	Administrative		Need access and easement onto private property, sleeve or re-route pipes to public right of way.
4768 81st Place SW	E	Survey	Surface Water	4768 81st Place SW	During a heavy rainfall, the stream uphill that goes into a pipe cannot keep up, and the water flows into the street. There is also iron oxide in the stormwater that stains the sidewalk.	Private	None		. Iron oxide is a natural occurance.
1811 19th Dr SW	D	2001 Plan	Ditch	19th Dr & 49th Ave. W	Open ditch carries a lot of water from higher ponds because of inadequate slope. Headwater for enclosed system is plugged with rocks and debris, garbage and leaves. School district retention/detention pond has not been maintained. Is ditch under capacity.	Private	Maintenance	Completed	It is a natural ravine and is not a ditch. School drainage is private.
10300 64th PL W	I	2015 Plan	Surface Water	64th PL NW	Pipe (not shown on the map) that goes to the west was plugged to direct flow to the east (pond behind 10300 64th PL W, but residents say flow is still occurring. Check maintenance repair records, could be seepage or flow from elsewhere.	Private	Maintenance	Completed	Pipe was plugged, subsurface flow.
6426 Chennault Beach Dr.	I	2015 Plan	Surface Water	Chennault Beach Drive at 64th Place NW	Local flooding at low point where water is collected and routed across Chennault Beach Drive to Chennault Creek--maintenance staff have not been able to identify downstream drainage.	Private	Maintenance	Completed	
9123 46th PL W	G	Survey	Surface Water	9123 46th PL W	On the north side of the property, during heavy rain water flows down the hill like a river. There is a drain at the street level that gets overwhelmed.	Private	Maintenance		Work with HOA/Property owners for maintenance on Kiley Woods Detention Pond
8930 48th PL W	G	2001 Plan	Surface Water	Mukilteo Speedway at ~ 90th	Flooding during both 25-year and 100-year storm events.	Private	Maintenance		Work with HOA/Property owners for maintenance on Kiley Woods Detention Pond
1414 Goat Trail Road	D	Survey	Detention Pond	1414 Goat Trail Road	Water discharge from culvert smells like raw sewage, is tainted with oil and garbage. Flows out through the grasses, gets shallow, and slows to a trickle. Property owner didn't notice culvert discharge until 3 to 4 years ago when cutting back some ivy.	Private	Maintenance		Work with HOA to get it cleaned and functioning properly.
9105 53rd Ave W	G	2015 Plan	Surface Water	Vacant property to the east of 9105 53rd Ave W	Restoration Plan and Implementation to restore natural detention pond/wetland area. Currently private property, would need to purchase property.	Private	Capital		Purchase vacant land to restore natural detention areas.
10623 56th Ave W	H	Survey	Surface Water	10623 56th Ave W	Property owner would like City to purchase vacant property at 106XX 56th Ave W. and use it as a water quality testing area and education for students as it is walking distance of the school.	Private	Capital		Purchasing of property. Work with MSD to see if interested.

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Address	Basin	Source of Information	Problem Type	Location	Reported Problem	Responsible Party	Solution Type	2014 Staus	Comments
9404 63rd PL W - 1	H	Survey	Surface Water	9404 63rd Pl W	Surface water runs down 63rd Pl into driveway during moderate to heavy rains. Front yard gets soggy during rainy periods. Right of way next to home (to the south) has sewer and storm lines with a history of landslides, it needs additional mitigation.	Private	Capital		Easements - 63rd Pl W Slope Stabilization project, completed, but needs additional landscaping.
9404 63rd PL W - 2	H	2001 Plan	Erosion	Vicinity of access road, 95th Pl SW, Big Gulch ravine	North bank failure	Private	Capital		Easements - 63rd Pl W Slope Stabilization project, completed, but needs additional landscaping.
718 Front Street	B	2001 Plan	Pipe	North side of Front Street, east of creek outfall	Pipes have inadequate capacity for the 100-year storm according to the model. This modeled flooding correlates with flooding on south side of Mukilteo Lane.	Private			To be addressed with WSDOT Project.
1004 Park Ave	C	2001 Plan	Pipe	South end of Park Ave.	Unstable hillside. 12" plastic pipe joined by bands will separate soon because of ground movement. Steep area. Pipe staked to hillside on the surface out of catch basin. (address may be wrong, it may be closer to 804 Park Ave.	Private			Homeowner stated their were no issues.
507 3rd Street - 1	C	2001 Plan	Surface Water	South end of Lighthouse Park, 3rd Street & Church Ave.	Inadequate drainage, it is frequently swampy.	Private			BNSF owns the ditch, needs maintenance.
507 3rd Street - 2	C	2015 Plan	Detention Pond	3rd and Church	Street floods, BNSF is to maintain the ditch, but has not.	Private			BNSF owns the ditch, needs maintenance.
507 3rd Street - 3	C	Open House	Catch Basin	3rd Ave and Church	Catch basin backs up because outflow is in the NGPA across the streeet, Burlington Northern Property.	Private			BNSF owns the ditch, needs maintenance.
2600 Mukilteo Dr - 2	D	2001 Plan	Pipe	South of Possession View Ln, west of Goat Trail Rd, east of Washington Ave	Pipe has inadequate capacity for the 25-year and 100-year storm events.	Private			No pipe in place, natural ravine. Pipe goes to Clover Court.
8010 Mukilteo Speedway	E	2001 Plan	Pipe	West of Mukilteo Speedway at 80th St SW	Scour in gulch due to failed storm line.	Private			
8524 46th PL W	F	2001 Plan	Surface Water	South end of 46th Pl W cul-de-sac	Ponding of water on street. Springs (ground water) and sheet flow contribute to flooding in the cul-de-sac.	Private			Solved with SP-2003-05? Now a private detention pond exists.
10227 48th Ave W	H	Survey	Surface Water	10227 48th Ave W	Driveway floods after heavy rain, water is then pumped onto street. This was historically a gravity drain until Harbour Pointe was built. Was told the project was on the list, but it has not been done yet.	Private			
602 Loveland Ave	C	2001 Plan	Erosion	South end of Campbell Ave.	Hill slope slid into catch basin; drainage OK otherwise	Private			
620 Randolph Ave - 1	C	Survey	Catch Basin	620 Randolph Ave	During heavy rains, stormwater flows down the ravine behind the house and overwhelms the private catch basin and culvert. Public Works has monitored the situation in recent years and have prevented serious flooding.	Private			Erosion and private property flooding, pond retrofit upstream (Pine Crest North and South Ponds) has alleviated the problem. However, investigate whether other alternatives can be employed to reduce erosion (and downstream sedimentation in the system)
620 Randolph Ave - 2	C	2001 Plan	Pipe	7th & Randall, two blocks east of Campbell Ave.	Undersized pipe, no access to pipe. Public stormwater going through private lot. 12" corrugated metal pipe blew open.	Private			Erosion and private property flooding, pond retrofit upstream (Pine Crest North and South Ponds) has alleviated the problem. However, investigate whether other alternatives can be employed to reduce erosion (and downstream sedimentation in the system)
620 Randolph Ave - 3	C	2015 Plan	Surface Water	5th and 6th Place	Erosion and private property flooding, pond retrofit upstream (Pine Crest North and South Ponds) has alleviated the problem. However, investigate whether other alternatives can be employed to reduce erosion (and downstream sedimentation in the system)	Private			Erosion and private property flooding, pond retrofit upstream (Pine Crest North and South Ponds) has alleviated the problem. However, investigate whether other alternatives can be employed to reduce erosion (and downstream sedimentation in the system)
700 Front Street	C	2001 Plan	Catch Basin	Intersection of First Street and Muk. Speedway.	Stormwater flow off ferry holding area in front of Ivars. Stormwater flows east down the middle of road to Park Ave. No water quality control	Private			Some work completed. This will also be addressed with ferry terminal relocation. Filterra systems were installed and a trench drain system installed across north side of ferry holding area.
805 9th Street	C	Survey	Surface Water	805 9th Street	After a day of heavy rain there is standing water in the back yard. The ground remains consistently soggy during the rainy season.	Private			
8126 45th Ave W	C	Survey	Surface Water	8130 44th Ave W and 8118 - 8127 45th Ave W	When it rains, surface water consistently comes from 8130 44th Ave W., through 8127 45th Ave W, and creates ponding directly on other side of fence on my property. There is always ponding at 8130 44th Ave W's driveway. It also affects 8119 and 8118 45th Ave W.	Private			
922 3rd Street	C	Survey	Surface Water	922 3rd Street	In December of 2012 the basement flooded. City offices said there was so much rain that the ground was saturated, therefore the water was seeping up through the concrete floors. Does not say that it occurred during Aug. 29th 2013 Storm event.	Private			
948 6th Street	C	Survey	Detention Pond	948 6th Street	Small retention pond overflowing at end of Prospect St (at base of small ravine) causing many plugged catch basins along Prospect St, and 6th St, to 948 corner catch basin. Retention pond needs improvements and/or maintenance.	Private			

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Address	Basin	Source of Information	Problem Type	Location	Reported Problem	Responsible Party	Solution Type	2014 Staus	Comments
1009 Mukilteo Speedway	D	2001 Plan	Erosion	11th Street & Mukilteo Speedway; southwest corner of intersection	Creek eroded fill under house	Private			
1205 Mukilteo Speedway - 1	D	Survey	Pipe	1205 Mukilteo Speedway	On, or about November 22nd, 2012, heavy rains caused the storm system and ravine that is around private drive to flood because the culvert was blocked, the flooding caused the road to washout.	Private			
1312 Goat Trail Road	D	Survey	Surface Water	1312 Goat Trail Road	Surface water flows from the street, down the driveway, only after rainfall event of 8/29/13	Private			
1404 Goat Trail Rd	D	2001 Plan	Detention Pond	Goat Trail Rd & 15th Place	Weir doesn't work properly; does not detain water or attenuate flows. Section of park could be used for storage. Malfunctioning flow control structure.	Private			Work with HOA to get it cleaned and functioning properly.
1905 Mukilteo Speedway	D	Survey	Surface Water	1905 Mukilteo Speedway	No where for water to drain between Speedway and house on private property. May affect the steep slope.	Private			
1941 Clover Pl	D	Survey	Surface Water	1941 Clover Pl	Doesn't know the exact path of water, but has seen the soil saturated and eroded. Water seeps into basement. Surface water flows over curb line on the street and flows down the driveway. Backyard is saturated and has sunk a couple of inches.	Private			
2600 Mukilteo Dr - 1	D	2001 Plan	Detention Pond	Corner of Clover Lane & Washington Avenue	Malfunctioning detention pond, weir has pipe in it and does not work.	Private			Work with School District to maintain pond.
2602 Mukilteo Dr	D	2001 Plan	Surface Water	North of the Mukilteo Speedway, east of Washington Avenue.	School property could flood during the 100-year storm event. This modeled flooding correlates with Olympic View Middle School inadequate drainage on east propoerty line.	Private			May be resolved with School renovations in the future.
517 17th Place	D	Survey	Catch Basin	517 17th Place	Drain outside of basement door cannot keep up with rain events that are moderate-heavy. The drain is connected to the storm drain system further down. (City inspected City system and it is clean and clear). Owner will have his private line investigated for blockage.	Private			
7207 48th Ave W	D	Survey	Detention Pond	7207 48th Ave W	The stream just to the north of the property goes underground as it reaches 48th Ave., every time rain occurs the area backs up with water. (It is a detention area)	Private			It is a detention pond, and is functioning.
7231 48th Ave W	D	Survey	Surface Water	7231 48th Ave W	During extremely heavy rainfall water flows into backyard from City street where ther is a break in the curb for entering side yard parking.	Private			Could add a raised berm along edge of pavement, however HO would be upset if we added curb as it would cut off access to side yard parking.
4809 80th Street SW	E	Survey	Ditch	4809 80th Street SW	There is a pipe running into a ditch that runs along the eastern side of property. During the winter months, the property is saturated with water on the east side.	Private			
4818 81st PL SW	E	2001 Plan	Surface Water	81st Pl SW, west of Mukilteo Speedway	Inadequate drainage, flooding apartment lot	Private			
7811 49th PL W	E	Open House	Surface Water	7811 49th PL W	Surface flow through the back of property that the City fixed back in the early 1990's. It became a problem again about two years ago.	Private			
8002 53rd Ave W	E	2001 Plan	Erosion	South of Faraway Condo. West of 53rd Ave W at 80th St SW	Possible erosion problem	Private			
8210 Naketa Beach Walk - 1	F	Survey	Erosion	8210 Naketa Beach Walk	Stormwater is causing excessive erosion in Naketa Beach Ravine, this has consequently changed the characteristics of our beach.	Private			
8210 Naketa Beach Walk - 2	F	Open House	Erosion	8210 Naketa Beach Walk	Stormwater is causing excessive erosion in Naketa Beach Ravine, this has consequently changed the characteristics of our beach.	Private			
8457 Smugglers Cove Ln	F	2001 Plan	Detention Pond	53rd Ave W & 84th St SW	Private detention pond, doesn't work. NE corner of intersection, next to roadway.	Private			HOA has been notified
5725 Sunset Ln	G	2001 Plan	Erosion	North of Sunset Lane	Slides from south of 53rd Ave W to 61st Pl W	Private			Large piece of ravine belongs to private property owner.
8912 46th PL W - 1	G	2001 Plan	Pipe	89th Pl SW to 45th Pl W	Flooding during both 25-year and 100-year storm events. Correlates with problem of drainage from Paine Field. Small pipes have no capacity for local drainage. CH2M Hill is working on big problem (*may have been solved with the building of the Dreamlifter Facility).	Private			Paine Field Dreamlifter Construction created a larger detention pond (private). WSDOT needs to maintain pond along 44th Ave W. (public/but not City responsibility).
8920 49th Ave W	G	Survey	Surface Water	8920 49th Ave W	Water seems to flow off the hill behind my house. During the wetter months the crawl space under my house fills with ground water. Even the plastic boxes partly buried in my yard, away from my house, fillu pwith water, indicating the ground water level is too high.	Private			
9002 45th PL W	G	Survey	Catch Basin	9002 45th PL W	After 2 to 3 days of heavy rain the drain in front of the garage overflows. Crawl space under the house floods.	Private			
10623 56th Ave W	H	Open House	Surface Water / Pipe	5302 104th St SW and 10623 56th Ave W	Water drains over sidewalk, drainage pipes under sidewalk need to be larger	Private			
5302 104th ST SW	H	2001 Plan	Surface Water	5302 104th St SW	Drainage from Columbia Elementary School walkway flows into school's crawl space and yard.	Private			
9200 63rd Pl W	H	Open House	Erosion	Entire bluff	Would like people to be better educated on proper bluff maintenance	Private			
9307 63rd PL W	H	Open House	Surface Water	9307 and 9251 63rd Pl W	Water coming out onto street	Private			
9328 62nd PL W	H	Open House	Surface Water	Flag lot between 62nd Pl W & 63rd Pl - retaining wall	Retaining wall subsiding, lawn very mushy, geotech reports ground has ~20% water. Neighbor reports much more water drainage around their houses recently.	Private			
9804 Marine View Drive	H	2001 Plan	Erosion	9804 & 9806 Marine View Drive	Bluff above Big Gulch sloughed in the past, but was stabilized with retaining wall. Bluff may slough more in future. Stormwater from home directed wrong way.	Private			

Address	Basin	Source of Information	Problem Type	Location	Reported Problem	Responsible Party	Solution Type	2014 Staus	Comments
9807 58th PL W	H	2001 Plan	Erosion	South of 85th Pl W. Big Gulch ravine	South bank sloughing	Private			
10153 Marine View Dr	I	Survey	Pipe	10153 Marine View Dr	In heavy storms, the system is challenged to keep up with the silt and volumes coming into it from the homes above our home.	Private			
10316 Marine View Dr	I	Survey	Surface Water	10316 Marine View Dr	After a heavy rainfall or consistent days of rain groundwater surfaces. We installed a french drain across the front of property to catch groundwater, but we are still getting it, probably due to neighboring properties. Believe heavy train vibrations (from heavy freight - not the Sounder) along with high soil moisture/saturation point create landslide this past spring.	Private			
10429 59th Ave W - 1	I	2001 Plan	Surface Water	10429 59th Ave W	Sidewalk settlement due to incomplete roof drain connection to street storm drainage system at 10429 59th Ave W.	Private			
10507 64th PL W	I	Survey	Catch Basin	10507 64th PL W	Water flowing onto private property from City street, debris flows down with water and clogs private drain grate at bottom of driveway. Silt, sand, and gravel that is washed from the street and shoulder go into the drain and clog it up.	Private			
10509 Marine View Dr	I	Open House	Pipe	10509, 10527, and 10521 Marine View Dr	Corroded pipe and sinkhole, vortex at inlet and occasional flooding in fall.	Private			
10527 MacArthur	I	Survey	Surface Water	10527 MacArthur	Property is particularly wet, and north side of property is susceptible to erosion.	Private			
10527 Marine View Dr	I	Survey	Pipe	10527 Marine View Dr	Flooding occurs during the fall storm events, the inlet is sized too small (12") to keep up. This has caused a sink hole at 10521 Marine View Drive. It also creates a pond which is hazardous.	Private			
10608 Marine View Dr	I	Survey	Surface Water	10608 Marine View Dr	Water backed up in toilet and flooded basement during Aug 29, 2013 event. On Dec 4, 2013, water again began flowing into the basement despite there being no appreciable weather event. Have to pump 24/7 to keep up with flow. Also had to vacate property for 4 days, while water was shut off to isolate where the water was coming from. Source of water still has not been pinpointed.	Private			
9825 Marine View Dr	I	2001 Plan	Surface Water	9825 Marine View Dr	Groundwater seeps through sanitary sewer, surfacing on property.	Private			
10961 Villa Monte Ct	K	Survey	Catch Basin	10961 Villa Monte Ct	Non-functioning storm drain, drain filled with 14 years of silt. (Private system) Only has seen a problem on August 29, 2013; flooding of home. Believes drain flow needs to be reconfigured.	Private			
12121 Wilmington Way	K	Survey	Surface Water	12121 Wilmington Way	After heavy rain, crawl space was flooded from water coming off of Concord Way.	Private			
6123 Bayview Dr	L	Survey	Surface Water	6123 Bayview Dr.	During extremely heavy rainfall flooding occurs and yard areas and parks are consistently wet. In 2005, a storm drain line was replaced on the 13th hole of the Harbour Pointe Golf Course. Ever since this was done, the yard and park are wetter.	Private			
13407 42nd Ave W	M	Survey	Surface Water	13407 42nd Ave W	Water flows to the backyard after heavy rainfall.	Private			
13427 42nd Ave W	M	Survey	Surface Water	13427 42nd Ave W	After a heavy rainfall of 1/2 inch or more water flows onto 13427, 13429, and 13423 42nd Ave W from the green belt area behind them. Heavy rains from the green belt area cause runoff that flows into the crawl spaces of the homes. All of the homes have required sump pumps to remove the runoff water. Concerned about extended power failures, and water building up in the crawl space.	Private			
11524 Cyrus Way	M	2001 Plan	Erosion	West of Cyrus Way, upper end of Creek	Vehicular traffic across creek bed.		Other	Completed	
5919 Central Dr	I	2001 Plan	Surface Water	5919 Central Dr	Groundwater seepage at 5919 Central Dr; water disappears in roadside ditch, flows through rockery and over bluff.				

Appendix B

SEPA Checklist, DNS and Public Comments with City Response

Part Eleven WAC 197-11-960 Environmental Checklist

CITY OF MUKILTEO
ENVIRONMENTAL CHECKLIST

A. BACKGROUND

1. Name of proposed project, if applicable:
   2015- 2021 Comprehensive Surface Water Management Plan Update

2. Name of applicant:
   City of Mukilteo

3. Address and phone number of applicant and contact person:
   Jennifer Adams
   Surface Water Technician
   425-263-8083
   City of Mukilteo
   11930 Cyrus Way
   Mukilteo, WA 98275

4. Date checklist prepared:
   June 25, 2015

5. Agency requesting checklist:
   City of Mukilteo

6. Proposed timing or schedule (including phasing, if applicable):
   The Mukilteo Department of Public Works presented the plan concepts at a public Open House on June 24, 2015. Public Works is expected to present the final 2015- 2021 Comprehensive Surface Water Management Plan Update (SWMP Update) to City Council in August 2015.

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain:
   None anticipated

8. List any environmental information you know about that has been prepared or will be prepared, directly related to this proposal:
   - *2001 City of Mukilteo Surface Water Management Plan*
   - *Possession Shores Master Plan EIS and Harbour Pointe Master Plan*
   - *2011 City Comprehensive Plan Amendments*
   - *Draft 2015 Comprehensive Plan Amendments*
   - *DNS for the 2015 Comprehensive Plan Amendments*

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain:
   None known

10. List any government approvals or permits that will be needed for your proposal, if known:
    Mukilteo City Council will need to adopt the Surface Water Fee rates structure proposed within the SWMP Update by resolution. Future individual capital projects to reduce localized flooding, improve water quality and enhance habitat will be reviewed for consistency with local, state, and federal regulations through the required development review and permitting process.

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description):

Part Eleven WAC 197-11-960 Environmental Checklist

The City of Mukilteo is updating its 2001 Comprehensive Surface Water Management Plan. The intent of the update is to provide a guiding document for the City's management of the Surface Water Utility. The SWMP Update includes a review of and recommendations for:

- *A) The conditions of natural systems and existing infrastructure under the purview of the Utility.*
- *B) The current regulatory requirements the Utility must operate under*
- *C) Operations and maintenance programs, both current and proposed to meet both regulatory requirements and Utility goals*
- *D) Engineering programs, both current and proposed to meet both regulatory requirements and Utility goals*
- *E) Capital improvement projects to reduce localized flooding problems, improve water quality and stream habitat*
- *F) Financial analysis to assure the Utility is funding the proposed programs*

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist:

The proposed SWMP Update is applicable Citywide.

TO BE COMPLETED BY APPLICANT:		EVALUATION FOR AGENCY USE ONLY
B.	**ENVIRONMENTAL ELEMENTS:**	
1.	**EARTH**	
a.	General description of this site (circle one): Flat, rolling, hilly, steep slopes, mountainous, other __________________: *The City of Mukilteo's physical topography ranges from relatively flat lands to steep sloped ravines and coastal bluffs.*	❑
b.	What is the steepest slope on the site (approximately percent slope)? *100%*	❑
c.	What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any prime farmland: *Primarily Vashon Till (Glacial) and Sand with sand lenses. There are no farmlands.*	❑
d.	Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe: *Coastal Bluffs and side slopes in the gulches and ravines have a history of being unstable.*	❑
e.	Describe the purpose, type and approximate quantities of any filling or grading proposed. Indicate source of fill: *No clearing, grading, or filling is proposed as a direct result of this action. Development proposals emerging subsequent to the adoption of this SWMP Update would be evaluated relative to federal, state, and local regulations and standards on an individual project-specific basis.*	❑
f.	Could erosion occur as a result of clearing, construction, or use? If so, generally describe: *No erosion could result as a direct result of this action. Development proposals emerging subsequent to the adoption of this SWMP Update would be evaluated relative to federal, state, and local regulations and standards on an individual project-specific basis.*	❑
g.	About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)? *N/A.*	❑
h.	Proposed measures to reduce or control erosion, or other impacts to the earth, if any: *N/A*	❑
2.	**AIR**	
a.	What types of emissions to the air would result from the proposal (i.e., dust, automobile, odors, industrial wood smoke) during construction and when the project is completed? If any, generally describe and give approximate quantities if known: *The proposed SWMP Update will not affect the amounts or types of emissions.*	❑
b.	Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe: *N/A*	❑

c. Proposed measures to reduce or control emissions or other impacts to air, if any: *N/A*. ❑

3. **WATER**

a. Surface:

(1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into: ❑
The City of Mukilteo is surrounded by Port Gardner Bay to the north and Possession Bay to the west. Physically the City and its urban growth area has fourteen (14) steep sloped ravines with small streams and drainage ways that feed into Possession Bay. Upland there is several wetland systems that feed into these ravines and drainage ways. Japanese, Big, and Picnic Point Gulches are the largest and most critical ravine and stream systems in the City. Lake Serene also lies within the City's MUGA area.

(2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans: *As a non-project proposal, no specific development conditions are presented.* ❑

(3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material: *N/A* ❑

(4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known: *N/A* ❑

(5) Does the proposal lie within a 100-year flood plain? If so, note location on the site plan: ❑
Portions of the northern section of the City from BNSF RR Tracks north is impacted by flooding. The SWMP Update changes do not affect this.

(6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge: ❑
No

b. Ground:

(1) Will ground water be withdrawn, or will water be discharged to ground water? Give general description, purpose, and approximate quantities if known: *As a non-project proposal, no specific development conditions are presented.* ❑

(2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals...; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve. *N/A* ❑

c. Water Runoff (including storm water):

(1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will ❑

TO BE COMPLETED BY APPLICANT:	EVALUATION FOR AGENCY USE ONLY
this water flow? Will this water flow into other waters? If so, describe: *N/A; Generally storm water is collected, detained, and then released slowly into the City's Storm Water Drainage System, which includes open ditches, culverts, and detention ponds or vaults. Eventually all storm water flows into Possession Bay via naturally occurring streams and / or drainage ways.*	
(2) Could waste materials enter ground or surface waters? If so, generally describe: *No waste materials could enter ground or surface waters as a result of this plan document. Part of the programs outlined will help reduce waste materials entering ground and surface waters. Specifically, the proposed stormwater inspection and maintenance programs.*	❑
d. Proposed measures to reduce or control surface, ground and runoff water impact, if any: *The SWMP Update itself does not have any effect on ground and runoff water impacts. Upon implementation of the programs within the SWMP Update, several measures to control surface, ground and runoff water impacts will be realized through:* • *Increasing public outreach programs on controlling pollution* • *Providing technical training to City staff to reduce pollution generating activities* • *Expand the Utility's maintenance programs to remove sediment and assure proper facility operation* • *Expand inspection and technical assistance programs to private facility owners* • *Provide review of development projects, consistent with local, state and federal regulations* • *Provide required inspections of development projects for sediment and pollution control*	❑
4. <u>PLANTS</u>	
a. Check or circle types of vegetation found within the City: _x_ Deciduous tree: alder, maple, aspen, other _x_ Evergreen tree: fir, cedar, pine, other _x_ Shrubs _x_ Grass ___ Pasture ___ Crop or grain _x_ Wet soil plants: cattail, buttercup, bulrush, skunk, cabbage, other _x_ Water plants: water lily, <u>eelgrass</u>, milfoil, other _x_ Other types of vegetation	❑
b. What kind and amount of vegetation will be removed or altered? *We anticipate no vegetation removal as part of the SWMP Update. The SWMP Update supports retention of native vegetation, tree preservation, and stream riparian buffer plantings / enhancements.*	❑
c. List threatened or endangered species known to be on or near the site. *No threatened/endangered plant species are known to exist in the City of Mukilteo.*	❑
d. Proposed landscaping, use of native plants, or other measures to preserve	❑

TO BE COMPLETED BY APPLICANT:	EVALUATION FOR AGENCY USE ONLY

or enhance vegetation on the site, if any:
We anticipate no landscaping as part of the SWMP Update. The SWMP Update supports retention of native vegetation, tree preservation, and stream riparian buffer plantings / enhancements. Capital projects that are subsequent to the SWMP Update will use native vegetation as the first alternative, when landscaping is necessary.

5. ANIMALS

a. Circle any birds and animals which have been observed on or near the site or are known to be on or near the site: ❑

Birds: **hawk, heron, eagle, songbirds,** other:
Mammals: **deer,** bear, elk, **beaver**, other:
Fish: bass, **salmon,** trout, herring, shellfish, other:

b. List any threatened or endangered species known to be on or near the site: ❑

- *Potential Peregrine Falcon Foraging – Threatened*
- *Potential Steller Sea Lion Foraging – Threatened*
- *Puget Sound Chinook Salmon – Endangered*
- *Bull Trout – Endangered*
- *Bald Eagle nesting Territory – Protected by State*

Marine species use Port Gardner Bay & Possession Sound. Bald eagles use Japanese, Big, and Picnic Point Gulches. Herons have been seen in Japanese Gulch. The City has three active Eagle nesting areas: Japanese Gulch, Mukilteo Olympic View Park (76th / 80th Street), and Possession Sound Park and Tidelands (Sector 11).

c. Is the site part of a migration route? If so, explain: ❑
Similar to the rest of the Puget Sound area.

d. Proposed measures to preserve or enhance wildlife, if any: ❑
Any projects proposed in the SWMP Update will follow regulatory requirements requiring the protection of critical areas in the City. Any future development is required to meet the City's adopted critical area regulations, which include: steep slopes, wetlands, streams, and fish and wildlife habitat; through the permitting process.

6. ENERGY AND NATURAL RESOURCES

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc. ❑
The City of Mukilteo is currently served with all the utilities necessary to serve an urban environment: storm water, public water, sewer, gas, power, telephone, and cable.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe: *No* ❑

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any: *None; The City is unaware of any limitations of the supporting utility districts to provide service to Mukilteo. To obtain service to a specific development the developer will be required to meet* ❑

TO BE COMPLETED BY APPLICANT:	EVALUATION FOR AGENCY USE ONLY
the permitting requirements of the applicable utility.	
7. ENVIRONMENTAL HEALTH	
a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe: *None known*	❑
(1) Describe special emergency services that might be required: *The City provides full police and emergency services to the residents and businesses of Mukilteo.*	❑
(2) Proposed measures to reduce or control environmental health hazards, if any: *The City will continue to provide emergency response to 911 calls. Typically development proposals include emergency response plans for accidents during construction.*	❑
b. Noise:	
(1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)? *Airport traffic, train, emergency services, and vehicle traffic*	❑
(2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site. *The SWMP Update is a planning document and will not generate noise. Any subsequent capital projects would be regulated by the City's Noise Ordinance and is generally limited after 9:00 pm.*	❑
(3) Proposed measures to reduce or control noise impacts, if any: *City adopted noise regulations, MMC 8.18, establish noise thresholds for residential, commercial, and industrial zones. All subsequent capital projects under the SWMP Update will be required to comply with the City's noise ordinance.*	❑
8. LAND AND SHORELINE USE	
a. What is the current use of the site and adjacent properties? *Land uses in the City range from vacant, parks and open space, single family residential, mix-use commercial, multi-family residential, commercial and industrial.*	❑
b. Has the site been used for agriculture? If so, describe: *There are no on-going and sustainable agricultural lands in the City.*	❑
c. Describe any structures on the site: *The City contains all building types associated with an urban area: single family residential to industrial.*	❑
d. Will any structures be demolished? If so, what? *N/A*	❑
e. What is the current zoning classification of the site? *The zoning land use classifications vary throughout the City.*	❑
f. What is the current comprehensive plan designation of the site? *The Comprehensive Plan land use designations vary throughout the City.*	❑
g. If applicable, what is the current shoreline master program designation of	❑

TO BE COMPLETED BY APPLICANT:		EVALUATION FOR AGENCY USE ONLY
	the site? *N/A*	
h.	Has any part of the site been classified as an "environmentally sensitive" area? If so, specify: *N/A*	❑
i.	Approximately how many people would reside or work in the completed project? *N/A*	❑
j.	Approximately how many people would the completed project displace? *N/A*	❑
k.	Proposed measures to avoid or reduce displacement impacts, if any: *N/A*	❑
l.	Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any: *N/A*	❑
9.	**HOUSING**	
a.	Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing: *N/A*	❑
b.	Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing: *N/A*	❑
c.	Proposed measures to reduce or control housing impacts, if any: *N/A*	❑
10.	**AESTHETICS**	
a.	What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed? *N/A.*	❑
b.	What views in the immediate vicinity would be altered or obstructed? *N/A*	❑
c.	Proposed measures to reduce or control aesthetic impacts, if any: *N/A*	❑
11.	**LIGHT AND GLARE**	
a.	What type of light or glare will the proposal produce? What time of day would it mainly occur? *N/A*	❑
b.	Could light or glare from the finished project be a safety hazard or interfere with views? *N/A*	❑
c.	What existing off-site sources of light or glare may affect your proposal? *N/A*	❑
d.	Proposed measures to reduce or control light and glare impacts, if any: *N/A.*	❑
12.	**RECREATION**	
a.	What designated and informal recreational opportunities are in the immediate vicinity? *There are two major public parks in the City: Mukilteo Lighthouse Park and the 92nd Street Park. In addition, there are several ravines that have been designated with the Parks and Open Space zoning classification.*	❑
b.	Would the proposed project displace any existing recreational uses? If so describe: *N/A*	❑
c.	Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:	❑

TO BE COMPLETED BY APPLICANT:	EVALUATION FOR AGENCY USE ONLY

N/A

13. HISTORIC AND CULTURAL PRESERVATION

a. Are there any places or objects listed on, or proposed for, national, state, or local preservation registers known to be on or next to the site? If so, generally describe: ☐

To date, the City of Mukilteo has a total of 10 properties listed on either the City, State, or Federal Register of Historic Places:

City Register: McNab-Hogland House, Epps House, Boys and Girls Club, Siemens House, and the Nelson House.

State Register: Point Elliot Treaty Site, Mukilteo Pioneer Cemetery, and the Fowler Pear Tree Site.

Federal Register: Mukilteo Light Station and Point Elliot Treaty Monument.

b. Generally describe any landmarks or evidence of historic, archaeological, scientific, or cultural importance known to be on or next to the site: *N/A* ☐

c. Proposed measures to reduce or control impacts, if any: ☐

No changes or impacts to these historical sites are proposed as a part of the SWMP Update.

14. TRANSPORTATION

a. Identify public streets and highways serving the site, and describe proposed access to the existing street system. Show on site plans, if any: ☐

The streets in Mukilteo are divided into four functional classifications: Principal Arterial, Minor Arterial, Collector Street and Local Street/Road.

Principal Arterials: 5th Street, SR 525 (Mukilteo Speedway), SR 526 (84th Street SW) and Paine Field Blvd

Minor Arterials: Beverly Park Road

Collector Streets: 3rd St., Prospect Ave., Goat Trail Rd., 8th Dr., 70th St. SW, 48th Ave. W., 73rd St. SW, 76th St. SW, 46th Ave. W, 44th Ave. W, 88th St. SW, Harbour Pointe Blvd., Chennault Beach Rd., Marine View Dr., Harbour Reach Dr.

All the remaining public roads are Local Streets/Roads.

b. Is site currently served by public transit? If not, what is the approximate distance to the nearest transit stop? ☐

Sound Transit, Everett Transit and Community Transit serve Mukilteo.

c. How many parking spaces would the completed project have? How many would the project eliminate? *N/A.* ☐

d. Will the proposal require any new roads or streets, or improvements to existing roads or streets, not including driveways? If so, generally describe (indicate whether public or private). *N/A* ☐

e. Describe the existing condition of the proposed access road, including width of easement, width of pavement or roadway, curbs, gutters, and/or sidewalks. *N/A* ☐

f. Will the project use (or occur in the immediate vicinity of) water, rail or air transportation? If so, generally describe. *N/A* ☐

TO BE COMPLETED BY APPLICANT:		EVALUATION FOR AGENCY USE ONLY
g	How many vehicular trips per day would be generated by the completed project? If known, indicate when peak volumes would occur. *N/A*	❑
h.	Proposed measures to reduce or control transportation impacts, if any: *N/A*	❑
15.	**PUBLIC SERVICES**	
a.	Would the project result in an increased need for public services (for example: fire protection, police protection, health care, schools, other)? If so, generally describe: *No.*	❑
b.	Proposed measures to reduce or control direct impacts on public services, if any: *N/A*	❑
16.	**UTILITIES**	
a.	Circle utilities currently available at the site: electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other. *All utilities are available in the City of Mukilteo*	❑
b.	Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed: *All utilities are available in the City of Mukilteo*	❑

C. SIGNATURE

The information and answers provided in the Environmental Checklist (including Supplement for Non-project Actions, if applicable) are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: [signature]

Date Submitted: 6/26/2015

Agency Evaluation completed by: ______________________

Date: ______________

Note: boxes (❑) are checked to indicate agency review of items in checklist.

Part Eleven WAC 197-11-960 Environmental Checklist

SUPPLEMENT FOR NON-PROJECT ACTIONS

Because these questions are very general, it may be helpful to read them in conjunction with the list of the elements of the environment. When answering these questions, to aware of the extent the proposal, of the types of activities likely to result from the proposal, would affect the item at a greater intensity or at a faster rate than if the proposal were not implemented. When answering these questions, be aware of the extent the proposal, or the types of activities likely to result from the proposal, would affect the item at a greater intensity or at a faster rate than if the proposal were not implemented. Respond briefly and in general terms.

TO BE COMPLETED BY APPLICANT:	EVALUATION FOR AGENCY USE ONLY
1. How would the proposal be likely to increase discharge to water; emissions to air; production, storage, or release of toxic or hazardous substances; or production of noise? *The proposed update will not increase discharges to water, emissions to air or produce, store or release toxic or hazardous substances nor produce noise.*	☐
Proposed measures to avoid or reduce such increases are: *N/A.*	☐
2. How would the proposal be likely to affect plants, animals, fish or marine life? *The proposed update will not affect plants or animal.*	☐
Proposed measures to protect or conserve plants, animals, fish, or marine life. *N/A*	☐
3. How would the proposal be likely to deplete energy or natural resources *The proposed update will not contribute to the depletion of energy or natural resources.*	☐
Proposed measures to protect or conserve energy and natural resources are: *N/A.*	☐
4. How would the proposal be likely to use or affect environmentally sensitive areas or areas designated (or eligible or under study) for governmental protection; such as parks, wilderness, wild and scenic rivers, threatened or endangered species habitat, historic or cultural sites, wetlands, floodplains, or prime farmlands? *Neither critical nor environmentally sensitive areas will be affected by the proposed update.*	☐
Proposed measures to protect such resources or to avoid or reduce impacts are: *N/A*	☐
5. How would the proposal be likely to affect land and shoreline use, including whether it would allow or encourage land uses incompatible with existing plans? *No change in land or shoreline use is proposed.*	☐
Proposed measures to avoid or reduce shoreline and land use impacts are: *N/A*	☐
6. How would the proposal be likely to increase demands on transportation or	☐

TO BE COMPLETED BY APPLICANT:		EVALUATION FOR AGENCY USE ONLY
	public services and utilities? *The proposed update will not increase demands on transportation or public services or utilities.*	
	Proposed measures to reduce or respond to such demand(s) are: *N/A*	❑
7.	Identify, if possible, whether the proposal may conflict with local, state, or federal laws or requirements for the protection of the environment. *There are no conflicts.*	❑
	Proposed measures to protect or conserve energy and natural resources are: *N/A*	❑

CITY OF
MUKILTEO
Planning and Community Development Department

REQUEST FOR COMMENTS

July 6, 2015

X	Alderwood Water District – Dan Sheil /Lauren Balisky	X	Puget Sound Clean Air Agency (Beth Carper)
X	Burlington Northern Santa Fe Railway (Richard Wagner)	X	Puget Sound Energy (Dom Amor)
X	City of Edmonds (Rob Chave)	X	Puget Sound Regional Council
X	City of Everett (Allan Giffen)	X	Seattle Dist. Corps of Engineers (Dept. Army-Reg. Branch)
X	City of Everett (Dave Koenig)	X	Snohomish Co. Airport/Paine Field (A. Rardin/B. Dolan)
X	City of Lynnwood (Paul Krauss)		Snohomish Co. Assessor's Office ***(Ordinances Only)***
X	City of Mill Creek (Tom Rogers)	X	Snohomish Co. Conservation District
X	City of Mukilteo (Building Official)	X	Snohomish Co. Environmental (Candace Soine)
X	City of Mukilteo (Fire Chief)	X	Snohomish Co. Fire District #1 (Ed Widdis)
X	City of Mukilteo (Fire Marshal)	X	Snohomish Co. Marine Res. Comm. (Kathleen Herrmann)
X	City of Mukilteo (Engineering "In-Box")	X	Snohomish Co. Planning & Dev. Srvc. (Darryl Easton)
X	City of Mukilteo (Com. Dev. Dir.)**(Postcard/Notice only)**	X	Snohomish Co. Public Works (Deb Werdal)
X	City of Mukilteo (Rex Caldwell, Police Chief)	X	Snohomish Co. PUD: Dist. Eng. Services (Mary Wicklund)
X	Comcast of Washington (Casey Brown)	X	Snohomish Health District (Brent Raasina)
X	Community Transit (Kate Tourtellot)	X	Sound Transit Authority (Perry Weinberg)
X	Dept. of Commerce (Growth Mgmt. Svcs Rev. Team)	X	Tulalip Tribes
	Dept. of Natural Resources (James Taylor)		Tulalip Tribes – (Richard Young)
	FAA/Air Traffic Division, ANM-0520 (Daniel Shoemaker)		United States Postal Service (Donald L. Hatch)
	FEMA (John Graves)	X	Verizon Company of the NW, Inc. (Nate Kimball.)
	Island County MRC (Rex Porter) (*Shoreline Only*)	X	Washington Dept. of Ecology (Peg Plummer)
X	Master Builders King/Sno. Counties (Jennifer Anderson)	X	Washington Dept of Fish & Wildlife (Jamie Bails)
X	Mukilteo Beacon (Editor) **(Postcard/Notice only)**	X	WSDOT (Scott Rodman)
X	Mukilteo School District (Cindy Steigerwald)	X	WSDOT (Ramin Pazooki)
X	Mukilteo School District (Josette Baines)	X	WSDOT (Leah Bolotin)
X	Mukilteo Tribune (Editor) **(Postcard/Notice only))**	X	WRIA 7 Water Resources
X	Mukilteo Water & Wastewater District (Jim Voetberg, Manager; Rick Matthews; Jodi Kerslake)		Planning Commission ***(Postcard Only)***
	National Marine Fishery Service		Adjacent Property Owners
X	Office of Archaeology & Historic Pres. (Allyson Brooks)		Applicant/Contact Person ***(Notice Only)***
	Ogden, Murphy, Wallace (Angela Belbeck) ***(Ordinances Only)***	X	Parties of Interest
X	Pilchuck Audubon Society (Karen Snyder)	X	Parties of Record
X	Port of Everett (Graham Anderson)		Property Owners within 300' ***(Postcard/Notice Only)***
			Other:

FILE NO.: CP-2015-001 PROPONENT: City of Mukilteo

PROJECT NAME: 2015 Comprehensive Surface Water Management Plan Update

PROJECT DESCRIPTION: The City of Mukilteo is updating its Comprehensive Surface Water Management Plan. The update will include a review of and recommendations for, the conditions of natural systems and existing infrastructure under the purview of the Utility; the current regulatory requirements the Utility must operate under; operations and maintenance programs, both current and proposed to meet both regulatory requirements and Utility goals; engineering programs, both current and proposed to meet both regulatory requirements and Utility goals; capital improvement projects to reduce localized flooding problems, improve water quality and stream habitat; financial analysis to assure the Utility is funding the proposed programs. All supporting documents are available at City Hall for public review.

FILE NO: CP-2015-001 PROPONENT: City of Mukilteo

PROJECT NAME: 2015 Comprehensive Surface Water Management Plan Update

ATTACHED IS:

X	Notice of Application		
X	DNS		
X	Environmental Checklist		
X	Draft Comprehensive Surface Water Management Plan		

NOTE: ____

____

****

Please review this project as it relates to your area of concern and return your comments with this cover sheet by, **Monday, July 20, 2015** to Jennifer Adams, Surface Water Technician, City of Mukilteo, 11930 Cyrus Way, Mukilteo, WA 98275.

J. Adams
Jennifer Adams
Surface Water Technician

7/1/2015
Date

****

FOR FIRE CHIEF ONLY SPRINKLERS REQUIRED: YES______ NO______

RESPONSE SECTION:

______ Comments Attached ______ No Comments

COMMENTS: ____

____

Signature

Date

Company

DO YOU WANT A COPY OF OUR NOTICE OF DECISION ***YES*** __ ***NO*** __

CITY OF
MUKILTEO

11930 Cyrus Way
Mukilteo, WA 98275
(425) 263-8000

Notice of Application and Determination of Non-Significance by the City of Mukilteo for the 2015 Comprehensive Surface Water Management Plan Update

The **City of Mukilteo** is proposing updates to its Comprehensive Surface Water Management Plan. All supporting documents are available at City Hall for public viewing under City File No. CP-2015-001.

Description of Proposal: The City of Mukilteo is updating its Comprehensive Surface Water Management Plan. The update will include a review of and recommendations for, the conditions of natural systems and existing infrastructure under the purview of the Utility; the current regulatory requirements the Utility must operate under; operations and maintenance programs, both current and proposed to meet both regulatory requirements and Utility goals; engineering programs, both current and proposed to meet both regulatory requirements and Utility goals; capital improvement projects to reduce localized flooding problems, improve water quality and stream habitat; financial analysis to assure the Utility is funding the proposed programs. All supporting documents are available at City Hall for public review.

Location of Proposal: Citywide

Environmental Documents Prepared for the Proposal
An environmental checklist and Determination of Nonsignificance (DNS) has been prepared for the 2015 Comprehensive Surface Water Management Plan Update.

Applicable Policies and Requirements
The project will be reviewed for consistency with the following policies, standards and regulations:

- NPDES Permit
- City of Mukilteo Development Standards
- Possession Shores Master Plan
- Mukilteo Municipal Code
- Comprehensive Plan, Shoreline Master Plan

Optional DNS Process to be Used:
The City of Mukilteo, as lead agency for this proposal expects to issue a Determination of Non-Significance (DNS) for the proposal. Therefore, the optional DNS process allowed by WAC 197-11-355 is being used. This may be the only opportunity to comment on the environmental impacts of the proposal.

Comment Period
The application and supporting documents are available for review at the City of Mukilteo, 11930 Cyrus Way, Mukilteo, WA 98275. Contact: Jennifer Adams, Surface Water Technician at (425) 263-8083. The public is invited to comment on the project by submitting written comments to the Engineering Department at the above address by 4:30 p.m. on the date noted below.

Notice of Application Issued: Monday, July 6, 2015

End of Comment Period: Monday, July 20, 2015

The City will not act on this application until the end of the 14-day public comment period.

Appeals
The final decision on this project is appealable to Superior Court. An appeal must be filed within 21 days after the final decision on the project is issued. Only persons who file written comments on the project in response to the Notice of Application are considered parties of record who may appeal the decision. If you do not file written comments within the comment period, you may not appeal the final decision.

Contact Person: Jennifer Adams, Surface Water Technician (425) 263-8083

Signature: J Adams
Jennifer Adams, Surface Water Technician

Date: 7/1/15

Location Map

Date Issued: Monday, July 6, 2015
Date Advertised: Monday, July 6, 2015
End Comment Period: Monday, July 20, 2015

pc:	Applicant/Representative Reviewing Agencies Interested Parties	CDD Director Permit Services Supervisor Permit Services Assistants (2)	Project File

City of Mukilteo

2015 Comprehensive Surface Water Management Plan Update

PUBLIC COMMENTS ON PLAN AND SEPA CHECKLIST AND RESPONSES TO COMMENTS

Comments and City Responses on Public Draft Plan (issued July 2015):

The following includes responses to comments received by the City of Mukilteo on the 2015 Comprehensive Surface Water Management Plan Update. Comments are restated in their entirety. Where multiple comments are included, they are numbered. Responses to comments follow the individual comments.

Comment from Mukilteo Water & Wastewater District on July 17, 2015

Thank you for the opportunity to comment on the 2015 update for the City of Mukilteo Comprehensive Surface Water Management Plan. As this is a Non-Project Action, the Mukilteo Water and Wastewater District (District) has no specific comments.

Response to Comment. None.

Comment from Snohomish Fire District #1 on July 7, 2015

Snohomish Fire District #1 has no comments or conditions. This email is good for FD1.

Response to Comment. None.

Comment from WSDOT NW Region Planning on July 20, 2015

This is in reference to Mukilteo's *DRAFT 2015- 2021 Comprehensive Surface Water Management Plan Update*. You were sent a draft version of this letter prior to the end of the comment period of July 20th, so by verbal agreement this final version will be considered a part of the official comment record.

Chapter 6 of the draft plan defines the analyses necessary to meet utility goals, with LOS 1 defined as a meeting NPDES Permit requirements and keeping up with basic maintenance. Under Section 6.2.2, O&M Program Level of Service Alternatives, there is a discussion of the LOS 1 program for public stormwater facilities that would increase the inspection program of flow control and water quality facilities to an annual program. At the end of Section 6.2.2, the draft plans states:

> Currently, the City maintains several stormwater vaults on SR 525. The City should explore requiring WSDOT to complete their maintenance responsibility on these vaults. This is an increase in effort and will require additional staffing. *(DRAFT 2015- 2021 Comprehensive Surface Water Management Plan Update*, p 73)

This statement implies that WSDOT does not properly inspect and maintain our stormwater facilities. This would be a violation of our stormwater permit, as well as be inconsistent with our goal of environmental stewardship. When you and I spoke on July 8th about this section, you said that when it was written, it was not meant exactly as it sounds, and that Mukilteo is unsure about whose maintenance responsibility those vaults are.

I ended up conferring with our Maintenance Superintendent for NW Region Area 3, Ron Morton, and the Maintenance Operations Manager for NW Region, Chris Johnson. They both referred me to the RCW 47.24.020 (1991), which states in part:

> The jurisdiction, control, and duty of the state and city or town with respect to such streets is as follows: ...(4) The city or town shall at its own expense maintain all underground facilities in such streets, and has the right to construct such additional underground facilities as may be necessary in such streets. However, pavement trenching and restoration performed as part of installation of such facilities must meet or exceed requirements established by the department; ...

"Such streets" in this context is referring to non-limited state highways within jurisdictional boundaries.

WSDOT and the Association of Washington Cities found need for further clarification of this RCW, and developed a set of Guidelines in 1997 covering construction, operations, and maintenance responsibilities for roadways shared by a city and the state. The AWC website states that although the Guidelines are not enforceable, they help to clarify state laws and rules, and provide more consistency across regions and jurisdictions. These original Guidelines were later referred to two years later in the 1999 WAC 468-18-050 as follows:

> **Policy on the construction, improvement and maintenance of intersections of state highways and city streets:**
>
> **...(3) The policy.** After the access plan for any partial, or fully controlled limited access highway has been approved by a city or town, the state and city authorities shall negotiate an agreement establishing responsibility for construction and maintenance of the various features of each interchange. ...On April 30, 1997, the department of transportation and the Association of Washington Cities approved guidelines on the interpretation of selected topics of chapter 47.24 RCW and the above figures for the construction, operation and maintenance responsibilities of the department and cities for city streets that are part of state highways. These guidelines are general in nature and do not preclude the department and individual cities from entering into agreements to address particular circumstances.

The original Guidelines were revised in 2013. Here is a *Summary* of the revisions, and here is the *Final "Conformed" Agreement*. A WSDOT webpage containing all three documents is available here.

Looking at the final document, there is text under *Section B) Parallel Ditches and Cross Culverts,* at the bottom of page 2, which lends further clarification to maintenance responsibility. The revised Section B reads as follows:

> Within all cities, regardless of population, the state shall solely maintain the structural integrity of box culverts, multiplates and individual culverts greater than 60 inches in width that are within rights of way and are not part of an enclosed drainage system. These are the size appropriate to identify natural stream flows. These structures that are 60 inches or less in width will be maintained by the cities. Cities shall maintain all other parallel roadside ditches and road approach culverts. Grass-lined swales constructed by the state solely for state highway runoff will be maintained by the state. *(Summary,* pg 3)

The WSDOT Maintenance Operations Manager explained that since the stormwater vaults are part of an enclosed drainage system, they therefore revert to the city for maintenance. This holds true regardless of culvert or vault size, and regardless of the city's population size. (Note that the text of the original agreement was changed only very slightly: "less than 60 inches" was changed to "60 inches or less," and "will be maintained by the WSDOT" now reads "will be maintained by the state.")

Note also that at the top of the second page of the *Summary*, it is acknowledged that further work may still be required to fully clarify responsibilities in this area:

> **Future Needs**
>
> In development of this update there were a number of elements which are contentious or need significant effort to resolve and define. These items are as follows;
>
> - Storm water treatment and management within cities
> - Evaluate responsibilities on city streets that cross limited access facilities

You may also wish to take a look at (16) of the RCW referred to above, RCW 47.24.020, which states:

> If any city or town fails to perform any of its obligations as set forth in this section or in any cooperative agreement entered into with the department for the maintenance of a city or town street forming part of the route of a state highway, the department may notify the mayor of the city or town to perform the necessary maintenance within thirty days. If the city or town within the thirty days fails to perform the maintenance or fails to authorize the department to perform the maintenance as provided by RCW 47.24.050, the department may perform the maintenance, the cost of which is to be deducted from any sums in the motor vehicle fund credited or to be credited to the city or town.

Based on the above state statutes, WSDOT suggests that Mukilteo either remove the statement at the top of page 73 of the draft plan update entirely, or revise the text to reflect state statutes and the AWC/WSDOT *Conformed Agreement*, which would mean reflecting Mukilteo's responsibility to maintain said stormwater vaults.

Both Ron Morton and Chris Johnson have previously met with Larry Waters, who we understand is now retired from the City of Mukilteo. According to Chris, WSDOT had an understanding with Larry that the stormwater vaults are Mukilteo's responsibility. After speaking with you again today, I understand that there is still some concern on Mukilteo's part regarding the exact definitions of "underground facilities," "enclosed drainage system," and possibly a few other items that may require further discussion. I encourage Mukilteo to explore these issues further with Chris J. Johnson, Maintenance & Operations Manager, Northwest Region, JohnsoC@wsdot.wa.gov, 206-440-4655.

Response to Comment: Language was changed to reflect the City's original intent.

Comment from Christina Bandaragoda on July 20, 2015

I reviewed the comprehensive plan and am so impressed with your work. The report is beautiful. You have done a great job and the citizens of Mukilteo are lucky to have your contribution and service to the community. Thank you for your commitment to a transparent process and including and involving citizens in the surface water planning.

Response to Comment: None.

Comments from Sylvia Kawabata on July 20, 2015

Here are my comments on the Draft Surface Water Management Plan.

Overall, the SWMP is excellent. It provides a good, clear comprehensive plan on how to move forward on the stormwater program for the city.

I support it 99%, in other words I can support it. It provides an excellent "roadmap" on how to move forward and it provides the "checks and balances" to see how the plan is implemented. Hence, one can see through the annual monitoring, how the plan is progressing.

Comment 1. Document Title

I have a few disagreements with some parts of the SWMP and I've included those disagreements in my attached comments. I guess I'm still not comfortable with calling this document a "surface" water management plan, since it just deals with stormwater. I believe it should be called the "Stormwater Management Plan" since it just primarily deals with the management of stormwater. Oh well, maybe that comment is too late in the game.

Response to Comment 1: The City adopted Ordinance 611, dated July 18, 1988, creating the "city surface water drainage utility." The 2001 Plan is titled "Comprehensive Surface Water Management Plan." The title of the current plan was chosen to reflect that it is an update to the 2001 Plan and to be consistent with the Utility's title, as adopted by Ordinance. No changes will be made to the title.

Comment 2. Infiltration

My other major comment is that sometimes in the SWMP it suggest or recommends infiltration as a stormwater management solution. However, the 2015 Infiltration Feasibility Study, does not recommend infiltration. But I do see that with additional soil testing and with adequate soils, infiltration might be an alternative.

Response to Comment 2: The City follows Department of Ecology's most current *Stormwater Management Manual for Western Washington (SWMMWW)* for stormwater requirements related to redevelopment and development projects. The standards in the *SWMMWW* require that infiltration be used for stormwater management, unless proven infeasible. The City requires that development and redevelopment projects prove infeasibility, using a site specific analysis, based on the criteria in the *SWMMWW*.

Ecology has previously commented on the *Infiltration Feasibility Study*. In that comment, they stated:

"It must be clarified that the presence of glacial till does not in itself make a site infeasible for LID under New and Redevelopment requirements."

Comment 3. Trees

One last comment: (1) the SWMP mentions in several places that is recommends that trees (in a few places conifer trees) not be cut. That trees provides a canopy and helps slow down the surface runoff. I support that. I know of two neighbors who have had steep slope failures due to tree cutting. However, in my attached comments I provide a link to an Ecology web site that includes other types of vegetation that is good for slope stability and I recommend that you also include that link (or other similar listing) of native plants could also be an good vegetation for slopes maintenance.

Response to Comment 3. The City recognizes the benefits of native vegetation retention.

Comment 4. Stormwater vs Surface Water

Page 2, Box that clarifies Surface Water and Stormwater. It disagree that stormwater is surface waters. Stormwater is what can enter a surface water body. Stormwater accumulating on a parking lot is not stormwater. Stormwater accumulating in a detention pond is not surface water. The CWA thru the NPDES permits regulate discharges to surface water. So it is confusing to call stormwater surface water.

I recommend that you call this the **Stormwater** Management Plan. Since that is all what this plan is addressing. It is not addressing how the city is going to manage surface water bodies. It indirectly will address surface water, but this plan does not directly manage surface water. I know that is a big change to this plan, but I guess I'm a purist when it comes the CWA and NPDES. I was in the EPA NPDES permit program for 20 years as a NPDES permit writer, enforcement office and program supervisor. So here is my suggestion for the "box"

> "Surface water is all the water at the surface of the landscape – streams, ponds, wetlands, lakes, ~~ditches~~, and marine waters. ~~ponds, and stormwater. Stormwater is a subset of surface water.~~

Response to Comment 4. From the Washington Administrative Code (WAC) 173-201-020: "**Storm water**" means that portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility." "**Surface waters of the state"** includes lakes, rivers, ponds, streams, inland waters,

saltwaters, wetlands *and all other surface waters and water courses* within the jurisdiction of the state of Washington." *(Italics added for emphasis.)*
The State of Washington's Department of Ecology (Ecology) further defines, and has successfully defended on numerous occasions, that "surface waters of the state," include stormwater. The definition given in the Plan Update is an interpretation of the WAC for the layperson.

Comment 5. Rain water.

> Stormwater is ~~rain water~~ precipitation that flows off the landscape, roadways during or immediately after rain or snow events. In urban areas, like Mukilteo, hard surfaces, like roads and roof tops, change the timing and rate of stormwater flows. Stormwater also picks up pollutants and carries them to surface waters. Altered flow patterns and pollutants on the landscape create problems in the City's streams and Puget Sound."

Response to Comment 5. Noted and changed.

Comment 6. Infiltration.

Page 2, 3rd para. This sentence is confusing since it conflicts with the report that concludes the LID that provides infiltration is not appropriate for most parts of Mukilteo. This sentence suggest that infiltration is a good BMP:

"For the region, low impact development (LID) methods (methods that infiltrate stormwater and retain it onsite before being released to receiving waters), have become mandatory for development projects."

The preceding italicized sentence conflicts with the following sentence from pages 4&5:

"*Low impact development methods relying on infiltration have proven challenging in Mukilteo due to underlying geology and the presence of steep slopes. Mukilteo is committed to low impact development, but site evaluations may prove they have limited feasibility, as was the case in the pre-design field investigations done for the Retrofit Project (ESA, 2015) (Retrofit Pre-Design Report*)."

Perhaps after the mention of LID on page 2, it should be stated that "...however, in Mukilteo LID may not be a good selection due to the poor soil conditions that result in negative impacts from infiltration. See further discussions of infiltration challenges in part xxxxx."

Response to Comment 6. Please see Response to Comment 2.

Comment 7. Surface Water vs Storm Water Utility Rate

Page 3, item #5 states "surface water utility rate". This term should be changed to "storm water" utility rate, since that is the term used on the billing statement. The term "surface water utility rate" is used in many places throughout the SWMP and should be changed to storm water (or stormwater) utility rate.

Response to Comment 7. The City of Mukilteo Municipal Code 13.16 repeatedly refers to "Rates for surface water drainage service." The term "surface water utility rate" is consistent with the language in the Code.

Comment 8. Surface vs. Storm
Section 1.2.5 "Surface Water Utility" pages 5 and 6. It states *"…as well as fund capital projects that will repair and/or improve the City's ~~surface~~ storm water system."*

Response to Comment 8. Noted.

Comment 9.
Page 6, amend this sentence to clarify "beneficial uses"

> The City's Surface Water Utility remains committed to preserving the City's freshwaters and Puget Sound to meet the criteria for protecting all beneficial uses of these valuable resources.

Response to Comment 9. Noted and changed.

Comment 10. Date correction.
Page 8, Table 1-1, the date range for when the Draft SWMP plan update was posted for public review and comments needs to be corrected to reflect the actual comment period that ends on July 20, 2015.

Response to Comment 10. Noted and changed.

Comment 11. Correction

Page 9, Section 1.51. line 3, correction "evaluation ~~if~~ of infiltration feasibility"

Response to Comment 11. Noted and changed.

Comment 12. Correction

8. Page 16, Section 2.1.2, line 2, there is an incorrect description of BNSF. It is the Burlington Northern Santa Fe (not San Francisco)

Response to Comment 12. Noted and changed.

Comment 13. Infiltration on Steep Slopes
Page 20, section 2.1.6. I disagree with this recommendation/conclusion. It should be deleted.

"Because the recharge process and steep slopes are vital to identifying solutions for many of the impacts on natural drainage basins, the City should explore these processes further and document the effects of infiltration on steep slopes, exhaust opportunities for infiltration projects, and/or begin to identify alternative solutions."

It conflicts with the conclusion of the 2015 Infiltration Feasibility Study. This study concludes:

• *Shallow Infiltration Feasibility: As shown on Figure 4, most of the City is not* ***suitable for shallow infiltration*** *due to the presence of low-permeability glacial till soils at the surface and/or proximity to steep slope hazards. There are small areas considered moderate or good for shallow infiltration scattered throughout the city.*

• *Deep infiltration Feasibility: Although the* ***assessment of deep infiltration feasibility is made less certain due to the limited availability of reliable subsurface information, available data suggest that there are no areas of high potential.*** *As shown on Figure 5, deep infiltration has moderate potential in upland portions of the City. It is unlikely that deep infiltration is feasible along the Study Area's shoreline, within wetland areas, and within or near the steep ravines and gulches in the City*

> Hence, the statement highlighted in yellow above is contrary to the infiltration feasibility study and the last 3 sentences on page 20 should be deleted and include the conclusion of the 2015 Infiltration Feasiblity Study.

Response to Comment 13. See Response to Comment 2.

Comment 14. Privately Owned Facilities

Page 22, Section2.2.2 last sentence states: "City has design plans for privately owned facility…" Please include in the appendix these design plans for privately owned facilities.

Response to Comment 14. As page 22 indicates, "the City does not currently have a cataloged list."

Comment 15.
Page 58, section 5.1. The paragraph after figure 5.1 the following statement should be changed to: "The Utility works to protect environmental resources & habitat through development review and ~~in requiring~~ implementing and enforcing local and regional stormwater regulations.

Response to Comment 15. Noted and changed.

Comment 16. Healthy Built Environment

Page 59, "healthy built environment" I recommend that when the Utility needs to replacing its existing vehicles it look to purchasing/leasing vehicles or equipment with alternative fuel or low CO2 emission types vehicles or equipment. The city move toward utilizing solar or other alternative sources of energy.

Response to Comment 16. The City follows RCW 43.19.648.

Comment 17. Vibrant Economy

Under "Vibrant Economy". I recommend the Utility look at small business, womenowned business, or minority owned businesses for their contracting needs.

Response to Comment 17. The City follows State contracting law, according to RCW 35.22.620, RCW 39.04.155, or RCW 39.80, as applicable to the project.

Comment 18. Rain Garden Permit

Page 105, 7.4.2, last sentence should be modified to say: This Rain Garden Permit would help residents identify areas of steep slopes and other factors that may pose risks to the Utility or the landowner, *or downslope landowner*. Part of the evaluation and permit will need to consider what impacts will there be on the downslope landowner since infiltration may make downslope lands saturated during higher rain events and hence unstable and more prone to landslides.

Response to Comment 18. Noted and modified.

Comment 19. Natural Yard Care

Page 105, 7.4.2 The 2nd paragraph states: The Utility fully supports natural yard care techniques and recommends ...... large conifer tree retention. They are many native plants that support slope stability and should also be considered for retention. See web link for suggestion from Ecology on plants adequate for planting on steep slopes. http://www.ecy.wa.gov/programs/sea/pubs/93-30/table3.html

Response to Comment 19. See Response to Comment 3.

Comment 20. Decision Outcomes

Page 107, 7.5 last section on page. I'm confused, it states there are "Four decision outcomes" however, it only see three listed.

Response to Comment 20. Noted.

Comment 21.
Page 114, section 8.5.1, 4th bullet: In addition to tree retention, this bullet should also include native plants retention or use of native plants in the landscape to help reduce surface runoff.

Response to Comment 21. An additional bullet was added.

Comment 22. CIP Implementation Measures

P115, section 8.7 – Capital Improvement Projects. This section does not have any implementation measures. For example, it could include:

- by xx month of each year, review existing CIP list and determine if it is still a high priority CIP
- by xx 2017 review CIP ranking criteria and adjust if necessary
- by xx 2018 solicit input from community about storm water issues in their neighborhoods.
- by xx 2018 rank community suggested projects including those that were submitted in previous years and develop new/adjusted CIP list)
- By xxx 201x evaluate completed projects and proposed projects to ensure equitable distribution of projects across the city.
- By xxx 201x establish qualitative measures for determining effectiveness of water quality projects

Response to Comment 22. Noted.

Comment 23. Map Label
Appendix D, Figure 1. The waterbody adjacent to Mukilteo is incorrectly labeled as "Lake Washington".

Response to Comment 23. Noted.

Comments from Eric Hovland on July 14, 2015

Comment 1. Past Expenses.

After reading through most of the material, I am still trying to figure out what we actually got from the last 1.3 million dollars of storm water money.

Response to Comment 1. See Chapter 4: Achievements Since the 2001 Plan.

Comment 2. Employees.

How many employees are paid out of this fund?

Response to Comment 2. See page 95, Figure 6-3: FTEs funded by Surface Water – Existing.

Comment 3. List of Accomplishments.

Does the city have a list of accomplishments?

Response to Comment 3. See Chapter 4: Achievements Since the 2001 Plan.

Comment 4. Vehicle repair and maintenance

Reading the cost sheet I'm shocked to see an annual $30,000 in vehicle repair and maintenance? and $15,000 in fuel costs.

Response to Comment 4. Noted.

Comment 5. Overhead costs.

There generally seems to be a high percentage of overhead costs and not much going to new infrastructure.

Response to Comment 5. Noted.

Comment 6. Financial streamlining

It would be nice to see some financial streamlining before asking for us citizens to pay higher taxes.

Response to Comment 6. Four financial alternatives were considered in the Financial Analysis, Chapter 9.

Comment 7. Current Regulatory Requirements

I thought I read in appendix B of the SEPA Checklist and DNS that the Comprehensive Surface Water Management Plan will include the current regulatory requirements the utility must operate under. I did not see these requirements.

Response to Comment 7. See Chapter 3: Environmental and Regulatory Factors.

Comment from David L. Eaton on July 10, 2015

I noticed in looking through the materials for this plan update that Bald Eagle nesting sites listed in the EIS did not include two sites in Big Gulch, one at the top of Marine View Drive in a large Douglass Fir tree behind homes situated at approximately the 9700 block of Marine Vew Drive. This nest has been in use for years. The other is located on a tree on the bluff in Olympus Terrace. We watched eagles build this new nest in Olympus Terrace last year, as they foraged for sticks by breaking off branckes of dead trees in Big Gulch immediately behind our house.

Response: The City uses Washington Department of Fish and Wildlife (WDFW) information for bald eagle nesting sites. WDFW can be contacted to report unlisted sites.

Comment from Alfred Gengnagel on June 24, 2015

I would appreciate being contacted by an engineer for the City to discuss an ongoing issue that is of great concern to me.

Response: Noted.

Comments from Kristin Kirk on July 7, 2015

I have had a chance to look at the documents emailed out yesterday and have the following comments:

Comment 1. Project 8
We are pleased to be included in the first phase - project 8 - 10th/Loveland. It will be a huge relief to worry less about flooding with this project completed. From what I can tell, we will see a few new storm drains on our street and the pipe in the ditch will be up sized. The ditch will remain open.

Response to Comment 1. Noted.

Comment 2. Curbs on 10th St
Please consider adding curbs/better bumps to the north side of 10th street, west of Loveland. This is particularly needed along the frontages of 904 Loveland and our frontage at 808 10th street due to the steel slopes and speed for which water sheets from the street and into our yards. The existing bumps don't help much.

Response to Comment 2. Noted.

Appendix C

Geomorphology and Critical Slope Evaluation Technical Memorandum

Technical Memorandum

To: Colleen Doten, PE, Brown and Caldwell
Challis Stringer, City of Mukilteo

From:

State of Washington
1427
Licensed Geologist
ERIN JAYNE NELSON
2-11-15

State of Washington
Hydrogeologist
417
Licensed Geologist
David H. McCormack
2-11-15

Erin Nelson, PE, LG
Altaterra Consulting, LLC

David McCormack, LHG, LEG
Aspect Consulting, LLC

Date: February 11, 2015

Subject: Geomorphology and Critical Slope Evaluation in Support of the City of Mukilteo Stormwater Comprehensive Plan Update

Introduction

This memorandum describes the results of the geomorphological and critical slope evaluation field work conducted in support of the City of Mukilteo's (City's) Stormwater Comprehensive Plan. The purpose of the field work was to qualitatively evaluate existing conditions (e.g., bank and bed erosion, landslides, lateral channel movement, and other geologic characteristics) and to estimate potential consequences of upstream stormwater management alternatives based on observed geologic conditions. Additionally, the field data was compared to published geologic maps and the deep and shallow infiltration potential maps that were prepared for the Stormwater Comprehensive Plan (Aspect, 2015a).

Methodology

The City requested that the consultant team evaluate four stream channels within the City's jurisdiction with regard to fluvial and hillslope geomorphology that are or have the potential to be influenced by stormwater management actions. The channels and ravines evaluated are:

- Brewery Creek
- Upper Chennault Creek
- Lower Chennault Creek
- Smuggler's Gulch Creek

Figure 1 shows the locations of the stream channels walked during this evaluation.

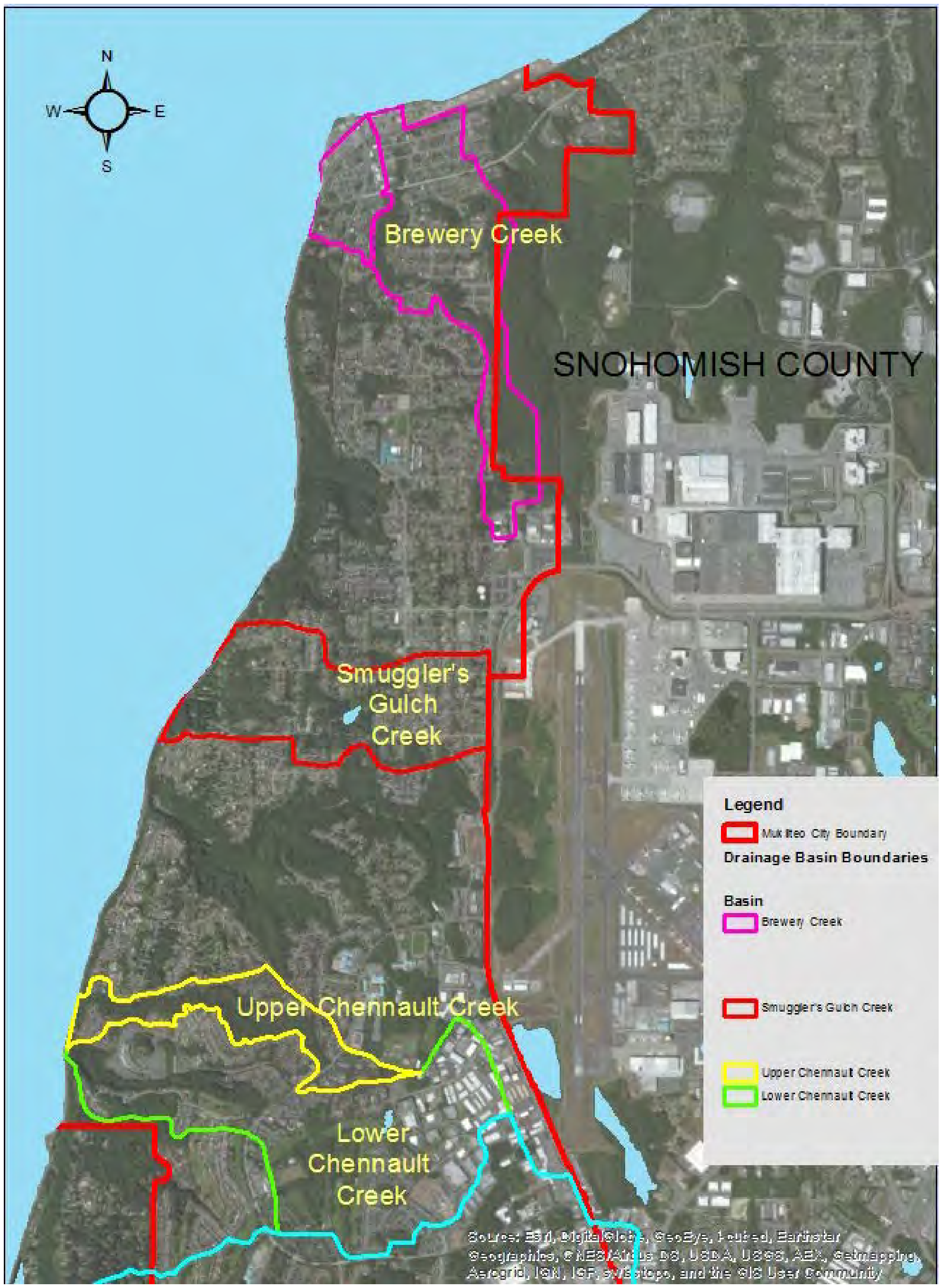


Figure 1 Locations of drainage basins and stream channels walked during reconnaissance

The primary evaluation method was direct field observation, however, published geologic maps and a draft of the infiltration feasibility study (Aspect, 2015a) conducted for the Stormwater Comprehensive Plan were also reviewed prior to conducting the field visits.

Site geologic reconnaissance visits to the four channels and ravines were conducted by Dave McCormack, LEG, LHG, of Aspect Consulting, LLC in conjunction with the fluvial geomorphic reconnaissance walks by Erin Nelson, PE, LG, of Altaterra Consulting LLC. The walks served to directly observe current site conditions and qualitatively evaluate hillslope and channel geomorphic processes (including landslides) and to inform potential projects on how to minimize or reduce adverse impacts.

In general, the stream channels were walked from the lowest accessible point in the basin (at the mouth or where access could be obtained) to the highest accessible point in the basin (near or at the headwaters of each stream channel). Observations noted include:

- Geologic units and/or contacts exposed in the creek bed and on the ravine slopes.
- Nature and extent of seepage and approximate seepage elevations.
- Predominant channel substrate and grain size (e.g., sand, silt, gravel, cobbles, boulders).
- General channel dimensions (bankfull widths and depths were occasionally measured and generally noted).
- Debris and sediment accumulation in the channel (e.g., wood, trash, depositional areas).
- Channel erosion.
- Relative slope stability and hillslope and bank failures adjacent to the channel and our opinion on the sensitivity of the site slopes to potential adverse impacts from increased stormwater inputs.
- Pipe crossings (culverts).
- Outfalls (piped inputs to the channel or slope above the channel).
- General vegetative conditions.

The Brewery Creek site reconnaissance was conducted on April 29, 2014; Upper Chennault Creek on May 6, 2014; Smuggler's Gulch on May 27 and July 15, 2014; and Lower Chennault Creek on July 15, 2014.

Photo documentation of the stream channels, hillslopes, and geologic conditions is included in Attachment A.

Geologic Mapping

Geologic maps in the vicinity of the four stream channels were reviewed and generate the basis of our understanding of surficial site geology.

The majority of the City and expansion area was first mapped in detail by Mackey Smith in 1976 and is presented on his geologic map of the Mukilteo and Everett quadrangles (Smith, 1976). Most of the City was re-mapped by James Minard in 1982 and is presented on his geologic map of the Mukilteo quadrangle (Minard, 1982). The southern portion of the City and study area falls within the Edmonds East quadrangle, which was mapped by Minard in 1983 (Minard, 1983).

Since Smith and Minard completed their mapping, geologists' understanding of the characteristics of the geologic units, the number of glacial advances and interglacial events that compose the stratigraphic framework, and the names and ages of these geologic units have advanced considerably. Consequently, Smith and Minard's interpretations of the names (and by inference number of glacial advances and position and ages of those advances) of geologic units that predate the most recent lowland glaciation (the Vashon stade of the Fraser glaciation) are suspect. Although their inferred names and interpretation of stratigraphic position for some geologic units may be inaccurate, their textural descriptions of these units appear valid in many, but not all, areas. Consequently, their mapping still provides some relevant data on the general textural nature of the deposits in the study area but should not be relied upon to accurately depict the hydrostratigraphy of the Site.

Geology of the Smith and Minard maps forms the basis for the geology presented on the Washington State Department of Natural Resources (DNR) online geologic map (Washington DNR, 2014), generally with only minimal re-interpretation or re-naming of the original map's geologic units. Figure 2 shows the DNR-compiled geology of the study area.

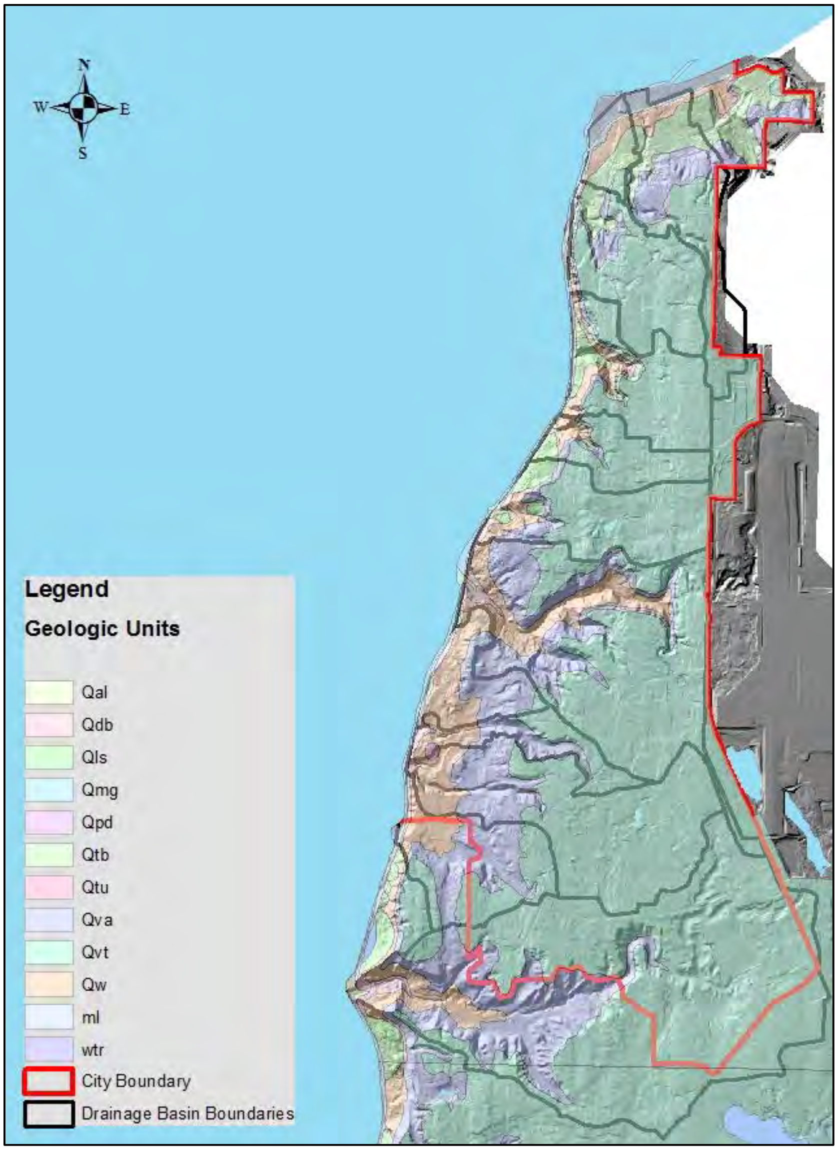


Figure 2 Geologic map

Since Minard and Smith mapped the area, there have also been significant advances in the understanding of recent deformational history (e.g. faulting, earth movements) and seismic hazards (e.g. earthquakes) of the area. The Southern Whidbey Island Fault (SWIF) zone is a major regional structure (a fold and thrust belt) that separates the Everett geologic basin to the north from the Seattle geologic basin to the south. The SWIF has been found to extend from Whidbey Island southeastward through the

Cities of Mukilteo and Edmonds. Seismic activity and faulting within this broad zone of deformation has had a significant impact on geomorphic processes and topography of the site area, including the location and direction of the regional drainage networks, and slope stability.

Regional Geologic Units

Geologic units observed during the site reconnaissance and referenced below can generally be correlated to the geologic units presented on the DNR's site geologic map (Figure 2), with the caveats on ages and names of units discussed above. Unit descriptions below are based on regional site observations and Smith, Minard, and DNR map unit descriptions. From generally younger (stratigraphically higher) to older (stratigraphically lower) site geologic units include:

> Alluvium (Qal) – Gravel, sand, silt, and clasts of cohesive and hard glacial soils from landslides deposited along the stream channels and floodplains; moderately sorted. Qal can be as much as 5 feet thick where impounded by slide debris, woody debris, or channel constrictions (e.g. culverts) in the channel bed.
>
> Colluvium – Loose surficial soil layer present on steep slopes that has weathered from underlying (parent) units and is creeping downslope under the influence of gravity. It may range from coarse-grained to fine-grained. Generally, colluvium is not mapped as a distinctive unit but is geomorphically significant on many site hillslopes.
>
> Landslide Debris (Qls) – Poorly to unsorted deposit with a fine-grained matrix of broken to internally coherent surficial deposits that form irregular surfaces and are transported down steep slopes *en masse* by gravity. Bedding and blocks of material are commonly fractured, sheared, rotated, and deformed, with abundant smooth, polished surfaces. Landslide deposits may be as much as several tens of feet thick and hundreds of feet wide.
>
> Vashon Basal Till (Qvt) and Subglacial Meltout Till (Qvtm) – Basal (lodgment) till consisting of a compact, poorly sorted deposit containing subrounded to well-rounded gravel and cobbles in a silt and sand matrix. Region wide, Qvt is typically up to a few tens of feet thick, but Mukilteo and the Paine Field area boring and well logs report 100 feet or more of till and till-like deposits over much of the uplands of the study area. Qvt is generally very low permeability and may perch stormwater. Till-like deposits (Qvtm) were not mapped as a distinctive unit by Smith or Minard, but are now regionally recognized as a distinctive stratigraphic and engineering geologic unit. Qvtm ranges from very low to moderate permeability but will generally not produce or accept significant quantities of water. In upland areas of the Site, Qvtm was encountered below Qvt in borings recently completed by Aspect as part of the Stormwater Retrofit Hydrogeologic investigation (Aspect, 2015b) that was completed to assess favorability of subsurface conditions to support deep infiltration.
>
> Vashon Advance Outwash (Qva) – Sand and gravel, well bedded; includes deposits of clean to slightly silty, fine-to-medium sand (Esperance sand). Generally unoxidized; gravelly phase clean, except near the base of the unit where it is locally grades to the transitional beds unit (Qtb) where present. Qva may grade upward into Vashon subglacial meltout till (Qvtm). Regional

maps suggest that thick Qva deposits may underlie much of the upland in the Mukilteo region where the thickness may exceed 100 feet. Field evidence from this investigation and results of Aspect's recent hydrogeologic soil boring investigation (Aspect, 2015b) suggests that much of the mapped Qva unit is actually composed of Qvtm. The Qva unit is generally fairly permeable and is water bearing, where saturated.

Transitional Beds (Qtb) – Silt, clayey silt, and silty clay, laminated to massive; deposited in lowland or proglacial lakes. The transitional beds stratigraphic unit marks the transition from nonglacial to glacial time and correlates with the Pilchuck clay and Lawton clay and the top of the Olympia beds (deposits of the nonglacial climatic interval that predated the Fraser glaciation). Qtb is generally present within valleys bound by ancestral hills of pre-Fraser deposits and generally absent in the study area above elevation 250 feet, the approximate local maximum elevation of the proglacial lake into which it was deposited. The Qtb unit is generally impermeable and controls the elevation of seepage horizons on many ravine exposures.

Olympia Beds (Qob) – Stratified sand, silt, clay, organic silt, and peat deposited in low-energy rivers, wetlands, and lakes in an environment similar to today's lowland river valleys. The unit may be present from about 300 feet above sea level to well below sea level. This unit was not recognized by Smith (1976). He mapped Whidbey Formation (Qw), which likely includes deposits now recognized as the much younger Qob.

Possession Drift (Qpd) – Clay, silt, sand, and gravel; sorted and stratified to unsorted; includes basal tills, glaciofluvial deposits, and glaciolacustrine and glaciomarine deposits.

Whidbey Formation (Qw) – Sand, silt, clay, and lesser gravel, organic silt, and peat; deposited in wetlands, floodplains, lakes, and meandering river environments. Units mapped by Smith as Whidbey Formation likely include deposits from the Olympia nonglacial interval (Qob).

Double Bluff Drift (Qdb) – Clay, silt, sand, and gravel; sorted and stratified to unsorted; includes basal tills, glaciofluvial deposits, and glaciolacustrine and glaciomarine deposits. Units mapped as Qdb by Smith may include deposits now recognized as Qpd.

Regional Slope Stability

Ravine slopes are formed by incision of a creek bed and erosion and mass wasting of the ravine side slopes above the creek bed. Factors affecting ravine slope stability include: (1) stream incision; (2) rate, type, and strength of soils forming the ravine side slopes; (3) vegetation; (4) presence or absence of surface water runoff; and (5) the amount and location of groundwater seepage. Within steep ravine slopes in the study area, there are five general types of potential slope movement processes:

Soil Creep – Creep of soils is the slow, gradual and mostly continuous downslope movement of the upper few feet of loose and weathered soils under gravitational stress. Movement occurs from a combination of biological activity, frost action, and other factors.

Shallow Colluvial Landslides – These slides, also called "skin slides," occur when the outer few feet of soil slide *en masse* down a slope in response to saturation of shallow soils from storms or improperly diverted or concentrated water discharging to a slope. These slides usually occur between late fall and early spring following exceptionally wet periods or extreme storm events. Movement ranges from very rapid to slow. Because they are sensitive to surficial soil moisture, increases in seepage or surface water discharge to a steep slope may have modest impacts on increased frequency or severity of colluvial slides.

Spalling Failures – These failures, also called slab spalling failures or "high bluff peel-offs" by some local practitioners, occur where dense and somewhat cohesive soils become over-steepened and a slab or block topples from an outcrop. These failures may occur where a meandering stream undermines soils to create a near vertical slope that then spalls. Failures generally occur along pre-existing stress relief fractures in the soil. Movement is generally very rapid. These slides are generally not caused by soil saturation or elevated groundwater levels, thus, they are not significantly susceptible to changes in local groundwater level or seepage amounts.

Deep Seated Landslides – These failures, also called rotational landslides, occur when soils shear along a typically curving failure plane and the mass of soil rotates and slides downhill. These failures occur where the gravitational forces driving the mass of soil downward exceed the strength of the soils. These slides generally occur in areas of groundwater seepage and when groundwater levels and seepage volumes are anomalously high. Movement often occurs well after the end of the wet season and may be slow to moderate, and occasionally rapid. These slides are generally triggered by elevated groundwater and, therefore, are sensitive to local increases in groundwater levels. Deep-seated slides may also be quite large, measuring tens of feet thick and hundreds or thousands of feet wide.

Debris Flows – These failures occur when a mass of soil disaggregates or liquefies with movement and the wet debris moves downhill as a fluid. Debris flows generally occur in soils that contain a high proportion of fines that hold water (e.g., silt and clay) or porous soils that contain excess pore water that cannot drain due to confined conditions (e.g., a veneer of fine-grained slide debris that blocks drainage). Movement is generally very rapid and these flows may extend a considerable distance along low angle surfaces or within drainages. No evidence of debris flows was observed during reconnaissance visits.

In many cases, the relative age of a landslide can be estimated from geomorphic features and vegetation patterns. Some landslides appear to predate regional development (pre-historic), others appear to date from the time of regional logging and urban development to within the past few decades (historic), and other, appear to be active now or within the past decade or less (active). The relative age of landslide activity is an imperfect but still useful predictor of the level of risk of renewed movement of those landslides – slides that have not moved in a long time are inferred to be at least marginally more stable than those that have moved very recently.

Results

All of the stream systems in the City originate on a flat plateau before flowing to Puget Sound in steep ravines that cut through the glacial and non-glacial geologic units described above. The stream channels walked for this evaluation were located in steep, forested ravines that have relatively intact riparian corridors that are not developed. Development is generally present at the top flanks of the ravines, although some landscaping improvements were also observed adjacent to the stream channel in some locations. There were only a few instances of stream channel encroachment by homes or structures, primarily in Brewery Creek. The hillslope and channel geomorphologic conditions observed are functions of site topography, geologic conditions present within the channel and on the side slopes, vegetation (including downed trees that have toppled into the channel), sediment, built structures bisecting the channels, and stormwater discharges at the top of slope or in pipes tight-lined directly to the stream channel. Stream channel, ravine, and geologic conditions are described by reach below.

Brewery Creek

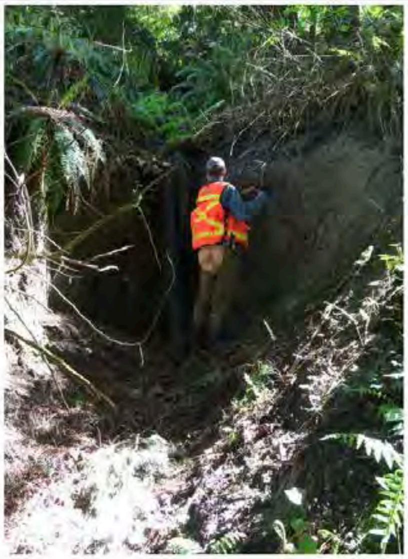
Brewery Creek originates in a large wetland near the eastern City boundary at 19th Street and Goat Trail Loop. A location map and summary of reach conditions is provided in Figure 3. The open channel section of Brewery Creek was walked from 5th Avenue to Loveland/8th Street and for a short distance upstream of Loveland/8th Street. The lower portion of Brewery Creek is conveyed in open channel and piped segments below 5th Avenue extending to Puget Sound. Although the lower portion of Brewery Creek was not walked during this reconnaissance, City maintenance crews report extensive sedimentation in the channel adjacent to the Burlington Northern Santa Fe (BNSF) railroad tracks. Sediment deposition is thought to limit conveyance capacity in these flat waterfront areas and contribute to flooding along Front Street near the ferry terminal, especially when heavy precipitation is combined with high tides.

Geologic Observations

Geology of the Brewery Creek area (Figure 2) is mapped (Washington DNR, 2014) as Vashon glacial till (Qvt), which caps the drainage headwater areas and uplands between elevations of about 175 to 375 feet. The DNR map shows Vashon advance glacial outwash (Qva) cropping out between elevations of about 375 and 240 feet. Below this, the DNR map shows silty and clayey transitional beds (Qtb) from about 240 to 70 feet in elevation; and silt, sand, and clay of the Whidbey Formation (Qw) to 30 feet in elevation where it is covered with fill placed for the Mukilteo waterfront. Implications from the map are that there is an extensive section of sandy to gravelly advance outwash, potentially up to several hundred feet thick that may serve as a receptor for stormwater infiltration. This unit is likely the source of sediment that is observed in the channel in the lowest part of the basin near the waterfront.

Field reconnaissance results generally support the mapped extent of the Qtb, which forms a regional aquitard (e.g., a relatively impermeable geologic unit that prevents downward migration of water), but also suggest that the Qva is much thinner and less extensive in outcrop than indicated on the DNR map. Our reconnaissance found Qva above about 200 feet in elevation (around 9th Street). The total thickness was not determined, but till is present in the drainage from about 250 feet in elevation and above (near Loveland/8th Street, suggesting that Qva is only locally present and, where present, is generally not significantly thicker than about 50 feet).

CITY OF MUKILTEO
STREAM ASSESSMENT REACH SUMMARIES



Gully on right bank from stormwater outfall erosion.

Stream
Brewery Creek

Reach
5th Avenue to Loveland/8th

General Characteristics
Gradient: ≈ 0.08 ft/ft average
Valley Width: ~100 – 300 feet
Planform: Confined within valley, relatively straight only slight sinuosity
Avg width: ≈ 6 feet (ranges from 4 to 10)
Avg. depth: ≈ 2 – 3 feet
Substrate: small to medium gravel, with cobbles and some boulders. Substrate coarsens in the upstream direction from 5th Avenue.
Vegetation: Forested, mix of natives and non-natives. Lots of ivy near 5th Avenue.

Issues:
Unstable wet hillslopes, failed stormwater tightlines.

Figure 3 Map of Brewery Creek and summary of conditions

Seepage Observations

Seepage was noted along most of the length of the ravine traversed, on both side slopes at heights ranging from several feet above creek bed to about 20 to 35 feet above creek bed. Thirty-five feet is the practical extent of our ability to observe seepage from near creek bottom – seepage in areas of active landslides may extend higher but could not be directly assessed.

Site seepage, slope stability, and vegetation observations all suggest that the eastern ravine slopes are wetter than the west slopes, likely due to buried geologic contacts between the underlying Qtb and overlying Qva units that dip northerly and westerly. Groundwater moves easily downward through the permeable Qva, but when it reaches the impermeable Qtb, it flows laterally along the contact between the two units. Therefore, groundwater flow direction is influenced by the direction of dip of the aquitard (Qtb), and the apparent increased seepage on the easterly ravine slopes may be due to flow of groundwater along the top of the contact.

Slope Geomorphology

Slopes in the Brewery Creek ravine range from relatively stable, well-drained, and well-vegetated to bare, wet, and actively sliding slopes. Active slope processes in Brewery Creek include soil creep in areas where there is little seepage and good vegetative cover. This was observed on the reach between about North 5th Street and North 6th Street. Upstream, south of North 6th Street, the ravine side slopes are dominated by shallow colluvial and deep landslides. Fresh and re-vegetated slide scarps, irregular and benched terrain, tipped trees, and mounds of landslide debris were all noted in the ravine bottom and on the side slopes south of North 6th Street, suggesting that landslides periodically occur on the ravine slopes. The size of trees and other vegetation patterns suggest that some areas experience infrequent slides (many decades to centuries apart), and other areas experience smaller but more frequent slides (several decades apart). The majority of the recent and active slides appeared to be on the wetter eastern ravine slopes.

The contact of the Qva aquifer above the Qtb aquitard is regionally recognized as a highly slide prone area due to concentration of seepage along the contact. Slope failures initiating at this contact seepage zone often extend to well above and below the contact. Some slides at Brewery Creek were observed to extend from near the top of the steep ravine slopes, to the ravine bottom.

Stream Channel Characteristics

General stream channel characteristics are summarized in Figure 3. There was evidence of recent sediment deposition in the channel at the time of the stream walk, with sources presumed to be the hillslope and stream channel bank failures observed, particularly in the reach between 5th and Loveland. Sedimentation issues are particularly problematic near the mouth of Brewery Creek where the grade flattens and sediment naturally deposits. Upstream hillslope sources undoubtedly contribute to these conditions.

A few drainpipes were observed entering the channel from upslope locations along the flanks of the ravine. Typically, roof and residential drainage is collected and conveyed via pipes placed on top of the hillslopes and tight-lined directly to the stream channel in order to keep water off the unstable slopes to help prevent hillslope erosion and landslide activation. The effectiveness of these pipes is mixed and dependent on durability of the pipe material, pipe placement, and hillslope movement that is independent of the drainage discharge. Some of the pipes were broken, and one broken pipe has resulted in the erosion of a large gully (see Figure 3).

The stream channel upstream of 8th/Loveland flattens significantly and has a broader floodplain area, with wetland characteristics, including presence of wetland vegetation. Stream channel erosion in this reach is not currently a problem, nor would it be expected in the future.

Discussion

Brewery Creek ravine slopes are the site of groundwater discharge at elevations ranging from near creek bed to several tens of feet or more above creek bed, with seepage more prevalent on the eastern ravine slopes. The implication of the dipping aquitard (Qtb) for stormwater dispersal is that stormwater infiltrating in uplands near the ravine will result in subsurface flow that trends to the northwest and daylights within the ravine at or near the contact. Infiltration west of Brewery Creek is anticipated to have less direct impact on Brewery Creek ravine seepage and stability than water infiltration east of the creek.

The steep slopes are subject to shallow colluvial landslides, and in areas of groundwater seepage, are prone to deep-seated landslides. The degree of and type of landslide activity in the Brewery Creek ravine is typical of ravines in the region. Brewery Creek ravine slopes are inferred to be susceptible to instability caused by seepage. However, because not all of the slope areas are currently wet from seepage, increasing the amount of seepage could cause saturation of areas that are not currently wet. Consequently, we conclude that infiltration that results in increased seepage on the ravine slopes could have an adverse impact on the stability of the slopes. Stormwater infiltration on the slopes east of the ravine will have higher risks of increasing instability and erosion hazards than infiltration on the slopes west of the ravine.

Because of the sedimentation issues in the lowest reaches of Brewery Creek, it is important to consider stormwater management strategies that do not exacerbate existing hillslope instability. Measures should also be taken to correct existing discharges that are contributing to hillslope and stream channel erosion (e.g., the broken stormwater outfall pipe that has eroded a large gully on the east side of the ravine [see Figure 3]).

Upper Chennault Creek

Upper Chennault Creek originates as a single thread channel near Harbour Pointe Boulevard and flows through a wide forested ravine to Puget Sound (Figure 4). Except for a maintenance road crossing culvert and two BNSF railroad crossing culverts near the mouth, the stream flows unobstructed. Chennault Creek was walked from its mouth at Puget Sound to Harbour Pointe Boulevard.

Geologic Observations

The headwater and eastern end of the Upper Chennault Creek drainage originate on the gently rolling glacial till covered uplands. The incised ravine portion of the drainage begins west of Harbour Pointe Boulevard at an elevation of about 490 feet. The drainage trends westerly to the shoreline of Puget Sound.

Site geology (Figure 2) is mapped as Vashon glacial till (Qvt) mantling the uplands above about elevation 480 feet, underlain by Vashon advance outwash (Qva) extending to about an elevation of 220 feet. Below the Vashon outwash, Whidbey Formation (Qw) is mapped to about elevation 90 feet, near the shoreline. Double Bluff Drift (Qdb) is mapped from about elevation 90 feet to beach level. As noted elsewhere in the study area, geologic units exposed in the ravine bottom and limited sidewall exposures reveal geology different than the mapping suggests.

Our observations suggest that in the eastern portion of the drainage area, Vashon till mantles the generally west-dipping older units. Near Harbour Pointe Boulevard, the drainage cuts through more resistant basal glacial till (Qvt) and less resistant subglacial meltout till unit (Qvtm) that appears to regionally lie below the basal till capped uplands. The Qvtm unit commonly occurs as interbedded sandy till and silty outwash, and may occur as a transitional unit between Qvt basal till and Qva advance glacial outwash. The combined till units are relatively thin near Harbour Pointe Boulevard and, by about elevation 460 feet, pre-Fraser non glacial deposits are exposed in the creek bed. Farther to the west, the till sequence also appears to transition downward from basal till (Qvt) to subglacial meltout till (Qvtm).

Pre-Fraser non-glacial soils composed of organic rich silts and sands were exposed in the northwest trending portion of the creek bed that forms the upper reach of the drainage. These soils lie stratigraphically below the advance outwash (they are older than the Vashon glacial deposits), but occur topographically above the outwash. This unit may be the Olympia beds nonglacial deposits or the older Whidbey Formation (or potentially even older deposits). Both of these formations have been glacially overridden and their normal condition of consolidation is very dense or hard, however, we observed these to be fractured and highly deformed and softened in the creek bed exposures. The northwest trend of the reach is parallel to the northwest trend of the numerous fault strands of the SWIF zone, and this reach also aligns with other northwest trending drainage features including the southern end of Big Gulch Creek. This northwest trending alignment and evidence of post-depositional deformation suggests that this reach of Upper Chennault and Big Gulch Creeks follow a structurally weakened zone in the soils and has allowed for incision of the drainages along the weak zone. The significance of this to the project is that groundwater flow is often impeded by faults or can develop preferential flow paths. This also increases the potential for landslides in the deformed zones if soils have been fractured and weakened after the last glaciation. The timing of last movement in this suspect fault zone has not been determined, but the degree of softening and observations of partly open fractures suggests that it postdates the Vashon glaciation.

CITY OF MUKILTEO
STREAM ASSESSMENT REACH SUMMARIES

Upstream end of culvert under maintenance road.

Sediment deposition upstream of maintenance road culvert.

Stream
Upper Chennault Creek

Reach
Puget Sound to Harbor Pointe Blvd.

General Characteristics
Gradient: ≈ 0.07 ft/ft average, steeper below maintenance road (0.11 ft/ft), and gentle downstream of Harbor Pointe Blvd (~0.02 ft/ft)
Valley Width: ~400 – 800 feet
Planform: Confined within valley, fairly straight
Avg. width: ≈ 6 - 8 feet (ranges from 4 to 10)
Avg. depth: ≈ 4 feet
Substrate: Coarse gravel, sand and cobbles with some boulders.
Vegetation: Forested

Issues:
Unstable wet hillslopes, failed stormwater tightlines, sedimentation.

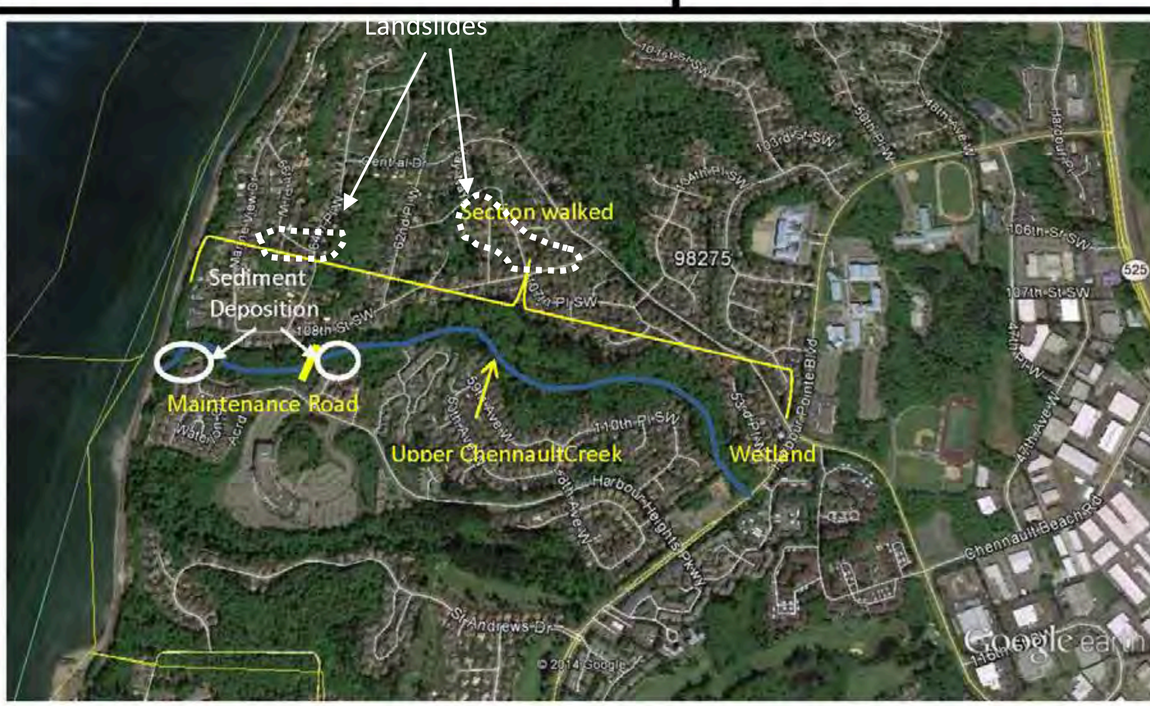


Figure 4 Map of Upper Chennault Creek and summary of conditions

Sandy colluvium and slide debris, likely derived from advance outwash, was observed on the ravine side slopes in the vicinity of approximately 450 to 350 feet in elevation. The actual subcrop elevation and thickness of this unit was not determined as no surface exposures were located.

Soils in the creek bed below the nonglacial unit are generally composed of pre-Fraser glaciolacustrine soils, to about elevation 325 feet, then pre-Fraser nonglacial sands and silts and clays to about elevation 225 feet, then older glacial clays and diamicts to elevation 190 feet (approximate location of the maintenance road crossing), then older glacial outwash to elevation 170 feet, then more older silts and clays of probably nonglacial origin to around elevation 100 feet, and, finally, more glacial silts and clays and diamicts to near sea level. Deposits of recent alluvium (Qal) are present upstream of culverts at the waterfront railroad embankment and at the access road crossing near 64th Place West.

The complicated transitions between multiple glacial and nonglacial units that were observed in the creek and ravine walls indicate either multi-layered and complex and varied stratigraphy and/or a folded and generally west dipping contact that brings a few glacial and non-glacial units repeatedly into and out of creek bed level.

Seepage Observations

Seepage or vegetation patterns indicating wet soils were observed in approximately the lower half (about 30 feet) of the height of the ravine in the lower reach of Upper Chennault Creek, generally west of 64th Place West. Seepage may extend higher up ravine slopes, but it was not observed during our reconnaissance and generally followed the creek bottom. Seepage from the ravine slopes was generally reduced to absent from about 64th Place West east to the vacant 61st Street West area. Seepage from ravine walls resumed upstream to about 58th Avenue West with seepage noted on the lower half of the ravine slopes. In the vicinity of 59th Avenue West, seepage was up to 50 feet above creek bed. Ravine walls became drier east toward the vacant 55th Avenue West area, then seepage into the creek bed resumed to Harbour Point Boulevard.

Seepage patterns indicate areas of perched water, interpreted to be where clay and other fine-grained soils extend up the ravine sidewalls, well above the ravine bottom. Where more permeable soils, such as pre-Fraser non-glacial sands (mapped as Whidbey Formation) or Vashon advance outwash (Qva) were observed on side slopes, seepage appeared to be lower, reflecting the higher permeability and generally better drainage characteristics of these units.

Slope Geomorphology

Geologic mapping (DNR) does not indicate the presence of landslide deposits within the ravine. However, our reconnaissance results indicate that shallow colluvial slides and deep-seated rotational slides are the dominant geomorphic processes on the taller and steeper ravine sidewalls. With the exception of areas where the ravine is shallow (near Harbour Point Boulevard and between 64th Place West and 62nd Place West), we noted steep headscarps (often that extend to the top of the ravine), side slope benches, blocks of disturbed soils, hummocky topography, and toe mounds of landslide debris. These all indicate active or recently active slope instability.

Stream Channel Characteristics

General stream channel conditions are summarized in Figure 4. Field observations of large volumes of deposited sediment and channel incision indicate that Upper Chennault Creek experiences high stream flows and is a high-energy system capable of moving large cobbles and debris under certain flows. Significant sediment deposition is occurring at two primary locations upstream of constrictions where the channel is routed through culverts. At both locations it appears that material has been removed by maintenance crews to prevent culvert blockage and potential failure of the road or railroad embankments.

Photo 1. Example of channel incision

Sediment observed in the depositional areas likely originates from two sources: landslides in the upper reach and the channel itself. Slope failures ranging from small slumps to deep-seated rotational landslides contribute sediment to the channel and result in deposition. Channel incision ranging from 4 to 8 feet is occurring downstream of 64th Place in several locations (see Photo 1).

Several attempts have been made to pipe stormwater runoff directly from upslope development to the stream channel to avoid discharging water onto steep and erosive slopes and potentially contributing to increased slope instability. As with Brewery Creek, these attempts have not been universally successful. Only one piped outfall to the stream appeared to be intact and functional. The remaining pipes were either constructed of ineffective drainpipe material that is thin and easily broken (Photo 2) or have been buried in sediment and are no longer functional (Photo 3).

Photo 2. Example of mangled drain pipe

The Upper Chennault drainage basin is relatively small (126 acres) and appears to only receive flows from single family residences on the very edges of the ravine that contains the stream channel. However, the conditions in the channel itself indicate otherwise and it is possible that stormwater flow from outside the mapped drainage basin is routed to Upper Chennault Creek.

Photo 3. Buried tightline

Discussion

Advance outwash may crop out on the site slopes, but not as a several hundred foot thick band as shown on DNR's regional geologic map. Sandy slide debris and colluvium suggest that advance outwash is present in the upper portion of the ravine sidewalls between about 59th Avenue West to vacant 57th Avenue West. A second band of sandy soils, interpreted to be a pre-Fraser sand unit, was observed in the lower reach of the creek in the vicinity of 64th Avenue

West to vacant 63rd Avenue West. Geologic units exposed in other portions of the ravine consist primarily of fine-grained (dominantly silty to clayey) soils.

Seepage heights on ravine slopes appear to generally conform to the elevation of the top of the fine-grained units. Where fine-grained perching units are topographically low, seepage from sidewalls is correspondingly low. Where fine-grained and perching units are high, seepage levels are topographically elevated.

Landslides are the dominant process on the steep portion of Upper Chennault Creek. Stormwater infiltration would potentially have a modest impact on the frequency and/or extent of landslides. The extent of landslide activity in Upper Chennault Creek ravine is average or slightly higher than typical ravines in this region. We conclude that the ravine slopes are susceptible to increased instability from stormwater infiltration. Piped stormwater inputs should be positioned so as to not exacerbate existing slope instability problems in the ravine. Many examples of failed attempts to tightline flow directly to the stream channel were observed in Upper Chennault Creek. These are likely privately owned pipes and would be the property owner's responsibility. Any future repair efforts and/or change in drainage should be designed to meet current engineering standards, and may require local and State permits.

The sediment derived from landslides in Upper Chennault Creek is transported by stream channel flows and deposited at locations where the gradient flattens, velocities slow, or constrictions or obstructions are present. The two culvert crossings (64th Avenue West and the BNSF railroad culverts) are two such depositional areas that should continue to be monitored and maintained to prevent blockage.

Lower Chennault Creek

Lower Chennault Creek originates as a single thread channel near Harbour Pointe Boulevard and flows through a wide forested ravine to Puget Sound (Figure 5). Other than the BNSF railroad culverts near the mouth, there are no culvert crossings in the stream channel. Lower Chennault Creek was walked from its mouth at Puget Sound to Harbour Pointe Boulevard.

Geologic Observations

Lower Chennault Creek is generally parallel to Upper Chennault Creek and lies about a quarter of a mile south. The setting is similar. The headwaters of Lower Chennault Creek consist of multiple branches that lie on the gently sloping, till-covered uplands. Incision of the ravine begins west of Harbour Pointe Boulevard at an elevation of about 490 feet. A short section flows northwest, then the ravine generally runs westward to near the shoreline where it bends and flows northwest. Near the shoreline, a small tributary joins from the north and the combined drainage proceeds west to the culvert below the railroad tracks.

Site geology (Figure 2) is mapped as Vashon glacial till (Qvt) mantling the uplands to about elevation 490 feet. Advance outwash (Qva) is mapped below the till, extending downstream to about elevation 220 feet. Whidbey Formation (Qw) is mapped below to about elevation 60 feet, then Double Bluff Drift (Qdb) to the shoreline.

Observations suggest that Vashon glacial till is present approximately as mapped on the uplands above an elevation of 450 feet. Abrupt incision of the drainage from elevation 490 feet to about 460 feet represents erosion of the more resistant basal till and creation of the knickpoint in the till-covered surface. Advance outwash is present as a west-dipping layer that crops out near creek bed level and extends midway up the ravine walls in much of the eastern third of the ravine. The base of the advance outwash appears to be locally conformable with the underlying silty and clayey transitional beds (Qtb) unit. The Qtb is much more erosion resistant than the overlying sandy Qva unit, and the top of the Qtb generally controls the elevation of the ravine bottom.

Older geologic units, including pre-Fraser non-glacial fine and coarse grained deposits with organic silt and peat beds, are exposed in the middle third of the stream reach. The western third exposes primarily pre-Fraser glaciolacustrine silts and clays and diamicts. We did not observe indications of significant thickness of sandy strata above the fine-grained units in the western half of the ravine.

Seepage Observations

Slopes above the creek bed in the eastern third of Lower Chennault Creek appear well drained and seepage was not generally evident. This reach of the drainage generally corresponds to the location of Vashon advance outwash that composes the majority of the slope height in this area. Seepage in the middle reach was also generally not evident during the reconnaissance. This portion of the drainage generally corresponds to areas of interbedded pre-Fraser non-glacial sand and silt units, with the sand units apparently improving drainage of these strata. Elevated seepage was noted in the western third of the ravine in a zone ranging from about 45 to 10 feet above the creek bed. This area corresponds to clayey glacial soils that form the ravine bed and walls.

CITY OF MUKILTEO
STREAM ASSESSMENT REACH SUMMARIES

Large landslide initiated in advance outwash glacial deposits. Note: This landslide is likely a spalling failure and caused by erosion of the toe of the slope by the creek, not seepage induced.

Stream
Lower Chennault Creek

Reach
Puget Sound to Harbour Pointe Blvd.

General Characteristics
Gradient: ≈ 0.10 ft/ft average, steeper below maintenance road (0.11 ft/ft), and gentle downstream of Harbor Pointe Blvd (~0.02 ft/ft)
Valley Width: ~200 - 400 feet
Planform: Confined within valley, fairly straight
Avg. width: ≈ 8 feet (ranges from 4 to 10)
Avg. depth: ≈ 2 - 4 feet
Substrate: Coarse gravel, sand and cobbles with some boulders.
Vegetation: Forested

Issues:
Active erosion and landslides, failed stormwater tightlines and stormwater outfall structures.

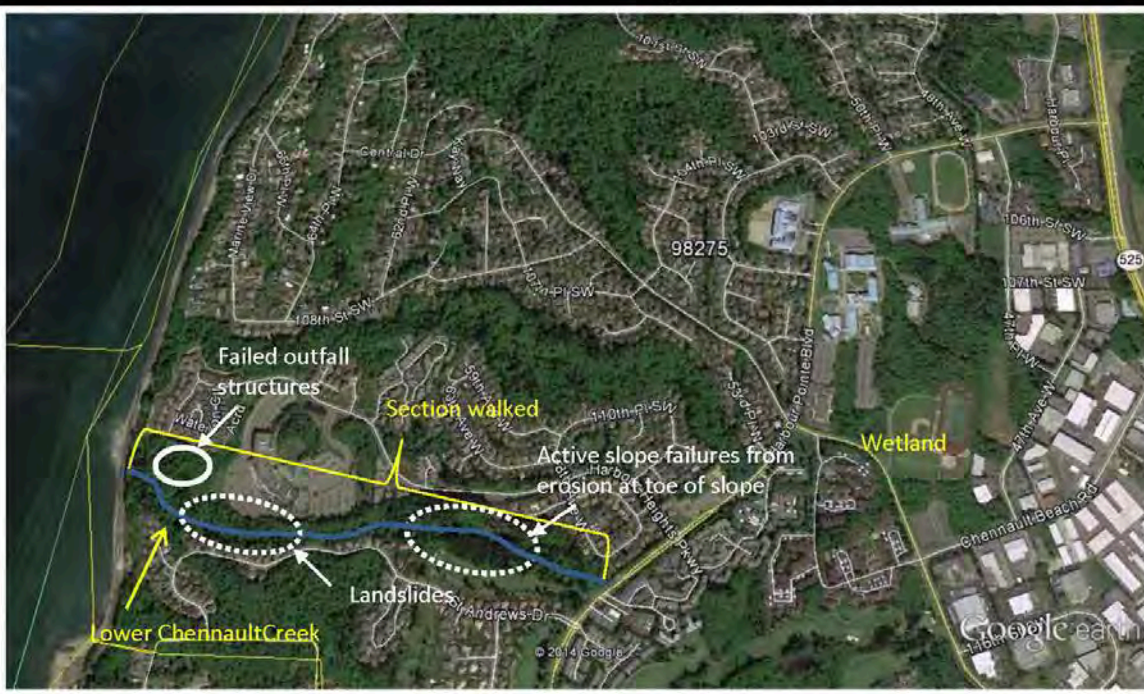


Figure 5 Map of Lower Chennault Creek and summary of conditions

Slope Geomorphology

Stability of Lower Chennault Creek ravine slopes ranges from poor to moderate, generally reflecting the level of groundwater and the drainage characteristics of the geologic units forming the ravine slopes. Numerous indicators of deep-seated and shallow colluvial landsides were noted in the westernmost portion of the drainage, specifically in the section within about 1,000 feet east of the shoreline. Indicators of past instability in this reach include land slide debris mounds, headscarps, and benched to hummocky landslide morphology. Slope soil in this reach appears to be generally fine-grained and, consequently, will perch groundwater. Slopes in this reach of the ravine were observed to be wet within at least 30 feet of the bottom of the ravine. This combination of geology, slope angle, and drainage produces high hazards for landslides.

Photo 4. Large trees above channel that have toppled as a result of hillslope spalling failures

East of this unstable westernmost reach, the ravine walls were noted to be better drained and exhibited little indication of seepage from side slopes. Vashon advance outwash soils compose significant portions of the slope stratigraphy. The presence of coarse-grained soils extending to near the bottom of the ravine results in improved drainage and, ultimately, more stable slopes. However, whereas seepage is not a factor in slope failures in the eastern part of the reach, there is active erosion and spalling that has exposed scarps and toppled trees (Photo 4). It is likely that the mechanism causing these slope failures is undercutting and erosion at the base of the slope by the channel. We interpret this section of the ravine to exhibit moderate hazards for landslides and instability due to seepage.

Stream Channel Characteristics

General stream channel conditions are summarized in Figure 5. Extensive sedimentation at the mouth and in other locations was not observed in Lower Chennault Creek, especially in comparison to Upper Chennault Creek. Additionally, channel incision, while present in some locations, was not as significant in Lower Chennault Creek as compared to Upper Chennault Creek.

Similar to the other streams walked, Lower Chennault Creek has many drainpipes and stormwater outfalls that have been piped directly to the channel. Only one appears to be functional.

Photo 5. Solid HPDE pipe

In one location, it appears that an original 24-inch corrugated metal pipe and control structure were installed to convey stormwater flows from development on the north side of the stream channel. This system is broken and other pipes have been installed to convey the flow, including a solid wall HDPE pipe. Erosion has occurred around the structures from uncontained flows and the solid wall HDPE pipe is bent upward (photo 5).

Discussion

Ravine slope stratigraphy consists of glacial till capping advance glacial outwash above pre-Fraser fine and coarse grained units. The thickness of the Vashon advance outwash is considerably less than the approximately 250-foot thickness indicated on geologic maps. Scattered outcrops and other indications suggest that it is likely on the order of up to 80 feet thick and occurs primarily in the eastern half of the ravine. Pre-Fraser sandy soils are exposed in the western half of the ravine's lower slopes, but the majority of the ravine walls in the western half are composed of fine-grained soils that generally perch groundwater. Little seepage was noted from ravine sidewalls in the central and eastern portions of the ravine – areas where Vashon advance outwash and/or other sandy soils were observed. Slope stability is generally low in the western third and moderate elsewhere.

We conclude that the Lower Chennault Creek ravine slopes are susceptible to increased instability from stormwater infiltration. The extent of landslide activity in the western third of the ravine is higher than average for ravines in this region. Landslide activity in the middle and eastern thirds are lower than average for the Mukilteo area. However, there are active and large spalling failures in the eastern third of the reach in the Vashon advance outwash. This slope instability is likely due to erosion at the toe of the slope through typical creek action. These failures have brought down larger fir trees that are currently spanning the valley at elevations of 15 to 30 feet above the channel bed (Photo 4). Additional trees will likely topple into the ravine as the slope continues to erode. Before considering the uplands around the middle and eastern reaches of the ravine as areas where infiltration could be safely implemented, additional site-specific studies would be required to assess whether unobserved seepage is contributing to the slope failures in the eastern third.

Smuggler's Gulch Creek

The Smuggler's Gulch basin extends from the western edge of Paine Field to Puget Sound (Figure 6). West of SR 525 (Mukilteo Speedway), Smuggler's Gulch Creek drainage flows through wetlands and ponds in a low gradient straightened drainage network confined by residential development on the upland plateau. The channel enters the Smuggler's Gulch ravine at Surrey Lane/57th Avenue West and rapidly deepens to the west as it cuts through the uplands to Puget Sound. Smuggler's Gulch Creek was walked from its mouth at Puget Sound to Surrey Lane.

Geologic Observations

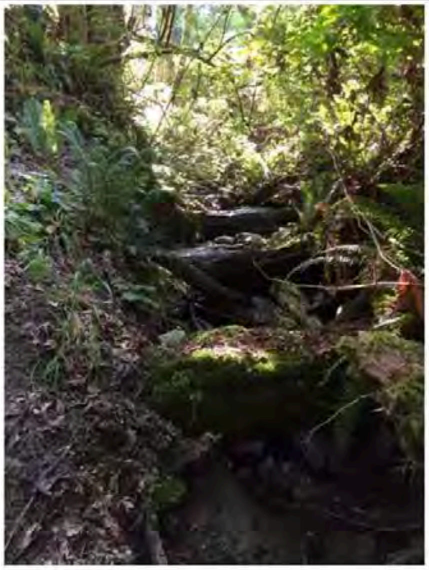
The geology of Smuggler's Gulch (Figure 2) is shown by DNR to consist of Vashon glacial till (Qvt) on the uplands. Surficial geology is mapped as Vashon advance outwash (Qva) near where the level uplands transition to a deepening ravine at approximate elevation of 330 feet (immediately downstream of Surrey Lane). The advance outwash is indicated to be about 100 to 150 feet thick and extends down to about elevation 200 feet. Below this, the Whidbey Formation (Qw) is mapped from about elevation 200 to 70 feet, then Double Bluff Drift (Qdb) from elevation 70 feet to sea level. Large individual landslides are shown on both the north facing and south facing slopes of the western half of the ravine.

Field observations indicate that the geology of the ravine where it is incised (west of 57th Avenue West) is significantly different than as mapped by DNR. We observed no evidence of Vashon advance outwash exposed in the ravine slopes. If Vashon outwash is present, it likely occurs as a thin stratum and is located below rip-rap placed for the culvert and Surrey Lane road crossing. From Surrey Lane to 56th Avenue West, soils exposed in the creek bed and incised inner ravine slopes near the creek bed are composed of glacially over-ridden silt and clay with scattered dropstones and layers of glacial diamict or glaciomarine deposits. West of 56th Avenue West and extending to near the mouth of Smuggler's Gulch at Puget Sound, soils in the bed and inner ravine slopes are composed of silty and clayey glaciolacustrine deposits. Landslide deposits were noted in many places on the slopes above the creek bed and extend into the creek bed below (west of) 61st Place West. Recent alluvium was present in a small delta that has formed east of the railroad tracks where storm flows were apparently impounded by the culverts below the railroad embankment.

Seepage Observations

Seepage was observed along the entire reach west of Surrey Lane. The creek bed upstream (east) of Surrey Lane is dry, suggesting that groundwater is locally shallow and occurs where perched atop low-permeability clay and till. The ravine deepens abruptly to the west and, by 56th Avenue West, seepage was observed 120 feet above the creek bed. In the lower (western) portion of this drainage, seepage was observed to extend at least 25 to 30 feet above the creek bed (the practical extent of our ability to assess seepage from near creek bottom), but, based on vegetation patterns, likely extends farther upslope. Seepage was observed at about elevation 120 feet on 61st Avenue West (the hillside road that descends to the mouth of Smuggler's Gulch), indicating that slopes throughout most of the ravine are wet with seepage occurring below a line generally extending from about elevation 120 feet near the mouth of the ravine to 340 feet at the eastern end by Surrey Lane.

CITY OF MUKILTEO
STREAM ASSESSMENT REACH SUMMARIES



Smuggler's Gulch Channel. Logs from previous forestry operations exposed in photo.

Stream
Smuggler's Gulch Creek

Reach
Puget Sound to Surrey Lane

General Characteristics
Gradient: ≈ 0.14 ft/ft average, gentler below 61st Place SW (~0.08 ft/ft)
Valley Width: ~50 - 300 feet
Planform: Confined within valley, fairly straight
Average BFW: ≈ 6 feet (ranges from 4 to 10)
Average BFD: ≈ 4 feet
Substrate: mixed cobbles, gravel and fines.
Vegetation: Forested

Issues:
Wet slopes, landslides.

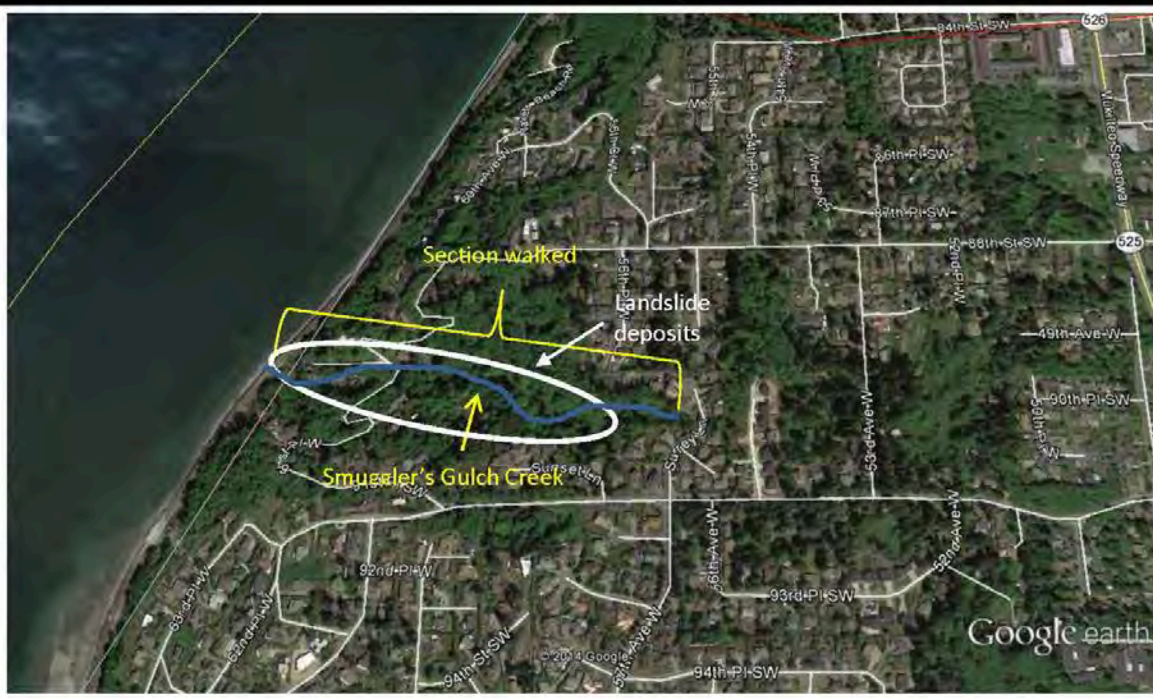


Figure 6 Map of Smuggler's Gulch Creek and summary of conditions

Slope Geomorphology

Geologic mapping (DNR) indicates two large but distinctive landslides are present in the lower portion of the ravine. Analysis of LiDAR topographic images and site observations suggest that the extent of the slope impacted by landslides is considerably more extensive than as mapped. Indications of landslides observed in Smuggler's Gulch include landslide debris in the creek bed and the narrow and incised inner ravine, tipped and rotated trees, benches and hummocky terrain on ravine side slopes, areas denuded of vegetation or covered with pioneering vegetation species, fresh soil exposures, or extensive seepage. The geomorphic evidence leads us to conclude that nearly all of the ravine sidewalls have been subject to pre-historic, deep-seated, and shallow colluvial landslides, with many areas of historic to currently active slides.

Stream Channel Characteristics

General stream channel conditions are summarized in Figure 6. Channel incision (up to 4 feet) is occurring in Smuggler's Gulch Creek downstream of 61st Place West as well as upstream, indicating that the channel experiences high, and perhaps frequent, flows. The presence of very large logs that were placed perpendicular to the channel during historical forestry operations has served to provide some grade control in certain locations, although the bed has eroded under these features in other locations. Between Surrey Lane and Puget Sound, Smuggler's Gulch Creek flows through 3 culverts: 61st Place Southwest, a private driveway upstream of the mouth, and the BNSF railroad crossing. Sediment is deposited upstream of each of these culverts, and material is removed by maintenance crews to maintain flow through the culverts in the public part of the system and prevent potential embankment failure.

At 61st Place Southwest, there is evidence that the stream routinely flows over the road during higher flows. This culvert has been reported as being undersized and is planned to be upgraded in 2015.

Discussion

Advance outwash may crop out in some areas of the ravine slopes, but is not a continuous layer as mapped. The majority of the soils observed in the reconnaissance consisted of landslide deposits on the ravine slopes and glaciolacustrine silt and clay in the creek bed and inner drainage. The presence of silty and clayey soils that compose the majority of the strata incised by the ravine creates a groundwater perching condition high in the ravine walls and uplands surrounding the ravine. Seepage is expected to occur along most of the ravine walls below a line extending from roughly 340 feet elevation at the eastern end to about an elevation of 120 feet at the western end. Slopes throughout the Smuggler's Gulch ravine are dominated by pre-historic to active deep-seated landslides. The extent of landslide activity in Smuggler's Gulch is greater than typical of ravines in the region.

The slopes are generally wet below the upper portions of the ravine sidewalls. Stormwater infiltration would increase the amount of seepage, but, because of the perching on clayey soils, this would occur primarily in already wet areas. A modest increase in water in already wet areas would have only a small but still negative impact on the overall slope stability, with potentially increases in the frequency and/or extent of landslides. We conclude that the ravine slopes are unstable and are susceptible to increased instability from additional stormwater infiltration.

Discussion and Recommendations

Several common characteristics were observed in the stream channels that were walked for this assessment, including:

- Unstable hillslopes above and adjacent to channels;
- Broken and non-functional stormwater outfalls; and,
- Sedimentation, mostly upstream of channel constrictions.

The degree to whether these characteristics constitute a problem depends on the setting and whether they represent a risk to human health, property, and/or aquatic habitat.

The BNSF railroad is located at the mouth of each stream channel. Deposition occurs in these locations (as it would with or without the railroad there), but it appears to be effectively managed by the railroad in all locations except Brewery Creek. Roads, the railroad, and infrastructure are all being affected by sediment deposition and flooding in the lower reaches of Brewery Creek. Maintenance staff conduct routine cleaning and sediment removal in order to maintain adequate capacity and flow paths to prevent flooding.

Other infrastructure and property could be at risk from stream and hillslope processes. Residences are generally located upslope, away from the channels. Although some appear to be constructed in landslide areas, it does not appear that channel processes would affect these homes in the near-term. None of the stream channels walked are recognized by the Washington State Department of Fish and Wildlife (WDFW) as critical habitat for anadromous fish and, as such, the observed degradation is likely not impacting critical in-channel fish habitat. However, WDFW listed Smuggler's Gulch Creek as having a modeled presence of Coho salmon, meaning that it is possible, though unconfirmed, that Coho are present in Smuggler's Gulch Creek.

Sediment Management

Upstream sources of sediment include both hillslopes (landslides, slumps) and channel erosion. The landslides are generally located in highly erodible geologic material or very wet areas and have initiated on steep slopes. The causal mechanisms of the landslides observed include multiple factors, and it is not unexpected for landslides to occur naturally in this type of terrain.

Channel incision is often the result of high flows of frequent occurrence and duration. Upstream stormwater management practices that control the peak volumes and minimize durations can help reduce channel erosion. There are some stormwater facilities present in each of the basins, but probably not of sufficient size to adequately control flows to prevent the observed erosion that is occurring.

In addition to landslides/slope failures and channel erosion, a third source of erosion is failed stormwater outfalls that were originally designed to prevent erosion. In all of the stream channels walked, there were numerous examples of corrugated plastic drainpipe that was installed by upslope residences to direct surface water runoff away from the hillslopes and route it directly to the channel. The drainpipe typically used is not strong enough to withstand damage from slope movement, toppled trees, and other factors that contribute to lost functionality. Even larger, sturdier pipe such as corrugated metal and solid wall HDPE have not retained the original functionality on the steep, unstable slopes present in all of the stream channels walked. Generally, tightlining water away from hillslopes and directly to stream channels is a good method of preventing erosion, however, poorly executed tightlines have resulted in the formation of gullies and new erosion features.

In general, management practices to reduce hillslope and channel erosion should continue. Specific best management practices (BMPs) include: (1) routing flow away from steep hillslopes in adequate infrastructure, and (2) controlling flows through implementation of stormwater management flow control BMPs.

Site-specific recommendations for repairing existing infrastructure and erosion include:

- Cut off solid wall HDPE pipe in Lower Chennault Creek so that it conveys flow.
- Repair tightline to Brewery Creek.
- Stabilize gullies that have formed as a result of failed stormwater tightlines in Brewery and Lower Chennault Creeks.
- Replace the 61st Place West culvert to improve capacity for flow and sediment in Smuggler's Gulch Creek.

Maintenance Recommendations

Sediment deposition will continue to occur in areas of constriction or flat topography. Sediment removal upstream of important infrastructure is necessary to prevent flooding and potential embankment failure. Locations where this is of particular concern include BNSF railroad crossings on Upper and Lower Chennault Creeks and Smuggler's Gulch Creek, 61st Place West, and the maintenance road located on Upper Chennault Creek.

Infiltrative BMPs

Shallow infiltration potential was determined to be poor or infeasible due to the presence of shallow glacial till in uplands and landslide hazards in the vicinity of the stream channels walked for this assessment. Areas of deep infiltration potential may remain possible within these drainage basins if sufficiently located away from the steep and unstable slopes and if a suitable infiltration receptor stratum is present at a feasible depth. However, this ravine geomorphic investigation generally corroborates the conclusions of the other Aspect investigations - when reviewed at a city wide scale (Aspect, 2015a) and in light of new subsurface soil and infiltration testing information (Aspect, 2015b), the feasibility of deeper infiltration appears low.

The ravine geologic and geomorphic reconnaissance visits conducted for this investigation have identified the need for improved surface geologic mapping and subsurface hydrostratigraphy in areas where additional stormwater infiltration is being considered. This investigation identified a number of areas where site geology and seepage conditions have created slopes that are sensitive to water loading under existing conditions. If stormwater infiltration is proposed in areas of identified data gaps and/or slope stability hazards, we recommend completing detailed geologic mapping of infiltration areas and ravine slopes and subsurface investigations. Subsurface investigations should focus on hydrostratigraphy and identify potential stormwater receptors, perching strata, and depth to groundwater. Mapping should include identifying geologic units that compose the uplands and the strata composing the ravine slopes (including strata below surficial mass wasting deposits), with emphasis on identifying perching strata and existing areas of seepage. Mapping should also include identifying existing landslides in the vicinity of the proposed infiltration sites and assessing the sensitivity of the individual slides to additional groundwater seepage. If results of expanded mapping suggest there is potential for safely infiltrating stormwater, the need for additional site-specific analyses should be evaluated on a case-by-case basis. These additional analyses could potentially include groundwater mounding analyses and numerical slope stability analyses.

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Aspect, 2015b. *Mukilteo Stormwater Management Plan – Stormwater Retrofit Hydrogeologic Investigation*. Prepared for Brown and Caldwell, January 29, 2015.

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Attachment A- Photo Logs

Brewery Creek Photo Log

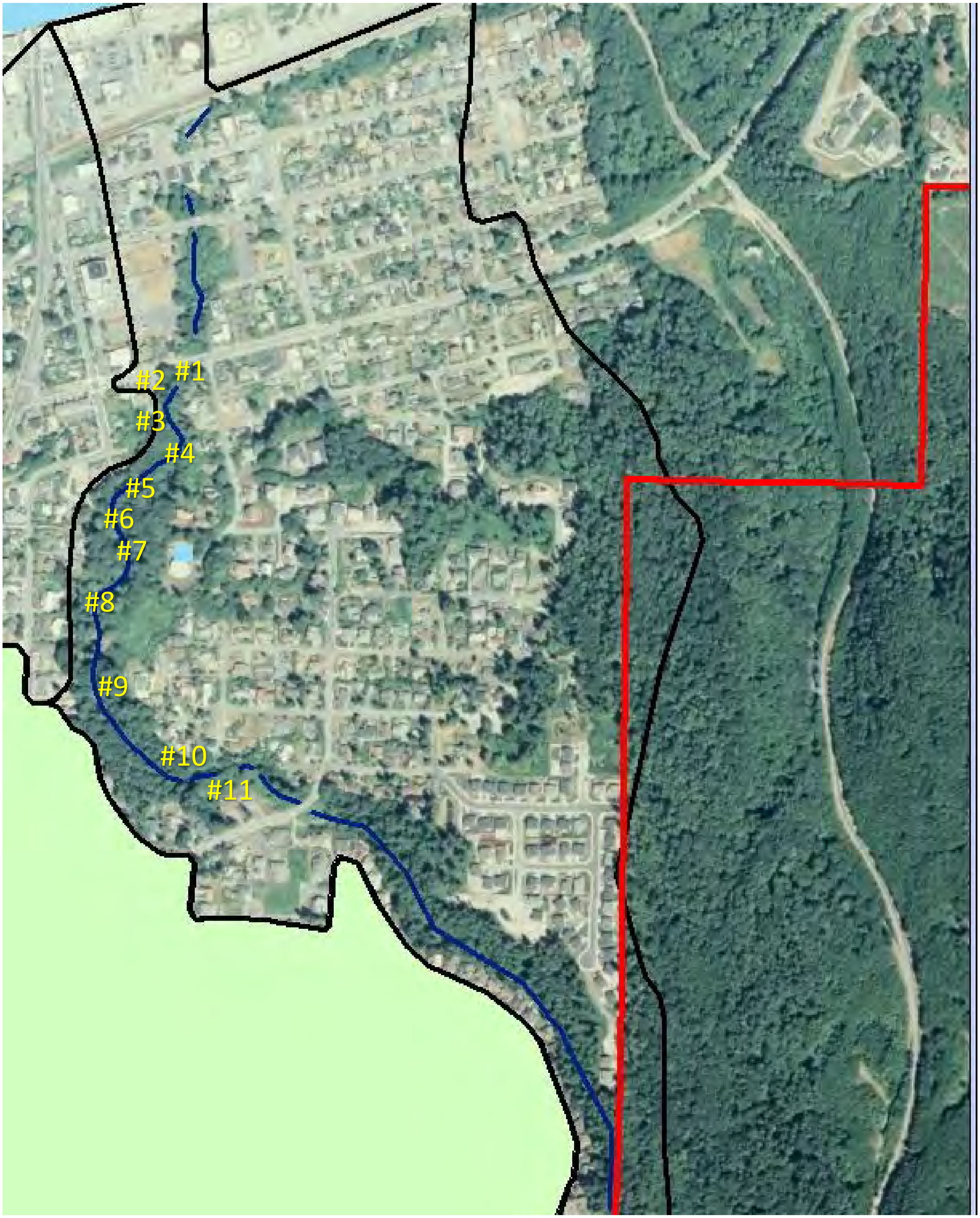


Photo #1. Looking downstream at 5th Avenue culvert crossing.

Photo #2. Near road crossing at 5th Avenue, looking upstream.

Photo #3. Looking upstream, recent sand deposition in channel opposite left bank slump.

Photo #4. Looking upstream, seepage on right bank.

Photo #5. Right bank slump.

Photo #6. Looking upstream. Valley is wider here, lots of downed trees.

Photo #7. Broken tightline and eroded gully on right bank approximately 50 feet east of channel.

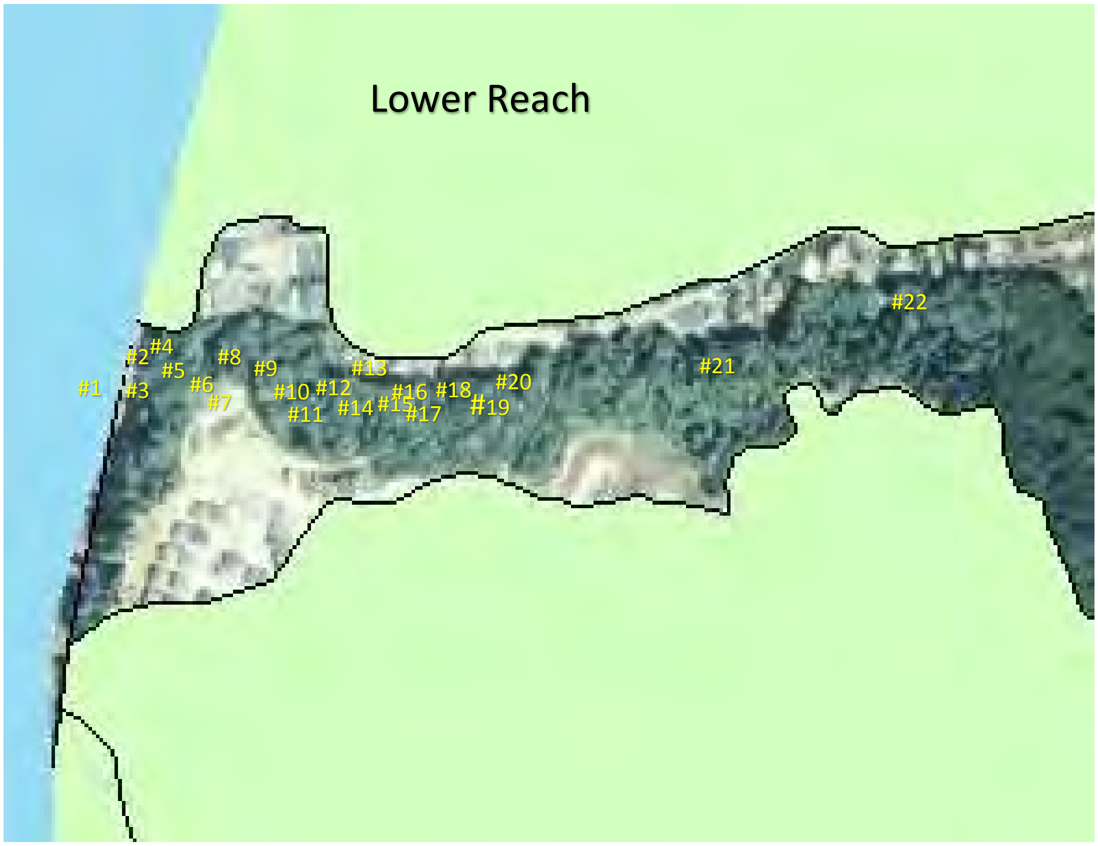
Photo #8. Wider valley. Residents appear to have done work in this area; non-native vegetation has been cleared and channel appears to have been dug.

Photo #9. Channel incised in landslide debris (landslide initiated from right bank).

Photo #10. Stream bed material much coarser moving upstream.

Photo #11. Broken tightline (12" corrugated black plastic) originating from left bank.

Upper Chennault Creek Photo Log



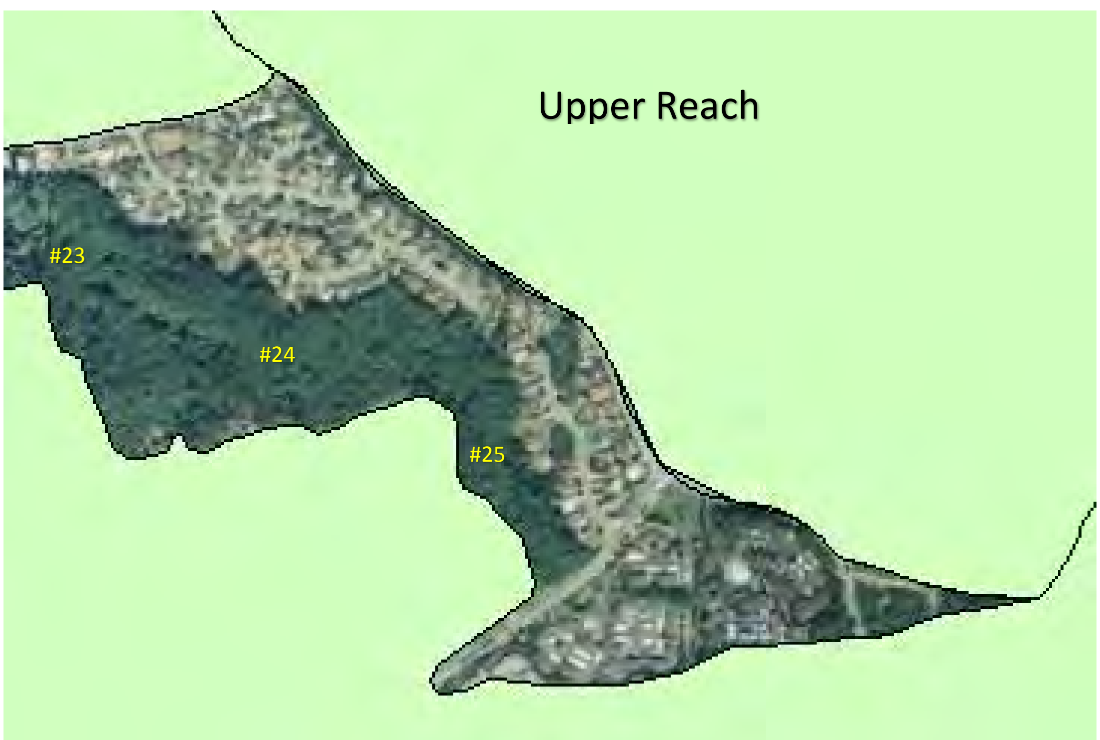


Photo #1. Looking north at mouth of Upper Chennault Creek.

Photo #2. Sediment accumulation on upstream side of culvert under BNSF railroad tracks. Cobble sizes range from 3 inches to 8 inches in diameter.

Photo #3. Delta formed near mouth (up to 2 feet above channel bed), upstream of BNSF railroad tracks.

Photo #4. Twelve-inch diameter solid wall polyethylene pipe (tightline) buried in sediment and debris.

Photo #5. Silt and clay bank material with occasional rounded gravel.

Photo #6. Example of damaged drain pipe in channel (many broken pipes were observed).

Photo #7. Left bank side channel.

Photo #8. Left bank side channel near top of slope.

Photo #9. Main channel.

Photo #10. Incised main stem channel.

Photo #11. Right bank broken drain pipe and T-section. Channel is incised about 8 feet in this location.

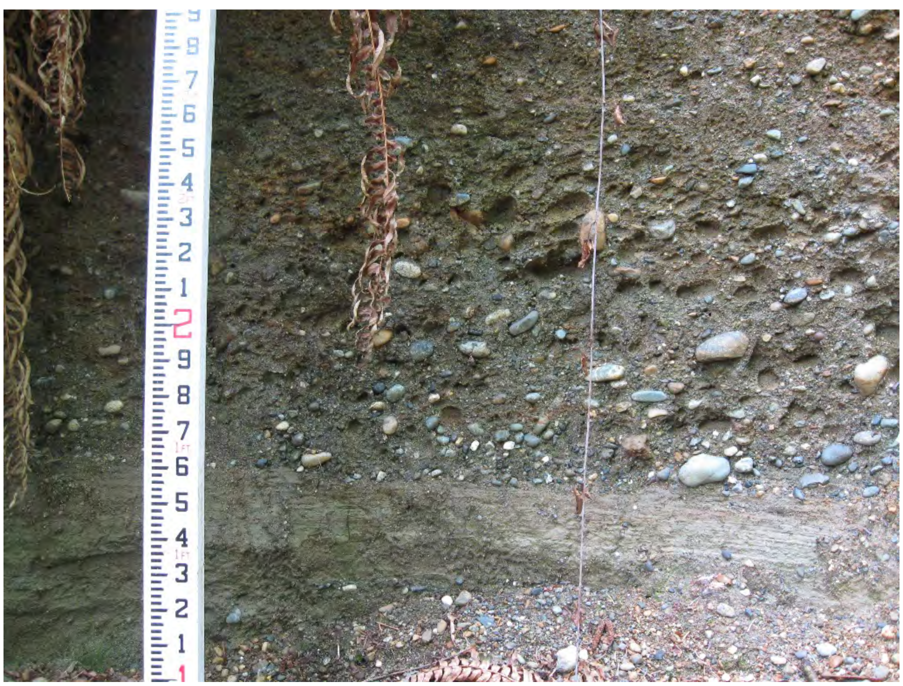


Photo #12. Glacial outwash on adjacent channel banks.

Photo #13. Right bank slope stabilization with rip-rap.

Photo #14. Downstream end of 3-ft diameter concrete culvert under access road.

Photo #15. Upstream end of 3-ft diameter concrete culvert.

Photo #16. Sand and gravel deposits upstream of culvert.

Photo #17. Stream channel cut through deposited sediment upstream of culvert.

Photo #18. Incised channel.

Photo #19. Glacial till.

Photo #20. Concrete block revetment on right bank.

Photo #21. Mainstem channel.

Photo #22. Right bank landslide and terrace.

Photo #23. 18-inch corrugated metal culvert on right bank (broken).

Photo #24. Gentler channel gradient, nearing top of ravine.

Photo #25. Channel bed near top of ravine in very wet area, exposing pre-Fraser non-glacial deposits.

Lower Chennault Creek Photo Log

Photo #1. Looking south at two 42-inch concrete culverts at low tide.

Photo #2. Upstream end of culverts under BNSF railroad tracks.

Photo #3. Looking upstream from culverts.

Photo #4. 24-inch corrugated metal pipe entering channel from right bank. Note HDPE has sag due to erosion of stream bed and hillslope on the left side of the photo.

Photo #5. Upslope on right bank from CMP outfall. Pipe entering manhole is broken and flow is going around manhole and eroding slope. Small diameter black drainpipe is also being used to route flow from upslope.

Photo #6. Downslope from manhole. Black drainpipe on left of photo and 12-inch HDPE on right.

Photo #7. Lots of wood in channel, storing sediment (gravel to boulder sized material).

Photo #8. Left bank 18-inch-diameter corrugated metal pipe with gabion outfall energy dissipation structure. Pipe is lined with interior plastic pipe.

Photo #9. Upstream of tributary channel/pipe. Wide channel, lots of cobbles and wood.

Photo #10. Pre-Fraser non-glacial deposit on right bank. Erosive hillslope.

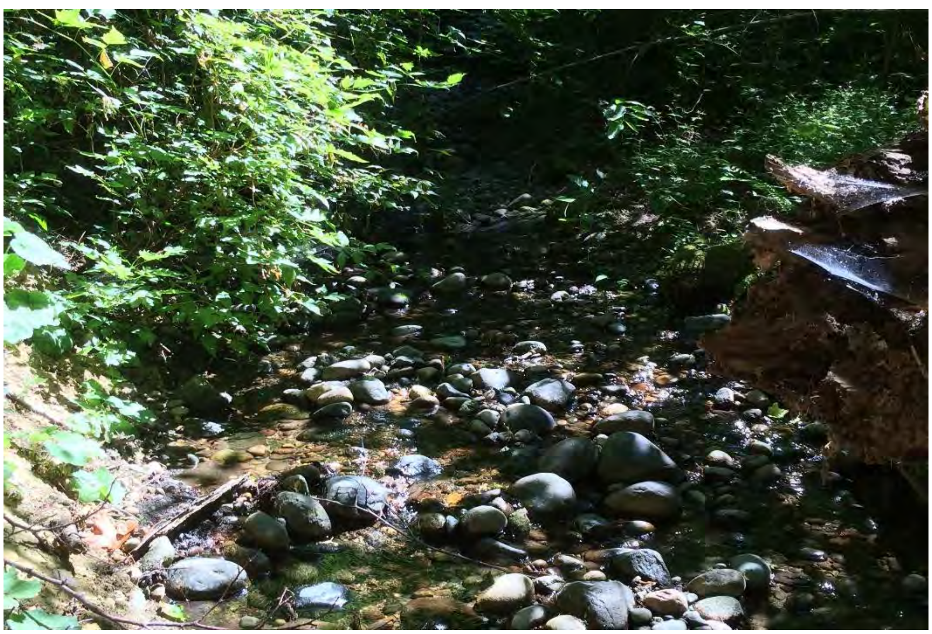


Photo #11. Channel, looking upstream.

Photo #12. Channel incised in clay.

Photo #13. Left bank drainpipe with pre-Fraser non-glacial deposit with erosion resistant hard peat layers in background.

Photo #14. Peat ledges in channel.

Photo #15. Close-up of peat ledge.

Photo #16. Glaciolacustrine deposits with iron staining on right bank (left side of photo).

Photo #17. Contact between Vashon advance outwash (Qva) (top, light brown) and Transitional beds (Qtb) lacustrine deposits (bottom, gray).

Photo #18. Channel with lots of wood, boulders and debris.

Photo #19. Right bank hillslope failures in advance outwash.

Photo #20. Spalling failure Landslide adjacent to channel on left bank.

Photo #21. Close up view of left bank landslide.

Photo #22. Channel grade break in clay just upstream of major slides.

Photo #23. Gentle grade near top of ravine and Harbour Pointe Drive (glacial till).

Smuggler's Gulch Creek Photo Log

Photo #1. Smuggler's Gulch Creek outfall to Puget Sound.

Photo #2. Upstream end of Smuggler's Gulch creek outfalls (30-in-diameter concrete culvert on right of photo and 18-in corrugated plastic culvert on left of photo).

Photo #3. Smuggler's Gulch Creek looking east from BNSF railroad tracks.

Photo #4. Squashed corrugated metal culvert under private driveway. Photo is from upstream end.

Photo #5. Upstream of private driveway culvert. Channel is incised in older landslide deposits.

Photo #6. Concrete block and rip rap slope stabilization on right bank.

Photo #7. Cut off logs adjacent to channel from previous restoration efforts or historical logging operations.

Photo #8. Solid wall pipe on left bank.

Photo #9. Culvert (24-in-diameter corrugated metal pipe) crossing under 61st Place SW. Culvert is perched 2 feet above the channel bed.

Photo #10. Upstream end of culvert from 61st Place SW.

Photo #11. Old logs from previous forestry operations.

Photo #12. Stream channel upstream of 61st Place SW. Old logs placed perpendicular to flow in channel bed.

Photo #13. Channel eroded underneath old logs.

Photo #14. Left bank tributary flow, originating as seeps.

Photo #15. Left hillslope seepage.

Photo #16. Steep narrow channel in glaciolacustrine deposits.

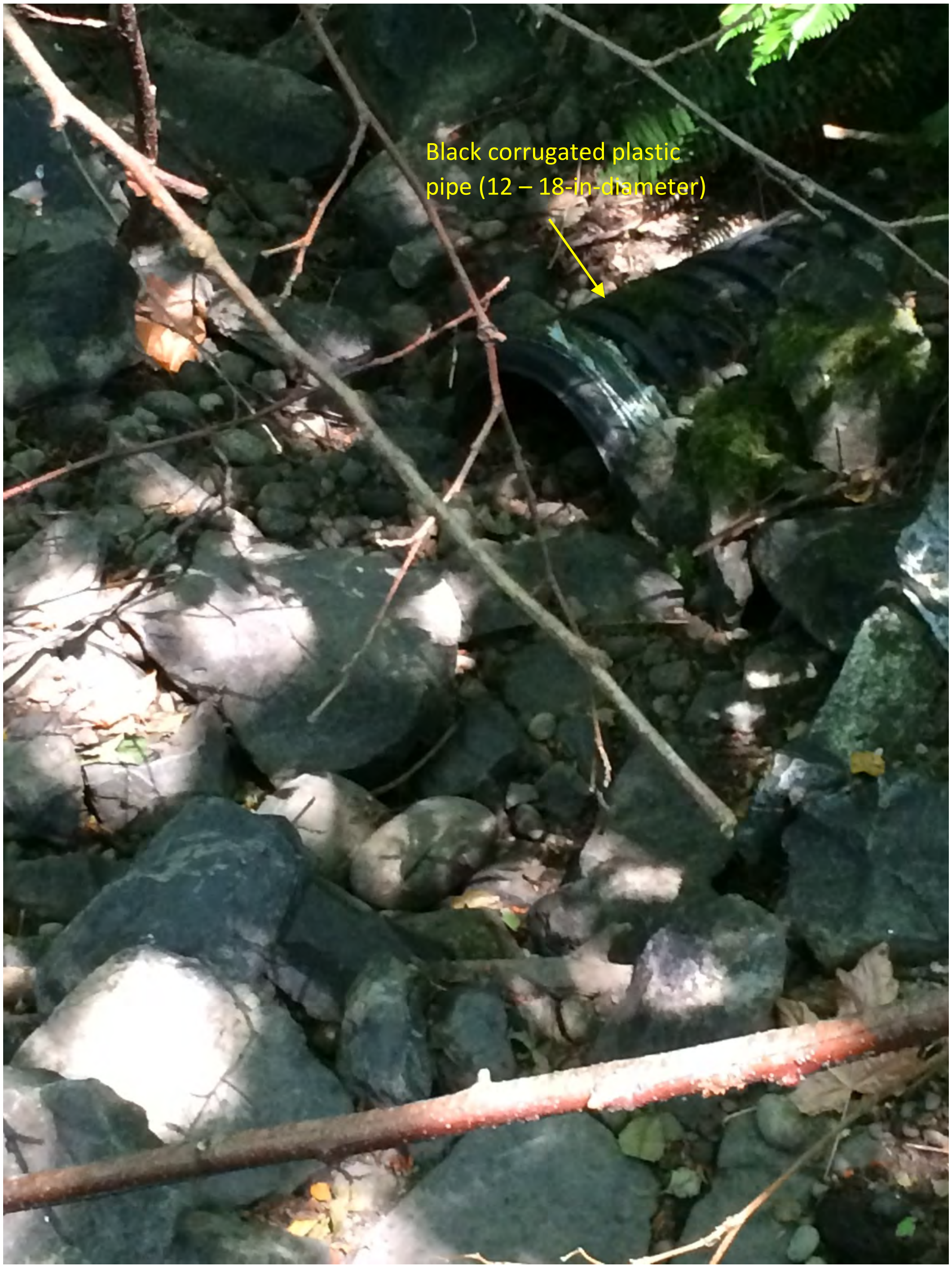


Photo #17. Near top of ravine. Coarser bed material (8 – 10-in diameter cobbles and 1 – 2-ft. diameter boulders). Pipe entering stream channel from left bank.

Photo #18. Squashed corrugated metal culvert under Surrey Lane.

Appendix D

Infiltration Feasibility Assessment

INFILTRATION FEASIBILITY ASSESSMENT

Stormwater Management Plan, Mukilteo, Washington

Prepared for: Brown and Caldwell

Project No. 130212 • January 29, 2015

earth + water

Aspect CONSULTING

INFILTRATION FEASIBILITY ASSESSMENT

Stormwater Management Plan, Mukilteo, Washington

Prepared for: Brown and Caldwell

Project No. 130212 • January 29, 2015

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Executive Summary

The City of Mukilteo is updating its 2001 Comprehensive Surface Water Management Plan. This plan will address the use of Low Impact Development (LID) approaches for stormwater management in order to reduce stormwater runoff. Since LID often incorporates stormwater infiltration, a City-wide assessment of infiltration feasibility was performed to provide the City a baseline for screening future LID approaches.

The feasibility of both shallow and deep infiltration was evaluated in this report. Shallow infiltration generally relies on vertical infiltration directly from the LID facility (typically a bioretention swale, tree-box, or pervious pavement) and is generally suitable in relatively flat areas with permeable surface soils. For this assessment, shallow infiltration feasibility was considered a function of surficial permeability, surface slope gradient, and steep slope hazards factors.

Deep infiltration is considered suitable when a permeable, unsaturated soil zone (referred to as a receptor horizon) exists beneath low-permeability surface soils. Deep infiltration systems use a deep well or trench to convey treated stormwater from the LID facility to the deeper permeable soils. For this assessment, deep infiltration feasibility was considered a function of steep slope hazards and potential for deep infiltration receptor horizon factors.

For each factor of shallow and deep infiltration feasibility, geographic information system (GIS) maps were created and the infiltration feasibility of combinations of the factors described above (referred to as hydrogeomorphic units) was evaluated. Maps of infiltration feasibility were created for the City and the results are summarized below:

- **Shallow Infiltration Feasibility**: Most of the City is not suitable for shallow infiltration due to the presence of low-permeability glacial till soils at the surface and/or proximity to steep slope hazards including landslides. There are small areas considered moderate or good for shallow infiltration scattered throughout the City.

- **Deep infiltration Feasibility**: Assessment of deep infiltration feasibility is uncertain in any specific City area because of the limited availability of reliable subsurface information. However, recently acquired regional data on the geology of the City's ravine slopes and deep explorations conducted for the City's Stormwater Retrofits program suggest a low potential for deep infiltration below most uplands portions of the City. Because of the potential for steep slope hazards including landslides, deep infiltration is generally not feasible along the City's shoreline and within or near the steep ravines and gulches found in the City.

The feasibility assessments provided in this report are suitable for identification and evaluation of potential stormwater infiltration solutions. Site-specific geologic and geomorphic mapping and subsurface explorations, infiltration testing, and additional analysis are recommended to verify the information that provides the basis for the assessments included in this report.

1 Introduction

The City of Mukilteo (City) is updating its 2001 Comprehensive Surface Water Management Plan. This plan will address the use of Low Impact Development (LID) approaches for stormwater management in order to reduce stormwater runoff. Since LID often incorporate stormwater infiltration, Aspect Consulting LLC (Aspect) conducted a City-wide analysis of infiltration feasibility and the potential effects of LID facilities on slope stability. The infiltration feasibility assessment provided in this report is intended to support stormwater management planning that will provide a baseline for screening potential LID approaches.

This City-wide infiltration feasibility assessment was initially based on readily available, pre-existing information. The assessment was then revised based on the results of a geomorphic investigation of four ravines (Altaterra and Aspect, 2014) that provided new data on regional geology, hydrostratigrahy, and steep slope hazards, and results of a subsurface hydrogeologic investigation completed for a stormwater retrofit program (Aspect, 2015) that provided new data on the depth and composition of deep hydrostratigraphic units.

The feasibility of both shallow and deep infiltration were evaluated in this assessment. Shallow infiltration generally relies on vertical infiltration directly from the LID facility (typically a bioretention swale, tree-box, or pervious pavement) and is generally suitable in relatively flat areas with permeable surface soils. If surface soils are relatively impermeable but underlain by a sufficiently thick unsaturated zone of permeable soils (referred to as a receptor horizon), the LID facility may be equipped with a deep well or trench that conveys treated stormwater to a deep infiltration drain. Deep infiltration drains convey water to the deeper unsaturated soils and improve the flow control (reduction in peak runoff) provided by the LID facility. Deep infiltration may be accomplished using dug drains (typically less than 20 feet deep) or drilled drains (typically between 20 and 150 feet deep). Deep infiltration drains may require permitting under the Washington State underground injection control (UIC) program.

Due to the history of landslides within the City, the proximity of potential infiltration facilities to steep slopes and landslide hazard areas is considered in this study.

1.1 Study Area

The location of the City of Mukilteo is shown on Figure 1. The study area for this assessment includes the City of Mukilteo and annexation areas (Study Area) shown on Figure 2. As shown on Figure 3 and the colorized topographic map in Figure A-1, the Study Area is generally a high plateau with elevations ranging from 400 to 600 feet above mean sea level (amsl) with steep bluffs dropping to Puget Sound along the northern and western boundaries of the City. The plateau is incised by a number of deep gulches or ravines, the primary ones being Big Gulch and Picnic Point Gulch.

2 Study Area Geology and Hydrogeology

This section summarizes the geology and hydrogeology of the Study Area. An understanding of the Study Area's surficial geology and hydrogeology is necessary to estimate soil properties and is a major factor in assessing the feasibility of potential infiltration approaches.

2.1 Geology

The surficial geology of the Puget Sound basin results from long periods of erosion and non-glacial sedimentation in depositional environments similar to those present today, punctuated by multiple glacial advances into the Puget Sound lowland. The most recent glaciation, the Vashon Stade of the Fraser glaciation, ended only about 13,000 years ago, and the resulting landform consists of glacially sculpted uplands composed of north to south elongated glacial drumlins and flutes, and waterways of Puget Sound. Post-glacial erosion has locally incised the uplands and created steep-sided ravines and steep bluffs near coastal areas and river valleys. Alluvial soils have been deposited in river and stream valleys since the end of the Vashon glaciation.

Figure 3 illustrates the surficial geology of the Study Area as presented by the Washington Department of Natural Resources (DNR; Washington DNR, 2014a) based on original geologic mapping by Smith (1976) and Minard (1982 and 1983). The geologic units that are present at the surface and in the shallow surface are divided into the following general categories (older to younger):

- **Older Glacial and Non-glacial Deposits:** The Possession Drift (Qpd), the Whidbey Formation (Qw) and the Double Bluff Drift (Qdb) are pre-Fraser in age and include both glacial and non-glacial deposits. In the Study Area, these deposits are found near sea level along the coastline and in low-lying areas of the ravines. Due to a relatively high percentage of fine soil particles and cementation, they are generally considered poor for infiltration.

- **Undifferentiated Units and Transitional Beds:** There are a number of geologic units of indeterminate age and origin (undifferentiated deposits) in the Study Area that include both Fraser and pre-Fraser deposits, including marine glacial drift (Qmg) and undifferentiated glacial till (Qtu). Also included in this group is the Transitional beds (Qtb), the geologic unit that marks the transition from Olympia non-glacial deposition to Vashon Stade glacial deposition. These units are found in the City's downtown area near the ferry dock and in the deeper portions of the ravines. Due to a relatively high percentage of fine soil particles and cementation, they are generally considered poor for infiltration.

- **Vashon Deposits:** Deposited during the Vashon Stade glaciation, these deposits include the following units (from oldest to youngest): advance outwash (Qva), a subglacial meltout till (Qvtm), basal (also known as lodgment) glacial till (Qvt), and recessional outwash (Qvr). The advance outwash is a predominately sandy unit mapped in the ravines and beneath the glacial till, which is generally considered relatively permeable. Subglacial meltout till is a unit formed by water reworking of sediments at the base of the melting glacier. Subglacial meltout till deposits are composed of outwash-like silty sand and gravel, and sandy till. The silty outwash strata occur as layers and lenses within the sandy till. The outwash-like interbeds may be moderately permeable, but they are poorly interconnected due to the presence of surrounding tills. The bulk permeability is low. The basal glacial till covers much of the high plateau area and generally consists of a dense mixture of silt, sand, and gravel considered relatively impermeable. Although not mapped anywhere within the Study Area, Vashon-age recessional outwash is often found above the glacial till and typically consists of relatively permeable sand and gravel.

- **Post-glacial (Recent) Deposits:** Deposited since the most recent glaciation, these deposits include alluvium (Qal), landslide deposits (Qls) and modified land (ml). The alluvial deposits occur in depositional areas of the gulches and can range from predominately silt to predominately sand with variable infiltration properties. The landslide deposits are considered unstable and not suitable for infiltration. Modified land generally refers to artificial fill and is primarily mapped along the Puget Sound shoreline within the Study Area.

Additional geologic and hydrogeologic information was obtained from the Washington Department of Natural Resources subsurface database (formerly GeoMap NW; Washington DNR, 2014a), over 100 geotechnical reports provided by the City, multiple reports provided by the Washington State Department of Transportation (WSDOT), and a number of reports describing explorations completed in the vicinity of the Boeing Plant north of Paine Field (Boeing Plant). Most of the reports found on the DNR database and provided by the City were for residential developments or minor infrastructure project and were primarily based on shallow explorations that did not extend more than 15 feet below the ground surface. Reports provided by WSDOT generally discussed shallow explorations. The explorations located north of Paine Field were generally deeper but were located outside the Study Area.

2.2 Study Area Glacial Till

One of the important parameters for determining the feasibility of deep infiltration is the thickness of the surficial glacial till. The thickness of this low-permeability deposit not only determines the depth of a deep filtration drain but also factors into the thickness of permeable unsaturated zone between the bottom of the glacial till and the water table in the advance outwash. Unfortunately, very few explorations within the Study Area penetrate the entire thickness of the glacial till in the upper plateau area. Regional data shows that glacial till rarely exceeds 50 feet in thickness, but there are borings outside the Study Area and generally associated with the Boeing Plant that suggest the glacial till is up to 200 feet thick. To help resolve this till thickness data gap and discrepancy and to assess specific sites for deep infiltration potential, several new borings were completed for the stormwater retrofit hydrogeologic investigation (Aspect, 2015). Based on the new hydrogeologic boring data, the basal till was observed to be anomalously thick (generally corroborating the data from the Paine field and Boeing borings), and it was found to locally grade downward and transition into the subglacial meltout till unit. Although the Aspect borings did not fully penetrate the subglacial meltout till, this unit may in turn grade down and lie above advance outwash, or any older deposits.

Based on the Washington DNR (2014b) mapping of the contact between the glacial till and the advance outwash, it appeared that the bottom of the glacial till would be generally encountered at an elevation of approximately 300 feet above mean sea level (amsl) in the northern portion of the Study Area and approximately 500 feet amsl in the southern portion of the Study Area. Data from the ravine geomorphic reconnaissance (Altaterra and Aspect, 2014) however showed that advance outwash is both thinner and more laterally restricted than indicated on the maps. It appears that the Qvtm unit was included as part of the Qva unit by the original mappers (Smith, 1976, Minard, 1982, and Minard, 1983). It should be noted that the advance outwash appears to be missing or quite thin in the northern portion of the Study Area between 12th Street and 88th Street SW, and is elsewhere generally thinner and lower in elevation than indicated by the geologic maps.

2.3 Hydrogeology

Based on our review of existing information, two hydrostratigraphic units of importance have been identified in the Study Area: near surface perched groundwater and the advance outwash aquifer. This section summarizes the characteristics and implications of these hydrostratigraphic units within the Study Area.

2.3.1 Near-Surface Perched Groundwater

The uppermost hydrostratigraphic unit in the Study Area consists of low-permeability surface and shallow subsurface soils that perch water. In particular, perched groundwater frequently occurs on the glacial till that covers most of the upland area of the Study Area. Depending on a variety of factors, such as facility size and horizontal permeability, groundwater mounding on glacial till can reduce the infiltration capacity of an LID facility by an order of magnitude or more in comparison with short term infiltration testing.

Perched groundwater may occur at any depth within the stratigraphic column where a low-permeability material is encountered. These perched units are typically thin and discontinuous. The uppermost groundwater aquifer of regional extent and importance for deep infiltration occurs in the advance outwash (Qva), which, where present, lies beneath the low-permeability glacial till and subglacial meltout till.

2.3.2 Advance Outwash Aquifer

There are very few wells within the Study Area that appear to intersect this Qva regional aquifer, and the elevation of the water table is poorly defined. A number of explorations east of the northern portion of the Study Area suggest the water table is located at an elevation of approximately 350 feet amsl. Perennial creeks and other natural water bodies are often a reflection of the groundwater table. Since many of the creeks found in the incised gulches within the City limits are mapped with headwaters at an elevation of 350 to 400 feet amsl, this evidence suggests that groundwater occurs near or above this elevation. Some streams are mapped with headwaters at higher elevations but generally are mapped as glacial till and may reflect runoff from till covered uplands and drainage of perched groundwater. Our initial analysis regarding the feasibility of deep infiltration assumed based on map units that the advance outwash groundwater table generally occurs in the range of 350 to 400 feet amsl beneath the high plateau and drops steeply to sea level near the shoreline. Based on new ravine reconnaissance and hydrogeologic boring data (Altaterra and Aspect, 2014, and Aspect 2015), our revised analysis assumed that the advance outwash is deeper and/or saturated or not present below much of the high plateau area.

3 Infiltration Feasibility Assessment

Aspect assessed infiltration feasibility by evaluating factors that affect infiltration potential and identifying hydrogeomorphic units defined by unique combinations of these factors. The infiltration feasibility assessment included the following factors:

- Surficial geology/gross unit permeability;
- Surface slope gradient;
- Proximity to steep slope hazard areas; and
- Potential for deep infiltration receptor horizon.

These factors are described in more detail in the sections that follow. Different combinations of these factors were used to define shallow and deep hydrogeomorphic units and each unique hydrogeomorphic unit was evaluated for infiltration feasibility. Maps of deep and shallow infiltration feasibility were created based on the geographic distribution of the hydrogeomorphic units.

3.1 Evaluation of Infiltration Factors

This section summarizes the evaluation of the infiltration factors used in the assessment.

3.1.1 Surficial Geology/Permeability

Mapped surficial geology is important as it helps assess the permeability of the surface soils and is a major factor in the feasibility of shallow infiltration. Surficial geology for the Study Area is discussed in Section 2.1. Each of the geologic units included within the Study Area were categorized into broad permeability[1] categories, as follows:

Moderate permeability (2-10 inches/hour):

- Alluvium (Qal)
- Vashon Advance outwash (Qva)

Poor permeability (0-2 inches/hour):

- Modified Land/Artificial Fill (ml)
- Landslide deposits (Qls)
- Vashon Glacial Till (Qvt)
- Transitional beds (Qtb)
- Marine glacial drift (Qmg)
- Till, undivided (Qtu)
- Possession Drift (Qpd)
- Whidbey Formation (Qw)
- Double Bluff Drift (Qdb)

[1] Permeability is a measurement of the ability of a porous geologic unit to transmit water, expressed here as velocity in inches per hour.

These categories were based on experience with similar soil and rock units in the Puget Sound lowlands. None of the geologic units mapped in the Study Area are deemed to possess good permeability (greater than 10 inches/hour).

Based on the geologic mapping discussed in Section 2.1 and the permeability categories discussed above, a map of surface permeability is provided on Figure A-2. As shown on the figure, most of the Study Area has poor surficial permeability due to the presence of glacial till across most of the high plateau and older geologic units along the shoreline. Portions of the high plateau and gulches are underlain by advance outwash and are mapped as having moderate permeability.

3.1.2 Surface Slope Gradient

Surface slope is a factor in determining the potential for shallow infiltration to migrate along a perching layer and daylight at the ground surface or in a crawl space/basement down slope from the infiltration facility. Potential adverse impacts include:

- Flooded or wet crawl spaces or basements;
- Standing water and/or flooding;
- Inundation of drain fields;
- Retaining wall failure due to saturation of soils; and
- Near field surface seepage.

In addition, LID facilities are generally more expensive to construct on steeper slopes due to the addition of check dams, embankments, and retaining structures.

Surface slope was calculated based on LiDAR elevation data (Puget Sound LiDAR Consortium, 2004). The Study Area was divided into the following surface slope gradient categories:

- **Good:** Less than 8 percent;
- **Moderate:** Between 8 percent and 20 percent;
- **Poor:** Greater than 20 percent.

The definition of these categories is generally based on our observations of slopes that typically have water seepage issues. For the Study Area, as shown on Figure A-3, the high plateau area is predominately less than 20 percent gradient and the gulches are predominately greater than 20 percent gradient.

3.1.3 Steep Slope Hazard Areas

Increased groundwater recharge can, in some situations, increase the potential for slope movement. Therefore, infiltration facilities generally should not be located close to slopes that may be susceptible to accelerated slope movement processes including landslides (referred to as steep slope hazard areas). Ideally, a complete geotechnical analysis of slope stability, which typically includes consideration of slope geometry, geology, and groundwater elevations, would be conducted before locating an infiltration facility near a sensitive slope.

Since this is a general scoping study and specific infiltration facility locations are not known, a complete geotechnical assessment is not warranted at this time. Instead, this assessment relied on mapping of slopes that have been found to be steep enough to be generally sensitive to increased water loading and may possess elevated landslide hazards. In general, this steep slope hazard area was defined as slopes steeper than 20 percent plus a buffer of 50 feet adjacent to those slopes. The steep slope determination used a smoothed topographic model to eliminate the very low height slopes that are not believed to be significant hazard areas for this regional analysis.

For this analysis, the Study Area was divided into the following Steep Slope Hazard categories:

- **Steep Slope Areas:** Slopes of 20 percent or greater, plus a 50-foot buffer, and any mapped landslide areas.
- **Other Areas:** All areas that do not fall within the above Steep Slope classification.

The resulting steep slope hazard area map (Figure A-4) was compared to the City of Mukilteo's Geologic Sensitive Areas map (City of Mukilteo, 2015) to confirm that it incorporates the general areas identified by the City as very high or high landslide hazard. It also includes areas mapped by Washington DNR (2014b) as landslides. These Steep Slope and Other Areas categories should be considered guidelines that generally identify the potential steep slope hazard associated with increased infiltration. The actual risk depends on the amount of infiltration and site-specific geology and groundwater conditions. Any proposed infiltration facility should be evaluated by a qualified geotechnical professional regarding the potential impacts on landslide hazard areas. Site-specific explorations and slope stability modeling may be necessary to evaluate the landslide hazard.

For the Study Area, as shown on Figure A-4, most of the high plateau area is mapped as Other Areas indicating low potential for slope hazards while the ravines and bluffs above Puget Sound are mapped as Steep Slopes, having greater potential for slope movement hazards. It should be noted that this assessment does not account for the potential for groundwater increase that might result if stormwater infiltration was significantly increased within a particular area. Because of the uncertainty regarding the potential rise in groundwater elevations and the potential to impact the slope hazard zones, slope stability evaluations are recommended if significant infiltration facilities are planned.

3.1.4 Potential for Deep Infiltration Receptor Horizon

Deep infiltration is suitable when a permeable, unsaturated soil horizon exists beneath low-permeability surface soils. Given the geologic setting of the Study Area, this permeable unsaturated zone generally occurs in the advance outwash deposits beneath the glacial till and above the advance outwash aquifer (i.e., the unsaturated portion of the advance outwash). The potential for a suitable thickness of unsaturated advance outwash depends on the elevation of the aquitard units that lie below the advance outwash, the thickness of the glacial till and subglacial meltout till that lies above advance outwash, and the depth to groundwater at each location within the Study Area.

As discussed in Section 2, the thickness of the Study Area's glacial till has been found to be greater than normal for the region, the advance outwash has been found to be thinner and less extensive than indicated by geologic maps, and the depth to groundwater is highly uncertain due to the limited availability of reliable deep subsurface information within the Study Area.

Therefore, the approach used in this assessment is based on the assumption that the glacial till is on the order of 100 feet thick, lies above subglacial meltout till, and the water table is at an elevation of approximately 400 feet amsl beneath the high plateau area and approximately 350 feet amsl near discharge zones such as the gulches and ravines and Puget Sound Shoreline. Based on these assumptions, the Study Area was divided into the following zones (refer to Figure A-5):

- **Moderate potential for a deep infiltration receptor horizon:** Plateau areas that are above an elevation of approximately 400 feet amsl near discharge zones and above 450 feet amsl further from discharge zones were mapped as having a moderate potential for a deep infiltration receptor horizon;
- **Low potential for a deep infiltration receptor horizon:** Plateau areas near discharge zones below an elevation of approximately 400 feet amsl were mapped as having a low potential for a deep infiltration receptor horizon, and areas that appear to be groundwater discharge areas based on elevation and or the presence of streams were mapped as having a lower potential for a deep infiltration receptor horizon.

Based on the new site data (Altaterra and Aspect, 2014, and Aspect, 2015) and criteria described above, we did not identify any areas that were considered high potential for deep infiltration receptor horizon. These deep infiltration receptor horizon category definitions were developed for planning level purposes. For specific sites, they would require adjustment based on actual site surface and subsurface information, and potentially, results of site-specific mounding analysis.

3.2 Hydrogeomorphic Units

Each unique combination of the infiltration feasibility factors defines a hydrogeomorphic unit, as listed in Tables 1 (shallow infiltration) and 2 (deep infiltration). As discussed below, different factors were used to define hydrogeomorphic units for the shallow and deep infiltration feasibility assessments. The infiltration feasibility for each hydrogeomorphic unit was evaluated and then categorized based on a combination of infiltration potential surface slopes, and potential hazard. Based on the geographic distribution of the hydrogeomorphic units, Figures 4 and 5 were created to show the deep and shallow infiltration feasibility, respectively, throughout the Study Area.

3.2.1 Shallow Infiltration Hydrogeomorphic Units

Shallow infiltration feasibility is a function of the following factors:

- Surficial geology/permeability;
- Surface slope gradient;
- And proximity to steep slope hazard areas.

Table 1 identifies each of the hydrogeomorphic units and the respective infiltration feasibility for shallow infiltration. There is a potential for up to 12 unique hydrogeomorphic units. Each of the hydrogeomorphic units was assigned to one of the following shallow infiltration classifications:

Good: Hydrogeomorphic units were categorized as good if shallow infiltration is considered both feasible and unlikely to pose any significant hazards. Generally, LID facilities located on relatively flat areas with effective infiltration rates greater than 2 inches/hour are generally considered feasible. (Note that the effective infiltration rate can be a function of both soil permeability and groundwater mounding.)

The only hydrogeomorphic unit categorized as good for shallow infiltration met the following criteria:

- Low steep slope hazard;
- Good surface slopes (less than 8 percent); and
- Good or moderate surface soil permeability.

Moderate: Hydrogeomorphic units were categorized as moderate if infiltration was considered feasible but may be less effective and/or there was a slight potential for adverse impacts. This classification was generally applied to hydrogeomorphic units that do not meet the criteria for the "good" classification but do meet all of the following criteria:

- Low steep slope hazard;
- Good or moderate surface slopes (less than 20 percent); and
- Good or moderate surface soil permeability.

Poor: Hydrogeomorphic units were categorized as poor if the infiltration feasibility is likely to be low or there are potential adverse impacts. This classification was generally applied to hydrogeomorphic units with elevated steep slope hazard that met one or more of the following criteria:

- Poor surface slope (greater than 20 percent); and
- Poor surface soil permeability.

As shown on Figure 4, many areas were determined to be infeasible for shallow infiltration due to proximity to steep slope hazards, which may result in elevated landslide hazards. Although infiltration is not recommended in these areas, lined LID facilities may be feasible to provide water quality treatment.

3.2.2 Deep Infiltration Hydrogeomorphic Units

Deep infiltration feasibility is a function of the following factors:

- Steep slope hazard areas; and
- Potential for a deep infiltration receptor horizon.

Table 2 identifies each of the deep infiltration hydrogeomorphic units and the respective deep infiltration feasibility. There is a potential for up to six unique hydrogeomorphic units.

Each of the hydrogeomorphic units were assigned to one of the following deep infiltration classifications:

Good: Hydrogeomorphic units would be categorized as good if deep infiltration is likely to be both feasible due to the higher potential for a deep infiltration receptor horizon and low potential for impacting steep slope hazard areas. Generally, deep infiltration drains are considered effective if they have a capacity of at least 50 gallons/minute (0.11 cubic feet/second) and are less than 100 feet deep or a capacity of at least 20 gallons/minute (0.045 cubic feet/second) and are less than 20 feet deep.

The “good” classification would be applied to hydrogeomorphic units that meet the following criteria:

- Low steep slope hazard; and
- Higher potential for a deep infiltration receptor horizon.

Moderate: Hydrogeomorphic units were categorized as moderate if deep infiltration may be feasible and there is a low potential for impacting steep slope hazard areas. This classification was generally applied to hydrogeomorphic units that do not meet the criteria for the “good” classification but do meet the following criteria:

- Low steep slope hazard; and
- Moderate potential for a deep infiltration receptor horizon.

Poor: Hydrogeomorphic units were categorized as poor if deep infiltration is unlikely to be feasible or there is the potential for adversely impacting steep slope hazard areas. This classification was generally applied to hydrogeomorphic units that meet one or more of the following criteria:

- Elevated steep slope hazard; and
- Low potential for a deep infiltration receptor horizon.

The feasibility for deep infiltration in the City is limited, as shown on Figure 5. The upland areas of the City were determined to mostly have a moderate feasibility for deep infiltration. Mapped wetland areas should be considered as infeasible for deep infiltration. In addition, areas near steep slope hazards were determined to be infeasible for deep infiltration.

4 Summary of Results

This section presents the results of the infiltration feasibility assessment for the City of Mukilteo and the annexation area (i.e., the Study Area). Maps of infiltration feasibility were created and the results are summarized below:

- **Shallow Infiltration Feasibility:** As shown on Figure 4, most of the City is not suitable for shallow infiltration due to the presence of low-permeability glacial till soils at the surface and/or proximity to steep slope hazards. There are small areas considered moderate or good for shallow infiltration scattered throughout the city.
- **Deep infiltration Feasibility:** Although the assessment of deep infiltration feasibility is made less certain due to the limited availability of reliable subsurface information, available data suggest that there are no areas of high potential. As shown on Figure 5, deep infiltration has moderate potential in upland portions of the City. It is unlikely that deep infiltration is feasible along the Study Area’s shoreline, within wetland areas, and within or near the steep ravines and gulches in the City.

The feasibility assessments provided in this report are suitable for identification and evaluation of potential infiltration solutions. Additional subsurface explorations, infiltration testing, and analysis are recommended to verify the information that provides the basis for the assessments included in this report and to refine the analysis for site-specific infiltration target areas of interest.

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Limitations

Work for this project was performed and this report prepared in accordance with generally accepted professional practices for the nature and conditions of work completed in the same or similar localities, at the time the work was performed. It is intended for the exclusive use of Brown and Caldwell and the City of Mukilteo for specific application to the referenced study area. This report does not represent a legal opinion. No other warranty, expressed or implied, is made.

TABLES

Table 1. Shallow Infiltration Hydrogeomorphic Units

Project #130129, City of Mukilteo
Mukilteo, Washington

Geology/Permeability
G2 = Moderate Permeability
G3 = Poor permeability

Proximity to Steep Slope Hazard Area
SH1 = Low Hazard
SH2 = Elevated Hazard

Surface Slope
S1 = Good: <8%
S2 = Moderate: 8-20%
S3 = Poor: >20%

Hydrogeomorphic Unit	Geology/ Permeability	Surface Slope	Proximity to Steep Slope Hazard Area	Shallow Infiltration Feasibility
G2-S1-SH1	G2	S1	SH1	Good
G2-S1-SH2	G2	S1	SH2	Poor
G2-S2-SH1	G2	S2	SH1	Moderate
G2-S2-SH2	G2	S2	SH2	Poor
G2-S3-SH1	G2	S3	SH1	Poor
G2-S3-SH2	G2	S3	SH2	Poor
G3-S1-SH1	G3	S1	SH1	Poor
G3-S1-SH2	G3	S1	SH2	Poor
G3-S2-SH1	G3	S2	SH1	Poor
G3-S2-SH2	G3	S2	SH2	Poor
G3-S3-SH1	G3	S3	SH1	Poor
G3-S3-SH2	G3	S2	SH2	Poor

Table 2. Deep Infiltration Hydrogeomorphic Units

Project #130129, City of Mukilteo

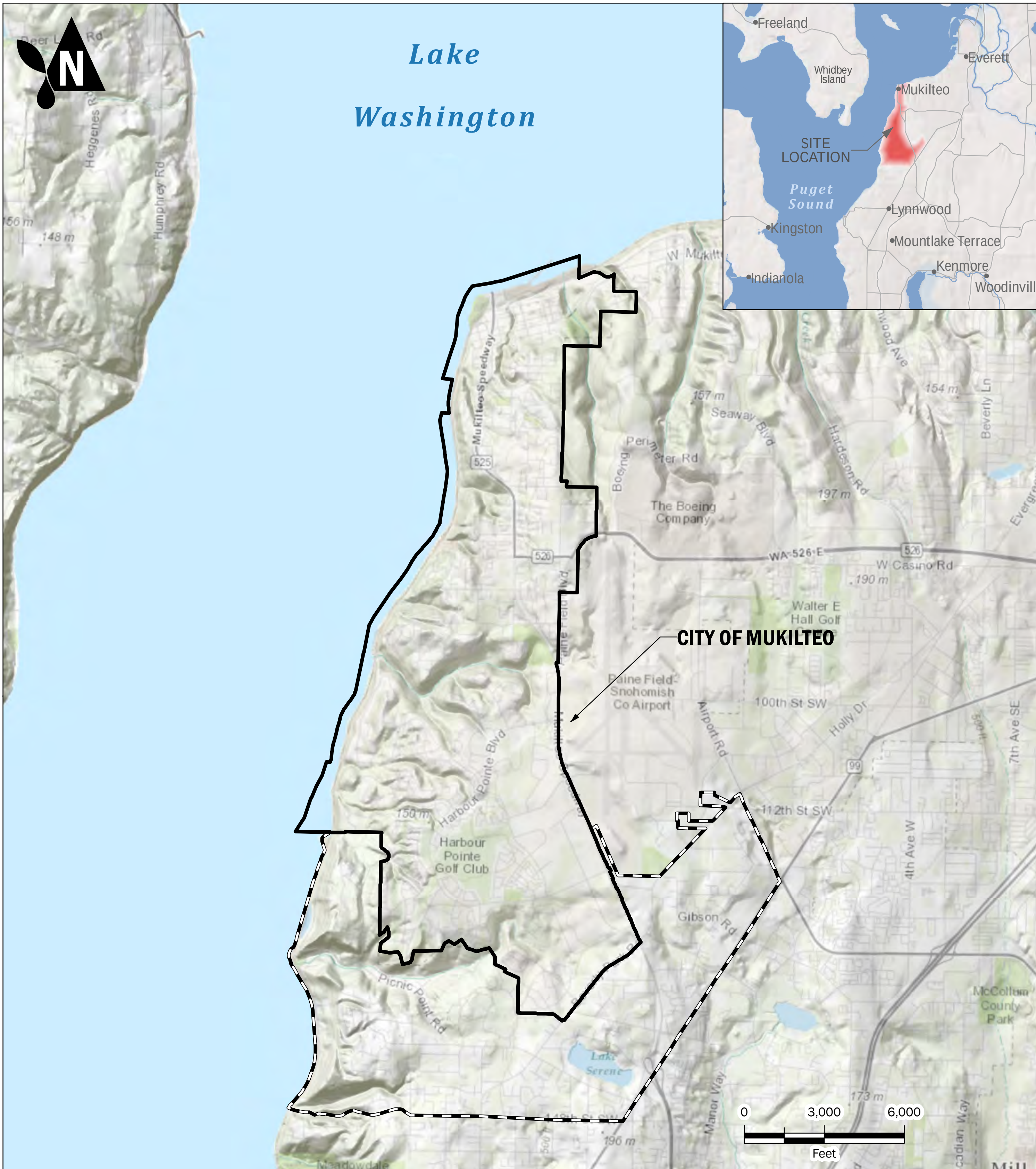
Mukilteo, Washington

Proximity to Steep Slope Hazard Area
SH1 = Low Hazard
SH2 = Elevated Hazard

Deep Unsaturated Receptor Potential
U1 = High Potential
U2 = Moderate Potential
U3 = Lower Potential

Hydrogeomorphic Unit	Proximity to Steep Slope Hazard Area	Deep Unsaturated Receptor Potential	Deep Infiltration Feasibility
SH1-U1	SH1	U1	Good
SH1-U2	SH1	U2	Moderate
SH1-U3	SH1	U3	Poor
SH2-U1	SH2	U1	Poor
SH2-U2	SH2	U2	Poor
SH2-U3	SH2	U3	Poor

FIGURES



Vicinity Map

Mukilteo City-Wide Stormwater Infiltration Feasibility
Mukilteo, Washington

Aspect CONSULTING	JAN-2015	BY: HHH / EAH	FIGURE NO.
	PROJECT NO. 130212	REV BY: - - -	1

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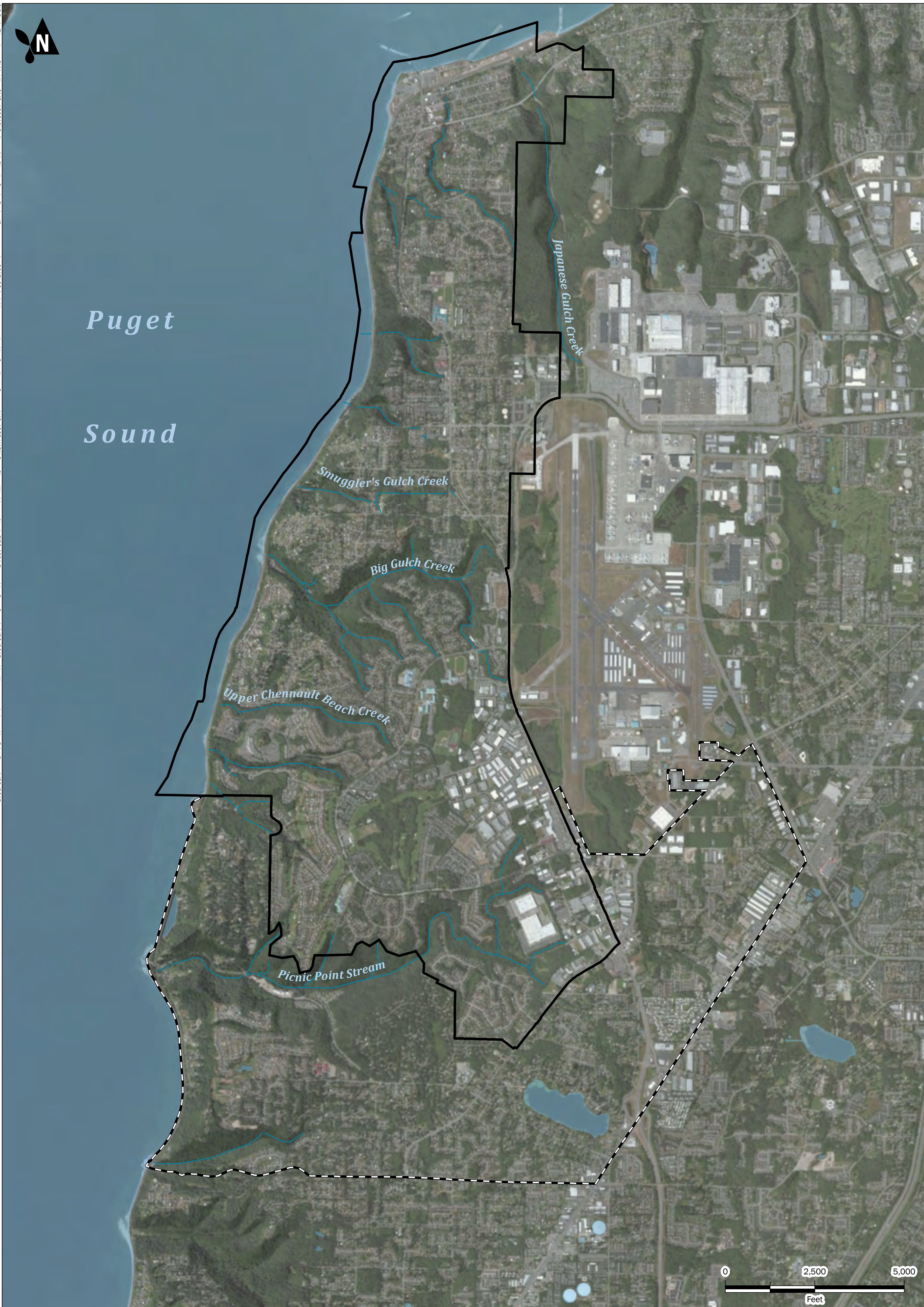

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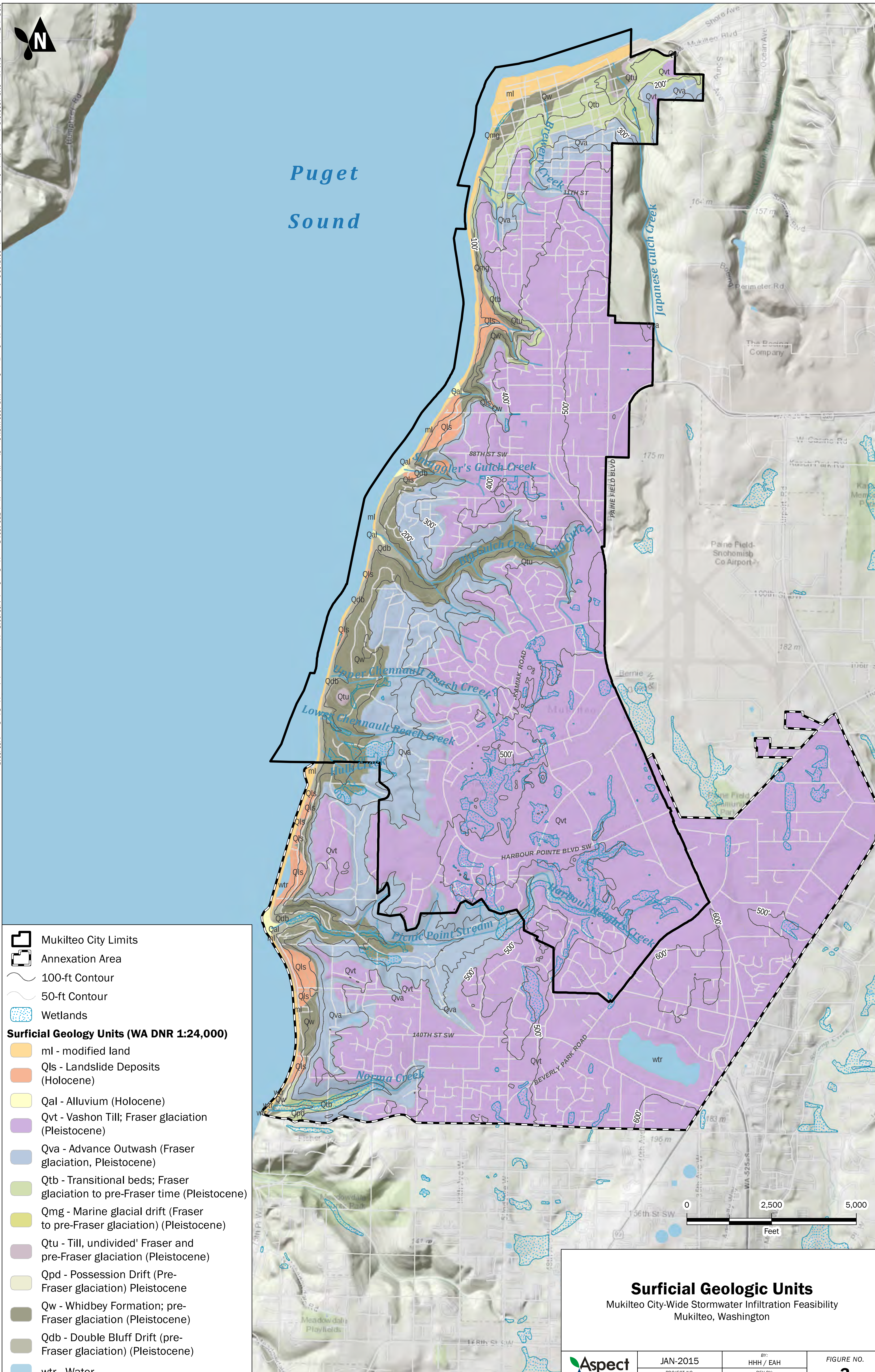
Mukilteo City Limits

Annexation Area

Aerial Imagery
August 2011

Mukilteo City-Wide Stormwater Infiltration Feasibility
Mukilteo, Washington

Aspect CONSULTING	JAN-2015 PROJECT NO. 130212	BY: HHH / EAH REV BY: - - -	FIGURE NO. 2



- Mukilteo City Limits
- Annexation Area
- 100-ft Contour
- 50-ft Contour
- Wetlands

Surficial Geology Units (WA DNR 1:24,000)

- ml - modified land
- Qls - Landslide Deposits (Holocene)
- Qal - Alluvium (Holocene)
- Qvt - Vashon Till; Fraser glaciation (Pleistocene)
- Qva - Advance Outwash (Fraser glaciation, Pleistocene)
- Qtb - Transitional beds; Fraser glaciation to pre-Fraser time (Pleistocene)
- Qmg - Marine glacial drift (Fraser to pre-Fraser glaciation) (Pleistocene)
- Qtu - Till, undivided' Fraser and pre-Fraser glaciation (Pleistocene)
- Qpd - Possession Drift (Pre-Fraser glaciation) Pleistocene
- Qw - Whidbey Formation; pre-Fraser glaciation (Pleistocene)
- Qdb - Double Bluff Drift (pre-Fraser glaciation) (Pleistocene)
- wtr - Water

Surficial Geologic Units

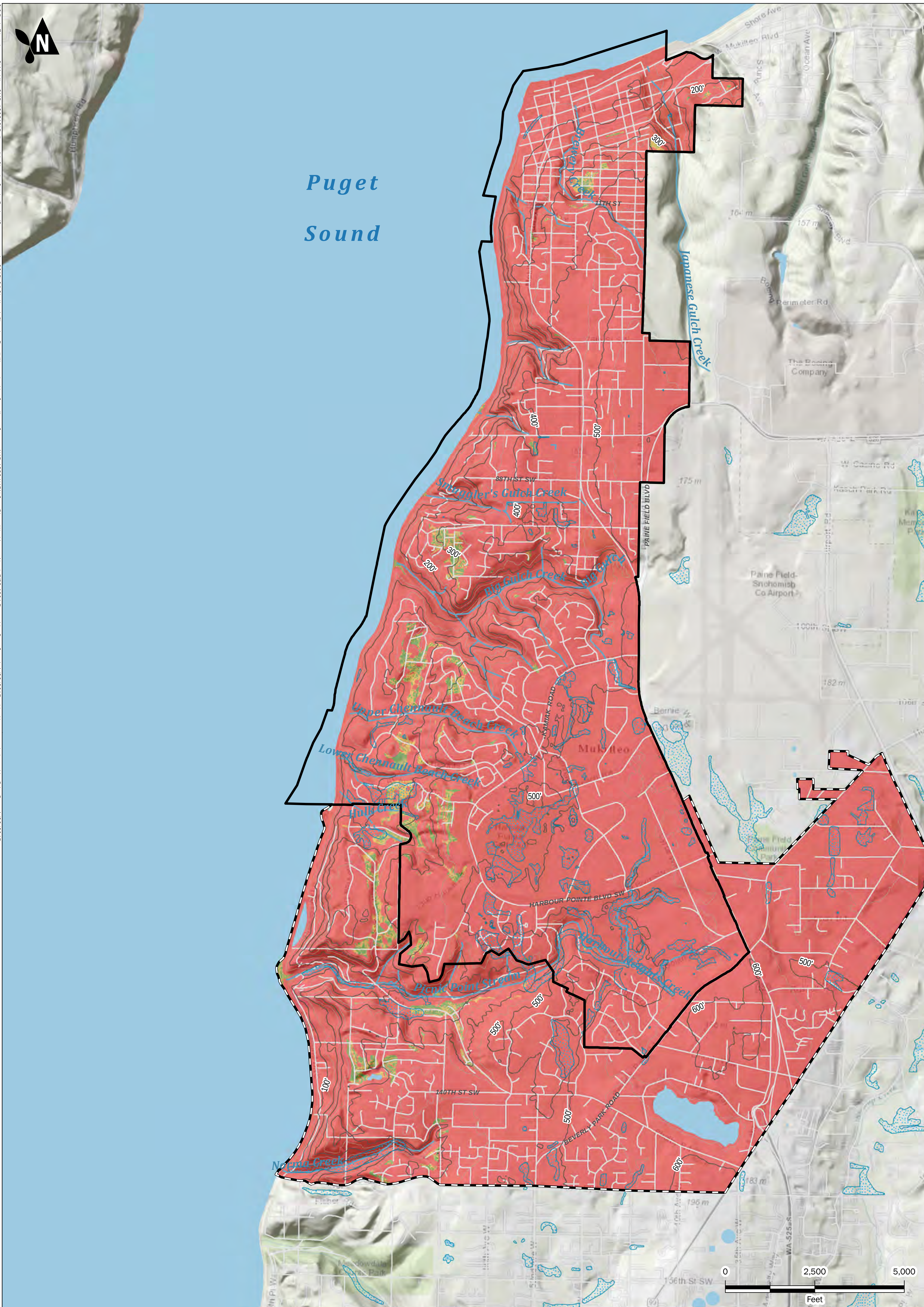
Mukilteo City-Wide Stormwater Infiltration Feasibility
Mukilteo, Washington

Aspect CONSULTING	JAN-2015	BY: HHH / EAH	FIGURE NO.
	PROJECT NO. 130212	REV BY: - - -	3

Basemap Layer Credits || Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

GIS Path: T:\projects_8\MukilteoSMP_130212\Delivered\InfiltrationStudy_RevisedParameters_Jan2015\03 Surface Geology.mxd || Coordinate System: NAD 1983 HARN StatePlane Washington North FIPS 4601 Feet || Date Saved: 1/29/2015 || User: ecrumbaker || Print Date: 1/29/2015

GIS Path: T:\projects_8\MukilteoSMP_130212\Delivered\InfiltrationStudy_RevisedParameters_Jan2015\04 Shallow Infiltration Feasibility.mxd || Coordinate System: NAD 1983 HARN StatePlane Washington North FIPS 4601 Feet || Date Saved: 1/29/2015 || User: ecrumbaker || Print Date: 1/29/2015



Mukilteo City Limits

Annexation Area

Wetlands

100-ft Contour

50-ft Contour

Shallow Infiltration Feasibility

Good Potential

Moderate Potential

Poor Potential

Shallow Infiltration Feasibility

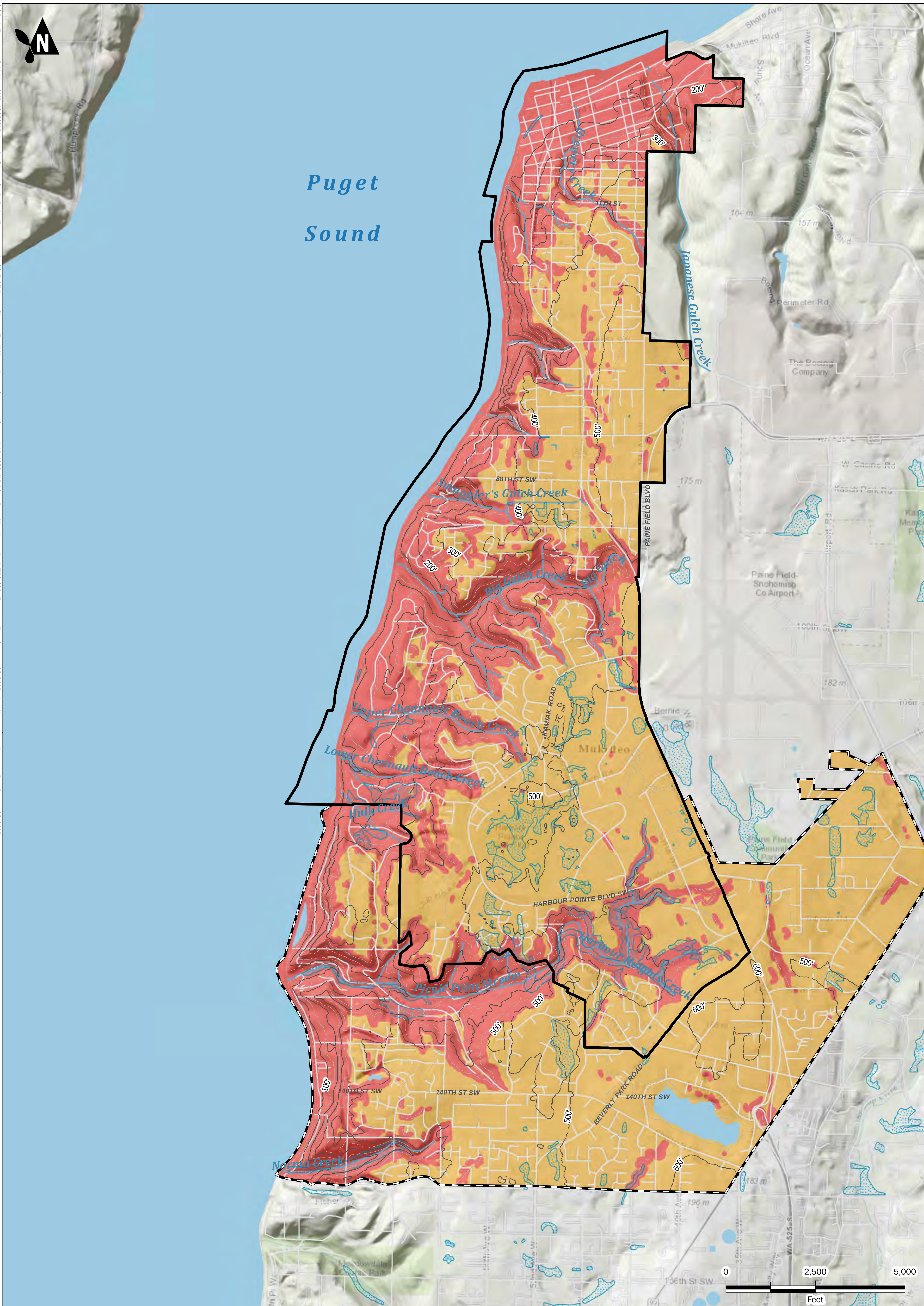
City of Mukilteo Infiltration Study
Mukilteo, Washington

Aspect CONSULTING

JAN-2015	BY: HHH / EAH	FIGURE NO.
PROJECT NO. 130212	REVISED BY: EA / RAA	4

Basemap Layer Credits || Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

GIS Path: T:\projects_8\MukilteoSMP_130212\Delivered\InfiltrationStudy_RevisedParameters_Jan2015\05 Deep Infiltration Feasibility.mxd || Coordinate System: NAD 1983 HARN StatePlane Washington North FIPS 4601 Feet || Date Saved: 1/28/2015 || User: ecrumbaker || Print Date: 1/28/2015



- Mukilteo City Limits
- Annexation Area
- Wetlands
- 100-ft Contour
- 50-ft Contour

Deep Infiltration Feasibility

- Good Potential
- Moderate Potential
- Poor Potential

Note: No areas of good potential were found in the study area.

Deep Infiltration Feasibility

City of Mukilteo Infiltration Study
Mukilteo, Washington

Aspect CONSULTING	JAN-2015	BY: HHH / EAH	FIGURE NO.
	PROJECT NO. 130212	REVISED BY: EA / RAA	5

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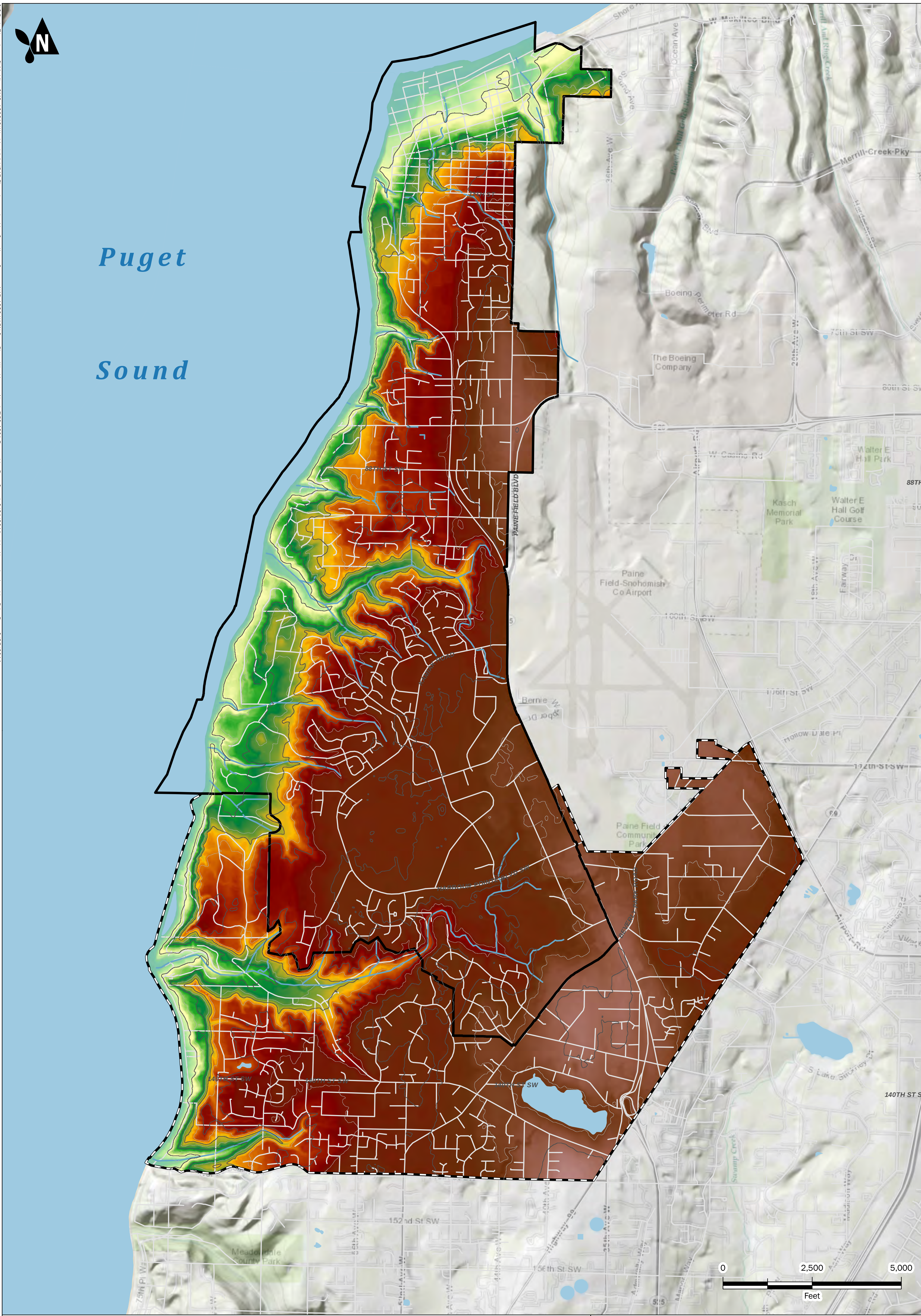
APPENDIX A

Infiltration Feasibility Factors

GIS Path: T:\projects_8\MukilteoSMP_130212\Working\A-1 LiDAR Elevation.mxd || Coordinate System: NAD 1983 HARN StatePlane Washington North FIPS 4601 Feet || Date Saved: 2/24/2014 || User: ehealy || Print Date: 2/25/2014



Mukilteo City Limits

Annexation Area

100-ft Contour

50-ft Contour

Streets

LiDAR Elevation (feet)

High : 639.56

Low : 2.81

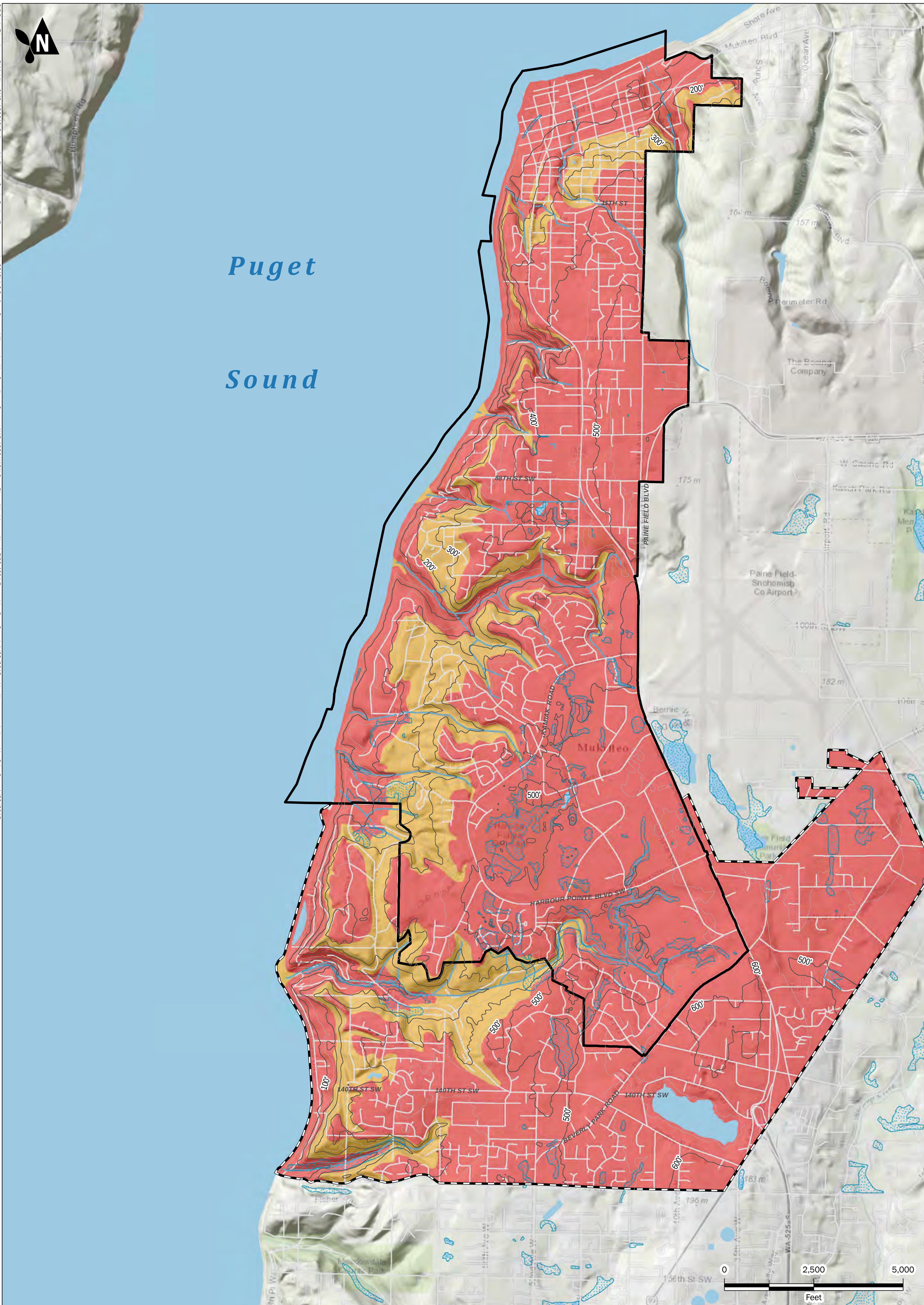
LiDAR Elevation

Mukilteo City-Wide Stormwater Infiltration Feasibility

Mukilteo, Washington

Aspect CONSULTING	FEB-2014	BY: HHH / EAH	FIGURE NO.
	PROJECT NO. 130212	REV BY: - - -	**A-1**

Basemap Layer Credits || Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, iPC, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), and the GIS User Community



Mukilteo City Limits
Annexation Area
100-ft Contour
50-ft Contour
Wetlands

Permeability
Good Permeability
Moderate Permeability
Poor Permeability

Note: No areas of good permeability were found in the study area.

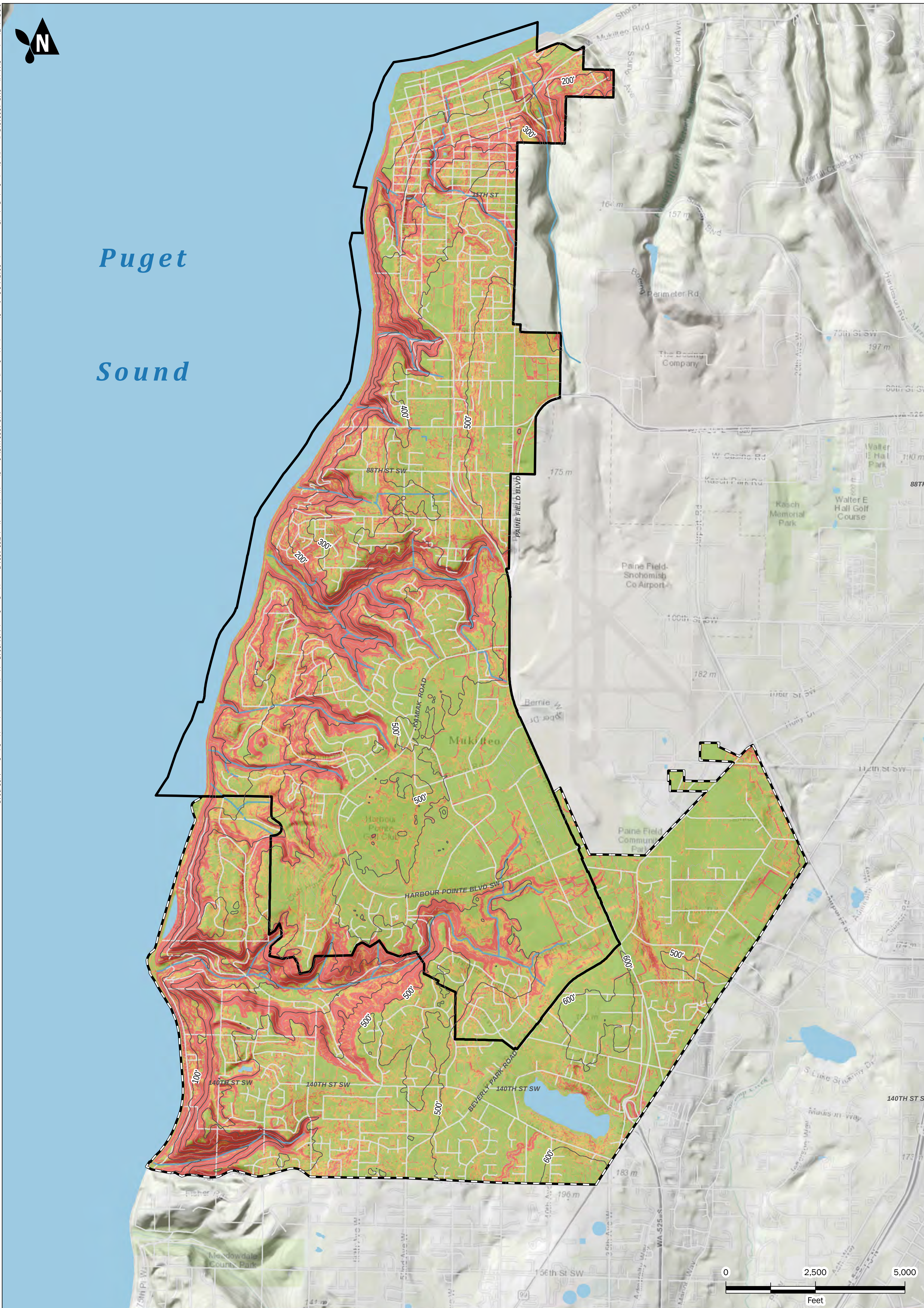
Surface Permeability

Mukilteo City-Wide Stormwater Infiltration Feasibility
Mukilteo, Washington

Aspect CONSULTING	JAN-2015	BY: HHH / EAC	FIGURE NO.
	PROJECT NO. 130212	REV BY: DHM / EAC	A-2

GIS Path: T:\projects_8\MukilteoSMP_130212\Delivered\InfiltrationStudy_RevisedParameters_Jan2015\A-2 Surface Permeability.mxd || Coordinate System: NAD 1983 HARN StatePlane Washington North FIPS 4601 Feet || Date Saved: 1/28/2015 || User: ecrumbaker || Print Date: 1/28/2015

GIS Path: T:\projects_8\MukilteoSMP_130212\Delivered\InfiltrationStudy_RevisedParameters_Jan2015\A-3 Surface Slope.mxd || Coordinate System: NAD 1983 HARN StatePlane Washington North FIPS 4601 Feet || Date Saved: 1/21/2015 || User: ecrumbaker || Print Date: 1/28/2015



Mukilteo City Limits
Annexation Area
100-ft Contour
50-ft Contour

LiDAR-derived Percent Slope

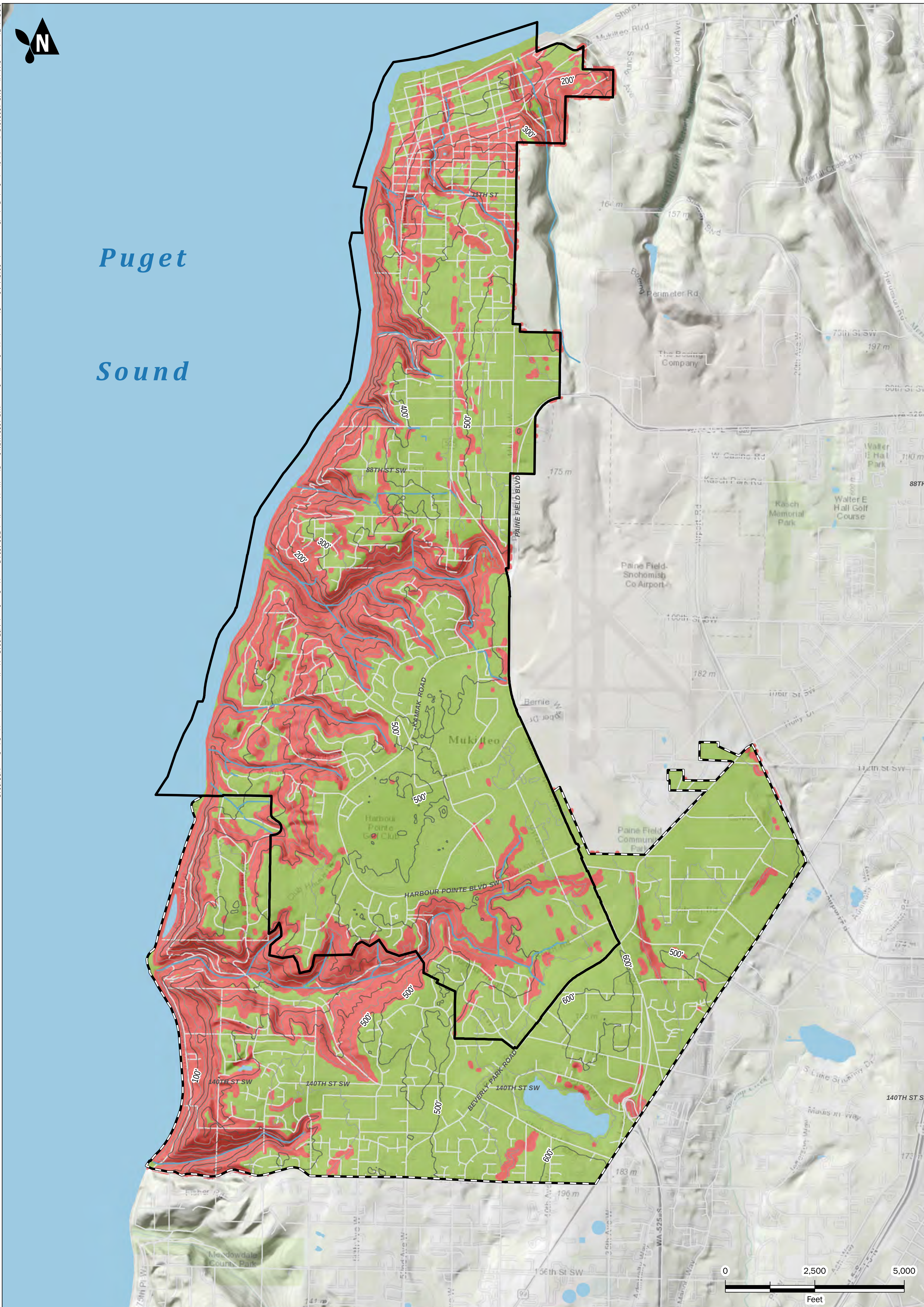
0 to 8%
8 to 20%
> 20%

Surface Slope

Mukilteo City-Wide Stormwater Infiltration Feasibility
Mukilteo, Washington

Aspect CONSULTING	JAN-2015	BY: HHH / EAH	FIGURE NO.
	PROJECT NO. 130212	REV BY: DHM / EAC	A-3

GIS Path: T:\projects_8\MukilteoSMP_130212\Delivered\InfiltrationStudy_RevisedParameters_Jan2015\A-4 Steep Slope.mxd || Coordinate System: NAD 1983 HARN StatePlane Washington North FIPS 4601 Feet || Date Saved: 1/27/2015 || User: ecrumbaker || Print Date: 1/28/2015



Mukilteo City Limits
Annexation Area
100-ft Contour
50-ft Contour

Steep Slope Areas

Steep Slopes
Other Areas

Steep Slope Areas

Mukilteo City-Wide Stormwater Infiltration Feasibility
Mukilteo, Washington

Aspect CONSULTING	JAN-2015	BY: HHH / EAH	FIGURE NO. A-4
	PROJECT NO. 130212	REV BY: DHM / EAC	

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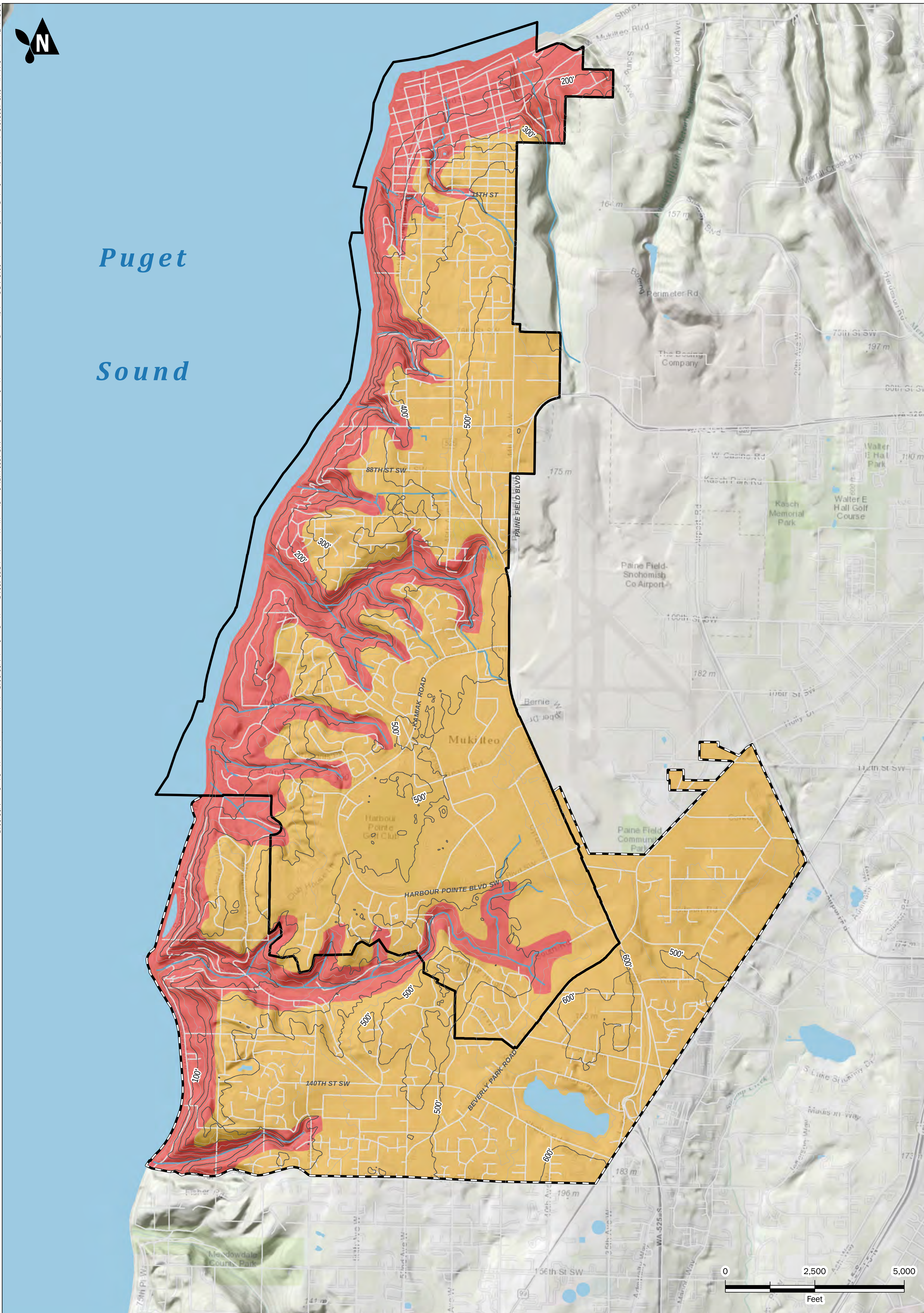
GIS Path: T:\projects_8\MukilteoSMP_130212\Delivered\InfiltrationStudy_RevisedParameters_Jan2015\A-5 Deep Infiltration Receptor.mxd || Coordinate System: NAD 1983 HARN StatePlane Washington North FIPS 4601 Feet || Date Saved: 1/28/2015 || User: ecrumbaker || Print Date: 1/28/2015



Mukilteo City Limits

Annexation Area

100-ft Contour

50-ft Contour

Deep Infiltration Receptor Horizon

High Potential for Deep Infiltration Receptor Horizon

Moderate Potential for Deep Infiltration Receptor Horizon

Low Potential for Deep Infiltration Receptor Horizon

Note: No areas of high potential were found in the study area.

Deep Infiltration Receptor Horizon

Mukilteo City-Wide Stormwater Infiltration Feasibility

Mukilteo, Washington

Aspect CONSULTING	JAN-2015	BY: HHH / EAH	FIGURE NO.
	PROJECT NO. 130212	REV BY: DHM / EAC	A-5

Appendix E

Capital Improvement Project Summary Descriptions and Cost Estimates

701 Pike Street, Suite 1200
Seattle, Washington 98101

T: 206.624.0100
F: 206.749.2200

Technical Memorandum

Prepared for: City of Mukilteo

Project Title: Stormwater Management Plan

Project No.: 145357.003

Technical Memorandum

Subject: Capital Improvement Project Summary Descriptions and Cost Estimates

Date: March 5, 2015

To: Jennifer Adams

From: Colleen O. Doten

Prepared by: Margaret Ales, E.I.T.

Reviewed by: Colleen O. Doten, P.E.

Table of Contents

This memorandum presents written summaries and cost estimates for eight planning-level capital improvement projects (CIPs) that were developed in support of the City of Mukilteo (City) Comprehensive Surface Water Management Plan update. The CIPs were selected in a prioritization process conducted by City staff, with input from a Citizen Advisory Committee. Project descriptions are organized into summaries containing the following information:

- **Project number:** Project ranking as provided by the City.
- **Project name:** A short, descriptive name was provided by the City.
- **Location:** A simple description of the project location, such as the cross streets, is provided.
- **Schedule:** Project implementation year is dependent on funding.
- **Problem summary:** A brief description of the observed problem is presented along with a summary of the analysis conducted to characterize the problem and evaluate alternatives for mitigation, preliminary hydrologic and hydraulic analysis.
- **Description:** A description of the proposed project is provided, including major project elements and sizes.
- **Level of service:** The level of service addressed by the project is provided.
- **Recommended predesign refinements or considerations:** In some cases, pre-project data collection and analysis is proposed to confirm GIS data used in the development of the project and the condition of existing stormwater infrastructure to be incorporated into the project.
- **Planning-level cost estimate:** A list of estimated costs is provided including construction costs, construction management and inspections, engineering, administrative, and public outreach costs, operation and maintenance, taxes, and contingency costs. Cost estimating assumptions are included as Attachment A: Cost Estimate Details.
- **Project area**: A figure showing the conceptual design and location of project elements is provided.

The CIPs cost estimates are summarized in Table 1. Hydrologic and hydraulic methods, parameters, and assumptions used to develop the CIP are outlined in Table 2. Hydrologic model inputs and results used to develop pipe sizes are included as Attachment B: Hydrologic Modeling and Pipe Sizing Summary.

Table 1. CIP Cost Summary

CIP Rank No.	Project name	Total CIP cost
1	Chennault Beach Drive Drainage Improvements	$3,811,000
2	Mukilteo Lane Drainage Improvements	$6,591,000
3	84th Street SW (West) Storm Drainage Improvements	$1,240,000
4 and 5	64th Place W Street Drainage Improvements 66th Place W Street Drainage Improvements	$1,202,000 $1,425,000
6	Central Drive Storm Drainage Improvements for Big Gulch Basin	$5,267,000
7	62nd Place W/Canyon Drive Storm Drainage Improvements	$2,852,000
8	10th Street and Loveland Avenue Storm Drainage Improvements	$794,000

<table>
<tr><th colspan="6">Table 2. Hydrologic and Hydraulic Information</th></tr>
<tr><th>Hydrology</th><th colspan="5">Method, parameter values, and assumptions</th></tr>
<tr><td>Methodology</td><td colspan="5">Urban Hydrology for Small Watersheds TR-55, U.S. Department of Agriculture (USDA), 1986 (TR-55)</td></tr>
<tr><td>Model</td><td colspan="5">HEC-HMS, version 4</td></tr>
<tr><td>Design storm</td><td colspan="5">25-year and 100-year, 24-hour design storm Type 1A (National Oceanic and Atmospheric Administration [NOAA] Atlas 2, 1973), per Mukilteo Municipal Code</td></tr>
<tr><td>Subbasin delineation</td><td colspan="5">Developed based on geographic information system (GIS) data including existing subbasin delineations, 2-foot contours, roadway extents, and drainage infrastructure</td></tr>
<tr><td>Subbasin characteristics (slope, soil, land cover and land use)</td><td colspan="5">Derived by Environmental Science Associates (ESA) with GIS data
Slope: average subbasin slope based on derived slope classes, using 6 foot digital elevation model (DEM) based on LiDAR data obtained from the Puget Sound LiDAR Consortium.
Soil: Natural Resources Conservation Service (NRCS) soil hydrologic groups
Land cover/land use: City of Mukilteo zoning, NOAA Coastal Change Analysis Program Regional Land Cover, 2011 aerial photography, City right-of-way GIS</td></tr>
<tr><td rowspan="8">Soil Conservation Service (SCS) curve number (CN)</td><td colspan="5">Composite CN per subbasin for five land cover/land use types (roads, residential, commercial, grass, forested) and for three hydrologic soil types</td></tr>
<tr><td rowspan="2">Land use or Land cover</td><td colspan="3">NRCS Soil Type</td><td rowspan="7">n/a = not applicable as this land cover & soil combination is not present in the CIP subbasins</td></tr>
<tr><td>A</td><td>C</td><td>D</td></tr>
<tr><td>Roads</td><td>98</td><td>98</td><td>98</td></tr>
<tr><td>Grass</td><td>n/a</td><td>74</td><td>n/a</td></tr>
<tr><td>Forested</td><td>n/a</td><td>70</td><td>n/a</td></tr>
<tr><td>Commercial</td><td>89</td><td>94</td><td>95</td></tr>
<tr><td>Residential</td><td>61</td><td>83</td><td>87</td></tr>
<tr><td>Lag time</td><td colspan="5">Method outlined in NRCS 1997 Engineering Handbook, part 630 Hydrology</td></tr>
<tr><td>Initial abstraction</td><td colspan="5">Methods outlined in TR-55</td></tr>
<tr><th>Hydraulics</th><th colspan="5">Method, parameter values, and assumptions</th></tr>
<tr><td>Methodology</td><td colspan="5">Manning's n equations</td></tr>
<tr><td>Pipe roughness</td><td colspan="5">0.013</td></tr>
<tr><td>Pipe slope</td><td colspan="5">Estimated from pipe invert elevations in GIS where available. When pipe invert elevations were not available, assigned CIP pipe slope to ground surface slope (based on 2-foot contour data) with a minimum slope of 0.005 ft/ft.</td></tr>
<tr><td>Sizing criteria</td><td colspan="5">Closed systems that are considered part of a major stream were designed to convey flows from a 100-year recurrence storm event. All other closed drainage systems were designed to convey flows from a 25-year recurrence storm event, with a 12-inch minimum diameter.</td></tr>
</table>

Project number	CIP Rank 1
Project name	Chennault Beach Drive Drainage Improvements
Location	Chennault Beach Drive from 60th Street and Marine View Drive
Schedule	Dependent on funding; currently unfunded Project should be implemented prior to upstream project, 62nd Place W/Canyon Drive Storm Drainage Improvements (CIP Rank 7)
Problem summary	Drainage from the Chennault Beach Drive roadway is conveyed in an under-developed ditch-and-culvert system as well as intermittent piping between 60th Avenue W and Marine View Drive. The piped portions of the system are located where the system outfalls to Upper Chennault Beach Creek at four locations: 60th Avenue W, McArthur Lane, 64th Place W, and west of Marine View Drive. During high flows, roadway flooding occurs because of a lack of ditch capacity, debris blocking driveway culverts and inlets, and misplaced inlets. High flows scour landscaping material (typically small rocks) located in the right-of-way (ROW), providing a debris source. Soil and vegetation on steep slopes adjacent to ditches slough into the ditches, reducing ditch capacity and providing another debris source. Some inlets are located outside of the drainage pathway. Flows bypass the inlets and contribute to the roadway flooding by concentrating flow in under-capacity ditches. In addition, the City does not have an easement to perform maintenance on their outfall near 64th Place W.
Description	This project provides a new drainage system along Chennault Beach Drive, where the existing drainage system is under-developed, under-capacity, or bypassed. See Figure 1. Flows currently routed to the existing Upper Chennault Creek outfall east of McArthur Lane will be routed through the new drainage system to the existing Upper Chennault Creek outfall east of 64th Place W. Existing inlets that are not currently collecting surface water will either be repositioned and connected to the new system or removed. Existing functional inlets may be connected to the new system. New inlets and laterals will be installed as needed. The project consists of four areas of drainage improvements: • Improvements to the north ROW shoulder of Chennault Beach Drive between 60th Avenue W and McArthur Lane consisting of paving and re-grading of the shoulder and installing asphalt curbing to channel water to the existing stormwater inlets. • A 12-inch-diameter drainage system located in the alignment of the existing ditch-and-culvert system located on the south side of Chennault Beach Drive between west of 60th Place W and west of 62nd Place W. • An 18-inch-diameter drainage system located in the alignment of the existing ditch-and-culvert system located on the south side of Chennault Beach Drive between west of 62nd Place W and 64th Place W. A proposed drainage system from 62nd Place W will tie into this new system on Chennault Beach Drive (see 62nd Place W/Canyon Drive Storm Drainage Improvements project, CIP Rank 7). The new 18-inch-diameter drainage system discharges to the existing outfall to Upper Chennault Creek east of 64th Place W. A maintenance easement will be obtained along the extent of the existing outfall pipe. • A 12-inch-diameter drainage system located in the alignment of the existing ditch-and-culvert system on the north side of Chennault Beach Drive between 64th Place W and W Marine View Drive. This new drainage system will tie into the existing drainage system on Marine View Drive.
Level of service	Closed drainage systems shall be designed to convey flows from a 25-year recurrence storm event.
Recommended predesign considerations	• Conduct a pipe condition assessment to confirm the existing pipe in the proposed CIP, as shown in Figure 1, is in good condition. • Conduct a geotechnical investigation to determine if special construction requirements are necessary or replacement of retaining walls. Cost estimate assumes no special measures or replacement are necessary.

Cost estimate	Gravity storm drain: install 1,400 feet of 12-inch-diameter pipe in ROW	$943,000
	Gravity storm drain: install 730 feet of 18-inch-diameter pipe in ROW	$519,000
	Gravity storm drain: install 170 feet of 18-inch-diameter outfall pipe	$75,000
	Improve 270 feet of shoulder ROW	$57,000
	Maintenance easement	$45,000
	Subtotal line-item costs	*$1,639,000*
	Contractor overhead, profit, and mobilization (18% of subtotal of line-item costs)	$295,000
	Construction contingency (20% of all above construction costs)	$387,000
	Washington State and Snohomish County sales tax (9.5% of all above construction costs)	$220,000
	Subtotal construction costs	*$2,541,000*
	Construction management and inspections (15% of construction costs)	$381,000
	Administration, engineering design, public outreach, and permitting (35% of construction costs)	$889,000
	CIP 1 project cost	$3,811,000
	Annual O&M costs	$750

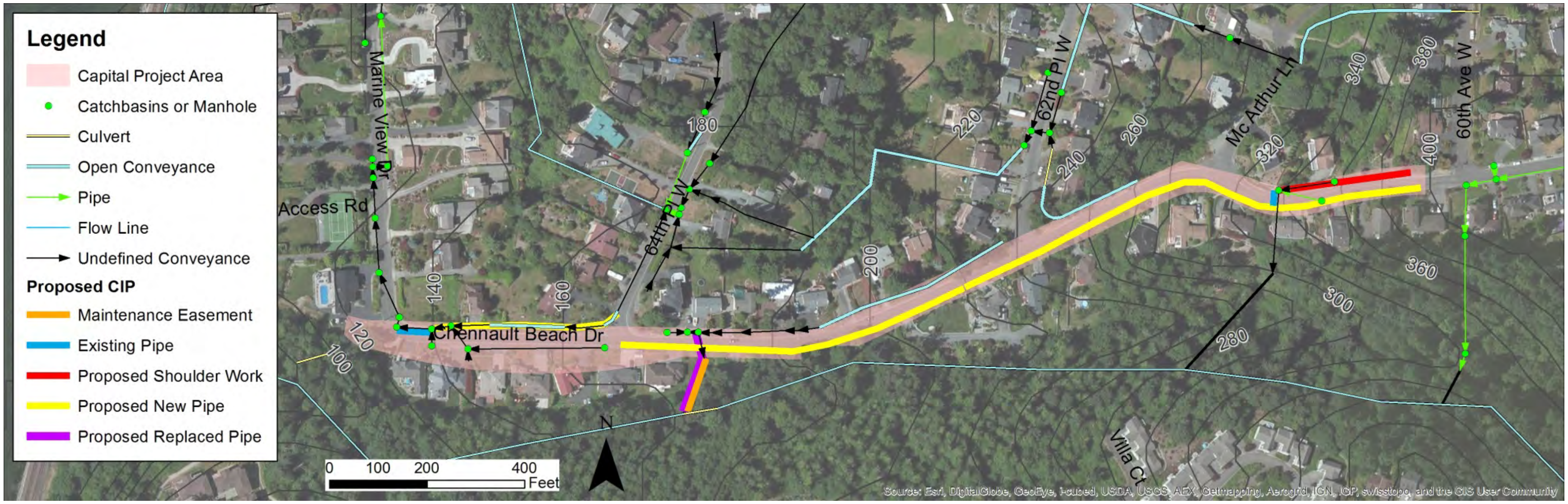


Figure 1. CIP Rank 1, Chennault Beach Drive Drainage Improvements

Project number	CIP Rank 2
Project name	Mukilteo Lane Drainage Improvements
Location	Mukilteo Lane between W Mukilteo Boulevard and Park Avenue
Schedule	Dependent on funding; currently unfunded
Problem summary	Drainage along Mukilteo Lane has three discharge locations. The drainage features and problems descriptions below are split up into three sections (eastern, middle and western), based on the discharge location. **Eastern Mukilteo Lane:** Drainage along the eastern portion of Mukilteo Lane (between W Mukilteo Boulevard and the rail line crossing) is conveyed along unimproved roadside shoulders, curb and gutter, ditches, and inlets and pipe, and discharges to Japanese Gulch. Flooding occurs during high flows when debris blocks driveway culverts and inlets. The debris is reported to be rock from unimproved right-of-way (ROW). Although not represented in the City's geographic information system (GIS), City staff report 8-inch-diameter pipes in the Eastern Mukilteo Lane section. City conveyance standards require minimum 12-inch-diameter pipe for storm sewers and culverts. Roadway drainage between the rail line and Japanese Gulch is conveyed in a shallow ditch along the shoulder of the road. This ditch is under capacity and floods the roadway. This area experiences roadside ponding year round. **Middle Mukilteo Lane:** Drainage along Mukilteo Lane from the rail line crossing and west to Loveland Avenue is collected in roadside ditches and conveyed to the north, where City GIS data show that flows discharge through an 18-inch-diameter pipe onto Burlington Northern Santa Fe (BNSF) property. Ditches along this middle section of Mukilteo Lane have low slope, but flooding has not been reported in this section of Mukilteo Lane. **Western Mukilteo Lane:** Drainage along the western section of Mukilteo Lane from Loveland Avenue to Park Avenue is the most downstream section of the conveyance of a 113-acre portion of the Brewery Creek drainage basin. This 400-foot section of conveyance is relatively flat compared to the steep slopes of the contributing basin. Modeling results show that the conveyance along the western portion of Mukilteo Lane is capacity-limited. Also, high sediment loads are conveyed from upstream sources and deposited along Mukilteo Lane, resulting in significant sediment accumulation in the pipes and ditches. Approximately 60 cubic yards of sediment are removed annually from the drainage system along Mukilteo Lane between Park and Loveland Avenues. The continual sediment accumulation further reduces the system capacity.
Description	This project consists of three areas of drainage improvements. See Figure 2. • For the eastern portion of Mukilteo Lane, this project provides a 12-inch-diameter storm drain from Mukilteo Boulevard to the rail line crossing. While the CIP assumes the existing piped system immediately east of Japanese Gulch will be replaced, some portions of the existing system with 12-inch-diameter pipe may remain and be connected to the new system. The new drainage system will discharge to Japanese Gulch. • For the middle portion of Mukilteo Lane (from the rail line crossing to Loveland Avenue), it is recommended that a 12-inch-diameter storm drain replace the ditch and culvert system to improve the drainage along this low sloped section as well as reduce ditch maintenance efforts. The new drainage system will tie into the existing 18-inch-diameter pipe that outfalls to the north onto BNSF property. • For the western portion of Mukilteo Lane, this project includes replacing the 24-inch-diameter pipe discharging from the south at Mukilteo Lane to a 36-inch-diameter pipe, installing an inline sediment collection vault in an existing City-owned ROW that will discharge to new a 36-inch-diameter pipe on the north side of Mukilteo Lane, and replacing the existing 24-inch-diameter Brewery Creek outfall crossing the BNSF rail yard at Park Avenue to 36-inch diameter.
Level of service	The conveyance in the Western Mukilteo Lane portion of the project is considered part of a major stream and shall be designed to convey flows from a 100-year recurrence storm event. Closed drainage systems in the middle and eastern portions of the project shall be designed to convey flows from a 25-year recurrence storm event.
Recommended predesign refinements	Detailed design should consider planning and development efforts outlined in the City of Mukilteo Downtown Waterfront Master Plan.

Cost estimate	Gravity line: install 2,100 feet of pipe with 12-inch-diameter pipe in ROW	$906,000
	Gravity line: replace 1,260 feet of pipe with 12-inch-diameter pipe in ROW	$507,000
	Gravity line: install 320 feet of 36-inch-diameter pipe in ROW	$196,000
	Gravity line: replace 640 feet of pipe with 36-inch-diameter pipe in ROW	$410,000
	Gravity line: replace 110 feet of pipe with 36-inch-diameter pipe by jack and bore	$363,000
	Contaminated soil remediation	$162,000
	Install a 130 by 12 by 10 sediment collection vault in ROW	$290,000
	Subtotal line-item costs	*$2,834,000*
	Contractor overhead, profit, and mobilization (18% of subtotal of line-item costs)	$510,000
	Construction contingency (20% of all above construction costs)	$669,000
	Washington State and Snohomish County sales tax (9.5% of all above construction costs)	$381,000
	Subtotal construction costs	*$4,394,000*
	Construction management and inspections (15% of construction costs)	$659,000
	Administration, engineering design, public outreach, cultural resources, and permitting, including railroad crossing permitting (35% of construction costs)	$1,538,000
	CIP 2 project cost	$6,591,000
	Annual O&M costs	$700

Figure 2. CIP Rank 2, Mukilteo Lane Drainage Improvements

Project number	CIP Rank 3	
Project name	84th Street SW (West) Storm Drainage Improvements	
Location	84th Street SW from Mukilteo Speedway and 53rd Avenue W	
Schedule	Dependent on funding; currently unfunded	
Problem summary	Drainage along the 84th Street SW roadway is conveyed in an under-developed ditch-and-culvert system as well as in intermittent piping between State Route 525/Mukilteo Speedway and 53rd Avenue W. The downstream section of ditch near the intersection of 84th Street SW and 53rd Avenue SW is shallow and gravel-lined. The inlet at the northeast corner of 84th Street SW and 53rd Avenue W is easily clogged with gravel (from the right-of-way [ROW] and upstream ditch) and results in flooding at the intersection. Also, the inlet is located in the ROW outside of the direct drainage path and flows that bypass this inlet are likely to contribute to intersection flooding.	
Description	This project provides a new drainage system along 84th Street SW and consists of a 12-inch-diameter pipe located in the existing 84th Street SW ROW, replacing the 36-inch diameter pipe that crosses 53rd Avenue SW at 84th Street SW, and replacing the pipe on 53rd Avenue SW that discharges into the 84th Street system. See Figure 3. The new system will have the same discharge location as the previous system an open channel, at the west end of 84th Street SW, flowing to the Naketa Beach outfall. Existing inlets that are not currently collecting surface water will either be repositioned and connected to the new system or removed. Existing functional inlets may be connected to the new system. New inlets will be installed as needed. Open ditch segments will be covered and the ROW shoulder will be restored in kind. (Some [currently unfunded] sidewalk projects are proposed in this area. If funding sources align for these projects, the ROW shoulder could be restored to a different standard.)	
Level of service	Closed drainage systems shall be designed to convey flows from a 25-year recurrence storm event.	
Recommended predesign refinements	None.	
Cost estimate	Gravity storm drain: install 1,080 feet of 12-inch-diameter pipe in ROW.....................................	$514,000
	Gravity storm drain: install 60 feet of 36-inch-diameter pipe in ROW...	$38,000
	Subtotal line-item costs..	*$552,000*
	Contractor overhead, profit, and mobilization (18% of subtotal of line-item costs).....................	$99,000
	Construction contingency (20% of all above construction costs)..	$130,000
	Washington State and Snohomish County sales tax (9.5% of all above construction costs).......	$74,000
	Subtotal construction costs..	*$855,000*
	Construction management and inspections (15% of construction costs)....................................	$128,000
	Administration, engineering design, public outreach, and permitting (30% of construction costs)	$257,000
	CIP 3 project cost	$1,240,000
	Annual O&M costs	$200

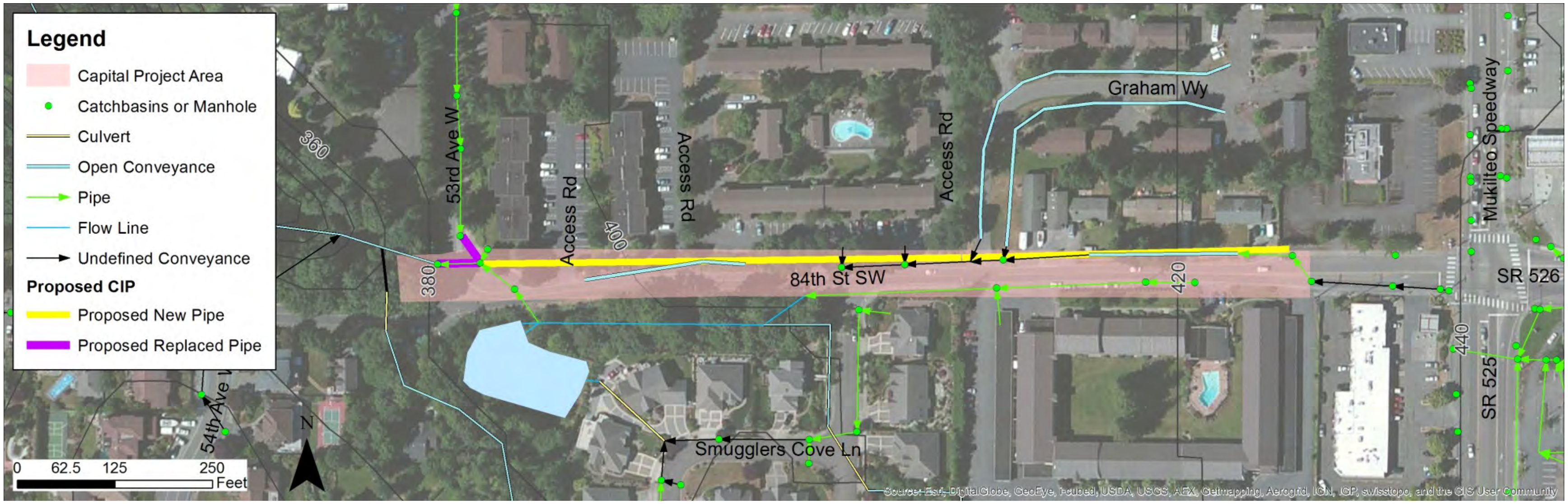


Figure 3. CIP Rank 3, 84th Street SW (West) Drainage Improvements

Project number	CIPs Rank 4 and Rank 5 (described jointly)	
Project name	64th Place W and 66th Place W Street Drainage Improvements	
Location	64th Place W from south of Central Drive to 66th Place W 66th Place W from 64th Place W to Marine View Drive	
Schedule	Dependent on funding; currently unfunded CIP Rank 5 should be implemented prior to, or concurrently with CIP Rank 4	
Problem summary	Drainage along the 64th Place W and 66th Place W roadways is conveyed in an under-developed ditch-and-culvert system as well as intermittent piping. Some culvert inlets are located in the gravel shoulder and erosion of the shoulder provides debris into the inlets and downstream ditches. Driveway culverts and open ditches and driveway culverts clog easily, resulting in flooding at driveways and the roadway.	
Description	This project provides a new drainage system along 64th Place W and 66th Place W and consists of a 12-inch-diameter pipe located in the existing right-of-way (ROW). See Figure 4. The new system will tie into the existing system on 66th Place W east of Marine View Drive. Existing inlets that are not currently collecting surface water will either be repositioned and connected to the new system or removed. Existing functional inlets may be connected to the new pipe. New inlets will be installed on both sides of the roads as needed. Open ditch segments will be covered and the ROW shoulder will be restored with in-kind landscaping. These projects were originally scoped and ranked separately. However, during problem analysis it was determined that the two projects are part of one drainage system and should be constructed together or phased from downstream to upstream to ensure there is adequate downstream conveyance capacity for upstream improvements. Because flows collected along 64th Place W (CIP Rank 4 project location) discharge to the ditch-and-culvert system on 66th Place W (CIP Rank 5 project location), CIP Rank 5 project should be constructed before CIP Rank 4 project.	
Recommended predesign considerations	CIP Rank 5 ties into an existing private drainage system (see existing pipe on Figure 4). Inspect the private system to confirm it is in good condition.	
Cost estimate Project 4	Gravity storm drain: install 750 feet of 12-inch-diameter pipe in ROW	$535,000
	Subtotal line-item costs	*$535,000*
	Contractor overhead, profit, and mobilization (18% of subtotal of line-item costs)	$96,000
	Construction contingency (20% of all above construction costs)	$126,000
	Washington State and Snohomish County sales tax (9.5% of all above construction costs)	$72,000
	Subtotal construction costs	*$829,000*
	Construction management and inspections (15% of construction costs)	*$124,000*
	Administration, engineering design, public outreach, and permitting (30% of construction costs)	$249,000
	CIP 4 project cost	$1,202,000
	Annual O&M costs	$250
Cost estimate Project 5	Gravity storm drain: install 880 feet of 12-inch-diameter pipe in ROW	$634,000
	Subtotal line-item costs	*$634,000*
	Contractor overhead, profit, and mobilization (18% of subtotal of line-item costs)	$114,000
	Construction contingency (20% of all above construction costs)	$150,000
	Washington State and Snohomish County sales tax (9.5% of all above construction costs)	$85,000
	Subtotal construction costs	*$983,000*
	Construction management and inspections (15% of construction costs)	*$147,000*
	Administration, engineering design, public outreach, and permitting (30% of construction costs)	$295,000
	CIP 5 project cost	$1,425,000
	Annual O&M costs	$300
	Total CIP 4 and 5 project cost	$2,627,000
	Total annual O&M costs	$550

Figure 4. CIP Rank 4 and 5, 64th Place W and 66th Place W Street Drainage Improvements

Project number	CIP Rank 6
Project name	Central Drive Storm Drainage Improvements for Big Gulch Basin
Location	Central Drive near 103rd Place SW to 63rd Place W, and 63rd Place W from Central Drive to Webster Way
Schedule	Dependent on funding; currently unfunded
Problem summary	Drainage along the Central Drive and 63rd Place W roadways is conveyed in an under-developed ditch-and-culvert system as well as intermittent piping. Some inlets are located in the gravel shoulder and erosion of the shoulder provides debris into the inlets and downstream ditches. Open ditches and driveway culverts are under-capacity and clog easily, resulting in flooding at driveways and onto roadway and private property. A portion of the runoff is conveyed through an open channel and piped system through a wetland area in the backyards of properties on the west side of 63rd Pl W. The City does not have an easement to perform maintenance for this portion of the system.
Description	This project provides a new drainage system along Central Drive and 63rd Place W. Existing inlets that are not currently collecting surface water will either be repositioned and connected to the new system or removed. Existing functional inlets may be connected to the new pipe. New inlets and laterals will be installed as needed. See Figure 5. The project consists of seven areas of drainage improvements: • A 12-inch-diameter drainage pipe located in the alignment of the existing ditch-and-culvert system located on the east side of Central Drive in the vicinity of 103rd Place SW to convey stormwater to across Central Drive to the new 12-inch-diameter pipe on the west side of Central Drive. • A 12-inch-diameter drainage pipe located in the alignment of the existing ditch-and-culvert system located on the south side of Central Drive between 103rd Place SW and 63rd Place W to convey storm-water to the west side of 63rd Place W. Inlets on the north side of Central Drive with laterals to the south piped system. The existing ditch-and-culvert system on the north side of Central Drive will remain. • A 12-inch-diameter drainage pipe located in the alignment of the existing ditch-and-culvert system and pipe-and-inlet system located on the east side of 63rd Place W between Central Drive and Webster Way, and in the alignment of the pipe crossing 63rd Place W (at its north end) to the open channel west of 63rd Place W. • A 12-inch-diameter drainage pipe located in the alignment of the existing ditch-and-culvert system located on the west side of 63rd Place W north of Central Drive to convey stormwater to the west side of 63rd Place W. • Replace the existing culvert crossing 63rd Place W north of Central Drive with an 18-inch-diameter pipe. • Replace the existing 12-inch-diameter wetland outfall pipe near the north end of west of 63rd Place W with an 18-inch-diameter pipe. • Obtain a maintenance easement for the piped portion of the conveyance system through the wetland area along properties on the west side of 63rd Place W.
Level of service	Closed drainage systems shall be designed to convey flows from a 25-year recurrence storm event.
Recommended predesign refinements	Conduct a field study and analysis of the open channel, pipe and wetland area, between 64th Place W and 63rd Place W north of Central Drive, to assess the condition of the system and function of the wetland.

Cost estimate	Gravity storm drain: replace 320 feet of pipe with 18-inch-diameter pipe in ROW	$269,000
	Gravity storm drain: install 2,650 feet of 12-inch-diameter pipe in ROW	$1,824,000
	Maintenance easement	$171,000
	Subtotal line-item costs..	*$2,264,000*
	Contractor overhead, profit, and mobilization (18% of subtotal of line-item costs)......................	$408,000
	Construction contingency (20% of all above construction costs)..	$534,000
	Washington State and Snohomish County sales tax (9.5% of all above construction costs)........	$305,000
	Subtotal construction costs..	*$3,511,000*
	Construction management and inspections (15% of construction costs)......................................	$527,000
	Administration, engineering design, public outreach, and permitting (35% of construction costs)	$1,229,000
	CIP 6 project cost	$5,267,000
	Annual O&M costs	$1,050

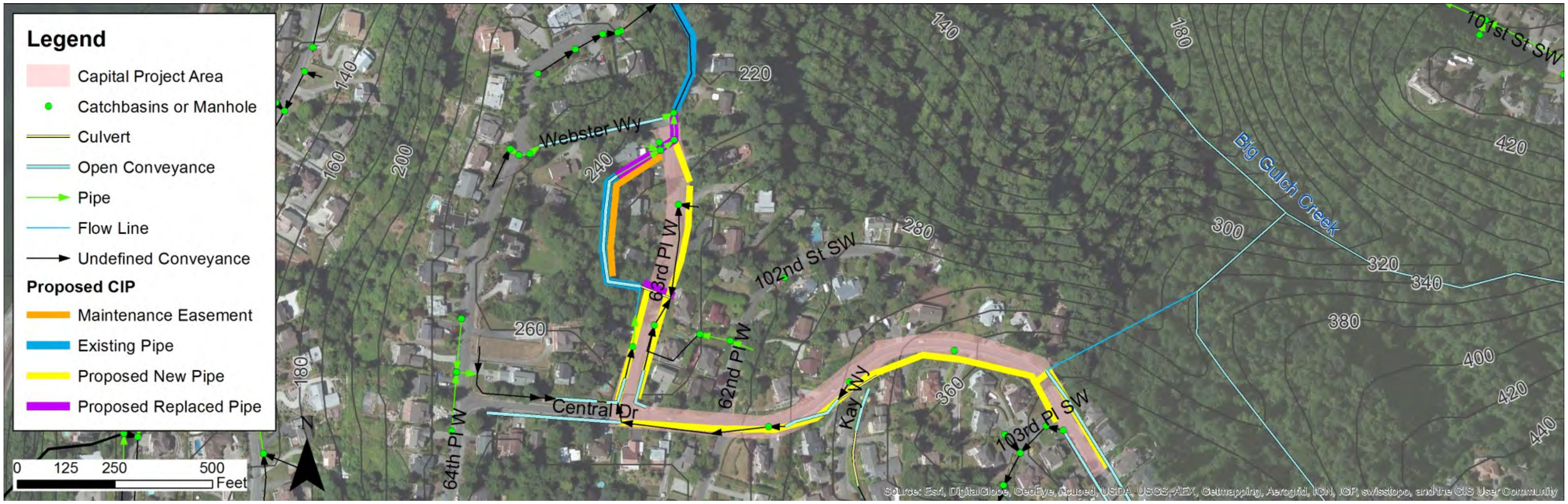


Figure 5. CIP Rank 6, Central Drive Storm Drainage Improvements for Big Gulch

Project number	CIP Rank 7	
Project name	62nd Place W/Canyon Drive Storm Drainage Improvements	
Location	Along 62nd Place W and Canyon Drive	
Schedule	Dependent on funding; currently unfunded Project should be implemented after downstream project, Chennault Beach Drive Drainage Improvements (CIP Rank 1)	
Problem summary	Drainage from Canyon Drive is conveyed in a ditch-and-culvert system as well as intermittent piping. The west side of 62nd Place W does not contain a conveyance system. As a result, roadway surface water flows onto private property west of 62nd Place W. During high flows, roadway flooding occurs because of a lack of conveyance system and debris blockage of driveway culverts and inlets. Also some inlets are located in the far extent of the right-of-way (ROW) and flows bypass the inlets contributing to the roadway flooding.	
Description	This project provides a new drainage system, along 62nd Place W and Canyon Drive, that ties into the proposed piped drainage system in the Chennault Beach Drive Drainage Improvements project (CIP Rank 1). Existing inlets that are not currently collecting surface water will either be repositioned and connected to the new system or removed. Existing functional inlets may be connected to the new pipe. New inlets will be installed in both sides of Canyon Drive and 62nd Place W as needed. See Figure 6. The project consists of three areas of drainage improvements: • A 12-inch-diameter drainage pipe located in the alignment of the existing ditch-and-culvert system on the north side of Canyon Drive, from west of Kay Way to 62nd Place W, and that crosses 62nd Place W at Canyon Drive. • A 12-inch-diameter drainage pipe located in the west ROW shoulder of 62nd Place W, from the northern project extent to where the existing pipes from the east ROW cross over 62nd Place W. • An 18-inch-diameter drainage pipe located in the west ROW shoulder of 62nd Place W (from where the existing pipes from the east ROW cross over 62nd Place W north) and in the north ROW shoulder of Chennault Beach Drive crossing over Chennault Beach Drive and tying into the proposed piped system on the south side of Chennault Beach Drive as described in Chennault Beach Drive Drainage Improvements project (CIP Rank 1).	
Level of service	Closed drainage systems shall be designed to convey flows from a 25-year recurrence storm event.	
Recommended predesign refinements	Conduct a pipe condition assessment to confirm the existing pipe in the proposed CIP, as shown in Figure 6, is in good condition.	
Cost estimate	Gravity storm drain: install 1,270 feet of 12-inch-diameter pipe in ROW	$891,000
	Gravity storm drain: install 390 feet of 18-inch-diameter pipe (deep trench) in ROW	$378,000
	Subtotal line-item costs	*$1,269,000*
	Contractor overhead, profit, and mobilization (18% of subtotal of line-item costs)	$228,000
	Construction contingency (20% of all above construction costs)	$299,000
	Washington State and Snohomish County sales tax (9.5% of all above construction costs)	$171,000
	Subtotal construction costs	*$1,967,000*
	Construction management and inspection (15% of construction costs)	$295,000
	Administration, engineering design, public outreach, and permitting (30% of construction costs...	$590,000
	CIP 7 project cost	$2,852,000
	Annual O&M costs	$600

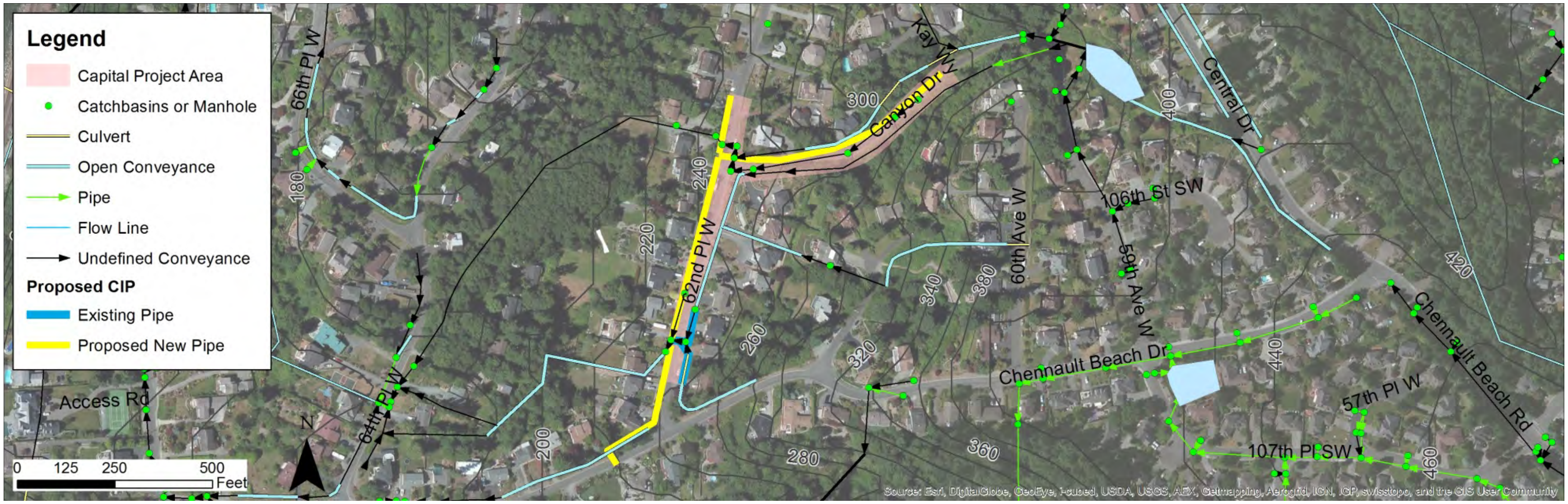


Figure 6. CIP Rank 7, 62nd Place W/Canyon Drive Storm Drainage Improvements

Project number	**CIP Rank 8**	
Project name	10th Street and Loveland Avenue Storm Drainage Improvements	
Location	Along 10th Street from Campbell Avenue to Park Avenue and along Park Avenue from 10th Street to 9th Street	
Schedule	Dependent on funding; currently unfunded	
Problem summary	Drainage along the 10th Street and Park Avenue roadways is conveyed in an under-developed ditch-and-culvert system. Between Campbell and Loveland Avenues along 10th Street, intermittent and under-capacity infrastructure results in private property flooding during heavy rainfall. Also roadway runoff is not directed to inlets resulting in surface water flowing on to private property instead of into the conveyance system. Between Loveland and Park avenues, the under-capacity ditch overflow to private property and stormwater enters homes.	
Description	This project provides drainage improvements along 10th Street and Park Avenue in five areas: • West of Loveland Avenue, the project consists of installing inlets and laterals along the north side of 10th Street to Park Avenue. The laterals will discharge to an existing ditch along the south side of 10th Street. • Also west of Loveland Avenue, a 12-inch diameter pipe will replace a 10-inch diameter pipe that discharges to the west. • For a third area west of Loveland Avenue, a 12-inch-diameter pipe will replace a section of open channel on the east side of Park Avenue between 9th and 10th streets. • East of Loveland Avenue, a 12-inch-diameter pipe will replace a section of open channel on the south side of 10th Street. • Also east of Loveland Avenue, this project includes installing additional inlets and laterals along the north shoulder of 10th Street at the intersection of Campbell Avenue. Existing laterals on the north side of 10th Street, west of Campbell Avenue, would be replaced to improve conveyance capacity. Shoulder work, such as re-grading and installation of asphalt berms or curbs, to direct flows to inlets would be completed. All laterals will discharge to the existing and proposed pipe on the south side of 10th Street.	
Level of service	Closed drainage systems shall be designed to convey flows from a 25-year recurrence storm event.	
Recommended predesign refinements	Although City staff confirmed the diameter of the existing pipe connecting to proposed pipes, a pipe condition assessment is recommended for the existing pipe in the proposed CIP as shown in Figure 7.	
Cost estimate	Gravity storm drain: install 400 feet of 12-inch-diameter pipe in ROW	$159,000
	Gravity storm drain: replace 180 feet of pipe with 12-inch-diameter pipe in ROW	$78,000
	Install 6 inlets and associated laterals that tie into existing system	$86,000
	Improve feet of ROW shoulder	$30,000
	Subtotal line-item costs	*$353,000*
	Contractor overhead, profit, and mobilization (18% of subtotal of line-item costs)	$64,000
	Construction contingency (20% of all above construction costs)	$83,000
	Washington State and Snohomish County sales tax (9.5% of all above construction costs)	$48,000
	Subtotal construction costs	*$548,000*
	Construction management and inspection (15% of construction costs)	$82,000
	Administration, engineering design, public outreach, and permitting (30% of construction costs)	$164,000
	CIP 8 project cost	$794,000
	Annual O&M costs	$200

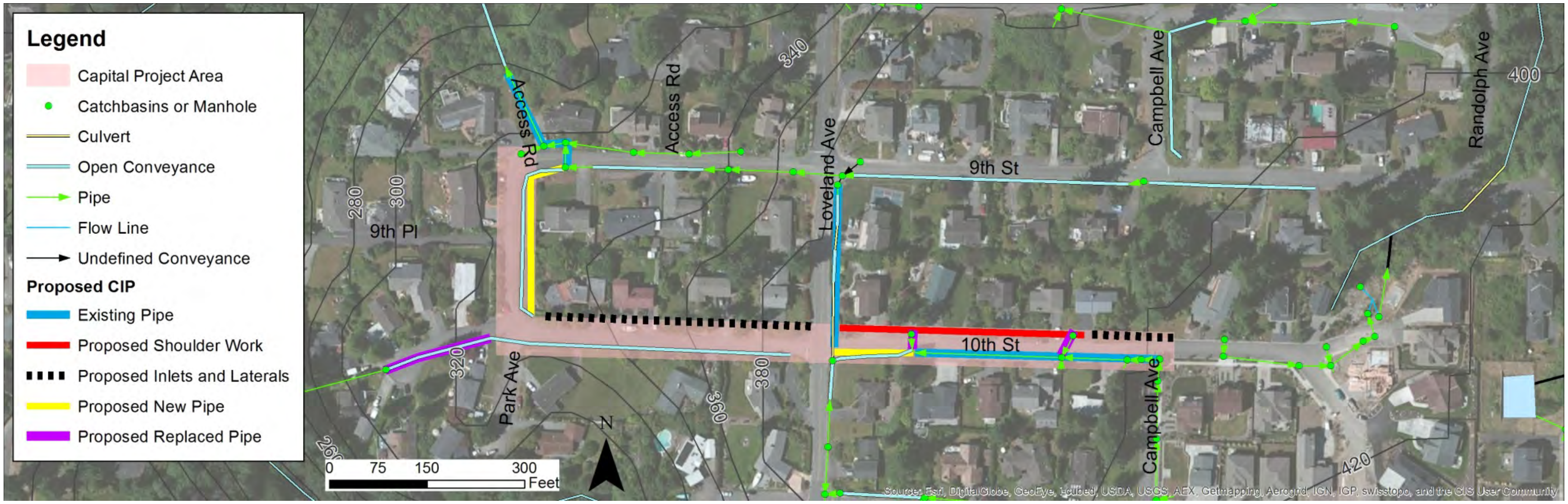


Figure 7. CIP Rank 8, 10th Street and Loveland Storm Drainage Improvement

Attachment A: Cost Estimate Details

Capital Improvement Project Summary Descriptions and Cost Estimates

Project: 145357 Mukilteo Stormwater Retrofit Predesign   Prepared By: CBoyle   Date: 3/3/2015
Task : 003 Tech Support, Capital Improvement Projects   ecked By: RWJacobsen

1 Unit Cost: Install SW piping

Item	Unit	Quantity	Unit Cost	Total Cost with Installation (1)	Source:	Notes:
			Construction Costs			
12" pipe - Light Traffic	LF	1	$ 360	$ 360	Unit Cost from Tabula	see other assumptions below
12" pipe - Heavy Traffic	LF	1	$ 360	$ 360	Unit Cost from Tabula	see other assumptions below
18" pipe - Light Traffic	LF	1	$ 400	$ 400	Unit Cost from Tabula	see other assumptions below
18" pipe - Heavy Traffic	LF	1	$ 410	$ 410	Unit Cost from Tabula	see other assumptions below
18" pipe - 14' Deep	LF	1	$ 600	$ 600	Unit Cost from Tabula	see other assumptions below
36" pipe - Light Traffic	LF	1	$ 600	$ 600	Unit Cost from Tabula	see other assumptions below
36" pipe - Heavy Traffic	LF	1	$ 610	$ 610	Unit Cost from Tabula	see other assumptions below
36" pipe - Jack and Bore	LF	1	$ 3,300	$ 3,300	Unit Cost from Tabula	see other assumptions below

2 Unit Cost: Improve ROW conditions - Curb and Gutter

Item	Unit	Quantity	Unit Cost	Total Cost with Installation (1)	Source:	Notes
			Construction Costs			
Mobilization	LS	1	$ 24	$ 24		10%
Erosion/Water Pollution Control	LS	1	$ 24	$ 24		10%
Project Temporary Traffic Control	LS	1	$ 24	$ 24		10%
SPCC Plan	LS	1	$ 24	$ 24		10%
Clearing and Grubbing	LF	1	$ 1	$ 2	SPU	
Remove existing paving	LF	0.20	$ 30	$ 9	WSDOT	
Regrade	CY	0.33	$ 50	$ 25		CB estimate, assume 1/3 CY total for needed regrading of each lf
Pave ROW	SY	1	$ 20	$ 30		CB estimate
Install asphalt curb and gutter	LF	1	$ 30	$ 30	WSDOT	concrete curb cost
Restoration	LF	1	$ 10	$ 10		CB estimate
TOTAL	**LF**	**1**		**$ 210**		

3 Unit Cost: Improve ROW conditions - Curb and Gutter

Item	Unit	Quantity	Unit Cost	Total Cost with Installation (1)	Source:	Notes
			Construction Costs			
Mobilization	LS	1	$ 5	$ 5		10%
Erosion/Water Pollution Control	LS	1	$ 5	$ 5		10%
Project Temporary Traffic Control	LS	1	$ 5	$ 5		10%
SPCC Plan	LS	1	$ 5	$ 5		10%
Clearing and Grubbing	LF	1	$ 1	$ 2	SPU	
Install berms	LF	1	$ 20	$ 20		CB estimate, assume 2/3 of curb cost
Restoration	LF	1	$ 10	$ 10		CB estimate
TOTAL	**LF**	**1**		**$ 60**		

4 Miscellaneous Unit Costs

Item	Unit	Quantity	Unit Cost	Total Cost with Installation (1)	Source:	Notes
			Construction Costs			
Remove culvert; includes excavation and haul	LF	1	$ 28	$ 42		
Remove CB	LS	1	$ 287	$ 430	SPU	
Remove culvert	LF	1	$ 14	$ 21	SPU	
Remove Pipe	LF	1	$ 19	$ 29		
Install CB and lateral - same side as pipe	LS	1	$ 7,100	$ 10,650	WSDOT, Tabula	assume CB cost from SPU and 10' 12" pipe from Tabula
Install CB and lateral - opposite side of pipe	LS	1	$ 21,500	$ 32,250	WSDOT, Tabula	assume CB cost from SPU and 50' 12" pipe from Tabula
Extensive Landscaping - incl trees and retaining wall	LF	1	$ 20	$ 30		assume 7 mature trees and 500' low retaining wall

(1) For items in this table where material costs were only available, 150% of unit cost was assumed to include installation cost

SPU - Seattle Public Utilities
Tabula is a computer program developed for use by King County staff and consultants to provide conveyance cost estimatesat the planning level.
WSDOT- Washington State Department of Transportation
SPCC- Spill Prevention, Control and Countermeasures

Cost Calculations for Pipe: **12" SW Pipe**

Printed date : 02/24/2015

Project year: 2015

The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc.).

Assumptions

Construction Year: 2015
Length: 1000 ft
Conduit Type: Gravity
Depth of Cover: 5 ft
Trench Backfill Type: Imported
Disposal Type: No Disposal Cost
Manhole Spacing: None
Existing Utilities: Average
Dewatering: Significant
Pavement Restoration: Half Width - Collector Street (18 ft)
Traffic: Light
Land Acquisition: None
Required Easements: None
Land Adjustment Factor: King County Average
Trench Safety: Standard
Pipe Diameter: 12 in.

Geometry

Outer Diameter	1.42 ft
Trench Width	4.34 ft
Excavation Depth	7.42 ft
Complete Surface Rest. Width	6.34 ft

Unit Costs (Basis 2008)

Item	Quantity	Unit	Unit Cost	Item Cost
Excavation	1,190.0	CY	13.00	15,500
Backfill	643.0	CY	34.00	21,900
Complete Pavement Restoration	705.0	SY	86.00	60,600
Overlay Pavement Restoration	1,300.0	SY	28.00	36,300
Trench Safety	14,800.0	SF	0.53	7,860
Spoil Load and Haul	1,190.0	CY	16.00	19,100
Pipe Unit Material Cost	1,000.0	lf	17.00	17,000
Pipe Installation	1,000.0	lf	25.00	25,000
Place Pipe Zone Fill	491.0	CY	34.00	16,700
Existing Utilities	1,000.0	lf	3.00	3,000
Dewatering	1,000.0	lf	80.00	80,000
Traffic Control	1,000.0	lf	8.00	8,000
			Year 2008 Subtotal	$311,000

Mobilization/Demobilization at 6%	1.06
Multiplier from ENRCCI 8815 (2008) to 10386 (2015)	1.18
Effective Multiplier	1.25
Construction Year 2015 Subtotal	$388,000

Tabula estimated cost:	$	388,000
Subtract Mobilization and Contractor Overhead/Profit (18%)	$	69,840
New Total:	$	318,160
Unit Cost:	$	320
Add Unit Disposal Cost ($50/cy)	$	32.15
Adjusted Unit Cost, rounded up:	$	360

Cost Calculations for Pipe: **12" SW Pipe - Heavy Traffic**

Printed date : 03/03/2015

Project year: 2015

The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc.).

Assumptions

Construction Year: 2015
Length: 1000 ft
Conduit Type: Gravity
Depth of Cover: 5 ft
Trench Backfill Type: Imported
Disposal Type: No Disposal Cost
Manhole Spacing: None
Existing Utilities: Average
Dewatering: Significant
Pavement Restoration: Half Width - Collector Street (18 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Land Adjustment Factor: King County Average
Trench Safety: Standard
Pipe Diameter: 12 in.

Geometry

Outer Diameter	1.42 ft
Trench Width	4.34 ft
Excavation Depth	7.42 ft
Complete Surface Rest. Width	6.34 ft

Unit Costs (Basis 2008)

Item	Quantity	Unit	Unit Cost	Item Cost
Excavation	1,190.0	CY	13.00	15,500
Backfill	643.0	CY	34.00	21,900
Complete Pavement Restoration	705.0	SY	86.00	60,600
Overlay Pavement Restoration	1,300.0	SY	28.00	36,300
Trench Safety	14,800.0	SF	0.53	7,860
Spoil Load and Haul	1,190.0	CY	16.00	19,100
Pipe Unit Material Cost	1,000.0	lf	17.00	17,000
Pipe Installation	1,000.0	lf	25.00	25,000
Place Pipe Zone Fill	491.0	CY	34.00	16,700
Existing Utilities	1,000.0	lf	3.00	3,000
Dewatering	1,000.0	lf	80.00	80,000
Traffic Control	1,000.0	lf	16.00	16,000
			Year 2008 Subtotal	$319,000

Mobilization/Demobilization at 6%	1.06
Multiplier from ENRCCI 8815 (2008) to 10386 (2015)	1.18
Effective Multiplier	1.25
Construction Year 2015 Subtotal	$398,000

Year 2015 Total: $398,000

$	398,000	Tabula estimated cost:
$	71,640	Subtract Mobilization and Contractor Overhead/Profit (18%)
$	326,360	New Total:
$	330	Unit Cost:
$	32	Add Unit Disposal Cost ($50/cy)
$	360	Adjusted Unit Cost, rounded up:

Cost Calculations for Pipe: **18" SW Pipe**

Printed date : 02/24/2015

Project year: 2015

The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc.).

Assumptions

Construction Year: 2015
Length: 1000 ft
Conduit Type: Gravity
Depth of Cover: 5 ft
Trench Backfill Type: Imported
Disposal Type: No Disposal Cost
Manhole Spacing: None
Existing Utilities: Average
Dewatering: Significant
Pavement Restoration: Half Width - Collector Street (18 ft)
Traffic: Light
Land Acquisition: None
Required Easements: None
Land Adjustment Factor: King County Average
Trench Safety: Standard
Pipe Diameter: 18 in.

Geometry

Outer Diameter	1.92 ft
Trench Width	4.99 ft
Excavation Depth	7.92 ft
Complete Surface Rest. Width	6.99 ft

Unit Costs (Basis 2008)

Item	Quantity	Unit	Unit Cost	Item Cost
Excavation	1,460.0	CY	13.00	19,000
Backfill	740.0	CY	34.00	25,100
Complete Pavement Restoration	777.0	SY	86.00	66,800
Overlay Pavement Restoration	1,220.0	SY	28.00	34,200
Trench Safety	15,800.0	SF	0.53	8,390
Spoil Load and Haul	1,460.0	CY	16.00	23,400
Pipe Unit Material Cost	1,000.0	lf	24.00	24,000
Pipe Installation	1,000.0	lf	29.00	29,000
Place Pipe Zone Fill	617.0	CY	34.00	21,000
Existing Utilities	1,000.0	lf	3.00	3,000
Dewatering	1,000.0	lf	87.00	87,000
Traffic Control	1,000.0	lf	8.00	8,000
			Year 2008 Subtotal	$349,000

Mobilization/Demobilization at 6%	1.06
Multiplier from ENRCCI 8815 (2008) to 10386 (2015)	1.18
Effective Multiplier	1.25
Construction Year 2015 Subtotal	$436,000

Tabula estimated cost:	$	436,000
Subtract Mobilization and Contractor Overhead/Profit (18%)	$	78,480
New Total:	$	357,520
Unit Cost:	$	360
Add Unit Disposal Cost ($50/cy)	$	37.00
Adjusted Unit Cost, rounded up:	$	400

Cost Calculations for Pipe: **18" SW Pipe Heavy Traffic**

Printed date : 03/03/2015

Project year: 2015

The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc.).

Assumptions

Construction Year: 2015
Length: 1000 ft
Conduit Type: Gravity
Depth of Cover: 5 ft
Trench Backfill Type: Imported
Disposal Type: No Disposal Cost
Manhole Spacing: None
Existing Utilities: Average
Dewatering: Significant
Pavement Restoration: Half Width - Collector Street (18 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Land Adjustment Factor: King County Average
Trench Safety: Standard
Pipe Diameter: 18 in.

Geometry

Outer Diameter	1.92 ft
Trench Width	4.99 ft
Excavation Depth	7.92 ft
Complete Surface Rest. Width	6.99 ft

Unit Costs (Basis 2008)

Item	Quantity	Unit	Unit Cost	Item Cost
Excavation	1,460.0	CY	13.00	19,000
Backfill	740.0	CY	34.00	25,100
Complete Pavement Restoration	777.0	SY	86.00	66,800
Overlay Pavement Restoration	1,220.0	SY	28.00	34,200
Trench Safety	15,800.0	SF	0.53	8,390
Spoil Load and Haul	1,460.0	CY	16.00	23,400
Pipe Unit Material Cost	1,000.0	lf	24.00	24,000
Pipe Installation	1,000.0	lf	29.00	29,000
Place Pipe Zone Fill	617.0	CY	34.00	21,000
Existing Utilities	1,000.0	lf	3.00	3,000
Dewatering	1,000.0	lf	87.00	87,000
Traffic Control	1,000.0	lf	16.00	16,000
			Year 2008 Subtotal	$357,000

Mobilization/Demobilization at 6%	1.06
Multiplier from ENRCCI 8815 (2008) to 10386 (2015)	1.18
Effective Multiplier	1.25
Construction Year 2015 Subtotal	$446,000

Year 2015 Total: $446,000

$	446,000	Tabula estimated cost:
$	80,280	Subtract Mobilization and Contractor Overhead/Profit (18%)
$	365,720	New Total:
$	370	Unit Cost:
$	37.00	Add Unit Disposal Cost ($50/cy)
$	410	Adjusted Unit Cost, rounded up:

Cost Calculations for Pipe: **18" SW Pipe 14' Deep**

Printed date : 03/03/2015

Project year: 2015

The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc.).

Assumptions

Construction Year: 2015
Length: 1000 ft
Conduit Type: Gravity
Depth of Cover: 14 ft
Trench Backfill Type: Imported
Disposal Type: No Disposal Cost
Manhole Spacing: None
Existing Utilities: Average
Dewatering: Significant
Pavement Restoration: Half Width - Collector Street (18 ft)
Traffic: Light
Land Acquisition: None
Required Easements: None
Land Adjustment Factor: King County Average
Trench Safety: Standard
Pipe Diameter: 18 in.

Geometry

Outer Diameter	1.92 ft
Trench Width	4.99 ft
Excavation Depth	16.9 ft
Complete Surface Rest. Width	6.99 ft

Unit Costs (Basis 2008)

Item	Quantity	Unit	Unit Cost	Item Cost
Excavation	3,130.0	CY	13.00	40,700
Backfill	2,400.0	CY	34.00	81,700
Complete Pavement Restoration	777.0	SY	86.00	66,800
Overlay Pavement Restoration	1,220.0	SY	28.00	34,200
Trench Safety	33,800.0	SF	0.53	17,900
Spoil Load and Haul	3,130.0	CY	16.00	50,000
Pipe Unit Material Cost	1,000.0	lf	24.00	24,000
Pipe Installation	1,000.0	lf	29.00	29,000
Place Pipe Zone Fill	617.0	CY	34.00	21,000
Existing Utilities	1,000.0	lf	3.00	3,000
Dewatering	1,000.0	lf	87.00	87,000
Traffic Control	1,000.0	lf	8.00	8,000
			Year 2008 Subtotal	$463,000

Mobilization/Demobilization at 6%	1.06
Multiplier from ENRCCI 8815 (2008) to 10386 (2015)	1.18
Effective Multiplier	1.25
Construction Year 2015 Subtotal	$579,000

Year 2015 Total: $579,000

Tabula estimated cost:	$	579,000
Subtract Mobilization and Contractor Overhead/Profit (18%)	$	104,220
New Total:	$	474,780
Unit Cost:	$	480
Add Unit Disposal Cost ($50/cy)	$	120
Adjusted Unit Cost, rounded up:	$	600

Cost Calculations for Pipe: **36" SW Pipe**

Printed date : 02/24/2015

Project year: 2015

The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc.).

Assumptions

Construction Year: 2015
Length: 1000 ft
Conduit Type: Gravity
Depth of Cover: 5 ft
Trench Backfill Type: Imported
Disposal Type: No Disposal Cost
Manhole Spacing: None
Existing Utilities: Average
Dewatering: Significant
Pavement Restoration: Half Width - Collector Street (18 ft)
Traffic: Light
Land Acquisition: None
Required Easements: None
Land Adjustment Factor: King County Average
Trench Safety: Standard
Pipe Diameter: 36 in.

Geometry

Outer Diameter	3.67 ft
Trench Width	7.27 ft
Excavation Depth	9.67 ft
Complete Surface Rest. Width	9.27 ft

Unit Costs (Basis 2008)

Item	Quantity	Unit	Unit Cost	Item Cost
Excavation	2,600.0	CY	13.00	33,800
Backfill	1,080.0	CY	34.00	36,600
Complete Pavement Restoration	1,030.0	SY	86.00	88,500
Overlay Pavement Restoration	970.0	SY	28.00	27,200
Trench Safety	19,300.0	SF	0.53	10,200
Spoil Load and Haul	2,600.0	CY	16.00	41,600
Pipe Unit Material Cost	1,000.0	lf	77.00	77,000
Pipe Installation	1,000.0	lf	45.00	45,000
Place Pipe Zone Fill	1,130.0	CY	34.00	38,600
Existing Utilities	1,000.0	lf	11.00	11,000
Dewatering	1,000.0	lf	107.00	107,000
Traffic Control	1,000.0	lf	12.00	12,000
			Year 2008 Subtotal	$529,000

Mobilization/Demobilization at 6%	1.06
Multiplier from ENRCCI 8815 (2008) to 10386 (2015)	1.18
Effective Multiplier	1.25
Construction Year 2015 Subtotal	$660,000

$	660,000	Tabula estimated cost:
$	118,800	Subtract Mobilization and Contractor Overhead/Profit (18%)
$	541,200	New Total:
$	550	Unit Cost:
$	54.00	Add Unit Disposal Cost ($50/cy)
$	600	Adjusted Unit Cost, rounded up:

Cost Calculations for Pipe: **36" SW Pipe - Heavy Traffic**

Printed date : 03/03/2015

Project year: 2015

The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc.).

Assumptions

Construction Year: 2015
Length: 1000 ft
Conduit Type: Gravity
Depth of Cover: 5 ft
Trench Backfill Type: Imported
Disposal Type: No Disposal Cost
Manhole Spacing: None
Existing Utilities: Average
Dewatering: Significant
Pavement Restoration: Half Width - Collector Street (18 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Land Adjustment Factor: King County Average
Trench Safety: Standard
Pipe Diameter: 36 in.

Geometry

Outer Diameter	3.67 ft
Trench Width	7.27 ft
Excavation Depth	9.67 ft
Complete Surface Rest. Width	9.27 ft

Unit Costs (Basis 2008)

Item	Quantity	Unit	Unit Cost	Item Cost
Excavation	2,600.0	CY	13.00	33,800
Backfill	1,080.0	CY	34.00	36,600
Complete Pavement Restoration	1,030.0	SY	86.00	88,500
Overlay Pavement Restoration	970.0	SY	28.00	27,200
Trench Safety	19,300.0	SF	0.53	10,200
Spoil Load and Haul	2,600.0	CY	16.00	41,600
Pipe Unit Material Cost	1,000.0	lf	77.00	77,000
Pipe Installation	1,000.0	lf	45.00	45,000
Place Pipe Zone Fill	1,130.0	CY	34.00	38,600
Existing Utilities	1,000.0	lf	11.00	11,000
Dewatering	1,000.0	lf	107.00	107,000
Traffic Control	1,000.0	lf	24.00	24,000
			Year 2008 Subtotal	$541,000

Mobilization/Demobilization at 6%	1.06
Multiplier from ENRCCI 8815 (2008) to 10386 (2015)	1.18
Effective Multiplier	1.25
Construction Year 2015 Subtotal	$675,000

Year 2015 Total: $675,000

Tabula estimated cost:	$	675,000
Subtract Mobilization and Contractor Overhead/Profit (18%)	$	121,500
New Total:	$	553,500
Unit Cost:	$	560
Add Unit Disposal Cost ($50/cy)	$	54.00
Adjusted Unit Cost, rounded up:	$	610

Cost Calculations for Jack and Bore: **Jack and Bore**

Printed date : 03/03/2015

Project year: 2015

The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc.). Unless added as an Additional Costs item in the estimate, this cost does NOT include land acquisition costs.

Assumptions

Construction Year: 2015
Inside Diameter: 36 in.
Length: 110 ft
Dewatering: Minimal
Launch Shaft Existing Utilities: Average
Launch Shaft Excavation Depth: 15 ft
Launch Shaft Surface Restoration: Hydroseed
Retrieval Shaft Excavation Depth: 20 ft
Retrieval Shaft Surface Restoration: Hydroseed
Retrieval Shaft Existing Utilities: Average
Tunnel Easement Length: 0 ft
Easement Type: None
Traffic: Heavy
Casing Required: true
Land Adjustment Factor: King County Average

Tunnel Geometry

Outer Diameter	4.83 ft
Spoils Volume	74.6 CY
Casing Pipe Diameter	48 in

Launch Shaft Geometry

Width	16 ft
Length	27 ft
Footprint	432 SF
Volume	240 CY
Easement Footprint	2,620 SF

Retrieval Shaft Geometry

Width	16 ft
Length	22 ft
Footprint	352 SF
Volume	261 CY
Easement Footprint	2,390 SF

Miscellaneous

Spoils Loads	8 loads

Unit Costs (Basis 2008)

Item	Quantity	Unit	Unit Cost	Item Cost
Spoils Haul	74.6	CY	33.0	2,460
Launch Shaft Excavation/Backfill	240.0	CY	25.0	6,000
Launch Shaft Shoring	1,290.0	SF	37.8	48,700
Launch Shaft Existing Utilities	432.0	SF	6.0	2,590
Launch Shaft Surface Restoration	48.0	SY	3.0	144
Retrieval Shaft Excavation/Backfill	261.0	CY	25.0	6,520
Retrieval Shaft Shoring	1,520.0	SF	47.0	71,400
Retrieval Shaft Existing Utilities	352.0	SF	6.0	2,110
Retrieval Shaft Surface Restoration	39.1	SY	3.0	117
Cased Carrier Pipe Cost	110.0	ft	223.0	24,500
Boring Cost	110.0	ft	1,140.0	126,000
Tunnel Dewatering	1.0	LS	8,500.0	8,500
Traffic Control	2.0	shaft	27,600.0	55,200
			Year 2008 Subtotal	$354,000

Mobilization/Demobilization at 6%	1.06
Multiplier from ENRCCI 8815 (2008) to 10386 (2015)	1.18
Effective Multiplier	1.25
Construction Year 2015 Subtotal	$442,000

Year 2015 Total: $442,000

$	442,000	Tabula estimated cost:
$	79,560	Subtract Mobilization and Contractor Overhead/Profit (18%)
$	362,440	New Total:
$	3,300	Adjusted Unit Cost, rounded up:

Project: 145357 Mukilteo Stormwater Retrofit Predesign Prepared By: CBoyle Date: 3/3/2015
Task : 003 Tech Support, Capital Improvement Projects Checked By: RWJacobsen

CIP Rank # 1 - Chennault Beach Drive Drainage Improvements

Construction Costs					
Item	**Unit**	**Quantity**	**Unit Cost**	**Total Cost**	**Notes:**
12" Gravity Storm Drain					
Install 1,400 feet of 12-inch-diameter pipe in ROW, heavy traffic	LF	1400	$ 360	$ 504,000	See Item 1 on Unit Costs worksheet
Install CBs and laterals - same side of pipe	EA	10	$ 10,650	$ 106,500	assume 1 CB every 150 ft per Mukilteo design standards
Install CB and lateral - opposite side of pipe	EA	10	$ 32,250	$ 322,500	assume 1 CB every 150 ft per Mukilteo design standards
Remove existing driveway culverts	LS	14	$ 500	$ 7,000	CB estimate, assume 1 driveway every 100 ft
Cement Concrete driveway	CY	14	$ 146	$ 2,046	SPU, assume 1 CY per driveway
TOTAL:				$ 942,046	
18" Gravity Storm Drain					
Install 730 feet of 18-inch-diameter pipe in ROW, heavy traffic	LF	730	$ 410	$ 299,300	See Item 1 on Unit Costs worksheet
Install CBs and laterals - same side of pipe	EA	5	$ 10,650	$ 53,250	assume 1 CB every 150 ft per Mukilteo design standards
Install CB and lateral - opposite side of pipe	EA	5	$ 32,250	$ 161,250	assume 1 CB every 150 ft per Mukilteo design standards
Remove existing driveway culverts	LS	8	$ 500	$ 4,000	CB estimate, assume 1 driveway every 100 ft
Cement Concrete driveway	CY	8	$ 146	$ 1,169	SPU, assume 1 CY per driveway
TOTAL:				$ 518,969	
18" Gravity Storm Outfall Pipe					
Install 170 feet of 18-inch-diameter pipe in ROW, heavy traffic	LF	170	$ 410	$ 69,700	See Item 1 on Unit Costs worksheet
remove exiting outfall	LF	170	$ 29	$ 4,970	See Item 4 on Unit Costs worksheet
TOTAL:				$ 74,670	
Improve 270 feet of shoulder ROW	LF	270	$ 210	$ 56,700	See Item 2 on Unit Costs worksheet
Maintenance Easement	SF	1500	$ 30	$ 45,000	
Annual O&M Cost	EA	15	$ 50	$ 750	assume 1/2 of CBs inspected and cleaned per year

Project: 145357 Mukilteo Stormwater Retrofit Predesign | Prepared By: CBoyle | Date: 3/3/2015
Task : 003 Tech Support, Capital Improvement Projects | Checked By: RWJacobsen

CIP Rank # 2 - Mukilteo Lane Drainage Improvements

Construction Costs					
Item	**Unit**	**Quantity**	**Unit Cost**	**Total Cost**	**Notes:**
Gravity line: Install 2,100 feet of 12" pipe in ROW, heavy traffic	LS	2100	$ 360	$ 756,000	See Item 1 on Unit Costs worksheet
Install CBs and laterals - same side of pipe	EA	14	$ 10,650	$ 149,100	assume 1 CB every 150 ft per Mukilteo design standards
TOTAL:				$ 905,100	
Gravity Storm Drain					
Replace 1,260 feet of pipe with 12" pipe in ROW, heavy traffic, heavy traffic	LF	1260	$ 360	$ 453,600	See Item 1 on Unit Costs worksheet
Demolition of existing pipe	LF	1260	$ 42	$ 52,920	See Item 4 on Unit Costs worksheet
Install CBs and laterals - same side of pipe	EA	9	$ 10,650	$ 95,850	assume 1 CB every 150 ft per Mukilteo design standards
TOTAL:				$ 506,520	
Gravity line: Install 230 feet of 36" pipe in ROW, heavy traffic	LF	320	$ 610	$195,200	See Item 1 on Unit Costs worksheet
Gravity Storm Drain					
Replace 640 feet of pipe with 36-inch-diameter pipe in ROW, heavy traffic	LF	640	$ 610	$ 390,400	See Item 1 on Unit Costs worksheet
Demolition of existing pipe	LF	640	$ 29	$ 18,711	See Item 4 on Unit Costs worksheet
Install CBs and laterals - same side of pipe	EA	5	$ 10,650	$ 53,250	assume 1 CB every 150 ft per Mukilteo design standards
TOTAL:				$ 409,111	
48-inch jack and bore underneath railroad with 36-inch carrier pipe	LF	110	$ 3,300	$ 363,000	See Item 1 on Unit Costs worksheet
Contaminated Soil Removal	CY	1613	$ 100	$ 161,333	Area is 20' along pipe between 1st Street and Front Street. Unit cost from City of Everett smelter clean up
Install a 130 by 12 by 10 sediment collection vault in ROW	LS	1	$ 289,500	$ 289,500	based on vendor quote, added 50% for installation (earthwork, subgrade prep, etc.)
Annual O&M Cost	EA	14	$ 50	$ 700	assume 1/2 of CBs inspected and cleaned per year

Project: 145357 Mukilteo Stormwater Retrofit Predesign
Task : 003 Tech Support, Capital Improvement Projects

Prepared By: CBoyle Date: 3/3/2015
Checked By: RWJacobsen

CIP Rank # 3 - 84th Street SW (West) Storm Drainage Improvements

Construction Costs					
Item	**Unit**	**Quantity**	**Unit Cost**	**Total Cost**	**Notes:**
Gravity Storm Drain					
Install 1,080 feet of 12-inch-diameter pipe in ROW	LF	1080	$ 360	$ 388,800	See Item 1 on Unit Costs worksheet
Install CB and lateral - same side as pipe	EA	8	$ 10,650	$ 85,200	assume 1 CB every 150 ft per Mukilteo design standards
Remove Pipe/culvert	LF	1080	$ 29	$ 31,574	Assume equal to installed pipe length.
Remove CB	EA	3	$ 430	$ 1,290	assume remove 1 CB every 500 ft
Remove existing driveway culverts	LS	11	$ 500	$ 5,500	assume 1 driveway every 100 ft
Cement Concrete driveway	CY	11	$ 146	$ 1,608	assume 1 CY per driveway
TOTAL:				$ 513,972	
Install 60 feet of 36-inch-diameter pipe in ROW	LF	60	$ 600	$ 36,000	See Item 1 on Unit Costs worksheet
Remove existing pipe	LF	60	$ 29	$ 1,754	See Item 4 on Unit Costs worksheet
TOTAL:				$ 37,754	
Annual O&M Cost	EA	4	$ 50	$ 200	assume 1/2 of CBs inspected and cleaned per year

Project: 145357 Mukilteo Stormwater Retrofit Predesign Prepared By: CBoyle Date: 3/3/2015
Task : 003 Tech Support, Capital Improvement Projects Checked By: RWJacobsen

CIP Rank # 4 & 5 - 64th Place W and 66th Place W Street Drainage Improvements

Construction Costs					
Item	**Unit**	**Quantity**	**Unit Cost**	**Total Cost**	**Notes:**
Gravity Storm Drain					
Install 750 feet of 12-inch-diameter pipe in ROW	LF	750	$ 360	$ 270,000	See Item 1 on Unit Costs worksheet
Install CB and lateral - same side as pipe	EA	5	$ 10,650	$ 53,250	assume 1 CB every 150 ft per Mukilteo design standards
Install CB and lateral - opposite side of pipe	EA	5	$ 32,250	$ 161,250	assume 1 CB every 150 ft per Mukilteo design standards
Remove Pipe/culvert	LF	750	$ 29	$ 21,926	Assume equal to installed pipe length.
Remove CB	EA	2	$ 430	$ 860	assume remove 1 CB every 500 ft
Remove existing driveway culverts	LS	8	$ 500	$ 4,000	assume 1 driveway every 100 ft
Cement Concrete driveway	CY	8	$ 97	$ 1,169	assume 1 CY per driveway
Replace extensive landscaping	LF	750	$ 30	$ 22,500	See Item 4 on Unit Costs worksheet
TOTAL:				$ 534,956	
Annual O&M Cost	EA	5	$ 50	$ 250	assume 1/2 of CBs inspected and cleaned per year
Gravity Storm Drain					
Install 880 feet of 12-inch-diameter pipe in ROW	LF	880	$ 360	$ 316,800	See Item 1 on Unit Costs worksheet
Install CB and lateral - same side as pipe	EA	6	$ 10,650	$ 63,900	assume 1 CB every 150 ft per Mukilteo design standards
Install CB and lateral - opposite side of pipe	EA	6	$ 32,250	$ 193,500	assume 1 CB every 150 ft per Mukilteo design standards
Remove Pipe/culvert	LF	880	$ 29	$ 25,727	Assume equal to installed pipe length.
Remove CB	EA	2	$ 430	$ 860	assume remove 1 CB every 500 ft
Remove existing driveway culverts	LS	9	$ 500	$ 4,500	assume 1 driveway every 100 ft
Cement Concrete driveway	CY	9	$ 146	$ 1,316	assume 1 CY per driveway
Replace extensive landscaping	LF	880	$ 30	$ 26,400	See Item 4 on Unit Costs worksheet
TOTAL:				$ 633,002	
Annual O&M Cost	EA	6	$ 50	$ 300	assume 1/2 of CBs inspected and cleaned per year

Project: 145357 Mukilteo Stormwater Retrofit Predesign | Prepared By: CBoyle | Date: 3/3/2015
Task : 003 Tech Support, Capital Improvement Projects | Checked By: RWJacobsen

CIP Rank # 6 - Central Drive Storm Drainage Improvements for Big Gulch Basin

Construction Costs					
Item	**Unit**	**Quantity**	**Unit Cost**	**Total Cost**	**Notes:**
Gravity Storm Drain					
Replace 320 feet of 18-inch-diameter pipe in ROW	LF	320	$ 400	$ 128,000	See Item 1 on Unit Costs worksheet
Install CB and lateral - same side as pipe	EA	3	$ 10,650	$ 31,950	assume 1 CB every 150 ft per Mukilteo design standards
Install CB and lateral - opposite side of pipe	EA	3	$ 32,250	$ 96,750	assume 1 CB every 150 ft per Mukilteo design standards
Remove Pipe/culvert	LF	320	$ 29	$ 9,355	Assume equal to installed pipe length.
Remove CB	EA	1	$ 430	$ 430	assume remove 1 CB every 500 ft
Remove existing driveway culverts	LS	3	$ 500	$ 1,500	assume 1 driveway every 100 ft
Cement Concrete driveway	CY	3	$ 146	$ 439	assume 1 CY per driveway
TOTAL:				$ 268,424	
Gravity Storm Drain					
Install 2,650 feet of 12-inch-diameter pipe in ROW	LF	2650	$ 360	$ 954,000	See Item 1 on Unit Costs worksheet
Install CB and lateral - same side as pipe	EA	18	$ 10,650	$ 191,700	assume 1 CB every 150 ft per Mukilteo design standards
Install CB and lateral - opposite side of pipe	EA	18	$ 32,250	$ 580,500	assume 1 CB every 150 ft per Mukilteo design standards
Remove Pipe/culvert	LF	2650	$ 29	$ 77,473	Assume equal to installed pipe length.
Remove CB	EA	6	$ 430	$ 2,580	assume remove 1 CB every 500 ft
Remove existing driveway culverts	LS	27	$ 500	$ 13,500	assume 1 driveway every 100 ft
Cement Concrete driveway	CY	27	$ 146	$ 3,947	assume 1 CY per driveway
TOTAL:				$ 1,823,700	
Maintenance Easement	SF	5700	$ 30	$ 171,000	assume 15' wide easement and measured length
Annual O&M Cost	EA	21	$ 50	$ 1,050	assume 1/2 of CBs inspected and cleaned per year

Capital Improvement Project Summary Descriptions and Cost Estimates

Project: 145357 Mukilteo Stormwater Retrofit Predesign Prepared By: CBoyle Date: 3/3/2015
Task : 003 Tech Support, Capital Improvement Projects Checked By: RWJacobsen

CIP Rank # 7 - 62nd Place W/Canyon Drive Storm Drainage Improvements

Construction Costs					
Item	**Unit**	**Quantity**	**Unit Cost**	**Total Cost**	**Notes:**
Gravity Storm Drain					
Install 1,270 feet of 12-inch-diameter pipe in ROW	LF	1270	$ 360	$ 457,200	See Item 1 on Unit Costs worksheet
Install CB and lateral - same side as pipe	EA	9	$ 10,650	$ 95,850	assume 1 CB every 150 ft per Mukilteo design standards
Install CB and lateral - opposite side of pipe	EA	9	$ 32,250	$ 290,250	assume 1 CB every 150 ft per Mukilteo design standards
Remove Pipe/culvert	LF	1270	$ 29	$ 37,129	Assume equal to installed pipe length.
Remove CB	EA	3	$ 430	$ 1,290	assume remove 1 CB every 500 ft
Remove existing driveway culverts	LS	13	$ 500	$ 6,500	CB estimate, assume 1 driveway every 100 ft
Cement Concrete driveway	CY	13	$ 146	$ 1,900	SPU, assume 1 CY per driveway
TOTAL:				$ 890,119	
Gravity Storm Drain					
Install 390 feet of 18-inch-diameter pipe in ROW, 14 feet deep	LF	390	$ 600	$ 234,000	See Item 1 on Unit Costs worksheet
Install CB and lateral - same side as pipe	EA	3	$ 10,650	$ 31,950	assume 1 CB every 150 ft per Mukilteo design standards
Install CB and lateral - opposite side of pipe	EA	3	$ 32,250	$ 96,750	assume 1 CB every 150 ft per Mukilteo design standards
Remove Pipe/culvert	LF	390	$ 29	$ 11,402	Assume equal to installed pipe length.
Remove CB	EA	1	$ 430	$ 430	assume remove 1 CB every 500 ft
Remove existing driveway culverts	LS	4	$ 500	$ 2,000	CB estimate, assume 1 driveway every 100 ft
Cement Concrete driveway	CY	4	$ 146	$ 584.70	SPU, assume 1 CY per driveway
TOTAL:				$ 377,116	
Annual O&M Cost	EA	12	$ 50	$ 600	assume 1/2 of CBs inspected and cleaned per year

Project: 145357 Mukilteo Stormwater Retrofit Predesign | Prepared By: CBoyle | Date: 3/3/2015
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CIP Rank # 8 - 10th Street and Loveland Avenue Storm Drainage Improvements

Construction Costs					
Item	**Unit**	**Quantity**	**Unit Cost**	**Total Cost**	**Notes:**
Gravity Storm Drain					
Install 400 feet of 12-inch-diameter pipe in ROW	LF	400	$ 360	$ 144,000	See Item 1 on Unit Costs worksheet
Remove Pipe/culvert	LF	400	$ 29	$ 11,694	Assume equal to installed pipe length.
Remove CB	EA	1	$ 430	$ 430	assume remove 1 CB every 500 ft
Remove existing driveway culverts	LS	4	$ 500	$ 2,000	CB estimate, assume 1 driveway every 100 ft
Cement Concrete driveway	CY	4	$ 97	$ 585	SPU, assume 1 CY per driveway
TOTAL:				$ 158,709	
Gravity Storm Drain					
Replace 180 feet of 12-inch-diameter pipe in ROW	LF	180	$ 360	$ 64,800	See Item 1 on Unit Costs worksheet
Remove Pipe/culvert	LF	180	$ 29	$ 5,262	Assume equal to installed pipe length.
Remove CB	EA	1	$ 430	$ 430	assume remove 1 CB every 500 ft
Remove existing driveway culverts	LS	2	$ 500	$ 1,000	CB estimate, assume 1 driveway every 100 ft
Cement Concrete driveway	CY	2	$ 146	$ 292.35	SPU, assume 1 CY per driveway
Demolition of existing pipe	LF	180	$ 29	$ 5,262	See Item 4 on Unit Costs worksheet
TOTAL:				$ 77,047	
Install CB and lateral - same side as pipe	EA	8	$ 10,650	$ 85,200	Quantity estimate City instruction
Improve 500 feet of ROW shoulder	LS	500	$ 60	$ 30,000	See Item 3 on Unit Costs worksheet
Annual O&M Cost	EA	4	$ 50	$ 200	assume 1/2 of CBs inspected and cleaned per year

Attachment B: Hydrologic Modeling and Pipe Sizing Summary

HEC-HMS model subbasins and junctions are shown the Figures B-1 through B-3. Subbasin input values are summarized on Table B-1. Design flows and locations of design flows (subbasin or junction) are summarized in Table B-2.

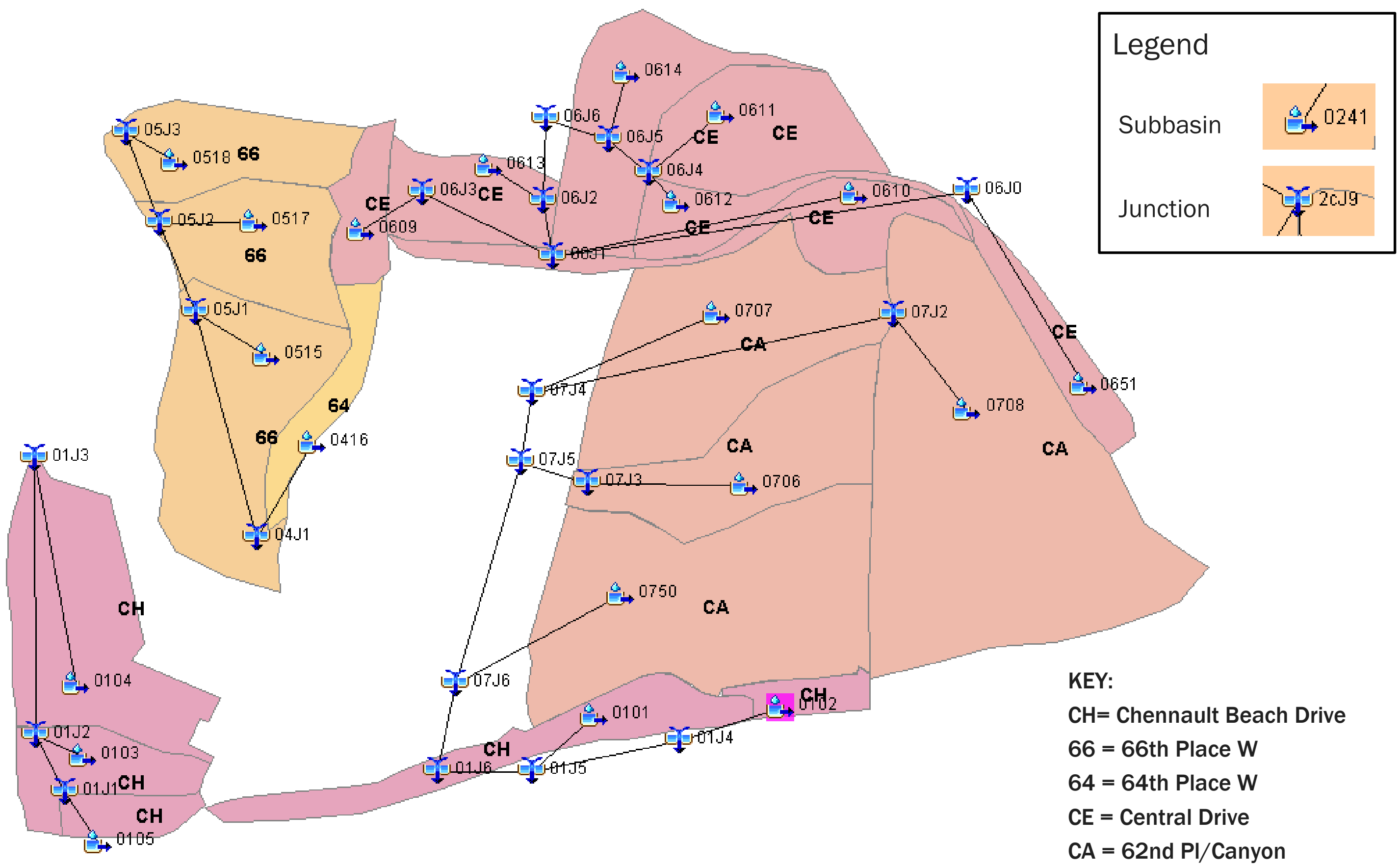
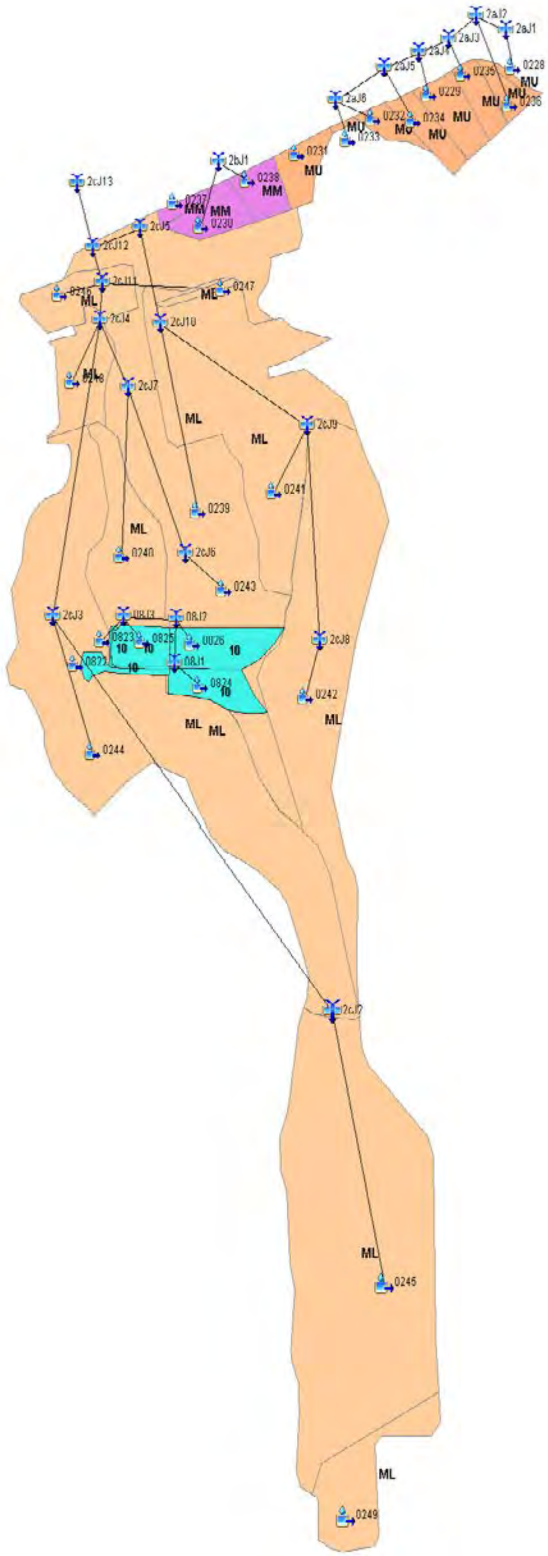
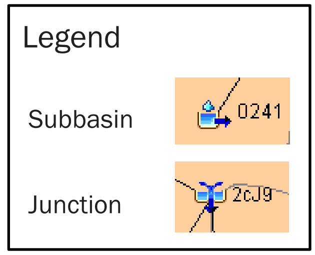


Figure B-1. HEC-HMS Subbasins and Junctions for CIP Rank 1 (Chennault Beach Drive), Rank 4 (64th Place W), Rank 5 (66th Place W), Rank 6 (Central Drive), and Rank 7 (62nd Pl/Canyon).





KEY:
ML = Western Mukilteo Lane
MM = Middle Mukilteo Lane
MU = Eastern Mukilteo Lane

Figure B-2. HEC-HMS Subbasins and Junctions for CIP Rank 2 (Mukilteo Lane)

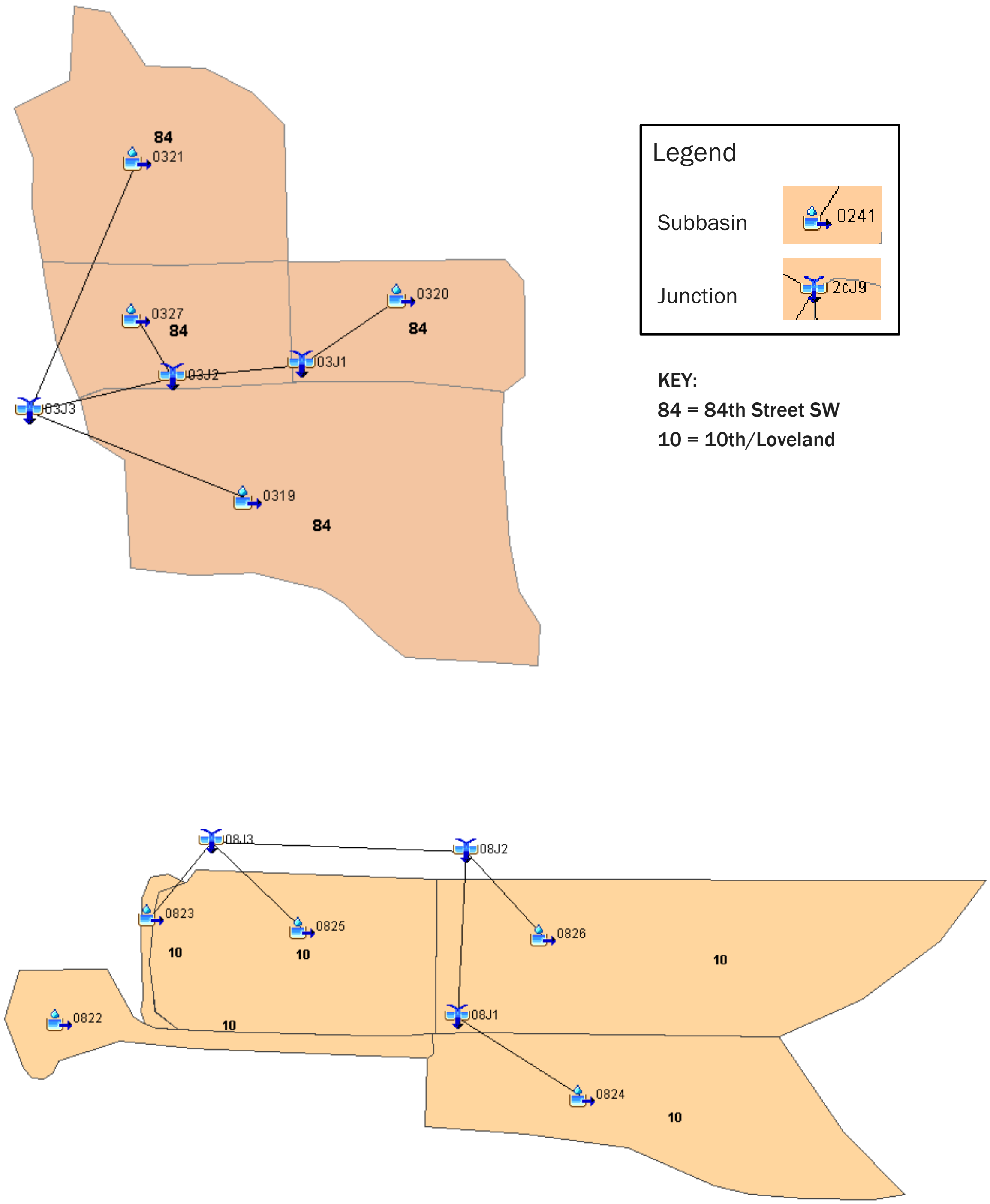


Figure B-3. HEC-HMS Subbasins and Junctions for CIP Rank 3 (84th St SW) and Rank 8 (10th/Loveland)

Table B-1. CIP Hydrologic Modeling Input Values							
CIP Rank No.	Project Short Name	HEC-HMS Subbasin ID	Area (acre)	Composite Curve Number	Average Basin Slope (percent)	Hydraulic Length (feet)	Lag Time [a] (hours)
1	Chennault Beach Drive	101	2.90	83	12.1	1,326	6.2
1	Chennault Beach Drive	102	0.73	83	12.3	393	2.3
1	Chennault Beach Drive	103	1.90	83	8.5	570	3.8
1	Chennault Beach Drive	104	5.39	83	11.8	881	4.5
1	Chennault Beach Drive	105	0.87	83	7.8	374	2.8
2	Mukilteo Lane	228	0.4	83	7.8	722	4.8
2	Mukilteo Lane	229	3.49	85	11.2	830	4.1
2	Mukilteo Lane	230	3.15	79	19.5	804	3.8
2	Mukilteo Lane	231	2.74	82	19.3	805	3.5
2	Mukilteo Lane	232	1.62	86	18.8	686	2.7
2	Mukilteo Lane	233	0.20	75	12.9	208	1.7
2	Mukilteo Lane	234	2.61	86	16.4	806	3.2
2	Mukilteo Lane	235	2.23	83	8.8	638	4.1
2	Mukilteo Lane	236	1.57	83	8.5	483	3.3
2	Mukilteo Lane	237	0.87	86	17.9	511	2.1
2	Mukilteo Lane	238	2.69	76	19.0	373	2.2
2	Mukilteo Lane	239	42.60	74	16.3	3,877	16.6
2	Mukilteo Lane	240	11.59	79	18.2	1,306	5.7
2	Mukilteo Lane	241	34.45	70	13.8	2,967	16.5
2	Mukilteo Lane	242	36.07	78	13.8	3,429	14.5
2	Mukilteo Lane	243	15.02	83	8.8	2,450	12.0
2	Mukilteo Lane	244	60.46	81	16.4	5,141	16.6
2	Mukilteo Lane	245	62.25	74	7.3	3,105	21.2
2	Mukilteo Lane	246	5.66	90	14.7	572	2.2
2	Mukilteo Lane	247	0.64	98	5.6	781	3.1
2	Mukilteo Lane	248	6.20	80	17.0	754	3.6
2	Mukilteo Lane	249	8.56	90	7.9	850	4.2
3	84th Street SW	319	17.5	87	9.7	1,625	7.2
3	84th Street SW	320	5.60	87	11.0	915	4.3
3	84th Street SW	321	9.83	83	7.8	978	6.1
3	84th Street SW	327	5.74	83	10.2	640	3.8
4	64th Place W	416	1.25	83	9.0	706	4.4
5	66th Place W	515	5.64	83	14.0	791	3.8
5	66th Place W	517	3.11	83	16.4	546	2.6

Table B-1. CIP Hydrologic Modeling Input Values							
CIP Rank No.	Project Short Name	HEC-HMS Subbasin ID	Area (acre)	Composite Curve Number	Average Basin Slope (percent)	Hydraulic Length (feet)	Lag Time[a] (hours)
5	66th Place W	518	2.85	83	14.3	693	3.4
6	Central Drive	609	1.21	83	12.4	189	1.3
6	Central Drive	610	2.61	78	12.0	1241	6.9
6	Central Drive	611	3.44	83	10.5	774	4.4
6	Central Drive	612	1.49	83	12.2	1,206	5.8
6	Central Drive	613	2.26	83	11.2	706	3.9
6	Central Drive	614	3.75	83	12.3	652	3.5
6	Central Drive	651	1.45	83	5.3	774	6.1
7	62nd Pl/Canyon	706	4.46	83	14.3	840	4.0
7	62nd Pl/Canyon	707	6.84	83	11.9	921	4.7
7	62nd Pl/Canyon	708	14.14	73	9.3	1,252	9.2
7	62nd Pl/Canyon	750	8.99	83	13.5	1,185	5.4
8	10th/Loveland	822	1.02	83	6.5	659	4.9
8	10th/Loveland	823	0.15	83	4.0	275	3.1
8	10th/Loveland	824	3.29	83	6.9	982	6.5
8	10th/Loveland	825	2.82	83	6.9	605	4.4
8	10th/Loveland	826	4.66	83	8.8	862	5.2

a. *Method outlined n NRCS 1997 Engineering Handbook, Part 630 Hydrology.*

Table B-2. CIP Hydrologic Modeling Results and Pipe Sizing Summary								
CIP Rank No.	Project Short Name	HEC-HMS Subbasin or Junction ID	GIS Pipe ID	HEC-HMS Design Flow [a] (cfs)	Maximum Conveyance Capacity of Proposed Pipe [b] (cfs)	Proposed Pipe Length (feet)	Proposed Pipe Slope [c] (feet/feet)	Proposed Pipe Size (in)
1	Chennault Beach Drive	01J5	C0101	1.6	16.5	999	0.184	12
1	Chennault Beach Drive	01J1	C0125	0.39	11.9	386	0.096	12
1	Chennault Beach Drive	01J6	C0103	9.19	25.1	729	0.049	18
1	Chennault Beach Drive	01J6	C0157	9.19	36.2	167	0.102	18
2	Mukilteo Lane	2aJ6	C0204	3.89	12	785	0.097	12
2	Mukilteo Lane	2aJ6	C0235	3.89	9.4	467	0.060	12
2	Mukilteo Lane	2aJ6	C0238	3.89	8.4	455	0.048	12
2	Mukilteo Lane	2bJ1	C0206	1.18	3	683	0.006	12
2	Mukilteo Lane	2bJ1	C0234	1.18	3	720	0.006	12
2	Mukilteo Lane	0231	C0249	0.71	4.9	246	0.016	12
2	Mukilteo Lane	2cJ5	C0248	26.72	190.3	100	0.070	36
2	Mukilteo Lane	2cJ5	C0208	26.72	82	232	0.013	36
2	Mukilteo Lane	2cJ12	C0263	66.45	88.1	542	0.015	36
3	84th Street SW	03J1	C0309	2.27	8.8	419	0.053	12
3	84th Street SW	03J2	C0327	4.08	9.6	615	0.062	12
3	84th Street SW	0321	C0371	2.84	11.9	42	0.096	12
3	84th Street SW	03J3	C0360	12.7	217	55	0.091	36
4	64th Place W	04J1	C4510	0.5	11.6	748	0.091	12
5	66th Place W	05J3	C4511	3.88	11.3	875	0.087	12
6	Central Drive	06J0	C0653	0.65	7.8	341	0.041	12
6	Central Drive	06J1	C0612	1.98	12.1	1250	0.099	12
6	Central Drive	06J6	C0615	5.73	17.2	84	0.201	12
6	Central Drive	06J2	C0631	2.74	9.9	301	0.066	12
6	Central Drive	06J5	C0629	2.99	3.2	292	0.007	12
6	Central Drive	06J5	C0630	2.99	6.7	271	0.030	12
6	Central Drive	06J6	C0615	5.73	17.2	84	0.201	12
6	Central Drive	06J6	C0654	5.73	14.8	241	0.017	18
7	62nd Pl/Canyon	07J4	C0717	3.54	14.5	637	0.143	12
7	62nd Pl/Canyon	0707	C0718	2.18	2.7	151	0.005	12
7	62nd Pl/Canyon	07J5	C0769	5.14	7.9	480	0.042	12
7	62nd Pl/Canyon	07J6	C0772	7.60	8.8	386	0.006	18

Table B-2. CIP Hydrologic Modeling Results and Pipe Sizing Summary								
CIP Rank No.	Project Short Name	HEC-HMS Subbasin or Junction ID	GIS Pipe ID	HEC-HMS Design Flow [a] (cfs)	Maximum Conveyance Capacity of Proposed Pipe [b] (cfs)	Proposed Pipe Length (feet)	Proposed Pipe Slope [c] (feet/feet)	Proposed Pipe Size (in)
8	10th/Loveland	0823	C0822	0.09	7.8	266	0.041	12
8	10th/Loveland	0824	C0823	1.13	16.3	123	0.179	12
8	10th/Loveland	0822	C0864	0.45	11.6	175	0.091	12

a. CIP pipes that are part of the Mukilteo Lane project and that convey Brewery Creek (C0248, C0208, C0263) are sized based on 100-year flow. All other CIP pipes are sized to convey the 25-year flow.

b. Calculated with Manning's equation assuming proposed pipe is 94% full.

c. CIP pipe slope assumed to match the existing pipe slope as estimated from pipe invert elevations in GIS where available. When pipe invert elevations were not available, pipe slope was assumed to match ground surface slope (based on 2-foot contour data) with a minimum slope of 0.005 ft/ft.

Appendix F

Public Flow Control and Water Quality Facilities

Known Flow Control and/or Water Quality Stormwater Facilities 2015

BASIN	FACILITY TYPE	2015 FACILITY NAME	PLAT / PROJECT NAME	LOCATION
A - Edgewater	Detention Pipe	Pipe 34	Lamar Walkway	Mukilteo Blvd. and Lamar Dr.
C - Brewery Creek	Detention Pipe	Pipe 02	Elliot Pointe	1300 Block of Goat Trail Loop Rd.
C - Brewery Creek	Detention Pipe	Pipe 06	Puget Sound Hills	45th Place W. cul-de-sac of 73rd Place W.
C - Brewery Creek	Detention Pipe	Pipe 15	Upper Bell Park	700 Block of Loveland Ave.
C - Brewery Creek	Detention Pipe	Pipe 16	Puget Sound Hills	7200 Block of 44th Place W.
C - Brewery Creek	Detention Pipe	Pipe 38	Wittington St. Improv.	West End of Wittington St.
D - Goat Trail Ravine	Detention Pipe	Pipe 03	Heritage Heights	1600 Block of Washington Ave.
D - Goat Trail Ravine	Detention Pipe	Pipe 04	Elliot Pointe	16th Place W. off Goat Trail Rd.
D - Goat Trail Ravine	Detention Pipe	Pipe 40	Sunnyside Park	601 Washington Court
D - Goat Trail Ravine	Detention Pipe	Pipe 17	Goat Trail Improv. Phase 1	7200 Block of 48th Ave. W.
D - Goat Trail Ravine	Detention Pipe	Pipe 18	Puget Sound Hills 3	73rd Pl. SW btwn 46th Ave. W. and 45th Place W.
D - Goat Trail Ravine	Detention Pipe	Pipe 19	Mariner Heights	73rd Pl. SW cul-de-sac off 48th Ave. W.
D - Goat Trail Ravine	Detention Pipe	Pipe 20	Mariner Heights	7400 Block of 48th Ave. W.
D - Goat Trail Ravine	Detention Pipe	Pipe 21	Olympic View Heights 2	75th St. SW east of 46th Ave. W.
D - Goat Trail Ravine	Detention Pipe	Pipe 45	Olympic View Drng Improv.	Clover Lane and Washington Ave.
D - Goat Trail Ravine	Detention Pipe	Pipe 30	Goat Trail Improv. Phase 2	Goat Trail Rd. and Washington Ave.
D - Goat Trail Ravine	Detention Pipe	Pipe 36	Horiz. Heights Drng Improv.	North End of Horizon Heights Dr.
E - Olympic View	Detention Pipe	Pipe 05	Trophy Heights	45th Ave. W. south of 80th St. SW
E - Olympic View	Detention Pipe	Pipe 07	-	46th Ave. W. south of 80th St. SW
E - Olympic View	Detention Pipe	Pipe 08	Bayview Estates	46th Pl. W. north of 84th St. SW
E - Olympic View	Detention Pipe	Pipe 09	Vicki's Highland View Tracts	46th Pl. W. south of 80th St. SW
E - Olympic View	Detention Pipe	Pipe 22	Filbert Estates	80th St. SW btwn 52nd Ave. W. and 53rd Ave. W.
E - Olympic View	Detention Pipe	Pipe 23	Trophy Soundview	81st Place SW east of Mukilteo Speedway

Known Flow Control and/or Water Quality Stormwater Facilities 2015

BASIN	FACILITY TYPE	2015 FACILITY NAME	PLAT / PROJECT NAME	LOCATION
E - Olympic View	Detention Pipe	Pipe 29	Eagle Bluff	Eagle Bluff Lane off 53rd Ave. W. (8000 Block)
F - Naketa Beach	Detention Pipe	Pipe 44	Mukilteo highland	45th & 88th SW
F - Naketa Beach	Detention Pipe	Pipe 13	Westwood Lane	53rd Ave. W. and 86th Place SW
F - Naketa Beach	Detention Pipe	Pipe 24	Soundview Ridge	85th Place SW east of 54th Ave. W.
F - Naketa Beach	Detention Pipe	Pipe 25	Windsong Vista	85th Place SW west of 44th Ave. W.
F - Naketa Beach	Detention Pipe	Pipe 43	West & Wheeler	east side of 5232 88th St SW
G - Smugglers Gulch	Detention Pipe	Pipe 11	92nd St. Park Improv.	49th Ave. W. south of 92nd St. SW
G - Smugglers Gulch	Detention Pipe	Pipe 12	Westwood Village	50th Place W. south of 92nd St. SW
G - Smugglers Gulch	Detention Pipe	Pipe 41	West & Wheeler	91st Ct and 49th Ave
G - Smugglers Gulch	Detention Pipe	Pipe 35	Naketa Pointe	Naketa Lane cul-de-sac
J - Upper Chennault Creek	Detention Pipe	Pipe 37	Dog Leg Pond	north of Bridgeport Pl. in H.P. Village
L - Hulk Creek	Detention Pipe	Pipe 31	Harbour Pointe Blvd.	Harbour Pointe Blvd. north of Clubhouse Lane
L - Hulk Creek	Detention Pipe	Pipe 32	Harbour Pointe Blvd.	Harbour Pointe Blvd. south of Clubhouse Lane
M - Picnic Point	Detention Pipe	Pipe 01	One Club House Lane Div. 3	128th St. SW btwn 60th Ave. W. and 61st Ave. W.
M - Picnic Point	Detention Pipe	Pipe 10	Harbour Heights	49th Ave. W. north of Harbour Heights Drive
M - Picnic Point	Detention Pipe	Pipe 14	Waterford Park Div. 2	56th Place W. cul-de-sac south of 128th St. SW
M - Picnic Point	Detention Pipe	Pipe 26	Beverly Park Rd.	Beverly Park Rd. east of 132nd St. SW
M - Picnic Point	Detention Pipe	Pipe 27	Beverly Park Rd.	Beverly Park Rd. east of 47th Pl. W.
M - Picnic Point	Detention Pipe	Pipe 28	Beverly Park Rd.	Beverly Park Rd. east of Harbour Heights Dr.
M - Picnic Point	Detention Pipe	Pipe 33	Harbour Pointe Blvd.	Harbour Pointe Blvd. southeast of 52nd Place W.
D - Goat Trail Ravine	Detention Pipe?	Pipe 39	Island Vista	501 Clover Court
G - Smugglers Gulch	Detention Pipe?	Pipe 42	Halverson Estates	81st & 53rd Ave W
C - Brewery Creek	Detention Pond	Pond 21		Hill Street (1009 Hill)
C - Brewery Creek	Detention Pond	Pond 24		Ridge Street, East of Campbell
D - Goat Trail Ravine	Detention Pond	Pond 06	Trophy Woodside	47th Ave. W. cul-de-sac off 73rd St. SW

Known Flow Control and/or Water Quality Stormwater Facilities 2015

BASIN	FACILITY TYPE	2015 FACILITY NAME	PLAT / PROJECT NAME	LOCATION
D - Goat Trail Ravine	Detention Pond	Pond 26	Puget Sound Hills 2	71st Place SW btwn 45th Ave. W. and 47th Ave. W.
D - Goat Trail Ravine	Detention Pond	Pond 35	Puget Sound Hills 2	71st Place SW and 48th Ave. W.
D - Goat Trail Ravine	Detention Pond	Pond 09	Puget Sound Hills 2	7200 Block of 48th Ave. W.
D - Goat Trail Ravine	Detention Pond	Pond 18	Ashlyn Lane	72nd Place SW cul-de-sac off 48th Ave. W.
D - Goat Trail Ravine	Detention Pond	Pond 33	Elliot Pointe	Goat Trail Loop Rd. northwest of Lumley Ave.
D - Goat Trail Ravine	Detention Pond	Pond 34	Elliot Pointe	Goat Trail Rd. south of Goat Trail Loop Rd.
F - Naketa Beach	Detention Pond	Pond 04	West & Wheeler	46th Place W. south of 84th St. SW
G - Smugglers Gulch	Detention Pond	Pond 05	Wisperwood West	46th Place W. south of 88th St. SW (8912 46th Pl W)
G - Smugglers Gulch	Detention Pond	Pond 08	92nd/50th Det. Pond	5000 Block of 92nd St. SW
G - Smugglers Gulch	Detention Pond	Pond 25	90th/50th Det. Pond	50th Ave. W. north of 90th Place SW
G - Smugglers Gulch	Detention Pond	Pond 22	Mukilteo Estates	Mukilteo Speedway south of 88th St. SW
G - Smugglers Gulch	Detention Pond	Pond 28	Horseshoe Ridge	Surrey Lane off 92nd St. SW
H - Big Gulch	Detention Pond	Pond 15	HP Sector 5 Div. 2	107th St. SW and 53rd Ave. W.
H - Big Gulch	Detention Pond	Pond 03	Windsong Vista	4500 Block of Mukilteo Speedway (east side)
H - Big Gulch	Detention Pond	Pond 19		9400 block of Mukilteo Speedway (525)
I - Chennault Beach	Detention Pond	Pond 17	HP Sector 6 Div. 3	59th Ave. W. and Canyon Dr.
J - Upper Chennault Creek	Detention Pond	Pond 14	HP Sector 6 Div. 2	107th Pl. SW and Chennault Beach Dr.
K - Lower Chennault Creek	Detention Pond	Pond 10	Harbour Pointe Blvd.	Harbour Pointe Blvd. northeast of St. Andrews Dr.
L - Hulk Creek	Detention Pond	Pond 01	One Club House Lane Div. 6	116th St. SW and 64th Ave. W. (Clearview Dr.)
L - Hulk Creek	Detention Pond	Pond 27	Bayveiw Pond (One Club House Lane Div. 6)	Central Ave. and Clearview Dr.
M - Picnic Point	Detention Pond	Pond 02	Harbour Heights	130th Place SW east of Harbour Heights Dr.
M - Picnic Point	Detention Pond	Pond 32	Harbour Heights	45th Ave. W. east of Harbour Heights Dr.
M - Picnic Point	Detention Pond	Pond 16	Faire Harbour	47th Place W.

Known Flow Control and/or Water Quality Stormwater Facilities 2015

BASIN	FACILITY TYPE	2015 FACILITY NAME	PLAT / PROJECT NAME	LOCATION
M - Picnic Point	Detention Pond	Pond 07	Faire Harbour	4900 Block of 131st St. SW
M - Picnic Point	Detention Pond	Pond 23	Pacific Pointe II	Pacific Place cul-de-sac off Beverly Park Rd.
M - Picnic Point	Detention Pond	Pond 11	Pacific Pointe I	Pacific Pointe Place cul-de-sac off Beverly Park Rd.
M - Picnic Point	Detention Pond	Pond 37	Waterford Park	Waterford Park
M - Picnic Point	Detention Pond	Pond 38	Waterford Park	Waterford Park
H - Big Gulch	Detention Pond (2 Cell)	Pond 29	Sector 3 South	47th Place W. and Harbour Pointe Blvd. N.
B - Japanese Gulch	Detention Pond (Vaults?) 2	Pond 13	Gill S.P.	Mukilteo Blvd. and Scurlock Lane
G - Smugglers Gulch	Detention Pond (Wet Pond)	Pond 30	Pearson S.P.	4600 block of 88th Street SW
G - Smugglers Gulch	Detention Ponds 2	Pond 12	92nd St. Park Ponds	92nd St. Park
J - Upper Chennault Creek	Detention Ponds 2	Pond 36	Tatoosh	53rd Pl. W. north of Harbour Pointe Blvd. N.
C - Brewery Creek	Detention Ponds 3	Pond 31	PW Shop	4206 78th St. SW
C - Brewery Creek	Detention Vault	Vault 05	Lighthouse Park Outfall	Lighthouse Park
E - Olympic View	Detention Vault	Vault 06	Island View Court	7700 block of SR525
F - Naketa Beach	Detention Vault	Vault 34	Mukilteo highland	46th Pl W & 88th
F - Naketa Beach	Detention Vault	Vault 33	MSW	Mukilteo Speedway north of 84th St. SW
G - Smugglers Gulch	Detention Vault	Vault 08		54th Pl & 88th SW
G - Smugglers Gulch	Detention Vault	Vault 13	Horseshoe Ridge	Surrey Lane off 92nd St. SW
H - Big Gulch	Detention Vault	Vault 02	Matiko	94th Place SW & 53rd Ave
H - Big Gulch	Detention Vault	Vault 03	Matiko	94th Place SW & 55th Ave
H - Big Gulch	Detention Vault	Vault 04	Mahalo	96th St. SW east of 57th Ave. W.
H - Big Gulch	Detention Vault	Vault 23	MSW	Mukilteo Speedway; NB SR525; N of 106th St SW - Vault O
H - Big Gulch	Detention Vault	Vault 24	MSW	Mukilteo Speedway; SB SR525, just past 106th St SW - Vault N
H - Big Gulch	Detention Vault	Vault 25	MSW	Mukilteo Speedway; SB SR525; Paine Field Blvd; median - Vault R
H - Big Gulch	Detention Vault	Vault 26	MSW	Mukilteo Speedway; SB SR525; past Harb Pt Blvd N - Vault P
H - Big Gulch	Detention Vault	Vault 27	MSW	Mukilteo Speedway; SB SR525; south of Paine Field Blvd - Vault Q
H - Big Gulch	Detention Vault	Vault 16	MSW	Mukilteo Speedway; Bubble Park
M - Picnic Point	Detention Vault	Vault 14	Waterford Park	126th St. SW

Known Flow Control and/or Water Quality Stormwater Facilities 2015

BASIN	FACILITY TYPE	2015 FACILITY NAME	PLAT / PROJECT NAME	LOCATION
M - Picnic Point	Detention Vault	Vault 07	Discovery Crest	12728 12805 52nd
M - Picnic Point	Detention Vault	Vault 01	Discovery Crest	5101 126th St SW
M - Picnic Point	Detention Vault	Vault 15	Waterford Park	53rd Pl. W.
M - Picnic Point	Detention Vault	Vault 32	Golf Course (One Club House Lane Div. 3)	61st Ave. W. and Double Eagle Dr. (also listed as One clubhouse Lane, end of 63rd)
M - Picnic Point	Detention Vault	Vault 09	Daffron Shortplat	96th Pl W
M - Picnic Point	Detention Vault	Vault 17	MSW	Mukilteo Speedway & Bev Ed Road - Vault A
M - Picnic Point	Detention Vault	Vault 18	MSW	Mukilteo Speedway & Bev Ed Road - Vault B
M - Picnic Point	Detention Vault	Vault 19	MSW	Mukilteo Speedway & in front of McDonalds - Vault G
M - Picnic Point	Detention Vault	Vault 20	MSW	Mukilteo Speedway & SW corner of South Rd - Vault C
M - Picnic Point	Detention Vault	Vault 10	MSW	Mukilteo Speedway; Fenced area by Golds Gym - Vault D
M - Picnic Point	Detention Vault	Vault 11	MSW	Mukilteo Speedway; Fenced area by Golds Gym - Vault E
M - Picnic Point	Detention Vault	Vault 12	MSW	Mukilteo Speedway; Fenced area by Golds Gym - Vault F
M - Picnic Point	Detention Vault	Vault 30	MSW	Mukilteo Speedway;Just N of Vault G - Vault H
Swamp	Detention Vault	Vault 21	MSW	Mukilteo Speedway; across and just north of Vault J - Vault L
Swamp	Detention Vault	Vault 22	MSW	Mukilteo Speedway; just before Russell Road - Vault J
Swamp	Detention Vault	Vault 28	MSW	Mukilteo Speedway; SE corner & Russell Road - V ault I
Swamp	Detention Vault	Vault 29	MSW	Mukilteo Speedway; SE corner of N525 and Chennault Bch Rd - Vault M

Appendix G

Financial Analysis Supporting Documents

Mukilteo
Stormwater Rate and GFC
Summary

Revenue Requirement	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Revenues																				
Rate Revenues Under Existing Rates	$ 1,334,000	$ 1,337,284	$ 1,340,576	$ 1,343,877	$ 1,347,185	$ 1,350,502	$ 1,353,826	$ 1,357,159	$ 1,360,500	$ 1,363,850	$ 1,367,207	$ 1,370,573	$ 1,373,947	$ 1,377,330	$ 1,380,720	$ 1,384,119	$ 1,387,527	$ 1,390,943	$ 1,394,367	$ 1,397,800
Non-Rate Revenues	3,000	125	57	283	323	324	333	342	351	361	371	381	391	402	413	425	436	448	461	474
Total Revenues	**$ 1,337,000**	**$ 1,337,409**	**$ 1,340,634**	**$ 1,344,159**	**$ 1,347,508**	**$ 1,350,825**	**$ 1,354,159**	**$ 1,357,501**	**$ 1,360,851**	**$ 1,364,210**	**$ 1,367,578**	**$ 1,370,954**	**$ 1,374,339**	**$ 1,377,732**	**$ 1,381,134**	**$ 1,384,544**	**$ 1,387,963**	**$ 1,391,391**	**$ 1,394,828**	**$ 1,398,274**
Expenses																				
Cash Operating Expenses	$ 1,521,995	$ 1,505,954	$ 1,397,960	$ 1,436,054	$ 1,425,270	$ 1,465,642	$ 1,507,205	$ 1,549,995	$ 1,594,051	$ 1,639,410	$ 1,686,113	$ 1,734,200	$ 1,783,715	$ 1,834,701	$ 1,887,203	$ 1,941,268	$ 1,996,944	$ 2,054,281	$ 2,113,330	$ 2,174,144
NPDES Expenses	-	505,000	517,625	530,566	543,830	557,426	571,361	585,645	600,286	615,293	630,676	646,443	662,604	679,169	696,148	713,552	731,391	749,675	768,417	787,628
Existing Debt Service	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
New Debt Service	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rate Funded Capital	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additions Required to Meet Op. Fund Balance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Expenses	**$ 1,521,995**	**$ 2,010,954**	**$ 1,915,585**	**$ 1,966,620**	**$ 1,969,100**	**$ 2,023,067**	**$ 2,078,566**	**$ 2,135,641**	**$ 2,194,337**	**$ 2,254,703**	**$ 2,316,789**	**$ 2,380,643**	**$ 2,446,319**	**$ 2,513,870**	**$ 2,583,351**	**$ 2,654,820**	**$ 2,728,334**	**$ 2,803,956**	**$ 2,881,747**	**$ 2,961,771**
Net Surplus (Deficiency)	**$ (184,995)**	**$ (673,545)**	**$ (574,951)**	**$ (622,460)**	**$ (621,591)**	**$ (672,242)**	**$ (724,407)**	**$ (778,140)**	**$ (833,486)**	**$ (890,493)**	**$ (949,211)**	**$ (1,009,689)**	**$ (1,071,980)**	**$ (1,136,138)**	**$ (1,202,217)**	**$ (1,270,275)**	**$ (1,340,371)**	**$ (1,412,565)**	**$ (1,486,919)**	**$ (1,563,498)**
Additions to Meet Coverage	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Surplus (Deficiency)	**$ (184,995)**	**$ (673,545)**	**$ (574,951)**	**$ (622,460)**	**$ (621,591)**	**$ (672,242)**	**$ (724,407)**	**$ (778,140)**	**$ (833,486)**	**$ (890,493)**	**$ (949,211)**	**$ (1,009,689)**	**$ (1,071,980)**	**$ (1,136,138)**	**$ (1,202,217)**	**$ (1,270,275)**	**$ (1,340,371)**	**$ (1,412,565)**	**$ (1,486,919)**	**$ (1,563,498)**
% of Rate Revenue	**13.87%**	**50.37%**	**42.89%**	**46.32%**	**46.14%**	**49.78%**	**53.51%**	**57.34%**	**61.26%**	**65.29%**	**69.43%**	**73.67%**	**78.02%**	**82.49%**	**87.07%**	**91.77%**	**96.60%**	**101.55%**	**106.64%**	**111.85%**
Annual Rate Adjustment	**0.00%**	**46.00%**	**10.00%**	**10.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**
Cumulative Annual Rate Adjustment	**0.00%**	**46.00%**	**60.60%**	**76.66%**	**80.19%**	**83.80%**	**87.47%**	**91.22%**	**95.05%**	**98.95%**	**102.93%**	**106.99%**	**111.13%**	**115.35%**	**119.65%**	**124.05%**	**128.53%**	**133.10%**	**137.76%**	**142.52%**
Rate Revenues After Rate Increase	$ 1,334,000	$ 1,952,435	$ 2,152,966	$ 2,374,092	$ 2,427,536	$ 2,482,182	$ 2,538,059	$ 2,595,193	$ 2,653,614	$ 2,713,350	$ 2,774,430	$ 2,836,885	$ 2,900,747	$ 2,966,046	$ 3,032,815	$ 3,101,086	$ 3,170,895	$ 3,242,276	$ 3,315,263	$ 3,389,893
Additional Taxes from Rate Increase	$ -	$ 9,227	$ 12,186	$ 15,453	$ 16,205	$ 16,975	$ 17,763	$ 18,571	$ 19,397	$ 20,242	$ 21,108	$ 21,995	$ 22,902	$ 23,831	$ 24,781	$ 25,755	$ 26,751	$ 27,770	$ 28,813	$ 29,881
Net Cash Flow After Rate Increase	**(184,995)**	**(67,622)**	**225,252**	**392,302**	**442,554**	**442,463**	**442,062**	**441,324**	**440,231**	**438,764**	**436,904**	**434,629**	**431,917**	**428,747**	**425,096**	**420,937**	**416,247**	**410,998**	**405,163**	**398,714**
Coverage After Rate Increases	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Sample Residential Monthly Bill	$ 7.85	$ 11.46	$ 12.61	$ 13.87	$ 14.15	$ 14.43	$ 14.72	$ 15.01	$ 15.31	$ 15.62	$ 15.93	$ 16.25	$ 16.57	$ 16.90	$ 17.24	$ 17.59	$ 17.94	$ 18.30	$ 18.66	$ 19.04
Monthly Average Increase ($)	$ -	$ 3.61	$ 1.15	$ 1.26	$ 0.28	$ 0.28	$ 0.29	$ 0.29	$ 0.30	$ 0.31	$ 0.31	$ 0.32	$ 0.32	$ 0.33	$ 0.34	$ 0.34	$ 0.35	$ 0.36	$ 0.37	$ 0.37

Fund Balance	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
OPERATING FUND																				
Beginning Balance	$ 543,651	$ 125,000	$ 57,378	$ 282,631	$ 323,280	$ 323,688	$ 332,559	$ 341,682	$ 351,064	$ 360,713	$ 370,636	$ 380,842	$ 391,339	$ 402,135	$ 413,239	$ 424,660	$ 436,409	$ 448,493	$ 460,924	$ 473,712
plus: Net Cash Flow after Rate Increase	(184,995)	(67,622)	225,252	392,302	442,554	442,463	442,062	441,324	440,231	438,764	436,904	434,629	431,917	428,747	425,096	420,937	416,247	410,998	405,163	398,714
less: Transfer of Surplus to Capital Fund	(233,656)	-	-	(351,653)	(442,146)	(433,592)	(432,939)	(431,942)	(430,582)	(428,841)	(426,698)	(424,132)	(421,121)	(417,643)	(413,674)	(409,189)	(404,162)	(398,567)	(392,376)	(385,559)
Ending Balance	**$ 125,000**	**$ 57,378**	**$ 282,631**	**$ 323,280**	**$ 323,688**	**$ 332,559**	**$ 341,682**	**$ 351,064**	**$ 360,713**	**$ 370,636**	**$ 380,842**	**$ 391,339**	**$ 402,135**	**$ 413,239**	**$ 424,660**	**$ 436,409**	**$ 448,493**	**$ 460,924**	**$ 473,712**	**$ 486,867**
Minimum Target Balance	*$ 125,000*	*$ 330,568*	*$ 314,891*	*$ 323,280*	*$ 323,688*	*$ 332,559*	*$ 341,682*	*$ 351,064*	*$ 360,713*	*$ 370,636*	*$ 380,842*	*$ 391,339*	*$ 402,135*	*$ 413,239*	*$ 424,660*	*$ 436,409*	*$ 448,493*	*$ 460,924*	*$ 473,712*	*$ 486,867*
Days	*30*	*10*	*54*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*
% of Budgeted Operating Revenue	*9.37%*	*4.29%*	*21.08%*	*24.06%*	*24.03%*	*24.62%*	*25.24%*	*25.87%*	*26.51%*	*27.18%*	*27.86%*	*28.55%*	*29.27%*	*30.00%*	*30.76%*	*31.53%*	*32.32%*	*33.14%*	*33.97%*	*34.83%*
CAPITAL FUND																				
Beginning Balance	$ -	$ 12,872	$ 12,885	$ 12,898	$ 364,564	$ 807,075	$ 1,241,473	$ 1,675,654	$ 2,109,271	$ 2,541,963	$ 2,973,345	$ 3,403,017	$ 3,830,552	$ 4,255,504	$ 4,677,402	$ 5,095,754	$ 5,510,038	$ 5,919,710	$ 6,324,197	$ 6,722,897
plus: Rate Funded System Reinvestment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
plus: Transfers from Operating Fund	233,656	-	-	351,653	442,146	433,592	432,939	431,942	430,582	428,841	426,698	424,132	421,121	417,643	413,674	409,189	404,162	398,567	392,376	385,559
plus: Grants/ Donations/ CIAC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
plus: Additional Proceeds (Costs)	727,600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
plus: General Facilities Charges	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
plus: Net Debt Proceeds Available for Projects	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
plus: Interest Earnings	-	13	13	13	365	807	1,241	1,676	2,109	2,542	2,973	3,403	3,831	4,256	4,677	5,096	5,510	5,920	6,324	6,723
Total Funding Sources	**$ 961,256**	**$ 12,885**	**$ 12,898**	**$ 364,564**	**$ 807,075**	**$ 1,241,473**	**$ 1,675,654**	**$ 2,109,271**	**$ 2,541,963**	**$ 2,973,345**	**$ 3,403,017**	**$ 3,830,552**	**$ 4,255,504**	**$ 4,677,402**	**$ 5,095,754**	**$ 5,510,038**	**$ 5,919,710**	**$ 6,324,197**	**$ 6,722,897**	**$ 7,115,179**
less: Capital Expenditures	(948,384)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ending Working Capital Balance	**$ 12,872**	**$ 12,885**	**$ 12,898**	**$ 364,564**	**$ 807,075**	**$ 1,241,473**	**$ 1,675,654**	**$ 2,109,271**	**$ 2,541,963**	**$ 2,973,345**	**$ 3,403,017**	**$ 3,830,552**	**$ 4,255,504**	**$ 4,677,402**	**$ 5,095,754**	**$ 5,510,038**	**$ 5,919,710**	**$ 6,324,197**	**$ 6,722,897**	**$ 7,115,179**
Minimum Target Balance	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*

Mukilteo
Stormwater Rate and GFC
Assumptions

Economic & Financial Factors	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
1 General Cost Inflation	2.29%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%
2 Construction Cost Inflation	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%
3 Labor Cost Inflation	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%
4 Benefit Cost Inflation	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%
5 Customer Growth	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%
6 General Inflation plus Growth	2.54%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%
7 No Escalation	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
8 [Extra]	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Investment Interest	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%
B&O Tax	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%

Accounting Assumptions		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
FISCAL POLICY RESTRICTIONS																					
Minimum Operating Fund Balance Target																					
Select Minimum Operating Fund Balance Target	1	**Defined as Days of O&M Expenses**																			
1 - Defined as Days of O&M expenses																					
Minimum Operating Fund Balance Target		30	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Maximum Operating Fund Balance		30	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
2 - Amounts at Right																					
Minimum Operating Fund Balance Target		$ 125,000	$ 267,457	$ 268,115	$ 268,775	$ 269,437	$ 270,100	$ 270,765	$ 271,432	$ 272,100	$ 272,770	$ 273,441	$ 274,115	$ 274,789	$ 275,466	$ 276,144	$ 276,824	$ 277,505	$ 278,189	$ 278,873	$ 279,560
Maximum Operating Fund Balance		$ 125,000	$ 267,457	$ 268,115	$ 268,775	$ 269,437	$ 270,100	$ 270,765	$ 271,432	$ 272,100	$ 272,770	$ 273,441	$ 274,115	$ 274,789	$ 275,466	$ 276,144	$ 276,824	$ 277,505	$ 278,189	$ 278,873	$ 279,560
Minimum Capital Fund Balance Target																					
Select Minimum Capital Fund Balance Target	2	**User Input**																			
1 - Defined as % of Plant																					
Plant-in-Service in 2014	$5,106,861	Estimated Net Assets																			
Minimum Capital Fund Balance - % of plant assets		1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
2 - Amount at Right ==>		$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000
RATE FUNDED CAPITAL																					
Select Capital Reinvestment Funding Strategy	3	**User Input**																			
Amount of Annual Cash Funding from Rates																					
1 - Equal to Annual Depreciation Expense		$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193
2 - Equal to Annual Depreciation less Annual Debt Principal Payments		$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193
3 - Equal to Amount at Right ==>		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
4 - Do Not Fund System Reinvestment																					

Mukilteo
Stormwater Rate and GFC
Assumptions

Capital Financing Assumptions		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
General Facilities Charges	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Equivalent Residential Units (Estimate)		13,644	13,678	13,711	13,745	13,779	13,813	13,847	13,881	13,915	13,949	13,984	14,018	14,053	14,087	14,122	14,157	14,192	14,227	14,262	14,297
Additional Units Per Year		34	34	34	34	34	34	34	34	34	34	34	35	35	35	35	35	35	35	35	35
GFC Revenues		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
FUNDING SOURCES																					
Grants		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Additional Proceeds (Costs)																					
Department of Ecology State Grant		$ 170,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Smuggler's Gulch DOE Grant		557,600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
[Extra line]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
[Extra line]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
[Extra line]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Additional Proceeds		**$ 727,600**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
REVENUE BONDS																					
Term (years)		20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Interest Cost		4.50%	4.50%	4.50%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	4.50%	4.50%	4.50%	4.50%
Issuance Cost		1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%
Revenue Bond Coverage Requirement	**1.25**																				
Use Reserves to Pay for Last Payment	**Yes**																				
PWTF LOANS																					
Term (years; no more than 20 years)		20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Interest Cost		2.55%	2.55%	2.55%	2.55%	2.55%	2.55%	2.55%	2.55%	2.55%	2.55%	2.55%	2.55%	2.55%	2.55%	2.55%	2.55%	1.00%	1.00%	1.00%	1.00%
Required Local Match		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.00%	1.00%	1.00%	1.00%
OTHER LOANS																					
Term (years)		20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Interest Cost		4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
Issuance Cost		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Mukilteo
Stormwater Rate and GFC
Operating Revenue and Expenditure Forecast

Revenues	FORECAST BASIS	Actual 2013	Actual 2014	Budget 2015	Projection 2016	Projection 2017	Projection 2018	Projection 2019	Projection 2020	Projection 2021	Projection 2022	Projection 2023	Projection 2024	Projection 2025	Projection 2026	Projection 2027	Projection 2028	Projection 2029	Projection 2030	Projection 2031	Projection 2032	Projection 2033	Projection 2034
Rate Revenues																							
Storm Drain Fees & Charges	Customer Growth	$ 1,293,185	$ 1,081,779	$ 1,334,000	$ 1,337,284	$ 1,340,576	$ 1,343,877	$ 1,347,185	$ 1,350,502	$ 1,353,826	$ 1,357,159	$ 1,360,500	$ 1,363,850	$ 1,367,207	$ 1,370,573	$ 1,373,947	$ 1,377,330	$ 1,380,720	$ 1,384,119	$ 1,387,527	$ 1,390,943	$ 1,394,367	$ 1,397,800
[Extra]	Customer Growth	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
[Extra]	Customer Growth	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Rate Revenue		**$ 1,293,185**	**$ 1,081,779**	**$ 1,334,000**	**$ 1,337,284**	**$ 1,340,576**	**$ 1,343,877**	**$ 1,347,185**	**$ 1,350,502**	**$ 1,353,826**	**$ 1,357,159**	**$ 1,360,500**	**$ 1,363,850**	**$ 1,367,207**	**$ 1,370,573**	**$ 1,373,947**	**$ 1,377,330**	**$ 1,380,720**	**$ 1,384,119**	**$ 1,387,527**	**$ 1,390,943**	**$ 1,394,367**	**$ 1,397,800**
Non-Rate Revenues																							
Transfers In	No Escalation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
MWWD Interlocal Agreement GIS/CAD Tech	No Escalation	-	9,856	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other Miscellaneous Revenue	No Escalation		39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
[Extra]	No Escalation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Non-Rate Revenues		**$ -**	**$ 9,895**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
TOTAL REVENUES		**$ 1,293,185**	**$ 1,091,674**	**$ 1,334,000**	**$ 1,337,284**	**$ 1,340,576**	**$ 1,343,877**	**$ 1,347,185**	**$ 1,350,502**	**$ 1,353,826**	**$ 1,357,159**	**$ 1,360,500**	**$ 1,363,850**	**$ 1,367,207**	**$ 1,370,573**	**$ 1,373,947**	**$ 1,377,330**	**$ 1,380,720**	**$ 1,384,119**	**$ 1,387,527**	**$ 1,390,943**	**$ 1,394,367**	**$ 1,397,800**

	General Operating Expenses	FORECAST BASIS	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
5301	Taxes and Assessments	Calculation	$ 24,229	$ 22,495	$ 27,000	$ 20,059	$ 20,109	$ 20,158	$ 20,208	$ 20,258	$ 20,307	$ 20,357	$ 20,408	$ 20,458	$ 20,508	$ 20,559	$ 20,609	$ 20,660	$ 20,711	$ 20,762	$ 20,813	$ 20,864	$ 20,916	$ 20,967
19	**Other Governmental Services**																							
590	***Title Not Found***																							
590.200	**Operating Transfers Out**																							
	Intergovernmental Services																							
5590	Transfer to Reserves	No Escalation	$ -	$ 50,000	$ 50,000	$ 100,000	$ 50,000	$ 50,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
38	**Public Works**																							
530	**Utilities and Environment**																							
530.200	**Engineering Plans & Services**																							
	Salaries and Wages																							
1001	Full Time Employees	Labor Cost Inflation	149,322	134,552	184,150	189,444	194,891	200,494	206,258	212,188	218,288	224,563	231,020	237,661	244,494	251,523	258,754	266,193	273,846	281,719	289,818	298,150	306,722	315,540
1102	Part Time Employees	Labor Cost Inflation	12,234	4,329	30,660	31,541	32,448	33,381	34,341	35,328	36,344	37,389	38,464	39,569	40,707	41,877	43,081	44,320	45,594	46,905	48,253	49,640	51,068	52,536
1201	Overtime	Labor Cost Inflation	-	1,773	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benefits																							
2000	Benefits	Benefit Cost Inflation	182,467	172,751	198,405	206,157	214,212	222,581	231,277	240,314	249,703	259,459	269,596	280,130	291,075	302,447	314,264	326,542	339,301	352,558	366,332	380,645	395,517	410,970
530.300	**Surface Water Management**																							
	Salaries and Wages																							
1101	Full Time Employees	Labor Cost Inflation	243,507	254,891	235,890	242,672	249,648	256,826	264,209	271,805	279,619	287,658	295,928	304,436	313,189	322,193	331,455	340,985	350,788	360,873	371,248	381,921	392,901	404,196
1115	Acting Supervisor Pay	Labor Cost Inflation	1,492	386	1,000	1,029	1,058	1,089	1,120	1,152	1,185	1,219	1,255	1,291	1,328	1,366	1,405	1,446	1,487	1,530	1,574	1,619	1,666	1,713
1201	Overtime	Labor Cost Inflation	8,037	6,843	6,500	6,687	6,879	7,077	7,280	7,490	7,705	7,926	8,154	8,389	8,630	8,878	9,133	9,396	9,666	9,944	10,230	10,524	10,826	11,138
1203	Standby Pay	Labor Cost Inflation	5,936	3,856	4,060	4,177	4,297	4,420	4,547	4,678	4,813	4,951	5,093	5,240	5,390	5,545	5,705	5,869	6,038	6,211	6,390	6,573	6,762	6,957
1241	OT - Disaster Support/Severe Weather	Labor Cost Inflation	-	246	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Supplies																							
3101	Office Supplies	General Cost Inflation	320	429	500	513	525	538	552	566	580	594	609	624	640	656	672	689	706	724	742	761	780	799
	Reference Material	General Cost Inflation	-	-	500	513	525	538	552	566	580	594	609	624	640	656	672	689	706	724	742	761	780	799
3112	Operating Supplies	General Cost Inflation	12,001	5,487	10,000	10,250	10,506	10,769	11,038	11,314	11,597	11,887	12,184	12,489	12,801	13,121	13,449	13,785	14,130	14,483	14,845	15,216	15,597	15,987
3113	Vehicle R&M Tools/Eq	General Cost Inflation	-	-	250	256	263	269	276	283	290	297	305	312	320	328	336	345	353	362	371	380	390	400
3124	Clothing/Boots	General Cost Inflation	2,151	2,970	3,750	3,844	3,940	4,038	4,139	4,243	4,349	4,458	4,569	4,683	4,800	4,920	5,043	5,169	5,299	5,431	5,567	5,706	5,849	5,995
3135	Aggregate	General Cost Inflation	9,525	3,449	6,500	6,663	6,829	7,000	7,175	7,354	7,538	7,726	7,920	8,118	8,321	8,529	8,742	8,960	9,184	9,414	9,649	9,891	10,138	10,391
3206	Motor Fuel	General Cost Inflation	14,972	12,347	12,000	12,300	12,608	12,923	13,246	13,577	13,916	14,264	14,621	14,986	15,361	15,745	16,139	16,542	16,956	17,380	17,814	18,259	18,716	19,184
3501	Small Items of Equipment	General Cost Inflation	6,247	3,235	8,000	8,200	8,405	8,615	8,831	9,051	9,278	9,509	9,747	9,991	10,241	10,497	10,759	11,028	11,304	11,586	11,876	12,173	12,477	12,789
	Other Services & Charges																							
	Equipment Replacement Charges	General Cost Inflation	-	-	36,080	36,982	37,907	38,854	39,826	40,821	41,842	42,888	43,960	45,059	46,185	47,340	48,524	49,737	50,980	52,255	53,561	54,900	56,272	57,679
4106	Other Professional Services	General Cost Inflation	169,939	275,822	300,000	307,500	315,188	323,067	331,144	339,422	347,908	356,606	365,521	374,659	384,025	393,626	403,467	413,553	423,892	434,489	445,352	456,485	467,898	479,595
4107	Wetland Mitigation Services	General Cost Inflation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4109	City Atty. Other Svcs.	General Cost Inflation	3,917	5,994	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4111	Hazardous Materials Testing	General Cost Inflation	2,620	3,120	2,800	2,870	2,942	3,015	3,091	3,168	3,247	3,328	3,412	3,497	3,584	3,674	3,766	3,860	3,956	4,055	4,157	4,261	4,367	4,476
4125	Contract Services	General Cost Inflation	4,941	959	3,500	3,588	3,677	3,769	3,863	3,960	4,059	4,160	4,264	4,371	4,480	4,592	4,707	4,825	4,945	5,069	5,196	5,326	5,459	5,595
4201	Telephone	General Cost Inflation	1,956	771	1,000	1,025	1,051	1,077	1,104	1,131	1,160	1,189	1,218	1,249	1,280	1,312	1,345	1,379	1,413	1,448	1,485	1,522	1,560	1,599
4209	Cell Phones	General Cost Inflation	1,290	1,395	1,200	1,230	1,261	1,292	1,325	1,358	1,392	1,426	1,462	1,499	1,536	1,575	1,614	1,654	1,696	1,738	1,781	1,826	1,872	1,918
4301	Travel & Subsistence	General Cost Inflation	78	67	2,500	2,563	2,627	2,692	2,760	2,829	2,899	2,972	3,046	3,122	3,200	3,280	3,362	3,446	3,532	3,621	3,711	3,804	3,899	3,997
4402	Legal Publications	General Cost Inflation	-	499	600	615	630	646	662	679	696	713	731	749	768	787	807	827	848	869	891	913	936	959
4503	Work Equip & Machine Rental	General Cost Inflation	6,048	5,029	12,000	12,300	12,608	12,923	13,246	13,577	13,916	14,264	14,621	14,986	15,361	15,745	16,139	16,542	16,956	17,380	17,814	18,259	18,716	19,184
4509	Equipment Replacement Charges	General Cost Inflation	40,080	33,073	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4601	Insurance	General Cost Inflation	28,777	35,865	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4705	Hazardous Waste Disposal	General Cost Inflation	26,557	31,721	30,000	30,750	31,519	32,307	33,114	33,942	34,791	35,661	36,552	37,466	38,403	39,363	40,347	41,355	42,389	43,449	44,535	45,649	46,790	47,960
4722	Brush Disposal	General Cost Inflation	-	14,892	4,000	4,100	4,203	4,308	4,415	4,526	4,639	4,755	4,874	4,995	5,120	5,248	5,380	5,514	5,652	5,793	5,938	6,086	6,239	6,395
4815	Equipment R&M	General Cost Inflation	460	5,683	5,000	5,125	5,253	5,384	5,519	5,657	5,798	5,943	6,092	6,244	6,400	6,560	6,724	6,893	7,065	7,241	7,423	7,608	7,798	7,993
4820	Vehicle R&M	General Cost Inflation	29,084	33,445	30,000	30,750	31,519	32,307	33,114	33,942	34,791	35,661	36,552	37,466	38,403	39,363	40,347	41,355	42,389	43,449	44,535	45,649	46,790	47,960
4821	Computer System Maint. & Subscriptions	General Cost Inflation	-	1,655	1,850	1,896	1,944	1,992	2,042	2,093	2,145	2,199	2,254	2,310	2,368	2,427	2,488	2,550	2,614	2,679	2,746	2,815	2,885	2,958
4904	Laundry Services	General Cost Inflation	1,261	1,411	1,400	1,435	1,471	1,508	1,545	1,584	1,624	1,664	1,706	1,748	1,792	1,837	1,883	1,930	1,978	2,028	2,078	2,130	2,184	2,238
4912	Training and Registration	General Cost Inflation	1,008	353	2,500	2,563	2,627	2,692	2,760	2,829	2,899	2,972	3,046	3,122	3,200	3,280	3,362	3,446	3,532	3,621	3,711	3,804	3,899	3,997
4921	Permit Fees	General Cost Inflation	-	-	10,000	10,250	10,506	10,769	11,038	11,314	11,597	11,887	12,184	12,489	12,801	13,121	13,449	13,785	14,130	14,483	14,845	15,216	15,597	15,987
4940	Vactor Service	General Cost Inflation	24,070	18,001	22,000	22,550	23,114	23,692	24,284	24,891	25,513	26,151	26,805	27,475	28,162	28,866	29,588	30,327	31,085	31,863	32,659	33,476	34,312	35,170
	Intergovernmental Services																							
5112	Mukilteo Water District	General Cost Inflation	36,453	47,278	48,000	49,200	50,430	51,691	52,983	54,308	55,665	57,057	58,483	59,945	61,444	62,980	64,555	66,169	67,823	69,518	71,256	73,038	74,864	76,735
5120	Snohomish County - ILA	General Cost Inflation	-	-	2,000	2,050	2,101	2,154	2,208	2,263	2,319	2,377	2,437	2,498	2,560	2,624	2,690	2,757	2,826	2,897	2,969	3,043	3,119	3,197
5153	WRIA ILA	General Cost Inflation	7,055	7,236	10,000	10,250	10,506	10,769	11,038	11,314	11,597	11,887	12,184	12,489	12,801	13,121	13,449	13,785	14,130	14,483	14,845	15,216	15,597	15,987
5169	Dept of Ecology	General Cost Inflation	10,934	25,703	26,400	27,060	27,737	28,430	29,141	29,869	30,616	31,381	32,166	32,970	33,794	34,639	35,505	36,393	37,303	38,235	39,191	40,171	41,175	42,204
5301	Taxes and Assessments	General Cost Inflation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Payments for Services																							
9918	Overhead Costs	General Cost Inflation	230,433	175,500	190,000	95,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Mukilteo
Stormwater Rate and GFC
Operating Revenue and Expenditure Forecast

		Actual	Actual	Budget	Projection	Projection	Projection	Projection	Projection	Projection	Projection	Projection	Projection	Projection	Projection	Projection	Projection	Projection	Projection	Projection	Projection	Projection	Projection
Operating Expense Adjustments	**FORECAST BASIS**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**
Additional NPDES Costs (3.75 FTEs + Equip + Ops)	General Cost Inflation	-	-	-	505,000	517,625	530,566	543,830	557,426	571,361	585,645	600,286	615,293	630,676	646,443	662,604	679,169	696,148	713,552	731,391	749,675	768,417	787,628
[Adjustment #2]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
[Adjustment #3]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
[Adjustment #4]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Add'l O&M from CIP	*From CIP*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Operating Expense Summary	**FORECAST BASIS**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**
Total Cash O&M Expenditures		**$ 1,411,785**	**$ 2,132,130**	**$ 1,521,995**	**$ 2,010,954**	**$ 1,915,585**	**$ 1,966,620**	**$ 1,969,100**	**$ 2,023,067**	**$ 2,078,566**	**$ 2,135,641**	**$ 2,194,337**	**$ 2,254,703**	**$ 2,316,789**	**$ 2,380,643**	**$ 2,446,319**	**$ 2,513,870**	**$ 2,583,351**	**$ 2,654,820**	**$ 2,728,334**	**$ 2,803,956**	**$ 2,881,747**	**$ 2,961,771**
Depreciation Expense in 2013	$ 333,145																						
Depreciation Expense	*Last year's plus annual additions from CIP*	$ 333,145	$ 333,145	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193
	debt principal payments	-	-	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	System Reinvestment Funding	$ 333,145	$ 333,145	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193	$ 340,193
TOTAL EXPENSES		**$ 1,744,930**	**$ 2,465,275**	**$ 1,862,188**	**$ 2,351,147**	**$ 2,255,777**	**$ 2,306,812**	**$ 2,309,292**	**$ 2,363,260**	**$ 2,418,759**	**$ 2,475,833**	**$ 2,534,530**	**$ 2,594,896**	**$ 2,656,981**	**$ 2,720,836**	**$ 2,786,511**	**$ 2,854,062**	**$ 2,923,543**	**$ 2,995,012**	**$ 3,068,527**	**$ 3,144,149**	**$ 3,221,940**	**$ 3,301,964**

Mukilteo
Stormwater Rate and GFC
Capital Improvement Program

Project Costs and O&M Impacts in Year:	2015

No	Description	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
1	**Stormwater Capital in 2015 Preliminary Budget**																				
2	Lighthouse Park Tidegate Stormwater Repairs	$ 50,000																			
3	Bayview Storm Drainage Improvements	-																			
4	61st Culvery Replacement	262,500																			
5	Naketa Beach Storm Pipe Repairs & Slope Rehab	333,500																			
6	**Stormwater Capital Moved Forward from 2014**																				
7	Smuggler's Gulch LID	302,384																			
8	Decant Facility																				
9																					
10	**SW Comp Plan CIP**																				
11	Chennault Beach Drive Drainage Improvements																				
12	Mukilteo Lane Drainage Improvements																				
13	84th Street SW (West) Storm Drainage Improvements																				
14	64th Place W Street Drainage Improvements																				
15	66th Place W Street Drainage Improvements																				
16	Central Dr Storm Drainage Improvements for Big Gulch Basin																				
17	62nd Pl W/Canyon Drive Storm Drainage Improvements																				
18	10th St and Loveland Ave Strom Drainage Improvements																				
19																					
20	Basin Planning - Pipe Inspections																				
21																					
	Total Capital Projects	**$ 948,384**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
	Total Upgrade/Expansion Projects	474,192	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total R&R Projects	474,192	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Projects by Grants / Developer Donations																				
	Projects by Enterprise Fund																				

Mukilteo
Stormwater Rate and GFC
Capital Improvement Program

Project Costs and O&M Impacts in Year:	2015

No	Description	Annual O&M Impact	Useful Life (Years)	Specific Funding Source 1-Enterprise Fund, 2-Grants & Developer Donations		TOTAL 2015 $ COSTS	TOTAL ESCALATED COSTS
1	**Stormwater Capital in 2015 Preliminary Budget**		50	1	Enterprise Fund	$ -	$ -
2	Lighthouse Park Tidegate Stormwater Repairs		50	1	Enterprise Fund	50,000	50,000
3	Bayview Storm Drainage Improvements		50	1	Enterprise Fund	-	-
4	61st Culvery Replacement		50	1	Enterprise Fund	262,500	262,500
5	Naketa Beach Storm Pipe Repairs & Slope Rehab		50	1	Enterprise Fund	333,500	333,500
6	**Stormwater Capital Moved Forward from 2014**		50	1	Enterprise Fund	-	-
7	Smuggler's Gulch LID		50	1	Enterprise Fund	302,384	302,384
8	Decant Facility		50	1	Enterprise Fund	-	-
9			50	1	Enterprise Fund	-	-
10	**SW Comp Plan CIP**		50	1	Enterprise Fund	-	-
11	Chennault Beach Drive Drainage Improvements		50	1	Enterprise Fund	-	-
12	Mukilteo Lane Drainage Improvements		50	1	Enterprise Fund	-	-
13	84th Street SW (West) Storm Drainage Improvements		50	1	Enterprise Fund	-	-
14	64th Place W Street Drainage Improvements		50	1	Enterprise Fund	-	-
15	66th Place W Street Drainage Improvements		50	1	Enterprise Fund	-	-
16	Central Dr Storm Drainage Improvements for Big Gulch Basin		50	1	Enterprise Fund	-	-
17	62nd Pl W/Canyon Drive Storm Drainage Improvements		50	1	Enterprise Fund	-	-
18	10th St and Loveland Ave Strom Drainage Improvements		50	1	Enterprise Fund	-	-
19			50	1	Enterprise Fund	-	-
20	Basin Planning - Pipe Inspections		50	1	Enterprise Fund	-	-
21			50	1	Enterprise Fund	-	-
	Total Capital Projects	**$ -**				**$ 948,384**	**$ 948,384**
	Total Upgrade/Expansion Projects					474,192	474,192
	Total R&R Projects					474,192	474,192
	Projects by Grants / Developer Donations	-				-	-
	Projects by Enterprise Fund	-				948,384	948,384

Mukilteo
Stormwater Rate and GFC
Capital Improvement Program

Project Costs and O&M Impacts in Year:	2015

TOTAL FORECASTED PROJECT COSTS

No	Description	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
1	**Stormwater Capital in 2015 Preliminary Budget**	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
2	Lighthouse Park Tidegate Stormwater Repairs	50,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	Bayview Storm Drainage Improvements	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	61st Culvery Replacement	262,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	Naketa Beach Storm Pipe Repairs & Slope Rehab	333,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	**Stormwater Capital Moved Forward from 2014**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	Smuggler's Gulch LID	302,384	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	Decant Facility	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	**SW Comp Plan CIP**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	Chennault Beach Drive Drainage Improvements	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	Mukilteo Lane Drainage Improvements	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13	84th Street SW (West) Storm Drainage Improvements	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	64th Place W Street Drainage Improvements	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	66th Place W Street Drainage Improvements	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	Central Dr Storm Drainage Improvements for Big Gulch Basin	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17	62nd Pl W/Canyon Drive Storm Drainage Improvements	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	10th St and Loveland Ave Strom Drainage Improvements	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	Basin Planning - Pipe Inspections	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total Capital Projects	**$ 948,384**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
	Total Upgrade/Expansion Projects	474,192	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total R&R Projects	474,192	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Projects by Grants / Developer Donations	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Projects by Enterprise Fund	948,384	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Mukilteo
Stormwater Rate and GFC
Revenue Requirements Analysis

Cash Flow Sufficiency Test	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
EXPENSES																				
Cash Operating Expenses	$ 1,521,995	$ 2,010,954	$ 1,915,585	$ 1,966,620	$ 1,969,100	$ 2,023,067	$ 2,078,566	$ 2,135,641	$ 2,194,337	$ 2,254,703	$ 2,316,789	$ 2,380,643	$ 2,446,319	$ 2,513,870	$ 2,583,351	$ 2,654,820	$ 2,728,334	$ 2,803,956	$ 2,881,747	$ 2,961,771
Existing Debt Service	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
New Debt Service	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rate Funded Capital	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additions Required to Meet Operating Fund Balance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Expenses	$ 1,521,995	$ 2,010,954	$ 1,915,585	$ 1,966,620	$ 1,969,100	$ 2,023,067	$ 2,078,566	$ 2,135,641	$ 2,194,337	$ 2,254,703	$ 2,316,789	$ 2,380,643	$ 2,446,319	$ 2,513,870	$ 2,583,351	$ 2,654,820	$ 2,728,334	$ 2,803,956	$ 2,881,747	$ 2,961,771
REVENUES																				
Retail Rate Revenue	$ 1,334,000	$ 1,337,284	$ 1,340,576	$ 1,343,877	$ 1,347,185	$ 1,350,502	$ 1,353,826	$ 1,357,159	$ 1,360,500	$ 1,363,850	$ 1,367,207	$ 1,370,573	$ 1,373,947	$ 1,377,330	$ 1,380,720	$ 1,384,119	$ 1,387,527	$ 1,390,943	$ 1,394,367	$ 1,397,800
Other Non Rate Revenue	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Operating Fund & Debt Reserve Fund Interest Earnings	3,000	125	57	283	323	324	333	342	351	361	371	381	391	402	413	425	436	448	461	474
Total Revenue	$ 1,337,000	$ 1,337,409	$ 1,340,634	$ 1,344,159	$ 1,347,508	$ 1,350,825	$ 1,354,159	$ 1,357,501	$ 1,360,851	$ 1,364,210	$ 1,367,578	$ 1,370,954	$ 1,374,339	$ 1,377,732	$ 1,381,134	$ 1,384,544	$ 1,387,963	$ 1,391,391	$ 1,394,828	$ 1,398,274
NET CASH FLOW (DEFICIENCY)	**$ (184,995)**	**$ (673,545)**	**$ (574,951)**	**$ (622,460)**	**$ (621,591)**	**$ (672,242)**	**$ (724,407)**	**$ (778,140)**	**$ (833,486)**	**$ (890,493)**	**$ (949,211)**	**$(1,009,689)**	**$(1,071,980)**	**$(1,136,138)**	**$(1,202,217)**	**$(1,270,275)**	**$(1,340,371)**	**$(1,412,565)**	**$(1,486,919)**	**$(1,563,498)**
% of Rate Revenue	13.87%	50.37%	42.89%	46.32%	46.14%	49.78%	53.51%	57.34%	61.26%	65.29%	69.43%	73.67%	78.02%	82.49%	87.07%	91.77%	96.60%	101.55%	106.64%	111.85%

Coverage Sufficiency Test	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
EXPENSES																				
Total Cash Operating Expenses (less Capital Outlay)	$ 1,521,995	$ 2,010,954	$ 1,915,585	$ 1,966,620	$ 1,969,100	$ 2,023,067	$ 2,078,566	$ 2,135,641	$ 2,194,337	$ 2,254,703	$ 2,316,789	$ 2,380,643	$ 2,446,319	$ 2,513,870	$ 2,583,351	$ 2,654,820	$ 2,728,334	$ 2,803,956	$ 2,881,747	$ 2,961,771
Revenue Bond Debt Service	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Revenue Bond Coverage Requirement at 1.25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Expenses	$ 1,521,995	$ 2,010,954	$ 1,915,585	$ 1,966,620	$ 1,969,100	$ 2,023,067	$ 2,078,566	$ 2,135,641	$ 2,194,337	$ 2,254,703	$ 2,316,789	$ 2,380,643	$ 2,446,319	$ 2,513,870	$ 2,583,351	$ 2,654,820	$ 2,728,334	$ 2,803,956	$ 2,881,747	$ 2,961,771
ALLOWABLE REVENUES																				
Rate Revenue	$ 1,334,000	$ 1,337,284	$ 1,340,576	$ 1,343,877	$ 1,347,185	$ 1,350,502	$ 1,353,826	$ 1,357,159	$ 1,360,500	$ 1,363,850	$ 1,367,207	$ 1,370,573	$ 1,373,947	$ 1,377,330	$ 1,380,720	$ 1,384,119	$ 1,387,527	$ 1,390,943	$ 1,394,367	$ 1,397,800
Other Revenue	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GFC Revenue	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Interest Earnings - All Funds	3,000	138	70	296	688	1,131	1,574	2,017	2,460	2,903	3,344	3,784	4,222	4,658	5,091	5,520	5,946	6,368	6,785	7,197
Total Revenue	$ 1,337,000	$ 1,337,422	$ 1,340,647	$ 1,344,172	$ 1,347,873	$ 1,351,632	$ 1,355,400	$ 1,359,176	$ 1,362,961	$ 1,366,752	$ 1,370,551	$ 1,374,357	$ 1,378,169	$ 1,381,987	$ 1,385,811	$ 1,389,640	$ 1,393,473	$ 1,397,311	$ 1,401,152	$ 1,404,996
Coverage Realized	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
COVERAGE SURPLUS (DEFICIENCY)	**$ (184,995)**	**$ (673,532)**	**$ (574,938)**	**$ (622,448)**	**$ (621,227)**	**$ (671,435)**	**$ (723,166)**	**$ (776,464)**	**$ (831,377)**	**$ (887,951)**	**$ (946,237)**	**$(1,006,286)**	**$(1,068,150)**	**$(1,131,882)**	**$(1,197,540)**	**$(1,265,180)**	**$(1,334,861)**	**$(1,406,645)**	**$(1,480,595)**	**$(1,556,775)**

Maximum Revenue Deficiency	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Sufficiency Test Driving the Deficiency	*Coverage*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*
Maximum Deficiency From Tests	$ 184,995	$ 673,545	$ 574,951	$ 622,460	$ 621,591	$ 672,242	$ 724,407	$ 778,140	$ 833,486	$ 890,493	$ 949,211	$ 1,009,689	$ 1,071,980	$ 1,136,138	$ 1,202,217	$ 1,270,275	$ 1,340,371	$ 1,412,565	$ 1,486,919	$ 1,563,498
less: Net Revenue From Prior Rate Increases	-	-	(607,415)	(802,173)	(1,017,261)	(1,066,765)	(1,117,450)	(1,169,341)	(1,222,466)	(1,276,853)	(1,332,530)	(1,389,527)	(1,447,873)	(1,507,600)	(1,568,738)	(1,631,319)	(1,695,376)	(1,760,942)	(1,828,052)	(1,896,740)
Revenue Deficiency	$ 184,995	$ 673,545	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plus: Adjustment for State Excise Tax	2,817	10,257	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Revenue Deficiency	**$ 187,812**	**$ 683,802**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**

Rate Increases	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Rate Revenue with no Increase	$ 1,334,000	$ 1,337,284	$ 1,340,576	$ 1,343,877	$ 1,347,185	$ 1,350,502	$ 1,353,826	$ 1,357,159	$ 1,360,500	$ 1,363,850	$ 1,367,207	$ 1,370,573	$ 1,373,947	$ 1,377,330	$ 1,380,720	$ 1,384,119	$ 1,387,527	$ 1,390,943	$ 1,394,367	$ 1,397,800
Revenues from Prior Rate Increases	-	-	616,665	814,389	1,032,752	1,083,010	1,134,467	1,187,148	1,241,082	1,296,297	1,352,822	1,410,687	1,469,922	1,530,558	1,592,627	1,656,161	1,721,194	1,787,759	1,855,890	1,925,624
Rate Revenue Before Rate Increase (Incl. previous increases)	1,334,000	1,337,284	1,957,241	2,158,266	2,379,937	2,433,512	2,488,293	2,544,307	2,601,582	2,660,147	2,720,029	2,781,260	2,843,869	2,907,888	2,973,348	3,040,281	3,108,721	3,178,701	3,250,257	3,323,424
Required Annual Rate Increase	14.08%	51.13%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Number of Months New Rates Will Be In Effect	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Info: Percentage Increase to Generate Required Revenue	*14.08%*	*51.13%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*
Policy-Induced Rate Increases	0.00%	46.00%	10.00%	10.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
ANNUAL RATE INCREASE	**0.00%**	**46.00%**	**10.00%**	**10.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**
CUMULATIVE RATE INCREASE	**0.00%**	**46.00%**	**60.60%**	**76.66%**	**80.19%**	**83.80%**	**87.47%**	**91.22%**	**95.05%**	**98.95%**	**102.93%**	**106.99%**	**111.13%**	**115.35%**	**119.65%**	**124.05%**	**128.53%**	**133.10%**	**137.76%**	**142.52%**

Impacts of Rate Increases	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Rate Revenues After Rate Increase	$ 1,334,000	$ 1,952,435	$ 2,152,966	$ 2,374,092	$ 2,427,536	$ 2,482,182	$ 2,538,059	$ 2,595,193	$ 2,653,614	$ 2,713,350	$ 2,774,430	$ 2,836,885	$ 2,900,747	$ 2,966,046	$ 3,032,815	$ 3,101,086	$ 3,170,895	$ 3,242,276	$ 3,315,263	$ 3,389,893
Full Year Rate Revenues After Rate Increase	*1,334,000*	*1,952,435*	*2,152,966*	*2,374,092*	*2,427,536*	*2,482,182*	*2,538,059*	*2,595,193*	*2,653,614*	*2,713,350*	*2,774,430*	*2,836,885*	*2,900,747*	*2,966,046*	*3,032,815*	*3,101,086*	*3,170,895*	*3,242,276*	*3,315,263*	*3,389,893*
Additional State and City Taxes Due to Rate Increases	-	9,227	12,186	15,453	16,205	16,975	17,763	18,571	19,397	20,242	21,108	21,995	22,902	23,831	24,781	25,755	26,751	27,770	28,813	29,881
Net Cash Flow After Rate Increase	$ (184,995)	$ (67,622)	$ 225,252	$ 392,302	$ 442,554	$ 442,463	$ 442,062	$ 441,324	$ 440,231	$ 438,764	$ 436,904	$ 434,629	$ 431,917	$ 428,747	$ 425,096	$ 420,937	$ 416,247	$ 410,998	$ 405,163	$ 398,714
Coverage After Rate Increase	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Mukilteo
Stormwater Rate and GFC
Fund Activity

Funds	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
OPERATING FUND Perform Transfer?	**Yes**																			
Beginning Balance	$ 543,651	$ 125,000	$ 57,378	$ 282,631	$ 323,280	$ 323,688	$ 332,559	$ 341,682	$ 351,064	$ 360,713	$ 370,636	$ 380,842	$ 391,339	$ 402,135	$ 413,239	$ 424,660	$ 436,409	$ 448,493	$ 460,924	$ 473,712
plus: Net Cash Flow after Rate Increase	(184,995)	(67,622)	225,252	392,302	442,554	442,463	442,062	441,324	440,231	438,764	436,904	434,629	431,917	428,747	425,096	420,937	416,247	410,998	405,163	398,714
less: Transfer of Surplus to Capital Fund	(233,656)	-	-	(351,653)	(442,146)	(433,592)	(432,939)	(431,942)	(430,582)	(428,841)	(426,698)	(424,132)	(421,121)	(417,643)	(413,674)	(409,189)	(404,162)	(398,567)	(392,376)	(385,559)
Ending Balance	**$ 125,000**	**$ 57,378**	**$ 282,631**	**$ 323,280**	**$ 323,688**	**$ 332,559**	**$ 341,682**	**$ 351,064**	**$ 360,713**	**$ 370,636**	**$ 380,842**	**$ 391,339**	**$ 402,135**	**$ 413,239**	**$ 424,660**	**$ 436,409**	**$ 448,493**	**$ 460,924**	**$ 473,712**	**$ 486,867**
Minimum Target Balance	*$ 125,000*	*$ 330,568*	*$ 314,891*	*$ 323,280*	*$ 323,688*	*$ 332,559*	*$ 341,682*	*$ 351,064*	*$ 360,713*	*$ 370,636*	*$ 380,842*	*$ 391,339*	*$ 402,135*	*$ 413,239*	*$ 424,660*	*$ 436,409*	*$ 448,493*	*$ 460,924*	*$ 473,712*	*$ 486,867*
Maximum Funds to be Kept as Operating Reserves	*$ 125,000*	*$ 330,568*	*$ 314,891*	*$ 323,280*	*$ 323,688*	*$ 332,559*	*$ 341,682*	*$ 351,064*	*$ 360,713*	*$ 370,636*	*$ 380,842*	*$ 391,339*	*$ 402,135*	*$ 413,239*	*$ 424,660*	*$ 436,409*	*$ 448,493*	*$ 460,924*	*$ 473,712*	*$ 486,867*
Info: No of Days of Cash Operating Expenses	*30*	*10*	*54*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*
CAPITAL FUND																				
Beginning Balance	$ -	$ 12,872	$ 12,885	$ 12,898	$ 364,564	$ 807,075	$ 1,241,473	$ 1,675,654	$ 2,109,271	$ 2,541,963	$ 2,973,345	$ 3,403,017	$ 3,830,552	$ 4,255,504	$ 4,677,402	$ 5,095,754	$ 5,510,038	$ 5,919,710	$ 6,324,197	$ 6,722,897
plus: Rate Funded Capital	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
plus: Transfers from Operating Fund	233,656	-	-	351,653	442,146	433,592	432,939	431,942	430,582	428,841	426,698	424,132	421,121	417,643	413,674	409,189	404,162	398,567	392,376	385,559
plus: Grants/ Donations / CIAC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
plus: Additional Proceeds (Costs)	727,600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
plus: General Facilities Charges	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
plus: Revenue Bond Proceeds	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
plus: PWTF Loans	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
plus: Other Low Interest Loan Proceeds	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
plus: Interest Earnings	-	13	13	13	365	807	1,241	1,676	2,109	2,542	2,973	3,403	3,831	4,256	4,677	5,096	5,510	5,920	6,324	6,723
Total Funding Sources	**$ 961,256**	**$ 12,885**	**$ 12,898**	**$ 364,564**	**$ 807,075**	**$ 1,241,473**	**$ 1,675,654**	**$ 2,109,271**	**$ 2,541,963**	**$ 2,973,345**	**$ 3,403,017**	**$ 3,830,552**	**$ 4,255,504**	**$ 4,677,402**	**$ 5,095,754**	**$ 5,510,038**	**$ 5,919,710**	**$ 6,324,197**	**$ 6,722,897**	**$ 7,115,179**
less: Capital Expenditures	(948,384)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ending Capital Fund Balance	**$ 12,872**	**$ 12,885**	**$ 12,898**	**$ 364,564**	**$ 807,075**	**$ 1,241,473**	**$ 1,675,654**	**$ 2,109,271**	**$ 2,541,963**	**$ 2,973,345**	**$ 3,403,017**	**$ 3,830,552**	**$ 4,255,504**	**$ 4,677,402**	**$ 5,095,754**	**$ 5,510,038**	**$ 5,919,710**	**$ 6,324,197**	**$ 6,722,897**	**$ 7,115,179**
Minimum Target Balance	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*
DEBT RESERVE																				
Beginning Balance	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
plus: Reserve Funding from New Debt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
less: Use of Reserves for Debt Service	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ending Balance	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Minimum Target Balance	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*

Mukilteo
Stormwater Rate and GFC
Summary

Revenue Requirement	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Revenues																				
Rate Revenues Under Existing Rates	$ 1,334,000	$ 1,337,284	$ 1,340,576	$ 1,343,877	$ 1,347,185	$ 1,350,502	$ 1,353,826	$ 1,357,159	$ 1,360,500	$ 1,363,850	$ 1,367,207	$ 1,370,573	$ 1,373,947	$ 1,377,330	$ 1,380,720	$ 1,384,119	$ 1,387,527	$ 1,390,943	$ 1,394,367	$ 1,397,800
Non-Rate Revenues	3,000	125	57	315	323	324	333	342	351	361	371	381	392	403	414	425	437	449	462	475
Total Revenues	**$ 1,337,000**	**$ 1,337,409**	**$ 1,340,634**	**$ 1,344,191**	**$ 1,347,508**	**$ 1,350,825**	**$ 1,354,159**	**$ 1,357,501**	**$ 1,360,851**	**$ 1,364,210**	**$ 1,367,578**	**$ 1,370,954**	**$ 1,374,339**	**$ 1,377,732**	**$ 1,381,134**	**$ 1,384,545**	**$ 1,387,964**	**$ 1,391,392**	**$ 1,394,829**	**$ 1,398,275**
Expenses																				
Cash Operating Expenses	$ 1,521,995	$ 1,505,954	$ 1,397,960	$ 1,436,054	$ 1,425,270	$ 1,465,642	$ 1,508,075	$ 1,550,887	$ 1,594,965	$ 1,640,347	$ 1,687,969	$ 1,736,103	$ 1,786,674	$ 1,837,733	$ 1,890,311	$ 1,945,975	$ 2,002,659	$ 2,060,443	$ 2,119,646	$ 2,180,618
NPDES Expenses	-	505,000	517,625	530,566	543,830	557,426	571,361	585,645	600,286	615,293	630,676	646,443	662,604	679,169	696,148	713,552	731,391	749,675	768,417	787,628
Existing Debt Service	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
New Debt Service	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rate Funded Capital	-	-	140,000	750,000	1,250,000	1,750,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additions Required to Meet Op. Fund Balance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Expenses	**$ 1,521,995**	**$ 2,010,954**	**$ 2,055,585**	**$ 2,716,620**	**$ 3,219,100**	**$ 3,773,067**	**$ 2,079,436**	**$ 2,136,532**	**$ 2,195,251**	**$ 2,255,640**	**$ 2,318,645**	**$ 2,382,545**	**$ 2,449,277**	**$ 2,516,902**	**$ 2,586,459**	**$ 2,659,526**	**$ 2,734,050**	**$ 2,810,119**	**$ 2,888,064**	**$ 2,968,246**
Net Surplus (Deficiency)	**$ (184,995)**	**$ (673,545)**	**$ (714,951)**	**$ (1,372,428)**	**$ (1,871,591)**	**$ (2,422,242)**	**$ (725,277)**	**$ (779,031)**	**$ (834,400)**	**$ (891,430)**	**$ (951,067)**	**$ (1,011,591)**	**$ (1,074,939)**	**$ (1,139,170)**	**$ (1,205,325)**	**$ (1,274,982)**	**$ (1,346,086)**	**$ (1,418,726)**	**$ (1,493,235)**	**$ (1,569,971)**
Additions to Meet Coverage	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Surplus (Deficiency)	**$ (184,995)**	**$ (673,545)**	**$ (714,951)**	**$ (1,372,428)**	**$ (1,871,591)**	**$ (2,422,242)**	**$ (725,277)**	**$ (779,031)**	**$ (834,400)**	**$ (891,430)**	**$ (951,067)**	**$ (1,011,591)**	**$ (1,074,939)**	**$ (1,139,170)**	**$ (1,205,325)**	**$ (1,274,982)**	**$ (1,346,086)**	**$ (1,418,726)**	**$ (1,493,235)**	**$ (1,569,971)**
% of Rate Revenue	**13.87%**	**50.37%**	**53.33%**	**102.12%**	**138.93%**	**179.36%**	**53.57%**	**57.40%**	**61.33%**	**65.36%**	**69.56%**	**73.81%**	**78.24%**	**82.71%**	**87.30%**	**92.12%**	**97.01%**	**102.00%**	**107.09%**	**112.32%**
Annual Rate Adjustment	**0.00%**	**46.00%**	**19.00%**	**19.00%**	**19.00%**	**19.00%**	**19.00%**	**2.50%**	**2.50%**	**2.50%**	**2.50%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**
Cumulative Annual Rate Adjustment	**0.00%**	**46.00%**	**73.74%**	**106.75%**	**146.03%**	**192.78%**	**248.41%**	**257.12%**	**266.05%**	**275.20%**	**284.58%**	**292.27%**	**300.11%**	**308.12%**	**316.28%**	**324.60%**	**333.10%**	**341.76%**	**350.59%**	**359.60%**
Rate Revenues After Rate Increase	$ 1,334,000	$ 1,952,435	$ 2,329,117	$ 2,778,473	$ 3,314,522	$ 3,953,992	$ 4,716,834	$ 4,846,657	$ 4,980,054	$ 5,117,122	$ 5,257,962	$ 5,376,325	$ 5,497,351	$ 5,621,103	$ 5,747,640	$ 5,877,025	$ 6,009,324	$ 6,144,600	$ 6,282,921	$ 6,424,357
Additional Taxes from Rate Increase	$ -	$ 9,227	$ 14,828	$ 21,519	$ 29,510	$ 39,052	$ 50,445	$ 52,342	$ 54,293	$ 56,299	$ 58,361	$ 60,086	$ 61,851	$ 63,657	$ 65,504	$ 67,394	$ 69,327	$ 71,305	$ 73,328	$ 75,398
Net Cash Flow After Rate Increase	**(184,995)**	**(67,622)**	**258,762**	**40,649**	**66,236**	**142,196**	**2,587,286**	**2,658,125**	**2,730,861**	**2,805,543**	**2,881,327**	**2,934,074**	**2,986,615**	**3,040,946**	**3,096,090**	**3,150,530**	**3,206,384**	**3,263,626**	**3,321,992**	**3,381,187**
Coverage After Rate Increases	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**
Sample Residential Monthly Bill	**$ 7.85**	**$ 11.46**	**$ 13.64**	**$ 16.23**	**$ 19.31**	**$ 22.98**	**$ 27.35**	**$ 28.03**	**$ 28.73**	**$ 29.45**	**$ 30.19**	**$ 30.79**	**$ 31.41**	**$ 32.04**	**$ 32.68**	**$ 33.33**	**$ 34.00**	**$ 34.68**	**$ 35.37**	**$ 36.08**
Monthly Average Increase ($)	$ -	$ 3.61	$ 2.18	$ 2.59	$ 3.08	$ 3.67	$ 4.37	$ 0.68	$ 0.70	$ 0.72	$ 0.74	$ 0.60	$ 0.62	$ 0.63	$ 0.64	$ 0.65	$ 0.67	$ 0.68	$ 0.69	$ 0.71

Fund Balance	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
OPERATING FUND																				
Beginning Balance	$ 543,651	$ 125,000	$ 57,378	$ 314,891	$ 323,280	$ 323,688	$ 332,559	$ 341,825	$ 351,211	$ 360,863	$ 370,790	$ 381,147	$ 391,651	$ 402,621	$ 413,737	$ 425,171	$ 437,182	$ 449,433	$ 461,937	$ 474,750
plus: Net Cash Flow after Rate Increase	(184,995)	(67,622)	258,762	40,649	66,236	142,196	2,587,286	2,658,125	2,730,861	2,805,543	2,881,327	2,934,074	2,986,615	3,040,946	3,096,090	3,150,530	3,206,384	3,263,626	3,321,992	3,381,187
less: Transfer of Surplus to Capital Fund	(233,656)	-	(1,250)	(32,260)	(65,828)	(133,325)	(2,578,020)	(2,648,739)	(2,721,208)	(2,795,616)	(2,870,970)	(2,923,570)	(2,975,645)	(3,029,830)	(3,084,656)	(3,138,519)	(3,194,134)	(3,251,121)	(3,309,179)	(3,368,007)
Ending Balance	**$ 125,000**	**$ 57,378**	**$ 314,891**	**$ 323,280**	**$ 323,688**	**$ 332,559**	**$ 341,825**	**$ 351,211**	**$ 360,863**	**$ 370,790**	**$ 381,147**	**$ 391,651**	**$ 402,621**	**$ 413,737**	**$ 425,171**	**$ 437,182**	**$ 449,433**	**$ 461,937**	**$ 474,750**	**$ 487,931**
Minimum Target Balance	*$ 125,000*	*$ 330,568*	*$ 314,891*	*$ 323,280*	*$ 323,688*	*$ 332,559*	*$ 341,825*	*$ 351,211*	*$ 360,863*	*$ 370,790*	*$ 381,147*	*$ 391,651*	*$ 402,621*	*$ 413,737*	*$ 425,171*	*$ 437,182*	*$ 449,433*	*$ 461,937*	*$ 474,750*	*$ 487,931*
Days	*30*	*10*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*
% of Budgeted Operating Revenue	*9.37%*	*4.29%*	*23.49%*	*24.06%*	*24.03%*	*24.62%*	*25.25%*	*25.88%*	*26.52%*	*27.19%*	*27.88%*	*28.58%*	*29.30%*	*30.04%*	*30.79%*	*31.59%*	*32.39%*	*33.21%*	*34.05%*	*34.91%*
CAPITAL FUND																				
Beginning Balance	$ -	$ 12,872	$ 12,885	$ 154,147	$ 282,569	$ 1,287,206	$ 2,850,179	$ 478,157	$ 2,784,401	$ 5,154,229	$ 7,589,278	$ 1,003,435	$ 3,928,008	$ 1,222,683	$ 4,253,736	$ 7,342,646	$ 1,962,437	$ 391,141	$ 2,272,095	$ 5,583,546
plus: Rate Funded System Reinvestment	-	-	140,000	750,000	1,250,000	1,750,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
plus: Transfers from Operating Fund	233,656	-	1,250	32,260	65,828	133,325	2,578,020	2,648,739	2,721,208	2,795,616	2,870,970	2,923,570	2,975,645	3,029,830	3,084,656	3,138,519	3,194,134	3,251,121	3,309,179	3,368,007
plus: Grants/ Donations/ CIAC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
plus: Additional Proceeds (Costs)	727,600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
plus: General Facilities Charges	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
plus: Net Debt Proceeds Available for Projects	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
plus: Interest Earnings	-	13	13	154	283	1,287	2,850	478	2,784	5,154	7,589	1,003	3,928	1,223	4,254	7,343	1,962	391	2,272	5,584
Total Funding Sources	**$ 961,256**	**$ 12,885**	**$ 154,147**	**$ 936,561**	**$ 1,598,680**	**$ 3,171,818**	**$ 5,431,049**	**$ 3,127,374**	**$ 5,508,394**	**$ 7,954,999**	**$10,467,837**	**$ 3,928,008**	**$ 6,907,581**	**$ 4,253,736**	**$ 7,342,646**	**$10,488,508**	**$ 5,158,533**	**$ 3,642,654**	**$ 5,583,546**	**$ 8,957,136**
less: Capital Expenditures	(948,384)	-	-	(653,992)	(311,474)	(321,639)	(4,952,892)	(342,973)	(354,165)	(365,722)	(9,464,402)	-	(5,684,898)	-	-	(8,526,071)	(4,767,392)	(1,370,558)	-	-
Ending Working Capital Balance	**$ 12,872**	**$ 12,885**	**$ 154,147**	**$ 282,569**	**$ 1,287,206**	**$ 2,850,179**	**$ 478,157**	**$ 2,784,401**	**$ 5,154,229**	**$ 7,589,278**	**$ 1,003,435**	**$ 3,928,008**	**$ 1,222,683**	**$ 4,253,736**	**$ 7,342,646**	**$ 1,962,437**	**$ 391,141**	**$ 2,272,095**	**$ 5,583,546**	**$ 8,957,136**
Minimum Target Balance	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*

Mukilteo
Stormwater Rate and GFC
Assumptions

Economic & Financial Factors	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
1 General Cost Inflation	2.29%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%
2 Construction Cost Inflation	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%
3 Labor Cost Inflation	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%
4 Benefit Cost Inflation	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%
5 Customer Growth	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%
6 General Inflation plus Growth	2.54%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%
7 No Escalation	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
8 [Extra]	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Investment Interest	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%
B&O Tax	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%

Accounting Assumptions		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
FISCAL POLICY RESTRICTIONS																					
Minimum Operating Fund Balance Target																					
Select Minimum Operating Fund Balance Target	1	**Defined as Days of O&M Expenses**																			
1 - Defined as Days of O&M expenses																					
Minimum Operating Fund Balance Target		30	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Maximum Operating Fund Balance		30	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
2 - Amounts at Right																					
Minimum Operating Fund Balance Target		$ 125,000	$ 267,457	$ 268,115	$ 268,775	$ 269,437	$ 270,100	$ 270,765	$ 271,432	$ 272,100	$ 272,770	$ 273,441	$ 274,115	$ 274,789	$ 275,466	$ 276,144	$ 276,824	$ 277,505	$ 278,189	$ 278,873	$ 279,560
Maximum Operating Fund Balance		$ 125,000	$ 267,457	$ 268,115	$ 268,775	$ 269,437	$ 270,100	$ 270,765	$ 271,432	$ 272,100	$ 272,770	$ 273,441	$ 274,115	$ 274,789	$ 275,466	$ 276,144	$ 276,824	$ 277,505	$ 278,189	$ 278,873	$ 279,560
Minimum Capital Fund Balance Target																					
Select Minimum Capital Fund Balance Target	2	**User Input**																			
1 - Defined as % of Plant																					
Plant-in-Service in 2014	$ 5,106,861	Estimated Net Assets																			
Minimum Capital Fund Balance - % of plant assets		1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
2 - Amount at Right ==>		$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000
RATE FUNDED CAPITAL																					
Select Capital Reinvestment Funding Strategy	3	**User Input**																			
Amount of Annual Cash Funding from Rates																					
1 - Equal to Annual Depreciation Expense		$ 340,193	$ 340,193	$ 340,193	$ 346,225	$ 352,455	$ 358,888	$ 457,945	$ 464,805	$ 471,888	$ 479,203	$ 668,491	$ 668,491	$ 782,189	$ 782,189	$ 782,189	$ 952,710	$ 1,048,058	$ 1,075,469	$ 1,075,469	$ 1,075,469
2 - Equal to Annual Depreciation less Annual Debt Principal Payments		$ 340,193	$ 340,193	$ 340,193	$ 346,225	$ 352,455	$ 358,888	$ 457,945	$ 464,805	$ 471,888	$ 479,203	$ 668,491	$ 668,491	$ 782,189	$ 782,189	$ 782,189	$ 952,710	$ 1,048,058	$ 1,075,469	$ 1,075,469	$ 1,075,469
3 - Equal to Amount at Right ==>		$ -	$ -	$ 140,000	$ 750,000	$ 1,250,000	$ 1,750,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
4 - Do Not Fund System Reinvestment																					

Mukilteo
Stormwater Rate and GFC
Assumptions

Capital Financing Assumptions		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
General Facilities Charges	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Equivalent Residential Units (Estimate)		13,644	13,678	13,711	13,745	13,779	13,813	13,847	13,881	13,915	13,949	13,984	14,018	14,053	14,087	14,122	14,157	14,192	14,227	14,262	14,297
Additional Units Per Year		34	34	34	34	34	34	34	34	34	34	34	35	35	35	35	35	35	35	35	35
GFC Revenues		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
FUNDING SOURCES																					
Grants		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Additional Proceeds (Costs)																					
Department of Ecology State Grant		$ 170,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Smuggler's Gulch DOE Grant		557,600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
[Extra line]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
[Extra line]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
[Extra line]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Additional Proceeds		**$ 727,600**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
REVENUE BONDS																					
Term (years)		20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Interest Cost		4.50%	4.50%	4.50%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	4.50%	4.50%	4.50%	4.50%
Issuance Cost		1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%
Revenue Bond Coverage Requirement	**1.25**																				
Use Reserves to Pay for Last Payment	**Yes**																				
PWTF LOANS																					
Term (years; no more than 20 years)		20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Interest Cost		2.55%	2.55%	2.55%	2.55%	2.55%	2.55%	2.55%	2.55%	2.55%	2.55%	2.55%	2.55%	2.55%	2.55%	2.55%	2.55%	1.00%	1.00%	1.00%	1.00%
Required Local Match		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.00%	1.00%	1.00%	1.00%
OTHER LOANS																					
Term (years)		20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Interest Cost		4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
Issuance Cost		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Mukilteo
Stormwater Rate and GFC
Operating Revenue and Expenditure Forecast

			Actual	Actual	Budget	Projection	Projection	Projection	Projection	Projection	Projection	Projection	Projection	Projection	Projection	Projection	Projection	Projection	Projection	Projection	Projection	Projection	Projection	Projection
Revenues		**FORECAST BASIS**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**
	Rate Revenues																							
	Storm Drain Fees & Charges	Customer Growth	$ 1,293,185	$ 1,081,779	$ 1,334,000	$ 1,337,284	$ 1,340,576	$ 1,343,877	$ 1,347,185	$ 1,350,502	$ 1,353,826	$ 1,357,159	$ 1,360,500	$ 1,363,850	$ 1,367,207	$ 1,370,573	$ 1,373,947	$ 1,377,330	$ 1,380,720	$ 1,384,119	$ 1,387,527	$ 1,390,943	$ 1,394,367	$ 1,397,800
	[Extra]	Customer Growth	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	[Extra]	Customer Growth	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total Rate Revenue		**$ 1,293,185**	**$ 1,081,779**	**$ 1,334,000**	**$ 1,337,284**	**$ 1,340,576**	**$ 1,343,877**	**$ 1,347,185**	**$ 1,350,502**	**$ 1,353,826**	**$ 1,357,159**	**$ 1,360,500**	**$ 1,363,850**	**$ 1,367,207**	**$ 1,370,573**	**$ 1,373,947**	**$ 1,377,330**	**$ 1,380,720**	**$ 1,384,119**	**$ 1,387,527**	**$ 1,390,943**	**$ 1,394,367**	**$ 1,397,800**
	Non-Rate Revenues																							
	Transfers In	No Escalation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	MWWD Interlocal Agreement GIS/CAD Tech	No Escalation	-	9,856	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Other Miscellaneous Revenue	No Escalation	-	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	[Extra]	No Escalation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total Non-Rate Revenues		**$ -**	**$ 9,895**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
TOTAL REVENUES			**$ 1,293,185**	**$ 1,091,674**	**$ 1,334,000**	**$ 1,337,284**	**$ 1,340,576**	**$ 1,343,877**	**$ 1,347,185**	**$ 1,350,502**	**$ 1,353,826**	**$ 1,357,159**	**$ 1,360,500**	**$ 1,363,850**	**$ 1,367,207**	**$ 1,370,573**	**$ 1,373,947**	**$ 1,377,330**	**$ 1,380,720**	**$ 1,384,119**	**$ 1,387,527**	**$ 1,390,943**	**$ 1,394,367**	**$ 1,397,800**

General Operating Expenses		FORECAST BASIS	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
5301	Taxes and Assessments	Calculation	$ 24,229	$ 22,495	$ 27,000	$ 20,059	$ 20,109	$ 20,158	$ 20,208	$ 20,258	$ 20,307	$ 20,357	$ 20,408	$ 20,458	$ 20,508	$ 20,559	$ 20,609	$ 20,660	$ 20,711	$ 20,762	$ 20,813	$ 20,864	$ 20,916	$ 20,967
19	**Other Governmental Services**																							
590	***Title Not Found***																							
590.200	**Operating Transfers Out**																							
	Intergovernmental Services																							
5590	Transfer to Reserves	No Escalation	$ -	$ 50,000	$ 50,000	$ 100,000	$ 50,000	$ 50,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
38	**Public Works**																							
530	**Utilities and Environment**																							
530.200	**Engineering Plans & Services**																							
	Salaries and Wages																							
1001	Full Time Employees	Labor Cost Inflation	149,322	134,552	184,150	189,444	194,891	200,494	206,258	212,188	218,288	224,563	231,020	237,661	244,494	251,523	258,754	266,193	273,846	281,719	289,818	298,150	306,722	315,540
1102	Part Time Employees	Labor Cost Inflation	12,234	4,329	30,660	31,541	32,448	33,381	34,341	35,328	36,344	37,389	38,464	39,569	40,707	41,877	43,081	44,320	45,594	46,905	48,253	49,640	51,068	52,536
1201	Overtime	Labor Cost Inflation	-	1,773	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benefits																							
2000	Benefits	Benefit Cost Inflation	182,467	172,751	198,405	206,157	214,212	222,581	231,277	240,314	249,703	259,459	269,596	280,130	291,075	302,447	314,264	326,542	339,301	352,558	366,332	380,645	395,517	410,970
530.300	**Surface Water Management**																							
	Salaries and Wages																							
1101	Full Time Employees	Labor Cost Inflation	243,507	254,891	235,890	242,672	249,648	256,826	264,209	271,805	279,619	287,658	295,928	304,436	313,189	322,193	331,455	340,985	350,788	360,873	371,248	381,921	392,901	404,196
1115	Acting Supervisor Pay	Labor Cost Inflation	1,492	386	1,000	1,029	1,058	1,089	1,120	1,152	1,185	1,219	1,255	1,291	1,328	1,366	1,405	1,446	1,487	1,530	1,574	1,619	1,666	1,713
1201	Overtime	Labor Cost Inflation	8,037	6,843	6,500	6,687	6,879	7,077	7,280	7,490	7,705	7,926	8,154	8,389	8,630	8,878	9,133	9,396	9,666	9,944	10,230	10,524	10,826	11,138
1203	Standby Pay	Labor Cost Inflation	5,936	3,856	4,060	4,177	4,297	4,420	4,547	4,678	4,813	4,951	5,093	5,240	5,390	5,545	5,705	5,869	6,038	6,211	6,390	6,573	6,762	6,957
1241	OT - Disaster Support/Severe Weather	Labor Cost Inflation	-	246	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Supplies																							
3101	Office Supplies	General Cost Inflation	320	429	500	513	525	538	552	566	580	594	609	624	640	656	672	689	706	724	742	761	780	799
	Reference Material	General Cost Inflation	-	-	500	513	525	538	552	566	580	594	609	624	640	656	672	689	706	724	742	761	780	799
3112	Operating Supplies	General Cost Inflation	12,001	5,487	10,000	10,250	10,506	10,769	11,038	11,314	11,597	11,887	12,184	12,489	12,801	13,121	13,449	13,785	14,130	14,483	14,845	15,216	15,597	15,987
3113	Vehicle R&M Tools/Eq	General Cost Inflation	-	-	250	256	263	269	276	283	290	297	305	312	320	328	336	345	353	362	371	380	390	400
3124	Clothing/Boots	General Cost Inflation	2,151	2,970	3,750	3,844	3,940	4,038	4,139	4,243	4,349	4,458	4,569	4,683	4,800	4,920	5,043	5,169	5,299	5,431	5,567	5,706	5,849	5,995
3135	Aggregate	General Cost Inflation	9,525	3,449	6,500	6,663	6,829	7,000	7,175	7,354	7,538	7,726	7,920	8,118	8,321	8,529	8,742	8,960	9,184	9,414	9,649	9,891	10,138	10,391
3206	Motor Fuel	General Cost Inflation	14,972	12,347	12,000	12,300	12,608	12,923	13,246	13,577	13,916	14,264	14,621	14,986	15,361	15,745	16,139	16,542	16,956	17,380	17,814	18,259	18,716	19,184
3501	Small Items of Equipment	General Cost Inflation	6,247	3,235	8,000	8,200	8,405	8,615	8,831	9,051	9,278	9,509	9,747	9,991	10,241	10,497	10,759	11,028	11,304	11,586	11,876	12,173	12,477	12,789
	Other Services & Charges																							
	Equipment Replacement Charges	General Cost Inflation	-	-	36,080	36,982	37,907	38,854	39,826	40,821	41,842	42,888	43,960	45,059	46,185	47,340	48,524	49,737	50,980	52,255	53,561	54,900	56,272	57,679
4106	Other Professional Services	General Cost Inflation	169,939	275,822	300,000	307,500	315,188	323,067	331,144	339,422	347,908	356,606	365,521	374,659	384,025	393,626	403,467	413,553	423,892	434,489	445,352	456,485	467,898	479,595
4107	Wetland Mitigation Services	General Cost Inflation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4109	City Atty. Other Svcs.	General Cost Inflation	3,917	5,994	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4111	Hazardous Materials Testing	General Cost Inflation	2,620	3,120	2,800	2,870	2,942	3,015	3,091	3,168	3,247	3,328	3,412	3,497	3,584	3,674	3,766	3,860	3,956	4,055	4,157	4,261	4,367	4,476
4125	Contract Services	General Cost Inflation	4,941	959	3,500	3,588	3,677	3,769	3,863	3,960	4,059	4,160	4,264	4,371	4,480	4,592	4,707	4,825	4,945	5,069	5,196	5,326	5,459	5,595
4201	Telephone	General Cost Inflation	1,956	771	1,000	1,025	1,051	1,077	1,104	1,131	1,160	1,189	1,218	1,249	1,280	1,312	1,345	1,379	1,413	1,448	1,485	1,522	1,560	1,599
4209	Cell Phones	General Cost Inflation	1,290	1,395	1,200	1,230	1,261	1,292	1,325	1,358	1,392	1,426	1,462	1,499	1,536	1,575	1,614	1,654	1,696	1,738	1,781	1,826	1,872	1,918
4301	Travel & Subsistence	General Cost Inflation	78	67	2,500	2,563	2,627	2,692	2,760	2,829	2,899	2,972	3,046	3,122	3,200	3,280	3,362	3,446	3,532	3,621	3,711	3,804	3,899	3,997
4402	Legal Publications	General Cost Inflation	-	499	600	615	630	646	662	679	696	713	731	749	768	787	807	827	848	869	891	913	936	959
4503	Work Equip & Machine Rental	General Cost Inflation	6,048	5,029	12,000	12,300	12,608	12,923	13,246	13,577	13,916	14,264	14,621	14,986	15,361	15,745	16,139	16,542	16,956	17,380	17,814	18,259	18,716	19,184
4509	Equipment Replacement Charges	General Cost Inflation	40,080	33,073	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4601	Insurance	General Cost Inflation	28,777	35,865	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4705	Hazardous Waste Disposal	General Cost Inflation	26,557	31,721	30,000	30,750	31,519	32,307	33,114	33,942	34,791	35,661	36,552	37,466	38,403	39,363	40,347	41,355	42,389	43,449	44,535	45,649	46,790	47,960
4722	Brush Disposal	General Cost Inflation	-	14,892	4,000	4,100	4,203	4,308	4,415	4,526	4,639	4,755	4,874	4,995	5,120	5,248	5,380	5,514	5,652	5,793	5,938	6,086	6,239	6,395
4815	Equipment R&M	General Cost Inflation	460	5,683	5,000	5,125	5,253	5,384	5,519	5,657	5,798	5,943	6,092	6,244	6,400	6,560	6,724	6,893	7,065	7,241	7,423	7,608	7,798	7,993
4820	Vehicle R&M	General Cost Inflation	29,084	33,445	30,000	30,750	31,519	32,307	33,114	33,942	34,791	35,661	36,552	37,466	38,403	39,363	40,347	41,355	42,389	43,449	44,535	45,649	46,790	47,960
4821	Computer System Maint. & Subscriptions	General Cost Inflation	-	1,655	1,850	1,896	1,944	1,992	2,042	2,093	2,145	2,199	2,254	2,310	2,368	2,427	2,488	2,550	2,614	2,679	2,746	2,815	2,885	2,958
4904	Laundry Services	General Cost Inflation	1,261	1,411	1,400	1,435	1,471	1,508	1,545	1,584	1,624	1,664	1,706	1,748	1,792	1,837	1,883	1,930	1,978	2,028	2,078	2,130	2,184	2,238
4912	Training and Registration	General Cost Inflation	1,008	353	2,500	2,563	2,627	2,692	2,760	2,829	2,899	2,972	3,046	3,122	3,200	3,280	3,362	3,446	3,532	3,621	3,711	3,804	3,899	3,997
4921	Permit Fees	General Cost Inflation	-	-	10,000	10,250	10,506	10,769	11,038	11,314	11,597	11,887	12,184	12,489	12,801	13,121	13,449	13,785	14,130	14,483	14,845	15,216	15,597	15,987
4940	Vactor Service	General Cost Inflation	24,070	18,001	22,000	22,550	23,114	23,692	24,284	24,891	25,513	26,151	26,805	27,475	28,162	28,866	29,588	30,327	31,085	31,863	32,659	33,476	34,312	35,170
	Intergovernmental Services																							
5112	Mukilteo Water District	General Cost Inflation	36,453	47,278	48,000	49,200	50,430	51,691	52,983	54,308	55,665	57,057	58,483	59,945	61,444	62,980	64,555	66,169	67,823	69,518	71,256	73,038	74,864	76,735
5120	Snohomish County - ILA	General Cost Inflation	-	-	2,000	2,050	2,101	2,154	2,208	2,263	2,319	2,377	2,437	2,498	2,560	2,624	2,690	2,757	2,826	2,897	2,969	3,043	3,119	3,197
5153	WRIA ILA	General Cost Inflation	7,055	7,236	10,000	10,250	10,506	10,769	11,038	11,314	11,597	11,887	12,184	12,489	12,801	13,121	13,449	13,785	14,130	14,483	14,845	15,216	15,597	15,987
5169	Dept of Ecology	General Cost Inflation	10,934	25,703	26,400	27,060	27,737	28,430	29,141	29,869	30,616	31,381	32,166	32,970	33,794	34,639	35,505	36,393	37,303	38,235	39,191	40,171	41,175	42,204
5301	Taxes and Assessments	General Cost Inflation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Payments for Services																							
9918	Overhead Costs	General Cost Inflation	230,433	175,500	190,000	95,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Mukilteo
Stormwater Rate and GFC
Operating Revenue and Expenditure Forecast

Operating Expense Adjustments	FORECAST BASIS	Actual 2013	Actual 2014	Budget 2015	Projection 2016	Projection 2017	Projection 2018	Projection 2019	Projection 2020	Projection 2021	Projection 2022	Projection 2023	Projection 2024	Projection 2025	Projection 2026	Projection 2027	Projection 2028	Projection 2029	Projection 2030	Projection 2031	Projection 2032	Projection 2033	Projection 2034
Additional NPDES Costs (3.75 FTEs + Equip + Ops)	General Cost Inflation	-	-	-	505,000	517,625	530,566	543,830	557,426	571,361	585,645	600,286	615,293	630,676	646,443	662,604	679,169	696,148	713,552	731,391	749,675	768,417	787,628
[Adjustment #2]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
[Adjustment #3]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
[Adjustment #4]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Add'l O&M from CIP	*From CIP*	-	-	-	-	-	-	-	-	870	892	914	937	1,856	1,903	2,959	3,033	3,109	4,707	5,715	6,163	6,317	6,475

Operating Expense Summary	FORECAST BASIS	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Total Cash O&M Expenditures		**$ 1,411,785**	**$ 2,132,130**	**$ 1,521,995**	**$ 2,010,954**	**$ 1,915,585**	**$ 1,966,620**	**$ 1,969,100**	**$ 2,023,067**	**$ 2,079,436**	**$ 2,136,532**	**$ 2,195,251**	**$ 2,255,640**	**$ 2,318,645**	**$ 2,382,545**	**$ 2,449,277**	**$ 2,516,902**	**$ 2,586,459**	**$ 2,659,526**	**$ 2,734,050**	**$ 2,810,119**	**$ 2,888,064**	**$ 2,968,246**
Depreciation Expense in 2013	$ 333,145																						
Depreciation Expense	*Last year's plus annual additions from CIP*	$ 333,145	$ 333,145	$ 340,193	$ 340,193	$ 340,193	$ 346,225	$ 352,455	$ 358,888	$ 457,945	$ 464,805	$ 471,888	$ 479,203	$ 668,491	$ 668,491	$ 782,189	$ 782,189	$ 782,189	$ 952,710	$ 1,048,058	$ 1,075,469	$ 1,075,469	$ 1,075,469
	debt principal payments	-	-	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	System Reinvestment Funding	$ 333,145	$ 333,145	$ 340,193	$ 340,193	$ 340,193	$ 346,225	$ 352,455	$ 358,888	$ 457,945	$ 464,805	$ 471,888	$ 479,203	$ 668,491	$ 668,491	$ 782,189	$ 782,189	$ 782,189	$ 952,710	$ 1,048,058	$ 1,075,469	$ 1,075,469	$ 1,075,469
TOTAL EXPENSES		**$ 1,744,930**	**$ 2,465,275**	**$ 1,862,188**	**$ 2,351,147**	**$ 2,255,777**	**$ 2,312,845**	**$ 2,321,555**	**$ 2,381,955**	**$ 2,537,381**	**$ 2,601,337**	**$ 2,667,139**	**$ 2,734,843**	**$ 2,987,135**	**$ 3,051,036**	**$ 3,231,466**	**$ 3,299,091**	**$ 3,368,648**	**$ 3,612,236**	**$ 3,782,108**	**$ 3,885,588**	**$ 3,963,533**	**$ 4,043,715**

Mukilteo
Stormwater Rate and GFC
Capital Improvement Program

Project Costs and O&M Impacts in Year:	2015

No	Description	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
1	**Stormwater Capital in 2015 Preliminary Budget**																				
2	Lighthouse Park Tidegate Stormwater Repairs	$ 50,000																			
3	Bayview Storm Drainage Improvements	-																			
4	61st Culvery Replacement	262,500																			
5	Naketa Beach Storm Pipe Repairs & Slope Rehab	333,500																			
6	**Stormwater Capital Moved Forward from 2014**																				
7	Smuggler's Gulch LID	302,384																			
8	Decant Facility				320,000																
9																					
10	**SW Comp Plan CIP**																				
11	Chennault Beach Drive Drainage Improvements							3,811,000													
12	Mukilteo Lane Drainage Improvements											6,591,000									
13	84th Street SW (West) Storm Drainage Improvements													1,240,000							
14	64th Place W Street Drainage Improvements													1,202,000							
15	66th Place W Street Drainage Improvements													1,425,000							
16	Central Dr Storm Drainage Improvements for Big Gulch Basin																5,267,000				
17	62nd Pl W/Canyon Drive Storm Drainage Improvements																	2,852,000			
18	10th St and Loveland Ave Strom Drainage Improvements																		794,000		
19																					
20	Pipe Inspections				78,705	78,705	78,705	78,705	78,705	78,705	78,705	78,705									
21	Basin Planning				195,225	195,225	195,225	195,225	195,225	195,225	195,225	195,225									
22																					
	Total Capital Projects	**$ 948,384**	**$ -**	**$ -**	**$ 593,930**	**$ 273,930**	**$ 273,930**	**$ 4,084,930**	**$ 273,930**	**$ 273,930**	**$ 273,930**	**$ 6,864,930**	**$ -**	**$ 3,867,000**	**$ -**	**$ -**	**$ 5,267,000**	**$ 2,852,000**	**$ 794,000**	**$ -**	**$ -**
	Total Upgrade/Expansion Projects	474,192	-	-	296,965	136,965	136,965	3,947,965	136,965	136,965	136,965	6,727,965	-	3,867,000	-	-	5,267,000	2,852,000	794,000	-	-
	Total R&R Projects	474,192	-	-	296,965	136,965	136,965	136,965	136,965	136,965	136,965	136,965	-	-	-	-	-	-	-	-	-
	Projects by Grants / Developer Donations																				
	Projects by Enterprise Fund																				

Mukilteo
Stormwater Rate and GFC
Capital Improvement Program

Project Costs and O&M Impacts in Year:	2015

No	Description	Annual O&M Impact	Useful Life (Years)	Specific Funding Source 1-Enterprise Fund, 2-Grants & Developer Donations		TOTAL 2015 $ COSTS	TOTAL ESCALATED COSTS
1	**Stormwater Capital in 2015 Preliminary Budget**		50	1	Enterprise Fund	$ -	$ -
2	Lighthouse Park Tidegate Stormwater Repairs		50	1	Enterprise Fund	50,000	50,000
3	Bayview Storm Drainage Improvements		50	1	Enterprise Fund	-	-
4	61st Culvery Replacement		50	1	Enterprise Fund	262,500	262,500
5	Naketa Beach Storm Pipe Repairs & Slope Rehab		50	1	Enterprise Fund	333,500	333,500
6	**Stormwater Capital Moved Forward from 2014**		50	1	Enterprise Fund	-	-
7	Smuggler's Gulch LID		50	1	Enterprise Fund	302,384	302,384
8	Decant Facility		50	1	Enterprise Fund	320,000	352,360
9			50	1	Enterprise Fund	-	-
10	**SW Comp Plan CIP**		50	1	Enterprise Fund	-	-
11	Chennault Beach Drive Drainage Improvements	750	50	1	Enterprise Fund	3,811,000	4,620,758
12	Mukilteo Lane Drainage Improvements	700	50	1	Enterprise Fund	6,591,000	9,086,746
13	84th Street SW (West) Storm Drainage Improvements	200	50	1	Enterprise Fund	1,240,000	1,822,931
14	64th Place W Street Drainage Improvements	250	50	1	Enterprise Fund	1,202,000	1,767,067
15	66th Place W Street Drainage Improvements	300	50	1	Enterprise Fund	1,425,000	2,094,900
16	Central Dr Storm Drainage Improvements for Big Gulch Basin	1,050	50	1	Enterprise Fund	5,267,000	8,526,071
17	62nd Pl W/Canyon Drive Storm Drainage Improvements	600	50	1	Enterprise Fund	2,852,000	4,767,392
18	10th St and Loveland Ave Strom Drainage Improvements	200	50	1	Enterprise Fund	794,000	1,370,558
19			50	1	Enterprise Fund	-	-
20	Pipe Inspections		50	1	Enterprise Fund	629,640	777,883
21	Basin Planning		50	1	Enterprise Fund	1,561,800	1,929,512
22			50	1	Enterprise Fund	-	-
	Total Capital Projects	**$ 4,050**				**$ 26,641,824**	**$ 38,064,562**
	Total Upgrade/Expansion Projects					24,911,912	36,060,492
	Total R&R Projects					1,729,912	2,004,069
	Projects by Grants / Developer Donations	-				-	-
	Projects by Enterprise Fund	4,050				26,641,824	38,064,562

Mukilteo
Stormwater Rate and GFC
Capital Improvement Program

Project Costs and O&M Impacts in Year:	2015

TOTAL FORECASTED PROJECT COSTS

No	Description	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
1	**Stormwater Capital in 2015 Preliminary Budget**	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
2	Lighthouse Park Tidegate Stormwater Repairs	50,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	Bayview Storm Drainage Improvements	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	61st Culvery Replacement	262,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	Naketa Beach Storm Pipe Repairs & Slope Rehab	333,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	**Stormwater Capital Moved Forward from 2014**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	Smuggler's Gulch LID	302,384	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	Decant Facility	-	-	-	352,360	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	**SW Comp Plan CIP**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	Chennault Beach Drive Drainage Improvements	-	-	-	-	-	-	4,620,758	-	-	-	-	-	-	-	-	-	-	-	-	-
12	Mukilteo Lane Drainage Improvements	-	-	-	-	-	-	-	-	-	-	9,086,746	-	-	-	-	-	-	-	-	-
13	84th Street SW (West) Storm Drainage Improvements	-	-	-	-	-	-	-	-	-	-	-	-	1,822,931	-	-	-	-	-	-	-
14	64th Place W Street Drainage Improvements	-	-	-	-	-	-	-	-	-	-	-	-	1,767,067	-	-	-	-	-	-	-
15	66th Place W Street Drainage Improvements	-	-	-	-	-	-	-	-	-	-	-	-	2,094,900	-	-	-	-	-	-	-
16	Central Dr Storm Drainage Improvements for Big Gulch Basin	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8,526,071	-	-	-	-
17	62nd Pl W/Canyon Drive Storm Drainage Improvements	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4,767,392	-	-	-
18	10th St and Loveland Ave Strom Drainage Improvements	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,370,558	-	-
19		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	Pipe Inspections	-	-	-	86,664	89,492	92,413	95,428	98,542	101,758	105,078	108,507	-	-	-	-	-	-	-	-	-
21	Basin Planning	-	-	-	214,967	221,982	229,226	236,706	244,430	252,407	260,643	269,149	-	-	-	-	-	-	-	-	-
22		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total Capital Projects	**$ 948,384**	**$ -**	**$ -**	**$ 653,992**	**$ 311,474**	**$ 321,639**	**$ 4,952,892**	**$ 342,973**	**$ 354,165**	**$ 365,722**	**$ 9,464,402**	**$ -**	**$ 5,684,898**	**$ -**	**$ -**	**$ 8,526,071**	**$ 4,767,392**	**$ 1,370,558**	**$ -**	**$ -**
	Total Upgrade/Expansion Projects	474,192	-	-	326,996	155,737	160,819	4,786,825	171,486	177,082	182,861	9,275,574	-	5,684,898	-	-	8,526,071	4,767,392	1,370,558	-	-
	Total R&R Projects	474,192	-	-	326,996	155,737	160,819	166,067	171,486	177,082	182,861	188,828	-	-	-	-	-	-	-	-	-
	Projects by Grants / Developer Donations	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Projects by Enterprise Fund	948,384	-	-	653,992	311,474	321,639	4,952,892	342,973	354,165	365,722	9,464,402	-	5,684,898	-	-	8,526,071	4,767,392	1,370,558	-	-

Mukilteo
Stormwater Rate and GFC
Revenue Requirements Analysis

Cash Flow Sufficiency Test	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
EXPENSES																				
Cash Operating Expenses	$ 1,521,995	$ 2,010,954	$ 1,915,585	$ 1,966,620	$ 1,969,100	$ 2,023,067	$ 2,079,436	$ 2,136,532	$ 2,195,251	$ 2,255,640	$ 2,318,645	$ 2,382,545	$ 2,449,277	$ 2,516,902	$ 2,586,459	$ 2,659,526	$ 2,734,050	$ 2,810,119	$ 2,888,064	$ 2,968,246
Existing Debt Service	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
New Debt Service	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rate Funded Capital	-	-	140,000	750,000	1,250,000	1,750,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additions Required to Meet Operating Fund Balance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Expenses	$ 1,521,995	$ 2,010,954	$ 2,055,585	$ 2,716,620	$ 3,219,100	$ 3,773,067	$ 2,079,436	$ 2,136,532	$ 2,195,251	$ 2,255,640	$ 2,318,645	$ 2,382,545	$ 2,449,277	$ 2,516,902	$ 2,586,459	$ 2,659,526	$ 2,734,050	$ 2,810,119	$ 2,888,064	$ 2,968,246
REVENUES																				
Retail Rate Revenue	$ 1,334,000	$ 1,337,284	$ 1,340,576	$ 1,343,877	$ 1,347,185	$ 1,350,502	$ 1,353,826	$ 1,357,159	$ 1,360,500	$ 1,363,850	$ 1,367,207	$ 1,370,573	$ 1,373,947	$ 1,377,330	$ 1,380,720	$ 1,384,119	$ 1,387,527	$ 1,390,943	$ 1,394,367	$ 1,397,800
Other Non Rate Revenue	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Operating Fund & Debt Reserve Fund Interest Earnings	3,000	125	57	315	323	324	333	342	351	361	371	381	392	403	414	425	437	449	462	475
Total Revenue	$ 1,337,000	$ 1,337,409	$ 1,340,634	$ 1,344,191	$ 1,347,508	$ 1,350,825	$ 1,354,159	$ 1,357,501	$ 1,360,851	$ 1,364,210	$ 1,367,578	$ 1,370,954	$ 1,374,339	$ 1,377,732	$ 1,381,134	$ 1,384,545	$ 1,387,964	$ 1,391,392	$ 1,394,829	$ 1,398,275
NET CASH FLOW (DEFICIENCY)	**$ (184,995)**	**$ (673,545)**	**$ (714,951)**	**$ (1,372,428)**	**$ (1,871,591)**	**$ (2,422,242)**	**$ (725,277)**	**$ (779,031)**	**$ (834,400)**	**$ (891,430)**	**$ (951,067)**	**$ (1,011,591)**	**$ (1,074,939)**	**$ (1,139,170)**	**$ (1,205,325)**	**$ (1,274,982)**	**$ (1,346,086)**	**$ (1,418,726)**	**$ (1,493,235)**	**$ (1,569,971)**
% of Rate Revenue	13.87%	50.37%	53.33%	102.12%	138.93%	179.36%	53.57%	57.40%	61.33%	65.36%	69.56%	73.81%	78.24%	82.71%	87.30%	92.12%	97.01%	102.00%	107.09%	112.32%

Coverage Sufficiency Test	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
EXPENSES																				
Total Cash Operating Expenses (less Capital Outlay)	$ 1,521,995	$ 2,010,954	$ 1,915,585	$ 1,966,620	$ 1,969,100	$ 2,023,067	$ 2,079,436	$ 2,136,532	$ 2,195,251	$ 2,255,640	$ 2,318,645	$ 2,382,545	$ 2,449,277	$ 2,516,902	$ 2,586,459	$ 2,659,526	$ 2,734,050	$ 2,810,119	$ 2,888,064	$ 2,968,246
Revenue Bond Debt Service	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Revenue Bond Coverage Requirement at 1.25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Expenses	$ 1,521,995	$ 2,010,954	$ 1,915,585	$ 1,966,620	$ 1,969,100	$ 2,023,067	$ 2,079,436	$ 2,136,532	$ 2,195,251	$ 2,255,640	$ 2,318,645	$ 2,382,545	$ 2,449,277	$ 2,516,902	$ 2,586,459	$ 2,659,526	$ 2,734,050	$ 2,810,119	$ 2,888,064	$ 2,968,246
ALLOWABLE REVENUES																				
Rate Revenue	$ 1,334,000	$ 1,337,284	$ 1,340,576	$ 1,343,877	$ 1,347,185	$ 1,350,502	$ 1,353,826	$ 1,357,159	$ 1,360,500	$ 1,363,850	$ 1,367,207	$ 1,370,573	$ 1,373,947	$ 1,377,330	$ 1,380,720	$ 1,384,119	$ 1,387,527	$ 1,390,943	$ 1,394,367	$ 1,397,800
Other Revenue	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GFC Revenue	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Interest Earnings - All Funds	3,000	138	70	469	606	1,611	3,183	820	3,136	5,515	7,960	1,385	4,320	1,625	4,667	7,768	2,400	841	2,734	6,058
Total Revenue	$ 1,337,000	$ 1,337,422	$ 1,340,647	$ 1,344,346	$ 1,347,791	$ 1,352,112	$ 1,357,009	$ 1,357,979	$ 1,363,636	$ 1,369,365	$ 1,375,167	$ 1,371,958	$ 1,378,267	$ 1,378,955	$ 1,385,388	$ 1,391,887	$ 1,389,927	$ 1,391,783	$ 1,397,101	$ 1,403,858
Coverage Realized	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
COVERAGE SURPLUS (DEFICIENCY)	**$ (184,995)**	**$ (673,532)**	**$ (574,938)**	**$ (622,274)**	**$ (621,309)**	**$ (670,955)**	**$ (722,427)**	**$ (778,553)**	**$ (831,615)**	**$ (886,275)**	**$ (943,477)**	**$ (1,010,588)**	**$ (1,071,011)**	**$ (1,137,947)**	**$ (1,201,071)**	**$ (1,267,639)**	**$ (1,344,123)**	**$ (1,418,335)**	**$ (1,490,962)**	**$ (1,564,388)**

Maximum Revenue Deficiency	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Sufficiency Test Driving the Deficiency	*Coverage*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*
Maximum Deficiency From Tests	$ 184,995	$ 673,545	$ 714,951	$ 1,372,428	$ 1,871,591	$ 2,422,242	$ 725,277	$ 779,031	$ 834,400	$ 891,430	$ 951,067	$ 1,011,591	$ 1,074,939	$ 1,139,170	$ 1,205,325	$ 1,274,982	$ 1,346,086	$ 1,418,726	$ 1,493,235	$ 1,569,971
less: Net Revenue From Prior Rate Increases	-	-	(607,415)	(976,110)	(1,416,556)	(1,942,598)	(2,570,751)	(3,320,718)	(3,445,617)	(3,574,037)	(3,706,074)	(3,841,828)	(3,955,379)	(4,071,552)	(4,190,407)	(4,312,005)	(4,436,407)	(4,563,677)	(4,693,879)	(4,827,080)
Revenue Deficiency	$ 184,995	$ 673,545	$ 107,536	$ 396,318	$ 455,035	$ 479,644	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plus: Adjustment for State Excise Tax	2,817	10,257	1,638	6,035	6,929	7,304	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Revenue Deficiency	**$ 187,812**	**$ 683,802**	**$ 109,174**	**$ 402,353**	**$ 461,965**	**$ 486,948**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**

Rate Increases	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Rate Revenue with no Increase	$ 1,334,000	$ 1,337,284	$ 1,340,576	$ 1,343,877	$ 1,347,185	$ 1,350,502	$ 1,353,826	$ 1,357,159	$ 1,360,500	$ 1,363,850	$ 1,367,207	$ 1,370,573	$ 1,373,947	$ 1,377,330	$ 1,380,720	$ 1,384,119	$ 1,387,527	$ 1,390,943	$ 1,394,367	$ 1,397,800
Revenues from Prior Rate Increases	-	-	616,665	990,975	1,438,128	1,972,181	2,609,900	3,371,287	3,498,089	3,628,464	3,762,512	3,900,333	4,015,613	4,133,555	4,254,221	4,377,670	4,503,967	4,633,175	4,765,360	4,900,589
Rate Revenue Before Rate Increase (Incl. previous increases)	1,334,000	1,337,284	1,957,241	2,334,851	2,785,313	3,322,682	3,963,726	4,728,446	4,858,589	4,992,314	5,129,719	5,270,906	5,389,560	5,510,885	5,634,941	5,761,790	5,891,494	6,024,118	6,159,727	6,298,389
Required Annual Rate Increase	14.08%	51.13%	5.58%	17.23%	16.59%	14.66%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Number of Months New Rates Will Be In Effect	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Info: Percentage Increase to Generate Required Revenue	*14.08%*	*51.13%*	*5.58%*	*17.23%*	*16.59%*	*14.66%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*
Policy-Induced Rate Increases	0.00%	46.00%	19.00%	19.00%	19.00%	19.00%	19.00%	2.50%	2.50%	2.50%	2.50%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
ANNUAL RATE INCREASE	**0.00%**	**46.00%**	**19.00%**	**19.00%**	**19.00%**	**19.00%**	**19.00%**	**2.50%**	**2.50%**	**2.50%**	**2.50%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**
CUMULATIVE RATE INCREASE	**0.00%**	**46.00%**	**73.74%**	**106.75%**	**146.03%**	**192.78%**	**248.41%**	**257.12%**	**266.05%**	**275.20%**	**284.58%**	**292.27%**	**300.11%**	**308.12%**	**316.28%**	**324.60%**	**333.10%**	**341.76%**	**350.59%**	**359.60%**

Impacts of Rate Increases	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Rate Revenues After Rate Increase	$ 1,334,000	$ 1,952,435	$ 2,329,117	$ 2,778,473	$ 3,314,522	$ 3,953,992	$ 4,716,834	$ 4,846,657	$ 4,980,054	$ 5,117,122	$ 5,257,962	$ 5,376,325	$ 5,497,351	$ 5,621,103	$ 5,747,640	$ 5,877,025	$ 6,009,324	$ 6,144,600	$ 6,282,921	$ 6,424,357
Full Year Rate Revenues After Rate Increase	*1,334,000*	*1,952,435*	*2,329,117*	*2,778,473*	*3,314,522*	*3,953,992*	*4,716,834*	*4,846,657*	*4,980,054*	*5,117,122*	*5,257,962*	*5,376,325*	*5,497,351*	*5,621,103*	*5,747,640*	*5,877,025*	*6,009,324*	*6,144,600*	*6,282,921*	*6,424,357*
Additional State and City Taxes Due to Rate Increases	-	9,227	14,828	21,519	29,510	39,052	50,445	52,342	54,293	56,299	58,361	60,086	61,851	63,657	65,504	67,394	69,327	71,305	73,328	75,398
Net Cash Flow After Rate Increase	$ (184,995)	$ (67,622)	$ 258,762	$ 40,649	$ 66,236	$ 142,196	$ 2,587,286	$ 2,658,125	$ 2,730,861	$ 2,805,543	$ 2,881,327	$ 2,934,074	$ 2,986,615	$ 3,040,946	$ 3,096,090	$ 3,150,530	$ 3,206,384	$ 3,263,626	$ 3,321,992	$ 3,381,187
Coverage After Rate Increase	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

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Fund Activity

Funds	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
OPERATING FUND Perform Transfer?	**Yes**																			
Beginning Balance	$ 543,651	$ 125,000	$ 57,378	$ 314,891	$ 323,280	$ 323,688	$ 332,559	$ 341,825	$ 351,211	$ 360,863	$ 370,790	$ 381,147	$ 391,651	$ 402,621	$ 413,737	$ 425,171	$ 437,182	$ 449,433	$ 461,937	$ 474,750
plus: Net Cash Flow after Rate Increase	(184,995)	(67,622)	258,762	40,649	66,236	142,196	2,587,286	2,658,125	2,730,861	2,805,543	2,881,327	2,934,074	2,986,615	3,040,946	3,096,090	3,150,530	3,206,384	3,263,626	3,321,992	3,381,187
less: Transfer of Surplus to Capital Fund	(233,656)	-	(1,250)	(32,260)	(65,828)	(133,325)	(2,578,020)	(2,648,739)	(2,721,208)	(2,795,616)	(2,870,970)	(2,923,570)	(2,975,645)	(3,029,830)	(3,084,656)	(3,138,519)	(3,194,134)	(3,251,121)	(3,309,179)	(3,368,007)
Ending Balance	**$ 125,000**	**$ 57,378**	**$ 314,891**	**$ 323,280**	**$ 323,688**	**$ 332,559**	**$ 341,825**	**$ 351,211**	**$ 360,863**	**$ 370,790**	**$ 381,147**	**$ 391,651**	**$ 402,621**	**$ 413,737**	**$ 425,171**	**$ 437,182**	**$ 449,433**	**$ 461,937**	**$ 474,750**	**$ 487,931**
Minimum Target Balance	*$ 125,000*	*$ 330,568*	*$ 314,891*	*$ 323,280*	*$ 323,688*	*$ 332,559*	*$ 341,825*	*$ 351,211*	*$ 360,863*	*$ 370,790*	*$ 381,147*	*$ 391,651*	*$ 402,621*	*$ 413,737*	*$ 425,171*	*$ 437,182*	*$ 449,433*	*$ 461,937*	*$ 474,750*	*$ 487,931*
Maximum Funds to be Kept as Operating Reserves	*$ 125,000*	*$ 330,568*	*$ 314,891*	*$ 323,280*	*$ 323,688*	*$ 332,559*	*$ 341,825*	*$ 351,211*	*$ 360,863*	*$ 370,790*	*$ 381,147*	*$ 391,651*	*$ 402,621*	*$ 413,737*	*$ 425,171*	*$ 437,182*	*$ 449,433*	*$ 461,937*	*$ 474,750*	*$ 487,931*
Info: No of Days of Cash Operating Expenses	*30*	*10*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*
CAPITAL FUND																				
Beginning Balance	$ -	$ 12,872	$ 12,885	$ 154,147	$ 282,569	$ 1,287,206	$ 2,850,179	$ 478,157	$ 2,784,401	$ 5,154,229	$ 7,589,278	$ 1,003,435	$ 3,928,008	$ 1,222,683	$ 4,253,736	$ 7,342,646	$ 1,962,437	$ 391,141	$ 2,272,095	$ 5,583,546
plus: Rate Funded Capital	-	-	140,000	750,000	1,250,000	1,750,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
plus: Transfers from Operating Fund	233,656	-	1,250	32,260	65,828	133,325	2,578,020	2,648,739	2,721,208	2,795,616	2,870,970	2,923,570	2,975,645	3,029,830	3,084,656	3,138,519	3,194,134	3,251,121	3,309,179	3,368,007
plus: Grants/ Donations / CIAC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
plus: Additional Proceeds (Costs)	727,600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
plus: General Facilities Charges	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
plus: Revenue Bond Proceeds	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
plus: PWTF Loans	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
plus: Other Low Interest Loan Proceeds	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
plus: Interest Earnings	-	13	13	154	283	1,287	2,850	478	2,784	5,154	7,589	1,003	3,928	1,223	4,254	7,343	1,962	391	2,272	5,584
Total Funding Sources	**$ 961,256**	**$ 12,885**	**$ 154,147**	**$ 936,561**	**$ 1,598,680**	**$ 3,171,818**	**$ 5,431,049**	**$ 3,127,374**	**$ 5,508,394**	**$ 7,954,999**	**$10,467,837**	**$ 3,928,008**	**$ 6,907,581**	**$ 4,253,736**	**$ 7,342,646**	**$10,488,508**	**$ 5,158,533**	**$ 3,642,654**	**$ 5,583,546**	**$ 8,957,136**
less: Capital Expenditures	(948,384)	-	-	(653,992)	(311,474)	(321,639)	(4,952,892)	(342,973)	(354,165)	(365,722)	(9,464,402)	-	(5,684,898)	-	-	(8,526,071)	(4,767,392)	(1,370,558)	-	-
Ending Capital Fund Balance	**$ 12,872**	**$ 12,885**	**$ 154,147**	**$ 282,569**	**$ 1,287,206**	**$ 2,850,179**	**$ 478,157**	**$ 2,784,401**	**$ 5,154,229**	**$ 7,589,278**	**$ 1,003,435**	**$ 3,928,008**	**$ 1,222,683**	**$ 4,253,736**	**$ 7,342,646**	**$ 1,962,437**	**$ 391,141**	**$ 2,272,095**	**$ 5,583,546**	**$ 8,957,136**
Minimum Target Balance	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*
DEBT RESERVE																				
Beginning Balance	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
plus: Reserve Funding from New Debt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
less: Use of Reserves for Debt Service	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ending Balance	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Minimum Target Balance	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*

Mukilteo
Stormwater Rate and GFC
Summary

Revenue Requirement	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Revenues																				
Rate Revenues Under Existing Rates	$ 1,334,000	$ 1,337,284	$ 1,340,576	$ 1,343,877	$ 1,347,185	$ 1,350,502	$ 1,353,826	$ 1,357,159	$ 1,360,500	$ 1,363,850	$ 1,367,207	$ 1,370,573	$ 1,373,947	$ 1,377,330	$ 1,380,720	$ 1,384,119	$ 1,387,527	$ 1,390,943	$ 1,394,367	$ 1,397,800
Non-Rate Revenues	3,000	125	331	315	323	324	333	342	351	361	371	381	392	403	414	425	437	449	462	475
Total Revenues	**$ 1,337,000**	**$ 1,337,409**	**$ 1,340,907**	**$ 1,344,191**	**$ 1,347,508**	**$ 1,350,825**	**$ 1,354,159**	**$ 1,357,501**	**$ 1,360,851**	**$ 1,364,210**	**$ 1,367,578**	**$ 1,370,954**	**$ 1,374,339**	**$ 1,377,732**	**$ 1,381,134**	**$ 1,384,545**	**$ 1,387,964**	**$ 1,391,392**	**$ 1,394,829**	**$ 1,398,275**
Expenses																				
Cash Operating Expenses	$ 1,521,995	$ 1,505,954	$ 1,397,960	$ 1,436,054	$ 1,425,270	$ 1,466,490	$ 1,508,075	$ 1,550,887	$ 1,594,965	$ 1,641,221	$ 1,687,969	$ 1,737,087	$ 1,786,674	$ 1,837,733	$ 1,891,795	$ 1,946,844	$ 2,002,956	$ 2,060,443	$ 2,119,646	$ 2,180,618
NPDES Expenses	-	505,000	517,625	530,566	543,830	557,426	571,361	585,645	600,286	615,293	630,676	646,443	662,604	679,169	696,148	713,552	731,391	749,675	768,417	787,628
Existing Debt Service	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
New Debt Service	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rate Funded Capital	-	-	1,000,000	1,250,000	1,500,000	1,750,000	1,807,107	1,866,077	1,926,971	1,989,852	2,054,786	2,121,838	2,191,079	2,262,579	2,336,412	2,412,654	2,491,385	2,572,685	2,656,637	2,743,329
Additions Required to Meet Op. Fund Balance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Expenses	**$ 1,521,995**	**$ 2,010,954**	**$ 2,915,585**	**$ 3,216,620**	**$ 3,469,100**	**$ 3,773,916**	**$ 3,886,542**	**$ 4,002,609**	**$ 4,122,222**	**$ 4,246,367**	**$ 4,373,431**	**$ 4,505,368**	**$ 4,640,356**	**$ 4,779,481**	**$ 4,924,355**	**$ 5,073,050**	**$ 5,225,732**	**$ 5,382,803**	**$ 5,544,701**	**$ 5,711,575**
Net Surplus (Deficiency)	**$ (184,995)**	**$ (673,545)**	**$ (1,574,678)**	**$ (1,872,428)**	**$ (2,121,591)**	**$ (2,423,091)**	**$ (2,532,383)**	**$ (2,645,108)**	**$ (2,761,370)**	**$ (2,882,156)**	**$ (3,005,853)**	**$ (3,134,414)**	**$ (3,266,017)**	**$ (3,401,749)**	**$ (3,543,221)**	**$ (3,688,505)**	**$ (3,837,767)**	**$ (3,991,411)**	**$ (4,149,872)**	**$ (4,313,301)**
Additions to Meet Coverage	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Surplus (Deficiency)	**$ (184,995)**	**$ (673,545)**	**$ (1,574,678)**	**$ (1,872,428)**	**$ (2,121,591)**	**$ (2,423,091)**	**$ (2,532,383)**	**$ (2,645,108)**	**$ (2,761,370)**	**$ (2,882,156)**	**$ (3,005,853)**	**$ (3,134,414)**	**$ (3,266,017)**	**$ (3,401,749)**	**$ (3,543,221)**	**$ (3,688,505)**	**$ (3,837,767)**	**$ (3,991,411)**	**$ (4,149,872)**	**$ (4,313,301)**
% of Rate Revenue	**13.87%**	**50.37%**	**117.46%**	**139.33%**	**157.48%**	**179.42%**	**187.05%**	**194.90%**	**202.97%**	**211.33%**	**219.85%**	**228.69%**	**237.71%**	**246.98%**	**256.62%**	**266.49%**	**276.59%**	**286.96%**	**297.62%**	**308.58%**
Annual Rate Adjustment	**0.00%**	**89.00%**	**16.50%**	**11.00%**	**10.50%**	**10.50%**	**6.50%**	**6.50%**	**6.00%**	**6.00%**	**2.50%**	**2.50%**	**2.50%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**
Cumulative Annual Rate Adjustment	**0.00%**	**89.00%**	**120.19%**	**144.41%**	**170.07%**	**198.43%**	**217.82%**	**238.48%**	**258.79%**	**280.32%**	**289.83%**	**299.57%**	**309.56%**	**317.75%**	**326.11%**	**334.63%**	**343.32%**	**352.19%**	**361.23%**	**370.46%**
Rate Revenues After Rate Increase	$ 1,334,000	$ 2,527,467	$ 2,951,748	$ 3,284,506	$ 3,638,314	$ 4,030,235	$ 4,302,767	$ 4,593,728	$ 4,881,339	$ 5,186,958	$ 5,329,720	$ 5,476,412	$ 5,627,142	$ 5,753,815	$ 5,883,339	$ 6,015,779	$ 6,151,201	$ 6,289,671	$ 6,431,259	$ 6,576,033
Additional Taxes from Rate Increase	$ -	$ 17,853	$ 24,168	$ 29,109	$ 34,367	$ 40,196	$ 44,234	$ 48,549	$ 52,813	$ 57,347	$ 59,438	$ 61,588	$ 63,798	$ 65,647	$ 67,539	$ 69,475	$ 71,455	$ 73,481	$ 75,553	$ 77,673
Net Cash Flow After Rate Increase	**(184,995)**	**498,785**	**12,326**	**39,092**	**135,171**	**216,447**	**372,323**	**542,912**	**706,656**	**883,605**	**897,223**	**909,838**	**923,379**	**909,089**	**891,859**	**873,680**	**854,452**	**833,837**	**811,466**	**787,259**
Coverage After Rate Increases	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**
Sample Residential Monthly Bill	**$ 7.85**	**$ 14.84**	**$ 17.28**	**$ 19.19**	**$ 21.20**	**$ 23.43**	**$ 24.95**	**$ 26.57**	**$ 28.17**	**$ 29.85**	**$ 30.60**	**$ 31.37**	**$ 32.15**	**$ 32.79**	**$ 33.45**	**$ 34.12**	**$ 34.80**	**$ 35.50**	**$ 36.21**	**$ 36.93**
Monthly Average Increase ($)	$ -	$ 6.99	$ 2.45	$ 1.90	$ 2.01	$ 2.23	$ 1.52	$ 1.62	$ 1.59	$ 1.69	$ 0.75	$ 0.77	$ 0.78	$ 0.64	$ 0.66	$ 0.67	$ 0.68	$ 0.70	$ 0.71	$ 0.72

Fund Balance	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
OPERATING FUND																				
Beginning Balance	$ 543,651	$ 125,000	$ 330,568	$ 314,891	$ 323,280	$ 323,688	$ 332,699	$ 341,825	$ 351,211	$ 360,863	$ 370,934	$ 381,147	$ 391,813	$ 402,621	$ 413,737	$ 425,415	$ 437,325	$ 449,482	$ 461,937	$ 474,750
plus: Net Cash Flow after Rate Increase	(184,995)	498,785	12,326	39,092	135,171	216,447	372,323	542,912	706,656	883,605	897,223	909,838	923,379	909,089	891,859	873,680	854,452	833,837	811,466	787,259
less: Transfer of Surplus to Capital Fund	(233,656)	(293,217)	(28,003)	(30,703)	(134,763)	(207,436)	(363,196)	(533,527)	(697,003)	(873,534)	(887,010)	(899,172)	(912,571)	(897,972)	(880,181)	(861,770)	(842,295)	(821,381)	(798,653)	(774,078)
Ending Balance	**$ 125,000**	**$ 330,568**	**$ 314,891**	**$ 323,280**	**$ 323,688**	**$ 332,699**	**$ 341,825**	**$ 351,211**	**$ 360,863**	**$ 370,934**	**$ 381,147**	**$ 391,813**	**$ 402,621**	**$ 413,737**	**$ 425,415**	**$ 437,325**	**$ 449,482**	**$ 461,937**	**$ 474,750**	**$ 487,931**
Minimum Target Balance	*$ 125,000*	*$ 330,568*	*$ 314,891*	*$ 323,280*	*$ 323,688*	*$ 332,699*	*$ 341,825*	*$ 351,211*	*$ 360,863*	*$ 370,934*	*$ 381,147*	*$ 391,813*	*$ 402,621*	*$ 413,737*	*$ 425,415*	*$ 437,325*	*$ 449,482*	*$ 461,937*	*$ 474,750*	*$ 487,931*
Days	*30*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*
% of Budgeted Operating Revenue	*9.37%*	*24.72%*	*23.49%*	*24.06%*	*24.03%*	*24.64%*	*25.25%*	*25.88%*	*26.52%*	*27.20%*	*27.88%*	*28.59%*	*29.30%*	*30.04%*	*30.81%*	*31.60%*	*32.39%*	*33.21%*	*34.05%*	*34.91%*
CAPITAL FUND																				
Beginning Balance	$ -	$ 12,872	$ 306,102	$ 733,542	$ 1,746,861	$ 3,106,505	$ 306,410	$ 2,181,789	$ 4,278,709	$ 6,592,149	$ 337,447	$ 2,943,885	$ 462,591	$ 3,566,703	$ 6,730,821	$ 1,697,507	$ 356,892	$ 2,363,682	$ 5,760,111	$ 9,221,162
plus: Rate Funded System Reinvestment	-	-	1,000,000	1,250,000	1,500,000	1,750,000	1,807,107	1,866,077	1,926,971	1,989,852	2,054,786	2,121,838	2,191,079	2,262,579	2,336,412	2,412,654	2,491,385	2,572,685	2,656,637	2,743,329
plus: Transfers from Operating Fund	233,656	293,217	28,003	30,703	134,763	207,436	363,196	533,527	697,003	873,534	887,010	899,172	912,571	897,972	880,181	861,770	842,295	821,381	798,653	774,078
plus: Grants/ Donations/ CIAC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
plus: Additional Proceeds (Costs)	727,600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
plus: General Facilities Charges	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
plus: Net Debt Proceeds Available for Projects	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
plus: Interest Earnings	-	13	306	734	1,747	3,107	306	2,182	4,279	6,592	337	2,944	463	3,567	6,731	1,698	357	2,364	5,760	9,221
Total Funding Sources	**$ 961,256**	**$ 306,102**	**$ 1,334,412**	**$ 2,014,978**	**$ 3,383,372**	**$ 5,067,048**	**$ 2,477,019**	**$ 4,583,574**	**$ 6,906,962**	**$ 9,462,128**	**$ 3,279,580**	**$ 5,967,840**	**$ 3,566,703**	**$ 6,730,821**	**$ 9,954,145**	**$ 4,973,629**	**$ 3,690,929**	**$ 5,760,111**	**$ 9,221,162**	**$12,747,791**
less: Capital Expenditures	(948,384)	-	(600,870)	(268,117)	(276,866)	(4,760,638)	(295,231)	(304,865)	(314,813)	(9,124,681)	(335,694)	(5,505,249)	-	-	(8,256,638)	(4,616,737)	(1,327,247)	-	-	-
Ending Working Capital Balance	**$ 12,872**	**$ 306,102**	**$ 733,542**	**$ 1,746,861**	**$ 3,106,505**	**$ 306,410**	**$ 2,181,789**	**$ 4,278,709**	**$ 6,592,149**	**$ 337,447**	**$ 2,943,885**	**$ 462,591**	**$ 3,566,703**	**$ 6,730,821**	**$ 1,697,507**	**$ 356,892**	**$ 2,363,682**	**$ 5,760,111**	**$ 9,221,162**	**$12,747,791**
Minimum Target Balance	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*

Mukilteo
Stormwater Rate and GFC
Assumptions

Economic & Financial Factors	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
1 **General Cost Inflation**	2.29%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%
2 **Construction Cost Inflation**	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%
3 **Labor Cost Inflation**	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%
4 **Benefit Cost Inflation**	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%
5 **Customer Growth**	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%
6 **General Inflation plus Growth**	2.54%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%
7 **No Escalation**	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
8 **[Extra]**	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Investment Interest	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%
B&O Tax	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%

Accounting Assumptions		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
FISCAL POLICY RESTRICTIONS																					
Minimum Operating Fund Balance Target																					
Select Minimum Operating Fund Balance Target	1	**Defined as Days of O&M Expenses**																			
1 - Defined as Days of O&M expenses																					
Minimum Operating Fund Balance Target		30	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Maximum Operating Fund Balance		30	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
2 - Amounts at Right																					
Minimum Operating Fund Balance Target		$ 125,000	$ 267,457	$ 268,115	$ 268,775	$ 269,437	$ 270,100	$ 270,765	$ 271,432	$ 272,100	$ 272,770	$ 273,441	$ 274,115	$ 274,789	$ 275,466	$ 276,144	$ 276,824	$ 277,505	$ 278,189	$ 278,873	$ 279,560
Maximum Operating Fund Balance		$ 125,000	$ 267,457	$ 268,115	$ 268,775	$ 269,437	$ 270,100	$ 270,765	$ 271,432	$ 272,100	$ 272,770	$ 273,441	$ 274,115	$ 274,789	$ 275,466	$ 276,144	$ 276,824	$ 277,505	$ 278,189	$ 278,873	$ 279,560
Minimum Capital Fund Balance Target																					
Select Minimum Capital Fund Balance Target	2	**User Input**																			
1 - Defined as % of Plant																					
Plant-in-Service in 2014	$ 5,106,861	Estimated Net Assets																			
Minimum Capital Fund Balance - % of plant assets		1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
2 - Amount at Right ==>		$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000
RATE FUNDED CAPITAL																					
Select Capital Reinvestment Funding Strategy	3	**User Input**																			
Amount of Annual Cash Funding from Rates																					
1 - Equal to Annual Depreciation Expense		$ 340,193	$ 340,193	$ 345,386	$ 350,748	$ 356,285	$ 451,498	$ 457,403	$ 463,500	$ 469,796	$ 652,290	$ 659,004	$ 769,109	$ 769,109	$ 769,109	$ 934,241	$ 1,026,576	$ 1,053,121	$ 1,053,121	$ 1,053,121	$ 1,053,121
2 - Equal to Annual Depreciation less Annual Debt Principal Payments		$ 340,193	$ 340,193	$ 345,386	$ 350,748	$ 356,285	$ 451,498	$ 457,403	$ 463,500	$ 469,796	$ 652,290	$ 659,004	$ 769,109	$ 769,109	$ 769,109	$ 934,241	$ 1,026,576	$ 1,053,121	$ 1,053,121	$ 1,053,121	$ 1,053,121
3 - Equal to Amount at Right ==>		$ -	$ -	$ 1,000,000	$ 1,250,000	$ 1,500,000	$ 1,750,000	$ 1,807,107	$ 1,866,077	$ 1,926,971	$ 1,989,852	$ 2,054,786	$ 2,121,838	$ 2,191,079	$ 2,262,579	$ 2,336,412	$ 2,412,654	$ 2,491,385	$ 2,572,685	$ 2,656,637	$ 2,743,329
4 - Do Not Fund System Reinvestment																					

Mukilteo
Stormwater Rate and GFC
Assumptions

Capital Financing Assumptions		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
General Facilities Charges	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Equivalent Residential Units (Estimate)		13,644	13,678	13,711	13,745	13,779	13,813	13,847	13,881	13,915	13,949	13,984	14,018	14,053	14,087	14,122	14,157	14,192	14,227	14,262	14,297
Additional Units Per Year		34	34	34	34	34	34	34	34	34	34	34	35	35	35	35	35	35	35	35	35
GFC Revenues		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
FUNDING SOURCES																					
Grants		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Additional Proceeds (Costs)																					
Department of Ecology State Grant		$ 170,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Smuggler's Gulch DOE Grant		557,600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
[Extra line]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
[Extra line]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
[Extra line]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Additional Proceeds		**$ 727,600**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
REVENUE BONDS																					
Term (years)		20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Interest Cost		4.50%	4.50%	4.50%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	4.50%	4.50%	4.50%	4.50%
Issuance Cost		1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%
Revenue Bond Coverage Requirement	**1.25**																				
Use Reserves to Pay for Last Payment	**Yes**																				
PWTF LOANS																					
Term (years; no more than 20 years)		20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Interest Cost		2.55%	2.55%	2.55%	2.55%	2.55%	2.55%	2.55%	2.55%	2.55%	2.55%	2.55%	2.55%	2.55%	2.55%	2.55%	2.55%	1.00%	1.00%	1.00%	1.00%
Required Local Match		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.00%	1.00%	1.00%	1.00%
OTHER LOANS																					
Term (years)		20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Interest Cost		4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
Issuance Cost		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Mukilteo
Stormwater Rate and GFC
Operating Revenue and Expenditure Forecast

Revenues	FORECAST BASIS	Actual 2013	Actual 2014	Budget 2015	Projection 2016	Projection 2017	Projection 2018	Projection 2019	Projection 2020	Projection 2021	Projection 2022	Projection 2023	Projection 2024	Projection 2025	Projection 2026	Projection 2027	Projection 2028	Projection 2029	Projection 2030	Projection 2031	Projection 2032	Projection 2033	Projection 2034
Rate Revenues																							
Storm Drain Fees & Charges	Customer Growth	$ 1,293,185	$ 1,081,779	$ 1,334,000	$ 1,337,284	$ 1,340,576	$ 1,343,877	$ 1,347,185	$ 1,350,502	$ 1,353,826	$ 1,357,159	$ 1,360,500	$ 1,363,850	$ 1,367,207	$ 1,370,573	$ 1,373,947	$ 1,377,330	$ 1,380,720	$ 1,384,119	$ 1,387,527	$ 1,390,943	$ 1,394,367	$ 1,397,800
[Extra]	Customer Growth	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
[Extra]	Customer Growth	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Rate Revenue		$ 1,293,185	$ 1,081,779	$ 1,334,000	$ 1,337,284	$ 1,340,576	$ 1,343,877	$ 1,347,185	$ 1,350,502	$ 1,353,826	$ 1,357,159	$ 1,360,500	$ 1,363,850	$ 1,367,207	$ 1,370,573	$ 1,373,947	$ 1,377,330	$ 1,380,720	$ 1,384,119	$ 1,387,527	$ 1,390,943	$ 1,394,367	$ 1,397,800
Non-Rate Revenues																							
Transfers In	No Escalation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
MWWD Interlocal Agreement GIS/CAD Tech	No Escalation	-	9,856	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other Miscellaneous Revenue	No Escalation	-	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
[Extra]	No Escalation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Non-Rate Revenues		$ -	$ 9,895	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
TOTAL REVENUES		$ 1,293,185	$ 1,091,674	$ 1,334,000	$ 1,337,284	$ 1,340,576	$ 1,343,877	$ 1,347,185	$ 1,350,502	$ 1,353,826	$ 1,357,159	$ 1,360,500	$ 1,363,850	$ 1,367,207	$ 1,370,573	$ 1,373,947	$ 1,377,330	$ 1,380,720	$ 1,384,119	$ 1,387,527	$ 1,390,943	$ 1,394,367	$ 1,397,800

	General Operating Expenses	FORECAST BASIS	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
5301	Taxes and Assessments	Calculation	$ 24,229	$ 22,495	$ 27,000	$ 20,059	$ 20,109	$ 20,158	$ 20,208	$ 20,258	$ 20,307	$ 20,357	$ 20,408	$ 20,458	$ 20,508	$ 20,559	$ 20,609	$ 20,660	$ 20,711	$ 20,762	$ 20,813	$ 20,864	$ 20,916	$ 20,967
19	**Other Governmental Services**																							
590	***Title Not Found***																							
590.200	**Operating Transfers Out**																							
	Intergovernmental Services																							
5590	Transfer to Reserves	No Escalation	$ -	$ 50,000	$ 50,000	$ 100,000	$ 50,000	$ 50,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
38	**Public Works**																							
530	**Utilities and Environment**																							
530.200	**Engineering Plans & Services**																							
	Salaries and Wages																							
1001	Full Time Employees	Labor Cost Inflation	149,322	134,552	184,150	189,444	194,891	200,494	206,258	212,188	218,288	224,563	231,020	237,661	244,494	251,523	258,754	266,193	273,846	281,719	289,818	298,150	306,722	315,540
1102	Part Time Employees	Labor Cost Inflation	12,234	4,329	30,660	31,541	32,448	33,381	34,341	35,328	36,344	37,389	38,464	39,569	40,707	41,877	43,081	44,320	45,594	46,905	48,253	49,640	51,068	52,536
1201	Overtime	Labor Cost Inflation	-	1,773	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benefits																							
2000	Benefits	Benefit Cost Inflation	182,467	172,751	198,405	206,157	214,212	222,581	231,277	240,314	249,703	259,459	269,596	280,130	291,075	302,447	314,264	326,542	339,301	352,558	366,332	380,645	395,517	410,970
530.300	**Surface Water Management**																							
	Salaries and Wages																							
1101	Full Time Employees	Labor Cost Inflation	243,507	254,891	235,890	242,672	249,648	256,826	264,209	271,805	279,619	287,658	295,928	304,436	313,189	322,193	331,455	340,985	350,788	360,873	371,248	381,921	392,901	404,196
1115	Acting Supervisor Pay	Labor Cost Inflation	1,492	386	1,000	1,029	1,058	1,089	1,120	1,152	1,185	1,219	1,255	1,291	1,328	1,366	1,405	1,446	1,487	1,530	1,574	1,619	1,666	1,713
1201	Overtime	Labor Cost Inflation	8,037	6,843	6,500	6,687	6,879	7,077	7,280	7,490	7,705	7,926	8,154	8,389	8,630	8,878	9,133	9,396	9,666	9,944	10,230	10,524	10,826	11,138
1203	Standby Pay	Labor Cost Inflation	5,936	3,856	4,060	4,177	4,297	4,420	4,547	4,678	4,813	4,951	5,093	5,240	5,390	5,545	5,705	5,869	6,038	6,211	6,390	6,573	6,762	6,957
1241	OT - Disaster Support/Severe Weather	Labor Cost Inflation	-	246	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Supplies																							
3101	Office Supplies	General Cost Inflation	320	429	500	513	525	538	552	566	580	594	609	624	640	656	672	689	706	724	742	761	780	799
	Reference Material	General Cost Inflation	-	-	500	513	525	538	552	566	580	594	609	624	640	656	672	689	706	724	742	761	780	799
3112	Operating Supplies	General Cost Inflation	12,001	5,487	10,000	10,250	10,506	10,769	11,038	11,314	11,597	11,887	12,184	12,489	12,801	13,121	13,449	13,785	14,130	14,483	14,845	15,216	15,597	15,987
3113	Vehicle R&M Tools/Eq	General Cost Inflation	-	-	250	256	263	269	276	283	290	297	305	312	320	328	336	345	353	362	371	380	390	400
3124	Clothing/Boots	General Cost Inflation	2,151	2,970	3,750	3,844	3,940	4,038	4,139	4,243	4,349	4,458	4,569	4,683	4,800	4,920	5,043	5,169	5,299	5,431	5,567	5,706	5,849	5,995
3135	Aggregate	General Cost Inflation	9,525	3,449	6,500	6,663	6,829	7,000	7,175	7,354	7,538	7,726	7,920	8,118	8,321	8,529	8,742	8,960	9,184	9,414	9,649	9,891	10,138	10,391
3206	Motor Fuel	General Cost Inflation	14,972	12,347	12,000	12,300	12,608	12,923	13,246	13,577	13,916	14,264	14,621	14,986	15,361	15,745	16,139	16,542	16,956	17,380	17,814	18,259	18,716	19,184
3501	Small Items of Equipment	General Cost Inflation	6,247	3,235	8,000	8,200	8,405	8,615	8,831	9,051	9,278	9,509	9,747	9,991	10,241	10,497	10,759	11,028	11,304	11,586	11,876	12,173	12,477	12,789
	Other Services & Charges																							
	Equipment Replacement Charges	General Cost Inflation	-	-	36,080	36,982	37,907	38,854	39,826	40,821	41,842	42,888	43,960	45,059	46,185	47,340	48,524	49,737	50,980	52,255	53,561	54,900	56,272	57,679
4106	Other Professional Services	General Cost Inflation	169,939	275,822	300,000	307,500	315,188	323,067	331,144	339,422	347,908	356,606	365,521	374,659	384,025	393,626	403,467	413,553	423,892	434,489	445,352	456,485	467,898	479,595
4107	Wetland Mitigation Services	General Cost Inflation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4109	City Atty. Other Svcs.	General Cost Inflation	3,917	5,994	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4111	Hazardous Materials Testing	General Cost Inflation	2,620	3,120	2,800	2,870	2,942	3,015	3,091	3,168	3,247	3,328	3,412	3,497	3,584	3,674	3,766	3,860	3,956	4,055	4,157	4,261	4,367	4,476
4125	Contract Services	General Cost Inflation	4,941	959	3,500	3,588	3,677	3,769	3,863	3,960	4,059	4,160	4,264	4,371	4,480	4,592	4,707	4,825	4,945	5,069	5,196	5,326	5,459	5,595
4201	Telephone	General Cost Inflation	1,956	771	1,000	1,025	1,051	1,077	1,104	1,131	1,160	1,189	1,218	1,249	1,280	1,312	1,345	1,379	1,413	1,448	1,485	1,522	1,560	1,599
4209	Cell Phones	General Cost Inflation	1,290	1,395	1,200	1,230	1,261	1,292	1,325	1,358	1,392	1,426	1,462	1,499	1,536	1,575	1,614	1,654	1,696	1,738	1,781	1,826	1,872	1,918
4301	Travel & Subsistence	General Cost Inflation	78	67	2,500	2,563	2,627	2,692	2,760	2,829	2,899	2,972	3,046	3,122	3,200	3,280	3,362	3,446	3,532	3,621	3,711	3,804	3,899	3,997
4402	Legal Publications	General Cost Inflation	-	499	600	615	630	646	662	679	696	713	731	749	768	787	807	827	848	869	891	913	936	959
4503	Work Equip & Machine Rental	General Cost Inflation	6,048	5,029	12,000	12,300	12,608	12,923	13,246	13,577	13,916	14,264	14,621	14,986	15,361	15,745	16,139	16,542	16,956	17,380	17,814	18,259	18,716	19,184
4509	Equipment Replacement Charges	General Cost Inflation	40,080	33,073	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4601	Insurance	General Cost Inflation	28,777	35,865	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4705	Hazardous Waste Disposal	General Cost Inflation	26,557	31,721	30,000	30,750	31,519	32,307	33,114	33,942	34,791	35,661	36,552	37,466	38,403	39,363	40,347	41,355	42,389	43,449	44,535	45,649	46,790	47,960
4722	Brush Disposal	General Cost Inflation	-	14,892	4,000	4,100	4,203	4,308	4,415	4,526	4,639	4,755	4,874	4,995	5,120	5,248	5,380	5,514	5,652	5,793	5,938	6,086	6,239	6,395
4815	Equipment R&M	General Cost Inflation	460	5,683	5,000	5,125	5,253	5,384	5,519	5,657	5,798	5,943	6,092	6,244	6,400	6,560	6,724	6,893	7,065	7,241	7,423	7,608	7,798	7,993
4820	Vehicle R&M	General Cost Inflation	29,084	33,445	30,000	30,750	31,519	32,307	33,114	33,942	34,791	35,661	36,552	37,466	38,403	39,363	40,347	41,355	42,389	43,449	44,535	45,649	46,790	47,960
4821	Computer System Maint. & Subscriptions	General Cost Inflation	-	1,655	1,850	1,896	1,944	1,992	2,042	2,093	2,145	2,199	2,254	2,310	2,368	2,427	2,488	2,550	2,614	2,679	2,746	2,815	2,885	2,958
4904	Laundry Services	General Cost Inflation	1,261	1,411	1,400	1,435	1,471	1,508	1,545	1,584	1,624	1,664	1,706	1,748	1,792	1,837	1,883	1,930	1,978	2,028	2,078	2,130	2,184	2,238
4912	Training and Registration	General Cost Inflation	1,008	353	2,500	2,563	2,627	2,692	2,760	2,829	2,899	2,972	3,046	3,122	3,200	3,280	3,362	3,446	3,532	3,621	3,711	3,804	3,899	3,997
4921	Permit Fees	General Cost Inflation	-	-	10,000	10,250	10,506	10,769	11,038	11,314	11,597	11,887	12,184	12,489	12,801	13,121	13,449	13,785	14,130	14,483	14,845	15,216	15,597	15,987
4940	Vactor Service	General Cost Inflation	24,070	18,001	22,000	22,550	23,114	23,692	24,284	24,891	25,513	26,151	26,805	27,475	28,162	28,866	29,588	30,327	31,085	31,863	32,659	33,476	34,312	35,170
	Intergovernmental Services																							
5112	Mukilteo Water District	General Cost Inflation	36,453	47,278	48,000	49,200	50,430	51,691	52,983	54,308	55,665	57,057	58,483	59,945	61,444	62,980	64,555	66,169	67,823	69,518	71,256	73,038	74,864	76,735
5120	Snohomish County - ILA	General Cost Inflation	-	-	2,000	2,050	2,101	2,154	2,208	2,263	2,319	2,377	2,437	2,498	2,560	2,624	2,690	2,757	2,826	2,897	2,969	3,043	3,119	3,197
5153	WRIA ILA	General Cost Inflation	7,055	7,236	10,000	10,250	10,506	10,769	11,038	11,314	11,597	11,887	12,184	12,489	12,801	13,121	13,449	13,785	14,130	14,483	14,845	15,216	15,597	15,987
5169	Dept of Ecology	General Cost Inflation	10,934	25,703	26,400	27,060	27,737	28,430	29,141	29,869	30,616	31,381	32,166	32,970	33,794	34,639	35,505	36,393	37,303	38,235	39,191	40,171	41,175	42,204
5301	Taxes and Assessments	General Cost Inflation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Payments for Services																							
9918	Overhead Costs	General Cost Inflation	230,433	175,500	190,000	95,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Mukilteo
Stormwater Rate and GFC
Operating Revenue and Expenditure Forecast

		Actual	Actual	Budget	Projection	Projection	Projection	Projection	Projection	Projection	Projection	Projection
Operating Expense Adjustments	**FORECAST BASIS**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
Additional NPDES Costs (3.75 FTEs + Equip + Ops)	General Cost Inflation	-	-	-	505,000	517,625	530,566	543,830	557,426	571,361	585,645	600,286
[Adjustment #2]		-	-	-	-	-	-	-	-	-	-	-
[Adjustment #3]		-	-	-	-	-	-	-	-	-	-	-
[Adjustment #4]		-	-	-	-	-	-	-	-	-	-	-
Add'l O&M from CIP	*From CIP*	-	-	-	-	-	-	-	849	870	892	914

		Projection	Projection	Projection	Projection	Projection	Projection	Projection	Projection	Projection	Projection	Projection
Operating Expense Adjustments	**FORECAST BASIS**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**
Additional NPDES Costs (3.75 FTEs + Equip + Ops)	General Cost Inflation	615,293	630,676	646,443	662,604	679,169	696,148	713,552	731,391	749,675	768,417	787,628
[Adjustment #2]		-	-	-	-	-	-	-	-	-	-	-
[Adjustment #3]		-	-	-	-	-	-	-	-	-	-	-
[Adjustment #4]		-	-	-	-	-	-	-	-	-	-	-
Add'l O&M from CIP	*From CIP*	1,811	1,856	2,887	2,959	3,033	4,592	5,576	6,012	6,163	6,317	6,475

Operating Expense Summary	**FORECAST BASIS**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
Total Cash O&M Expenditures		**$ 1,411,785**	**$ 2,132,130**	**$ 1,521,995**	**$ 2,010,954**	**$ 1,915,585**	**$ 1,966,620**	**$ 1,969,100**	**$ 2,023,916**	**$ 2,079,436**	**$ 2,136,532**	**$ 2,195,251**
Depreciation Expense in 2013	$ 333,145											
Depreciation Expense	*Last year's plus annual additions from CIP*	$ 333,145	$ 333,145	$ 340,193	$ 340,193	$ 345,386	$ 350,748	$ 356,285	$ 451,498	$ 457,403	$ 463,500	$ 469,796
	debt principal payments	-	-	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	System Reinvestment Funding	$ 333,145	$ 333,145	$ 340,193	$ 340,193	$ 345,386	$ 350,748	$ 356,285	$ 451,498	$ 457,403	$ 463,500	$ 469,796
TOTAL EXPENSES		**$ 1,744,930**	**$ 2,465,275**	**$ 1,862,188**	**$ 2,351,147**	**$ 2,260,970**	**$ 2,317,367**	**$ 2,325,385**	**$ 2,475,414**	**$ 2,536,838**	**$ 2,600,032**	**$ 2,665,047**

Operating Expense Summary	**FORECAST BASIS**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**
Total Cash O&M Expenditures		**$ 2,256,514**	**$ 2,318,645**	**$ 2,383,530**	**$ 2,449,277**	**$ 2,516,902**	**$ 2,587,943**	**$ 2,660,395**	**$ 2,734,347**	**$ 2,810,119**	**$ 2,888,064**	**$ 2,968,246**
Depreciation Expense in 2013	$ 333,145											
Depreciation Expense	*Last year's plus annual additions from CIP*	$ 652,290	$ 659,004	$ 769,109	$ 769,109	$ 769,109	$ 934,241	$ 1,026,576	$ 1,053,121	$ 1,053,121	$ 1,053,121	$ 1,053,121
	debt principal payments	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	System Reinvestment Funding	$ 652,290	$ 659,004	$ 769,109	$ 769,109	$ 769,109	$ 934,241	$ 1,026,576	$ 1,053,121	$ 1,053,121	$ 1,053,121	$ 1,053,121
TOTAL EXPENSES		**$ 2,908,804**	**$ 2,977,648**	**$ 3,152,638**	**$ 3,218,386**	**$ 3,286,011**	**$ 3,522,184**	**$ 3,686,972**	**$ 3,787,468**	**$ 3,863,240**	**$ 3,941,185**	**$ 4,021,367**

Mukilteo
Stormwater Rate and GFC
Capital Improvement Program

Project Costs and O&M Impacts in Year:	2015

No	Description	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
1	**Stormwater Capital in 2015 Preliminary Budget**																				
2	Lighthouse Park Tidegate Stormwater Repairs	$ 50,000																			
3	Bayview Storm Drainage Improvements	-																			
4	61st Culvery Replacement	262,500																			
5	Naketa Beach Storm Pipe Repairs & Slope Rehab	333,500																			
6	**Stormwater Capital Moved Forward from 2014**																				
7	Smuggler's Gulch LID	302,384																			
8	Decant Facility			320,000																	
9																					
10	**SW Comp Plan CIP**																				
11	Chennault Beach Drive Drainage Improvements						3,811,000														
12	Mukilteo Lane Drainage Improvements										6,591,000										
13	84th Street SW (West) Storm Drainage Improvements												1,240,000								
14	64th Place W Street Drainage Improvements												1,202,000								
15	66th Place W Street Drainage Improvements												1,425,000								
16	Central Dr Storm Drainage Improvements for Big Gulch Basin															5,267,000					
17	62nd Pl W/Canyon Drive Storm Drainage Improvements																2,852,000				
18	10th St and Loveland Ave Strom Drainage Improvements																	794,000			
19																					
20	Pipe Inspections			69,960	69,960	69,960	69,960	69,960	69,960	69,960	69,960	69,960									
21	Basin Planning			173,533	173,533	173,533	173,533	173,533	173,533	173,533	173,533	173,533									
22																					
	Total Capital Projects	**$ 948,384**	**$ -**	**$ 563,493**	**$ 243,493**	**$ 243,493**	**$ 4,054,493**	**$ 243,493**	**$ 243,493**	**$ 243,493**	**$ 6,834,493**	**$ 243,493**	**$ 3,867,000**	**$ -**	**$ -**	**$ 5,267,000**	**$ 2,852,000**	**$ 794,000**	**$ -**	**$ -**	**$ -**
	Total Upgrade/Expansion Projects	474,192	-	281,747	121,747	121,747	3,932,747	121,747	121,747	121,747	6,712,747	121,747	3,867,000	-	-	5,267,000	2,852,000	794,000	-	-	-
	Total R&R Projects	474,192	-	281,747	121,747	121,747	121,747	121,747	121,747	121,747	121,747	121,747	-	-	-	-	-	-	-	-	-
	Projects by Grants / Developer Donations																				
	Projects by Enterprise Fund																				

Mukilteo
Stormwater Rate and GFC
Capital Improvement Program

Project Costs and O&M Impacts in Year:	2015

No	Description	Annual O&M Impact	Useful Life (Years)	Specific Funding Source 1-Enterprise Fund, 2-Grants & Developer Donations		TOTAL 2015 $ COSTS	TOTAL ESCALATED COSTS
1	**Stormwater Capital in 2015 Preliminary Budget**		50	1	Enterprise Fund	$ -	$ -
2	Lighthouse Park Tidegate Stormwater Repairs		50	1	Enterprise Fund	50,000	50,000
3	Bayview Storm Drainage Improvements		50	1	Enterprise Fund	-	-
4	61st Culvery Replacement		50	1	Enterprise Fund	262,500	262,500
5	Naketa Beach Storm Pipe Repairs & Slope Rehab		50	1	Enterprise Fund	333,500	333,500
6	**Stormwater Capital Moved Forward from 2014**		50	1	Enterprise Fund	-	-
7	Smuggler's Gulch LID		50	1	Enterprise Fund	302,384	302,384
8	Decant Facility		50	1	Enterprise Fund	320,000	341,225
9			50	1	Enterprise Fund	-	-
10	**SW Comp Plan CIP**		50	1	Enterprise Fund	-	-
11	Chennault Beach Drive Drainage Improvements	750	50	1	Enterprise Fund	3,811,000	4,474,737
12	Mukilteo Lane Drainage Improvements	700	50	1	Enterprise Fund	6,591,000	8,799,595
13	84th Street SW (West) Storm Drainage Improvements	200	50	1	Enterprise Fund	1,240,000	1,765,324
14	64th Place W Street Drainage Improvements	250	50	1	Enterprise Fund	1,202,000	1,711,226
15	66th Place W Street Drainage Improvements	300	50	1	Enterprise Fund	1,425,000	2,028,699
16	Central Dr Storm Drainage Improvements for Big Gulch Basin	1,050	50	1	Enterprise Fund	5,267,000	8,256,638
17	62nd Pl W/Canyon Drive Storm Drainage Improvements	600	50	1	Enterprise Fund	2,852,000	4,616,737
18	10th St and Loveland Ave Strom Drainage Improvements	200	50	1	Enterprise Fund	794,000	1,327,247
19			50	1	Enterprise Fund	-	-
20	Pipe Inspections		50	1	Enterprise Fund	629,640	766,052
21	Basin Planning		50	1	Enterprise Fund	1,561,800	1,900,165
22			50	1	Enterprise Fund	-	-
	Total Capital Projects	**$ 4,050**				**$ 26,641,824**	**$ 36,936,029**
	Total Upgrade/Expansion Projects					24,911,912	34,958,116
	Total R&R Projects					1,729,912	1,977,913
	Projects by Grants / Developer Donations	-				-	-
	Projects by Enterprise Fund	4,050				26,641,824	36,936,029

Mukilteo
Stormwater Rate and GFC
Capital Improvement Program

Project Costs and O&M Impacts in Year:	2015

TOTAL FORECASTED PROJECT COSTS

No	Description	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
1	**Stormwater Capital in 2015 Preliminary Budget**	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
2	Lighthouse Park Tidegate Stormwater Repairs	50,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	Bayview Storm Drainage Improvements	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	61st Culvery Replacement	262,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	Naketa Beach Storm Pipe Repairs & Slope Rehab	333,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	**Stormwater Capital Moved Forward from 2014**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	Smuggler's Gulch LID	302,384	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	Decant Facility	-	-	341,225	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	**SW Comp Plan CIP**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	Chennault Beach Drive Drainage Improvements	-	-	-	-	-	4,474,737	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	Mukilteo Lane Drainage Improvements	-	-	-	-	-	-	-	-	-	8,799,595	-	-	-	-	-	-	-	-	-	-
13	84th Street SW (West) Storm Drainage Improvements	-	-	-	-	-	-	-	-	-	-	-	1,765,324	-	-	-	-	-	-	-	-
14	64th Place W Street Drainage Improvements	-	-	-	-	-	-	-	-	-	-	-	1,711,226	-	-	-	-	-	-	-	-
15	66th Place W Street Drainage Improvements	-	-	-	-	-	-	-	-	-	-	-	2,028,699	-	-	-	-	-	-	-	-
16	Central Dr Storm Drainage Improvements for Big Gulch Basin	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8,256,638	-	-	-	-	-
17	62nd Pl W/Canyon Drive Storm Drainage Improvements	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4,616,737	-	-	-	-
18	10th St and Loveland Ave Strom Drainage Improvements	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,327,247	-	-	-
19		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	Pipe Inspections	-	-	74,600	77,035	79,549	82,144	84,825	87,593	90,451	93,403	96,451	-	-	-	-	-	-	-	-	-
21	Basin Planning	-	-	185,044	191,082	197,318	203,756	210,406	217,272	224,362	231,683	239,243	-	-	-	-	-	-	-	-	-
22		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total Capital Projects	**$ 948,384**	**$ -**	**$ 600,870**	**$ 268,117**	**$ 276,866**	**$ 4,760,638**	**$ 295,231**	**$ 304,865**	**$ 314,813**	**$ 9,124,681**	**$ 335,694**	**$ 5,505,249**	**$ -**	**$ -**	**$ 8,256,638**	**$ 4,616,737**	**$ 1,327,247**	**$ -**	**$ -**	**$ -**
	Total Upgrade/Expansion Projects	474,192	-	300,435	134,058	138,433	4,617,687	147,615	152,432	157,407	8,962,138	167,847	5,505,249	-	-	8,256,638	4,616,737	1,327,247	-	-	-
	Total R&R Projects	474,192	-	300,435	134,058	138,433	142,950	147,615	152,432	157,407	162,543	167,847	-	-	-	-	-	-	-	-	-
	Projects by Grants / Developer Donations	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Projects by Enterprise Fund	948,384	-	600,870	268,117	276,866	4,760,638	295,231	304,865	314,813	9,124,681	335,694	5,505,249	-	-	8,256,638	4,616,737	1,327,247	-	-	-

Mukilteo
Stormwater Rate and GFC
Revenue Requirements Analysis

Cash Flow Sufficiency Test	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
EXPENSES																				
Cash Operating Expenses	$ 1,521,995	$ 2,010,954	$ 1,915,585	$ 1,966,620	$ 1,969,100	$ 2,023,916	$ 2,079,436	$ 2,136,532	$ 2,195,251	$ 2,256,514	$ 2,318,645	$ 2,383,530	$ 2,449,277	$ 2,516,902	$ 2,587,943	$ 2,660,395	$ 2,734,347	$ 2,810,119	$ 2,888,064	$ 2,968,246
Existing Debt Service	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
New Debt Service	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rate Funded Capital	-	-	1,000,000	1,250,000	1,500,000	1,750,000	1,807,107	1,866,077	1,926,971	1,989,852	2,054,786	2,121,838	2,191,079	2,262,579	2,336,412	2,412,654	2,491,385	2,572,685	2,656,637	2,743,329
Additions Required to Meet Operating Fund Balance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Expenses	$ 1,521,995	$ 2,010,954	$ 2,915,585	$ 3,216,620	$ 3,469,100	$ 3,773,916	$ 3,886,542	$ 4,002,609	$ 4,122,222	$ 4,246,367	$ 4,373,431	$ 4,505,368	$ 4,640,356	$ 4,779,481	$ 4,924,355	$ 5,073,050	$ 5,225,732	$ 5,382,803	$ 5,544,701	$ 5,711,575
REVENUES																				
Retail Rate Revenue	$ 1,334,000	$ 1,337,284	$ 1,340,576	$ 1,343,877	$ 1,347,185	$ 1,350,502	$ 1,353,826	$ 1,357,159	$ 1,360,500	$ 1,363,850	$ 1,367,207	$ 1,370,573	$ 1,373,947	$ 1,377,330	$ 1,380,720	$ 1,384,119	$ 1,387,527	$ 1,390,943	$ 1,394,367	$ 1,397,800
Other Non Rate Revenue	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Operating Fund & Debt Reserve Fund Interest Earnings	3,000	125	331	315	323	324	333	342	351	361	371	381	392	403	414	425	437	449	462	475
Total Revenue	$ 1,337,000	$ 1,337,409	$ 1,340,907	$ 1,344,191	$ 1,347,508	$ 1,350,825	$ 1,354,159	$ 1,357,501	$ 1,360,851	$ 1,364,210	$ 1,367,578	$ 1,370,954	$ 1,374,339	$ 1,377,732	$ 1,381,134	$ 1,384,545	$ 1,387,964	$ 1,391,392	$ 1,394,829	$ 1,398,275
NET CASH FLOW (DEFICIENCY)	**$ (184,995)**	**$ (673,545)**	**$(1,574,678)**	**$(1,872,428)**	**$(2,121,591)**	**$(2,423,091)**	**$(2,532,383)**	**$(2,645,108)**	**$(2,761,370)**	**$(2,882,156)**	**$(3,005,853)**	**$(3,134,414)**	**$(3,266,017)**	**$(3,401,749)**	**$(3,543,221)**	**$(3,688,505)**	**$(3,837,767)**	**$(3,991,411)**	**$(4,149,872)**	**$(4,313,301)**
% of Rate Revenue	13.87%	50.37%	117.46%	139.33%	157.48%	179.42%	187.05%	194.90%	202.97%	211.33%	219.85%	228.69%	237.71%	246.98%	256.62%	266.49%	276.59%	286.96%	297.62%	308.58%

Coverage Sufficiency Test	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
EXPENSES																				
Total Cash Operating Expenses (less Capital Outlay)	$ 1,521,995	$ 2,010,954	$ 1,915,585	$ 1,966,620	$ 1,969,100	$ 2,023,916	$ 2,079,436	$ 2,136,532	$ 2,195,251	$ 2,256,514	$ 2,318,645	$ 2,383,530	$ 2,449,277	$ 2,516,902	$ 2,587,943	$ 2,660,395	$ 2,734,347	$ 2,810,119	$ 2,888,064	$ 2,968,246
Revenue Bond Debt Service	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Revenue Bond Coverage Requirement at 1.25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Expenses	$ 1,521,995	$ 2,010,954	$ 1,915,585	$ 1,966,620	$ 1,969,100	$ 2,023,916	$ 2,079,436	$ 2,136,532	$ 2,195,251	$ 2,256,514	$ 2,318,645	$ 2,383,530	$ 2,449,277	$ 2,516,902	$ 2,587,943	$ 2,660,395	$ 2,734,347	$ 2,810,119	$ 2,888,064	$ 2,968,246
ALLOWABLE REVENUES																				
Rate Revenue	$ 1,334,000	$ 1,337,284	$ 1,340,576	$ 1,343,877	$ 1,347,185	$ 1,350,502	$ 1,353,826	$ 1,357,159	$ 1,360,500	$ 1,363,850	$ 1,367,207	$ 1,370,573	$ 1,373,947	$ 1,377,330	$ 1,380,720	$ 1,384,119	$ 1,387,527	$ 1,390,943	$ 1,394,367	$ 1,397,800
Other Revenue	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GFC Revenue	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Interest Earnings - All Funds	3,000	138	637	1,048	2,070	3,430	639	2,524	4,630	6,953	708	3,325	854	3,969	7,145	2,123	794	2,813	6,222	9,696
Total Revenue	$ 1,337,000	$ 1,337,422	$ 1,341,213	$ 1,344,925	$ 1,349,255	$ 1,353,932	$ 1,354,465	$ 1,359,683	$ 1,365,130	$ 1,370,803	$ 1,367,916	$ 1,373,898	$ 1,374,802	$ 1,381,299	$ 1,387,865	$ 1,386,242	$ 1,388,321	$ 1,393,756	$ 1,400,589	$ 1,407,496
Coverage Realized	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
COVERAGE SURPLUS (DEFICIENCY)	**$ (184,995)**	**$ (673,532)**	**$ (574,372)**	**$ (621,695)**	**$ (619,845)**	**$ (669,984)**	**$ (724,970)**	**$ (776,849)**	**$ (830,121)**	**$ (885,712)**	**$ (950,729)**	**$(1,009,631)**	**$(1,074,476)**	**$(1,135,603)**	**$(1,200,078)**	**$(1,274,153)**	**$(1,346,025)**	**$(1,416,363)**	**$(1,487,474)**	**$(1,560,750)**

Maximum Revenue Deficiency	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Sufficiency Test Driving the Deficiency	*Coverage*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*
Maximum Deficiency From Tests	$ 184,995	$ 673,545	$ 1,574,678	$ 1,872,428	$ 2,121,591	$ 2,423,091	$ 2,532,383	$ 2,645,108	$ 2,761,370	$ 2,882,156	$ 3,005,853	$ 3,134,414	$ 3,266,017	$ 3,401,749	$ 3,543,221	$ 3,688,505	$ 3,837,767	$ 3,991,411	$ 4,149,872	$ 4,313,301
less: Net Revenue From Prior Rate Increases	-	-	(1,175,216)	(1,590,911)	(1,916,226)	(2,262,318)	(2,646,035)	(2,911,857)	(3,195,869)	(3,476,564)	(3,775,032)	(3,912,684)	(4,054,208)	(4,199,710)	(4,321,450)	(4,445,998)	(4,573,416)	(4,703,771)	(4,837,127)	(4,973,552)
Revenue Deficiency	$ 184,995	$ 673,545	$ 399,462	$ 281,517	$ 205,365	$ 160,772	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plus: Adjustment for State Excise Tax	2,817	10,257	6,083	4,287	3,127	2,448	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Revenue Deficiency	**$ 187,812**	**$ 683,802**	**$ 405,545**	**$ 285,804**	**$ 208,493**	**$ 163,221**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**

Rate Increases	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Rate Revenue with no Increase	$ 1,334,000	$ 1,337,284	$ 1,340,576	$ 1,343,877	$ 1,347,185	$ 1,350,502	$ 1,353,826	$ 1,357,159	$ 1,360,500	$ 1,363,850	$ 1,367,207	$ 1,370,573	$ 1,373,947	$ 1,377,330	$ 1,380,720	$ 1,384,119	$ 1,387,527	$ 1,390,943	$ 1,394,367	$ 1,397,800
Revenues from Prior Rate Increases	-	-	1,193,113	1,615,138	1,945,407	2,296,770	2,686,330	2,956,200	3,244,537	3,529,507	3,832,520	3,972,268	4,115,947	4,263,665	4,387,259	4,513,703	4,643,062	4,775,402	4,910,788	5,049,291
Rate Revenue Before Rate Increase (Incl. previous increases)	1,334,000	1,337,284	2,533,689	2,959,015	3,292,592	3,647,271	4,040,157	4,313,359	4,605,037	4,893,356	5,199,727	5,342,841	5,489,894	5,640,995	5,767,980	5,897,823	6,030,589	6,166,344	6,305,155	6,447,091
Required Annual Rate Increase	14.08%	51.13%	16.01%	9.66%	6.33%	4.48%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Number of Months New Rates Will Be In Effect	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Info: Percentage Increase to Generate Required Revenue	*14.08%*	*51.13%*	*16.01%*	*9.66%*	*6.33%*	*4.48%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*
Policy-Induced Rate Increases	0.00%	89.00%	16.50%	11.00%	10.50%	10.50%	6.50%	6.50%	6.00%	6.00%	2.50%	2.50%	2.50%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
ANNUAL RATE INCREASE	**0.00%**	**89.00%**	**16.50%**	**11.00%**	**10.50%**	**10.50%**	**6.50%**	**6.50%**	**6.00%**	**6.00%**	**2.50%**	**2.50%**	**2.50%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**
CUMULATIVE RATE INCREASE	**0.00%**	**89.00%**	**120.19%**	**144.41%**	**170.07%**	**198.43%**	**217.82%**	**238.48%**	**258.79%**	**280.32%**	**289.83%**	**299.57%**	**309.56%**	**317.75%**	**326.11%**	**334.63%**	**343.32%**	**352.19%**	**361.23%**	**370.46%**

Impacts of Rate Increases	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Rate Revenues After Rate Increase	$ 1,334,000	$ 2,527,467	$ 2,951,748	$ 3,284,506	$ 3,638,314	$ 4,030,235	$ 4,302,767	$ 4,593,728	$ 4,881,339	$ 5,186,958	$ 5,329,720	$ 5,476,412	$ 5,627,142	$ 5,753,815	$ 5,883,339	$ 6,015,779	$ 6,151,201	$ 6,289,671	$ 6,431,259	$ 6,576,033
Full Year Rate Revenues After Rate Increase	*1,334,000*	*2,527,467*	*2,951,748*	*3,284,506*	*3,638,314*	*4,030,235*	*4,302,767*	*4,593,728*	*4,881,339*	*5,186,958*	*5,329,720*	*5,476,412*	*5,627,142*	*5,753,815*	*5,883,339*	*6,015,779*	*6,151,201*	*6,289,671*	*6,431,259*	*6,576,033*
Additional State and City Taxes Due to Rate Increases	-	17,853	24,168	29,109	34,367	40,196	44,234	48,549	52,813	57,347	59,438	61,588	63,798	65,647	67,539	69,475	71,455	73,481	75,553	77,673
Net Cash Flow After Rate Increase	$ (184,995)	$ 498,785	$ 12,326	$ 39,092	$ 135,171	$ 216,447	$ 372,323	$ 542,912	$ 706,656	$ 883,605	$ 897,223	$ 909,838	$ 923,379	$ 909,089	$ 891,859	$ 873,680	$ 854,452	$ 833,837	$ 811,466	$ 787,259
Coverage After Rate Increase	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Mukilteo
Stormwater Rate and GFC
Fund Activity

Funds	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
OPERATING FUND Perform Transfer?	Yes																			
Beginning Balance	$ 543,651	$ 125,000	$ 330,568	$ 314,891	$ 323,280	$ 323,688	$ 332,699	$ 341,825	$ 351,211	$ 360,863	$ 370,934	$ 381,147	$ 391,813	$ 402,621	$ 413,737	$ 425,415	$ 437,325	$ 449,482	$ 461,937	$ 474,750
plus: Net Cash Flow after Rate Increase	(184,995)	498,785	12,326	39,092	135,171	216,447	372,323	542,912	706,656	883,605	897,223	909,838	923,379	909,089	891,859	873,680	854,452	833,837	811,466	787,259
less: Transfer of Surplus to Capital Fund	(233,656)	(293,217)	(28,003)	(30,703)	(134,763)	(207,436)	(363,196)	(533,527)	(697,003)	(873,534)	(887,010)	(899,172)	(912,571)	(897,972)	(880,181)	(861,770)	(842,295)	(821,381)	(798,653)	(774,078)
Ending Balance	**$ 125,000**	**$ 330,568**	**$ 314,891**	**$ 323,280**	**$ 323,688**	**$ 332,699**	**$ 341,825**	**$ 351,211**	**$ 360,863**	**$ 370,934**	**$ 381,147**	**$ 391,813**	**$ 402,621**	**$ 413,737**	**$ 425,415**	**$ 437,325**	**$ 449,482**	**$ 461,937**	**$ 474,750**	**$ 487,931**
Minimum Target Balance	*$ 125,000*	*$ 330,568*	*$ 314,891*	*$ 323,280*	*$ 323,688*	*$ 332,699*	*$ 341,825*	*$ 351,211*	*$ 360,863*	*$ 370,934*	*$ 381,147*	*$ 391,813*	*$ 402,621*	*$ 413,737*	*$ 425,415*	*$ 437,325*	*$ 449,482*	*$ 461,937*	*$ 474,750*	*$ 487,931*
Maximum Funds to be Kept as Operating Reserves	*$ 125,000*	*$ 330,568*	*$ 314,891*	*$ 323,280*	*$ 323,688*	*$ 332,699*	*$ 341,825*	*$ 351,211*	*$ 360,863*	*$ 370,934*	*$ 381,147*	*$ 391,813*	*$ 402,621*	*$ 413,737*	*$ 425,415*	*$ 437,325*	*$ 449,482*	*$ 461,937*	*$ 474,750*	*$ 487,931*
Info: No of Days of Cash Operating Expenses	*30*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*
CAPITAL FUND																				
Beginning Balance	$ -	$ 12,872	$ 306,102	$ 733,542	$ 1,746,861	$ 3,106,505	$ 306,410	$ 2,181,789	$ 4,278,709	$ 6,592,149	$ 337,447	$ 2,943,885	$ 462,591	$ 3,566,703	$ 6,730,821	$ 1,697,507	$ 356,892	$ 2,363,682	$ 5,760,111	$ 9,221,162
plus: Rate Funded Capital	-	-	1,000,000	1,250,000	1,500,000	1,750,000	1,807,107	1,866,077	1,926,971	1,989,852	2,054,786	2,121,838	2,191,079	2,262,579	2,336,412	2,412,654	2,491,385	2,572,685	2,656,637	2,743,329
plus: Transfers from Operating Fund	233,656	293,217	28,003	30,703	134,763	207,436	363,196	533,527	697,003	873,534	887,010	899,172	912,571	897,972	880,181	861,770	842,295	821,381	798,653	774,078
plus: Grants/ Donations / CIAC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
plus: Additional Proceeds (Costs)	727,600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
plus: General Facilities Charges	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
plus: Revenue Bond Proceeds	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
plus: PWTF Loans	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
plus: Other Low Interest Loan Proceeds	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
plus: Interest Earnings	-	13	306	734	1,747	3,107	306	2,182	4,279	6,592	337	2,944	463	3,567	6,731	1,698	357	2,364	5,760	9,221
Total Funding Sources	**$ 961,256**	**$ 306,102**	**$ 1,334,412**	**$ 2,014,978**	**$ 3,383,372**	**$ 5,067,048**	**$ 2,477,019**	**$ 4,583,574**	**$ 6,906,962**	**$ 9,462,128**	**$ 3,279,580**	**$ 5,967,840**	**$ 3,566,703**	**$ 6,730,821**	**$ 9,954,145**	**$ 4,973,629**	**$ 3,690,929**	**$ 5,760,111**	**$ 9,221,162**	**$12,747,791**
less: Capital Expenditures	(948,384)	-	(600,870)	(268,117)	(276,866)	(4,760,638)	(295,231)	(304,865)	(314,813)	(9,124,681)	(335,694)	(5,505,249)	-	-	(8,256,638)	(4,616,737)	(1,327,247)	-	-	-
Ending Capital Fund Balance	**$ 12,872**	**$ 306,102**	**$ 733,542**	**$ 1,746,861**	**$ 3,106,505**	**$ 306,410**	**$ 2,181,789**	**$ 4,278,709**	**$ 6,592,149**	**$ 337,447**	**$ 2,943,885**	**$ 462,591**	**$ 3,566,703**	**$ 6,730,821**	**$ 1,697,507**	**$ 356,892**	**$ 2,363,682**	**$ 5,760,111**	**$ 9,221,162**	**$12,747,791**
Minimum Target Balance	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*
DEBT RESERVE																				
Beginning Balance	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
plus: Reserve Funding from New Debt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
less: Use of Reserves for Debt Service	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ending Balance	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Minimum Target Balance	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*

Mukilteo
Stormwater Rate and GFC
Summary

Revenue Requirement	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Revenues																				
Rate Revenues Under Existing Rates	$ 1,334,000	$ 1,337,284	$ 1,340,576	$ 1,343,877	$ 1,347,185	$ 1,350,502	$ 1,353,826	$ 1,357,159	$ 1,360,500	$ 1,363,850	$ 1,367,207	$ 1,370,573	$ 1,373,947	$ 1,377,330	$ 1,380,720	$ 1,384,119	$ 1,387,527	$ 1,390,943	$ 1,394,367	$ 1,397,800
Non-Rate Revenues	3,000	125	331	315	323	324	333	342	351	361	371	381	392	403	414	426	437	449	462	475
Total Revenues	**$ 1,337,000**	**$ 1,337,409**	**$ 1,340,907**	**$ 1,344,191**	**$ 1,347,508**	**$ 1,350,825**	**$ 1,354,159**	**$ 1,357,501**	**$ 1,360,851**	**$ 1,364,211**	**$ 1,367,578**	**$ 1,370,954**	**$ 1,374,339**	**$ 1,377,732**	**$ 1,381,134**	**$ 1,384,545**	**$ 1,387,964**	**$ 1,391,392**	**$ 1,394,829**	**$ 1,398,275**
Expenses																				
Cash Operating Expenses	$ 1,521,995	$ 1,505,954	$ 1,397,960	$ 1,436,054	$ 1,426,098	$ 1,466,490	$ 1,508,075	$ 1,550,887	$ 1,595,818	$ 1,641,221	$ 1,688,929	$ 1,737,087	$ 1,786,674	$ 1,839,181	$ 1,892,643	$ 1,947,133	$ 2,002,956	$ 2,060,443	$ 2,119,646	$ 2,180,618
NPDES Expenses	-	505,000	517,625	530,566	543,830	557,426	571,361	585,645	600,286	615,293	630,676	646,443	662,604	679,169	696,148	713,552	731,391	749,675	768,417	787,628
Existing Debt Service	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
New Debt Service	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rate Funded Capital	-	750,000	1,250,000	1,500,000	1,750,000	2,000,000	2,065,265	2,132,659	2,202,253	2,274,117	2,348,327	2,424,958	2,504,090	2,585,804	2,670,185	2,757,319	2,847,297	2,940,211	3,036,157	3,135,234
Additions Required to Meet Op. Fund Balance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Expenses	**$ 1,521,995**	**$ 2,760,954**	**$ 3,165,585**	**$ 3,466,620**	**$ 3,719,928**	**$ 4,023,916**	**$ 4,144,700**	**$ 4,269,191**	**$ 4,398,356**	**$ 4,530,631**	**$ 4,667,932**	**$ 4,808,488**	**$ 4,953,368**	**$ 5,104,154**	**$ 5,258,976**	**$ 5,418,005**	**$ 5,581,644**	**$ 5,750,330**	**$ 5,924,220**	**$ 6,103,480**
Net Surplus (Deficiency)	**$ (184,995)**	**$ (1,423,545)**	**$ (1,824,678)**	**$ (2,122,428)**	**$ (2,372,419)**	**$ (2,673,091)**	**$ (2,790,541)**	**$ (2,911,690)**	**$ (3,037,505)**	**$ (3,166,421)**	**$ (3,300,353)**	**$ (3,437,533)**	**$ (3,579,029)**	**$ (3,726,422)**	**$ (3,877,842)**	**$ (4,033,459)**	**$ (4,193,679)**	**$ (4,358,937)**	**$ (4,529,391)**	**$ (4,705,205)**
Additions to Meet Coverage	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Surplus (Deficiency)	**$ (184,995)**	**$ (1,423,545)**	**$ (1,824,678)**	**$ (2,122,428)**	**$ (2,372,419)**	**$ (2,673,091)**	**$ (2,790,541)**	**$ (2,911,690)**	**$ (3,037,505)**	**$ (3,166,421)**	**$ (3,300,353)**	**$ (3,437,533)**	**$ (3,579,029)**	**$ (3,726,422)**	**$ (3,877,842)**	**$ (4,033,459)**	**$ (4,193,679)**	**$ (4,358,937)**	**$ (4,529,391)**	**$ (4,705,205)**
% of Rate Revenue	**13.87%**	**106.45%**	**136.11%**	**157.93%**	**176.10%**	**197.93%**	**206.12%**	**214.54%**	**223.26%**	**232.17%**	**241.39%**	**250.81%**	**260.49%**	**270.55%**	**280.86%**	**291.41%**	**302.24%**	**313.38%**	**324.83%**	**336.62%**
Annual Rate Adjustment	**0.00%**	**131.00%**	**9.00%**	**8.50%**	**8.00%**	**5.50%**	**5.50%**	**5.00%**	**5.00%**	**5.00%**	**4.50%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**
Cumulative Annual Rate Adjustment	**0.00%**	**131.00%**	**151.79%**	**173.19%**	**195.05%**	**211.28%**	**228.40%**	**244.82%**	**262.06%**	**280.16%**	**297.27%**	**305.21%**	**313.32%**	**321.58%**	**330.01%**	**338.61%**	**347.39%**	**356.33%**	**365.46%**	**374.77%**
Rate Revenues After Rate Increase	$ 1,334,000	$ 3,089,126	$ 3,375,437	$ 3,671,365	$ 3,974,836	$ 4,203,775	$ 4,445,901	$ 4,679,689	$ 4,925,770	$ 5,184,791	$ 5,431,445	$ 5,553,713	$ 5,678,733	$ 5,806,567	$ 5,937,280	$ 6,070,934	$ 6,207,597	$ 6,347,337	$ 6,490,223	$ 6,636,324
Additional Taxes from Rate Increase	$ -	$ 26,278	$ 30,523	$ 34,912	$ 39,415	$ 42,799	$ 46,381	$ 49,838	$ 53,479	$ 57,314	$ 60,964	$ 62,747	$ 64,572	$ 66,439	$ 68,348	$ 70,302	$ 72,301	$ 74,346	$ 76,438	$ 78,578
Net Cash Flow After Rate Increase	**(184,995)**	**302,020**	**179,660**	**170,148**	**215,817**	**137,384**	**255,153**	**361,002**	**474,286**	**597,207**	**702,921**	**682,860**	**661,186**	**636,377**	**610,369**	**583,053**	**554,090**	**523,111**	**490,026**	**454,742**
Coverage After Rate Increases	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**
Sample Residential Monthly Bill	**$ 7.85**	**$ 18.13**	**$ 19.77**	**$ 21.45**	**$ 23.16**	**$ 24.44**	**$ 25.78**	**$ 27.07**	**$ 28.42**	**$ 29.84**	**$ 31.19**	**$ 31.81**	**$ 32.45**	**$ 33.09**	**$ 33.76**	**$ 34.43**	**$ 35.12**	**$ 35.82**	**$ 36.54**	**$ 37.27**
Monthly Average Increase ($)	$ -	$ 10.28	$ 1.63	$ 1.68	$ 1.72	$ 1.27	$ 1.34	$ 1.29	$ 1.35	$ 1.42	$ 1.34	$ 0.62	$ 0.64	$ 0.65	$ 0.66	$ 0.68	$ 0.69	$ 0.70	$ 0.72	$ 0.73

Fund Balance	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
OPERATING FUND																				
Beginning Balance	$ 543,651	$ 125,000	$ 330,568	$ 314,891	$ 323,280	$ 323,824	$ 332,699	$ 341,825	$ 351,211	$ 361,003	$ 370,934	$ 381,305	$ 391,813	$ 402,621	$ 413,975	$ 425,555	$ 437,373	$ 449,482	$ 461,937	$ 474,750
plus: Net Cash Flow after Rate Increase	(184,995)	302,020	179,660	170,148	215,817	137,384	255,153	361,002	474,286	597,207	702,921	682,860	661,186	636,377	610,369	583,053	554,090	523,111	490,026	454,742
less: Transfer of Surplus to Capital Fund	(233,656)	(96,452)	(195,337)	(161,759)	(215,273)	(128,509)	(246,026)	(351,616)	(464,493)	(587,276)	(692,550)	(672,351)	(650,378)	(625,023)	(598,790)	(571,235)	(541,981)	(510,655)	(477,213)	(441,561)
Ending Balance	**$ 125,000**	**$ 330,568**	**$ 314,891**	**$ 323,280**	**$ 323,824**	**$ 332,699**	**$ 341,825**	**$ 351,211**	**$ 361,003**	**$ 370,934**	**$ 381,305**	**$ 391,813**	**$ 402,621**	**$ 413,975**	**$ 425,555**	**$ 437,373**	**$ 449,482**	**$ 461,937**	**$ 474,750**	**$ 487,931**
Minimum Target Balance	*$ 125,000*	*$ 330,568*	*$ 314,891*	*$ 323,280*	*$ 323,824*	*$ 332,699*	*$ 341,825*	*$ 351,211*	*$ 361,003*	*$ 370,934*	*$ 381,305*	*$ 391,813*	*$ 402,621*	*$ 413,975*	*$ 425,555*	*$ 437,373*	*$ 449,482*	*$ 461,937*	*$ 474,750*	*$ 487,931*
Days	*30*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*
% of Budgeted Operating Revenue	*9.37%*	*24.72%*	*23.49%*	*24.06%*	*24.04%*	*24.64%*	*25.25%*	*25.88%*	*26.53%*	*27.20%*	*27.89%*	*28.59%*	*29.30%*	*30.06%*	*30.82%*	*31.60%*	*32.39%*	*33.21%*	*34.05%*	*34.91%*
CAPITAL FUND																				
Beginning Balance	$ -	$ 12,872	$ 302,599	$ 1,514,559	$ 2,936,527	$ 322,227	$ 2,193,748	$ 4,241,525	$ 6,455,663	$ 324,014	$ 2,893,154	$ 303,522	$ 3,401,135	$ 6,559,004	$ 1,780,671	$ 580,584	$ 2,624,414	$ 6,016,317	$ 9,473,199	$12,996,043
plus: Rate Funded System Reinvestment	-	750,000	1,250,000	1,500,000	1,750,000	2,000,000	2,065,265	2,132,659	2,202,253	2,274,117	2,348,327	2,424,958	2,504,090	2,585,804	2,670,185	2,757,319	2,847,297	2,940,211	3,036,157	3,135,234
plus: Transfers from Operating Fund	233,656	96,452	195,337	161,759	215,273	128,509	246,026	351,616	464,493	587,276	692,550	672,351	650,378	625,023	598,790	571,235	541,981	510,655	477,213	441,561
plus: Grants/ Donations/ CIAC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
plus: Additional Proceeds (Costs)	727,600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
plus: General Facilities Charges	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
plus: Net Debt Proceeds Available for Projects	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
plus: Interest Earnings	-	13	303	1,515	2,937	322	2,194	4,242	6,456	324	2,893	304	3,401	6,559	1,781	581	2,624	6,016	9,473	12,996
Total Funding Sources	**$ 961,256**	**$ 859,337**	**$ 1,748,239**	**$ 3,177,833**	**$ 4,904,737**	**$ 2,451,059**	**$ 4,507,232**	**$ 6,730,041**	**$ 9,128,864**	**$ 3,185,732**	**$ 5,936,924**	**$ 3,401,135**	**$ 6,559,004**	**$ 9,776,391**	**$ 5,051,427**	**$ 3,909,719**	**$ 6,016,317**	**$ 9,473,199**	**$12,996,043**	**$16,585,833**
less: Capital Expenditures	(948,384)	(556,738)	(233,680)	(241,305)	(4,582,510)	(257,311)	(265,708)	(274,378)	(8,804,850)	(292,578)	(5,633,402)	-	-	(7,995,719)	(4,470,843)	(1,285,305)	-	-	-	-
Ending Working Capital Balance	**$ 12,872**	**$ 302,599**	**$ 1,514,559**	**$ 2,936,527**	**$ 322,227**	**$ 2,193,748**	**$ 4,241,525**	**$ 6,455,663**	**$ 324,014**	**$ 2,893,154**	**$ 303,522**	**$ 3,401,135**	**$ 6,559,004**	**$ 1,780,671**	**$ 580,584**	**$ 2,624,414**	**$ 6,016,317**	**$ 9,473,199**	**$12,996,043**	**$16,585,833**
Minimum Target Balance	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*

Mukilteo
Stormwater Rate and GFC
Assumptions

Economic & Financial Factors	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
1 General Cost Inflation	2.29%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%
2 Construction Cost Inflation	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%	3.26%
3 Labor Cost Inflation	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%
4 Benefit Cost Inflation	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%
5 Customer Growth	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%
6 General Inflation plus Growth	2.54%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%
7 No Escalation	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
8 [Extra]	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Investment Interest	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%
B&O Tax	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%

Accounting Assumptions	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
FISCAL POLICY RESTRICTIONS																				
Minimum Operating Fund Balance Target																				
Select Minimum Operating Fund Balance Target: 1	**Defined as Days of O&M Expenses**																			
1 - Defined as Days of O&M expenses																				
Minimum Operating Fund Balance Target	30	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Maximum Operating Fund Balance	30	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
2 - Amounts at Right																				
Minimum Operating Fund Balance Target	$ 125,000	$ 267,457	$ 268,115	$ 268,775	$ 269,437	$ 270,100	$ 270,765	$ 271,432	$ 272,100	$ 272,770	$ 273,441	$ 274,115	$ 274,789	$ 275,466	$ 276,144	$ 276,824	$ 277,505	$ 278,189	$ 278,873	$ 279,560
Maximum Operating Fund Balance	$ 125,000	$ 267,457	$ 268,115	$ 268,775	$ 269,437	$ 270,100	$ 270,765	$ 271,432	$ 272,100	$ 272,770	$ 273,441	$ 274,115	$ 274,789	$ 275,466	$ 276,144	$ 276,824	$ 277,505	$ 278,189	$ 278,873	$ 279,560
Minimum Capital Fund Balance Target																				
Select Minimum Capital Fund Balance Target: 2	**User Input**																			
1 - Defined as % of Plant																				
Plant-in-Service in 2014: $5,106,861	Estimated Net Assets																			
Minimum Capital Fund Balance - % of plant assets	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
2 - Amount at Right ==>	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000
RATE FUNDED CAPITAL																				
Select Capital Reinvestment Funding Strategy: 3	**User Input**																			
Amount of Annual Cash Funding from Rates																				
1 - Equal to Annual Depreciation Expense	$ 340,193	$ 344,719	$ 349,392	$ 354,218	$ 445,868	$ 451,015	$ 456,329	$ 461,816	$ 637,913	$ 643,765	$ 756,433	$ 756,433	$ 756,433	$ 916,347	$ 1,005,764	$ 1,031,470	$ 1,031,470	$ 1,031,470	$ 1,031,470	$ 1,031,470
2 - Equal to Annual Depreciation less Annual Debt Principal Payments	$ 340,193	$ 344,719	$ 349,392	$ 354,218	$ 445,868	$ 451,015	$ 456,329	$ 461,816	$ 637,913	$ 643,765	$ 756,433	$ 756,433	$ 756,433	$ 916,347	$ 1,005,764	$ 1,031,470	$ 1,031,470	$ 1,031,470	$ 1,031,470	$ 1,031,470
3 - Equal to Amount at Right ==>	$ -	$ 750,000	$ 1,250,000	$ 1,500,000	$ 1,750,000	$ 2,000,000	$ 2,065,265	$ 2,132,659	$ 2,202,253	$ 2,274,117	$ 2,348,327	$ 2,424,958	$ 2,504,090	$ 2,585,804	$ 2,670,185	$ 2,757,319	$ 2,847,297	$ 2,940,211	$ 3,036,157	$ 3,135,234
4 - Do Not Fund System Reinvestment																				

Mukilteo
Stormwater Rate and GFC
Assumptions

Capital Financing Assumptions		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
General Facilities Charges	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Equivalent Residential Units (Estimate)		13,644	13,678	13,711	13,745	13,779	13,813	13,847	13,881	13,915	13,949	13,984	14,018	14,053	14,087	14,122	14,157	14,192	14,227	14,262	14,297
Additional Units Per Year		34	34	34	34	34	34	34	34	34	34	34	35	35	35	35	35	35	35	35	35
GFC Revenues		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
FUNDING SOURCES																					
Grants		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Additional Proceeds (Costs)																					
Department of Ecology State Grant		$ 170,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Smuggler's Gulch DOE Grant		557,600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
[Extra line]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
[Extra line]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
[Extra line]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Additional Proceeds		**$ 727,600**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
REVENUE BONDS																					
Term (years)		20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Interest Cost		4.50%	4.50%	4.50%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	4.50%	4.50%	4.50%	4.50%
Issuance Cost		1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%
Revenue Bond Coverage Requirement	**1.25**																				
Use Reserves to Pay for Last Payment	**Yes**																				
PWTF LOANS																					
Term (years; no more than 20 years)		20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Interest Cost		2.55%	2.55%	2.55%	2.55%	2.55%	2.55%	2.55%	2.55%	2.55%	2.55%	2.55%	2.55%	2.55%	2.55%	2.55%	2.55%	1.00%	1.00%	1.00%	1.00%
Required Local Match		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.00%	1.00%	1.00%	1.00%
OTHER LOANS																					
Term (years)		20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Interest Cost		4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
Issuance Cost		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Mukilteo
Stormwater Rate and GFC
Operating Revenue and Expenditure Forecast

		Actual	Actual	Budget	Projection	Projection	Projection	Projection	Projection	Projection	Projection	Projection	Projection	Projection	Projection	Projection	Projection	Projection	Projection	Projection	Projection	Projection
Revenues	**FORECAST BASIS**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**
Rate Revenues																							
Storm Drain Fees & Charges	Customer Growth	$ 1,293,185	$ 1,081,779	$ 1,334,000	$ 1,337,284	$ 1,340,576	$ 1,343,877	$ 1,347,185	$ 1,350,502	$ 1,353,826	$ 1,357,159	$ 1,360,500	$ 1,363,850	$ 1,367,207	$ 1,370,573	$ 1,373,947	$ 1,377,330	$ 1,380,720	$ 1,384,119	$ 1,387,527	$ 1,390,943	$ 1,394,367	$ 1,397,800
[Extra]	Customer Growth	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
[Extra]	Customer Growth	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Rate Revenue		**$ 1,293,185**	**$ 1,081,779**	**$ 1,334,000**	**$ 1,337,284**	**$ 1,340,576**	**$ 1,343,877**	**$ 1,347,185**	**$ 1,350,502**	**$ 1,353,826**	**$ 1,357,159**	**$ 1,360,500**	**$ 1,363,850**	**$ 1,367,207**	**$ 1,370,573**	**$ 1,373,947**	**$ 1,377,330**	**$ 1,380,720**	**$ 1,384,119**	**$ 1,387,527**	**$ 1,390,943**	**$ 1,394,367**	**$ 1,397,800**
Non-Rate Revenues																							
Transfers In	No Escalation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
MWWD Interlocal Agreement GIS/CAD Tech	No Escalation	-	9,856	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other Miscellaneous Revenue	No Escalation	-	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
[Extra]	No Escalation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Non-Rate Revenues		**$ -**	**$ 9,895**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
TOTAL REVENUES		**$ 1,293,185**	**$ 1,091,674**	**$ 1,334,000**	**$ 1,337,284**	**$ 1,340,576**	**$ 1,343,877**	**$ 1,347,185**	**$ 1,350,502**	**$ 1,353,826**	**$ 1,357,159**	**$ 1,360,500**	**$ 1,363,850**	**$ 1,367,207**	**$ 1,370,573**	**$ 1,373,947**	**$ 1,377,330**	**$ 1,380,720**	**$ 1,384,119**	**$ 1,387,527**	**$ 1,390,943**	**$ 1,394,367**	**$ 1,397,800**

	General Operating Expenses	**FORECAST BASIS**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**
5301	Taxes and Assessments	Calculation	$ 24,229	$ 22,495	$ 27,000	$ 20,059	$ 20,109	$ 20,158	$ 20,208	$ 20,258	$ 20,307	$ 20,357	$ 20,408	$ 20,458	$ 20,508	$ 20,559	$ 20,609	$ 20,660	$ 20,711	$ 20,762	$ 20,813	$ 20,864	$ 20,916	$ 20,967
19	**Other Governmental Services**																							
590	***Title Not Found***																							
590.200	**Operating Transfers Out**																							
	Intergovernmental Services																							
5590	Transfer to Reserves	No Escalation	$ -	$ 50,000	$ 50,000	$ 100,000	$ 50,000	$ 50,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
38	**Public Works**																							
530	**Utilities and Environment**																							
530.200	**Engineering Plans & Services**																							
	Salaries and Wages																							
1001	Full Time Employees	Labor Cost Inflation	149,322	134,552	184,150	189,444	194,891	200,494	206,258	212,188	218,288	224,563	231,020	237,661	244,494	251,523	258,754	266,193	273,846	281,719	289,818	298,150	306,722	315,540
1102	Part Time Employees	Labor Cost Inflation	12,234	4,329	30,660	31,541	32,448	33,381	34,341	35,328	36,344	37,389	38,464	39,569	40,707	41,877	43,081	44,320	45,594	46,905	48,253	49,640	51,068	52,536
1201	Overtime	Labor Cost Inflation	-	1,773	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benefits																							
2000	Benefits	Benefit Cost Inflation	182,467	172,751	198,405	206,157	214,212	222,581	231,277	240,314	249,703	259,459	269,596	280,130	291,075	302,447	314,264	326,542	339,301	352,558	366,332	380,645	395,517	410,970
530.300	**Surface Water Management**																							
	Salaries and Wages																							
1101	Full Time Employees	Labor Cost Inflation	243,507	254,891	235,890	242,672	249,648	256,826	264,209	271,805	279,619	287,658	295,928	304,436	313,189	322,193	331,455	340,985	350,788	360,873	371,248	381,921	392,901	404,196
1115	Acting Supervisor Pay	Labor Cost Inflation	1,492	386	1,000	1,029	1,058	1,089	1,120	1,152	1,185	1,219	1,255	1,291	1,328	1,366	1,405	1,446	1,487	1,530	1,574	1,619	1,666	1,713
1201	Overtime	Labor Cost Inflation	8,037	6,843	6,500	6,687	6,879	7,077	7,280	7,490	7,705	7,926	8,154	8,389	8,630	8,878	9,133	9,396	9,666	9,944	10,230	10,524	10,826	11,138
1203	Standby Pay	Labor Cost Inflation	5,936	3,856	4,060	4,177	4,297	4,420	4,547	4,678	4,813	4,951	5,093	5,240	5,390	5,545	5,705	5,869	6,038	6,211	6,390	6,573	6,762	6,957
1241	OT - Disaster Support/Severe Weather	Labor Cost Inflation	-	246	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Supplies																							
3101	Office Supplies	General Cost Inflation	320	429	500	513	525	538	552	566	580	594	609	624	640	656	672	689	706	724	742	761	780	799
	Reference Material	General Cost Inflation	-	-	500	513	525	538	552	566	580	594	609	624	640	656	672	689	706	724	742	761	780	799
3112	Operating Supplies	General Cost Inflation	12,001	5,487	10,000	10,250	10,506	10,769	11,038	11,314	11,597	11,887	12,184	12,489	12,801	13,121	13,449	13,785	14,130	14,483	14,845	15,216	15,597	15,987
3113	Vehicle R&M Tools/Eq	General Cost Inflation	-	-	250	256	263	269	276	283	290	297	305	312	320	328	336	345	353	362	371	380	390	400
3124	Clothing/Boots	General Cost Inflation	2,151	2,970	3,750	3,844	3,940	4,038	4,139	4,243	4,349	4,458	4,569	4,683	4,800	4,920	5,043	5,169	5,299	5,431	5,567	5,706	5,849	5,995
3135	Aggregate	General Cost Inflation	9,525	3,449	6,500	6,663	6,829	7,000	7,175	7,354	7,538	7,726	7,920	8,118	8,321	8,529	8,742	8,960	9,184	9,414	9,649	9,891	10,138	10,391
3206	Motor Fuel	General Cost Inflation	14,972	12,347	12,000	12,300	12,608	12,923	13,246	13,577	13,916	14,264	14,621	14,986	15,361	15,745	16,139	16,542	16,956	17,380	17,814	18,259	18,716	19,184
3501	Small Items of Equipment	General Cost Inflation	6,247	3,235	8,000	8,200	8,405	8,615	8,831	9,051	9,278	9,509	9,747	9,991	10,241	10,497	10,759	11,028	11,304	11,586	11,876	12,173	12,477	12,789
	Other Services & Charges																							
	Equipment Replacement Charges	General Cost Inflation	-	-	36,080	36,982	37,907	38,854	39,826	40,821	41,842	42,888	43,960	45,059	46,185	47,340	48,524	49,737	50,980	52,255	53,561	54,900	56,272	57,679
4106	Other Professional Services	General Cost Inflation	169,939	275,822	300,000	307,500	315,188	323,067	331,144	339,422	347,908	356,606	365,521	374,659	384,025	393,626	403,467	413,553	423,892	434,489	445,352	456,485	467,898	479,595
4107	Wetland Mitigation Services	General Cost Inflation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4109	City Atty. Other Svcs.	General Cost Inflation	3,917	5,994	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4111	Hazardous Materials Testing	General Cost Inflation	2,620	3,120	2,800	2,870	2,942	3,015	3,091	3,168	3,247	3,328	3,412	3,497	3,584	3,674	3,766	3,860	3,956	4,055	4,157	4,261	4,367	4,476
4125	Contract Services	General Cost Inflation	4,941	959	3,500	3,588	3,677	3,769	3,863	3,960	4,059	4,160	4,264	4,371	4,480	4,592	4,707	4,825	4,945	5,069	5,196	5,326	5,459	5,595
4201	Telephone	General Cost Inflation	1,956	771	1,000	1,025	1,051	1,077	1,104	1,131	1,160	1,189	1,218	1,249	1,280	1,312	1,345	1,379	1,413	1,448	1,485	1,522	1,560	1,599
4209	Cell Phones	General Cost Inflation	1,290	1,395	1,200	1,230	1,261	1,292	1,325	1,358	1,392	1,426	1,462	1,499	1,536	1,575	1,614	1,654	1,696	1,738	1,781	1,826	1,872	1,918
4301	Travel & Subsistence	General Cost Inflation	78	67	2,500	2,563	2,627	2,692	2,760	2,829	2,899	2,972	3,046	3,122	3,200	3,280	3,362	3,446	3,532	3,621	3,711	3,804	3,899	3,997
4402	Legal Publications	General Cost Inflation	-	499	600	615	630	646	662	679	696	713	731	749	768	787	807	827	848	869	891	913	936	959
4503	Work Equip & Machine Rental	General Cost Inflation	6,048	5,029	12,000	12,300	12,608	12,923	13,246	13,577	13,916	14,264	14,621	14,986	15,361	15,745	16,139	16,542	16,956	17,380	17,814	18,259	18,716	19,184
4509	Equipment Replacement Charges	General Cost Inflation	40,080	33,073	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4601	Insurance	General Cost Inflation	28,777	35,865	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4705	Hazardous Waste Disposal	General Cost Inflation	26,557	31,721	30,000	30,750	31,519	32,307	33,114	33,942	34,791	35,661	36,552	37,466	38,403	39,363	40,347	41,355	42,389	43,449	44,535	45,649	46,790	47,960
4722	Brush Disposal	General Cost Inflation	-	14,892	4,000	4,100	4,203	4,308	4,415	4,526	4,639	4,755	4,874	4,995	5,120	5,248	5,380	5,514	5,652	5,793	5,938	6,086	6,239	6,395
4815	Equipment R&M	General Cost Inflation	460	5,683	5,000	5,125	5,253	5,384	5,519	5,657	5,798	5,943	6,092	6,244	6,400	6,560	6,724	6,893	7,065	7,241	7,423	7,608	7,798	7,993
4820	Vehicle R&M	General Cost Inflation	29,084	33,445	30,000	30,750	31,519	32,307	33,114	33,942	34,791	35,661	36,552	37,466	38,403	39,363	40,347	41,355	42,389	43,449	44,535	45,649	46,790	47,960
4821	Computer System Maint. & Subscriptions	General Cost Inflation	-	1,655	1,850	1,896	1,944	1,992	2,042	2,093	2,145	2,199	2,254	2,310	2,368	2,427	2,488	2,550	2,614	2,679	2,746	2,815	2,885	2,958
4904	Laundry Services	General Cost Inflation	1,261	1,411	1,400	1,435	1,471	1,508	1,545	1,584	1,624	1,664	1,706	1,748	1,792	1,837	1,883	1,930	1,978	2,028	2,078	2,130	2,184	2,238
4912	Training and Registration	General Cost Inflation	1,008	353	2,500	2,563	2,627	2,692	2,760	2,829	2,899	2,972	3,046	3,122	3,200	3,280	3,362	3,446	3,532	3,621	3,711	3,804	3,899	3,997
4921	Permit Fees	General Cost Inflation	-	-	10,000	10,250	10,506	10,769	11,038	11,314	11,597	11,887	12,184	12,489	12,801	13,121	13,449	13,785	14,130	14,483	14,845	15,216	15,597	15,987
4940	Vactor Service	General Cost Inflation	24,070	18,001	22,000	22,550	23,114	23,692	24,284	24,891	25,513	26,151	26,805	27,475	28,162	28,866	29,588	30,327	31,085	31,863	32,659	33,476	34,312	35,170
	Intergovernmental Services																							
5112	Mukilteo Water District	General Cost Inflation	36,453	47,278	48,000	49,200	50,430	51,691	52,983	54,308	55,665	57,057	58,483	59,945	61,444	62,980	64,555	66,169	67,823	69,518	71,256	73,038	74,864	76,735
5120	Snohomish County - ILA	General Cost Inflation	-	-	2,000	2,050	2,101	2,154	2,208	2,263	2,319	2,377	2,437	2,498	2,560	2,624	2,690	2,757	2,826	2,897	2,969	3,043	3,119	3,197
5153	WRIA ILA	General Cost Inflation	7,055	7,236	10,000	10,250	10,506	10,769	11,038	11,314	11,597	11,887	12,184	12,489	12,801	13,121	13,449	13,785	14,130	14,483	14,845	15,216	15,597	15,987
5169	Dept of Ecology	General Cost Inflation	10,934	25,703	26,400	27,060	27,737	28,430	29,141	29,869	30,616	31,381	32,166	32,970	33,794	34,639	35,505	36,393	37,303	38,235	39,191	40,171	41,175	42,204
5301	Taxes and Assessments	General Cost Inflation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Payments for Services																							
9918	Overhead Costs	General Cost Inflation	230,433	175,500	190,000	95,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Mukilteo
Stormwater Rate and GFC
Operating Revenue and Expenditure Forecast

Operating Expense Adjustments	FORECAST BASIS	Actual 2013	Actual 2014	Budget 2015	Projection 2016	Projection 2017	Projection 2018	Projection 2019	Projection 2020	Projection 2021	Projection 2022	Projection 2023	Projection 2024	Projection 2025	Projection 2026	Projection 2027	Projection 2028	Projection 2029	Projection 2030	Projection 2031	Projection 2032	Projection 2033	Projection 2034
Additional NPDES Costs (3.75 FTEs + Equip + Ops)	General Cost Inflation	-	-	-	505,000	517,625	530,566	543,830	557,426	571,361	585,645	600,286	615,293	630,676	646,443	662,604	679,169	696,148	713,552	731,391	749,675	768,417	787,628
[Adjustment #2]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
[Adjustment #3]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
[Adjustment #4]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Add'l O&M from CIP	*From CIP*	-	-	-	-	-	-	828	849	870	892	1,767	1,811	2,816	2,887	2,959	4,480	5,440	5,866	6,012	6,163	6,317	6,475

Operating Expense Summary	FORECAST BASIS	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Total Cash O&M Expenditures		**$ 1,411,785**	**$ 2,132,130**	**$ 1,521,995**	**$ 2,010,954**	**$ 1,915,585**	**$ 1,966,620**	**$ 1,969,928**	**$ 2,023,916**	**$ 2,079,436**	**$ 2,136,532**	**$ 2,196,104**	**$ 2,256,514**	**$ 2,319,605**	**$ 2,383,530**	**$ 2,449,277**	**$ 2,518,350**	**$ 2,588,791**	**$ 2,660,685**	**$ 2,734,347**	**$ 2,810,119**	**$ 2,888,064**	**$ 2,968,246**
Depreciation Expense in 2013	$ 333,145																						
Depreciation Expense	*Last year's plus annual additions from CIP*	$ 333,145	$ 333,145	$ 340,193	$ 344,719	$ 349,392	$ 354,218	$ 445,868	$ 451,015	$ 456,329	$ 461,816	$ 637,913	$ 643,765	$ 756,433	$ 756,433	$ 756,433	$ 916,347	$ 1,005,764	$ 1,031,470	$ 1,031,470	$ 1,031,470	$ 1,031,470	$ 1,031,470
	debt principal payments	-	-	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	System Reinvestment Funding	$ 333,145	$ 333,145	$ 340,193	$ 344,719	$ 349,392	$ 354,218	$ 445,868	$ 451,015	$ 456,329	$ 461,816	$ 637,913	$ 643,765	$ 756,433	$ 756,433	$ 756,433	$ 916,347	$ 1,005,764	$ 1,031,470	$ 1,031,470	$ 1,031,470	$ 1,031,470	$ 1,031,470
TOTAL EXPENSES		**$ 1,744,930**	**$ 2,465,275**	**$ 1,862,188**	**$ 2,355,673**	**$ 2,264,977**	**$ 2,320,838**	**$ 2,415,796**	**$ 2,474,931**	**$ 2,535,765**	**$ 2,598,348**	**$ 2,834,017**	**$ 2,900,279**	**$ 3,076,038**	**$ 3,139,963**	**$ 3,205,710**	**$ 3,434,697**	**$ 3,594,555**	**$ 3,692,155**	**$ 3,765,817**	**$ 3,841,589**	**$ 3,919,534**	**$ 3,999,716**

Mukilteo
Stormwater Rate and GFC
Capital Improvement Program

Project Costs and O&M Impacts in Year:	2015

No	Description	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
1	**Stormwater Capital in 2015 Preliminary Budget**																				
2	Lighthouse Park Tidegate Stormwater Repairs	$ 50,000																			
3	Bayview Storm Drainage Improvements	-																			
4	61st Culvery Replacement	262,500																			
5	Naketa Beach Storm Pipe Repairs & Slope Rehab	333,500																			
6	**Stormwater Capital Moved Forward from 2014**																				
7	Smuggler's Gulch LID	302,384																			
8	Decant Facility		320,000																		
9																					
10	**SW Comp Plan CIP**																				
11	Chennault Beach Drive Drainage Improvements					3,811,000															
12	Mukilteo Lane Drainage Improvements									6,591,000											
13	84th Street SW (West) Storm Drainage Improvements											1,240,000									
14	64th Place W Street Drainage Improvements											1,202,000									
15	66th Place W Street Drainage Improvements											1,425,000									
16	Central Dr Storm Drainage Improvements for Big Gulch Basin														5,267,000						
17	62nd Pl W/Canyon Drive Storm Drainage Improvements															2,852,000					
18	10th St and Loveland Ave Strom Drainage Improvements																794,000				
19																					
20	Pipe Inspections		62,964	62,964	62,964	62,964	62,964	62,964	62,964	62,964	62,964	62,964									
21	Basin Planning		156,180	156,180	156,180	156,180	156,180	156,180	156,180	156,180	156,180	156,180									
22																					
	Total Capital Projects	**$ 948,384**	**$ 539,144**	**$ 219,144**	**$ 219,144**	**$ 4,030,144**	**$ 219,144**	**$ 219,144**	**$ 219,144**	**$ 6,810,144**	**$ 219,144**	**$ 4,086,144**	**$ -**	**$ -**	**$ 5,267,000**	**$ 2,852,000**	**$ 794,000**	**$ -**	**$ -**	**$ -**	**$ -**
	Total Upgrade/Expansion Projects	474,192	269,572	109,572	109,572	3,920,572	109,572	109,572	109,572	6,700,572	109,572	3,976,572	-	-	5,267,000	2,852,000	794,000	-	-	-	-
	Total R&R Projects	474,192	269,572	109,572	109,572	109,572	109,572	109,572	109,572	109,572	109,572	109,572	-	-	-	-	-	-	-	-	-
	Projects by Grants / Developer Donations																				
	Projects by Enterprise Fund																				

Mukilteo
Stormwater Rate and GFC
Capital Improvement Program

Project Costs and O&M Impacts in Year:	2015

No	Description	Annual O&M Impact	Useful Life (Years)	Specific Funding Source 1-Enterprise Fund, 2-Grants & Developer Donations		TOTAL 2015 $ COSTS	TOTAL ESCALATED COSTS
1	**Stormwater Capital in 2015 Preliminary Budget**		50	1	Enterprise Fund	$ -	$ -
2	Lighthouse Park Tidegate Stormwater Repairs		50	1	Enterprise Fund	50,000	50,000
3	Bayview Storm Drainage Improvements		50	1	Enterprise Fund	-	-
4	61st Culvery Replacement		50	1	Enterprise Fund	262,500	262,500
5	Naketa Beach Storm Pipe Repairs & Slope Rehab		50	1	Enterprise Fund	333,500	333,500
6	**Stormwater Capital Moved Forward from 2014**		50	1	Enterprise Fund	-	-
7	Smuggler's Gulch LID		50	1	Enterprise Fund	302,384	302,384
8	Decant Facility		50	1	Enterprise Fund	320,000	330,442
9			50	1	Enterprise Fund	-	-
10	**SW Comp Plan CIP**		50	1	Enterprise Fund	-	-
11	Chennault Beach Drive Drainage Improvements	750	50	1	Enterprise Fund	3,811,000	4,333,330
12	Mukilteo Lane Drainage Improvements	700	50	1	Enterprise Fund	6,591,000	8,521,518
13	84th Street SW (West) Storm Drainage Improvements	200	50	1	Enterprise Fund	1,240,000	1,709,538
14	64th Place W Street Drainage Improvements	250	50	1	Enterprise Fund	1,202,000	1,657,149
15	66th Place W Street Drainage Improvements	300	50	1	Enterprise Fund	1,425,000	1,964,590
16	Central Dr Storm Drainage Improvements for Big Gulch Basin	1,050	50	1	Enterprise Fund	5,267,000	7,995,719
17	62nd Pl W/Canyon Drive Storm Drainage Improvements	600	50	1	Enterprise Fund	2,852,000	4,470,843
18	10th St and Loveland Ave Strom Drainage Improvements	200	50	1	Enterprise Fund	794,000	1,285,305
19			50	1	Enterprise Fund	-	-
20	Pipe Inspections		50	1	Enterprise Fund	629,640	754,465
21	Basin Planning		50	1	Enterprise Fund	1,561,800	1,871,425
22			50	1	Enterprise Fund	-	-
	Total Capital Projects	**$ 4,050**				**$ 26,641,824**	**$ 35,842,709**
	Total Upgrade/Expansion Projects					24,911,912	33,890,351
	Total R&R Projects					1,729,912	1,952,358
	Projects by Grants / Developer Donations	-				-	-
	Projects by Enterprise Fund	4,050				26,641,824	35,842,709

Mukilteo
Stormwater Rate and GFC
Capital Improvement Program

Project Costs and O&M Impacts in Year:	2015

TOTAL FORECASTED PROJECT COSTS

No	Description	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
1	**Stormwater Capital in 2015 Preliminary Budget**	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
2	Lighthouse Park Tidegate Stormwater Repairs	50,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	Bayview Storm Drainage Improvements	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	61st Culvery Replacement	262,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	Naketa Beach Storm Pipe Repairs & Slope Rehab	333,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	**Stormwater Capital Moved Forward from 2014**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	Smuggler's Gulch LID	302,384	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	Decant Facility	-	330,442	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	**SW Comp Plan CIP**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	Chennault Beach Drive Drainage Improvements	-	-	-	-	4,333,330	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	Mukilteo Lane Drainage Improvements	-	-	-	-	-	-	-	-	8,521,518	-	-	-	-	-	-	-	-	-	-	-
13	84th Street SW (West) Storm Drainage Improvements	-	-	-	-	-	-	-	-	-	-	1,709,538	-	-	-	-	-	-	-	-	-
14	64th Place W Street Drainage Improvements	-	-	-	-	-	-	-	-	-	-	1,657,149	-	-	-	-	-	-	-	-	-
15	66th Place W Street Drainage Improvements	-	-	-	-	-	-	-	-	-	-	1,964,590	-	-	-	-	-	-	-	-	-
16	Central Dr Storm Drainage Improvements for Big Gulch Basin	-	-	-	-	-	-	-	-	-	-	-	-	-	7,995,719	-	-	-	-	-	-
17	62nd Pl W/Canyon Drive Storm Drainage Improvements	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4,470,843	-	-	-	-	-
18	10th St and Loveland Ave Strom Drainage Improvements	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,285,305	-	-	-	-
19		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	Pipe Inspections	-	65,019	67,140	69,331	71,594	73,930	76,343	78,834	81,406	84,063	86,806	-	-	-	-	-	-	-	-	-
21	Basin Planning	-	161,277	166,539	171,974	177,586	183,381	189,365	195,544	201,925	208,515	215,319	-	-	-	-	-	-	-	-	-
22		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total Capital Projects	**$ 948,384**	**$ 556,738**	**$ 233,680**	**$ 241,305**	**$ 4,582,510**	**$ 257,311**	**$ 265,708**	**$ 274,378**	**$ 8,804,850**	**$ 292,578**	**$ 5,633,402**	**$ -**	**$ -**	**$ 7,995,719**	**$ 4,470,843**	**$ 1,285,305**	**$ -**	**$ -**	**$ -**	**$ -**
	Total Upgrade/Expansion Projects	474,192	278,369	116,840	120,653	4,457,920	128,655	132,854	137,189	8,663,184	146,289	5,482,340	-	-	7,995,719	4,470,843	1,285,305	-	-	-	-
	Total R&R Projects	474,192	278,369	116,840	120,653	124,590	128,655	132,854	137,189	141,666	146,289	151,063	-	-	-	-	-	-	-	-	-
	Projects by Grants / Developer Donations	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Projects by Enterprise Fund	948,384	556,738	233,680	241,305	4,582,510	257,311	265,708	274,378	8,804,850	292,578	5,633,402	-	-	7,995,719	4,470,843	1,285,305	-	-	-	-

Mukilteo
Stormwater Rate and GFC
Revenue Requirements Analysis

Cash Flow Sufficiency Test	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
EXPENSES																				
Cash Operating Expenses	$ 1,521,995	$ 2,010,954	$ 1,915,585	$ 1,966,620	$ 1,969,928	$ 2,023,916	$ 2,079,436	$ 2,136,532	$ 2,196,104	$ 2,256,514	$ 2,319,605	$ 2,383,530	$ 2,449,277	$ 2,518,350	$ 2,588,791	$ 2,660,685	$ 2,734,347	$ 2,810,119	$ 2,888,064	$ 2,968,246
Existing Debt Service	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
New Debt Service	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rate Funded Capital	-	750,000	1,250,000	1,500,000	1,750,000	2,000,000	2,065,265	2,132,659	2,202,253	2,274,117	2,348,327	2,424,958	2,504,090	2,585,804	2,670,185	2,757,319	2,847,297	2,940,211	3,036,157	3,135,234
Additions Required to Meet Operating Fund Balance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Expenses	$ 1,521,995	$ 2,760,954	$ 3,165,585	$ 3,466,620	$ 3,719,928	$ 4,023,916	$ 4,144,700	$ 4,269,191	$ 4,398,356	$ 4,530,631	$ 4,667,932	$ 4,808,488	$ 4,953,368	$ 5,104,154	$ 5,258,976	$ 5,418,005	$ 5,581,644	$ 5,750,330	$ 5,924,220	$ 6,103,480
REVENUES																				
Retail Rate Revenue	$ 1,334,000	$ 1,337,284	$ 1,340,576	$ 1,343,877	$ 1,347,185	$ 1,350,502	$ 1,353,826	$ 1,357,159	$ 1,360,500	$ 1,363,850	$ 1,367,207	$ 1,370,573	$ 1,373,947	$ 1,377,330	$ 1,380,720	$ 1,384,119	$ 1,387,527	$ 1,390,943	$ 1,394,367	$ 1,397,800
Other Non Rate Revenue	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Operating Fund & Debt Reserve Fund Interest Earnings	3,000	125	331	315	323	324	333	342	351	361	371	381	392	403	414	426	437	449	462	475
Total Revenue	$ 1,337,000	$ 1,337,409	$ 1,340,907	$ 1,344,191	$ 1,347,508	$ 1,350,825	$ 1,354,159	$ 1,357,501	$ 1,360,851	$ 1,364,211	$ 1,367,578	$ 1,370,954	$ 1,374,339	$ 1,377,732	$ 1,381,134	$ 1,384,545	$ 1,387,964	$ 1,391,392	$ 1,394,829	$ 1,398,275
NET CASH FLOW (DEFICIENCY)	**$ (184,995)**	**$(1,423,545)**	**$(1,824,678)**	**$(2,122,428)**	**$(2,372,419)**	**$(2,673,091)**	**$(2,790,541)**	**$(2,911,690)**	**$(3,037,505)**	**$(3,166,421)**	**$(3,300,353)**	**$(3,437,533)**	**$(3,579,029)**	**$(3,726,422)**	**$(3,877,842)**	**$(4,033,459)**	**$(4,193,679)**	**$(4,358,937)**	**$(4,529,391)**	**$(4,705,205)**
% of Rate Revenue	13.87%	106.45%	136.11%	157.93%	176.10%	197.93%	206.12%	214.54%	223.26%	232.17%	241.39%	250.81%	260.49%	270.55%	280.86%	291.41%	302.24%	313.38%	324.83%	336.62%

Coverage Sufficiency Test	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
EXPENSES																				
Total Cash Operating Expenses (less Capital Outlay)	$ 1,521,995	$ 2,010,954	$ 1,915,585	$ 1,966,620	$ 1,969,928	$ 2,023,916	$ 2,079,436	$ 2,136,532	$ 2,196,104	$ 2,256,514	$ 2,319,605	$ 2,383,530	$ 2,449,277	$ 2,518,350	$ 2,588,791	$ 2,660,685	$ 2,734,347	$ 2,810,119	$ 2,888,064	$ 2,968,246
Revenue Bond Debt Service	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Revenue Bond Coverage Requirement at 1.25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Expenses	$ 1,521,995	$ 2,010,954	$ 1,915,585	$ 1,966,620	$ 1,969,928	$ 2,023,916	$ 2,079,436	$ 2,136,532	$ 2,196,104	$ 2,256,514	$ 2,319,605	$ 2,383,530	$ 2,449,277	$ 2,518,350	$ 2,588,791	$ 2,660,685	$ 2,734,347	$ 2,810,119	$ 2,888,064	$ 2,968,246
ALLOWABLE REVENUES																				
Rate Revenue	$ 1,334,000	$ 1,337,284	$ 1,340,576	$ 1,343,877	$ 1,347,185	$ 1,350,502	$ 1,353,826	$ 1,357,159	$ 1,360,500	$ 1,363,850	$ 1,367,207	$ 1,370,573	$ 1,373,947	$ 1,377,330	$ 1,380,720	$ 1,384,119	$ 1,387,527	$ 1,390,943	$ 1,394,367	$ 1,397,800
Other Revenue	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GFC Revenue	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Interest Earnings - All Funds	3,000	138	633	1,829	3,260	646	2,526	4,583	6,807	685	3,264	685	3,793	6,962	2,195	1,006	3,062	6,466	9,935	13,471
Total Revenue	$ 1,337,000	$ 1,337,422	$ 1,341,209	$ 1,345,706	$ 1,350,445	$ 1,351,148	$ 1,356,353	$ 1,361,743	$ 1,367,307	$ 1,364,535	$ 1,370,471	$ 1,371,258	$ 1,377,740	$ 1,384,291	$ 1,382,915	$ 1,385,126	$ 1,390,589	$ 1,397,409	$ 1,404,302	$ 1,411,271
Coverage Realized	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
COVERAGE SURPLUS (DEFICIENCY)	**$ (184,995)**	**$ (673,532)**	**$ (574,375)**	**$ (620,914)**	**$ (619,483)**	**$ (672,768)**	**$ (723,083)**	**$ (774,790)**	**$ (828,797)**	**$ (891,980)**	**$ (949,133)**	**$(1,012,272)**	**$(1,071,537)**	**$(1,134,058)**	**$(1,205,876)**	**$(1,275,559)**	**$(1,343,758)**	**$(1,412,710)**	**$(1,483,761)**	**$(1,556,975)**

Maximum Revenue Deficiency	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Sufficiency Test Driving the Deficiency	*Coverage*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*
Maximum Deficiency From Tests	$ 184,995	$ 1,423,545	$ 1,824,678	$ 2,122,428	$ 2,372,419	$ 2,673,091	$ 2,790,541	$ 2,911,690	$ 3,037,505	$ 3,166,421	$ 3,300,353	$ 3,437,533	$ 3,579,029	$ 3,726,422	$ 3,877,842	$ 4,033,459	$ 4,193,679	$ 4,358,937	$ 4,529,391	$ 4,705,205
less: Net Revenue From Prior Rate Increases	-	-	(1,729,813)	(2,009,272)	(2,298,220)	(2,594,608)	(2,817,394)	(3,053,192)	(3,280,749)	(3,520,436)	(3,772,893)	(4,013,130)	(4,130,537)	(4,250,653)	(4,373,540)	(4,499,260)	(4,627,878)	(4,759,458)	(4,894,067)	(5,031,775)
Revenue Deficiency	$ 184,995	$ 1,423,545	$ 94,865	$ 113,156	$ 74,199	$ 78,483	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plus: Adjustment for State Excise Tax	2,817	21,678	1,445	1,723	1,130	1,195	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Revenue Deficiency	**$ 187,812**	**$ 1,445,223**	**$ 96,310**	**$ 114,879**	**$ 75,329**	**$ 79,678**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**

Rate Increases	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Rate Revenue with no Increase	$ 1,334,000	$ 1,337,284	$ 1,340,576	$ 1,343,877	$ 1,347,185	$ 1,350,502	$ 1,353,826	$ 1,357,159	$ 1,360,500	$ 1,363,850	$ 1,367,207	$ 1,370,573	$ 1,373,947	$ 1,377,330	$ 1,380,720	$ 1,384,119	$ 1,387,527	$ 1,390,943	$ 1,394,367	$ 1,397,800
Revenues from Prior Rate Increases	-	-	1,756,155	2,039,870	2,333,219	2,634,120	2,860,298	3,099,687	3,330,709	3,574,047	3,830,348	4,074,244	4,193,438	4,315,384	4,440,142	4,567,777	4,698,353	4,831,937	4,968,596	5,108,401
Rate Revenue Before Rate Increase (Incl. previous increases)	1,334,000	1,337,284	3,096,731	3,383,747	3,680,404	3,984,621	4,214,125	4,456,846	4,691,209	4,937,896	5,197,555	5,444,817	5,567,385	5,692,713	5,820,862	5,951,896	6,085,880	6,222,880	6,362,963	6,506,200
Required Annual Rate Increase	14.08%	108.07%	3.11%	3.40%	2.05%	2.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Number of Months New Rates Will Be In Effect	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Info: Percentage Increase to Generate Required Revenue	*14.08%*	*108.07%*	*3.11%*	*3.40%*	*2.05%*	*2.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*
Policy-Induced Rate Increases	0.00%	131.00%	9.00%	8.50%	8.00%	5.50%	5.50%	5.00%	5.00%	5.00%	4.50%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
ANNUAL RATE INCREASE	**0.00%**	**131.00%**	**9.00%**	**8.50%**	**8.00%**	**5.50%**	**5.50%**	**5.00%**	**5.00%**	**5.00%**	**4.50%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**
CUMULATIVE RATE INCREASE	**0.00%**	**131.00%**	**151.79%**	**173.19%**	**195.05%**	**211.28%**	**228.40%**	**244.82%**	**262.06%**	**280.16%**	**297.27%**	**305.21%**	**313.32%**	**321.58%**	**330.01%**	**338.61%**	**347.39%**	**356.33%**	**365.46%**	**374.77%**

Impacts of Rate Increases	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Rate Revenues After Rate Increase	$ 1,334,000	$ 3,089,126	$ 3,375,437	$ 3,671,365	$ 3,974,836	$ 4,203,775	$ 4,445,901	$ 4,679,689	$ 4,925,770	$ 5,184,791	$ 5,431,445	$ 5,553,713	$ 5,678,733	$ 5,806,567	$ 5,937,280	$ 6,070,934	$ 6,207,597	$ 6,347,337	$ 6,490,223	$ 6,636,324
Full Year Rate Revenues After Rate Increase	*1,334,000*	*3,089,126*	*3,375,437*	*3,671,365*	*3,974,836*	*4,203,775*	*4,445,901*	*4,679,689*	*4,925,770*	*5,184,791*	*5,431,445*	*5,553,713*	*5,678,733*	*5,806,567*	*5,937,280*	*6,070,934*	*6,207,597*	*6,347,337*	*6,490,223*	*6,636,324*
Additional State and City Taxes Due to Rate Increases	-	26,278	30,523	34,912	39,415	42,799	46,381	49,838	53,479	57,314	60,964	62,747	64,572	66,439	68,348	70,302	72,301	74,346	76,438	78,578
Net Cash Flow After Rate Increase	$ (184,995)	$ 302,020	$ 179,660	$ 170,148	$ 215,817	$ 137,384	$ 255,153	$ 361,002	$ 474,286	$ 597,207	$ 702,921	$ 682,860	$ 661,186	$ 636,377	$ 610,369	$ 583,053	$ 554,090	$ 523,111	$ 490,026	$ 454,742
Coverage After Rate Increase	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Mukilteo
Stormwater Rate and GFC
Fund Activity

Funds	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
OPERATING FUND Perform Transfer?	Yes																			
Beginning Balance	$ 543,651	$ 125,000	$ 330,568	$ 314,891	$ 323,280	$ 323,824	$ 332,699	$ 341,825	$ 351,211	$ 361,003	$ 370,934	$ 381,305	$ 391,813	$ 402,621	$ 413,975	$ 425,555	$ 437,373	$ 449,482	$ 461,937	$ 474,750
plus: Net Cash Flow after Rate Increase	(184,995)	302,020	179,660	170,148	215,817	137,384	255,153	361,002	474,286	597,207	702,921	682,860	661,186	636,377	610,369	583,053	554,090	523,111	490,026	454,742
less: Transfer of Surplus to Capital Fund	(233,656)	(96,452)	(195,337)	(161,759)	(215,273)	(128,509)	(246,026)	(351,616)	(464,493)	(587,276)	(692,550)	(672,351)	(650,378)	(625,023)	(598,790)	(571,235)	(541,981)	(510,655)	(477,213)	(441,561)
Ending Balance	**$ 125,000**	**$ 330,568**	**$ 314,891**	**$ 323,280**	**$ 323,824**	**$ 332,699**	**$ 341,825**	**$ 351,211**	**$ 361,003**	**$ 370,934**	**$ 381,305**	**$ 391,813**	**$ 402,621**	**$ 413,975**	**$ 425,555**	**$ 437,373**	**$ 449,482**	**$ 461,937**	**$ 474,750**	**$ 487,931**
Minimum Target Balance	*$ 125,000*	*$ 330,568*	*$ 314,891*	*$ 323,280*	*$ 323,824*	*$ 332,699*	*$ 341,825*	*$ 351,211*	*$ 361,003*	*$ 370,934*	*$ 381,305*	*$ 391,813*	*$ 402,621*	*$ 413,975*	*$ 425,555*	*$ 437,373*	*$ 449,482*	*$ 461,937*	*$ 474,750*	*$ 487,931*
Maximum Funds to be Kept as Operating Reserves	*$ 125,000*	*$ 330,568*	*$ 314,891*	*$ 323,280*	*$ 323,824*	*$ 332,699*	*$ 341,825*	*$ 351,211*	*$ 361,003*	*$ 370,934*	*$ 381,305*	*$ 391,813*	*$ 402,621*	*$ 413,975*	*$ 425,555*	*$ 437,373*	*$ 449,482*	*$ 461,937*	*$ 474,750*	*$ 487,931*
Info: No of Days of Cash Operating Expenses	*30*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*
CAPITAL FUND																				
Beginning Balance	$ -	$ 12,872	$ 302,599	$ 1,514,559	$ 2,936,527	$ 322,227	$ 2,193,748	$ 4,241,525	$ 6,455,663	$ 324,014	$ 2,893,154	$ 303,522	$ 3,401,135	$ 6,559,004	$ 1,780,671	$ 580,584	$ 2,624,414	$ 6,016,317	$ 9,473,199	$12,996,043
plus: Rate Funded Capital	-	750,000	1,250,000	1,500,000	1,750,000	2,000,000	2,065,265	2,132,659	2,202,253	2,274,117	2,348,327	2,424,958	2,504,090	2,585,804	2,670,185	2,757,319	2,847,297	2,940,211	3,036,157	3,135,234
plus: Transfers from Operating Fund	233,656	96,452	195,337	161,759	215,273	128,509	246,026	351,616	464,493	587,276	692,550	672,351	650,378	625,023	598,790	571,235	541,981	510,655	477,213	441,561
plus: Grants/ Donations / CIAC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
plus: Additional Proceeds (Costs)	727,600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
plus: General Facilities Charges	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
plus: Revenue Bond Proceeds	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
plus: PWTF Loans	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
plus: Other Low Interest Loan Proceeds	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
plus: Interest Earnings	-	13	303	1,515	2,937	322	2,194	4,242	6,456	324	2,893	304	3,401	6,559	1,781	581	2,624	6,016	9,473	12,996
Total Funding Sources	**$ 961,256**	**$ 859,337**	**$ 1,748,239**	**$ 3,177,833**	**$ 4,904,737**	**$ 2,451,059**	**$ 4,507,232**	**$ 6,730,041**	**$ 9,128,864**	**$ 3,185,732**	**$ 5,936,924**	**$ 3,401,135**	**$ 6,559,004**	**$ 9,776,391**	**$ 5,051,427**	**$ 3,909,719**	**$ 6,016,317**	**$ 9,473,199**	**$12,996,043**	**$16,585,833**
less: Capital Expenditures	(948,384)	(556,738)	(233,680)	(241,305)	(4,582,510)	(257,311)	(265,708)	(274,378)	(8,804,850)	(292,578)	(5,633,402)	-	-	(7,995,719)	(4,470,843)	(1,285,305)	-	-	-	-
Ending Capital Fund Balance	**$ 12,872**	**$ 302,599**	**$ 1,514,559**	**$ 2,936,527**	**$ 322,227**	**$ 2,193,748**	**$ 4,241,525**	**$ 6,455,663**	**$ 324,014**	**$ 2,893,154**	**$ 303,522**	**$ 3,401,135**	**$ 6,559,004**	**$ 1,780,671**	**$ 580,584**	**$ 2,624,414**	**$ 6,016,317**	**$ 9,473,199**	**$12,996,043**	**$16,585,833**
Minimum Target Balance	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*	*$ 300,000*
DEBT RESERVE																				
Beginning Balance	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
plus: Reserve Funding from New Debt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
less: Use of Reserves for Debt Service	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ending Balance	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Minimum Target Balance	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*

Appendix H

Ranking Criteria for Capital Projects

Ranking Criteria for SWMP Capital Projects					
General	Specific	Score Range	Score (0-5)	Weight	(Maximum) Weighted Score
Flood Hazard Reduction	Flooding of Public Streets	0 = no impact 3 = moderate road flooding 5 = extreme – large area affected		2.168	(10.84)
	Flooding of Properties, public or private	0 = no impact 3 = moderate, crawl spaces impacted 5 = heavy property damage		1.168	(5.84)
	Frequency of Flooding	0 = no impact 3 = once every 2 years 5 = 3 to 4 times per year		1.168	(5.84)
	City Responsibility	0 = none 3 = city contribution to the problem is $^1/_3$ to ½ 5 = City is primarily responsible for problem		2.168	(10.84)
Environmental Protection/Improvement	Stream bank Erosion	0 = no impact 3 = visible stream bank erosion in stream 5 = hillside erosion with impacts to stream channel		1.168	(5.84)
	Hillside Erosion	0 = no impact 3 = visible hillside erosion 5 = hillside erosion with impacts to stream channel		1.168	(5.84)
	Water Quality	0 = no water quality concerns 3 = minor water quality concerns 5 = measurable water quality concerns		.168	(.84)
	Freshwater Habitat (as identified in MMC 17B.52C.080 Table 1)	0 = no impact 1 = Type 5 2 = Type 4 3 = Type 3 4 = Type 2 5 = Type 1		.168	(.84)
Community Considerations	Aesthetics	0 = no impact 3 = occasional aesthetic impacts (appearance or smell) 5 = constant aesthetic impacts (appearance or smell)		.168	(.84)
	Socioeconomic Consideration (only apply to residential areas)	0 = no impacts 3 = moderate potential for improvement to benefit *economically disadvantaged areas 5 = project directly supports *economically disadvantaged areas * Economically disadvantaged areas are those areas where residents meet the qualifications for low-income senior citizens and low-income disabled citizens set forth in RCW 74.38.070 (and are utilizing the requirements in MMC 13.16.030 D)		.168	(.84)

	Complaint History	0 = 0 - 1 citizen complaint 3= 3 - 5 different citizen complaints 5 = more than 5 different citizen complaints		1.168	(5.84)
	Community Support	0 = unknown 3 = moderate amount of support for project within the basin 5 = 100% support for project within the basin affected by the project		2.168	(10.84)
Maintenance	Reduced Maintenance (Based on NPDES requirements)	0 = project requires additional maintenance above what is currently being done 3 = project reduces annual maintenance 5 = project has very infrequent annual maintenance requirements		1.168	(5.84)
	Cost of Operation and Maintenance (O & M)	0 = O & M cost significantly higher 3 = O & M costs are reduced by 50% 5 = O & M costs are reduced by 75%		1.168	(5.84)
Risks	Cost Implications	0 = no effect 3 = costs associated with interim projects or maintenance to keep system functioning before long term fix can be applied 5 = costs associated with interim projects or maintenance to keep system functioning and the future cost will be an order of magnitude higher than doing the project now		1.168	(5.84)
	Public Safety	0 = not applicable 3 = project will result in moderate risk reduction for public safety 5 = project will significantly decrease risk of catastrophic consequences for public safety		2.168	(10.84)
	Railroad Impacts	0 = no effect 3 = project has moderate potential to reduce potential impacts to railroad 5 = project directly reduces on-going impacts to railroad		.168	(.84)
	Landslide Mitigation	0 = no effect 3 = in mapped landslide area (LM) 5= known active landslide		1.168	(5.84)