STORMWATER MANAGEMENT ELEMENT

INTRODUCTION

This section of the Irondale and Port Hadlock Urban Growth Area (UGA) Plan summarizes the Irondale & Port Hadlock Urban Growth Area Stormwater Management Plan. The UGA Stormwater Management Plan was developed in conformance with the guidance provided by Jefferson County Comprehensive Plan *Appendix G: Review of Drainage, Flooding, Stormwater Management Issues and Polluted Discharges*. The UGA Stormwater Management Plan provides analysis and recommendations to guide the provision of appropriate stormwater management facilities and programs for the UGA. The goal of the Plan is to preserve the natural hydrologic regime within the UGA drainage basins, particularly Chimacum Creek and to minimize the adverse effects on surface and ground water quality and quantity and on aquatic resources and habitats from stormwater runoff generated within the UGA.

BACKGROUND AND METHODS

General Methodology

The UGA Stormwater Management Plan analyzes existing and projected impervious surface, drainage patterns, and runoff water quality and quantity. It identifies appropriate stormwater management facilities and Best Management Practices, operation and maintenance activities, and programs for the UGA. It also presents funding options and a Capital Improvement and Program Plan.

Urban Level of Service Standard

The Washington State Department of Ecology *2001 Stormwater Management Manual for Western Washington* provided the technical basis for the analysis and recommendations in the UGA Stormwater Management Plan. Jefferson County has previously adopted the standards of the *Stormwater Management Manual* in its Unified Development Code. The *Stormwater Management Manual* provides an urban level of service standard that is appropriate for new development and redevelopment in the Irondale and Port Hadlock UGA. Where technically and financially feasible, the *Stormwater Management Manual* will provide the technical standard for retrofitting and replacing existing facilities. Jefferson County has previously adopted the Washington Department of Transportation *Hydraulics Manual* and *Highway Runoff Manual* as the appropriate stormwater management standards for transportation facilities.

Zoning Districts

The drainage analysis in the Plan is based on the proposed UGA Zoning Districts and development projections for the UGA.

Population and Growth Projections

Population and growth projections assume a 2.76% growth rate as adopted by the Jefferson County Board of County Commissioners. The Stormwater Management Plan assumes that with population growth will come a one-to-one increase in impervious area, which is the primary driver in stormwater management. This assumption is conservative since a portion of population growth will be accommodated by multi-family residential development that typically generates less impervious surface per resident than single family residential development.

STORMWATER MANAGEMENT

Existing Conditions

Soils in the UGA are generally sandy and gravelly with high infiltration rates. As a result there is minimal surface flow from impervious surfaces and very few drainage problems. Because of the high rate of infiltration, water quality treatment is necessary to protect groundwater from contaminated stormwater runoff.

The analysis conducted for the UGA Stormwater Management Plan identified two locations in the UGA where significant quantities of stormwater runoff are discharged directly to Port Townsend Bay: the outfall from the Port Hadlock Core storm sewer system and the Moore Street conveyance system in Irondale. There is not significant direct stormwater runoff from the UGA to Chimacum Creek, but the Creek does receive groundwater flows originating from infiltration within the UGA.

Existing Stormwater Management Facilities
Existing stormwater management facilities primarily employ direct infiltration. County Roads typically use drywells and infiltration chambers in the rights-of-way. Private developments use on-site infiltration ponds and trenches. The only existing storm sewer system within the UGA is in the Port Hadlock Core.

Water Quality Sampling
Jefferson County conducted water quality sampling at the outfalls of the Port Hadlock Core storm sewer system and Moore Street. The sampling showed that stormwater runoff contained typical pollutants from urban land uses. The complete sampling results are presented in Chapter 3 of the UGA Stormwater Management Plan. The Capital Improvements Plan proposes providing water quality treatment facilities at both of these locations.

The Jefferson County Conservation District conducts a water quality monitoring program at numerous sites on Chimacum Creek, including two sites immediately upstream from the UGA and one site downstream from the Irondale Road. Parameters include dissolved oxygen, temperature, conductivity, pH, nitrate-nitrogen, total phosphorus, total suspended solids, turbidity, and fecal coliform. Water quality standards for several of these parameters are exceeded at several sites. Numerous sources of water quality degradation have been identified upstream of the UGA, including forestry, agriculture, and livestock activities. The analysis conducted for the UGA Stormwater Management Plan did not identify stormwater runoff from the UGA is a significant contaminant source.

Future Needs
New development and redevelopment will be required to comply with the stormwater management standards of the Jefferson County Unified Development Code. It is expected that new development and redevelopment will continue the use of on-site infiltration to manage stormwater runoff. New development and redevelopment will also need to provide runoff treatment as appropriate. Retrofitting existing stormwater management systems to provide adequate treatment and capacity are the primary capital improvements identified in the Plan.

Identified projects include conveyance improvements and water quality treatment for the Port Hadlock Core and Moore Street. Other anticipated costs include facility operation and maintenance and stormwater management programs such as education, facility inspection, water quality monitoring, and stream gauging.

Flow Control (Water Quantity)
Infiltration will remain the primary means of flow control in the UGA. New development and redevelopment connecting to an existing system may need to provide detention and a controlled release rate to prevent over-taxing the system. The *Stormwater Management Manual* will provide technical standards for flow control for new development and redevelopment. The Washington Department of Transportation *Hydraulics Manual* and *Highway Runoff Manual* will provide the appropriate flow control standards for transportation facilities.

Water Quality Treatment
Water quality treatment will be required for all new development and redevelopment in accordance with the *Stormwater Management Manual*. Water quality sampling conducted for the UGA Stormwater Management Plan indicates that the stormwater runoff from the Port Hadlock Core storm sewer system and Moore Street conveyance system contain typical pollutants found in urban stormwater. These facilities currently do not provide treatment before discharge. Retrofitting these systems to provide treatment is addressed in the Capital Improvements Plan. The Washington Department of Transportation *Hydraulics Manual* and *Highway Runoff Manual* provide the appropriate water quality treatment standards for transportation facilities.

Operation and Maintenance
Anticipated operations and maintenance expenditures and funding sources for County drainage facilities in the UGA are provided in the Capital Improvements and Program Plan. The owners of private developments are responsible for maintaining and repairing their onsite stormwater management facilities. The Stormwater Management Program includes an inspection program to ensure that private facilities are adequately maintained and repaired

Stormwater Management Program
Minimizing the adverse effects of stormwater runoff from new development and redevelopment in the UGA will also require developing and implementing a UGA Stormwater Management Program. The Program should include inspection of stormwater management facilities, public education activities, water quality monitoring, and stream gauging on Chimacum Creek. Anticipated expenditures and funding sources are provided in the Capital Improvements and Program Plan below.

The Jefferson County Conservation District currently conducts water quality monitoring on Chimacum Creek at two sites immediately upstream from the UGA and one site downstream from the Irondale Road. The District has stated that due to projected revenue constraints, it may be necessary to find new revenue in order to continue this activity. The cost of this activity is included in the Stormwater Management Program funding.

The Jefferson County Natural Resources Division currently conducts stream gauging that is funded by a grant from the Washington Department of Ecology. It is anticipated that this funding will continue for the foreseeable future. This activity is included in the Stormwater Management Program to provide an accounting of the total program costs, but would not be funded through the UGA Stormwater Management Program.

GOALS AND POLICIES

SWM Goal 1.0 – Minimize the adverse effects on ground and surface water quality and protect aquatic resources and habitats from stormwater runoff generated within the Irondale and Port Hadlock UGA.

> ***Discussion:*** *The goal of minimizing stormwater runoff impacts from development is to allow the natural water cycle to continue with minimum interruption by development. The natural hydrologic cycle is disrupted by development and without adequate mitigation, problems such as flooding, pollution, reduction in base flows, and reduced aquifer recharge are exacerbated.*

SWM Policy 1.1 – Manage stormwater runoff in the UGA in compliance with the Jefferson County Comprehensive Plan and Unified Development Code and consistent with the guidance of the Puget Sound Water Quality Management Plan.

Discussion: *Jefferson County Comprehensive Plan and Unified Development Code provide the framework for regulating development and managing stormwater runoff. The UDC provides specific requirements for development that are intended to mitigate development impacts. The Puget Sound Water Quality Management Plan provides overall policy guidance for areas draining to Puget Sound.*

SWM Policy 1.2 – Use the technical standards from the Washington Department of Ecology *Stormwater Management Manual for Western Washington* to manage stormwater within the Irondale and Port Hadlock UGA.

Discussion: *The 2001 DOE Stormwater Management for Western Washington provides technical resources for stormwater management. The Manual meets requirements of the Puget Sound Water Quality Management Plan and NPDES Phase II program requirements. Although Jefferson County and Irondale/Port Hadlock are not defined as a Phase II community, the program requirements provide both technical and programmatic guidelines that will improve stormwater management and reduce potential risk of take under the federal Endangered Species Act.*

SWM Policy 1.3 – Develop and implement an Irondale and Port Hadlock UGA Stormwater Management Program.

Discussion: *The development of the Irondale/Port Hadlock UGA Stormwater Management Program will provide for public participation and education, facility inspections and maintenance, and funding for stormwater management programs. The Irondale/Port Hadlock UGA Stormwater Management Program is modeled after the NPDES Phase II permit requirements from the Federal Clean Water Act.*

SWM Policy 1.4 – Increase the public's knowledge of stormwater runoff issues and support public involvement in stormwater management by developing and implementing a Stormwater Management Public Education component of the Irondale and Port Hadlock Stormwater Management Program.

Discussion: *See discussion of Policy 1.3 above. Education of the public can provide significant improvement to stormwater management. Rather than rely on regulation alone (which only addresses new development), education of the public can improve existing conditions within the UGA.*

SWM Policy 1.5 – Ensure the continued operation of stormwater management facilities by developing and implementing a Stormwater Management Facility Operation and Maintenance component of the Irondale and Port Hadlock Stormwater Management Program.

Discussion: *Facility inspection, operation, and maintenance are key elements of preventing pollution and conveyance problems such as flooding. Stormwater management system failures are often not even recognized until a significant event occurs, which can lead to flooding, property damage, pollution discharges, and potential loss of life.*

SWM Policy 1.6 – Ensure that stormwater management activities are effective by developing and implementing a Water Quality Monitoring and Stream Gauging component of the Irondale and Port Hadlock Stormwater Management Program.

Discussion: *Adaptive management must, of necessity, include monitoring and feedback to see if implemented programs and facilities are providing the level of service intended. Water Quality monitoring and stream gauging will provide the data necessary to appropriately manage the system.*

SWM Policy 1.7 – Develop a stable and equitable revenue source to fund an Irondale and Port Hadlock UGA Stormwater Management Program.

> ***Discussion:*** *Multiple studies have concluded that lack of maintenance of facilities and dedicated resources are the prime reason for failures within stormwater systems. Existing County revenues are not adequate to fund a UGA Stormwater Management Program.*

SWM Policy 1.8 – Maintain an inventory of public and private stormwater management facilities within the UGA.

> ***Discussion:*** *Jefferson County has developed an inventory of stormwater management facilities as a component of the UGA Stormwater Management Plan. The inventory needs to be updated as new facilities are provided. An accurate and current mapping system meets Phase II requirements as discussed for Policies 1.2 and 1.3. This system facilitates implementing adaptive management, operations and maintenance.*

SWM Policy 1.9 – Join with State and local agencies and private landowners to plan, finance, and construct regional stormwater management facilities and to remediate existing stormwater management deficiencies.

> ***Discussion:*** *Regional stormwater management facilities may be less expensive and more effective than facilities provided to serve individual developments. Remediating existing deficiencies will require cooperation by all the affected parties.*

SWM Policy 1.10 – Minimize adverse stormwater impacts and preserve aquifer recharge by encouraging Low Impact Development design strategies.

> ***Discussion:*** *Low Impact Development offers an innovative approach to urban stormwater management that does not rely on the conventional end-of-pipe or in-the-pipe structural methods but rather integrates stormwater management through out the developed landscape.*

STORMWATER MANAGEMENT CAPITAL IMPROVEMENTS AND PROGRAM PLAN

The Capital Improvements and Program Plan includes capital improvement projects, facility operations and maintenance, and program activities. The Plan would continue to fund capital improvement projects for facilities located within County Road rights-of-way in the Transportation Improvement Program. Operation and maintenance of drainage facilities located within County Road rights-of-way would continue to be funded out of the County Road operations budget. The Plan recommends funding capital improvements to the Port Hadlock Core storm sewer system and Stormwater Management Program activities through stormwater management fees.

Stormwater management fees are authorized in RCW 36. They would be assessed based on an individual parcel's impervious surface area measured in Equivalent Residential Units (ERUs). All single-family residential parcels would be assumed to have 2,000 square feet of impervious surface or one Equivalent Residential Unit. ERUs for commercial and industrial designated parcels would be calculated by dividing the total area of impervious surface by 2,000. County Roads and State Highways within the UGA would also be assessed a stormwater fee based on their ERUs. There are currently a total of 5,244 ERUs in the UGA.

The Plan proposes that public roads and private parcels that discharge to the Port Hadlock Core storm sewer system would be assessed to construct a treatment facility for the system in 2005 and to replace the outfall in 2011. The treatment facility would cost approximately $10,220. There are currently 453 ERUs that discharge to the outfall. The cost per ERU to provide a treatment system would be $22.56. The estimated cost to replace the outfall in 2011 would be $167,700. The Stormwater Management Plan anticipates 477 ERUs discharging to the Port Hadlock Core system in 2011. The cost per ERU to replace the outfall would be $351.56. These would be one-time assessments.

The Plan proposes implementing an ongoing UGA-wide Stormwater Management Program that would conduct public education and outreach activities and water quality monitoring. The annual cost is expected to be approximately $15,000. The Plan presents two options for funding the Program.

Option 1:
Option 1 assumes that all developed parcels in the UGA, including single-family residences, contribute stormwater runoff and have potential water quality impacts. Therefore all developed parcels should pay an annual fee based on their ERUs to fund the UGA-wide Stormwater Management Program. There are currently 5,244 ERUs. The annual Option 1 UGA-wide Program cost per ERU would be $2.86.

Option 2:
Option 2 assumes that the UGA designation will significantly benefit only those parcels that are designated for commercial, industrial, and multi-family development. Therefore only those parcels should pay an annual fee based on their ERUs to fund the UGA-wide Stormwater Management Program activities. Single-family residential parcels would not be assessed a fee. There are currently 1,429 ERUs on commercial, industrial, and multi-family designated parcels. The annual Option 2 UGA-wide Program cost per ERU would be $10.50.

The Plan proposes implementing an ongoing UGA Commercial Area Program to fund inspection of stormwater management facilities in those designations. Parcels designated for commercial, industrial, and multi-family development would be assessed an annual fee. The inspection program cost would be approximately $10,000 per year. There are 1,429 ERUs on commercial, industrial, and multi-family designated parcels. The annual inspection program cost per ERU would be $7.00.

The following table summarizes the projected expenditures and revenue sources for stormwater management within the UGA.

Irondale and Port Hadlock UGA Stormwater Management Plan
Capital Improvements Expenditures and Funding: 2005 - 2024

Capital Improvement Projects	2004 Cost	Year Planned	2005-2010 Cost*	2011-2024 Cost*	Funding Source / Notes
Moore Street Drainage	$208,000	2011		$ 321,426	Transportation Improvement Program
Moore Street Outfall	$ 42,000	2005	$ 42,000		TIP, WA Dept. of Fish and Wildlife
Replace 25 Drywells in County Roads	$375,000	2005-2024	$140,237	$ 353,497	TIP
Port Hadlock Core Water Quality Treatment Facility	$ 10,000	2005	$ 10,220		
Port Hadlock Core ERUs			453		Existing Port Hadlock Core ERUs
Port Hadlock Core Treatment Cost per ERU			**$22.56**		**SWM Fee-Port Hadlock Core**
Port Hadlock Core Conveyance Replacement	$144,000	2011		$ 167,694	
Port Hadlock Core ERUs				477	Projected 2011 Port Hadlock Core ERUs
Port Hadlock Core Project Cost per ERU				**$351.56**	**SWM Fee-Port Hadlock Core**

* Adjusted for 2.2 percent inflation rate

Irondale and Port Hadlock UGA Stormwater Management Plan
Program Plan Expenditures and Funding: 2005 - 2024

Program Activities	2004 Cost	Year Planned	2010 Annual Cost*	2024 Annual Cost*	Funding Source / Notes
Programs – Commercial, Industrial, and MFR Areas					
SWM Facility Inspection	$ 10,000	Annual	$ 11,395	$ 15,453	
Commercial, Industrial, and MFR Area ERUs	1,429		1,516	2,489	
Commercial, Industrial, and MFR Area Annual Program Cost / ERU	$7.00		$7.52	$6.21	**SWM Program Fee – Commercial, Industrial, and MFR Areas**
Programs - UGA-wide					
Public Education	$10,000	Annual	$ 11,395	$ 15,453	SWM Program Fee options
Sampling and Water Quality Monitoring	$ 5,000	Annual	$ 5,697	$ 7,727	Jefferson County Conservation District
Stream Gauging - Chimacum Creek	($ 5,000)	Annual	($ 5,697)	($ 7,727)	JC Natural Resources - Ecology grant
Total	$15,000		$ 17,092	$ 23,180	SWM Program Fee options
Option 1: Assess Program Costs to All ERUs in UGA					
Total ERUs in UGA	5,244		5,810	8,168	
Option 1 Annual Cost per ERU	**$2.86**		**$2.94**	**$2.84**	**SWM Program Fee - All UGA**
Option 2: Assess Program Costs to Commercial, Industrial, and Multi-family Residential ERUs					
ERUs in Commercial, Industrial, and MFR Designations	1,429		1,516	2,489	Existing and projected ERUs
Option 2 Annual Cost per ERU	**$10.50**		**$11.27**	**$9.31**	**SWM Program Fee – Commercial, Industrial, and MFR Areas**

* Adjusted for 2.2 percent inflation rate