

Mason County

Update of County's  
Stormwater Policies/Regulations  
and Development of  
Comprehensive Stormwater  
Management Plans

Belfair Urban Growth Area  
Stormwater Management  
Plan



*Submitted to:*  
Mason County  
Department of Public Works  
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Shelton, WA 98584

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# Transmittal

Mason County

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## Preface

### Belfair Urban Growth Area Stormwater Management Plan

This document, entitled Belfair Urban Growth Area Stormwater Management Plan, has been prepared by Mason County in response to a request from the Western Washington Growth Management Hearings Board to enhance and provide additional information as to the need, cost, funding, and schedule for implementation of stormwater management infrastructure improvements over the next six years within the Belfair Urban Growth Area of Mason County, as described in the County's 2005 Comprehensive Land Use Plan.

The final Belfair UGA Stormwater Management Plan document will go through extensive local public review, consisting of public meeting(s), a public hearing, and review and approval by the County Board of Commissioners prior to its submittal to the State Boundary Review Board on August 6, 2007. Public comments will be addressed and incorporated into this Plan, as appropriate. This is the initial draft of that document.

## Acknowledgements

### Mason County

#### Update of County's Stormwater Policies/Regulations and Development of Comprehensive Stormwater Management Plans

#### Belfair Urban Growth Area Stormwater Management Plan

#### Mason County Board of Commissioners

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Tim Sheldon—District 2  
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## Executive Summary

Mason County has been requested by the Western Washington Growth Management Hearings Board to develop and submit an expanded Stormwater Management Plan (SWM Plan) for the Belfair Urban Growth Area (UGA). The purpose of this plan is to identify the stormwater related infrastructure needed to support continued urban and economic development (as defined in the County's 2005 Comprehensive Plans) of the Belfair UGA, and to avoid water quality and habitat impacts associated with unmanaged stormwater runoff.

The recommended plan includes a combination of programmatic activities and capital improvement projects. The total cost for the SWM Plan is \$7,587,000 over the next 26 years, \$6,087,000 in programmatic costs and \$1,500,000 in capital improvement costs. Average annual SWM costs for years 1-6 is \$398,000 per year, including an annual capital appropriation of \$100,000 for future capital projects. The average annual SWM programmatic (and short term CIP) cost decreases to \$304,000 per year for years 7-26, due to the higher initial start up costs required within the first six years of the development of the Belfair SWM Plan.



Photo 1—SR 300 Crossing the Union River

### Future Growth Within the Belfair UGA

Population growth estimates documented in The Belfair Urban Growth Area Plan, prepared for Mason County, estimate population in the Belfair UGA will grow from the current population of approximately 900 to a population of 2,000 to 4,000 people over the next seven to thirteen years (this range reflects the findings of two different studies referenced in

the Belfair UGA plan). To support the estimated population increase in both residential development and commercial/industrial development, depending on the availability of employment throughout the region, are anticipated. Growth and development will occur according to proposed future zoning.

### **Existing Drainage System**

Existing drainage facilities within the UGA are primarily associated with SR 3, county roads and commercial development adjacent to SR 3. These facilities consist of road culverts, roadside ditches, onsite water quality and infiltration systems. They complement and work in concert with the natural elements of the drainage system.

Twelve of the twenty culverts evaluated have adequate capacity under the conservative assumptions used in the analysis. Two culverts are just at capacity and may be satisfactory with a design HW/D of 1.5. Six culverts are recommended for future investigation by County maintenance staff as capacity problems have not been reported at these locations. This could be done as part of the monitoring program included as part of this plan.

### **Existing Water Quality, Habitat, and Shellfish**

Mason County is dedicated to protecting and improving existing water quality, habitat, and shellfish conditions in the Belfair UGA. This document recommends the adoption of the 2005 Department of Ecology Stormwater Manual and a Low Impact Development (LID) ordinance; both of which encourage LID techniques and require enhanced water quality standards for new developments and redevelopments.

### **Belfair UGA Stormwater Management Plan**

The drainage infrastructure needed to support development within the Belfair UGA, growth over the next six years and ultimate buildout, has been identified and proposed for implementation in the following Belfair UGA Stormwater Management Plan. Costs and priorities for implementation have been identified for both the short-term (six year planning period) as well as long-term future (ultimate development over the next twenty-six years) planning periods.

## Short-Term Infrastructure Needs

The existing system of ditches, culverts, swales, and streams provides an adequate level of service for the 25 year storm event, as confirmed by the lack of drainage complaints and local flooding observations. In the future, water quality treatment and infiltration or detention facilities to control future flow rates will be provided by developers. No new stormwater facilities have been proposed for the short-term.

## Long-Term Infrastructure Needs for Ultimate Buildout

Long-term activities (7 – 26 years) include one proposed CIP project and one potential CIP project (Activity #10) as outlined below.

### Activity #9: CIP No. 1—Belfair Creek Relocation and Fish Passage Improvements

- Perform final design, right-of-way/property acquisition and construction of the Belfair Creek relocation and fish passage improvement project defined by Activity #8 (Annual Monitoring Program).

### Activity #10: CIP No. 2—Sweetwater Creek Fish Passage Improvements

- If this project is determined viable based on the investigation of the habitat study proposed in Activity #7, perform final design, right-of-way/property acquisition and construction of the Sweetwater Creek fish passage improvement project defined in Activity #7 (Sweetwater Creek pre-design study).

## SWM Programmatic Elements: Priorities and Costs

Recommended SWM Programmatic elements are summarized along with annual costs in Table E-1. These activities represent an enhancement of the County's existing SWM Program within the Belfair UGA. They emphasize the need to control/guide new development, enhance maintenance where needed, conduct focused water quality monitoring and initiate a local public involvement/education program. Annual costs for these SWM Programmatic Elements averages \$258,000 per year.

# Executive Summary

Continued

**Table E-1—Recommended SWM Programmatic Elements and Costs**

SWMP Element	Recommended Action	Satisfies Program Needs			Costs (\$1,000's)						
		PSWQ MP	NPDES Phasell Permit	WQ Habitat Shellfish	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Total
1	<b>Public Education*</b> - SWM (LID) Brochure	X	X	X	\$5	\$5	\$5	\$5	\$5	\$5	\$30
2	<b>Public Involvement*</b> - Organize Volunteers/Mtgs	X	X	X	\$25	\$25	\$25	\$25	\$25	\$25	\$150
3	<b>Illicit Discharges (IDDE)</b> - Facility Inventory & Mapping	X	X	X	\$0	\$25	\$25	\$0	\$0	\$0	\$50
4	<b>New Development</b> - Ordinance - 05 DOE Manual	X	X	X	\$25	\$25	\$0	\$0	\$0	\$0	\$50
	- Ordinance - LID										
	- Training - 05 Manual	X	X		\$25	\$25	\$0	\$0	\$0	\$0	\$50
	- Training - LID										
	- Annual Review of O/M	X	X	X	\$0	\$10	\$10	\$10	\$10	\$10	\$50
5	<b>Maintenance</b> - Annual Plus Enhancements	X	X	X	\$25	\$25	\$35	\$35	\$35	\$35	\$190
6	<b>SWM Program*</b> <b>Implementation</b> - Develop Tracking System	X	X		\$15	\$15	\$10	\$10	\$10	\$10	\$70
	- Annual Program Evaluation	X	X		\$0	\$10	\$10	\$10	\$10	\$10	\$50
7	<b>TMDLs</b>		X	X	\$0	\$0	\$0	\$0	\$0	\$0	\$0
8	<b>SWM Program Monitoring</b> (Addressed in Element #6)	X	X		\$0	\$0	\$0	\$0	\$0	\$0	\$0
9	<b>Reporting*</b> (Internal)		X		\$10	\$10	\$10	\$10	\$10	\$10	\$60
10	<b>Basin Planning</b> (Part of current Co. study.)	X		X	\$0	\$0	\$0	\$0	\$0	\$0	\$0
11	<b>Funding</b> - Develop SWM Utility	X			\$50	\$50	\$0	\$0	\$0	\$0	\$100
	- SDC Feasibility Study	X			\$50	\$50	\$0	\$0	\$0	\$0	\$100
12	<b>WQ Monitoring</b> - Annual WQ Monitoring	X		X	\$100	\$100	\$100	\$100	\$100	\$100	\$600
	Total:				\$330	\$375	\$230	\$205	\$205	\$205	\$1550
	*Future County Staff (~ 1 FTE)				\$55	\$55	\$50	\$50	\$50	\$50	\$310
	Outside Services				\$275	\$320	\$180	\$155	\$155	\$155	\$1240

## Costs and Implementation

It is likely that the biggest challenge facing the County in the development and implementation of the Belfair Stormwater Management Plan will be the development of the needed revenue within the required timeframe.

### Costs: Funding and Timing

#### Implementation Priorities and Schedule Determine Revenue Needs

Although difficult to predict, an attempt has been made to identify the priority and timing of future activities and capital projects in order that future revenue needs can be established. The Comprehensive SWM Program for the Belfair UGA has been created by integrating the capital needs/costs (as identified in Section 7) with the programmatic and regulatory compliance needs/costs (presented in Section 8). The resulting SWM Plan that allows the Comprehensive SWM Program to be realized is presented below in Table E-2.

The total cost for the SWM Plan is \$7,587,000 over 26 years. The average annual SWM cost for years 1-6 is \$398,000 per year, \$298,000 for programmatic (\$258,000) and short term CIP(\$40,000) and \$100,000 for future capital projects. This annual capital allocation will increase annual SWM costs to \$398,000 per year for the first six years of the SWM Program. The average annual SWM cost decreases to \$304,000 per year for years 7-26, due to the higher initial start up costs required within the first six years of the development of the Belfair SWM Program.

(Note that future SWM programmatic costs beyond year six are likely to increase beyond the \$215,000, which was used in determining the cost for the entire SWM Program (programmatic costs) over the next twenty six year planning period.

## Executive Summary

Continued

<b>Table E-2—Financial Plan for the Belfair Stormwater Management Plan</b>											
<b>Annualized Revenue Needs Over the Planning Period</b>											
Relative Priority for Implementation	Schedule & Costs by Years (\$1000s)										
	1	2	3	4	5	6	10	15	20	26	Total
Short-Term Activities: <i>(See Tables 7.1 &amp; 8.1)</i>											
SWM Programmatic Needs*	\$330	\$375	\$230	\$205	\$205	\$205	\$820	\$1025	\$1025	\$1230	\$5,650
Short-Term CIP	\$32	\$56	\$54	\$65	\$15	\$15	\$40	\$50	\$50	\$60	\$437
Long-Term CIP	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1500	\$0	\$0	\$1,500
Total:**	\$362	\$431	\$284	\$270	\$220	\$220	\$860	\$2575	\$1075	\$1290	\$7,587
*Future County Staff	\$87	\$86	\$65	\$65	\$65	\$65	\$240	\$300	\$300	\$360	\$1633
Outside Services	\$275	\$345	\$219	\$205	\$155	\$155	\$620	\$2275	\$775	\$930	\$5954

Notes:

- \*Year 6 costs for Programmatic Needs (including \$10K for annual culvert inspections) were assumed to remain constant for years 7-26 at about \$215K/year.
- \*\*Average annual SWM cost for years #1-6 is \$1.79M/6 years = \$298K per year.
- If an additional annual appropriation of \$100,000 is made for future CIP, the annual SWM cost is \$398K per year.
- Short term culvert flow monitoring has been continued from year 7 through year 26 at \$10K per year.
- Belfair Creek realignment/channel improvement project is scheduled for year 15 when adequate local funding allows construction. A capital appropriation of \$100,000 (not shown in the table) would allow a fund balance for future capital construction to accumulate to a level that would allow construction, unless grant funding is procured prior to year 15.
- Annual Funding allows the hiring of one full time County staff person to oversee and implement the plan.

For this analysis, the six and twenty six year planning periods have been selected to present the proposed SWM Plan, as shown below. This planning period allows one capital stream improvement project to be built after an initial six year period of primarily SWM programmatic and regulatory compliance enhancements have been initiated. The long term capital program totals \$1.5M, and averages about \$100,000 annually if CIP funding is initiated in the first year of SWM Program implementation. *Note that the additional annual allocation of \$100,000 has not been included in Table 9-1 under programmatic or short term CIP needs.*

## Summary of SWM Plan Costs

### Short Term SWM Plan Elements: Years 1-6 (to 2013)

#### Capital Project Needs

- Capital projects in the short term average about \$40,000 per year and consist of the following activities:
  - #1- routine coordination with WSDOT to ensure an adequate level of maintenance is being provided and Mindy Creek culvert project is included in the SR3 widening project,
  - #2 - routine monitoring and maintenance of culverts by County staff,
  - #3 - coordination with WSDOT on SR3 streetscape water quality improvements,
  - #4 – coordination with WSDOT re. joint use facilities as a part of the SR 3 project,
  - #5 – coordination with County Roads re. future LID improvements,
  - #6 – coordination with County Parks re. incorporating LID into their future capital projects,
  - #7 – conducting Sweetwater Creek Fish Passage Study, and
  - #8 – conducting Belfair Creek Fish Passage Study.

#### Programmatic Activity Needs

- Programmatic and regulatory compliance needs in the short term include various activities ranging from public education/involvement to water quality monitoring, and include the adoption of new ordinances, development of new funding mechanisms, and completion of the inventory and GIS mapping of existing drainage facilities. Costs have been estimated to be about \$258,000 annually.

### Long Term SWM Plan Elements: Years 7-26 (to 2033)

#### Capital Project Needs

- Capital projects in the long term total \$1.5M for the relocation and reconstruction of the Belfair Creek channel. Costs are estimated to be about \$100,000 annually (over the next 15 years). This annual capital appropriation of \$100,000 should be continued throughout years 16-26 for the construction of other future capital projects.

#### Programmatic Activity Needs

- Programmatic and regulatory compliance needs beyond year six have been estimated at this time. For planning purposes, Year 6 costs were assumed to remain constant over Years 7-26 at about \$215 per year. It is likely, however, that the County will have been issued a Phase II NPDES Permit by that time and it is also likely that annual programmatic activities and related costs will at least double during the next few years.  
*(Note that it is possible that they could go even higher in order to meet the increased needs of water*

*quality protection and possibly restoration that may require retrofitting and/or replacing of existing older facilities.)*

## Potential Sources of Funding

Discussions with the County suggest that there are several financial options that should be considered. A preliminary review of these potential funding sources suggests that multiple sources of funding will likely be needed; no single funding mechanism will likely be adequate by itself. Funding sources that are currently being considered include:

- Formation of a *Local Drainage/ Stormwater Improvement District*.
- *Real Estate Excise Tax (REET) Funding*, which currently amounts to about \$750K per year.
- *Annual County Portion of State Sales Tax* which has recently been raised from .08% to .09%; this will amount to about \$450K per year with the recent increase to 0.09 per cent.
- *Public Sector Funding*, such as grants and low interest loans from the State (Ecology or the Puget Sound Action Team) or federal government, including federal 319 Water Quality Grants, and the State Public Works Trust Fund and State Revolving Fund.
- Formation of a *Local Stormwater Utility* throughout the Belfair UGA.
- Continued collection and use of *developer fees* to review and approve plans for new development and re-development, as well as conducting inspection and enforcement in the field.
- *System Development Charges (SDCs)*.
- *SEPA Mitigation Funds*.
- *Partnering* with prospective developers, land owners and other State agencies.
- Other potential, but less likely sources of direct internal County funding, include the General Fund, Road Fund, Park Fund and the Utility (Sewer) Fund.

From this list of ten potential sources of funding, the most likely sources of new future funding in relative order of priority are the following:

1. Forming a **stormwater utility** to support monitoring and other programmatic activities.
2. Ensuring **developer and permit fees** are adequate to support development review, inspection, and enforcement services.
3. Using project related **SEPA mitigation** funding to support capital projects, especially those required by an increase in capacity within a regional conveyance system.
4. Establishing **System Development Charges** for new growth-related capital drainage projects; another good source of funding for regional conveyance systems.
5. Annually appropriating a portion of Annual State **Sales Tax Returns**.

6. Securing periodic appropriations from **REET funding** for either capital or program needs.
7. Obtaining capital project funding, from **future road, park, and/or utility projects** with common objectives that include stormwater management opportunities.

### Estimate of Potential Annual Revenues

#### Funding Source #1: Stormwater Utility

*Type/Source of Funding:* A monthly service fee to residences and businesses based on the amount of impervious area on each parcel. Rates are usually in the \$6-\$12 per month per equivalent rate unit (ERU).

*Allowed Uses:* These funds can be used for both capital and programmatic needs.

*Estimated Annual Amount:* \$108,000

*Assumes:*

- 1200 ERUs\* at \$7.50/mo X 12 months = \$108,000; Rate is for \$7.50/mo and includes programmatic costs, as well as short term CIP costs. \*Note that ERU estimates are estimates. They do not take into account future growth which may be substantial with the recent changes in zoning and the construction of the new Belfair sewage treatment plant.

#### Funding Source #2: Developer and Permit Fees

*Type/Source of Funding:* These are the fees that developers pay for plan and permit review and approval by the County. These generally entirely paid for by developers with little to no subsidies from the County. These funds reimburse the County for development review staff time as well as field time for inspection and enforcement.

*Allowed Uses:* Reimburses County for staff time; has limited direct cash value to SWM Program.

*Estimated Annual Amount:* No direct revenue to SWM Fund (usually goes into the General Fund). These revenues support the SWM effort and pay for some of the regulatory compliance costs but generally do not provide additional cash that can be used for other programmatic or capital needs.

#### Funding Source #3: SEPA Mitigation

*Type/Source of Funding:* These are payments made by developers to the County to mitigate the impacts associated with new development. These payments are usually project specific and are often used to provide additional supporting infrastructure such as access roads, or lighting, or downstream flow attenuation, or wetland impact mitigation.

*Allowed Uses:* Usually these payments go toward new capital facilities; they could be used as a good potential source of funding for future projects. Not useful for addressing programmatic costs.

## Executive Summary

### Continued

*Estimated Annual Amount:* About \$50,000 per year. (The annual amount is difficult to predict since the County does not have a long history to track these types of payments.)

#### **Funding Source #4: System Development Charges**

*Type/Source of Funding:* These are specific payments that developers make to support regional utilities and infrastructure. They are common to support the extension of roads and water and sewer services to new developments. Lately, they have been growing in popularity and are used in the development of new revenue to help pay for new capacity in regional detention, treatment, capacity, and outfall drainage systems. Similar in some ways to a SWM utility in establishing a unit price for each residential unit, usually about \$400-\$600 per home, and then extrapolating that cost to new commercial developments based on a measured number of equivalent residential units.

*Allowed Use:* These funds are primarily used for future capital improvements associated with future growth.

*Estimated Annual Amount:* \$33,000 per year (over the next six years)

*Assumes:*

- $300 \text{ homes} \times \$500/\text{home} = \$150,000/6 \text{ years} = \$25,000 \text{ per year}$
- $100 \text{ business units} \times \$500/\text{unit} = \$50,000/6 \text{ years} = \$8,300 \text{ per year}$ 
  - \* Note that these estimates of future growth are conservative and assume about 300 new homes over the next six years and a much smaller increase in new business units. The Belfair Urban Growth Plan estimates the UGA population to increase from about 800 to as many as 3,000 new residences over the next six years, depending on the availability of future employment within the region.

#### **Funding Source #5: Sales Tax Returns**

*Type/Source of Funding:* These funds are provided to the County from the State based on a formula that distributes a portion of the State sales tax returns back to local governments. Recently, the per cent return has increased from 0.08 to 0.09%. Annually this amounts to about \$450K.

*Allowed Uses:* Could be used to address either capital or programmatic costs.

*Estimated Annual Amount:* \$45,000

#### **Funding Source #6: REET Funding**

*Type/Source of Funding:* A portion of annual real estate sales throughout the County, as determined by the local real estate tax, are annually returned to the County. This currently amounts to about \$750K per year.

*Allowed Uses:* These funds could go right into the SWM Fund for either capital projects or programmatic needs.

*Estimated Annual Amount:* About \$100,000

**Funding Source #7: Road, Park, Utility Common Capital Projects**

*Type/Source of Funding:* When other departments of the County build capital projects, a portion of their project often is needed to address local drainage related impacts and needs. Some times these types of projects provide direct funding to SWM to build projects or the SWM fund could contribute to create larger drainage related projects that have regional benefits.

*Allowed Uses:* Primarily for capital project assistance.

Estimated Annual Amount: Estimated to be about \$50K-\$100K per year.

**Summary of New Potential Annual Revenue Sources**

*(Creation of Multiple Funding Sources to Realize Needed Revenue)*

By optimizing the revenue potential of the above proposed SWM funding mechanisms, approximately \$441,000 may be realized on an annual basis to support the development and implementation of the SWM Plan for the Belfair UGA, as shown in Table E-3.

Approximately \$308,000 in annual programmatic funding and \$133,000 in annual capital funding could be realized from these sources.

<b>Table E-3 List of Potential SWM Funding Sources and Estimated Annual Revenues</b>			
<b>Funding Source</b>	<b>Potential Estimated Annual Revenue</b>		
	<b>Amount</b>	<b>Programmatic</b>	<b>Capital</b>
#1: Stormwater Utility	\$108,000	X	Ok for either
#2: Developer and Permit Fees	\$0	---	---
#3: SEPA Mitigation	\$50,000	---	X
#4: System Development Charges	\$33,000	---	X
#5: Sales Tax Returns	\$100,000	X	Ok for either
#6: REET Funding	\$100,000	X	Ok for either
#7: Project-Specific Funding	\$50,000	---	X
Annual Total:	~\$441,000	~\$308,000	~\$133,000

**Matching Funding with Revenue Needs of the Implementation Plan**

*(Assessment of Proposed Stormwater Management Funding Strategy)*

**Funding for the Short Term: The Next Six Years**

The proposed Short-Term SWM Plan totaling \$1,790,000 and averaging \$298,000 over each of the next six years is a reasonable level of funding that matches the local drainage needs, as well as the County’s and community’s ability to pay. It is suggested that this annual level of funding be supplemented by another annual \$100,000 appropriation to begin to build a fund

## Executive Summary

### Continued

balance to address future capital needs. If this is annual capital appropriation is initiated in year one, the average annual funding requirement would be \$398,000.

As shown in Table E-3, estimated annual revenues from the above listed funding sources totals about \$441,000 per year. With the annual capital appropriation of \$100,000, the total average annual level of funding needed over the next six years is \$398,000, and closely matches the available resources, projected in above in Table E-2.

*(Note that annual programmatic operating costs (including \$10K for annual field inspections) beyond year six have not been estimated, however, an annual level of programmatic funding at least equal to year six (~\$215,000) can be anticipated throughout the future years. It is more likely that future programmatic costs will increase due to new regulatory compliance and additional water quality monitoring and enhancement requirements.)*

#### **Funding for the Long Term: Seven-Twenty Six or More Years**

The proposed longer-term SWM Plan totaling \$1.5M and averaging about \$100,000 per year for years one through ultimate buildout is also a significant local capital investment.

Note that this long term capital need will be supplemented by future County road projects build over time to continue to support development throughout the UGA.

In this funding analysis, it has been suggested that an annual appropriation or set-aside for future capital projects be initiated in year one so that an on-going annual capital fund balance can be established. If this type of financial discipline is established early in the initiation of the SWM Program, then adequate funding reserves should be available, approximately when needed, to support future development. About \$1.5M could be accumulated by year 15 when the Belfair Creek Steam Relocation/Channel Project would be scheduled for construction.

*(Note that this initial funding analysis has not estimated any annual increases in the amount annual funding available from each of the seven proposed funding mechanisms. It is likely that future funding from these sources will increase along with the increased annual funding needs of the Belfair SWM Program. Also, new funding mechanisms may present themselves as the SWM Program is implemented. For example, future grants would be an excellent way to augment these local funding mechanisms and should be actively and aggressively pursued. Additional funding analyses may be needed to substantiate and further refine this conceptual funding plan.)*

## Findings and Conclusion

There is adequate local funding to develop and maintain the needed drainage infrastructure and associated SWM Program to support continued economic development within the Belfair UGA.

## Section I—Introduction

### I.1 Background

Comprehensive land use planning by Mason County has resulted in establishing the Belfair community as an Urban Growth Area (UGA). Other UGAs established by the County include the communities of Allyn and Hoodspout and the City of Shelton. This report provides the Stormwater Management Plan (SWM Plan) to support development within the Belfair UGA.

The Belfair UGA is located northeast of the City of Shelton, southwest of Bremerton, and east of Hood Canal, as shown in Figure 1-1. The Belfair UGA includes a mix of existing residential, light industrial and commercial areas. The residential development is generally located away from State Route 3 (SR 3) which bisects the UGA. Light industrial development is located principally in the northerly part of the UGA along either side of SR 3. Commercial development is concentrated along east and west sides of SR 3 in the southerly part of the UGA. The proposed zoning for Belfair generally follows the existing land use patterns. Stormwater management for the UGA will need to address both existing development with vehicular pollution generating surfaces and as well as runoff from future development.

The majority of runoff from the Belfair UGA drains to Hood Canal, either directly or indirectly via a series of six streams that discharge into the Union River or Hood Canal. From north to south the streams include: Viola, Irene, Belfair, Mindy, Sweetwater and Alder Creeks. A significant portion of the region's discharge is conveyed into the Union River and Hood Canal as subsurface flow.



Photo 1—SR 300 Crossing the Union River

## Section I—Introduction

Continued

Water quality issues associated with both existing and future land use are a key element of this Stormwater Management Plan. Hood Canal’s marine ecosystem is at risk because of low levels of dissolved oxygen as well as nutrient, sediment, and other pollutant loadings. The Puget Sound Action Team has suggested that the dissolved oxygen problem is the result of three factors that play a significant role including:

- Poor overall water circulation.
- Stratification of water that discourages mixing of surface-to-deeper water.
- Increased input of human-influenced nutrients materials (especially nitrogen) that cause rich plankton and algae blooms, which proliferate, add oxygen to surface waters, then die and sink to the bottom where they decompose and use up oxygen in the process.

The Hood Canal Dissolved Oxygen Program (HCDOP), which is a partnership of 28 organizations including Mason County, is actively addressing the low dissolved oxygen issue in Hood Canal. HCDOP has two integrated and complementary arms: the Corrective Action and Education Group and the Integrated Assessment and Modeling (IAM) study. The HCDOP has a number of projects underway in a variety of areas including education and involvement, sewage management, stormwater management and hatchery management. In the area of stormwater management, one of the HCDOP 2006-2007 projects is to complete stormwater management plans for both Belfair and Hoodspport. Washington State Department of Ecology has issued a grant to Mason County<sup>1</sup> to help fund the preparation of these two plans. This report provides the stormwater management plan for the Belfair area, as defined in the County’s Comprehensive Plan.



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<sup>1</sup> Washington State Legislative 2005-07 Capital Budget, Section 325(3).

Photo 2—Public Education Poster Posted Near the Union River

## 1.2 Purpose and Scope

The purpose of this report is to develop the Stormwater Management Plan (SWM Plan) for the community of Belfair, Mason County, Washington, in response to the stormwater element of the 2006 Belfair Urban Growth Area (UGA) Comprehensive Plan.

The scope of this Stormwater Management Plan includes:

1. Characterization of existing stormwater conditions within the Belfair UGA.
2. An estimate of future conditions based on zoning defined in the County's 2005 Comprehensive Plan.
3. Hydrologic modeling and engineering analyses to determine the size and location of facilities needed to accommodate existing and future growth.
4. Development of an appropriate stormwater strategy to address existing and future development needs, as tailored to the specific characteristics of the study area.
5. Presentation of the proposed Belfair Stormwater Management Plan, including proposed projects and activities, costs, priorities, permitting, financing, and implementation considerations over a three and twenty year planning period.

## 1.3 Authorization

This study has been authorized by the Mason County Board of Commissioners and is being jointly initiated by the Departments of Public Works and Community Development. The Mason County Department of Health Services has also been invited to participate. The development of the Belfair UGA Stormwater Management Plan has been funded in part by a grant to Mason County by the Washington State Department of Ecology along with a local match from Mason County.

This study is part of a larger stormwater and regulatory compliance planning effort currently being undertaken by the County entitled: *Update of County's Stormwater Policies/Regulations and Development of Comprehensive Stormwater Management Plan for Mason County and the Communities of Belfair, Allyn, and Hoodspport*. This larger county-wide stormwater management planning program is expected to be completed by the end of 2007 and includes the development of stormwater management plans for the County and the areas of Allyn, Belfair and Hoodspport. It also includes the development of updated design criteria, policies, and funding mechanisms for stormwater management throughout the County.

## 1.4 Regulatory Requirements

This Stormwater Management Plan has been prepared to be consistent with the requirements set forth in the Ecology 2005 Stormwater Management Manual for Western Washington and existing Mason County codes and regulations. These design criteria are also consistent with the 2000 Puget Sound Water Quality Management Plan and the 2005-2007 Conservation Plan Update. Additional discussion of the design criteria used to develop the Belfair Stormwater Management Plan is presented in Section 5.

## 1.5 Stormwater Planning Approach

The Belfair UGA contains varying soils, slopes and land uses, all of which influence stormwater management. Management methodologies to meet regulatory requirements include land use and zoning controls to guide individual development, joint-use opportunities (with proposed SR 3 storm facilities), coordination with local salmon and water quality groups and the tribes, approaches to retrofit and mitigate existing development, and area-wide/regional stormwater facilities as opportunities allow.

The approach taken in developing this Stormwater Management Plan has been to analyze and develop stormwater plans on a subbasin or watershed basis. The existing characteristics of each subbasin in terms of size, soils, slopes, and land use were initially quantified using GIS methods. Information available on stream systems was reviewed to identify those streams that are fish bearing, including those that may have fish barriers. Future zoning areas were then quantified for each subbasin by GIS methods.

With this information—including an inventory of existing facilities—alternative methods of stormwater management within individual subbasins were developed and evaluated. Alternative methods were screened based on the feasibility for future development, joint-use, retrofit, and area-wide/regional facility type solutions. From the screening analyses, recommended stormwater management projects and activities were developed for each subbasin. From this list of proposed stormwater management initiatives, both short-term and long-term CIP programs were prepared.

## 1.6 Report Content and Organization

The Belfair UGA Stormwater Management Plan is presented as a series of discrete sections that generally follow the flow of work, culminating in the presentation of recommended activities, capital projects and costs. The report is composed of the following ten sections:

## Section I—Introduction

Continued

- Section 1—documents the goals and authorization for the study.
- Section 2—characterizes the Belfair UGA study area.
- Section 3—describes existing facilities and problems.
- Section 4—analyzes future conditions needed to support ultimate development.
- Section 5—outlines regulatory mandated design criteria.
- Section 6—conducts modeling and performs engineering analyses to support existing and future/ultimate development.
- Section 7—presents the recommended SWM Plan for the Belfair UGA.
- Section 8—lists priorities, and presents costs and funding sources for implementation.
- Section 9— summarizes funding needs, presents annualized costs, and translates costs to associated revenue needs.
- Section 10—documents how public comments have been addressed in this document.

### I.7 Stormwater Management Planning Activities in Study Area

Two stormwater related planning activities have been recently completed that impact stormwater management planning within the Belfair UGA study area. In March 2005, Perteet, Inc. completed the “Belfair Urban Improvements Project Feasibility Report” for Mason County. Technical Memorandum 4 of that report addresses stormwater management for Highway SR 3. It identifies alternatives for stormwater treatment and detention of the runoff from the proposed SR 3 widening and improvements.

In general, while there are some opportunities for joint-use stormwater management facilities between the County and WSDOT, timing, funding and local development of and/or redevelopment opportunities will determine their cost-effectiveness and practicality.

In May 2006, Engineering Services Associates completed the “Lower Union River Stormwater Study” for the Hood Canal Salmon Enhancement Group, Mason County and Mason County Conservation District. This study was funded by the Department of Ecology in 2003 as part of the Lower Union River Restoration Study. The study states that “a major part of the project was to monitor, study, and develop a plan to reduce or eliminate pollution from storm water drainages in the Belfair Urban Growth Area (UGA).” (i.e., existing development).

Currently, the Washington State Department of Transportation (WSDOT) is planning the SR 3 Belfair Bypass project. The proposal is to construct a high-speed bypass with limited access on the east side of the Belfair UGA. Its purpose is to relieve congestion in the community of Belfair by re-routing through traffic. Stormwater management facilities for the bypass project will be designed, constructed and operated by WSDOT, Opportunities to

## Section I—Introduction

Continued

include them as potential regional stormwater facilities to also accept existing and future stormwater runoff have been considered in the development of the Belfair SWM Plan.

## Section 2—Characterization of the Belfair UGA

Existing conditions relating to stormwater management in the Belfair UGA are described in this section. They include a review of the topography of the study area, along with the drainage basins, soils and land cover as they affect runoff, streams and receiving waters and the presence of fish.

### 2.1 Other Planning Efforts in the Region

In addition to comprehensive land use planning, several other planning and monitoring initiatives in the region are identifying local issues, needs and goals related to water quality, habitat and shellfish that need to be addressed. A brief overview is provided here with additional information provided in Section 8.

- Water quality monitoring is conducted by both the Washington State Department of Ecology and the Washington State Department of Health, Office of Shellfish Programs
- Salmon recovery planning has been conducted by the Shared Strategy for Puget Sound and the Hood Canal Coordinating Council, in conjunction with the National Marine Fisheries Service (NMFS) of the National Oceanic and Atmospheric Administration (NOAA).
- The Watershed Planning Act (RCW 90.82) provides local governments a framework and resources for developing local solutions to watershed issues on a watershed basis. A draft local watershed plan that includes the Belfair UGA has been created.
- Washington State has also developed the Puget Sound Water Quality Management Plan, which is the state's long-term strategy for managing and protecting the Sound and coordinating the roles and responsibilities of federal, state and local governments.
- The Puget Sound Action Team defines, coordinates and implements Washington State's environmental agenda for Puget Sound and has been providing leadership in the area of low impact development (LID).
- The Hood Canal Coordinating Council (HCCC) is a council of governments established in 1985. Its mission is to improve regulatory decision making and policy review by providing a forum for discussion of regional water quality issues affecting Hood Canal.
- The Hood Canal Dissolved Oxygen Program (HCDOP) is partnership of 28 organizations that conducts monitoring and analysis and develops potential corrective actions to address the low dissolved oxygen problem in Hood Canal.

### 2.2 Topography and Drainage Basins

The Belfair UGA contains about 2,314 acres. Of this area, about ten percent is in commercial-industrial land uses (usually about 85 percent impervious), five percent of the area contains poorly drained Hydrologic Soil Group D soils and 0.1 percent contains saturated (wetland) soils

## Section 2—Characterization of the Belfair UGA

Continued

The UGA is about 2.9 miles in distance north to south and averages about 1.3 miles wide east to west. The topography of the UGA generally slopes from east to west. Slopes range from flat (0 to 5 percent) to over 30 percent in the hills to the east of SR 3. Runoff in the northerly part of the UGA drains to the Union River by a series of small streams. The Union River roughly parallels the west side of the UGA and discharges to Hood Canal. Runoff in southerly portion of the UGA discharges directly to Hood Canal, either as streamflow or as diffused subsurface flow.

A total of 19 drainage subbasins have been delineated within the Belfair UGA as shown in Figure 2-1, together with directions of flow and 100-foot contours. SR 3 provides the westerly boundary for subbasins in the easterly part of the UGA. The Union River and the Hood Canal shoreline provide the westerly boundary for subbasins located along the west side of SR 3. Portions of these subbasins are located west of the westerly UGA boundary.

There are areas outside the UGA that are tributary to the UGA from the north, east and south, as shown in Figure 2-1. The magnitude of these areas is not large in comparison to size of the UGA and its subbasins. In the easterly part of the UGA there are a few smaller subbasins which drain to the east rather than to Union River or Hood Canal. These areas drain principally to Coulter Creek and Linder Lake.

Comments received on the draft of this SWM Plan indicated basin boundaries in the vicinity of the juncture of Subbasins 150, 140 and 120 (between the railroad tracks and SR 3) need adjustment as this area drains to a stormwater management pond. Additionally it was commented that a portion of Subbasin 90 east of SR 3 drains to the stormwater management pond mentioned via a culvert under SR 3 rather than to Irene Creek. The subbasin boundaries should be field reviewed in the future in response to the comments received. If validated, subbasin boundaries should be revised. Irene Creek in this area is located in outwash soils with high infiltration capacities. Because of this and the limited potential subbasin revisions, validation of the suggested changes would not be expected to materially change the findings or recommendations of this study in the northeast area of the UGA.

### 2.3 Soils

The soils within the Belfair UGA, as mapped by the Natural Resources Conservation Service (NRCS), formerly the U.S. Soil Conservation Service (SCS), are shown in Figure 2-2.

## Section 2—Characterization of the Belfair UGA

Continued

To facilitate runoff calculations and hydrologic planning, soils are assigned to one of four hydrologic soil groups by the NRCS based on their infiltration capabilities of the soil as shown in Table 2-1

Soil Group	Infiltration Characteristic	Area Within UGA (ac)	Percent of UGA area (%)
A	High infiltration, low runoff, as for deep sand or loess, aggregated silts	1,150	50%
B	Moderate infiltration, as for moderately coarse-textured soils such as sandy loam	3	0.1%
C	Slow infiltration, as for fine-textured soil such as clay loam, shallow sandy loam, soils low in organic content	1,038	45%
D	Very slow infiltration, such as swelling and plastic claypan	117	5%

The distribution of soils within the UGA by their hydrologic soil group is shown in Figure 2-3. Approximately half of the UGA is associated with Group A soils and half associated with Group C soils. There are minor areas of Group B and Group D soils in the UGA. Group A and B soils which are generally located in the lower, flatter areas of the UGA, promote infiltration of runoff. In these areas, infiltration would be the preferred method of stormwater disposal. Group C and D soils, located in the upland areas of the study area, do not have much infiltration capacity and, as a result, constructed stormwater facilities will be needed to support development in these areas.

### 2.4 Sensitive Areas

Sensitive areas include steep slopes (areas with slopes of 15 percent or more), hydric soils, wetlands, and geologic hazards, which include landslide, seismic and erosion hazards. (Refer to Mason County Draft 2006 Critical Area Update for hazard area criteria). Critical areas within the UGA (as provided in the shape files obtained from Mason County) are delineated in Figures 2-4 and 2-5. Areas exist within the Belfair UGA, especially within Subbasins 10 through 80 that have land with slopes exceeding 15 percent. The steeper slopes will tend to

## Section 2—Characterization of the Belfair UGA

Continued

reduce the ultimate development potential of those properties. Steep slopes are shown on Figure 2-4.

There are numerous wetlands throughout the UGA. Over half of Subbasin 100 is defined as wetlands by The National Wetlands Inventory (NWI). Elsewhere in the UGA, isolated wetlands are present particularly in the northern part of the UGA west of SR 3. Wetlands are shown on Figure 2-5.



Photo 3—Wetland on Irene Creek; east side of Old Belfair Highway

Sensitive areas pose constraints on development in terms of setbacks and mitigation requirements. These constraints will need to be addressed by future development.

### 2.5 Fish Bearing Streams and Receiving Waters

Streams located within the UGA are described in Table 2-3 and graphically shown in Figure 2-4 and 2-5. The stream locations are from Mason County's GIS database which uses the Washington State Department of Natural Resources (WDNR) stream location data. Comments received on the draft SWM Plan indicate that corrections to stream location information are needed to reflect data gained from a field GPS inventory of Belfair streams. This information should be evaluated in the future and if validated, the stream inventory provided in Figures 2-4 and 2-5 should be modified accordingly. The permanent water type classification is taken from the Washington Department of Natural Resources (WDNR). The

**Table 2-3  
Existing Drainage Basin Characteristics**

Subbasin	Subbasin Area								Hydrologic Soil Group for areas within the UGA										Range of topography slope for areas within the UGA										
	Total Area		Within UGA		Upstream of UGA <sup>1</sup>		Downstream of UGA <sup>2</sup>		Water Course <sup>3</sup>	Water Type <sup>4</sup>	Receiving Water	A		B		C		D		SAT		0-5% slope		5-15% slope		15-30% slope		>30% slope	
	(ac)	(%)	(ac)	(%)	(ac)	(%)	(ac)	(%)				(ac)	(%)	(ac)	(%)	(ac)	(%)	(ac)	(%)	(ac)	(%)	(ac)	(%)	(ac)	(%)	(ac)	(%)	(ac)	(%)
10	52.3	1.7%	16.5	0.7%	35.8	8.1%	0.0	0.0%	Unnamed Drainage Course	U	HC	16.5	100.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	1.2	7%	6.1	37%	6.0	37%	3.1	19%
20	212.6	6.9%	40.5	1.7%	172.1	38.9%	0.0	0.0%	Alder Creek	F	HC	36.2	89.3%	0.0	0.0%	4.3	10.7%	0.0	0.0%	0.0	0.0%	2.5	6%	12.6	31%	13.9	34%	11.4	28%
30	184.3	6.0%	184.3	8.0%	0.0	0.0%	0.0	0.0%	Sweetwater Creek	F	HC	65.4	35.5%	0.0	0.0%	118.9	64.5%	0.0	0.0%	0.0	0.0%	19.7	11%	83.2	45%	52.4	28%	28.0	15%
40	94.6	3.1%	94.6	4.1%	0.0	0.0%	0.0	0.0%	Unnamed Drainage Course	U	HC	74.3	78.5%	0.0	0.0%	20.4	21.5%	0.0	0.0%	0.0	0.0%	8.6	9%	29.3	31%	31.9	34%	24.6	26%
50	64.0	2.1%	64.0	2.8%	0.0	0.0%	0.0	0.0%	Romance Hill Drainage	U	HC	41.6	65.0%	0.0	0.0%	22.4	35.0%	0.0	0.0%	0.0	0.0%	4.4	7%	19.5	30%	20.9	33%	19.0	30%
60	68.7	2.2%	68.7	3.0%	0.0	0.0%	0.0	0.0%	Mindy Creek	F	HC	66.5	96.9%	0.0	0.0%	2.1	3.1%	0.0	0.0%	0.0	0.0%	5.0	7%	23.0	34%	22.3	32%	18.2	27%
70	344.1	11.2%	336.0	14.5%	8.2	1.8%	0.0	0.0%	Belfair Creek	F	UR	89.6	26.7%	0.0	0.0%	241.0	71.7%	5.2	1.5%	0.0	0.0%	40.7	12%	171.3	51%	71.8	21%	51.8	15%
80	125.4	4.1%	125.4	5.4%	0.0	0.0%	0.0	0.0%	Unnamed Drainage Course	U	UR	22.8	18.2%	0.0	0.0%	102.6	81.8%	0.0	0.0%	0.0	0.0%	11.8	9%	51.5	41%	37.4	30%	24.4	19%
90	251.1	8.1%	146.9	6.3%	104.1	23.6%	0.0	0.0%	Unnamed Drainage Course	U	CD	71.5	48.7%	0.0	0.0%	72.7	49.5%	0.0	0.0%	0.0	0.0%	25.9	18%	89.5	61%	28.5	19%	2.7	2%
100	267.6	8.7%	110.9	4.8%	0.0	0.0%	156.7	47.9%	Creek / Wetland	N	HC	54.5	49.2%	0.0	0.0%	11.0	9.9%	45.4	40.9%	0.0	0.0%	20.7	19%	65.7	59%	20.7	19%	4.0	4%
110	45.0	1.5%	42.2	1.8%	0.0	0.0%	2.8	0.9%	Belfair Creek	N	UR	15.7	37.1%	0.5	1.2%	13.4	31.9%	12.5	29.8%	0.0	0.0%	11.4	27%	24.4	58%	5.7	13%	0.7	2%
120	313.0	10.2%	263.2	11.4%	0.0	0.0%	49.9	15.3%	Irene Creek	U	UR	134.9	51.3%	0.1	0.0%	101.9	38.7%	24.5	9.3%	1.8	0.7%	47.8	18%	122.0	46%	68.6	26%	24.7	9%
130	88.1	2.9%	15.7	0.7%	0.0	0.0%	72.3	22.1%	Unnamed Drainage Course	U	UR	0.0	0.0%	0.9	5.7%	14.8	94.3%	0.0	0.0%	0.0	0.0%	7.3	46%	7.4	47%	1.0	7%	0.2	1%
140	203.9	6.6%	193.7	8.4%	0.0	0.0%	10.2	3.1%	Viola Creek	N	UR	148.2	76.5%	0.4	0.2%	26.6	13.7%	18.5	9.6%	0.0	0.0%	32.8	17%	95.0	49%	54.8	28%	10.8	6%
150	100.7	3.3%	99.9	4.3%	0.8	0.2%	0.0	0.0%	Unnamed Drainage Course	U	CD	49.3	49.4%	0.0	0.0%	50.5	50.6%	0.0	0.0%	0.0	0.0%	19.7	20%	50.5	51%	23.5	24%	6.1	6%
160	432.1	14.0%	276.1	11.9%	121.0	27.4%	34.9	10.7%	Unnamed Drainage Course	U	UR	184.2	66.7%	1.4	0.5%	79.2	28.7%	11.3	4.1%	0.0	0.0%	54.5	20%	137.7	50%	70.7	26%	13.4	5%
200	106.6	3.5%	106.6	4.6%	0.0	0.0%	0.0	0.0%	Unnamed Drainage Course	U	CC	5.3	5.0%	0.0	0.0%	101.3	95.0%	0.0	0.0%	0.0	0.0%	15.0	14%	56.4	53%	27.5	26%	7.3	7%
210	119.2	3.9%	119.2	5.1%	0.0	0.0%	0.0	0.0%	Unnamed Drainage Course	U	CC	73.7	61.9%	0.0	0.0%	44.3	37.2%	0.0	0.0%	0.0	0.0%	11.8	10%	54.2	45%	38.0	32%	14.8	12%
220	10.2	0.3%	10.2	0.4%	0.0	0.0%	0.0	0.0%	Unnamed Drainage Course	U	LL	0.0	0.0%	0.0	0.0%	10.2	99.9%	0.0	0.0%	0.0	0.0%	1.7	17%	6.9	68%	1.5	15%	0.0	0%
Totals	3,083.4	100%	2,314.5	100%	442.0	100%	326.9	100%	----	----	----	1,150.2	49.7%	3.2	0.1%	1,037.8	44.8%	117.4	5.1%	1.8	0.1%	342.6	14.8%	1106.2	47.8%	597.4	25.8%	265.1	11.5%

Notes:

1. Upstream of UGA areas drain through the UGA
2. Downstream of UGA areas receive water from the UGA
3. Water Types are defined by the Washington State Department of Natural Resources, Forest Practices Water Typing
4. Receiving Waters are the downstream discharge locations as follows: HC=Hood Canal, UR=Union River, CD=Closed Depression, CC=Coulter Creek, LL=Lider Lake
5. Mindy Creek is fish bearing west of SR3

**Water Type Classifications**

- S Shorelines
- F Fish
- N Non-Fish
- U Unknown

Typing is as defined by the WDNR, Forest Practices Water Typing

**Hydrologic Soil Group Classification Descriptions**

- A High infiltration rate; low runoff; excessively drained
- B Moderate infiltration when wet; moderately well; to well drained
- C Slow infiltration when wet; has a layer that impedes downward water movement
- D Very slow infiltration; often resulting from clay and/or a high water table; nearly impervious

Descriptions are based on information provided by <http://websoilsurvey.nrcs.usda.gov>

## Section 2—Characterization of the Belfair UGA

Continued

receiving water for each water course is also provided. The WDNR classification definitions are provided below.

- Type “F”—Fish
- Type “S”—Shorelines
- Type “Np”—Non-Fish Perennial
- Type “Ns”—Non-Fish Seasonal
- Letter “N”—Non-Fish
- Letter “U”—Unknown

As the non-fish UGA streams have not been differentiated as “Np” or “Ns” by WDNR, “N” has been used for non-fish streams.

<b>Table 2-2</b>			
<b>UGA Streams and Classifications</b>			
<b>Subbasin ID #</b>	<b>Water Course</b>	<b>WDNR Water Type</b>	<b>Receiving Water*</b>
10	Unnamed Drainage Course	U	HC
20	Alder Creek	F	HC
30	Sweetwater Creek	F	HC
40	Unnamed Drainage Course	U	HC
50	Mindy Creek	F**	HC
60	Unnamed Drainage Course	U	HC
70	Belfair Creek	F	UR
80	Unnamed Drainage Course	U	UR
90	Unnamed Drainage Course	U	CD
100	Creek / Wetland	N	HC
110	Belfair Creek	N	UR
120	Irene Creek	U	UR
130	Unnamed Drainage Course	U	UR
140	Viola Creek	N	UR
150	Unnamed Drainage Course	U	CD
160	Unnamed Drainage Course	U	UR

## Section 2—Characterization of the Belfair UGA

Continued

200	Unnamed Drainage Course	U	CC
210	Unnamed Drainage Course	U	CC
220	Unnamed Drainage Course	U	LL

\*HC=Hood Canal, UR= Union River, CD=Closed Depression, CC= Coulter Creek, LL= Linder Lake

\*\*West of SR 3 only

As may be noted, four streams have been classified as fish bearing by the WDNR. These include Alder Creek, Sweetwater Creek, Mindy Creek and Belfair Creek. The streams classified as Unknown should be investigated further to determine if they are fish bearing. It is likely that all streams within the Belfair UGA are available to fish. Some stranding with existing barriers has been noted in this study.



Photo 4—Belfair Creek, east of SR 3

### 2.6 Land Use

The majority of land within the Belfair UGA is currently dedicated to low-density residential and forested areas. Commercial uses are located principally adjacent to SR 3. Industrial uses are present within the UGA and are primarily located to the northeast in Subbasins 90, 140, 150 and 160. Details of existing land use by subbasin are provided in Section 4, Table 4-2.

## Section 2—Characterization of the Belfair UGA

Continued

### 2.7 Hydrology

The Belfair area average annual precipitation is about 52 inches per year based on the Wauna 3 SW Minter Creek precipitation station (closest to Belfair). This is based on the period of record from June 1948 through December 2005 as reported by the Western Regional Climate Center. Average monthly precipitation from November through January exceeds eight inches per month. The lowest rainfall month is July where the average monthly rainfall is about 0.9 inches.

### 2.8 Receiving Water Quality

Receiving waters for the UGA include the Union River and Hood Canal. Data collected by the University of Washington, Department of Ecology and the Hood Canal Salmon Enhancement Group show that Hood Canal's dissolved oxygen (DO) concentrations are at historical lows. In recent years the low DO conditions have become more widespread. Water quality sampling of the Union River demonstrated that fecal coliform has exceeded Class AA water quality standards at several stations since 1990. Because of this, the Union River has been placed on the state's list of "impaired" water bodies, Ecology's 2002/2004 303(d) List, as has Lynch Cove (fecal coliform, DO and pH) and Belfair Creek (fecal coliform). Ecology prepared the report Detailed Implementation Plan for the Union River Fecal Coliform TMDL in 2003 to detail watershed activities to clean up bacterial contamination. Lynch Cove in Hood Canal is located at the mouth of the Union River. Portions of Lynch Cove shellfish beds have been closed due to bacterial contamination since 1987. According to the 2006 Annual Growing Area Review for the Hood Canal #9 area (Lynch Cove to Sunset Beach) by the Office of Shellfish and Water Protection of the Washington State Department of Health, most of the Lynch Cove area is classified as prohibited from south to the west end of Belfair State Park.

### 2.9 Natural Habitat

The Belfair UGA contains numerous streams and wetland systems as described previously that provide valuable habitat for fish and wildlife. Of the 19 streams and drainage courses in the UGA, four are classified as fish-bearing and a number of other streams may be available to fish. The 185 acre Theler Wetland at the south end of the UGA on its west side and the wetlands along the west side of the UGA provide valuable natural habitat as do the lowlands along the Union River. The land cover on the hillsides on east side of the SR 3 is predominately forest which contributes to the diversity of natural habitat within the UGA.

## Section 2—Characterization of the Belfair UGA

Continued

### 2.10 Existing Drainage Basin Characteristics Summary

The existing characteristics of the Belfair UGA subbasins are summarized in Table 2-3. These include stream and receiving area information, subbasin areas including both total and area within the UGA, hydrologic soil group areas, and topographic slope information. This information has been used in part to develop stormwater management strategies for each subbasin, as presented in Section 6.

## Section 3—Existing Stormwater Facilities

### 3.1 Introduction

Existing drainage facilities within the UGA are primarily associated with SR 3, county roads and commercial development adjacent to SR 3. These facilities consist of road culverts, roadside ditches, onsite water quality and infiltration systems. These elements of the Belfair drainage system are described in this Section. They complement and work in concert with the natural elements of the drainage system characterized in the preceding section.

### 3.2 Roadway Culverts

#### Existing Culverts and Reported Drainage Problems

The location and size of the 22 existing culverts crossing SR 3 and NE Old Belfair Highway are shown in Figure 3-1. They vary in size from 12 to 54 inches in diameter. Typically roadside ditches collect road and adjacent property runoff and convey it to the culverts. Some portions of SR 3 north of the intersection with NE Old Belfair Road have catch basin and cross pipe systems instead of roadside ditches. Comments received on the draft SWM Report indicated that some additional culverts exist that are not shown on Figure 3-1. These should be investigated in the future and added to the inventory when they are validated. No capacity problems have been reported by WSDOT or Mason County with any of these culverts except where Mindy Creek crosses SR 3 near Mitchell Lumber. Mindy Creek flows into an 18-inch corrugated metal pipe that is connected to a piped collection system for SR 3. This system crosses SR 3 and goes under the Mitchell Lumber yard before it daylight again. In discussing this system with the County, it was noted that this system, if not maintained, can become clogged with debris which has resulted in localized flooding in the past.

## Section 3—Existing Stormwater Facilities

Continued



Photo 5—Mindy Creek crosses SR 3 near Mitchell Lumber

On the west side of SR 3 north of the Romance Hill Road junction, there is reported frequent flooding of a yard of a residence near Mindy Creek. It has been proposed that Mindy Creek be relocated and a fish passage culvert installed as a part of the Washington Department of Transportation (WSDOT) improvements to SR 3. It is recommended that Mason County coordinate with WSDOT during design of the SR 3 project to have this problem corrected as a part of the proposed improvements to SR 3.

In the northerly part of the commercial area, it is reported that there are commercial area catch basins (in the vicinity of McDonalds) that are not collecting surface runoff so that surface runoff is running on to SR 3. It is recommended that this reported drainage problems be subject to future investigation by the County maintenance crew.

### Road Culvert Capacity Evaluation

Although drainage problems have not been reported at the existing road culverts on SR 3 (except for Mindy Creek) or Old Belfair Road, a preliminary analysis was performed to check for culvert capacity problems. For this analysis, peak flows for a 25-year return period event (event that can be expected to occur once every 25 years) were determined from hydrologic modeling of the watersheds tributary to the culvert inlets. A continuous simulation hydrologic model was used as described in Section 6. Unrouted models were used, as field data on stream channels, upstream culverts and upstream ponds or wetlands were not available, to create routed models which address the effects of upstream storage on peak flows at the culverts. This provides for conservative flows relative to culvert capacity.

## Section 3—Existing Stormwater Facilities

Continued

Culverts were assumed to operate under inlet control where water can exit the culvert without the influence of downstream backwater conditions. Capacities were determined using a standard headwater (depth of water above the invert of the upstream end of the culvert) depth to pipe diameter ratio (HW/D ratio) of 1.25. Higher HW/D ratios are acceptable to many agencies depending on the conditions in the field and other factors. Due to the lack of detailed field information, the HW/D ratio of 1.25 was used in this study to reflect a conservative water depth at culverts relative to roadway elevations (avoidance of road overtopping).

The results of the evaluation of the road culvert capacities are presented in Table 3-1. Twelve of the twenty culverts evaluated have adequate capacity under the conservative assumptions used in the analysis. Two culverts are just at capacity (C-2 and C-9) and may be satisfactory with a design HW/D of 1.5. Six culverts (C-4, C-5, C-6, C-8, C-11, and C-17) are recommended for future investigation by County maintenance staff as capacity problems have not been reported at these locations. This could be done as part of the monitoring program included as part of this plan.

## Section 3—Existing Stormwater Facilities

Continued

Table 3-1—Road Culvert Capacity Evaluation Belfair UGA Culvert Capacity (culverts numbered from south to north)							
Culvert #	Location	Description			Capacity (cfs) <sup>1</sup>	25-yr Flow Existing <sup>3</sup>	Evaluation Results
		Diam.	Type	Inlet			
1	S of Alder Cr Lane	24	Unknown	Projecting	15	3.0	Adequate
2	SR3 & Alder Cr Lane	12	Concrete	Projecting	3	3.0	Investigate
3	SR3 & Alder Cr	24	Unknown	Projecting	15	13.0	Adequate
4		12	Unknown	Projecting	3	13.0	Investigate
5		12	Unknown	Projecting	3	5.2	Investigate
6		12	Unknown	Projecting	3	5.2	Investigate
7	SR3 & Sweetwater Cr	12' box culvert	Concrete	Projecting	120	5.2	Adequate
8	N of Sweetwater Cr	12	Concrete	Projecting	3	5.2	Investigate
9	SR3 & Roessel Rd	15	Concrete	Projecting	6	6.3	Investigate
10	SR3 & Byerly Dr	18	Concrete	Projecting	10	6.3	Adequate
11	SR3 & Romance Hill	18	Unknown	Projecting	7	9.7	Investigate
12	N of Romance Hill	24	Unknown	Projecting	15	2.9	Adequate
13	S of Mindy Cr	18	Concrete	Projecting	10	2.9	Adequate
14	SR3 & Mindy Cr	18	CMP	Projecting	7	2.9	Adequate
15	SR3 at Belfair St	48	Concrete	Projecting	100	43.8	Adequate
16	N of Olf Cilfton	24	Unknown	Projecting	15	10.2	Adequate
17	N of Olf Cilfton	12	CMP	Projecting	3	21.9	Investigate
18	Old Belfair & Irene Cr	54	CMP	Projecting	110	47.5	Adequate
19	370 Old Belfair Hwy	36	Concrete	Projecting	50	12.2	Adequate
20	N of Timberline	24	CMP	Projecting	15	12.2	Adequate

Note: This assumes all culverts are in good condition and clean of debris

1. Capacity is calculated assuming inlet control with a HW/D ratio of 1.25.
2. Subbasins were not delineated specific to each culvert. The total subbasin runoff is divided among the culverts at that location.
3. This table does not include the culverts crossing E North Bay Rd at the north end of the UGA

### 3.3 Private Drainage Systems

Within the commercial areas and residential developments, there are both public and private storm drainage facilities. Some of the newer commercial developments, such as the QFC grocery store and the car wash for example, have onsite water quality and flow controls. However, the majority of the commercial developments are older and release their stormwater runoff untreated and undetained.

The stormwater runoff from residential areas is also primarily untreated and undetained. The current level of development in most of the residential areas is low so much of the stormwater is infiltrated, or is collected and conveyed by ditch/culvert systems, or drains directly into the numerous local creeks. Some of the newer residential developments provide

## Section 3—Existing Stormwater Facilities

Continued

onsite water quality treatment and detention. The development on top of Romance Hill Road has its own stormwater facility located on the east side of SR 3. This system provides for water quality treatment and infiltration of treated stormwater.

## Section 4—Future Conditions

### 4.1 Introduction

Future conditions relating to stormwater management within the Belfair UGA are described in this section. These are defined by future zoning, as presented in the Belfair Comprehensive Plan (2005) and its associated land use cover criteria.

Population growth estimates documented in The Belfair Urban Growth Area Plan, prepared for Mason County, estimate population in the Belfair UGA will grow from the current population of approximately 900 to a population of 2,000 to 4,000 people over the next seven to thirteen years (this range reflects the findings of two different studies referenced in the Belfair UGA Plan). The Belfair Urban Growth Area Plan attributes the anticipated growth to stimulus such as the construction of a regional sanitary sewer system, the completion of the Tacoma Narrows Bridge, and industrial development in the nearby South Kitsap Industrial Area. To support the estimated population increase in both residential development and commercial/ industrial development are anticipated, depending on the availability of employment throughout the region. Growth and development will occur according to proposed future zoning.

### 4.2 Belfair Comprehensive Land Use Plan

The Belfair Comprehensive Plan includes proposed future zoning for the Belfair UGA. The proposed zoning is shown in Figure 4-1. Future land use cover assumptions for the proposed zoning range from 35 to 90 percent impervious area, as shown in Table 4-1. The percentage of impervious area given for each by land use corresponds to maximum allowed lot cover values in the Comprehensive Plan. Approximately 17 percent (about 10 percent commercial/industrial and 7 percent residential) of the Belfair UGA is currently developed. Existing land use by subbasin is presented in Table 4-2.

UGA Zoning Land Uses	% Impervious	% Pasture	% Lawn
LTA	2	98	0
R-3	35	0	65
R-5	40	0	60
R-10	50	0	50
B-I	85	0	15
FR	85	0	15

## Section 4—Future Conditions

Continued

GC	85	0	15
GC-BI	85	0	15
MU	85	0	15
ROW	90	0	10

Table 4-1 continued - Zoning Classifications	
ROW	Right of way
B-I	Business Industrial
FR	Festival Retail
GC	General Commercial
GC-BI	General Commercial & Business Industrial
LTA	Long Term Agricultural
MU	Mixed Use
R-10	Multi Family Residential
R-3	Single Family Residential
R-5	Medium Density Residential
<i>As defined by Mason County Planning Department</i>	

### 4.3 Future Drainage Basin Characteristics Summary

Existing land uses within the UGA, along with the future land uses defined by the proposed zoning, are shown in Table 4-1 for each subbasin. As may be noted from Table 4-2, approximately 69 percent of the UGA will be dedicated to residential land uses as compared to about seven percent in the existing condition. Also, approximately 17 percent of the UGA will be dedicated commercial-industrial uses as compared to about ten percent in the existing condition.

The future residential development of 69 percent reflects conversion of much of the existing undeveloped areas in the UGA, which currently amounts to 83 percent of the UGA area. With this conversion from undeveloped to residential developed areas, extensive stormwater management facilities will be required to support this land use change.

### 4.4 Coordination with Belfair Comprehensive Plan

In addition to the zoning discussed above, The Belfair Urban Growth Area Plan outlines strategic concepts for the future land use in the Belfair UGA. The three strategic concepts addressed in this section are: intense development centers, expanding the parks, trails, open space and public facilities, and recommended transportation improvements. Each of these

Table 4-2

Existing and Future UGA Land Use

Subbasin	Water Course	Existing Land Use Within UGA								County Proposed Zoning Within UGA																			
		Residential		Commercial		Industrial		Undeveloped		ROW		B-I		FR		GC		GC-BI		LTA		MU		R-3		R-5		R-10	
ID #		(ac)	(%)	(ac)	(%)	(ac)	(%)	(ac)	(%)	(ac)	(%)	(ac)	(%)	(ac)	(%)	(ac)	(%)	(ac)	(%)	(ac)	(%)	(ac)	(%)	(ac)	(%)	(ac)	(%)	(ac)	(%)
10	Unnamed Drainage Course	3.7	22.4%	1.3	7.9%	0.0	0.0%	11.5	69.7%	0.7	4.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	8.5	51.3%	7.4	44.7%	0.0	0.0%	0.0	0.0%
20	Alder Creek	3.6	8.9%	0.2	0.4%	0.0	0.0%	36.8	90.7%	2.1	5.3%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	3.7	9.0%	29.1	71.7%	0.2	0.6%	5.4	13.4%
30	Betwater Cr	1.4	0.8%	0.0	0.0%	0.0	0.0%	182.9	99.2%	10.8	5.9%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	6.0	3.3%	51.1	27.7%	105.5	57.2%	10.9	5.9%
40	Unnamed Drainage Course	15.8	16.6%	8.3	8.8%	0.0	0.0%	70.6	74.6%	3.5	3.7%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	30.9	32.7%	37.0	39.1%	23.3	24.6%	0.0	0.0%
50	Romance Hill Drainage	17.2	26.9%	5.9	9.2%	0.0	0.0%	40.9	63.9%	7.7	12.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	13.6	21.2%	21.3	33.3%	14.3	22.4%	7.1	11.1%
60	Mindy Cree	5.5	8.1%	10.0	14.5%	0.0	0.0%	53.2	77.5%	2.1	3.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	14.0	20.4%	27.8	40.5%	22.6	32.9%	2.2	3.1%
70	Belfair Cree	0.0	0.0%	7.8	2.3%	0.0	0.0%	328.1	97.7%	15.8	4.7%	0.0	0.0%	0.0	0.0%	3.0	0.9%	0.1	0.0%	0.0	0.0%	15.7	4.7%	54.9	16.3%	76.9	22.9%	169.7	50.5%
80	Unnamed Drainage Course	0.0	0.0%	12.9	10.3%	2.2	1.7%	110.3	88.0%	11.3	9.0%	0.0	0.0%	0.0	0.0%	12.2	9.7%	11.2	8.9%	0.0	0.0%	2.4	1.9%	18.8	15.0%	63.0	50.2%	6.6	5.2%
90	Unnamed Drainage Course	2.5	1.7%	0.0	0.0%	10.5	7.2%	133.9	91.2%	6.3	4.3%	0.0	0.0%	0.0	0.0%	100.4	68.4%	9.6	6.5%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	30.6	20.8%
100	Wetla	16.2	14.6%	17.6	15.9%	0.0	0.0%	77.1	69.6%	4.7	4.2%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	69.4	62.6%	28.9	26.0%	0.0	0.0%	9.9	8.9%
110	Belfair Cree	3.8	8.9%	24.3	57.7%	0.0	0.0%	14.0	33.3%	4.6	10.9%	0.0	0.0%	16.1	38.2%	3.1	7.4%	0.0	0.0%	0.0	0.0%	4.3	10.3%	0.0	0.0%	0.0	0.0%	14.0	33.2%
120	Irene Cree	20.3	7.7%	19.8	7.5%	9.4	3.6%	213.6	81.2%	17.6	6.7%	0.0	0.0%	2.0	0.7%	10.5	4.0%	8.4	3.2%	8.2	3.1%	31.0	11.8%	92.3	35.1%	93.0	35.4%	0.0	0.0%
130	Unnamed Drainage Course	6.7	42.6%	0.0	0.0%	0.0	0.0%	9.0	57.4%	0.7	4.5%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	15.0	95.6%	0.0	0.0%	0.0	0.0%
140	Viola Cree	10.3	5.3%	5.1	2.7%	8.9	4.6%	169.4	87.4%	11.4	5.9%	11.8	6.1%	0.0	0.0%	0.0	0.0%	12.6	6.5%	9.1	4.7%	0.0	0.0%	126.8	65.5%	22.0	11.4%	0.0	0.0%
150	Unnamed Drainage Course	0.0	0.0%	0.0	0.0%	56.5	56.6%	43.4	43.4%	4.5	4.6%	35.5	35.6%	0.0	0.0%	0.0	0.0%	60.2	60.3%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%
160	Unnamed Drainage Course	48.6	17.6%	0.0	0.0%	28.7	10.4%	198.8	72.0%	12.8	4.6%	71.1	25.8%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	124.7	45.2%	67.5	24.5%	0.0	0.0%
200	Unnamed Drainage Course	0.0	0.0%	0.0	0.0%	0.0	0.0%	106.60	100.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.3	0.3%	0.0	0.0%	105.6	99.1%	0.0	0.0%
210	Unnamed Drainage Course	0.0	0.0%	0.0	0.0%	0.0	0.0%	119.17	100.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	119.2	100.0%	0.0	0.0%
220	Unnamed Drainage Course	0.0	0.0%	0.0	0.0%	4.04	39.5%	6.18	60.5%	0.0	0.0%	10.2	100.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%
Totals	----	155.5	6.7%	113.2	4.9%	120.2	5.2%	1925.6	83.2%	116.5	5.0%	128.7	5.6%	18.1	0.8%	129.3	5.6%	102.1	4.4%	17.3	0.7%	199.9	8.6%	635.0	27.4%	713.1	30.8%	256.3	11.1%

## Section 4—Future Conditions

Continued

concepts has opportunities for being integrated into a cohesive regional drainage system that protects natural functions as well as enhances the water quality of Hood Canal.

The first strategic concept focuses more intense development in three commercial centers along SR 3. This concept is shown in Figure 4-2, Plan Concept (Belfair Urban Growth Area Plan). Dense development centers present numerous opportunities for shared and/or regional stormwater facilities. Partnering, including the sharing of costs, may occur among developers, and/or with the County.

The second strategic concept expands the parks, trails, open space and public facilities throughout the UGA. This concept is shown in Figure 4-3, Parks, Trails, Open Space, and Public Facility (Belfair Urban Growth Area Plan). Proposed parks also present opportunities for shared use and regional facilities such as enhanced stream buffers through the parks, and/or water features that could also be incorporated into future stormwater facilities. Shared use opportunities are discussed further in Section 6.

The third strategic concept proposed transportation improvements throughout the UGA. This concept is shown in Figure 4-4, Transportation Recommendations (Belfair Urban Growth Area Plan). For some of these recommendations, such as the SR 3 widening improvements and the alternative North/South bypass, WSDOT is the lead agency and preliminary plans have already been developed. Such projects may present partnering opportunities between the County and WSDOT. For other transportation related drainage opportunities, such as Old Belfair Highway sidewalk and landscape improvements, the County is the lead agency and is planning on considering Low Impact Development for water quality treatment of road runoff as a part of these improvements.

These three strategic concepts were considered during the development of this stormwater plan and are addressed further in Section 6 of this document in developing, evaluating, and suggesting drainage facilities to compliment and support continued development throughout the region.

## Section 5—Regulatory Criteria

### 5.1 Introduction

The current Mason County stormwater requirements are generally based on Ecology’s 1992 Stormwater Management Manual for the Puget Sound. For this study, the 2005 Ecology Stormwater Management Manual for Western Washington (Ecology 2005 Manual) has been used to help protect water quality and habitat of Hood Canal and the Union River. The following summarizes the stormwater management criteria for Belfair.

In addition to the Ecology 2005 Manual, this section also recommends the use of Low Impact Development (LID) techniques (currently under development by the County), in conjunction with the continued use of the County’s new small parcel stormwater management requirements for low density residential development.

### 5.2 Minimum Stormwater Management Requirements

The regulatory requirements for stormwater management are contained in the Ecology 2005 Manual and in the various Mason County codes and regulations. The Ecology 2005 Manual sets forth ten minimum requirements for stormwater management that are required for development and redevelopment. These are listed in Table 5-1 and have been used throughout the development of the Belfair Stormwater Management Plan.

All stormwater plans must demonstrate compliance with these applicable minimum requirements. (The full text of the minimum requirements should be referred to for a complete understanding of the requirements and when and how they are to be applied.)

1	Preparation of Stormwater Site Plans – <i>All projects meeting the thresholds [outlined in the Ecology 2005 Manual] shall prepare a Stormwater Site Plan for local government review.</i>
2	Construction Stormwater Pollution Prevention (SWPP) – <i>Projects in which the new, replaced, or new plus replaced impervious surfaces total 2,000 square feet or more, or disturb 7,000 square feet or more of land must prepare a Construction SWPP Plan as part of the Stormwater Site Plan.</i>
3	Source Control of Pollution – <i>All known, available and reasonable source control Best Management Practices (BMPs) shall be selected, designed, and maintained according to [the Ecology 2005 Manual].</i>
4	Preservation of Natural Drainage Systems and Outfalls – <i>Natural drainage patterns shall be maintained, and discharges from the project site shall occur at the natural location, to the maximum extent practicable. Then manner by which runoff is discharged from the project site must not cause significant adverse impact to downstream receiving waters and downgradient properties. All outfalls require energy dissipation.</i>

## Section 5— Regulatory Criteria

Continued

5	On-site Stormwater Management – <i>Projects should employ On-Site Stormwater Management BMPs to infiltrate, disperse, and retain stormwater runoff onsite to the maximum extent feasible without causing flooding or erosion impacts.</i>
6	Runoff Treatment – <i>[Many projects] require construction of stormwater treatment facilities. Direct discharge of untreated stormwater from pollution-generating impervious surfaces to ground water is prohibited, except for the discharge achieved by infiltration or dispersion of runoff from residential sites through use of On-Site Stormwater Management BMPs.</i>
7	Flow Control – <i>Projects must provide flow control to reduce the impacts of stormwater runoff from impervious surfaces and land cover conversions. The requirement applies to projects that discharge stormwater directly, or indirectly through a conveyance system, into a fresh water – except for projects that discharge to [an approved direct discharge receiving water]</i>
8	Wetlands Protection – <i>Discharges to wetlands shall maintain the hydrologic conditions, hydrophytic vegetation, and substrate characteristics necessary to support existing and designated uses.</i>
9	Basin/Watershed Planning – <i>Projects may be subject to equivalent or more stringent minimum requirements... as identified in Basin/Watershed Plans.</i>
10	Operation and Maintenance – <i>An operation and maintenance manual... shall be provided for all proposed stormwater facilities and BMPs, and the party (or parties) responsible for the maintenance and operation shall be identified.</i>

The applicability of the minimum requirements is defined for both new development and redevelopment projects, as summarized below:

**New Development Projects.** As quoted from the Ecology 2005 Manual, “*All new development shall be required to comply with Minimum Requirement #2*” (entitled Construction Stormwater Pollution Prevention).

*“The following new development shall comply with Minimum Requirements #1 through #5 for the new and replaced impervious surfaces and the land disturbed (if the proposed new development):*

- *Creates or adds 2,000 square feet, or greater, of new, replaced, or new plus replaced impervious surface area, or*
- *Has land disturbing activity of 7,000 square feet or greater.*

*The following new development shall comply with Minimum Requirements #1 through #10 for the new impervious surfaces and the converted pervious surfaces (if the proposed new development):*

- *Creates or adds 5,000 square feet, or more, of new impervious surface area, or*
- *Converts ¾ acres, or more, of native vegetation to lawn or landscaped areas, or*
- *Converts 2.5 acres, or more, of native vegetation to pasture.”*

**Redevelopment Projects.** As quoted from the Ecology 2005 Manual, “*all redevelopment shall be required to comply with Minimum Requirement #2. In addition, all redevelopment that exceeds certain*

## Section 5— Regulatory Criteria

Continued

*thresholds shall be required to comply with additional Minimum Requirements as follows.*

- *Redevelopment shall comply with Minimum Requirements #1 through #5 for the new and replaced impervious surfaces and the land disturbed (if):*
  - *The new, replaced, or total of new plus replaced impervious surfaces is 2,000 square feet or more, or*
  - *The redevelopment involves more than 7,000 square feet or more land disturbing activities.*
- *Redevelopment shall comply with Minimum Requirements #1 through #10 for the new impervious surfaces and converted pervious areas (if new redevelopment):*
  - *Adds 5,000 square feet or more of new impervious surfaces or,*
  - *Converts  $\frac{3}{4}$  acres, or more, of native vegetation to lawn or landscaped areas, or*
  - *Converts 2.5 acres, or more, of native vegetation to pasture.*
- *If the runoff from the impervious surfaces and converted pervious surfaces is not separated from runoff from other surfaces on the project site, the stormwater treatment facilities must be sized for the entire flow that is directed to them.”*
- *Also note that: “The local government may allow the Minimum Requirements to be met for an equivalent (flow and pollution characteristics) area within the same site. For public roads’ projects, the equivalent area does not have to be within the project limits, but must drain to the same receiving water.”*

Existing developed properties are not required to meet the stormwater regulatory requirements discussed above unless they undergo redevelopment.

### 5.3 Flow Rate Control Requirements

In regard to flow control, the stormwater compliance criteria used in this stormwater planning study are taken directly from the Ecology 2005 Manual for Western Washington. The compliance criteria, set forth in the Manual for basins requiring rate control, are as follows:

1. *Stormwater discharge shall match pre-developed conditions flow duration values from  $\frac{1}{2}$  of the 2-year flow frequency through the 50-year flow frequency. (Matching flow durations ensures that any potential erosion problems downstream of the development are not exacerbated by the proposed development.)*
2. *Developed peak discharge rates should match pre-developed conditions peak flows for the 2-, 10-, and 50- year return periods. (Matching peak flows ensures that the downstream system will continue to have the capacity to carry the expected flow rates.)*

Note that the Ecology 2005 Manual flow control requirement applies only to stormwater runoff that discharges into fresh water. The 2005 Manual does not define flow control requirements for freshwater discharges into salt water receiving water bodies. Thus for some

of the subbasins in the Belfair UGA, stormwater discharges after treatment could be directly discharged into Hood Canal without detention. These subbasins are limited to Subbasins 10, 40 and 100.

### 5.4 Water Quality Treatment Requirements

The Ecology 2005 Manual presents two sets of requirements for the selection of water quality treatment methods, depending on the type of development that is being constructed. The Basic Treatment Menu is the standard for most residential developments, including those that discharge into salt water. However, there is also the Enhanced Treatment Menu that applies to developments with a more intense use of impervious areas and greater potential for pollutants leaving the site, including new roads and highways, and commercial and multi-family developments. These two menus are summarized below:

The *Basic Water Quality Treatment Menu* allows any of the following options to be used:

- |                         |  |
|-------------------------|--|
| -Bio-infiltration Swale | -Stormwater Treatment Wetland              |
| -Infiltration           | -Combined Detention and Wetpool Facilities |
| -Sand Filters           | -Bioretention/Rain Garden                  |
| -Bio-filtration Swales  | -Ecology Embankment                        |
| -Filter Strips          | -“StormFilter” with ZPG™ media             |
| -Basic Wetpond          | -Wetvault                                  |

To meet the Basic requirements, it is common for a developer to use either bio-infiltration/bio-filtration swales or some form of a wetpond, depending on the shape and amount of space available on the site. Wetponds are sized with continuous simulation models to treat the volume associated with the 91 percent exceedance value of all flows during the period of simulation, which is generally equivalent to 0.72 times the amount of precipitation of the 2-year, 24 hour storm event per the Ecology 2005 Manual.

The *Enhanced Water Quality Treatment Menu* allows any of the following options:

- |   |                               |
|---|-------------------------------|
| -Infiltration with Appropriate Pretreatment | -Compost-amended Filter Strip |
| -Large Sand Filter                          | -Two Facility Treatment Train |
| -Amended Sand Filter                        | -Bioretention/Rain Garden     |
| -Stormwater Treatment Wetland               | -Ecology Embankment           |

To meet the Enhanced requirements, a developer will often use a two facility treatment train or a constructed wetland. Sand filters may also be required for special pollutant removals such as nutrients.

## 5.5 Low Impact Development Techniques

Ecology encourages the use of Low Impact Development (LID) techniques for stormwater management where appropriate. Mason County is currently considering the adoption of a LID ordinance, and approval by the Commissioners is expected by the end of the year. The Low Impact Development Technical Guidance Manual for the Puget Sound describes LID as follows: *Low impact development (LID) is a stormwater strategy that emphasizes conservation and use of natural site features integrated with distributed, small-scale stormwater controls to more closely mimic natural hydrologic patterns in residential, commercial, and industrial settings.* LID techniques have been considered in the development of the stormwater alternatives for the Belfair UGA, and are presented in Appendix A. Design guidance for LID methods are also available from:

- The 2005 Ecology Manual  
[www.ecy.wa.gov/programs/wq/stormwater/manual.html](http://www.ecy.wa.gov/programs/wq/stormwater/manual.html)
- The Puget Sound Action Team  
[http://www.psat.wa.gov/Publications/LID\\_tech\\_manual05/lid\\_index.htm](http://www.psat.wa.gov/Publications/LID_tech_manual05/lid_index.htm)

LID techniques may reduce or eliminate the size of stormwater facilities and infrastructure. LID would be especially effective in areas with Group A (outwash) soils, such as Everett and Indianola which are generally found the lower elevations of the Belfair UGA, as shown in Figure 2-3. Outwash soils are generally well drained with little generation of surface runoff. Such soils are well suited for LID techniques such as downspout dispersion and the use of permeable pavement. There are a large variety of LID options available; descriptions of potential LID options are included in Appendix A.

## 5.6 Mason County Small Parcel Stormwater Site Plan Requirements

Mason County Ordinance No. 114-06 provides requirements for managing storm drainage on small sites. A “Small Parcel Stormwater Site Plan” is required whenever a building application is made for residential development with more than 2,000 square feet of new roof, paving, gravel or parking area. The plan consists of a written description of the proposed stormwater management features, an erosion and sediment control plan to be followed during construction, and a residential site improvement plan which shows how stormwater runoff will be controlled after construction.

The Small Parcel Stormwater Site Plan process complies with Ecology’s Minimum Technical Requirements #1 through #5. These requirements apply to developments with less than 5,000 square feet of impervious area under Ecology’s definitions. Thus the Small Parcel Stormwater Plan requirements may also be applied to residential development between 2,000

## Section 5— Regulatory Criteria Continued

and 5,000 square feet. Above 5,000 square feet, Technical Requirements #1 through #10 apply, and exceed the County's small parcel requirements.

## Section 6—SWM Impacts, Analysis and Strategies

### 6.1 Introduction

The development, evaluation and selection of stormwater management concepts for the Belfair UGA are described in this section. The evaluations were performed subbasin by subbasin and included consideration of the following:

- Subbasin size and proposed land use
- Receiving water and the presence of fish
- Subbasin soils and the potential to infiltrate stormwater
- Proposed land use
- Potential for regional stormwater facilities within a subbasin or subbasins
- Potential for joint-use stormwater facilities by expanding the proposed SR 3 widening project facilities to accommodate UGA development
- Potential to implement water quality retrofit facilities for existing commercial areas
- Potential fish passage improvements

These evaluations provided the guidance to develop a recommended stormwater management plan for each subbasin. Resulting recommended plans and associated capital improvement projects are described in Section 7.

As a part of these evaluations, hydrologic modeling was performed to quantify preliminary water quality and detention volume requirements for the types of land uses allowed by the UGA zoning and the local soil conditions within each subbasin. The results of the modeling are presented first, followed by the results of the evaluation of stormwater management concepts for regional facilities, joint-use facilities, water quality retrofitting and fish passage improvements for each subbasin. A summary of the stormwater engineering analysis is presented at the end of this section.

### 6.2 Hydrologic Modeling

Hydrologic modeling for the Belfair UGA was completed using a continuous-simulation model, MGSFlood, Version 3. MGSFlood is a continuous, rainfall-runoff model developed specifically for stormwater facility design in Western Washington. It based on, and is consistent with, the design requirements of the Ecology 2005 Manual. The program uses the EPA Hydrologic Simulation Program-Fortran (HSPF) model for computing runoff from rainfall. MGSFlood uses one-hour time step precipitation data to predict flow rates. A GIS analysis was used to delineate soil-cover areas for modeling.

The modeling was performed for two purposes: (1) estimate peak flows to road culverts under SR 3 and Old Belfair Highway to assess the adequacy of culvert capacities; (2) estimate

## Section 6—SWM Impacts, Analysis and Strategies

Continued

existing unrouted peak flows at subbasin boundaries; and (3) to estimate preliminary water quality treatment, detention and infiltration pond volumes for the types of development allowed by the Belfair zoning as well as for existing business-industrial developments that may wish to redevelop.

The results of the road culvert capacity evaluation, which used 25-year frequency peak flow values, are presented in Section 3. The estimated unrouted peak flow modeling results at subbasin boundaries for the 2-year, 25-year and 50-year frequency events are presented in Table 6-1.

<b>Table 6-1</b>				
<b>Existing Subbasin Unrouted Peak Flows at Basin Boundaries</b>				
<b>Basin ID #</b>	<b>Area, Acres</b>	<b>Unrouted Peak Flow, cfs</b>		
		<b>2-yr</b>	<b>25-yr</b>	<b>50-yr</b>
10	52.3	3.2	6.0	6.2
20	212.6	14.2	26.0	26.5
30	184.3	10.9	20.7	21.1
40	94.6	6.8	12.6	12.7
50	64.0	5.9	9.7	9.9
60	68.7	4.6	8.8	9.1
70	344.1	25.1	43.8	45.1
80	125.4	13.0	20.4	22.1
90	251.1	17.6	31.5	31.6
100	267.6	42.1	66.0	68.6
110	45.0	11.4	15.5	15.9
120	313.0	32.2	47.5	47.8
130	88.1	7.4	11.9	12.4
140	203.9	13.4	24.4	25.2
150	100.7	21.6	29.2	31.0
160	432.1	30.0	56.1	56.3
200	106.6	8.5	14.2	15.7
210	119.2	4.4	11.5	11.9
220	10.2	1.9	2.7	2.9

The results of hydrologic modeling to estimate stormwater management volumes per unit acre of development are presented in Table 6-2. Water quality treatment will be required for all zoning categories listed. Detention volumes were calculated only for Hydrologic Soil Group C (till) soils which generally do not allow significant amounts of infiltration. Runoff in Group A (outwash) and Group B soils was assumed to be fully infiltrated and infiltration facilities were size for these areas. For the infiltration sizing, Mixed Use (MU) zoning was used for three different infiltration rates (0.5-, 1.0-, and 2.0 inches per hour). The modeling

## Section 6—SWM Impacts, Analysis and Strategies

Continued

was performed for conceptual ten-acre basins and the results converted to a unit acre basis so the results could be applied to any size of proposed development. The impervious areas given in Table 6-1 are based on the percentage of lot coverage allowed for each zoning land use in the Belfair Comprehensive Plan (refer to Table 4-1). The results of the hydrologic modeling are presented in Appendix B and summarized in Table 6-2.

<b>Table 6-2</b>						
<b>Hydrologic Modeling Results</b>						
<b>Rate Control and Water Quality Volumes (2005 DOE)</b>						
Proposed Condition			Typical Results Per 1 Acre Developed			
Zoning	Land Use Developed					
	Impervious Area (ac)	Grass Area (ac)	Wet Pond Volume (cf)	Detention Volume (cf)	Infiltration Pond Volume (cf)	Footprint incl. access (sf)
R-3	3.5	6.5	4,600	11,200	—	5,500
R-5	4	6	4,800	13,800	—	6,900
R-10	5	5	5,100	14,800	—	7,300
MU2	8.5	1.5	6,700	18,300	—	8,500
ROW	9	1	6,900	19,400	—	8,900
Ex_BI_60	6	4	5,500	16,700	—	8,100
Ex_BI_80	8	2	6,400	19,800	—	9,400
MU(0.5)	8.5	1.5	6,300	—	17,700	8,500
MU(1.0)	8.5	1.5	6,300	—	11,200	5,800
MU(2.0)	8.5	1.5	6,300	—	8,500	4,700

<b>Zoning Classifications</b>	
R-3	Single Family Residential
R-5	Medium Density Residential
R-10	Multi Family Residential
MU	Mixed Use
EX BI 60	Existing BI 60% Impervious
EX BI 80	Existing BI 80% Impervious

The values given in Table 6-2 are for one developed acre. Multiplication of the values times a proposed development area will give a rough approximation of the volumes and land areas required for needed stormwater facilities. The land area estimates include a 20-foot maintenance width allowance on all four sides of the detention/treatment ponds. These estimates were also used to determine preliminary land requirements for potential regional stormwater facilities as a part of the facility evaluation process.

## Section 6—SWM Impacts, Analysis and Strategies

Continued

### 6.3 Regional Facility Analysis

Regional stormwater facilities are generally a cost-effective way to provide stormwater management for multiple users in a watershed. Regional facilities can also reduce future operation and maintenance costs, as typically only one or two facilities are constructed and operated for a large drainage area. Funding of regional facilities can be by private developers or by the County. A latecomer fee can be used by the County to recover costs as properties are developed and connect to the regional facility.

Soil groups within the subbasins were the key factor in determining the potential for regional facilities. In areas with Soil Group A or B, infiltration of stormwater in or nearby areas that are being developed is desirable; this reduces the cost of construction and the use of additional conveyance facilities. Collection of stormwater and conveyance to an offsite regional site is also not as desirable as it changes the natural location of the infiltration. This can affect ground water recharge regimes as well as ground water contributions to stream flows.

Subbasins with significant areas of Soil Group C soils are the most likely for the use of area-wide or regional detention stormwater facilities. This soil group is prevalent in the higher elevations east of SR 3 and is principally zoned residential. These regional facilities would most likely be constructed by private developers during the development process. As a part of the planning and feasibility determination of regional facilities, stream systems in each of the subbasins should be evaluated to determine if there would be any negative impacts such as reduction in base flows. Flow mitigation measures may be needed such as flow splitters to direct base flows and peak flows to mimic natural conditions and to bypass high flows downstream to lower regional facilities.

All nineteen subbasins within the Belfair UGA were evaluated for the potential use of regional facilities. The key criterion was the extent of soil Group C in the subbasin. As a part of the evaluation, core business areas and parks locations, as defined in the Belfair Comprehensive Plan (refer to Figures 4-2 and 4-3) were reviewed in regard to regional facility planning concepts. The results of these evaluations are presented in Table 6-2. Subbasins that were determined to have the potential use of regional facilities included nine of the nineteen subbasins (Subbasins 30, 70, 80, 90, 120, 150, 160, 200, and 210). The potential locations for these regional facilities in each of the respective subbasins are shown in Figure 6-1. (Table 6-2 should be referred to for deciding information on whether or not a subbasin was judged feasible for regional facilities.)

### 6.4 UGA and WSDOT SR 3 Combined Facility Analysis

## Section 6—SWM Impacts, Analysis and Strategies

Continued

The proposed SR 3 Widening Project through Belfair will require stormwater treatment and detention facilities. Conceptual design of facilities for two stormwater alternatives has been developed by WSDOT and is reviewed in the SR 3 project report (Technical Memorandum No. 4) prepared by Pertect, Inc., for Mason County. Alternative 1 provides for detention of net area increases in impervious areas from new roadway development and the release of flows to streams or by dispersed discharge. Alternative 2 proposes direct discharge to Hood Canal from the most southerly stormwater facility (west of Subbasins 10 and 100) and detention in the north part of the project where the road alignment is distant from the Hood Canal shoreline. Discharge from the northerly facilities would also be by release of flows to streams or by dispersed discharge. For both alternatives, enhanced treatment of runoff from the entire width of the roadway is proposed through the use of constructed stormwater treatment wetlands.

The locations of the stormwater facilities proposed in the SR 3 project report are shown in Figure 6-1. Not all UGA subbasins are tributary to a potential SR 3 stormwater facility. Those that are tributary were evaluated for possible expansion and use as joint-use facilities in accepting and treating other local/regional stormwater runoff. The results of the evaluations are presented in Table 6-3. Subbasins 10, 30, 40, 50, 60, 100, 110 and 120 have the potential to be served by joint-use facilities as they can gravity discharge to the SR 3 facilities.

### Opportunities for Regional Coordination

The most likely non-SR 3 contributors to a joint-use facility would be from new or redeveloped commercial areas located along SR 3 and the large majority of existing and zoned business-industrial areas are located in Soil Group A soils. Thus, infiltration of treated stormwater within these developed areas may be feasible and a viable alternative to the expansion of a WSDOT roadway storm facility into a regional joint-use facility. Analyses of alternatives on a site specific basis would need to be performed. Due to the timing and parcel-by-parcel nature of future development and redevelopment opportunities for the integration of local drainage needs with proposed WSDOT SR 3 facilities is not likely to occur except perhaps in isolated instances.

### 6.5 Water Quality Retrofit Analysis

All UGA subbasins with commercial and industrial areas were evaluated for the potential of water quality retrofitting. In general, the existing commercial areas within the Belfair UGA adjacent to SR 3 (with a few exceptions) do not have stormwater treatment facilities. An approach that retrofits existing commercial areas to provide for water quality treatment of

Subbasin ID #	Water Course	Water Type	Receiving Water	Subbasin Area		Potential for Regional Facility with	Comments
				Total Area (ac)	Within UGA (ac)		
10	Unnamed Drainage	U	HC	52.3	16.5	No	Type A soils - stormwater will be infiltrated
20	Alder Creek	F	HC	212.6	40.5	No	Type A soils - stormwater will be infiltrated
30	Sweetwater Creek	F	HC	184.3	184.3	Yes	65% of basin is Type C soil. Type C soils in area zoned R-5 residential; development of large areas (multiple lots) could use regional or area-wide stormwater facilities; funded by private developer.
40	Unnamed Drainage	U	HC	94.6	94.6	No	Type A soils - stormwater will be infiltrated
50	Romance Hill	U	HC	64.0	64.0	No	Type A soils - stormwater will be infiltrated
60	Mindy Creek	F	HC	68.7	68.7	No	Type A soils - stormwater will be infiltrated
70	Belfair Creek	F	UR	344.1	336.0	Yes	72% of basin is Type C soil. Type C soils in area zoned R-5 residential; development of multiple lots could use regional stormwater facilities; funded by private developer. The Belfair UGA Plan proposes two parks in this basin; P-3 Downtown Park and P-4 Regional Park. These sites may present an opportunity for a shared use park/stormwater regional facility.
80	Unnamed Drainage	U	UR	125.4	125.4	Yes	82% of basin is Type C soil. Type C soils in area zoned R-5 & R-3 residential; development of multiple lots could use regional stormwater facilities; funded by private developer.
90	Unnamed Drainage	U	CD	251.1	146.9	Yes	There is a localized low spot in Type A soils that has potential as an infiltration facility. The Belfair UGA Plan proposes a park partially located in this subbasin however, the site does not have a very large tributary area, therefore is not a good location for a stormwater facility.
100	Creek / Wetland	N	HC	267.6	110.9	No	50% of the basin is Type A soil and should be infiltrated. The rest of the basin will require water quality treatment and rate control. Large regional facilities are not likely due to the shape of the basin, but shared facilities between neighbors is a possibility and can be explored by developers.
110	Belfair Creek	N	UR	45.0	42.2	No	37% Type A soils, existing commercial, and dense development, zoning would suggests a regional facility. However, the subbasin's small size, existing developed area, and the stream buffer along Belfair Creek have greatly limited the available land for such a facility.
120	Irene Creek	U	UR	313.0	263.2	Yes	51% of the basin is Type A soil and should be infiltrated. Development projects in Type C soils could use regional stormwater facilities; funded by private developer.
130	Unnamed Drainage	U	UR	88.1	15.7	No	Although 94% Type C soil; regional stormwater facilities would be challenged by the small size of this subbasin.
140	Viola Creek	N	UR	203.9	193.7	No	77% of the basin is Type A soil and should be infiltrated. 76% of the subbasin is zoned R-5 & R-3 residential; development of multiple lots in Type C soils could use regional stormwater facilities; funded by private developer.
150	Unnamed Drainage	U	CD	100.7	99.9	Yes	50% Type A soils, 50% Type C soils. There is a localized low spot in Type A soils that has potential as an infiltration facility.
160	Unnamed Drainage	U	UR	432.1	276.1	Yes	67% of the basin is Type A soil and should be infiltrated. Development projects in Type C soils could use regional stormwater facilities; funded by private developer.
200	Unnamed Drainage	U	CC	106.6	106.6	Yes	95% of basin is Type C soil. This entire subbasin is zoned R-5 residential; development of multiple lots could use regional stormwater facilities; funded by private developer. The Belfair UGA Plan proposes a neighborhood park in this subbasin that may present an opportunity as mixed use facility (park and stormwater wetland).
210	Unnamed Drainage	U	CC	119.2	119.2	Yes	62% of the basin is Type A soil and should be infiltrated. This subbasin is zoned R-5 residential; development of multiple lots in Type C soils could use regional stormwater facilities; funded by private developer.
220	Unnamed Drainage	U	LL	10.2	10.2	No	Although 100% Type C soil; a regional stormwater facility would be challenged by the small size of this subbasin.

## Section 6—SWM Impacts, Analysis and Strategies

Continued

runoff before discharging to Union River and Hood Canal would be beneficial and is an important consideration for the development of the UGA. Commercial areas of potential water quality retrofit are defined by areas of commercial and/or industrial development on either side of SR 3 within the UGA. These areas are shown in Figure 6-2.



Photo 5—Belfair Creek crosses SR 3 through a 48-inch culvert.  
Existing development is in the background.

Factors considered in the evaluations included developed commercial and/or industrial area, primary soil group, the potential to use a joint-use facility and the potential to use LID methods. The results of the evaluations are presented in Table 6-4. In 15 of the 19 subbasins, either joint-use facilities or Low Impact Development methods (or both) provide the potential for water quality retrofit. The comment column of Table 6-4 should be referred to for information on whether or not retrofitting was applicable for a subbasin and if so how water quality retrofitting could be accomplished. At this time, retrofitting of existing development for water quality has not been recommended; however, annual monitoring has been proposed to determine if retrofitting may be needed in the future. If needed in the future, a retrofitting program would be developed.

### 6.6 Fish Passage Improvement Analysis

The Belfair UGA contains both fish bearing and non-fish bearing streams, as shown in Figure 2-4, according to the stream survey information obtained from DNR. The fish bearing streams were reviewed for possible improvements that would restore or facilitate the

Subbasin ID #	Water Course	Water Type	Receiving Water	Subbasin Area		Proposed SR 3 Pond (Alt. 1)	Primary Hydrologic Soil Group		Potential for Joint-Use Facility	Comments
				Total Area (ac)	Within UGA (ac)		Group	(%)		
10	Unnamed Drainage	U	HC	52.3	16.5	I-1 & I-2	A	100.0%	Yes	Potential joint facility
20	Alder Creek	F	HC	212.6	40.5	—	A	89.3%	No	N/A - no site available
30	Sweetwater Creek	F	HC	184.3	184.3	I-1 & I-2	C	64.5%	Yes	Potential joint facility
40	Unnamed Drainage	U	HC	94.6	94.6	K-1 & K-2	A	78.5%	Yes	Potential joint facility
50	Romance Hill Drainage	U	HC	64.0	64.0	L-1	A	65.0%	Yes	Potential joint facility
60	Mindy Creek	F	HC	68.7	68.7	L-2	A	96.9%	Yes	Potential joint facility
70	Belfair Creek	F	UR	344.1	336.0	M	C	71.7%	Yes	Potential joint facility
80	Unnamed Drainage	U	UR	125.4	125.4	—	C	81.8%	No	No facility available
90	Unnamed Drainage	U	CD	251.1	146.9	—	C	49.5%	No	No facility available
100	Creek / Wetland	N	HC	267.6	110.9	I, J, K, & L	A	49.2%	Yes	Basin downstream of SR3, some potential for J-1 & J-2 facilities for areas close to SR-3.
110	Belfair Creek	N	UR	45.0	42.2	N	A	37.1%	Yes	Potential joint facility
120	Irene Creek	U	UR	313.0	263.2	N	A	51.3%	Yes	Potential joint facility
130	Unnamed Drainage	U	UR	88.1	15.7	—	C	94.3%	No	Does not drain to SR3
140	Viola Creek	N	UR	203.9	193.7	—	A	76.5%	No	Does not drain to SR3
150	Unnamed Drainage	U	CD	100.7	99.9	—	C	50.6%	No	Does not drain to SR3
160	Unnamed Drainage	U	UR	432.1	276.1	—	A	66.7%	No	Does not drain to SR3
200	Unnamed Drainage	U	CC	106.6	106.6	—	C	95.0%	No	Does not drain to SR3
210	Unnamed Drainage	U	CC	119.2	119.2	—	A	61.9%	No	Does not drain to SR3
220	Unnamed Drainage	U	LL	10.2	10.2	—	C	99.9%	No	Does not drain to SR3

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Continued

passage of fish. Fish passage barriers include non-fish friendly culverts beneath SR 3, culverts within commercial areas and vertical height barriers. Solutions include fish-friendly culvert system, stream relocations, and fish ladders. The locations of potential improvements are shown in Figure 6-3 and described below.

- Belfair Creek—Belfair Creek is typed by WDNR as fish bearing in its Forest Practices Water Typing mapping. The section of the creek through the commercial area on the west side of SR 3 is piped for about 600 feet. Reinstatement of the creek through this section would require the purchase of private property, construction of a new stream channel and appropriate stream bank landscaping, and construction of a fish-friendly culvert system from the east side of SR 3 to the beginning of the new stream channel. The preliminary estimate of project cost for this is \$1,500,000.
- Mindy Creek—Mindy Creek is similar to Belfair Creek in that it is piped under SR 3 and through a commercial area on the west side of SR 3. The SR 3 project report provides an improvement plan for Mindy Creek that eliminates the piped section by rerouting the creek to the south on the east side of SR 3 and then beneath SR 3 via a fish friendly culvert. From this point, a new stream channel would convey flow to the southwest where it would join the existing Mindy Creek stream channel. This study concurs with and supports the concept presented for Mindy Creek. (It has been assumed that this culvert capacity issue will be addressed by WSDOT during the widening of SR 3.)



Photo 6—Fish Friendly Culvert at SR 3 at Sweetwater Creek

- Sweetwater Creek—This creek has a fish friendly culvert beneath SR 3. However, on the east side of SR 3, a fish blockage exists. The blockage is a drop of about six feet associated with a water wheel. It may be possible to install a fish ladder to provide passage around this obstruction. However, the stream channel condition for fish is not known upstream of the obstruction. It is recommended that a reconnaissance study be

## Section 6—SWM Impacts, Analysis and Strategies

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made of Sweetwater Creek to determine the appropriateness and feasibility of a fish passage facility to improve this potential fishery resource.



Photo 7—Waterwheel Fish Blockage Upstream of SR 3

- Unnamed Channel—The SR 3 Widening Project Report also mentions a fish blockage at the 24-inch culvert crossing of an unnamed channel. This blockage should be field investigated and improvements defined.

### 6.7 Subbasin Design Parameter Summary

Design parameters for each Belfair subbasin are presented in Table 6-5. The parameters include the subbasin area, soils, existing land use, proposed land use, primary and secondary method of runoff rate control, water quality treatment standard, and the potential as determined from screening analyses for regional stormwater facilities, joint-use facilities with the SR 3 improvement project, water quality retrofitting of the existing commercial area and for fish passage improvements.

These parameters provided the guidance used to define the stormwater management approach for each subbasin. For example, a subbasin with principally residential development and soils with good infiltration characteristics (such as Subbasin 20) would not be a good candidate for a regional stormwater facility. This is because infiltration is readily available for new development and through the use of more expensive regional facilities is not needed.

**Table 6-5  
Water Quality Treatment Retrofit Evaluations**

Subbasin ID #	Water Course	Water Type	Receiving Water	Subbasin Area		Existing B-I, FR, GC & MU LAND USE		Primary Hydrologic Soil Group		Potential Joint use with SR3	LID Retrofit Potential <sup>2</sup>	Comments
				Total Area	Within UGA	(ac)	(%)	Group	(%)			
				(ac)	(ac)	(ac)	(%)	Group	(%)			
10	Unnamed Drainage	U	HC	52.3	16.5	1.3	8%	A	100.0%	Yes	No	LID retrofit is encouraged, however due to the small amount of existing development the benefits may be limited. Joint facility may be used for retrofit of existing development (depending on when facility is constructed).
20	Alder Creek	F	HC	212.6	40.5	0.2	1%	A	89.3%	No	No	No existing development to retrofit.
30	Sweetwater Creek	F	HC	184.3	184.3	0.0	0%	C	64.5%	Yes	No	No existing development to retrofit.
40	Unnamed Drainage	U	HC	94.6	94.6	8.3	9%	A	78.5%	Yes	Yes	LID retrofit is encouraged to provide pre-treatment upstream of existing treatment by dispersion. Due to the limited amount of space between existing developments and SR3 the retrofit benefits may be limited. Joint facility may be used for retrofit of existing development (depending on when facility is constructed).
50	Romance Hill Drainage	U	HC	64.0	64.0	5.9	9%	A	65.0%	Yes	Yes	LID retrofit is encouraged, however due to the limited amount of space between existing developments and SR3 the retrofit benefits may be limited. Joint facility may be used for retrofit of existing development (depending on when facility is constructed).
60	Mindy Creek	F	HC	68.7	68.7	10.0	15%	A	96.9%	Yes	Yes	LID retrofit is encouraged, however due to the limited amount of space between existing developments and SR3 the retrofit benefits may be limited. Joint facility may be used for retrofit of existing development (depending on when facility is constructed).
70	Belfair Creek	F	UR	344.1	336.0	7.8	2%	C	71.7%	Yes	Yes	Joint facility may be used for retrofit of existing development (depending on when facility is constructed). The Belfair GMA plan shows a proposed downtown park that may provide a location for LID retrofit.
80	Unnamed Drainage	U	UR	125.4	125.4	15.1	12%	C	81.8%	No	Yes	Proposed streetscape landscaping along SR3 may be used for retrofit of existing water quality treatment (depending on when facility is constructed).
90	Unnamed Drainage	U	CD	251.1	146.9	10.5	7%	C	49.5%	No	Yes	Existing water quality treatment is by dispersion as stormwater infiltrates at a local depression. Existing water quality treatment can be improved by providing pre-treatment in the form of a filter strip, rain garden or other LID technique.
100	Creek / Wetland	N	HC	267.6	110.9	17.6	16%	A	49.2%	Yes	Yes	Joint facility may be used for proposed development and retrofit of existing development (depending on when facility is constructed). Existing water quality treatment is by dispersion as stormwater flows to Hood Canal. Existing water quality treatment can be improved by providing pre-treatment in the form of a filter strip, rain garden or other LID technique.
110	Belfair Creek	N	UR	45.0	42.2	24.3	58%	A	37.1%	Yes	Yes	Joint facility may be used for retrofit of existing development (depending on when facility is constructed). Existing water quality treatment (such as the open channel through the QFC parking lot) can be improved by providing pre-treatment in the form of a filter strip, rain garden or other LID technique. Underground storm filter vaults may be installed to retrofit existing developments that lack the space to use LID techniques.
120	Irene Creek	U	UR	313.0	263.2	29.2	11%	A	51.3%	Yes	Yes	Existing water quality treatment (achieved by dispersion) can be improved by providing pre-treatment in the form of a filter strip, rain garden or other LID technique. Underground storm filter vaults may be installed to retrofit existing developments that lack the space to use LID techniques. Joint facility may be used for retrofit of existing development (depending on when facility is constructed).
130	Unnamed Drainage	U	UR	88.1	15.7	0.0	0%	C	94.3%	No	No	No existing development to retrofit.
140	Viola Creek	N	UR	203.9	193.7	14.0	7%	A	76.5%	No	Yes	Existing water quality treatment (achieved by dispersion) can be improved by providing pre-treatment in the form of a filter strip, rain garden or other LID technique.
150	Unnamed Drainage	U	CD	100.7	99.9	56.5	57%	C	50.6%	No	Yes	LID retrofit is encouraged, the extent of existing water quality treatment is unknown.
160	Unnamed Drainage	U	UR	432.1	276.1	28.7	10%	A	66.7%	No	Yes	LID retrofit is encouraged, the extent of existing water quality treatment is unknown.
200	Unnamed Drainage	U	CC	106.6	106.6	0.0	0%	C	95.0%	No	No	No existing development to retrofit.
210	Unnamed Drainage	U	CC	119.2	119.2	0.0	0%	A	61.9%	No	No	No existing development to retrofit.
220	Unnamed Drainage	U	LL	10.2	10.2	4.0	40%	C	99.9%	No	Yes	LID retrofit is encouraged, however due to the small amount of existing development the benefits may be limited.

1. Dispersion Potential requires Type A soils for infiltration. Water quality treatment is provided as stormwater moves through the soil. Pre-treatment is typically required.

Cation exchange treatment requires soil sampling and testing on a parcel by parcel basis.

2. LID for retrofit of existing water quality treatment is beneficial and therefore recommended in all basins. This column highlights the areas of dense existing development that offer the greatest opportunity for improved water quality.

## Section 6—SWM Impacts, Analysis and Strategies

Continued

Recommended stormwater plans for each Belfair subbasin are presented in Section 7. These are developed for each subbasin based on the results of the evaluation of parameters as defined in this section. For example, the subbasin size, soil group type, future zoning and joint-use facility availability all influence the sub basin's stormwater management plan.

				Subbasin Area		Hydrologic Soil Group for areas within the UGA				B-I, FR, GC & MU LAND USE				R & ROW Land Use				Rate Control Method		WQ	WQ	Regional	UGA/SR-3	
Subbasin ID #	Water Course	Water Type	Receiving Water	Area (ac)	UGA (ac)	Primary		Secondary		Existing		Future		Future Residential %				Future ROW %	Primary	Secondary	WQ Standard	WQ Retrofit Candidate	Regional Facility Candidate	UGA/SR-3 Joint Facility Candidate
						Group	(%)	Group	(%)	(ac)	(%)	(ac)	(%)	R-3	R-5	R-10	Total							
10	Unnamed Drainage Course	U	HC	52.3	16.5	A	100.0%	—	—	1.3	8%	8.5	52%	45%	0%	0%	45%	4%	I	D,SD	Basic	No	No	Yes
20	Alder Creek	F	HC	212.6	40.5	A	89.3%	C	10.7%	0.2	1%	3.7	9%	72%	1%	13%	86%	5%	I	D,SD	Basic*	No	No	No
30	Sweetwater Creek	F	HC	184.3	184.3	C	64.5%	A	35.5%	0.0	0%	6.0	3%	28%	57%	6%	91%	6%	D, SD	I	Basic*	No	Yes	Yes
40	Unnamed Drainage Course	U	HC	94.6	94.6	A	78.5%	C	21.5%	8.3	9%	30.9	33%	39%	25%	0%	64%	4%	I	D,SD	Basic	Yes	No	Yes
50	Romance Hill Drainage	U	HC	64.0	64.0	A	65.0%	C	35.0%	5.9	9%	13.6	21%	33%	22%	11%	66%	12%	I	D,SD	Basic	Yes	No	Yes
60	Mindy Creek	F	HC	68.7	68.7	A	96.9%	C	3.1%	10.0	15%	14.0	20%	41%	33%	3%	77%	3%	I	D,SD	Basic	Yes	No	Yes
70	Belfair Creek	F	UR	344.1	336.0	C	71.7%	A	26.7%	7.8	2%	18.8	6%	16%	23%	51%	90%	5%	D, SD	I	Basic	Yes	Yes	Yes
80	Unnamed Drainage Course	U	UR	125.4	125.4	C	81.8%	A	18.2%	15.1	12%	25.8	21%	15%	50%	5%	70%	9%	D, SD	I	Basic	Yes	Yes	No
90	Unnamed Drainage Course	U	CD	251.1	146.9	C	49.5%	A	48.7%	10.5	7%	110.0	75%	0%	0%	23%	23%	4%	D, SD	I	Basic	Yes	Yes	No
100	Creek / Wetland	N	HC	267.6	110.9	A	49.2%	D	40.9%	17.6	16%	69.4	63%	26%	0%	9%	35%	4%	I	D,SD	Basic	Yes	No	Yes
110	Belfair Creek	N	UR	45.0	42.2	A	37.1%	C	31.9%	24.3	58%	23.5	56%	0%	0%	33%	33%	11%	I	D,SD	Basic	Yes	No	Yes
120	Irene Creek	U	UR	313.0	263.2	A	51.3%	C	38.7%	29.2	11%	41.5	16%	35%	35%	0%	70%	7%	I	D,SD	Basic	Yes	Yes	Yes
130	Unnamed Drainage Course	U	UR	88.1	15.7	C	94.3%	B	5.7%	0.0	0%	0.0	0%	96%	0%	0%	96%	4%	D, SD	I	Basic	No	No	No
140	Viola Creek	N	UR	203.9	193.7	A	76.5%	C	13.7%	14.0	7%	24.4	13%	66%	11%	0%	77%	6%	I	D,SD	Basic	Yes	No	No
150	Unnamed Drainage Course	U	CD	100.7	99.9	C	50.6%	A	49.4%	56.5	57%	95.7	96%	0%	0%	0%	0%	4%	D, SD	I	Basic	Yes	Yes	No
160	Unnamed Drainage Course	U	UR	432.1	276.1	A	66.7%	C	28.7%	28.7	10%	71.1	26%	45%	25%	0%	70%	5%	I	D,SD	Basic	Yes	Yes	No
200	Unnamed Drainage Course	U	CC	106.6	106.6	C	95.0%	A	5.0%	0.0	0%	0.3	0%	0%	99%	0%	99%	0%	D, DD	I	Basic	No	Yes	No
210	Unnamed Drainage Course	U	CC	119.2	119.2	A	61.9%	C	37.2%	0.0	0%	0.0	0%	0%	100%	0%	100%	0%	I	D, DD	Basic	No	Yes	No
220	Unnamed Drainage Course	U	LL	10.2	10.2	C	99.9%	---	0.0%	4.0	39%	10.2	100%	0%	0%	0%	0%	0%	I	D, DD	Basic*	Yes	No	No
Totals	----	----	----	3083.4	2314.5	A	49.7%	C	44.8%	233.4	10%	567.4	25%	28%	34%	7%	69%	5%	----	----	----	----	----	----

**Hydrologic Soil Group Classification Descriptions**

- A High infiltration rate; low runoff; excessively drained
- B Moderate infiltration when wet; moderately well; to well drained
- C Slow infiltration when wet; has a layer that impedes downward water movement
- D Very slow infiltration; often resulting from clay and/or a high water table; nearly impervious

Descriptions are based on information provided by <http://websoilsurvey.nrcs.usda.gov>

**Zoning Classifications**

- ROW Right of way
- B-I Business Industrial
- FR Festival Retail
- GC General Commercial
- GC-BI General Commercial & Business Industrial
- LTA Long Term Agricultural
- MU Mixed Use
- R-10 Multi Family Residential
- R-3 Single Family Residential
- R-5 Medium Density Residential

**Receiving Water**

- HC Hood Canal
- UR Union River
- CD Closed Depression
- CC Coulter Creek
- LL Lider Lake

**Rate Control Method**

- I Infiltration
- D Detention
- SD Stream Discharge
- DD Dispersed Discharge
- \* Enhanced treatment required for commercial and multifamily development

## Section 7—SWM Plan: Capital Projects

### 7.1 Introduction

Based on the previous analyses described in Section 6, stormwater management strategies including both projects and management activities have been developed for the Belfair UGA. These strategies have been developed and are presented by subbasin to reflect the soils, existing development, zoning and other characteristics unique to each subbasin within the study area. The management strategies presented in following Belfair Stormwater Management Plan focus on enhancing the design criteria for new developments as well as studies and projects aimed at enhancing water quality and habitat functions within the Belfair UGA. The first priority is a recommendation to use the Ecology 2005 Manual requirements for new development and ultimate buildout.

It is anticipated that most future stormwater improvements associated with new development will be designed, constructed and funded by private developers, and have therefore not been included in the Mason County, Belfair SWM Plan or associated CIP program. The exception would be if the County determined that it would be in the public's best interest to acquire a potential regional stormwater site because of its strategic location with respect to drainage considerations. This advance purchase of the site would likely be paid back by future development.

### 7.2 Summary of Findings

The following are the key findings associated with the development of the Belfair UGA Stormwater Management Plan:

- There are no identified existing major flooding or hydraulic capacity problems within the Belfair UGA and, as a result no major system upgrades are being recommended.
- There are several reported localized flooding problems and several existing road culverts that may have capacity problems as identified from the hydrologic modeling of this study. Coordination with WSDOT on SR 3 drainage issues is recommended as is on-going program of road culvert maintenance and tributary basin investigation to identify and correct road culvert capacity problems.
- Fish blockages are present on Belfair Creek and Mindy Creek and projects to correct both of these blockages have been identified.
- Baseline habitat and water quality data are not available for the streams in the Belfair UGA. A program is recommended to obtain this information so that problems can be identified and projects developed to address any significant problems.
- Ecology has established a Total Maximum Daily Load for fecal coliform bacteria for the Union River. Activities are identified to enlist the public through educational means to reduce fecal coliform bacteria as well as other pollutants associated with existing

## Section 7—SWM Plan: Capital Projects

Continued

stormwater discharges. Water quality retrofit potentials have been identified for each subbasin with existing commercial-industrial development should they be needed to address the water quality problems in the Union River and Hood Canal. For identified problems, a cooperative retrofit program has been proposed with potential funding developed on a cost sharing basis by property owners and Mason County with support from future grant funds.

- The Belfair Comprehensive Plan contains plans for future park and transportation improvements; coordination of these regional planning efforts with stormwater recommendations as provided in plan.
- The use of regional stormwater facilities in the Belfair UGA will, with limited exceptions, be most applicable to the residential zoned areas east of SR 3. Subbasins with the regional SWM facilities potential have been identified.
- Due to topography and existing and future land uses, there are limited opportunities to coordinate the regional drainage needs of the UGA with development of SR 3 drainage facilities proposed by WSDOT.

### 7.3 Recommended Stormwater Management Strategies for Each Subbasin

Recommended stormwater management projects and activities for the Belfair subbasins are presented in Table 7-1. Implementation of these plans will be principally by private developers as new projects are constructed within each of the subbasins. For each Belfair UGA subbasin, the stormwater strategy includes the following:

- Type of development
- Type of needed water quality and rate control facilities
- Potential water quality retrofit opportunities for existing commercial-industrial development
- Potential use of regional SR 3 joint-use stormwater facilities
- Consistency with Belfair Comp Plan and vision for ultimate development.
- Opportunities to coordinate with future County infrastructure projects (especially transportation projects)
- Proposed fish passage improvements

The desirability of coordinating with WSDOT on joint-use stormwater facilities, water quality retrofitting of existing commercial areas and implementation of fish passage improvements is acknowledged and reflected in this plan. Whenever practical, these types of regional project have been promoted and included in this plan.

Table 7-1 Recommended Stormwater Management Plans									
Subbasin ID #	Water Course	Water Type	Receiving Water	Subbasin Area		Type of development and water quality and rate control facilities	Existing commercial water quality retrofit program	Regional or SR 3 joint-use stormwater facility program	Proposed fish passage improvements
				Total Area (ac)	Within UGA (ac)				
10	Unnamed Drainage Course	U	HC	52.3	16.5	Roughly half commercial and half residential development. Treated stormwater will be infiltrated.	NA - only a small area of commercial is present. Future site evaluation for LID application recommended.	NA - Type A soils present	NA
20	Alder Creek	F	HC	212.6	40.5	86% residential development. The large majority of stormwater will be infiltrated.	NA - No existing commercial is present. Future site evaluation for LID application recommended.	NA - Type A soils present	Replace existing 24-inch diameter "not fish-friendly" culvert per Pertect report
30	Sweetwater Creek	F	HC	184.3	184.3	91% residential development. About two-third of the development will have detention and discharge to the creek. The remainder will infiltrate.	NA - No existing commercial is present. Future site evaluation for LID application recommended.	This is a large residential basin with primarily Type C soils. Regional facilities or multiple-project shared facilities are possibilities. Such facilities would be best funded privately. <u>Joint-use Facility</u> : Possible project with SR 3 Pond .	A fish ladder should be evaluated at the stream drop/water wheel on the north side of SR 3.
40	Unnamed Drainage Course	U	HC	94.6	94.6	Roughly one-third commercial and two-thirds residential development. The majority of the stormwater will be infiltrated.	Approximately 8 acres of existing commercial development. The presence of Type A soils, the lack of an active stream, and the distance to Hood Canal would suggest that adequate treatment of this runoff may be occurring by subsurface discharge through the soils in the down gradient Subbasin 100. Further analysis of commercial drainage collection in Subbasin 40 and routing through Subbasin 100 would be necessary to a determination of adequate soil treatment.	NA - 80% of soils are Type A <u>Joint-use Facility</u> : Possible project with SR 3 Pond .	NA
50	Romance Hill Drainage	U	HC	64.0	64.0	Roughly 21% commercial and 66% residential development. About two-thirds of the stormwater will be infiltrated and the rest detained and released to the Romance Hill Drainage system. About 14 acres of commercial development is planned for the future of which 6 acres is existing. Some of this development will likely be redevelopment of existing commercial properties.	Approximately 6 acres of commercial development is existing. This area is a candidate for water quality retrofit. Treatment facilities could be located in Subbasin 50; or down-gradient in Subbasin 100 either as a standalone facility or partially in a joint-use facility with the SR-3 project (Pertect Ponds J, K and L) in Subbasin 100.	<u>Regional Facility</u> : NA, smaller basin, 65% of the soils are Type A. <u>Joint-use Facility</u> : Possible project with Pertect Pond L2 either for water quality retrofit and/or new commercial adjacent to SR 3.	NA
60	Mindy Creek	F	HC	68.7	68.7	Roughly half commercial and half residential development. Treated stormwater will be infiltrated.	Approximately 6 acres of commercial development is existing and this will increase to about 10 acres in the future condition. This area is a candidate for water quality retrofit. Treatment facilities could be located in Subbasin 60; or down-gradient in Subbasin 100 either as a standalone facility or in a joint-use facility with the SR-3 project (Pertect Pond L2). This would be a combined project with Subbasin 50, Mindy Creek.	<u>Regional Facility</u> : NA, smaller basin, 97% of the soils are Type A. <u>Joint-use Facility</u> : Possible project with SR 3 Pond L2 either for water quality retrofit and/or new commercial adjacent to SR 3.	The SR 3 Widening Project Report provides an improvement plan for Mindy Creek that eliminates the piped section by rerouting the creek to the south on the north side of SR 3 and then beneath SR 3 via a fish friendly culvert. From this point a new stream channel would convey flow to the south where it would join the existing Mindy Creek stream channel. It is recommended that this potential project be pursued.
70	Belfair Creek	F	UR	344.1	336.0	90% residential development (23% R-5, 16% R-3, and 51% R-10). About 72% of the development will have detention and discharge to the creek system. The remainder will infiltrate within or near individual project areas.	Approximately 8 acres of existing commercial development exists in this basin. Potential water quality retrofit opportunities may exist at the proposed Belfair park P-3 and/or at the proposed Pertect Pond M.	<u>Regional Facility</u> : Regional Facilities may be located at proposed park locations P-3 and P-4 (Belfair UGA Plan figure 32). <u>Joint-use Facility</u> : Possible project with SR 3 Pond M either for water quality retrofit and/or portion of subbasin in as redevelopment projects occur.	Opening up of Belfair Creek through the existing commercial area (downstream in subbasin 110) would be a significant undertaking and is likely not to be feasible.
80	Unnamed Drainage Course	U	UR	125.4	125.4	50% R-5 residential, 21% commercial, and 15% R-3 residential development. About 82% of the development will have detention and discharge to the drainage system. The remaining 18% will infiltrate within or near individual project areas.	Approximately 15 acres of commercial development is existing and this will increase to about 26 acres in the future condition. This area is a candidate for water quality retrofit. Treatment facilities would be located in Subbasin 80 as a standalone facility. Joint use opportunity with the SR3 streetscape plan.	<u>Regional Facility</u> : Regional facilities or multiple-project shared facilities are possibilities. Such facilities would be best funded privately. <u>Joint-use Facility</u> : There are no SR 3 proposed ponds in this subbasin.	NA

**Table 7-1  
Recommended Stormwater Management Plans**

Subbasin ID #	Water Course	Water Type	Receiving Water	Subbasin Area		Type of development and water quality and rate control facilities	Existing commercial water quality retrofit program	Regional or SR 3 joint-use stormwater facility program	Proposed fish passage improvements
				Total Area (ac)	Within UGA (ac)				
90	Unnamed Drainage Course	U	CD	251.1	146.9	23% R-10 residential development, 75% commercial development. About 50% of the development will have detention and discharge to the creek system. The remainder will infiltrate within or near individual project areas.	Approximately 10.5 acres of commercial development is existing and will increase to about 110 acres. Existing water quality treatment can be improved by providing pre-treatment in the form of a filter strip, rain garden or other LID technique.	This is a large principally commercial basin with equal areas of Type A and C soils. Regional facilities or multiple-project shared facilities are possibilities. Such facilities would be best funded privately.	NA
100	Creek / Wetland	N	HC	267.6	110.9	35% residential development, 63% commercial development. About 50% of the development will infiltrate within or near individual project areas. The remainder will have detention and discharge to a creek system or by dispersion.	Approximately 18 acres of commercial development is existing and this will increase to about 69 acres in the future condition. This area is a candidate for water quality retrofit. Treatment facilities would be located in Subbasin 100 as a stand-alone LID facility, or possibly in a joint-use facility with the SR-3 project.	This is a large principally commercial basin with equal areas of Type A and C soils. Regional facilities or multiple-project shared facilities are possibilities. Such facilities would be best funded privately. <u>Joint-use Facility</u> : Possible project with SR 3 Pond.	NA
110	Belfair Creek	N	UR	45.0	42.2	33% R-10 residential development, 56% commercial development. The existing commercial area is about 58% of the basin, so there will be only a minor change from existing to future commercial land use. In theory, about one-third of the development could be infiltrated within or near individual project areas. However, the extent of the existing subbasin development will likely provide a lesser fraction that will infiltrate. The remainder will have detention and discharge to a creek system or by dispersion. Redevelopment criteria will apply to much of this subbasin.	Approximately 24 acres of commercial development is existing and this will remain at about 24 acres in the future condition. This area is a candidate for water quality retrofit. Treatment facilities would be located in Subbasin 110 as a standalone facility, or possibly for part of the area in a joint-use facility with the SR-3 project (SR 3 Pond N) in Subbasin 110. Joint facility may be used for retrofit of existing development (depending on when facility is constructed). Existing water quality treatment (such as the open channel through the QFC parking lot) can be improved by providing pre-treatment in the form of a filter strip, rain garden or other LID technique. Underground storm filter vaults may be installed to retrofit existing developments that lack the space to use LID techniques.	<u>Regional Facility</u> : NA, smaller basin, divided by Belfair Creek system. <u>Joint-use Facility</u> : Possible project with SR 3 Pond N either for water quality retrofit and/or portion of subbasin in as commercial redevelopment projects occur.	Opening up of Belfair Creek through the existing commercial area would be a significant undertaking
120	Irene Creek	U	UR	313.0	263.2	70% residential development, 16% commercial development. About one-half of the development will infiltrate within or near individual project areas. The remainder will have detention and discharge to the creek system.	Approximately 28 acres of commercial development is existing and this will increase to about 42 acres in the future condition. This area is a candidate for water quality retrofit. Treatment facilities would be located in Subbasin 120 as a standalone facility.	<u>Regional Facility</u> : This is a large primarily residential basin with approximately 40% Type C soils. Regional facilities or multiple-project shared facilities are possibilities. Such facilities would be best funded privately. <u>Joint-use Facility</u> : Possible project with SR 3 Pond	NA
130	Unnamed Drainage Course	U	UR	88.1	15.7	100% R-3 residential development. Nearly all areas will have detention and discharge to a creek system or by dispersion.	NA - No existing commercial	NA - Small subbasin	NA
140	Viola Creek	N	UR	203.9	193.7	76% residential development, 13% commercial development. About 75% of the development will infiltrate within or near individual project areas. The remainder will have detention and discharge to creek systems or by dispersion	Approximately 16 acres of commercial development is existing and this will increase to about 24 acres in the future condition. This area is a candidate for water quality retrofit. Treatment facilities would be located in Subbasin 140 as a standalone facility.	NA - 77% of the soils are Type A	NA
150	Unnamed Drainage Course	U	CD	100.7	99.9	96% B-I commercial development. About 50% of the development will infiltrate within or near individual project areas. The remainder will have detention and discharge to existing systems or by dispersion.	Approximately 57 acres of commercial development is existing and this will increase to about 96 acres in the future condition. This area is a candidate for water quality retrofit. Treatment facilities would be located in Subbasin 150 as a standalone facility.	This is a large principally commercial basin with equal areas of Type A and C soils. Regional facilities or multiple-project shared facilities are possibilities. Such facilities would be best funded privately.	NA
160	Unnamed Drainage Course	U	UR	432.1	276.1	69% residential development, 26% commercial development. About 67% of the development will infiltrate within or near individual project areas. The remainder will have detention and discharge to creek systems or by dispersion	Approximately 29 acres of commercial development is existing and this will increase to about 71 acres in the future condition. This area is a candidate for water quality retrofit. Treatment facilities would be located in Subbasin 160 as a standalone facility.	Regional facilities or multiple-project shared facilities are possibilities. Such facilities would be best funded privately.	NA

Table 7-1 Recommended Stormwater Management Plans									
Subbasin ID #	Water Course	Water Type	Receiving Water	Subbasin Area		Type of development and water quality and rate control facilities	Existing commercial water quality retrofit program	Regional or SR 3 joint-use stormwater facility program	Proposed fish passage improvements
				Total Area (ac)	Within UGA (ac)				
200	Unnamed Drainage Course	U	CC	106.6	106.2	99% R-5 residential development. Nearly all areas will have detention and discharge to a creek system or by dispersion.	NA - No existing commercial	Regional Facility: This is a medium sized residential basin with nearly all Type C soils. Regional facilities or multiple-project shared facilities are possibilities. Such facilities would be best funded privately.	NA
210	Unnamed Drainage Course	U	CC	119.2	119.2	100% R-5 residential development. About 62% of the development will infiltrate within or near individual project areas. The remainder will have detention and discharge to creek systems or by dispersion.	NA - No existing commercial	Regional Facility: This is a medium sized residential basin with a 60/40 split between Type A and C soils. Regional facilities or multiple-project shared facilities are possibilities. Such facilities would be best funded privately.	NA
220	Unnamed Drainage Course	U	LL	10.2	10.2	100% B-I commercial development. Nearly all areas will have detention and discharge to a creek system or by dispersion.	Approximately 4 acres of business-industrial development is existing and this will increase to about 10 acres in the future condition. This area should be field reviewed to determine if it is a candidate for water quality retrofit. If so, treatment facilities would be located in Subbasin 220 as a standalone facility.	NA - Small subbasin	NA
			Totals	3083.4	2314.1				

## Section 7—SWM Plan: Capital Projects

Continued

The various elements of the recommended stormwater management activities for the Belfair UGA are presented in Table 7-2. Monitoring, coordination, and investigation activities and CIP projects are included in the activities which span a 26-year period.

Each proposed short-term activity (1-6 years) is described below.

### **Activity #1: Coordinate with WSDOT Regarding Culvert Maintenance and the Relocation of Mindy Creek (as a Part of the SR 3 Project) (Using existing County staff)**

- County maintenance crew will coordinate with the local WSDOT maintenance crew to establish a regular annual maintenance and monitoring program for the existing culverts/outfalls. Also, coordinate with WSDOT on the relocation of Mindy Creek on the east and west sides of SR 3 and the installation of a fish-friendly culvert under SR 3 relative to the stream habitat enhancement objectives of the Belfair UGA.

### **Activity #2: Road Culvert Monitoring Program**

The purpose of the short-term culvert monitoring program is to observe the operation of the existing drainage system during storm events. Identified problems could trigger investigation of upstream and/or downstream conditions. This could be performed by County maintenance staff. Subbasin studies to determine solutions to identified problems may be performed by a consultant.

### **Activity #3: Coordinate with WSDOT on Streetscape Improvements (As a Part of the SR 3 Project) (Using existing County staff)**

- Coordinate with WSDOT on streetscape improvements in areas where right-of-way width may allow water quality facilities (rain gardens, etc.) to be included for treatment of existing impervious areas.

### **Activity #4: Coordination with WSDOT on SR 3 (Using existing County staff)**

- Coordinate with WSDOT to establish the feasibility of joint-use stormwater facilities at proposed SR 3 stormwater treatment and detention sites. The Belfair interest in these facilities would be primarily for water quality retrofit purposes and/or to support new future commercial development along the SR 3 corridor. Timing of development with respect to construction of the WSDOT facilities may affect the feasibility of these potential joint-use facilities.

### **Activity #5: Coordinate with Mason County Transportation Department to Incorporate LID and Water Quality Benefits into Transportation Improvements (Using Existing County Staff)**

- Coordinate with the Mason County Transportation Department to incorporate LID and water quality benefits into transportation improvements (sidewalks and landscaping), as identified in the UGA Comprehensive Plan (along Old Belfair Highway).

**Table 7-2  
Belfair Stormwater Management Plan: Activities for 26-Year CIP Plan**

Activity	Lead Agency	Supporting Agency	Priority	Cost and Schedule						
				1	2	3	4	5	6	7-26
Activity #1: Coordinate with WSDOT maintenance of existing culverts and on relocation of Mindy Creek as a part of the SR3 project (County Staff)	WSDOT	Mason Co.	High	\$ 10,000.00	\$ 5,000.00	\$ 5,000.00	\$ 5,000.00	\$ 5,000.00	\$ 5,000.00	---
Activity #2: Perform monitoring of existing County road culverts relative to capacity and investigate any identified problems (County Staff)	Mason Co.	-	High	\$ 10,000.00	\$ 10,000.00	\$ 10,000.00	\$ 10,000.00	\$ 10,000.00	\$ 10,000.00	
Activity #3: Coordinate with WSDOT on Streetscape improvements for water quality as part of the SR 3 project (County Staff)	WSDOT	Mason Co.	High	\$ 4,000.00	\$ 2,000.00	\$ 2,000.00				---
Activity #4: Coordinate with WSDOT on joint-use stormwater facilities as part of the SR 3 project (County Staff)	WSDOT	Mason Co.	High	\$ 8,000.00	\$ 4,000.00	\$ 2,000.00				---
Activity #5: Coordinate with Mason Co. Transportation Department to incorporate LID and WQ benefits into transportation improvements as identified in the UGA Plan (County Staff)	Mason Co.	Mason Co. Transportation	High		\$ 5,000.00	\$ 5,000.00				---
Activity #6: Coordinate with Mason Co. Parks Department to incorporate LID and WQ benefits into planned park locations as identified in the UGA Plan (County Staff)	Mason Co.	Mason Co. Parks	High		\$ 5,000.00	\$ 5,000.00				---
Activity #7: Perform Sweetwater Creek Fish Passage Improvements Study	Mason Co.	HCSEG	High				\$ 50,000			---
Activity #8: Perform Belfair Creek Fish Passage Improvements Study	Mason Co.	HCSEG	High		\$ 25,000	\$ 25,000				---
Activity #9: CIP No. 1 – Belfair Creek relocation and fish passage improvements	Mason Co.	WSDOT	Low	---						\$ 1,500,000
Activity #10: CIP No. 2 – Sweetwater Creek fish passage improvements (if found feasible by Activity #7)	Mason Co.	---	Low	---						To Be Determined
<b>Total = \$1,737,000</b>				<b>\$ 32,000</b>	<b>\$ 56,000</b>	<b>\$ 54,000</b>	<b>\$ 65,000</b>	<b>\$ 15,000</b>	<b>\$ 15,000</b>	<b>\$ 1,500,000</b>

HCSEG = Hood Canal Salmon Enhancement Group

## Section 7—SWM Plan: Capital Projects

Continued

### **Activity #6: Coordinate With Mason County Parks Department to Incorporate LID and Water Quality Benefits into Planned Park Improvements (Using Existing County Staff)**

- Coordinate with Mason County Parks Department to incorporate LID and water quality benefits into park improvements, as identified in the UGA Comprehensive Plan, and the development of potential regional facilities as future park properties are purchased.

### **Activity #7: Conduct Sweetwater Creek Fish Passage Improvements Study.**

- Conduct a fish passage improvement investigation for Sweetwater Creek. Develop options and costs to eliminate vertical drop fish barrier associated with the water wheel. This activity would start after confirmation from the baseline habitat study (Activity #8) that areas above the water wheel would support fish. The study would include coordination with WDFW on passage design options and a project cost estimate.

### **Activity #8: Prepare Belfair Creek Fish Passage Improvements Study.**

- Conduct a fish passage improvement study for Belfair Creek from the east side of SR 3 to the existing active stream west of the commercial area. The study would include an alternatives analysis for stream location, accommodation of existing commercial uses, preparation of preliminary plans, coordination with WDFW and preparation of a project cost estimate.

Long-term activities (7 – 26 years) include two potential CIP project as outlined below.

### **Activity #9: CIP No. 1—Belfair Creek Relocation and Fish Passage Improvements**

- Perform final design, right-of-way/property acquisition and construction of the Belfair Creek relocation and fish passage improvement project defined by Activity #8 (Annual Monitoring Program).

### **Activity #10: CIP No. 2—Sweetwater Creek Fish Passage Improvements**

- If this project is determined viable based on the investigation of the habitat study proposed in Activity #7, perform final design, right-of-way/property acquisition and construction of the Sweetwater Creek fish passage improvement project defined in Activity #7 (Sweetwater Creek pre-design study).

## Section 8—Programmatic Elements and Regulatory Compliance

### 8.1 Introduction

Mason County is blessed with a wealth of natural resources that significantly add to the local quality of life and regional economy. The County also recognizes and appreciates their role as one of the primary stewards of these resources. In keeping with this role, Mason County has begun to undertake the development of a comprehensive county-wide stormwater management (SWM) program. The elements of this program include the following:

- Update of County's SWM related Policies and Ordinances,
- Development of County-wide SWM Program, and
- Regional SWM Studies for the areas of Belfair, Allyn and Hoodspport.

This report is the regional SWM Study for the Belfair Urban Growth Area (UGA). The intent of this plan is to:

- Assess the capacity of the existing drainage system,
- Plan for growth by projecting the runoff from new development over the next six years (in order to satisfy the Western Washington Growth Management Hearings Board due date of August 6, 2007),
- Provide guidance to new development and redevelopment to ensure future design criteria support this SWM Plan and continue to support local economic development,
- Assist the County in achieving compliance with existing regulatory requirements, including the Puget Sound Water Quality Management Plan (PSWQMP) and local water quality problems, as recorded in local TMDLs issued by Ecology,
- Provide advance planning to the County in anticipation of its future NPDES Phase II Municipal Stormwater Permit, that contains regulatory requirements are similar to those of the PSWQMP, and
- Protect local and regional water quality, habitat, and groundwater functions and resources.

### 8.2 Strategy to Manage Existing and Future Runoff

The above objectives are achieved by characterizing the Belfair UGA as documented in Sections 2, 3 and 4, conducting modeling, engineering analyses and selecting capital projects to address existing and future development as described in Sections 5, 6 and 7, and then combining the results of the capital needs assessment with the programmatic elements of SWM as described in this section. The comprehensive SWM Plan for the Belfair UGA is created by combining the capital needs with the programmatic needs, establishing costs, setting priorities, and identifying needed funding, as described in the following Section 9.

## Section 8—Programmatic Elements and Regulatory Compliance

Continued

It has been recommended that all future development and re-development be done according to the criteria in the 2005 Ecology Manual. This SWM Plan proposes on-site water quality treatment and rate control for new development and re-development.

The stormwater management strategy as explained in development of the capital projects program, focused on making sure that existing conveyance systems have adequate capacity to pass existing runoff. This was accomplished by assessing existing facilities, primarily the culverts under SR 3, and finding them to be of adequate capacity or if at capacity or over capacity to require monitoring by County maintenance staff as there have not been reported capacity problems. Thus, no immediate or short-term capital projects have been recommended. For the short and long-term, the assumption has been made that if future developers use the 2005 Ecology Manual, there should be no net increase in future flow rates over current existing conditions. (Note: The only long term projects suggested in this study consists of a stream restoration/relocation project for Belfair Creek and potentially, a fish passage project on Sweetwater Creek; no other long term capital projects have been proposed.)

Identified short and long-term capital needs have been supplemented by a series of programmatic SWM activities within the Belfair UGA. These programmatic activities have been recommended to respond to local water quality, habitat, and shellfish concerns, as well as begin to prepare the County for compliance with a future NPDES II Municipal Stormwater Permit. The types of programmatic SWM activities suggested in this section include such SWM Plan elements as adoption of the 2005 Ecology Manual, adoption of a low impact development ordinance, conducting water quality outfall monitoring, creating adequate local funding, enhancing maintenance, and conducting watershed planning.

### 8.3 Review of County's Existing SWM Program

#### Programmatic Overview

Mason County is in the process of conducting a review of its existing stormwater management program for the Belfair UGA, as well as for the entire County. This review will document existing SWM activities, legal authorities, staffing, resources and equipment. During this review a detailed regulatory gap analysis will be performed comparing its existing SWM Program with its existing SWM responsibilities and obligations.

Not all the information of the County's SWM Program, or the various SWM activities within the Belfair UGA, has been gathered at this point in time, however, it is important to acknowledge that the County's existing SWM activities include:

- Comprehensive land use planning

## Section 8—Programmatic Elements and Regulatory Compliance

Continued

- Development review and permitting
- SWM Design criteria and codes
- Construction inspection and enforcement
- Annual maintenance
- Response to spills and complaints
- Participating in local and regional planning
- Some public education and involvement
- Support to local volunteer groups
- Promotion of low impact development

Levels of funding, staffing and resource allocation are in the process of being documented and analyzed for adequacy. They will be compared with the recommended SWM activities presented in this SWM Plan for the Belfair UGA. It is anticipated that the Belfair SWM Program will be incorporated into the County's larger comprehensive SWM Program and will benefit from future County funding and staffing appropriations. Increased funding for SWM throughout the County is currently being considered to support the County's growing SWM obligations.

### Existing SWM Policies and Legal Authority

As part of the current analysis of the County's existing SWM Program, a review was completed of the County's policies pertaining to stormwater management, as presented in the County's Comprehensive Plan. Results of this review were used to develop a reorganized and revised set of policies that provided broader coverage and a consistent Countywide framework to guide future land use decisions and ensure compliance with regulatory requirements in the areas of stormwater management, and the protection of public health and safety, water quality, groundwater, and habitat. The updated policies were presented to the Planning Commission and adopted by the County BOCC in December 2006.

In addition to these updated policies, other existing legal authorities were also reviewed including the County's existing stormwater management ordinance, referring to the adoption of the 1992 Ecology Manual, and the recently adopted small parcel drainage requirements. The County is also considering adoption of an LID ordinance, a draft of which is currently under internal review.

Review of the County's existing code suggests that current legal authorities will not be adequate to fully implement the proposed SWM Plans for Belfair and Allyn. Existing codes, design manuals and legal authorities will need to be expanded and updated to satisfy existing and future water quality and regulatory compliance needs, as well as develop needed funding. Implementation of the Countywide Comprehensive Plan and the associated specific SWM

## Section 8—Programmatic Elements and Regulatory Compliance

Continued

Plans for Allyn, Belfair, and Hoodspport will need these updated legal authorities for the successful implementation of these plans. The specific legal authorities needed will be identified in the upcoming Regulatory and SWM Program Gap Analysis, soon to be undertaken by the County as part of the broader county-wide comprehensive stormwater management planning process that is currently underway.

### 8.4 Regulatory Compliance Considerations

#### Overview

There are a series of existing regulatory requirements that apply to the Belfair UGA. The most significant are the municipal stormwater elements of the Puget Sound Water Quality Management Plan (PSWQMP) and its associated 2007-2009 Conservation Plan. Compliance with these requirements consists of addressing thirteen different program elements including:

1. Stormwater controls for new development and redevelopment,
2. Stormwater site plan review,
3. Inspection of construction sites,
4. Maintenance of permanent facilities,
5. Source control,
6. Illicit discharges and water quality,
7. Identification and ranking of problems,
8. Public involvement and education,
9. Low impact development practices,
10. Watershed or basin planning,
11. Funding,
12. Monitoring, and
13. Schedule for implementation.

Other existing requirements include local water quality TMDLs, which have been established for the receiving waters in and around the Belfair UGA, such as the TMDL for the Union River for fecal coliform.

Preparing the County for compliance with a future Phase II NPDES Municipal Stormwater Permit requires additional stormwater programmatic elements, many of which are the same as those required under the PSWQMP. Future compliance will include:

- Developing and conducting a public education program,
- Developing and implementing a public involvement program,
- Adopting the 2005 Manual and maintaining effective and responsive development review program, that includes inspection and enforcement, especially for erosion control,

## Section 8—Programmatic Elements and Regulatory Compliance

Continued

- Conducting an annual maintenance program consistent with the protocols and frequencies listed in the Phase II Permit, and
- Setting up a comprehensive stormwater management program and conducting annual reporting and assessments of program effectiveness using adaptive management.

### NPDES Phase II Municipal Stormwater Permit

Phase II requirements were issued in January of 2007 and cover a five-year permit cycle that will be renewed in 2012. The requirements are grouped into nine stormwater management program elements. A brief summary of the requirements of each element, its applicability to the Belfair UGA, and recommended actions are provided below.

#### SWMP Element #1—Public Education and Outreach

*Summary:* Develop and implement a public education and outreach program designed to achieve measurable improvements in stakeholders understanding of stormwater pollution sources and impacts and what they can do to address these issues. The program needs to include efforts to measure the results of any education activities as well as maintaining records of activities undertaken.

*Applicability:* Public education and outreach is an effective and low-cost method for addressing stormwater pollution issues within the County and can be focused on those specific issues relevant for the Belfair UGA, especially those related to existing water quality impairments such as fecal coliform contamination and low dissolved oxygen levels.

*Recommended Actions:*

- Develop and distribute a County-wide brochure for the public that addresses stormwater pollution issues and what homeowners can do to help solve them. Ensure it covers those issues specific to the Belfair UGA, including the benefits of low impact development (LID). Consider the use of the Puget Sound Action Team's recently updated general education brochure on LID, which is available at no charge on its web site.

#### SWMP Element #2—Public Involvement and Participation

*Summary:* Develop and implement a public involvement and participation program to create ongoing opportunities for the public to participate in the decision making processes involved in the development, implementation and update of the SWMP and make all program documents available on the County website.

*Applicability:* Public involvement and outreach is vital to the success of stormwater management and compliance with regulations. There is an increasing realization that government programs with limited resources cannot do the job alone and that citizens share the responsibility of finding, funding, and implementing solutions to local stormwater

## Section 8—Programmatic Elements and Regulatory Compliance

Continued

problems. It is equally important to keep the public informed about program goals, objectives, priorities, available resources, and strategies.

*Recommended Actions:*

- Engage the Belfair community and stakeholders in SWM planning and implementation within the Belfair UGA.
- Organize volunteers to assist in Stream Team for Belfair area creeks, regional surface water management water quality monitoring, and facility inventory and mapping.

### SWMP Element #3—Illicit Discharge Detection and Elimination (IDDE)

*Summary:* Develop and implement an ongoing program to detect and remove illicit discharges and spills to the County's stormwater system. The program needs to include system mapping, an ordinance to prohibit such discharges that includes escalating enforcement procedures and actions, field assessment procedures and activities, and procedures for characterizing discharges, tracing sources, notifying the appropriate parties, and removing sources.

*Applicability:* Due to the small amount of stormwater infrastructure within the Belfair UGA and the relatively high expense of program development and implementation, this element is not being considered for the Belfair SMW Plan at this time. If spills or obvious pollution does occur these should be reported to Ecology for cleanup and possible enforcement activities.

*Recommended Actions:*

- Illicit discharge and spill education is a topic that can be incorporated into products developed under SWMP Element #1.
- An element of the IDDE requirement that would be useful in the short-term is an accurate inventory of facilities and a survey of key drainage facilities electronically recorded in the County's GIS/mapping system. This could be done in annual increments.

### SWMP Element #4—Controlling Runoff from New Development, Redevelopment and Construction Sites

*Summary:* Develop and implement a program designed to reduce pollutants in stormwater runoff. The program needs to include a stormwater runoff control ordinance that allows the use of low impact development (LID) and specifies site plan review and permitting processes. It also needs to establish maintenance standards and regulations to enforce long term operations and maintenance of facilities.

*Applicability:* The County currently operates under an existing stormwater runoff control ordinance and conducts development review and inspection activities for new development, redevelopment and construction sites. The County recently worked with the Puget Sound Action Team under its LID Local Regulation Assistance Project to develop

## Section 8—Programmatic Elements and Regulatory Compliance

Continued

recommendations on how to incorporate the use of LID into its existing regulations. A draft ordinance was developed and is currently under internal County review.

### *Recommended Actions:*

- For the Belfair UGA, the County needs to update its current ordinance and adopt standards that are consistent with the requirements of the 2005 Ecology Manual.
- Adopt a Countywide ordinance allowing or requiring the use of LID for new development.
- Provide training on 2005 Ecology Manual and LID to both County staff and local developers.

### **SWMP Element #5—Pollution Prevention and Operations and Maintenance for Municipal Operations**

*Summary:* Develop and implement an operations and maintenance program designed to prevent or reduce pollutant runoff from municipal operations. The program needs to include establishment of maintenance standards, policies and procedures, inspections, maintenance practices, staff training, and recordkeeping.

*Applicability:* Due to the small amount of stormwater infrastructure within the Belfair UGA and the relatively high expense of program development and implementation, enhancement of the County's existing level of maintenance is not being recommended for the Belfair SWM Plan, except at known problem areas.

### *Recommended Actions:*

- Review the adequacy of current annual maintenance practices and their effectiveness. Annually review and update their effectiveness to improve water quality.
- Maintain the County's existing level of maintenance effort within the Belfair UGA; enhance frequency of inspection and maintenance of known problem areas.

### **SWMP Element #6—Stormwater Management Program Implementation**

*Summary:* Develop and implement a stormwater management program consistent with permit requirements. Document the SWMP. The SWMP needs to include program cost tracking and coordination mechanisms and be designed to reduce the discharge of pollutants to the Maximum Extent Practicable (MEP), meet All Known, Available, and Reasonable methods of prevention, control and Treatment (AKART).

*Applicability:* The County is not yet subject to the NPDES Phase II permit requirements however, it sees the value of tracking SWMP implementation activities for the purposes of annual reporting that can be used as part of an adaptive management strategy to help measure the effectiveness of its program.

### *Recommended Actions:*

- Develop and implement a routine tracking system for County SWMP implementation that includes the SWM activities associated with the Belfair SWM Plan.

## Section 8—Programmatic Elements and Regulatory Compliance

Continued

- Evaluate annually using adaptive management and make refinements as needed.

### SWMP Element #7—Total Maximum Daily Load (TMDL) Allocations

*Summary:* The Phase II permit requires compliance with established TMDLs identified in Appendix 2 of the permit.

*Applicability:* There is currently an established TMDL for fecal coliform for the Union River and a detailed implementation plan that was published in April of 2003. Mason County's implementation responsibilities are being carried out by several departments: Public Works (Belfair SWM Planning), Utilities and Waste Management (Belfair Sewer Planning), and Environment Health, (On-site sewage systems) as well as the Mason Conservation District. Development and implementation of the Belfair SWM Plan is a requirement of the TMDL.

*Recommended Actions:*

- Strategies to protect surface waters from water quality degradation are included in recommended actions of other SWMP elements, including the adoption of the 2005 Ecology Manual and development/adoption of an LID ordinance
- Local water quality monitoring of major outfalls has been recommended in SWMP Element #12 to assess impacts of stormwater and the effectiveness of existing SWM controls and practices.

### SWMP Element #8—Monitoring (of SWM Program)

*Summary:* The current Phase II permit requires an assessment of the appropriateness of best management practices (BMPs) in the SWMP and any changes made or proposed to those previously selected. It also specifies steps to be taken in preparation for future stormwater monitoring in the next permit cycle, which starts in 2012.

*Applicability:* Assessments of the appropriateness of BMPs in the SWMP is recommended as part of the tracking and evaluation activities identified in SWMP Element 6—Stormwater Management Program Implementation. Water quality monitoring is also addressed in SWMP Element #12—Water Quality Monitoring.

*Recommended Actions:*

- An annual monitoring program of major outfalls has been proposed. This monitoring program should be annually tailored to focus on local water quality priorities.

### SWMP Element #9—Reporting

*Summary:* The Phase II permit requires that permittees submit annual reports that include its SWMP, formal report forms that summarize the status of implementation, progress toward meeting minimum performance standards, and description of activities, an implementation schedule and a summary of its SWMP evaluation.

*Applicability:* The County is not yet subject to the requirements of the Phase II permit, however as pointed out in SWMP Element #6—Program Implementation, it sees the value

## Section 8—Programmatic Elements and Regulatory Compliance

Continued

of tracking SWMP implementation activities for the purposes of annual reporting that can be used as part of an adaptive management strategy to help document its program and measure its effectiveness. Annual reports are also useful for informing the public of implementation progress and results.

*Recommended Actions:*

- Develop and implement an annual internal reporting system for County SWMP implementation that includes the SWM activities associated with the Belfair SWM Plan.
- Define the program annually using adaptive management.

Note that the NPDES II Permit is similar in many ways to the PSWQMP. The elements that are specifically stated in the PSWQMP that are not specifically spelled out in the Phase II Permit are conducting watershed or basin planning, creating adequate local funding, and implementing an ongoing water quality monitoring to assess program effectiveness. To ensure consistency in the County's response to the various stormwater requirements, the following three elements from the PSWQMP should also be included in the development of the Belfair SWM Plan and are listed below with recommended actions.

### SWMP Element #10—Watershed or Basin Planning

*Summary:* The PSWQMP calls for the use of watershed or basin planning processes to identify and rank existing problems that degrade water quality, aquatic species and habitat, and natural hydrological processes. This element of the Plan also calls for development of plans and schedules and identification of funding to fix the problems.

*Applicability:* The development of the Belfair SWM Plan fulfills this requirement since it involved basin characterization and problem assessment within the Belfair UGA. Both capital and programmatic recommendations are included in the Plan together with implementation costs, a schedule, and a funding strategy to address regulatory SWM obligations and water quality and habitat needs.

*Recommended Actions:*

- This Belfair SWM Plan and the County's larger evaluation of its SWM needs and funding is consistent with this requirement.
- Implementation of the recommended actions described in the various SWMP Elements presented in this section demonstrates the initial benefits of local basin planning.

### SWMP Element #11—Funding

*Summary:* The PSWQMP calls for the creation of funding capacity, such as a utility, to ensure adequate, on-going funding for SWM program activities and regional stormwater projects.

*Applicability:* Developing and maintaining an adequate level of annual local funding is the key to the long-term success of the program and the support of an effective capital improvement

## Section 8—Programmatic Elements and Regulatory Compliance

Continued

program. Creating adequate local funding is the focus of the financial analysis presented in the following section.

### *Recommended Actions:*

- Work with local citizens to create a stormwater management utility throughout the Belfair UGA (and urban areas throughout the County). (Costs may be regionally distributed.)
- Also explore the development of a system development charge for new development and redevelopment to help the County off-set some of the costs of building the larger regional conveyance systems that will be needed in the future.

### **SWMP Element #12 – Water Quality Monitoring**

*Summary:* The PSWQMP calls for monitoring of program implementation and environmental conditions and trends over time to measure the effectiveness of program activities and to share the results with others.

*Applicability:* The need for program effectiveness and water quality monitoring within the Belfair UGA is discussed in SWMP Elements #6—Program Implementation, #7—TMDLs, and #8—Monitoring as well as in Section 8.5 Water Quality, Habitat, and Shellfish Needs.

### *Recommended Actions:*

- Implementation of the recommended actions described in the various SWMP Elements presented in Section 8 address this requirement.

## **8.5 Guidance for Future Development/Redevelopment**

The County's existing design criteria for stormwater are largely based on the 1992 Ecology Manual. When the County was more rural that level of treatment may have been adequate, however, as urban centers have emerged throughout the County pollutant loadings have increased and impacts to water quality, fish habitat, and shellfish rearing areas have been documented. It is widely understood that untreated or inadequately treated surface water runoff, particularly from the more intensely developed areas, may be a major contributor to these problems in local receiving waters.

The most current design criteria are needed to reduce the loadings of additional pollutants from new and redevelopment. This SWM Plan for the Belfair UGA has been based on the latest stormwater management techniques, as described in the 2005 Ecology Manual. It is strongly recommended that the County adopt these same design standards for all future development and redevelopment within the Belfair UGA.

## Section 8—Programmatic Elements and Regulatory Compliance

Continued

### *Recommended SWM Plan: Programmatic Elements*

- Adoption of the 2005 Ecology Manual is strongly recommended to address both local flow and potential water quality related problems.

### **8.6 Water Quality, Habitat and Shellfish Needs**

It is well known that the Belfair UGA contains numerous unique environmental and ecological features that are dependent upon the maintenance of a high level of water quality. Shellfish are good indicators of localized pollution and are especially sensitive.

Of the 19 streams and drainage courses in the UGA, four are classified as fish-bearing and a number of other streams may be available to fish. According to the 2003 Union River TMDL Implementation Plan, the lower Union River contains salmon habitat for small runs of chum, Chinook, Coho, cutthroat and steelhead according to a study conducted in 2000. White sturgeon are also known to inhabit the Union River and estuary. Lynch Cove at the Union River estuary contains commercial and recreational clam and oyster beds.

The Hood Canal Watershed Project includes North Mason High School students that study the Union River and Belfair Creek to locate sources of bacteria and determine levels of road runoff pollutants in cooperation with local property owners, the Hood Canal Salmon Enhancement Group (HCSEG), and Belfair Water District.

The waters of Hood Canal also have been monitored by both Ecology and the Department of Health at a number of stations. Monitoring results indicate evidence of pollution throughout Lynch Cove, as measured by elevated fecal coliform counts. It is important that the County and local residents gather a greater understanding of the relationship of the area's local stormwater discharges on the existing and long-term health of North Bay and its associated habitat areas.

### *Recommended SWM Plan: Programmatic Elements*

- Initially, an annual monitoring program of one or more of the area's larger stormwater outfalls is recommended.

### **8.7 Regional Water Resource Planning**

As summarized in Section 1.5 there are a number of planning initiatives underway within the region that collectively influence the development and implementation of policy and regulation related to water resource management that are discussed below.

## Section 8—Programmatic Elements and Regulatory Compliance

Continued

The Washington State Department of Ecology conducts water quality assessments and categorizes water bodies depending on water quality conditions. These assessments are published in Ecology's 303(d) list. Several sampling locations in Lynch Cove are included in the 2002/2004 303(d) list for the parameters of fecal coliform, dissolved oxygen and pH. The Union River and Belfair Creek are also listed for fecal coliform contamination. The Union River has a TMDL for fecal coliform that has been under implementation since 2003.

The Washington Department of Health, Office of Shellfish Programs also conducts water quality monitoring of shellfish growing areas for the purposes of classification. According to its 2006 Annual Growing Area Review of Hood Canal #9 (Lynch Cove to Sunset Beach), most of the Lynch Cove is classified as prohibited south to the west end of Belfair State Park.

Salmon recovery planning has been conducted by the Shared Strategy for Puget Sound, a voluntary coalition of federal, tribal, state and local governments and business and environmental organizations that is working to protect and restore regional salmon populations. The National Marine Fisheries Service (NMFS) of the National Oceanic and Atmospheric Administration (NOAA) worked with the Shared Strategy to produce a recovery plan for Puget Sound Chinook that was adopted on January 19, 2007. The Puget Sound Salmon Recovery Plan is built on the foundation of fourteen local watershed planning areas across Puget Sound with a tailored approach for recovery based on local characteristics.

To coordinate government actions for protecting and restoring Puget Sound, the Washington State legislature enacted Chapter 90.71 RCW, Puget Sound Water Quality Protection. Under this authority, the state developed the Puget Sound Water Quality Management Plan, which is the state's long-term strategy for managing and protecting the Sound and coordinating the roles and responsibilities of federal, state and local governments. Each biennium a work plan is developed (2007-2009 Puget Sound Conservation Recovery Plan) that prescribes the necessary federal, state and local actions needed to maintain and enhance Puget Sound water quality.

The Puget Sound Action Team defines, coordinates and implements Washington State's environmental agenda for Puget Sound and has been providing leadership in the area of low impact development (LID). LID is a more environmentally sensitive approach to developing land and managing stormwater runoff. Many jurisdictions in Puget Sound are turning to LID techniques to help protect their waters and natural resources. Between 2005 and 2006, the Puget Sound Action Team lead a project to help twelve cities and seven counties, including

## Section 8—Programmatic Elements and Regulatory Compliance

Continued

Mason County, integrate low impact development into their regulations and development standards. A draft ordinance was developed for Mason County and is currently under review.

The Hood Canal Coordinating Council (HCCC) advocates and helps implement locally appropriate actions to protect and enhance the unique qualities of Hood Canal. The Council coordinates salmon, shellfish, and general water quality protection efforts in Hood Canal by providing public education and information about salmon recovery, water quality, and shellfish protection. The HCCC also worked in conjunction with NOAA NMFS to produce a salmon recovery plan for summer chum that was adopted on May 24, 2007. The Plan includes specific recommendations within the Union Conservation Unit and recommended County programmatic actions specific to Mason County. Actions include SWM planning for the Belfair UGA, use of LID, and adoption of the 2005 Ecology Manual.

The Hood Canal Dissolved Oxygen Program (HCDOP) has two integrated and complementary arms, one to plan and conduct a scientific study, the Integrated Assessment and Modeling (IAM) study. The IAM study will quantitatively assess what factors are causing the increased severity of low oxygen concentrations. The other arm, the Corrective Action and Education Group, developed a preliminary assessment and funded potential corrective action demonstration projects. This group will focus on community outreach, funding ongoing demonstration projects, and working directly with policy makers to take information from the IAM and potential corrective action project to help inform policy development.

The Watershed Planning Act (RCW 90.82) provides local governments a framework and resources for developing local solutions to watershed issues on a watershed basis. The watershed plans are required to address water quantity with optional elements of water quality and habitat. The Belfair UGA is located within Water Resource Inventory Area (WRIA) 15, the Kitsap Peninsula and Islands watershed. A Final Draft Watershed Management Plan was completed in June 2005 but was vetoed by an initiating government despite months of trying to reach a consensus plan. After the watershed plan was vetoed, the planning unit chose to disassemble the watershed planning unit. Many of the plan recommendations are being implemented by various parties independent of the watershed planning process. For instance actions related to water reuse, stormwater management, and water supply planning are being implemented by various governments in WRIA 15.

It is important that the Belfair SWM Plan build upon and help advance this base of knowledge to protect and enhance water quality, habitat, and shellfish within the region as well as help address current 303(d) water quality listings.

## Section 8—Programmatic Elements and Regulatory Compliance

Continued

### *Recommended SWM Plan: Programmatic Elements*

- The County's initial response is to recommend and fund an annual water quality monitoring program throughout the Belfair UGA planning area.
- The County is also taking the initiative to enhance future development criteria (2005 Manual and LID Ordinance) as well as review and enhance annual maintenance procedures and practices.
- The County is planning on continuing regional coordination efforts and making additional SWM program enhancements as more knowledge of the relationship of stormwater discharges to local and regional receiving waters is acquired.

### **8.8 SWM Programmatic Elements: Priorities and Costs**

Recommended SWM Programmatic elements listed above have been summarized along with annual costs in Table 8-1. These activities represent an enhancement of the County's existing SWM Program within the Belfair UGA. They emphasize the need to control/guide new development, enhance maintenance where needed, conduct focused water quality monitoring and initiate a local public involvement/education program. Annual costs for these SWM Programmatic Elements averages \$260,000 per year.

## Section 8—Programmatic Elements and Regulatory Compliance

Continued

**Table 8-1—Recommended SWM Programmatic Elements and Costs**

SWMP Element	Recommended Action	Satisfies Program Needs			Costs (\$1,000's)						
		PSWQ MP	NPDES Phasell Permit	WQ Habitat Shellfish	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Total
1	<b>Public Education*</b> - SWM (LID) Brochure	X	X	X	\$5	\$5	\$5	\$5	\$5	\$5	\$30
2	<b>Public Involvement*</b> - Organize Volunteers/Mtgs	X	X	X	\$25	\$25	\$25	\$25	\$25	\$25	\$150
3	<b>Illicit Discharges (IDDE)</b> - Facility Inventory & Mapping	X	X	X	\$0	\$25	\$25	\$0	\$0	\$0	\$50
4	<b>New Development</b> - Ordinance - 05 DOE Manual	X	X	X	\$25	\$25	\$0	\$0	\$0	\$0	\$50
	- Ordinance - LID										
	- Training - 05 Manual	X	X		\$25	\$25	\$0	\$0	\$0	\$0	\$50
	- Training - LID										
	- Annual Review of O/M	X	X	X	\$0	\$10	\$10	\$10	\$10	\$10	\$50
5	<b>Maintenance</b> - Annual Plus Enhancements	X	X	X	\$25	\$25	\$35	\$35	\$35	\$35	\$190
6	<b>SWM Program*</b> <b>Implementation</b>	X	X		\$15	\$15	\$10	\$10	\$10	\$10	\$70
	- Develop Tracking System										
	- Annual Program Evaluation	X	X		\$0	\$10	\$10	\$10	\$10	\$10	\$50
7	<b>TMDLs</b>		X	X	\$0	\$0	\$0	\$0	\$0	\$0	\$0
8	<b>SWM Program Monitoring</b> (Addressed in Element #6)	X	X		\$0	\$0	\$0	\$0	\$0	\$0	\$0
9	<b>Reporting*</b> (Internal)		X		\$10	\$10	\$10	\$10	\$10	\$10	\$60
10	<b>Basin Planning</b> (Part of current Co. study.)	X		X	\$0	\$0	\$0	\$0	\$0	\$0	\$0
11	<b>Funding</b> - Develop SWM Utility	X			\$50	\$50	\$0	\$0	\$0	\$0	\$100
	- SDC Feasibility Study	X			\$50	\$50	\$0	\$0	\$0	\$0	\$100
12	<b>WQ Monitoring</b> - Annual WQ Monitoring	X		X	\$100	\$100	\$100	\$100	\$100	\$100	\$600
	Total:				\$330	\$375	\$230	\$205	\$205	\$205	\$1550
*Future County Staff (~ 1 FTE)					\$55	\$55	\$50	\$50	\$50	\$50	\$310
Outside Services					\$275	\$320	\$180	\$155	\$155	\$155	\$1240

*Recommended SWM Plan: Programmatic Elements*

It is suggested that the programmatic SWM elements identified above be developed and integrated with the proposed short and long term capital improvements proposed in Section

## Section 8—Programmatic Elements and Regulatory Compliance

Continued

7 to create a comprehensive Stormwater Management Plan for the Belfair UGA. Annual costs, and funding are presented in an associated implementation plan in the following section.

## Section 9—Costs, Funding and Implementation

### 9.1 Introduction and Overview

The intent of this section is to address the combined revenue needs of both the capital and programmatic/regulatory compliance needs that constitute the recommended SWM Plan for the Belfair UGA. The first part of this funding and implementation analysis combines the capital and programmatic Belfair SWM needs, as identified previously in Sections 7 and 8, so that total annualized costs can be identified (Section 9.2). Section 9.3 summarizes the short and long term needs, presenting annualized costs, and translates costs to associated revenue needs for the next six years and ultimate buildout.

Funding options are reviewed and anticipated amounts of annual and total new revenue are estimated in Section 9.4. A series of recommendations of how the needed revenue will be generated is also discussed. Section 9.5 assesses the adequacy of potential revenue sources and identifies any revenue gaps that may be anticipated in the future. This funding analysis concludes with a statement of the adequacy of the proposed revenue sources to address the stormwater management needs within the UGA.

### 9.2 Recommended Belfair Stormwater Management Plan

The Comprehensive SWM Program for the Belfair UGA has been created by integrating the capital needs/costs identified in Section 7 with the programmatic and regulatory compliance needs/costs presented in Section 8. The recommended plan includes a combination of programmatic activities and capital improvement projects. The total cost for the SWM Plan is \$7,587,000 over 26 years. The average annual SWM costs for years 1-6 is \$298,000 per year (\$398,000 per year if an annual capital appropriation is made). The average annual SWM cost increases to \$304,000 per year for years 7-26. The resulting SWM Plan that allows the Comprehensive SWM Program to be realized is presented below in Table 9-1.

## Section 9— Costs, Funding and Implementation

Continued

Table 9-1—Financial Plan for the Belfair Stormwater Management Plan											
Annualized Revenue Needs Over the Planning Period											
Relative Priority for Implementation	Schedule & Costs by Years (\$1,000s)										
	1	2	3	4	5	6	10	15	20	26	Total
Short-Term Activities: <i>(See Tables 7.1 &amp; 8.1)</i>											
SWM Programmatic Needs*	\$330	\$375	\$230	\$205	\$205	\$205	\$820	\$1025	\$1025	\$1230	\$5,650
Short-Term CIP	\$32	\$56	\$54	\$65	\$15	\$15	\$40	\$50	\$50	\$60	\$437
Long-Term CIP	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1500	\$0	\$0	\$1,500
Total:**	\$362	\$431	\$284	\$270	\$220	\$220	\$860	\$2575	\$1075	\$1290	\$7,587
*Future County Staff	\$87	\$86	\$65	\$65	\$65	\$65	\$240	\$300	\$300	\$360	\$1633
Outside Services	\$275	\$345	\$219	\$205	\$155	\$155	\$620	\$2275	\$775	\$930	\$5954

Notes:

- \*Year 6 costs for Programmatic Needs (including \$10K for annual culvert inspections) were assumed to remain constant for years 7-26 at about \$215K/year.
- \*\*Average annual SWM cost for years #1-6 is \$1.79M/6 years = \$298K per year.
- If an additional annual appropriation of \$100,000 is made for future CIP, the annual SWM cost is \$398K per year.
- Short term culvert flow monitoring has been continued from year 7 through year 26 at \$10K per year.
- Belfair Creek realignment/channel improvement project is scheduled for year 15 when adequate local funding allows construction. A capital appropriation of \$100,000 (not shown in the table) would allow a fund balance for future capital construction to accumulate to a level that would allow construction, unless grant funding is procured prior to year 15.
- Annual Funding allows the hiring of one full time County staff person to oversee and implement the plan.

For this analysis, the six and twenty six year planning periods have been selected to present the proposed SWM Plan, as shown below. This planning period allows one capital stream improvement project to be built after an initial six year period of primarily SWM programmatic and regulatory compliance enhancements have been initiated. The long term capital program totals \$1.5M, and averages about \$100,000 annually if CIP funding is initiated in the first year of SWM Program implementation. Note that the additional annual allocation of \$100,000 has not been included in Table 9- 1 under programmatic or short term CIP needs.

## Section 9— Costs, Funding and Implementation

Continued

### 9.3 Summary of Stormwater Management Plan Costs

For a detailed list of projects see Tables 7-2, and for programmatic/regulatory compliance needs see Table 8-1.

#### Short Term SWM Plan Elements: Years 1-6 (to 2013)

##### Capital Project Needs

- Capital projects in the short term average about \$40,000 per year and consist of the following activities (See Table 7-1):
  - #1—routine coordination with WSDOT to ensure an adequate level of maintenance is being provided and Mindy Creek culvert project is included in the SR3 widening project,
  - #2— routine monitoring and maintenance of culverts by County staff,
  - #3—coordination with WSDOT on SR3 streetscape water quality improvements,
  - #4—coordination with WSDOT re: joint use facilities as a part of the SR 3 project
  - #5—coordination with County Roads re: future LID improvements,
  - #6—coordination with County Parks re: incorporating LID into their future capital projects,
  - #7—conducting Sweetwater Creek Fish Passage Study, and
  - #8—conducting Belfair Creek Fish Passage Study.

##### Programmatic Activity Needs

- Programmatic and regulatory compliance needs in the short term include various activities ranging from public education/involvement to water quality monitoring, and include the adoption of new ordinances, development of new funding mechanisms, and completion of the inventory and GIS mapping of existing drainage facilities. Costs have been estimated to be about \$258,000 annually. (See Table 8-1.)

#### Long Term SWM Plan Elements: Years 7-26 (to 2033)

##### Capital Project Needs

- Capital projects in the long term total \$1.5M for the relocation and reconstruction of the Belfair Creek channel. Costs are estimated to be about \$100,000 annually (over the next 15 years). This annual capital appropriation of \$100,000 should be continued throughout years 16-26 for the construction of other future capital projects.

##### Programmatic Activity Needs

- Programmatic and regulatory compliance needs beyond year six have been estimated at this time. For planning purposes, Year 6 costs were assumed to remain constant over Years 7-26 at about \$215 per year. It is likely, however, that the County will have been issued a Phase II NPDES Permit by that time and it is also likely that annual

## Section 9— Costs, Funding and Implementation

Continued

programmatic activities and related costs will at least double during the next few years. (Note that it is possible that costs could go even higher in order to meet the increased needs of water quality protection and possibly restoration that may require retrofitting and/or replacing of existing older facilities.)

### 9.4 Funding Analysis

Presented in Table 9-1 is an estimate of the cost of the recommended SWM Plan for the Belfair UGA. New revenue is needed over the next six years to support programmatic initiatives, as well as over the next 20 or more years to support both future programmatic and capital projects needed to support ultimate buildout.

#### SWM Policies/Decisions Guide Selection of Financial Options

The SWM management policies and approaches presented in this plan play a large role in determining the funding strategies to implement the proposed Belfair SWM Plan. In general, the proposed SWM Plan guides the development of the proposed funding strategy according to the following policies, analyses/findings and technical decisions that have been created to manage stormwater within the Belfair UGA:

- Water quality treatment and infiltration or detention will be provided onsite by each new developer.
- New development/redevelopment will pay for the cost of on-site water quality treatment and detention, both now as well as in the future (by the adoption of the 2005 Manual).
- No new capital improvements are needed over the next six years.
- New development/redevelopment should help pay for any future facilities outside of their developments that may be needed to support future growth through the establishment of SEPA mitigation and system developer charges.
- There is currently no major flooding or maintenance problems associated with the current drainage system within the Belfair UGA. Thus, there are no major outstanding capital drainage needs or associated financial obligations that currently exist. (The possible exception is the need to more fully evaluate the water quality needs of the UGA and continue to prepare for future regulatory compliance and possible future TMDL requirements.)
- Retrofitting existing homes and businesses for detention or water quality treatment is not required at this time.
- In the future and as needed, the County will pay for some of the new regional collection and conveyance systems that are located within the County road right-of-ways. Their design and Construction will occur primarily as the County builds new roads within the UGA.

## Section 9— Costs, Funding and Implementation

Continued

### Review and Evaluate Potential Funding/Revenue Options

Discussions with the County suggest that there are several financial options that should be considered. A preliminary review of these potential funding sources suggests that multiple sources of funding will likely be needed; no single funding mechanism will likely be adequate by itself. Funding sources that are currently being considered include:

- Formation of a *Local Drainage/ Stormwater Improvement District*, which would have an annual assessment often based on assessed property value, or some other equitable means of establishing value and/or benefit to the various rate payers.
- *Real Estate Excise Tax (REET) Funding*, which currently amounts to about \$750K per year, and is currently being used to pay for a number of capital projects throughout the County. Securing periodic appropriations from REET funding for either capital or program needs may be available on an annual basis depending on other County project priorities.
- *Annual County Portion of State Sales Tax* which has recently been raised from .08% to .09%; this will amount to about \$450K per year with the recent increase to 0.09 per cent.
- *Public Sector Funding*, such as grants and low interest loans from the State (Ecology or the Puget Sound Action Team) or federal government, including federal 319 Water Quality Grants, and the State Public Works Trust Fund and State Revolving Fund. While available, they are generally limited in duration and amount. They are also very competitive and have obligations regarding timing, applicability, reporting, and administrative costs.
- Formation of a *Local Stormwater Utility* throughout the Belfair UGA, where a monthly service fee is assessed to rate payers, often based on the amount of impervious area per parcel.
- Continue the collection and use of *developer fees* for the review and approval of plans for new development and redevelopment, as well as conducting inspection and enforcement in the field.
- *System Development Charges (SDCs)*, where any person moving into an upstream drainage area by the purchase of a home would be required to pay for a portion of the downstream collection, conveyance, detention, treatment, and outfall facilities that may be needed to support continued development within the drainage basin. These would be assessed to the developer prior to the construction of the home during the County's permitting process.
- *SEPA Mitigation Funds*, which would be established on a per development basis as a project enters and is ultimately approved through the State SEPA review process. This has historically been used very successfully by the County for additional infrastructure has directly resulted from new proposed development/redevelopment.

## Section 9— Costs, Funding and Implementation

Continued

- *Partnering* with prospective developers, land owners and other State agencies can be especially effective in establishing funding for larger regional drainage facilities. These are usually project-specific types of funding agreements based on use or contribution of stormwater runoff.
- Other potential, but less likely sources of direct internal county funding, include the General Fund, Road Fund, Park Fund and the Utility (Sewer) Fund; however, these funds good potential sources for the new *joint funding of projects* with common community purposes.

From this list of ten potential sources of funding, the most likely sources of new future funding in relative order of priority are the following:

8. Forming a **stormwater utility** to support monitoring and other programmatic activities.
9. Ensuring **developer and permit fees** are adequate to support development review, inspection, and enforcement services.
10. Using project related **SEPA mitigation** funding to support capital projects, especially those required by an increase in capacity within a regional conveyance system.
11. Establishing **System Development Charges** for new growth-related capital drainage projects; another good source of funding for regional conveyance systems.
12. Annually appropriating a portion of Annual State **Sales Tax Returns**.
13. Securing periodic appropriations from **REET funding** for either capital or program needs.
14. Obtaining capital project funding, from **future road, park, and/or utility projects** with common objectives that include stormwater management opportunities.

### Estimate of Potential Annual Revenues

#### Funding Source #1: **Stormwater Utility**

*Type/Source of Funding:* A monthly service fee to residences and businesses based on the amount of impervious area on each parcel. Rates are usually in the \$6-\$12 per month per equivalent rate unit (ERU).

*Allowed Uses:* These funds can be used for both capital and programmatic needs.

*Estimated Annual Amount:* \$108,000

*Assumes:*

- 1,200 ERUs\* at \$7.50/mo X 12 months = \$108,000; Rate is for \$7.50/mo and includes programmatic costs, as well as short term CIP costs.

*\*Note that ERU estimates are estimates. They do not take into account future growth which may be substantial with the recent changes in zoning and the construction of the new Belfair sewage treatment plant.*

## Section 9— Costs, Funding and Implementation

Continued

### Funding Source #2: Developer and Permit Fees

*Type/Source of Funding:* These are the fees that developers pay for plan and permit review and approval by the County. These generally entirely paid for by developers with little to no subsidies from the County. These funds reimburse the County for development review staff time as well as field time for inspection and enforcement.

*Allowed Uses:* Reimburses County for staff time; has limited direct cash value to SWM Program.

*Estimated Annual Amount:* No direct revenue to SWM Fund (usually goes into the General Fund). These revenues support the SWM effort and pay for some of the regulatory compliance costs but generally do not provide additional cash that can be used for other programmatic or capital needs.

### Funding Source #3: SEPA Mitigation

*Type/Source of Funding:* These are payments made by developers to the County to mitigate the impacts associated with new development. These payments are usually project specific and are often used to provide additional supporting infrastructure such as access roads, or lighting, or downstream flow attenuation, or wetland impact mitigation.

*Allowed Uses:* Usually these payments go toward new capital facilities; they could be used as a good potential source of funding for future projects. Not useful for addressing programmatic costs.

*Estimated Annual Amount:* About \$50,000 per year. (The annual amount is difficult to predict since the County does not have a long history to track these types of payments.)

### Funding Source #4: System Development Charges

*Type/Source of Funding:* These are specific payments that developers make to support regional utilities and infrastructure. They are common to support the extension of roads and water and sewer services to new developments. Lately, they have been growing in popularity and are used in the development of new revenue to help pay for new capacity in regional detention, treatment, capacity, and outfall drainage systems. Similar in some ways to a SWM utility in establishing a unit price for each residential unit, usually about \$400-\$600 per home, and then extrapolating that cost to new commercial developments based on a measured number of equivalent residential units.

*Allowed Use:* These funds are primarily used for future capital improvements associated with future growth.

*Estimated Annual Amount:* \$33,000 per year (over the next six years)

*Assumes:*

- $300 \text{ homes} \times \$500/\text{home} = \$150,000/6 \text{ years} = \$25,000 \text{ per year}$
- $100 \text{ business units} \times \$500/\text{unit} = \$50,000/6 \text{ years} = \$8,300 \text{ per year}$

## Section 9— Costs, Funding and Implementation

Continued

*\* Note that these estimates of future growth are conservative and assume about 300 new homes over the next six years and a much smaller increase in new business units. The Belfair Urban Growth Plan estimates the UGA population to increase from about 800 to as many as 3,000 new residences over the next six years, depending on the availability of future employment within the region.*

### **Funding Source #5: Sales Tax Returns**

*Type/ Source of Funding:* These funds are provided to the County from the State based on a formula that distributes a portion of the State sales tax returns back to local governments. Recently, the per cent return has increased from 0.08 to 0.09%. Annually this amounts to about \$450K.

*Allowed Uses:* Could be used to address either capital or programmatic costs.

*Estimated Annual Amount:* \$45,000

### **Funding Source #6: REET Funding**

*Type/ Source of Funding:* A portion of annual real estate sales throughout the County, as determined by the local real estate tax, are annually returned to the County. This currently amounts to about \$750K per year.

*Allowed Uses:* These funds could go right into the SWM Fund for either capital projects or programmatic needs.

*Estimated Annual Amount:* About \$100,000

### **Funding Source #6: Road, Park, Utility Common Capital Projects**

*Type/ Source of Funding:* When other departments of the County build capital projects, a portion of their project often is needed to address local drainage related impacts and needs. Some times these types of projects provide direct funding to SWM to build projects or the SWM fund could contribute to create larger drainage related projects that have regional benefits.

*Allowed Uses:* Primarily for capital project assistance.

*Estimated Annual Amount:* Estimated to be about \$50K-\$100K per year.

### **Summary of New Potential Annual Revenue Sources**

Creation of Multiple Funding Sources to Realize Needed Revenue

By optimizing the revenue potential of the above proposed SWM funding mechanisms, approximately \$441,000 may be realized on an annual basis to support the development and implementation of the SWM Plan for the Belfair UGA, as shown in Table 9-2.

Approximately \$308,000 in annual programmatic funding and \$133,000 in annual capital funding could be realized from these sources.

## Section 9— Costs, Funding and Implementation

Continued

Table 9-2 List of Potential SWM Funding Sources and Estimated Annual Revenues			
Funding Source	Potential Estimated Annual Revenue		
	Amount	Programmatic	Capital
#1: Stormwater Utility	\$108,000	X	Ok for either
#2: Developer and Permit Fees	\$0	---	---
#3: SEPA Mitigation	\$50,000	---	X
#4: System Development Charges	\$33,000	---	X
#5: Sales Tax Returns	\$100,000	X	Ok for either
#6: REET Funding	\$100,000	X	Ok for either
#7: Project-Specific Funding	\$50,000	---	X
Annual Total:	~\$441,000	~\$308,000	~\$133,000

### 9.5 Adequacy of Potential Future Funding Mechanisms

#### Matching Funding with Revenue Needs of the Implementation Plan

##### Assessment of Proposed Stormwater Management Funding Strategy

#### Funding for the Short Term: The Next Six Years

The proposed Short-Term SWM Plan totaling \$1,790,000 and averaging \$298,000 over each of the next six years is a reasonable level of funding that matches the local drainage needs, as well as the County's and community's ability to pay. It is suggested that this annual level of funding be supplemented by another annual \$100,000 appropriation to begin to build a fund balance to address future capital needs. If this annual capital appropriation is initiated in year one, the average annual funding requirement would be \$398,000.

As shown in Table 9-2, estimated annual revenues from the above listed funding sources totals about \$441,000 per year. With the annual capital appropriation of \$100,000, the total average annual level of funding needed over the next six years is \$398,000, and closely matches the available resources, projected in above in Table 9-2.

*(Note that annual programmatic operating costs (including \$10K for annual field inspections) beyond year six have not been estimated, however, an annual level of programmatic funding at least equal to year six (~\$215,000) can be anticipated throughout the future years. It is more likely that future programmatic costs will increase due to new regulatory compliance and additional water quality monitoring and enhancement requirements.)*

## Section 9— Costs, Funding and Implementation

Continued

### Funding for the Long Term: Seven-Twenty Six or More Years

The proposed longer-term SWM Plan totaling \$1.5M and averaging about \$100,000 per year for years one through ultimate buildout is also a significant local capital investment.

Note that this long term capital need will be supplemented by future County road projects build over time to continue to support development throughout the UGA.

In this funding analysis, it has been suggested that an annual appropriation or set-aside for future capital projects be initiated in year one so that an on-going annual capital fund balance can be established. If this type of financial discipline is established early in the initiation of the SWM Program, then adequate funding reserves should be available, approximately when needed, to support future development. About \$1.5M could be accumulated by year 15 when the Belfair Creek Steam Relocation/Channel Project would be scheduled for construction.

*(Note that this initial funding analysis has not estimated any annual increases in the amount annual funding available from each of the seven proposed funding mechanisms. It is likely that future funding from these sources will increase along with the increased annual funding needs of the Belfair SWM Program. Also, new funding mechanisms may present themselves as the SWM Program is implemented. For example, future grants would be an excellent way to augment these local funding mechanisms and should be actively and aggressively pursued. Additional funding analyses may be needed to substantiate and further refine this conceptual funding plan.)*

### 9.6 Findings and Conclusion

There is adequate local funding to develop and maintain the needed drainage infrastructure and associated SWM Program to support continued economic development within the Belfair UGA.

## Section 10—Public Review and Approval

### 10.1 Public Involvement Process

#### Overview of the Public Process

The public review process for the Allyn and Belfair Stormwater Management Plans consists of a public meeting, which was held on June 20, 2007, a presentation to the County Planning Commission, review by the County Board of Commissioners, and a formal public hearing for additional public comment and final adoption by the County Board of Commissioners. The intent is to review and formally adopt these plans so they can be presented to the Western Washington Growth Management Hearings Board on August 6, 2007.

#### Response to Public Comments

Comments received from the public at the June 20, 2007 public meeting, held on that Wednesday evening at 6pm at the Port of Allyn, were recorded by County staff at the meeting. Each comment has been listed below in the order received at the meeting and County response to each comment has been presented in Section 10.2.

Note that in some cases, letters have been received from local groups, individuals, and State agencies, most notably the Puget Sound Action Team, the Department of Ecology, and the Allyn Community Association. Letters are currently being developed to respond to their comments as well. To the extent the timing allowed (one week), as many of their edits as possible have been attempted to be addressed and incorporated into the edits and revisions made to the original drafts of these two plans. A summary of the major edits and revisions made to each of the draft documents is presented in Section 10.3 below.

#### Edits and Revisions to the Draft Allyn and Belfair SWM Plans

In addition to the formal responses to each of the public comments and the various letters, the County has made a series of major edits and revisions to the existing drafts of each of the two plans. The revised and final versions of the two plans are available from the County beginning July 2, 2007, and have also been presented on the County's web site as well as making hard copies available for public review at local public libraries.

#### Note: This is Just the Beginning of the Public Input Process

The public has commented that the timing for this public review process has been especially short. In response to that perception, if you have additional concerns or comments, please do not hesitate to call Mason County and make your thoughts known so that they may be taken into account as these two regional stormwater plans are implemented. Please also recognize, however, that this is just the beginning, not the end, of the public's opportunities to be directly involved in the future development, funding, and implementation of these two very significant guidance documents. Each of these planning documents will be used by the

## Section 10— Public Review and Approval

Continued

County, as well as the State, Tribes, local and regional agencies, industry, developers, and local citizens to monitor, mitigate, enhance and restore the critical and unique natural water resource functions (i.e. water quality, habitat, aquifer recharge, and shellfish rearing) of the Allyn and Belfair Urban Growth Areas.

### 10.2 June 20, 2007 Public Meeting: Response to Public Comments

On June 20, 2007, Mason County held a public meeting to receive comments on the draft SWM Plans for the Allyn and Belfair Urban Growth Areas (UGAs). The public meeting was located at the Port of Allyn in their main conference room at six pm. Comments were recorded by Mason County. This memorandum documents the County's response to those comments received at the meeting.

#### Public Workshop Comments

1. Do not use "Cty" to abbreviate for County

*Response:* "Cty" abbreviation has been removed.

2. Are there any unexplored Grant opportunities for Allyn

*Response:* Grant opportunities are discussed in Section 9 and are strongly encouraged; Ecology grant funds are currently available upon application.

3. Establish a Community Association in Belfair

*Response:* Comment noted. Please contact Mason County Department of Community Planning to inquire as to the process for getting this done.

4. There is a critical aquifer recharge area in Belfair that is not included in the Plan

*Response:* The aquifer recharge area in Belfair has been added to Figure 3-3.

5. There is a natural wetland collection area in Allyn not mentioned in the Plan

*Response:* Yes, this comment was received and acknowledged; there are likely many such smaller or localized wetlands likely distributed throughout the planning area. Figure 2-3 used *National Wetlands Inventory Data* the currently available information from the County to map existing wetland conditions.

6. Streams in wrong location – North Allyn

*Response:* Stream data was obtained from Mason County, who obtained it originally from DNR. This comment has been received previously and will be fixed in the future by the

## Section 10— Public Review and Approval

Continued

County. A note to explain this has been added to the Figures. The County acknowledges this error and intends to update their GIS data base accordingly.

7. Place more priority on Action Item #8 for Belfair (#8 – Perform Baseline Habitat and Water Quality Study)

*Response:* Action Item #8 is currently listed as “High Priority” in Table 7-2.

8. Culverts on SR3 not identified

*Response:* The existing culvert inventory is based on a combination of site visits, input from the County, as-builts from WSDOT as available, and inventories published in drainage reports prepared by others. Culvert monitoring plans have been recommended in both UGAs; all culverts will be inventoried at that time.

9. Planning for Allyn must include input from the Allyn community

*Response:* Comments from the Allyn Community Association have been received over the phone and in a letter. Also a series of phone calls to local members have been placed to gather local information. Comments have been addressed to the extent possible in the revised documents.

10. There has not been enough public review

*Response:* The review time has been a bit short due to the August 6 due date to get back to the Growth Management Hearings Board. Those public comments received have been incorporated into revised Stormwater Planning Documents. Revised documents are again available again for public review beginning on Monday, July 2, 2007.

11. There needs to be more involvement with the Allyn Community Association prior to adoption

*Response:* Comments from the Allyn Community Association have been received over the phone, in a letter, and via follow-up phone calls. Their comments have been addressed in the revised documents.

12. Use LID model for zoning in Allyn

*Response:* The analysis was performed using the Interim Zoning shown in the *Allyn Urban Growth Area Comprehensive Plan, Public Review Draft August 2006*, as provided by Mason County. The use of LID has been strongly encouraged in the revised plan and an LID ordinance has been recommended for adoption within the Allyn UGA.

13. What is the criteria used for siting stormwater facilities in Allyn – not provided in Plan

*Response:* Facilities were sited based on the County’s need to address both existing and future drainage needs. Regional water quality ponds were sited on large, relatively flat parcels

## Section 10— Public Review and Approval Continued

located close to the proposed new outfalls. The regional water quality ponds have been removed from the capital improvement recommendations.

14. The sites chosen (for regional ponds) in Allyn are inappropriate  
*Response:* Regional water quality ponds have been removed from the capital improvement recommendations.

15. Hotel, Reynolds development, Knight residential site, Kayak Park – these sites for (regional) facilities need to be eliminated from the plan  
*Response:* These sites, as well as the proposed regional water quality ponds have been removed from the capital improvement recommendations.

16. Use “bubble” diagrams instead of identifying specific pieces of property  
*Response:* Regional water quality ponds have been removed from the capital improvement recommendations and specific parcel identification has also been removed.

17. Existing lack of infrastructure not addressed (in both plans?)  
*Response:* Analysis of existing culverts crossing SR3 in both UGAs has been included in each plan. Initial analyses show that most of these culverts are currently adequate and should be able to accommodate the additional growth projected to occur over the next six years. Culverts that appear to be inadequate or where flooding complaints have been made have been listed as locations for future analysis. In general within both planning areas, all future development will provide the needed infrastructure to support future development.

18. Plans should incorporate the communities’ goals  
*Response:* The communities’ goals have been added to Section 1, along with the creation of a community vision.

19. The Plan for Allyn should be tailored to the community’s needs  
*Response:* Comments from the Allyn Community Association have been received over the phone and in a letter. Comments have been addressed in the revised documents and the resulting documents are more responsive to local and community needs.

20. Eastern Basin (?)  
*Response:* No response. (Unsure what this comment was about.)

21. Preliminary costs estimates should be +/- 25% and they are not  
*Response:* A 30% contingency has been added to all project costs to take into account needed right of ways and permitting issues, as well as other unknown needs and expenses.

## Section 10— Public Review and Approval

Continued

22. Boundaries in Allyn are inaccurate

*Response:* Subbasin boundaries are based on GIS contour data provided by the County and confirmed in the field during two site visits. It is recommended that subbasin boundaries continue to be evaluated, validated, and modified as more site specific studies occur.

23. Field observations in Allyn are inaccurate

*Response:* Documentation of conditions (sections 2 and 3) has been enhanced with personal communication with Allyn community members and comments from Mason County and WSDOT maintenance personnel.

24. Wade Street Basin - ?

*Response:* No response. (Unsure what this comment was about.)

25. Developer fees won't fund this – cost will be higher than estimated (for regional detention facilities).

*Response:* Based on public input, costs have been modified (reduced from \$15.1 million to \$2.53 million) to reflect changes to the proposed CIP program. Updated costs are presented in Section 7. Costs will be funded, as needed, by a variety of sources, as presented in Section 9.

26. Several roads in Allyn have water going uphill – can't pump water uphill

*Response:* Ditch locations have been refined and updated based on existing topography and the uphill locations of originally proposed facilities have been eliminated. Changes are shown in revised Figure 6-5.

27. If Activity #1 in Belfair Plan includes redevelopment – it should state that (#1 – Adopt Ecology 2005 Manual)

*Response:* Statement has been addressed by referring to redevelopment throughout the revised document, most notably in revised Sections 5 and 8; however, it is very clear in the 2005 Manual that all design criteria apply equally to development as well as redevelopment.

28. Nothing in Belfair Plan identifies existing stormwater problems or facilities

*Response:* Existing stormwater deficiencies, according to conversations with Belfair community members and from Mason County and WSDOT maintenance personnel have been added to revise Section 3. Additional localized problems have been noted, however, there still may be some that have not yet been documented.

29. Should put Phase II Permit requirements in the Belfair Plan now

*Response:* Phase II permit requirements have been added to both plans in new Section 8.

## Section 10— Public Review and Approval Continued

30. In Belfair Plan, Activity 14 must be done regardless of findings for Activity 8. (#8 – Study, #14 – Develop Cooperative Commercial Water Quality Retrofit Program)  
*Response:* There has been considerable discussion within the State, County, local community and scientific community as to the need, cost, and benefit of retrofitting existing development. Some additional monitoring is needed to focus any future retrofit efforts on the known and identified problems areas. Although a bit premature at this point in time, some retrofit may be required in the future.
31. Re: Mindy and Belfair Creek – get runoff out  
*Response:* Stormwater runoff has historically made up a large portion of the base flows to both Mindy and Belfair Creeks. While development may have increased the total amount of surface water being discharged, some continued surface water discharge is likely needed to maintain the health of the streams and their natural functions. Additional future detention and/or treatment, however, may be required in the future and would be one of the results from continued monitoring of both drainage systems. The plan currently recommends the realignment of both Mindy and Belfair Creeks to improve both flow and habitat functions.
32. Monitoring Water Quality: monthly; hit storm events; more monitoring points, cost of monitoring will be higher  
*Response:* An aggressive monitoring program has been placed in both plans at a cost of \$100,000 per year. Additional monitoring may be required in the future.
33. In NE Belfair, no discussion of current situation and drainage areas not correct.  
*Response:* Existing stormwater deficiencies, additional information gathered from Belfair community members and from Mason County and WSDOT maintenance personnel, have been added to Section 3.
34. No identified source of County’s funding source: Charlie’s response, “the countywide plan will identify funding sources”  
*Response:* Funding sources are discussed in Section 9. The plan has identified a number of potential funding mechanisms, which if developed and implemented, have the potential to provide the annual revenue needed to successfully implement both plans.
35. Has the sewer in Allyn/Lakeland Village been considered in this process?  
*Response:* Not at this time. Currently, the approach is to minimize the amount of stormwater entering the sewer system so that future sewer treatment plant costs are kept to a minimum and not increased to accept excess and unwanted stormwater flows.
36. Will changes be made prior to the Planning Commissioner’s public hearing?  
*Response:* Yes, both plans have been substantially edited and updated versions are available for public review beginning on July 2, 2007.

## Section 10— Public Review and Approval

Continued

37. What are the consequences of non-compliance?

*Response:* Consequences are unclear, however, it is likely that any existing and/or future funding from the State, including grants or loans, may be delayed or held in jeopardy.

38. “Current Staff” responsibilities are a concern as the County is currently “understaffed”.  
Charlie, “the county intends to bring on an expert(s) to implement plans”.

*Response:* Cost estimates for programmatic costs have been added to Section 9 of the plan to identify the role and provide funding for the hiring of permanent SWM staff and/or qualified outside services to implement both plans.

39. County has no ability to implement these plans

*Response:* The revised plans have new sections added to create the needed funding and obtain needed resources and expertise to successfully implement both plans. These analyses show that there are adequate funding mechanisms available to implement the proposed plans.

40. #130 in the Belfair map is the Davis Farm which has a lot of water on it

*Response:* This farm is located next to the Union River, likely within the historical floodplain of the river and although it does not appear to have significant wetlands it does have Type C soils that do not readily infiltrate. It is likely that it has historically always been wet.

41. Romance Hill, Union River, Irene and Viola Creek – fish blockage issues

*Response:* Irene Creek, Viola Creek, and Romance Hill are not currently classified as fish bearing streams according to the Washington Department of Natural Resources; therefore we did not identify fish blockages on those streams. Recent additional discussions with the Hood Canal Salmon Enhancement Group suggest that it is likely that almost all streams within the UGA are likely to be salmon/fish bearing. The proposed Plan recommends a habitat inventory be performed so that the status of these streams can be updated and addressed.

Please note that the Union River is not within the Belfair UGA; fish blockages on the Union River will be addressed when the County performs their County wide stormwater plan.

42. Review the wetland located on the Knight’s property

*Response:* The drainage complaint at the southwest corner of E Wade Street and SR3 in Allyn is noted throughout the Allyn Stormwater Plan. It is recommended in Section 6 that the 18-inch culvert at that location be further investigated. The County is planning a future road project that will address the runoff currently coming down Wade Street.

43. These plans need to be more cohesive before they go to the BOCC. Incorporate Planning Commissioner comments into plans; do not present them separately.

## Section 10— Public Review and Approval

Continued

*Response:* It is the intent of the County to present both plans concurrently to the BOCC.

44. Is an extension of time from the Western Washington Growth Management Hearings Board possible?

*Response:* The County has investigated this possibility and this does not seem likely; we must progress with the current schedule for review and adoption.

45. If any county funding being threatened (by non-compliance)?

*Response:* Yes, compliance is necessary to receive the \$25M in proposed funding currently slated for the Belfair sanitary sewer project.

46. Can you recognize in the document that it is not complete and that the planning process is continuous?

*Response:* Like any planning process, these plans only reflect one point in time and will be continually refined during implementation and will be regularly updated and re-written in the future as more water quality, habitat, shellfish and flooding data is collected and more experience is gained by the community and County during implementation.

47. Plans reflect a lack of urgency for stormwater itself

*Response:* A lack of urgency certainly has not been the intent. There are many localized drainage issues that should be addressed, there are local and regional water quality issues that are significant and must be addressed soon, and there is the need for the County to create adequate local funding and begin to implement this plan in order to meet the requirements of the Puget Sound Water Quality Management Plan and the prepare the County for compliance with its future NPDES II Stormwater Permit.

### 10.3 Summary of Edits to the Original Draft of the Belfair SWM Plan

Both the Allyn and Belfair SWM Plans have been edited based on comments received from the public, local community groups, County staff, Ecology, and the Puget Sound Action Team. All comments received to date have been acknowledged, are appreciated and have been responded to in the revised versions of both reports. This section presents a general listing of all of the major edits and revisions that have been made to both plans. The revisions have been grouped according to each of the sections of the revised document. The only exception is the future engineering and capital projects proposed for ultimate build out of the Allyn UGA. These have been listed separately, as shown below.

#### Executive Summary

- This section has been reviewed and revised.

## Section 10— Public Review and Approval

Continued

- The Executive Summary for each plan has been rewritten to reflect the changes to the content of each plan, and their associated SWM projects, activities, costs, and funding mechanisms.

### Section 1—Introduction

- This section has been reviewed and revised.
- Additional information has been collected and recorded in this section.
- Sections have been added for Mission Statement, Scope of the SWM Planning Project and Planning for Growth with the UGA.

### Section 2—Characterization of the UGA

- This section has been reviewed and revised.
- Additional research and coordination has been done to better describe the key environmental issues associated with each UGA.
- This section has also been enhanced by the addition of more detailed information about local hydrology, land use, wetlands, water quality, habitat and shellfish.

### Section 3—Existing Stormwater Facilities

- This section has been reviewed and revised.
- This section has been enhanced with additional information obtained via communication with local residents, and County and WSDOT maintenance personnel. Especially the listing of known and observed local drainage problem areas.
- Additional input from the public has been documented here.

### Section 4—Future Conditions

- This section has been reviewed revised.
- Additional information has been collected and recorded in this section.
- A section has been added to describe future growth and its related impacts in terms of number of new homes and amounts of new impervious areas.
- A conceptual strategy to manage stormwater within each UGA is also presented to describe the methodology to be used to control/manage the increased runoff associated with new development.

### Section 5—Regulatory Design Criteria

#### (New Title: SWM Impacts, Analysis and Strategy)

- This section has been reviewed and revised.
- Additional information has been collected and recorded in this section.
- This section has been revised to include additional mentions of LID.

## Section 10— Public Review and Approval

Continued

- A new section describing the County’s existing SWM requirements has also been added.

### Section 6—Hydrologic Modeling and Engineering

#### (New Title: SWM Impacts, Analysis and Strategy)

- This section has been reviewed and revised.
- Additional information has been collected and recorded in this section.
- Title has been changed to SWM Impacts, Analysis and Strategy
- Information previously provided in appendices has been move into the text to better explain the analysis, the methodology, the results and how the results were used to make engineering and design/project related decisions.
- Culvert analyses were expanded, summarized, and recorded.
- A section has been added to develop and explain the proposed SWM strategy for the UGA and each subbasin within the UGA

### Section 7—Stormwater Management Plan

#### (New Title: SWM Plan: Capital Projects)

- This section has been reviewed and revised.
- Additional information has been collected and recorded in this section.
- Title has been changed to SWM Plan: Capital Projects.
- In the Allyn SWM Plan, this section has been significantly modified and rewritten according to comments from Mason Co. and Allyn Community members. In general, the use of any regional facilities for water quality treatment has been removed and the costs adjusted accordingly. An alternative infrastructure management proposal has been made to create a series of four regional conveyance and outfall systems that would be built by the County to accommodate future growth on an as needed basis. As a result, costs have been reduced from about \$15M to \$2.53M.
- In the Belfair SWM Plan, additional engineering has been performed and the culvert analysis has been expanded to confirm and technically support previous analyses and recommendations. No changes in the recommended strategy or proposed projects or costs have resulted from these additional analyses.

### Section 8—Costs, Schedule, and Implementation (New Section)

#### (New Title: SWM Plan: Programmatic Elements and Regulatory Compliance)

- This is a new section.
- Additional information has been collected and recorded in this section.
- Title has been changed to SWM Plan: Programmatic Elements and Regulatory Compliance.

## Section 10— Public Review and Approval

Continued

- This section has been created to respond to the comments from County staff, local communities, Ecology, and the Puget Sound Action Team.
- The section consists of the following new sections: overview of county-side SWM planning process, strategy to manage existing and future runoff, review of the County's existing SWM Program and legal authorities, regulatory compliance considerations (especially the Puget Sound Water Quality Management Plan and the requirements of the NPDES II Permit for Western Washington), presents a strategy, list of actions, costs, and schedule for addressing regulatory requirements, provides guidance for development and redevelopment, summarizes local habitat, water quality, and shellfish issues, discusses status and impacts/importance of regional water resource planning, and presents an overall cost and implementation that shows relative priority and future annualized revenue needs for successful implementation over the next six years.

### Section 9—Costs, Schedule, and Implementation (New Title: Costs, Funding and Implementation)

- This section has been reviewed and revised.
- Additional information has been collected and recorded in this section.
- Title has been changed to Costs, Funding and Implementation.
- Additional information has been added that includes: recommended SWM Plans in terms of activities, costs, priorities, and annualized revenue needs, lists and defines short and long term activities and projects and their costs, performs a funding analysis in which funding options are reviewed and evaluated, preferred funding mechanisms are selected and potential future revenues from each are estimated, the amount and adequacy of project potential future revenues are reviewed and evaluated by comparing annualized SWM program and capital costs with annualized proposed potential future revenues, and a final statement is made about the County's ability to continue to adequately fund and implement the drainage infrastructure needed to continue to support existing and future growth throughout each of the UGAs.

### Section 10—Public Involvement (New Section)

- This is a new section.
- Additional information has been collected and recorded in this section.
- This new section summarizes the public review process and summarizes the comments received and the County's response to those comments.
- A listing of major changes by section is presented in an outline format so the public and other reviewers will have a quick and easy way to locate and read the new information presented within each plan.
- A review of the remaining activities associated with the formal public review and comment process are also presented.

## Section 10— Public Review and Approval

Continued

### Tables

- In general, a few new tables have been provided.
- New tables have been added to Sections 6, 8 and 9, as needed to present and explain new information, recommended program elements, and their associated costs.

### Figures

- Only two figures have been changed: one is Figure 6-5 (same as E-2) in the Allyn SWM Plan, the other is Figure 2-4 in the Belfair SWM Plan to add the location and extent of the regional groundwater aquifer underlying a large part of the UGA.
- All figures have been updated to include the source of stream data.

### Appendices

- Some changes have also been made to the associated appendices to accommodate the changes in the associated text of each document.

#### Allyn SWM Plan

##### **Appendix A—Lakeland Village Stormwater Facility Information**

- Remains the same.

##### **Appendix B—Low Impact Development Techniques**

- Remains the same.

##### **Appendix C—Hydrologic Analysis**

- This Appendix has been appended to include additional modeling analysis of the existing conditions.

##### **Appendix D—Hydraulic Analysis**

- This Appendix has been removed.

##### **Appendix E—Construction Cost Estimates**

- This Appendix is now Appendix D. Costs have been updated to reflect updated CIP plan.

##### **Appendix F—Suggested Scope for Culvert/Outfall Inventory and Analysis**

- This Appendix has been removed.

##### **Appendix G—Preliminary Analysis of Existing Culvert Analysis**

- This Appendix has been removed.

#### Belfair SWM Plan

##### **Appendix A—Low Impact Development Techniques**

- Remains the same.

## Section 10— Public Review and Approval

Continued

### Appendix B—Hydrologic Analysis

- This Appendix has been revised to include additional modeling analysis of the existing flow conditions that was used for the expanded culvert analysis.

### Appendix C—Construction Cost Estimates

- This Appendix remains about the same; however, the estimated cost of a typical rain garden has been taken out due to too much variability in site conditions.

## 10.4 Formal Review and Approval Process

The remaining elements of the formal review and approval process include the following:

- Issuance of the revised plans to the public for additional comment,
- Presentation of the plans to the County Planning Commission for additional discussion and potential edits and/or revisions,
- Presentation to the Board of County Commissioners (BOCC), and finally
- Another public meeting/hearing to receive additional public comment prior to final review/approval by the Board of County Commissioners.