

**REPORT TO CORE AREA LIQUID WASTE MANAGEMENT COMMITTEE  
MEETING OF WEDNESDAY, 25 JULY 2007**

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**SUBJECT**      **STORMWATER QUALITY ANNUAL REPORT, CORE AREA – 2006**

**PURPOSE**

To present the results of the 2006 Core Area Stormwater Quality program.

**BACKGROUND**

As part of the Core Area Liquid Waste Management Plan (LWMP), the Capital Regional District (CRD) Stormwater, Harbours and Watersheds program (SHWP) coordinates the management of stormwater quality in cooperation with the seven core municipalities and First Nations. SHWP has been effective in drawing attention to and prioritizing problems associated with contaminated stormwater. This has allowed the municipalities, the Department of National Defence (DND) and First Nations to develop plans and carry out remedial actions to address these problems. This partnership between SHWP and the jurisdictions involved has been successful in improving stormwater quality in the CRD core area.

The results of the 2006 SHWP work in the core area are detailed in the report, *Stormwater Quality Annual Report, Core Area – 2006*. A copy of the executive summary is attached (Appendix A). Copies of the full report are available from the Environmental Services department. The 2006 report has been discussed with the jurisdictions involved.

The annual report covers five main activity areas: stormwater discharge surveys, stormwater source control, upstream investigations, nearshore marine investigations and special projects.

**1.      Stormwater Discharge Surveys**

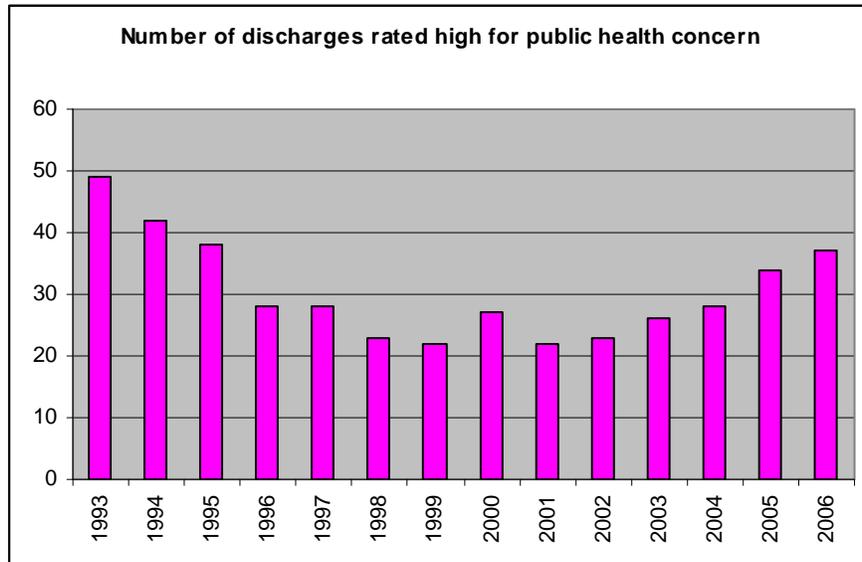
In 2006, stormwater discharges along the marine coastline of the core area (Colwood/Metchosin border in the west to the Saanich/Central Saanich border in the east) were surveyed. These stormwater discharges were sampled, evaluated and rated for public health and environmental concerns.

**Public Health – Fecal Coliforms**

From 1993 to 1999, the number of stormwater discharges assigned a high level of concern for public health dropped dramatically (from 49 to 22). Little change was seen from 1999 to 2001 and, since then, the number of high priority discharges has been increasing (refer to Graph 1). In 2006, 37 of 175 stormwater discharges were assigned a high level of concern for public health and recommended for action (figures A and B in Appendix A show the location of these discharges).

This 14-year pattern of numbers of high priority discharges indicates that the municipalities and other jurisdictions have worked hard to reduce problem discharges and have addressed most of the stormwater discharges with obvious contaminant sources. The majority of the remaining discharges are difficult to address. The 2006 high priority stormwater discharges either have contaminant sources that are proving difficult to identify or a new contaminant source has developed in the discharge.

Graph 1



The recent increase in high ratings has occurred in three areas: Esquimalt, Oak Bay and Victoria (see Appendix A, Table A). To address this increase and reverse the trend, SHWP staff worked with municipal staff from the three municipalities to develop three-year action plans for 2006 to 2008. These plans set targets for each municipality to reduce the number of high-rated discharges to approximately half of 2005 levels at the end of the three years. SHWP and municipal staff are working in a cooperative manner to rapidly locate problems, followed by municipal remedial action.

In the first year of the action plans (2006), there was an increase in the overall number of high-rated discharges (from 32 to 34). Efforts in the first year focused on finding contaminant sources. In the second year of the plans, efforts should focus on remediation, which should result in a decrease in the numbers of discharges rated high for public health concern.

#### Environment – Chemical Contaminants

In 2006, 30 stormwater discharges were sampled for chemical contaminants and then evaluated for environmental concerns. Based on the 2006 results and results from previous years, 20 discharges are recommended for action to determine the sources of contamination, now that repeated sampling has confirmed high contaminant levels at these locations (see figures A and B for locations).

#### **2. Stormwater Source Control**

In the Core Area LWMP, the CRD committed to conduct a Stormwater Source Control program in cooperation with the municipalities. The goal of the program is to reduce environmental contamination by controlling it at the source (the discharger becomes responsible for keeping contaminants out of stormwater flows).

At the 22 November 2006 meeting of the Core Area Liquid Waste Management committee, the committee approved an action plan prepared by staff in response to the recommendations in the Society of Environmental Toxicology and Chemistry (SETAC) review of the Core Area LWMP. One of the recommended actions was to "initiate discussions with municipalities to identify needed changes to CRD or municipal authority to ensure stormwater protection and improvement". This recommendation came

from the SETAC report's comment that the CRD appeared to be responsible for stormwater quality management but lacked the authority to enforce stormwater bylaws. In 2006, SHWP began to investigate options related to this authority in order to develop options to better protect the environment from stormwater-carried contamination. These options for stormwater source control will be evaluated and discussed with municipalities in 2007.

### **3. Upstream Investigations**

Upstream investigations were carried out to identify sources of bacterial and chemical contamination in stormwater discharges. In 2006, sources of contamination were eliminated in three catchment areas, one discharge had a source identified for action by the Vancouver Island Health Authority and the municipality, and contaminant sources were narrowed down in 24 more. In 2006, municipalities used the information provided by SHWP to resolve the identified contaminant sources, and SHWP staff will continue to work with the municipalities to further narrow down the remaining areas of stormwater contamination and monitor for new problems.

### **4. Nearshore Marine Investigations**

Surface water samples were collected from Esquimalt Lagoon and Victoria and Esquimalt harbours in the winter and summer. This monitoring is used to provide information about some of the overall effects of stormwater discharges on these partially-enclosed waterbodies in the core area.

In 2006, fecal coliform levels in the centre of the three waterbodies were generally low, indicating that there was no overall effect from fecal coliform present in stormwater flows. However, water quality adjacent to stormwater discharges may be affected by the discharge flows.

### **5. Special Projects**

In 2006, SHWP and other CRD staff were involved in a number of special projects to improve stormwater quality in the region. These are outlined in the annual report.

## **ALTERNATIVES**

1. SHWP staff work with the Township of Esquimalt, District of Oak Bay and City of Victoria to continue to implement the action plans to reduce the number of stormwater discharges rated high for public health concern.
2. SHWP staff do not work with the Township of Esquimalt, District of Oak Bay and City of Victoria to continue to implement the action plans to reduce the number of stormwater discharges rated high for public health concern.

## **FINANCIAL IMPLICATIONS**

Included in the Core Area Stormwater Quality program annual budget.

## **PUBLIC HEALTH / ENVIRONMENTAL IMPLICATIONS**

Stormwater discharges that are contaminated with sewage and chemical compounds pose a public health risk on beaches and can cause environmental damage to our shorelines. To address these issues, the number of high-priority stormwater discharges must be lowered. This will result in cleaner beaches and healthier nearshore environments. The CRD/municipal stormwater quality partnerships are an effective means to achieve these public health and environmental benefits.

### **SUMMARY/CONCLUSIONS**

In 2006, stormwater discharge surveys and upstream investigations continued to provide valuable information to municipalities by identifying stormwater issues and prioritizing areas for remedial action. Due to recent increases in the number of discharges rated high for public health concern, action plans have been developed in cooperation with three municipalities to address this issue over a three-year period. SHWP staff are working closely with municipal staff to identify and remediate sources of contamination. Although the number of discharges rated high increased in 2006, it is anticipated that remedial measures undertaken by the municipalities will result in a decrease in 2007.

As a result of the recommendations in the SETAC report, SHWP is initiating discussions with municipalities to identify needed changes to CRD or municipal authority to ensure stormwater protection and improvement. These options for stormwater source control will be evaluated and discussed with municipalities in 2007. SHWP staff are also working with the municipalities to assist with the adoption of other tools for stormwater source control and to educate the affected businesses and residents.

### **RECOMMENDATIONS**

That the Core Area Liquid Waste Management committee recommend that:

1. the Capital Regional District *Stormwater Quality Annual Report, Core Area – 2006*, dated June 2007, be received for information;
2. the report be forwarded to the jurisdictions involved for their consideration;
3. copies of the report be forwarded to the Ministry of Environment; and
4. SHWP staff work with the Township of Esquimalt, District of Oak Bay and City of Victoria to continue to implement the action plans to reduce the number of stormwater discharges rated high for public health concern.

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Concurrence

### **COMMENTS**

DG:wg  
Attachment: 1

## STORMWATER QUALITY ANNUAL REPORT CORE AREA – 2006

### EXECUTIVE SUMMARY

#### INTRODUCTION

The Capital Regional District (CRD) Stormwater, Harbours and Watersheds program (SHWP) plans, promotes and coordinates the management of stormwater quality in the core Liquid Waste Management Plan (LWMP) area, in consultation with the municipalities, Department of National Defence (DND) and First Nations. The CRD does not have the authority to directly implement any mitigative programs. This continues to be the responsibility of the municipalities, DND and First Nations.

This 2006 annual report covers five main areas of activity:

1. **Stormwater Discharge Surveys** – carried out along the entire coastline of the core area to investigate the public health and environmental concern of stormwater discharges.
2. **Upstream Investigations** – undertaken to identify the source(s) of contaminants in stormwater.
3. **Nearshore Marine Investigations** – carried out in Esquimalt Lagoon and Esquimalt and Victoria harbours to determine the health of the waterbodies and monitor for change over time.
4. **Stormwater Source Control** – promoted through the creation of a Model Storm Sewer and Watercourse Protection Bylaw and associated codes of practice (COPs) for business sectors that have the potential to impact stormwater quality.
5. **Special Projects** – to improve stormwater quality in the region.

This annual report has been discussed with the seven core area municipalities, the two First Nations and the DND.

#### RESULTS AND DISCUSSION

##### 1. Stormwater Discharge Survey

The stormwater discharge survey covers the coastline between the Colwood/Metchosin border in the west and the Saanich/Central Saanich border in the east, including Esquimalt Lagoon, Esquimalt Harbour, Victoria Harbour, Gorge and Selkirk waters, Portage Inlet and the City of Langford coastline along Saanich Inlet.

##### Public Health – Fecal Coliforms

Stormwater discharges are evaluated for public health concerns. This is done by sampling each discharge for fecal coliform bacteria and assigning a rating of high, moderate or low using the CRD's rating system. This allows the jurisdictions involved to better manage limited funds and undertake remedial measures where necessary.

In 2006, 175 stormwater discharges were rated for fecal coliform where flows allowed. Discharges were visited once during the winter and once during the summer to represent seasonal differences. Of the 175 discharges assessed, 37 were rated high for public health concern (refer to Table A and figures A and B), 78 were rated moderate and 60 were rated low.

The state of municipal infrastructure varies widely throughout the study area and, therefore, the number of high-priority discharges in a jurisdiction should not be used to gauge the level of remedial effort. Some discharges also carry flows from more than one jurisdiction, and the source(s) of fecal coliform bacteria may not be from the jurisdiction at the point of discharge.

There has been an overall 24% reduction (49 to 37) in the number of stormwater discharges with a high level of public health concern between 1993 and 2006 (Table A and Graph 1). This improvement in stormwater quality is primarily due to the cooperative efforts of municipal, Vancouver Island Health Authority (VIHA) and SHWP staff to identify and eliminate sources of fecal coliform bacteria. However, most of these improvements occurred during the first half of this 13-year time period.

Over the last five years, the number of high-rated discharges has increased. As a result, SHWP staff are working with three municipalities (City of Victoria, District of Oak Bay and Township of Esquimalt) to address this increase and reverse the trend. SHWP staff worked with municipal staff from the three municipalities to develop three-year action plans for 2006 to 2008. These plans set targets for each municipality to reduce the number of high-rated discharges to approximately half of 2005 levels at the end of the three years. SHWP and municipal staff are working in a cooperative manner to rapidly locate problems, followed by municipal remedial action.

In the first year of the action plans (2006), there was an increase in the overall number of high-rated discharges (from 32 to 34). Efforts in the first year focused on finding contaminant sources. In the second year of the plans, efforts should focus on remediation, which should result in a decrease in the number of discharges rated high for public health concern.

**Table A. Comparison of the Total Number of Discharges with a High Level of Public Health Concern**

Area	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
City of Colwood	0	1	2	2	1	0	0	0	0	1	1	0	0	0
Town of View Royal	1	2	0	0	0	0	0	0	0	0	1	0	1	2
Township of Esquimalt	12	10	10	9	9	9	6	6	5	5	5	5	7	7
DND	0	1	0	1	2	1	1	1	0	0	0	0	0	0
District of Saanich	6	3	2	1	2	1	0	2	2	1	0	4	1	1
City of Victoria	22	18	17	12	10	9	11	13	9	8	13	14	14	15
City of Victoria private discharges <sup>1</sup>	*	*	*	*	*	*	*	*	*	*	*	*	2	3
District of Oak Bay	8	7	7	3	4	3	4	5	6	8	6	5	9	9
City of Langford <sup>2</sup>	-	-	-	-	-	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>49</b>	<b>42</b>	<b>38</b>	<b>28</b>	<b>28</b>	<b>23</b>	<b>22</b>	<b>27</b>	<b>22</b>	<b>23</b>	<b>26</b>	<b>28</b>	<b>34</b>	<b>37</b>

<sup>1</sup> Discharges that drain from private property do not fall under municipal jurisdiction. Starting in the 2006 report, discharges within the City of Victoria survey area that drain from private properties to the ocean are indicated separately. Other municipalities will be reported similarly in future annual reports.

<sup>2</sup> City of Langford stormwater discharges were sampled for the first time by the Stormwater Quality program in 1998.

\* = Private discharges included in the City of Victoria totals.



**Figure A Core Area - 2006**  
**Stormwater Discharges Requiring Action**  
**for Public Health and Environmental Concerns**  
**(Metchosin to Esquimalt Border)**

- ▲ Environmental Concern
- Public Health Concern
- ~ Creeks and Rivers
- Municipal Boundaries
- DND Boundaries
- Major Roads
- Stormwater Monitoring Area
- CRD



UTM Zone 10N  
NAD83



CENTRAL SAANICH

SAANICH

Haro Strait

Prospect Lake

Elk Lake

Cordova Bay

Blenkinsop Lake

VIEW ROYAL

ESQUIMALT

OAK BAY

VICTORIA

Baynes Channel

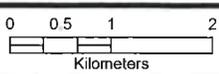
Esquimalt Harbour

Victoria Harbour

Oak Bay

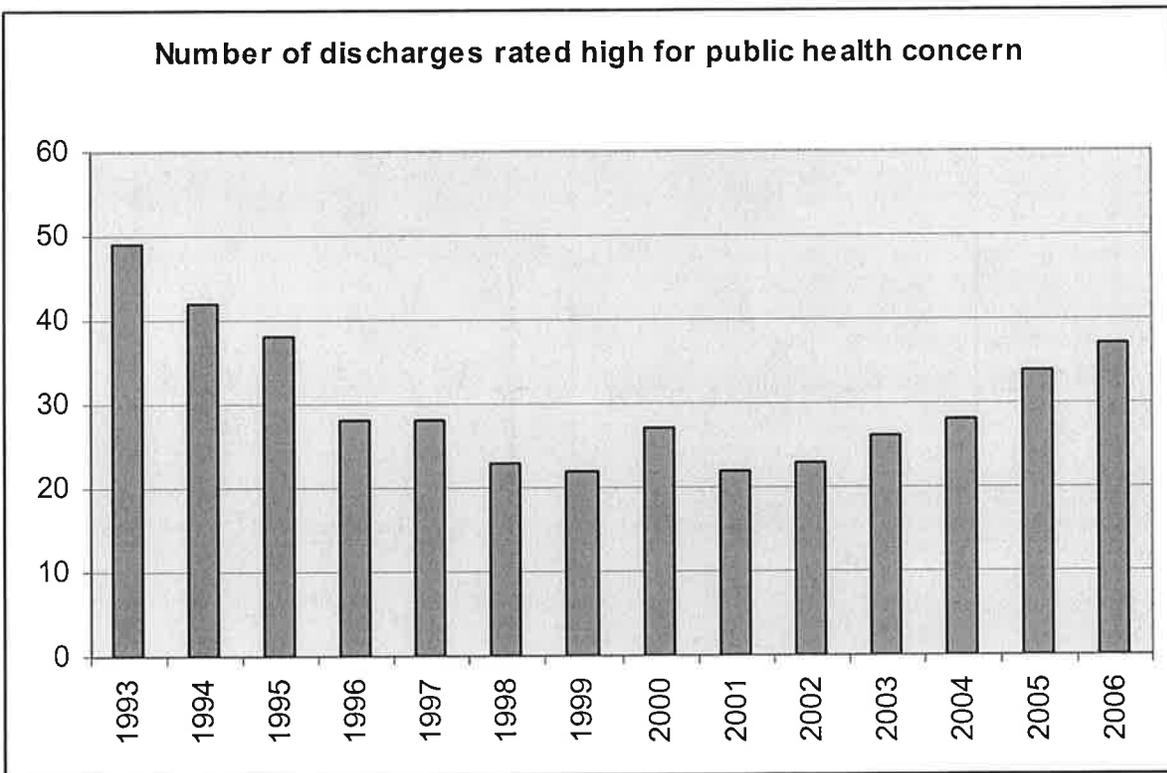
**Figure B Core Area - 2006**  
**Stormwater Discharges Requiring Action**  
**for Public Health and Environmental Concerns**  
**(Esquimalt to Central Saanich Border)**

- ▲ Environmental Concern
- Public Health Concern
- ~ Creek and Rivers
- Municipal Boundaries
- DND Boundaries
- Major Roads
- Stormwater Monitoring Area
- CRD



UTM Zone10N  
 NAD83

Graph 1



#### Environment – Chemical Contaminants

Stormwater discharges are evaluated for environmental concerns based on the level of metals and organic contaminants identified in each flow. Discharges with high chemical contaminants are then prioritized for action based on environmental factors, including habitat sensitivity, discharge flow rate and the flushing characteristics of marine receiving waters. This prioritization is undertaken in consultation with the appropriate jurisdiction(s) and may result in a detailed investigation to locate the source(s) of contamination. All chemical contaminant data from previous years were considered because sampling is discontinued at discharges consistently rated high for three years until some form of remediation is implemented. This allows limited funds to be re-allocated for sampling other discharges while continuing to report the need for action in each annual report.

The 2006 sediment sampling program focused more effort on fewer discharges than in 2005 in order to undertake upstream sampling in an attempt to locate sources of contaminants. As a result, the total number of points of discharge rated for concern was reduced from 49 in 2005 to 30 in 2006. These stormwater discharges were sampled for polycyclic aromatic hydrocarbons and metals and were assessed for environmental concern. Eleven of the 30 stormwater discharges received a high contaminant rating. Twelve discharges received a moderate contaminant rating and seven were rated low.

Based on the 2006 results and results from previous years, 20 discharges are recommended for action to determine the sources of contamination now that repeated sampling has confirmed high contaminant levels at these locations. Figures A and B show the location of these 20 discharges, and Table B presents the jurisdictional distribution of discharges recommended for action.

**Table B. Discharges Recommended for Action Due to Elevated Chemical Contaminant Levels**

<b>Jurisdiction</b>	<b>Discharges Requiring Action</b>
City of Colwood	0
City of Langford	0
City of Victoria	10
DND	2
District of Oak Bay	2
District of Saanich	2
Parks Canada	1
Township of Esquimalt	2
Town of View Royal	1
<b>Total</b>	<b>20</b>

Sediments associated with stormwater discharges have been collected and analysed for chemical contaminants since 1993. To date, monitoring for environmental concern has been successful in defining problem areas. However, a review of the sampling program was started in 2006 and, if required, the program will be redesigned to measure the effectiveness of the municipal and SHWP source control initiatives.

## 2. Upstream Investigations

Upstream investigations by municipal staff, VIHA and SHWP were undertaken in the catchment areas of 39 stormwater discharges. These investigations included both biological and chemical contaminant sampling. As a result of these investigations, the source of contamination was eliminated in three catchments (although investigations continue in one catchment to locate a second potential source). Additional findings are shown in Table C. SHWP staff continue to work cooperatively with municipal staff, senior government and stakeholders to identify and reduce/eliminate contaminants at the source.

**Table C. Results of Upstream Investigations in 2006**

<b>Status</b>	<b>Number of Discharges</b>
Source eliminated	2
One source eliminated – investigating another source	1
Source identified – repairs pending	1
Source location narrowed down	24
No sources identified, contaminant levels have decreased over time	5
No sources identified, contaminant levels remain high	6
<b>Total</b>	<b>39</b>

### 3. Nearshore Marine Investigations

Summer and winter surface water fecal coliform monitoring of Esquimalt Lagoon and Esquimalt and Victoria harbours was carried out to provide a general indication of fecal coliform levels and track changes in these waterbodies over time. In 2006, fecal coliform levels in the centre of the three waterbodies were generally low, indicating that there was no overall effect from fecal coliform present in stormwater flows. However, water quality adjacent to stormwater discharges may be affected by the discharge flows.

No significant changes in water quality were observed in 2006 compared to 2005, except for two samples (near Selkirk Trestle and Bay Street bridge) which exceeded the SHWP guideline of 200 FC/100 mL (1,400 and 1,300 FC/100mL respectively). At both of these stations, high levels were absent in followup sampling on the same day and other samples taken at later dates. Investigations in the area indicate that the source of bacteria was likely from birds. These locations will be monitored in 2007 to ensure bacteria levels are from wildlife and not indicative of stormwater contamination. All other monitoring stations sampled in 2006 showed fecal coliform results consistent with previous years and known distribution of birds.

### 4. Stormwater Source Control

At its 22 November 2006 meeting, the CRD Core Area Liquid Waste Management committee approved an action plan prepared by staff in response to the recommendations in the Society of Environmental Toxicology and Chemistry (SETAC) review and of Jacques Whitford Limited in the audit of the Core Area LWMP. One of the recommended actions was to "initiate discussions with municipalities to identify needed changes to CRD or municipal authority to ensure stormwater protection and improvement". This recommendation came from the SETAC report's comment that the CRD appeared to be responsible for stormwater quality management but lacked the authority to enforce stormwater bylaws.

In 2006, SHWP began to investigate options related to this authority in order to develop options to better protect the environment from stormwater-carried contamination. These options for stormwater source control will be evaluated and discussed with municipalities in 2007.

#### Model Stormwater Bylaw

In the Core Area LWMP, the CRD committed to coordinating a Stormwater Source Control program in cooperation with municipal partners. This program, initiated in 2001, is now primarily focused on the promotion of the Model Storm Sewer and Watercourse Protection Bylaw and associated COPs. This regulatory framework is specifically targeted at activities that have the potential to impact stormwater quality.

In 2004, the province enacted the *Community Charter*. This, combined with a desire to produce a more streamlined version of the bylaw, resulted in a new draft of the model bylaw in the spring of 2006. The model bylaw is now ready for adoption and enforcement by the municipalities.

#### Codes of Practice

The bylaw was designed to allow the incorporation of stormwater COPs that set out municipal regulatory requirements under which various business sectors will be required to operate to prevent the pollution of stormwater.

The six COPs, which have been completed and are ready for adoption, are as follows:

1. Code of Practice for Automotive and Parking Lot Operations
2. Code of Practice for Construction and Development Activities
3. Code of Practice for Streets and Roads
4. Code of Practice for Recreation Facilities
5. Code of Practice for Recycling Facilities
6. Code of Practice for Outdoor Storage Yards

### Best Management Practices

A best management practice (BMP) is a voluntary strategy for preventing stormwater pollution and often uses the same methods and strategies as in a code of practice but without the regulatory mechanism for compliance.

Two sector-specific BMPs, which have been completed and are ready for region-wide use, are as follows:

1. Painting without Pollution
2. Power Washing without Pollution

It is hoped that municipalities will actively promote these BMPs by making these information sheets available to those involved in these two activities.

### Outreach and Promotion Component

SHWP staff worked with representatives of the Bylaw Working group and municipal staff to update the bylaw and COPs, discuss mechanisms for municipal adoption of the regulations and to plan future work related to regulatory tools for the protection of stormwater. Staff also hosted an informational session for municipalities on the Riparian Areas Regulation.

Two editions of the Stormwater, Harbours and Watersheds newsletter were produced to highlight watershed-related activities in the region and to promote activities that reduce stormwater contamination. SHWP staff continue to provide assistance to the municipalities, as required, with the adoption and implementation of the model bylaw and COPs.

## **5. Special Projects**

In 2006, SHWP staff were involved with a number of special projects to improve stormwater quality in the region. These included the continued development of the Natural Areas and Harbours atlases, watershed management planning, working cooperatively with the Regional Source Control program and educational initiatives.

### **RECOMMENDATIONS:**

#### **Public Health Concerns**

The following recommendations are based on the results of the fecal coliform sampling:

1. that SHWP staff work with the jurisdictions involved to investigate and eliminate the sources of high fecal coliform concentrations for 37 stormwater discharges rated high for public health concern.
2. that SHWP staff work cooperatively with the Township of Esquimalt, District of Oak Bay and City of Victoria to reduce the number of stormwater discharges rated high for public health concern.
3. that SHWP staff continue sampling at all discharges with a high or moderate level of public health concern and at selected discharges rated low to confirm contaminant levels.
4. that annual sampling be discontinued at approximately 2/3 of the discharges rated low, but that they be sampled at least once every five years as part of a long-term strategy to monitor for possible changes in the future.
5. that SHWP staff continue to monitor surface fecal coliform levels in Esquimalt Lagoon and Esquimalt and Victoria harbours to track changes in these waterbodies over time.

**Environmental Concerns**

The following recommendations are based on the results of the chemical contaminants survey:

1. that SHWP staff work with the jurisdictions involved to determine the source(s) of contamination for the 20 discharges requiring action.
2. that sampling and analysis be discontinued at discharges where low contaminant levels have been confirmed.
3. that SHWP staff evaluate the effectiveness of the current sediment sampling program and make changes, as required, to protect watercourses and the nearshore marine environment.

**Stormwater Source Control**

1. that SHWP staff continue to develop, as required, the regulatory framework of bylaws, COPs and BMPs for the protection of stormwater quality.
2. that all core area municipalities that have not yet adopted the Model Storm Sewer and Watercourse Protection Bylaw and associated COPs consider doing so.
3. that SHWP staff continue to investigate options related to stormwater authority in order to develop options to better protect the environment from stormwater-carried contamination and discuss those options with the municipalities.

**General**

1. that, where appropriate, municipalities, the DND and First Nations investigate spills and other incidents that may lead to contamination of stormwater.