Stormwater Management Program

Clark College Facilities Services

1933 Fort Vancouver Way

Vancouver, WA 98663

Clark College Permit No. WAR 045212
Revised June 2016
Prepared by BergerABAM Inc.

STORMWATER MANAGEMENT PROGRAM

Clark College
Vancouver, Washington

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1.0 INTRODUCTION

Clark College (the College) is currently operating under a Washington Department of Ecology (Ecology) Phase II Western Washington National Pollutant Discharge Elimination System (NPDES) municipal stormwater general permit as a municipal separate storm sewer system (MS4) Secondary Permittee. Coverage for this general permit (WAR 04512) was originally effective June 24, 2009 and expired February 15, 2012. After Ecology reissued an updated Phase II permit, the College's general permit was renewed effective August 1, 2013 and expires on July 31, 2018.

A Secondary Permittee is defined as an operator of a regulated small MS4 that is not a city, town, or county. Each permittee is responsible for compliance with the terms of the Phase II permit. In accordance with the Revised Code of Washington (RCW) 90.48.520, the discharge of toxicants to waters of the state that would violate any water quality standard, including toxicant standards, sediment criteria, and dilution zone criteria is prohibited. The permittee is required to reduce the discharge of pollutants to the maximum extent practicable using all known, available, and reasonable methods of prevention, control and treatment to prevent and control pollution of waters of the state.

As a Secondary Permittee, the College is required to maintain a stormwater management program (SWMP). The SWMP covers requirements for subject areas such as education and outreach, public involvement, illicit discharges, construction runoff, post construction runoff, and pollution prevention. The College is also required to comply with City of Vancouver (City) regulations and fees per Vancouver Municipal Code (VMC) 14.09. Additionally, Washington Administrative Code (WAC) 173-218 applies to the College's underground injection control (UIC) drywells.

2.0 CAMPUS STORMWATER SYSTEM

The College's main campus is a 90-acre site located centrally in Vancouver, Washington. There are approximately 13,000 students currently enrolled. The campus is primarily composed of educational buildings, parking, grassy landscaped areas, and sports fields. The core area is bound by Fort Vancouver Way to the west, East McLoughlin Boulevard to the south, East Reserve Street to the east, and East Fourth Plain Boulevard to the north. There are also several buildings with associated parking and landscape directly across Fort Vancouver Way to the northwest. The sports fields lay between Fort Vancouver Way to the east, and Interstate 5 to the west.

The majority of the campus uses drywells for stormwater disposal; some with upstream treatment. Drywells have been effective for Clark College for decades because of strong infiltration rates. For parking and access roads, catch basins collect the runoff and then direct it to more central drywells, typically located within the parking area. Roof runoff

is also directed to drywells; some dedicated to roof runoff and some that also accept parking and landscape runoff.

The majority of the stormwater system is grandfathered because it was constructed decades ago. For areas that have undergone recent redevelopment or construction, current stormwater regulations are followed. As an example, the most northern parking areas have been retrofitted with stormwater filtration vaults that provide water quality treatment prior to infiltration. New construction to the northwest of Fort Vancouver Way includes a mix of current stormwater management techniques. There is no known connection to the City's stormwater collection system.

3.0 PERMIT REQUIREMENTS

The College is currently a secondary permit holder under Ecology Permit No. WAR 045212. Requirements for secondary permit holders are defined within the Western Washington Phase II Municipal Stormwater Permit. This permit authorizes the discharge of stormwater to surface waters and to groundwaters with the exception of the discharges from the College's drywells. Drywells fall under Ecology's UIC program (WAC 173-218). Best management practices (BMPs) for the management of UICs can be found in Ecology's published UIC guidance document titled, "Guidance for UIC Wells that Manage Stormwater" (see Appendix D).

A Secondary Permittee remains in compliance with the permit as long Ecology is notified in writing within 30 days of becoming aware, based on credible site-specific information, that a discharge owned by the permittee is causing or contributing to a known or likely violation of Ecology's water quality standards. The written notification must, at a minimum, identify the source of the site-specific information, describe the nature and extent of the violation, and reasons why the discharge is believed to be causing a problem.

The SWMP must be developed and implemented in accordance with the schedules contained in this section and must be fully developed and implemented no later than four and one-half years from the initial permit coverage date. Because permit coverage began in 2009, the SWMP is required to be fully developed and implemented. Permittees must coordinate stormwater-related policies, programs, and projects within a watershed and interconnected MS4s. Where relevant and appropriate, the SWMP must be coordinated among the individual departments within the permittee's organization.

The SWMP addresses the following components:

- *Public Education and Outreach* – Measures must be taken to educate tenants and residents about stormwater compliance to include signage, distribution of educational pamphlets, and electronic publication.
- *Public Involvement and Participation* – The annual report and latest SWMP must be made available on the Permittee's website.

- *Illicit Discharge Detection and Elimination* – Implement policies that prohibit illicit connections, non-stormwater discharges, and improper disposal of pet waste and litter.
- *Construction Site Stormwater Runoff Control* – Implement policies and training that ensures compliance with relevant ordinances, rules, and regulations of the local jurisdiction.
- *Post-Construction Stormwater Management for New Development and Redevelopment* – Comply with all relevant ordinances, rules, and regulations of the local jurisdiction that govern post-construction stormwater pollution prevention measures.
- *Pollution Prevention and Good Housekeeping for Municipal Operations* – Implement a municipal operation and maintenance plan to minimize stormwater pollution. Provide training and regularly maintain conveyance systems, pavements, open space, storage areas, and work areas.
- *Monitoring and Assessment* – Conduct continuous monitoring and assessment for any discharges that may violate water quality standards. If applicable, notify Ecology of the discharge. Provide any stormwater assessments or studies to Ecology.
- *Reporting* – Submit the annual report through the web portal system that indicates compliance status for each requirement. Maintain records of the stormwater management program for internal and external use and access.

4.0 PUBLIC EDUCATION AND OUTREACH

4.1 Requirements

Each Secondary Permittee must implement the following stormwater education strategies:

A. Storm drain inlets owned or operated by the Secondary Permittee that are located in maintenance yards, in parking lots, along sidewalks, and at pedestrian access points must be clearly labeled with a message similar to "Dump no waste – Drains to water body." As identified during visual inspection and regular maintenance of storm drain inlets per the requirements of S6.D.3.d and S6.D.6.a.i, or as otherwise reported to the Secondary Permittee, any inlet having a label that is no longer clearly visible and/or easily readable must be re-labeled within 90 days.[1]

B. Each year beginning no later than three years from the initial date of permit coverage, public ports, colleges, and universities must distribute educational information to tenants and residents on the impact of stormwater discharges on receiving waters, and steps that can be taken to reduce pollutants in stormwater runoff. Distribution may be by hard copy or electronic means. Appropriate topics may include:

[1] Paragraph references refer to Ecology's Phase II Western Washington National Pollutant Discharge Elimination System (NPDES) municipal stormwater general permit document.

1. How stormwater runoff affects local water bodies.
2. Proper use and application of pesticides and fertilizers.
3. Benefits of using well-adapted vegetation.
4. Alternative equipment washing practices, including cars and trucks that minimize pollutants in stormwater.
5. Benefits of proper vehicle maintenance and alternative transportation choices; proper handling and disposal of vehicle wastes, including the location of hazardous waste collection facilities in the area.
6. Hazards associated with illicit connections and illicit discharges.
7. Benefits of litter control of pet waste.

4.2 Current Activities

- Inspect the campus grounds twice annually for any labeling that may be faded or damaged.
- Replace faded or damaged labeling with the following, "Dump No Waste – Drains to Water Body".
- Provide the following information on Clark College's stormwater resources website:
  - Stormwater Management Program
  - Operations and Maintenance Plan
  - Spill Control Plan
- Distribute the following pamphlets in hardcopy (see Appendix C):
  - Protecting Washington's Waters from Stormwater Pollution
  - Healthy Watersheds, Healthy People
- Providing website links to the following educational documents (see Sustainability Bulletins at http://www.clark.edu/clark-and-community/risk_management/ehs/sustainability/sustainability-bulletins.php):
  - Alternative Transportation
  - Pet Waste
  - Leaf Cleanup
  - Pest Management
  - Learn about Stormwater http://www.ecy.wa.gov/washington_waters/stormwater.html
  - Car Washing http://www.ecy.wa.gov/washington_waters/carwash.html
  - Car Maintenance http://www.ecy.wa.gov/washington_waters/cars.html
  - Best Work Practices http://www.ecy.wa.gov/washington_waters/business.html

4.3 Annual Implementation Schedule

Table 1. Public Education and Outreach

Activity	Description	Frequency
Inspect Catch Basin Labeling	Document and repair any catch basin labels that are faded or damaged	Twice Annually
Review Published Education and Training Material	Review material for relevance, information updates, and new resources	Annually
Replenish and Distribute Pamphlets	Inspect locations where pamphlets are available and replenish if necessary	Twice Annually
Review Website Links and Resources	Update any educational website links and update or add as needed	Annually

5.0 PUBLIC INVOLVEMENT AND PARTICIPATION

5.1 Requirements

Each year, no later than May 31, each Secondary Permittee must:

A. Make the annual report available on the Permittee's website.

B. Make available on the Permittee's website the latest updated version of the SWMP Plan.

C. A Secondary Permittee that does not maintain a website may submit the updated SWMP Plan and annual report in electronic format to Ecology for posting on Ecology's website.

5.2 Current Activities

- The annual report and the latest version of the SWMP Plan is posted on the Colleges stormwater resources website.
- The school newspaper will include references to an updated website and resources and training and will invite people to explore stormwater etc.

5.3 Annual Implementation Schedule

Table 2. Public Involvement and Participation

Activity	Description	Frequency
Publish the SWMP and Annual Report	Publish the SWMP and Annual Report to the College's stormwater resources website	Annually
Publish Newspaper Notice	Publish information in the Independent that points students to the stormwater resources website	Annually

6.0 ILLICIT DISCHARGE DETECTION AND ELIMINATION

6.1 Requirements

Each Secondary Permittee must:

A. From the initial date of permit coverage, comply with all relevant ordinances, rules, and regulations of the local jurisdiction(s) in which the Secondary Permittee is located that govern non-stormwater discharges.

B. Implement appropriate policies prohibiting illicit discharges, and an enforcement plan to ensure compliance with illicit discharge policies. These policies must address, at a minimum, illicit connections; non-stormwater discharges, including spills of hazardous materials; and improper disposal of pet waste and litter.

1. Allowable discharges: The policies do not need to prohibit the following categories of non-stormwater discharges:

   - Diverted stream flows
   - Rising ground waters
   - Uncontaminated ground water infiltration (as defined at 40 CFR 35.2005(b)(20))
   - Uncontaminated pumped ground water
   - Foundation drains.
   - Air conditioning condensation
   - Irrigation water from agricultural sources that is commingled with urban stormwater
   - Springs
   - Uncontaminated water from crawl space pumps
   - Footing drains
   - Flows from riparian habitats and wetlands
   - Discharges from emergency firefighting activities in accordance with S2 Authorized Discharges
   - Non-stormwater discharges authorized by another NPDES or state waste discharge permit

2. Conditionally allowable discharges: The policies may allow the following categories of non-stormwater discharges only if the stated conditions are met and such discharges are allowed by local codes:

   - Discharges from potable water sources, including but not limited to water line flushing, hyperchlorinated water line flushing, fire hydrant system flushing, and pipeline hydrostatic test water. Planned discharges must be dechlorinated to a total residual chlorine concentration of 0.1 ppm or less, pH-adjusted if necessary, and volumetrically and velocity controlled to prevent resuspension of sediments in the MS4.

- Discharges from lawn watering and other irrigation runoff. These discharges must be minimized through, at a minimum, public education activities and water conservation efforts conducted by the Secondary Permittee and/or the local jurisdiction.
- Dechlorinated swimming pool, spa and hot tub discharges. The discharges must be dechlorinated to a total residual chlorine concentration of 0.1 ppm or less, pH-adjusted and reoxygenated if necessary, and volumetrically and velocity controlled to prevent resuspension of sediments in the MS4. Discharges must be thermally controlled to prevent an increase in temperature of the receiving water. Swimming pool cleaning wastewater and filter backwash must not be discharged to the MS4.
- Street and sidewalk wash water, water used to control dust, and routine external building washdown that does not use detergents. The Secondary Permittee must reduce these discharges through, at a minimum, public education activities and/or water conservation efforts conducted by the permittee and/or the local jurisdiction. To avoid washing pollutants into the MS4, the permittee must minimize the amount of street wash and dust control water used.
- Other non-stormwater discharges must be in compliance with the requirements of a pollution prevention plan reviewed by the permittee that addresses control of such discharges.

3. The Secondary Permittee must address any category of discharges in the first two bullets above if the discharge is identified as a significant source of pollutants to waters of the state.

C. Maintain a storm sewer system map showing the locations of all known MS4 outfalls and discharge points, labeling the receiving waters (other than ground water) and delineating the areas contributing runoff to each outfall and discharge point. Make the map (or completed portions of the map) available on request to Ecology and to the extent appropriate, to other permittees. The preferred format for mapping is an electronic format with fully described mapping standards. An example description is provided on Ecology's website.

D. Conduct field inspections and visually inspect for illicit discharges at all known MS4 outfalls and discharge points. Visually inspect at least one third (on average) of all known outfalls and discharge points each year beginning no later than two years from the initial date of permit coverage. Implement procedures to identify and remove any illicit discharges. Keep records of inspections and follow-up activities.

E. Implement a spill response plan that includes coordination with a qualified spill responder (see Appendix B).

F. No later than two years from initial date of permit coverage, provide staff training or coordinate with existing training efforts to educate staff on proper BMPs for

preventing illicit discharges, including spills. Train all Secondary Permittee staff who, as part of their normal job responsibilities, have a role in preventing such illicit discharges.

6.2 Current Activities

- Clark College has adopted policies that prohibit illicit discharges and illegal dumping.
- Educational information about illicit discharges is provided on the College's Stormwater information website.
- Training for employees regarding illicit discharges is provided annually.
- Training for employees regarding conditionally allowable discharges is provided annually.
- Landscape irrigation is monitored and adjusted continuously to ensure that overwatering is not occurring and discharging into the storm drain.
- Swimming pool discharge water is managed per the operations and maintenance (O&M) plan (see Appendix A).
- Pressure washing of buildings and surfaces does not use detergents and is monitored to ensure any runoff from the operations is minimized. See the O&M plan.
- A stormwater system map is maintained by the College and is published with the SWMP.
- Field inspections are conducted quarterly for the detection of any illicit discharges at catch basins and drywells.
- A spill response plan is maintained by the College and is published with the SWMP (see Appendix B).

6.3 Annual Implementation Schedule

Table 3. Illicit Discharges

Activity	Description	Frequency
Policy Review	Review current administrative policies for relevant updates	Annually
Review Education and Training Material	Review material for relevance, information updates, and new resources	Annually
Review Irrigation Practices	Review frequency and volume of irrigation practices and make any adjustments to reduce runoff	Annually
Review Stormwater System Map	Review system map and provide any necessary updating	Annually
Illicit Discharge Field Inspections	Inspect catch basins and drywells for evidence of any illicit discharges	Quarterly
Review Spill Response Plan	Review the spill response plan for relevance and update any relevant information as needed	Annually

7.0 CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

7.1 Requirements

From the initial date of permit coverage, each Secondary Permittee must:

A. Comply with all relevant ordinances, rules, and regulations of the local jurisdiction(s) in which the Secondary Permittee is located that govern construction phase stormwater pollution prevention measures.

B. Ensure that all construction projects under the functional control of the Secondary Permittee that require a construction stormwater permit obtain coverage under the NPDES General Permit for Stormwater Discharges Associated with Construction Activities or an individual NPDES permit prior to discharging construction related stormwater.

C. Coordinate with the local jurisdiction regarding projects owned or operated by other entities that discharge into the Secondary Permittee's MS4, to assist the local jurisdiction with achieving compliance with all relevant ordinances, rules, and regulations of the local jurisdiction(s).

D. Provide training or coordinate with existing training efforts to educate relevant staff in erosion and sediment control BMPs and requirements, or hire trained contractors to perform the work.

E. Coordinate as requested with Ecology or the local jurisdiction to provide access for inspection of construction sites or other land disturbances that are under the functional control of the Secondary Permittee during land disturbing activities and/or construction period.

7.2 Current Activities

- Construction contract specifications for any projects require full compliance with Ecology standards for temporary erosion and sediment control (TESC), and with the project NPDES construction permit.
- Clark College construction project inspectors are trained annually on TESC requirements.
- Construction project managers inspect projects regularly to ensure TESC compliance, and to ensure any overseeing jurisdictions have access to the sites.

7.3 Implementation Schedule

Table 4. Construction Site Runoff Control

Activity	Description	Frequency
Review Contract Specifications	Review standard contract specifications and documents to ensure the most recent TESC standards are included	Annually
Provide TESC Training for Project Inspectors	Provide training for inspectors and project managers that are responsible for ensuring TESC compliance	Bi-annual
Project Inspection	Provide regular inspection for ongoing construction projects to ensure that TESC measures are in place and performing as intended	Weekly

8.0 POST-CONSTRUCTION STORMWATER MANAGEMENT FOR NEW DEVELOPMENT AND REDEVELOPMENT

8.1 Requirements

From the initial date of permit coverage, each Secondary Permittee must:

A. Comply with all relevant ordinances, rules and regulations of the local jurisdiction(s) in which the Secondary Permittee is located that govern post construction stormwater pollution prevention measures.

B. Coordinate with the local jurisdiction regarding projects owned or operated by other entities that discharge into the Secondary Permittee's MS4, to assist the local jurisdiction with achieving compliance with all relevant ordinances, rules and regulations of the local jurisdiction(s).

8.2 Current Activities

- All projects requiring a building permit are submitted to the City of Vancouver, and are reviewed with respect to City stormwater engineering standards for post construction stormwater management facilities. The City adheres to Ecology standards for these facilities.

9.0 POLLUTION PREVENTION AND GOOD HOUSEKEEPING FOR MUNICIPAL OPERATIONS

9.1 Requirements

Each Secondary Permittee must:

A. Implement a municipal operation and maintenance (O&M) plan to minimize stormwater pollution from activities conducted by the Secondary Permittee. The O&M Plan must include appropriate pollution prevention and good housekeeping procedures for all of the following operations, activities, and/or types of facilities that

are present within the Secondary Permittee's boundaries and under the functional control of the Secondary Permittee.

1. **Stormwater collection and conveyance systems,** including catch basins, stormwater pipes, open channels, culverts, and stormwater treatment and flow control BMPs/facilities. The O&M Plan must address, at a minimum: scheduled inspections and maintenance activities, including cleaning and proper disposal of waste removed from the system. Secondary Permittees must properly maintain stormwater collection and conveyance systems owned or operated by the Secondary Permittee and regularly inspect and maintain all stormwater facilities to ensure facility function. Secondary Permittees must establish maintenance standards that are as protective or more protective of facility function than those specified in Chapter 4 Volume V of the Stormwater Management Manual for Western Washington. Secondary Permittees must review their maintenance standards to ensure they are consistent with the requirements of this section. Secondary Permittees must conduct spot checks of potentially damaged permanent stormwater treatment and flow control BMPs/facilities following major storm events (24 hour storm event with a 10 year or greater recurrence interval).
2. **Roads, highways, and parking lots.** The O&M Plan must address, but is not limited to: deicing, anti-icing, and snow removal practices; snow disposal areas; material (e.g., salt, sand, or other chemical) storage areas; all-season BMPs to reduce road and parking lot debris and other pollutants from entering the MS4.
3. **Vehicle fleets.** The O&M Plan must address, but is not limited to: storage, washing, and maintenance of Secondary Permittee vehicle fleets; and fueling facilities. Secondary Permittees must conduct all vehicle and equipment washing and maintenance in a self-contained covered building or in designated wash and/or maintenance areas.
4. **External building maintenance.** The O&M Plan must address, building exterior cleaning and maintenance including cleaning, washing, painting; and maintenance and management of dumpsters; and other maintenance activities.
5. **Parks and open space.** The O&M Plan must address, but is not limited to: proper application of fertilizer, pesticides, and herbicides; sediment and erosion control; BMPs for landscape maintenance and vegetation disposal; and trash and pet waste management.
6. **Material storage facilities and heavy equipment maintenance or storage yards**. Secondary Permittees must develop and implement a Stormwater Pollution Prevention Plan to protect water quality at each of these facilities owned or operated by the Secondary Permittee and not covered under the General NPDES Permit for Stormwater Discharges Associated with Industrial Activities or under another NPDES permit that authorizes stormwater discharges associated with the activity.

7. **Other facilities that would reasonably be expected to discharge contaminated runoff.** The O&M Plan must address proper stormwater pollution prevention practices for each facility.

B. From the initial date of permit coverage, Secondary Permittees must also have permit coverage for all facilities operated by the Secondary Permittee that are required to be covered under the General NPDES Permit for Stormwater Discharges Associated with Industrial Activities or another NPDES permit that authorizes discharges associated with the activity.

C. The O&M Plan must include sufficient documentation and records as necessary to demonstrate compliance with the O&M Plan requirements in items 1 through 7 above.

D. No later than three years from the initial date of permit coverage, Secondary Permittees must implement a program designed to train all employees whose primary construction, operations, or maintenance job functions may impact stormwater quality. The training must address:

1. The importance of protecting water quality.
2. The requirements of this Permit.
3. Operation and maintenance requirements.
4. Inspection procedures.
5. Ways to perform their job activities to prevent or minimize impacts to water quality.
6. Procedures for reporting water quality concerns, including potential illicit discharges (including spills).

9.2 Current Activities

- An O&M Plan has been developed and is attached in Appendix A. This plan will be reviewed on an annual basis to ensure that adjustments are made for changing operations. Also, the BMPs will be reviewed to see if any updates are required.
- Operations and maintenance activities are recorded and archived to demonstrate permit compliance. Facilities department managers will review this documentation on a monthly basis to ensure that it is being completed, and to ensure that the O&M plan is being implemented.
- Training for employees whose jobs impact stormwater quality is provided on an annual basis. The training focuses on the individual items listed under section 9.1.D in this document.

9.3 Implementation Schedule

Table 5. O&M and Good Housekeeping

Activity	Description	Frequency
Review O&M Plan	Review the O&M plan to ensure that the information is updated with regard to campus operations and with any changes to BMPs	Annually
Record O&M Activities	Record and document any operations and maintenance activities that relate to stormwater compliance	Monthly
Review O&M Records	Assigned personnel within the Facilities Services Department must review these records regularly to ensure proper documentation and frequency of activities	Monthly
Training for Relevant Employees	Provide training for employees whose job has an impact to stormwater quality	Annually

10.0 COMPLIANCE WITH TOTAL MAXIMUM DAILY LOAD REQUIREMENTS

10.1 Requirements

The following requirements apply if an applicable total maximum daily load (TMDL) is approved for stormwater discharges from MS4s owned or operated by the Permittee. Applicable TMDLs are TMDLs that have been approved by EPA on or before the issuance date of this Permit or prior to the date that Ecology issues coverage under this permit, whichever is later.

10.2 Current Activities

TMDL Requirements do not apply to Clark College stormwater discharges.

11.0 MONITORING AND ASSESSMENT

11.1 Requirements

A. All Permittees including Secondary Permittees must provide, in each annual report, a description of any stormwater monitoring or stormwater-related studies conducted by the Permittee during the reporting period. If other stormwater monitoring or stormwater-related studies were conducted on behalf of the Permittee during the reporting period, or if stormwater-related investigations conducted by other entities were reported to the Permittee during the reporting period, a brief description of the type of information gathered or received must be included in the annual report.

   Permittees are <u>not</u> required to provide descriptions of any monitoring, studies, or analyses conducted as part of the Regional Stormwater Monitoring Program (RSMP) in annual reports.

B. A Permittee remains in compliance with S4 despite any discharges prohibited by S4.A or S4.B, when the Permittee undertakes the following response toward long-term water quality improvement:[2]

1. A Permittee must notify Ecology in writing within 30 days of becoming aware, based on credible site-specific information that a discharge from the MS4 owned or operated by the Permittee is causing or contributing to a known or likely violation of Water Quality Standards in the receiving water. Written notification provided under this subsection must, at a minimum, identify the source of the site specific information, describe the nature and extent of the known or likely violation in the receiving water, and explain the reasons why the MS4 discharge is believed to be causing or contributing to the problem. For ongoing or continuing violations, a single written notification to Ecology will fulfill this requirement.
2. In the event that Ecology determines, based on a notification provided under S4.F.1 or through any other means, that a discharge from an MS4 owned or operated by the Permittee is causing or contributing to a violation of Water Quality Standards in a receiving water, Ecology will notify the Permittee in writing that an adaptive management response outlined in S4.F.3 below is required, unless:
    a. Ecology also determines that the violation of Water Quality Standards is already being addressed by a Total Maximum Daily Load (TMDL) or other enforceable water quality cleanup plan; or
    b. Ecology concludes the MS4 contribution to the violation will be eliminated through implementation of other permit requirements.
3. Adaptive Management Response
    a. Within 60 days of receiving a notification under S4.F.2, or by an alternative date established by Ecology, the Permittee must review its Stormwater Management Program (SWMP) and submit a report to Ecology. The report must include:
        i. A description of the operational and/or structural BMPs that are currently being implemented to prevent or reduce any pollutants that are causing or contributing to the violation of Water Quality Standards, including a qualitative assessment of the effectiveness of each best management practice (BMP).
        ii. A description of potential additional operational and/or structural BMPs that will or may be implemented in order to apply AKART on a site-specific basis to prevent or reduce any pollutants that are causing or contributing to the violation of Water Quality Standards.

[2] Paragraph references refer to Ecology's Phase II Western Washington National Pollutant Discharge Elimination System (NPDES) municipal stormwater general permit document.

iii. A description of the potential monitoring or other assessment and evaluation efforts that will or may be implemented to monitor, assess, or evaluate the effectiveness of the additional BMPs.

iv. A schedule for implementing the additional BMPs including, as appropriate: funding, training, purchasing, construction, monitoring, and other assessment and evaluation components of implementation.

b. Ecology will, in writing, acknowledge receipt of the report within a reasonable time and notify the Permittee when it expects to complete its review of the report. Ecology will either approve the additional BMPs and implementation schedule or require the Permittee to modify the report as needed to meet AKART on a site-specific basis. If modifications are required, Ecology will specify a reasonable time frame in which the Permittee must submit and Ecology will review the revised report.

c. The Permittee must implement the additional BMPs, pursuant to the schedule approved by Ecology, beginning immediately upon receipt of written notification of approval.

d. The Permittee must include with each subsequent annual report a summary of the status of implementation and the results of any monitoring, assessment or evaluation efforts conducted during the reporting period. If, based on the information provided under this subsection, Ecology determines that modification of the BMPs or implementation schedule is necessary to meet AKART on a site-specific basis, the Permittee must make such modifications as Ecology directs. In the event there are ongoing violations of water quality standards despite the implementation of the BMP approach of this section, the Permittee may be subject to compliance schedules to eliminate the violation under WAC 173-201A-510(4) and WAC 173-226-180 or other enforcement orders as Ecology deems appropriate during the term of this permit.

e. A TMDL or other enforceable water quality cleanup plan that has been approved and is being implemented to address the MS4's contribution to the Water Quality Standards violation supersedes and terminates the S4.F.3 implementation plan.

f. Provided the Permittee is implementing the approved adaptive management response under this section, the Permittee remains in compliance with Condition S4, despite any on-going violations of Water Quality Standards identified under S4.A or B above.

g. The adaptive management process provided under Section S.4.F is not intended to create a shield for the Permittee from any liability it may face under 42 U.S.C. 9601 et seq. or chapter 70.105D RCW.

11.2 Current Activities

- Clark College currently conducts independent water quality testing at their drywells on an annual basis. This testing is not explicitly required by this permit, but is conducted to enhance the College's ability to monitor pollutants. According to this permit, this testing should accompany the annual stormwater report. Furthermore, any other stormwater assessments or research conducted during the reporting period will be included.
- As a part of their O&M and monitoring program, the College will continuously monitor for any discharges that would fall under section 11.1.B. If any such discharges are found, the notification and adaptive management process must be followed as described.

11.3 Implementation Schedule

Table 6. Monitoring and Assessment

Activity	Description	Frequency
Submit Testing Results and Assessments	Submit any water quality testing results and any stormwater studies or assessments completed	Annually
Notify Ecology of Prohibited Discharges	Monitor the stormwater system and campus operations for any prohibited discharges to the system	Quarterly

12.0 REPORTING

12.1 Requirements

A. No later than March 31 of each year beginning in 2015, each Permittee must submit an annual report. The reporting period for the first annual report will be from January 1, 2014 through December 31, 2014. The reporting period for all subsequent annual reports will be the previous calendar year unless otherwise specified.

   Permittees must submit annual reports electronically using Ecology's Water Quality Permitting Portal (WQWebPortal) available on Ecology's website at: http://www.ecy.wa.gov/programs/wq/permits/paris/portal.html unless otherwise directed by Ecology. Permittees unable to submit electronically through Ecology's WQWebPortal must contact Ecology to request a waiver and obtain instructions on how to submit an annual report in an alternative format.

B. Each Permittee is required to keep all records related to this permit and the SWMP for at least five years.

C. Each Permittee must make all records related to this permit and the Permittee's SWMP available to the public at reasonable times during business hours. The Permittee will provide a copy of the most recent annual report to any individual or entity, upon request.

1. A reasonable charge may be assessed by the Permittee for making photocopies of records.
2. The Permittee may require reasonable advance notice of intent to review records related to this Permit.

D. Annual report for Secondary Permittees Each annual report must include the following:

1. Submittal of the annual report form as provided by Ecology pursuant to S9.A, describing the status of implementation of the requirements of this permit during the reporting period.
2. Attachments to the annual report form including summaries, descriptions, reports, and other information as required, or as applicable, to meet the requirements of this permit during the reporting period.
3. If applicable, notice that the MS4 is relying on another governmental entity to satisfy any of the obligations under this permit.
4. Certification and signature pursuant to G19.D, and notification of any changes to authorization pursuant to G19.C.
5. A notification of any jurisdictional boundary changes resulting in an increase or decrease in the Secondary Permittee's geographic area of permit coverage during the reporting period.

12.2 Current Activities

- Submit the annual report to Ecology through the Web Portal system by March 31 of each year. The reporting period will cover the previous calendar year. Include any relevant notifications, water quality testing results, and stormwater assessments, and SWMP implementation updates.
- Maintain stormwater records throughout the year in an organized fashion so that they can be referenced when necessary for annual reporting or for monitoring of record keeping. This will also allow the public or any agency to access the records upon request.

12.3 Implementation Schedule

Table 7. Reporting

Activity	Description	Frequency
Submit the Annual Stormwater Report	Submit the annual stormwater permit through Ecology's web portal system. Include relevant documents.	Annually
Maintain Stormwater Records	Maintain stormwater records in an organized fashion for monitoring and public access.	Weekly

Appendix A
Operations and Maintenance Plan

Stormwater Operations and Maintenance Plan

Clark College Facilities Services

1933 Fort Vancouver Way

Vancouver, WA 98663

Clark College Permit No. WAR 045212
June 2016
Prepared by BergerABAM Inc.

STORMWATER OPERATIONS AND MAINTENANCE PLAN

Clark College
Vancouver, Washington

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1.0 PURPOSE

As a Secondary Permittee, Clark College is required to implement a municipal operations and maintenance (O&M) plan to minimize stormwater pollution. The O&M Plan includes appropriate pollution prevention and good housekeeping procedures for all of the following operations, activities, and/or types of facilities that are present within College boundaries, including the following:

- Stormwater collection and conveyance systems including catch basins, stormwater pipes, open channels, culverts, and stormwater treatment and flow control best management practices (BMPs) and facilities.
- Maintenance of roads, highways, and parking lots with respect to debris removal and deicing.
- Storage, washing, and maintenance of vehicle fleets and fueling facilities.
- External building maintenance, including cleaning and painting.
- Proper application of fertilizer, pesticides, and herbicides for parks and open spaces, as well as sediment and erosion control, landscape maintenance, vegetation disposal, trash management, and pet waste.
- Stormwater protection at material storage areas, heavy equipment areas, and maintenance areas not covered under other National Pollutant Discharge Elimination System permits.
- Any other facilities that would reasonably be expected to discharge contaminated runoff.

2.0 STORMWATER COLLECTION AND CONVEYANCE SYSTEM

The stormwater collection and conveyance system includes catch basins, drywells, piping, ponds, vaults, and other facilities used for stormwater conveyance and/or treatment.

2.1 Catch Basins

Most catch basins have a storage area at the bottom to trap sediments, debris, and other particles that can settle out of stormwater, which prevents clogging of downstream piping and washing of these solids into the surface water ultimately receiving drainage water.

When the catch basin is approximately 60 percent full of sediment, sediment can begin to wash into stormwater piping. Oils and grease, petroleum hydrocarbons, debris, metals, sediment, and contaminated water collect in catch basins, oil/water separators,

and settling basins. Outlet traps (downturned elbows) are required to trap oil and other floatables and must be replaced or repaired when damaged or missing.

Clean the catch basins when the depth of deposits reaches 60 percent of the sump depth as measured from the bottom of basin to the invert of the lowest pipe into or out of the basin. However, in no case should there be less than six inches clearance from the debris surface to the invert of the lowest pipe. Disposal of sediments and liquids from catch basins must comply with the Washington State Department of Ecology's (Ecology) "Recommendations for Management of Street Wastes."

2.2 Drywells

Drywells, or underground injection control (UIC) facilities, will be maintained in order to avoid clogging and to prevent contamination from materials that collect in the well over time. The following practices help to maintain UIC function:[1]

- Pretreatment for solids removal is recommended to ensure protection of long-term infiltration capacity and reduced frequency of maintenance. It will also reduce the long-term accumulation of contaminants in the vadose zone.
- Frequent inspections and regular maintenance will improve the long-term performance of the facilities.
- The removal of debris and sediment from the drywell prevents the buildup of materials that could inhibit infiltration.

2.3 Stormwater Piping

Stormwater piping must be in good condition. Piping should be inspected regularly and repaired as needed. Video may be necessary to identify problem areas within the piping, including things like tree roots, debris accumulation, and loose joints or connections.

The stormwater permit requires development of a storm sewer system map showing the locations of all known storm drain outfalls, labeling the receiving waters, and delineating the areas contributing runoff to each outfall.

2.4 Other Stormwater Facilities

Other facilities can include both structural and nonstructural stormwater facilities ranging from stormwater filtration vaults to vegetation and soil. All of these facilities require routine maintenance to ensure their functionality is maintained. Frequency and level of maintenance varies based on the facility location, function, and exposure to impacts. In some cases, filtration media should be regularly inspected and replaced. Facilities should be maintained according to the following actions:

- Promptly repair or replace all substantially cracked or otherwise damaged secondary containment and any deterioration that threatens the structural integrity

[1] Requirements are outlined in Ecology's "Guidance for UIC Wells that Manage Stormwater".

of the facilities, and replace cleanout gates, catch basin lids, and rock for emergency spillways, etc. as needed.

- Inspect and clean stormwater treatment facilities, conveyance systems, and catch basins as needed, and determine whether improvements in O&M procedures are needed.
- Ensure that storm drain capacities are not exceeded and that heavy sediment discharges to the drainage system are prevented.
- Regularly remove debris and sludge from facilities used for treatment. Dewater, transport, and dispose of the material as solid waste, as approved by the local or state government, or have it professionally removed by a contractor. If visual or olfactory indications of pollution are noted, the waste must be characterized to ensure it is disposed of properly.

3.0 MAINTENANCE OF ROADS AND PARKING

3.1 Snow Removal

Snow removal is preferred over deicing with chemicals to reduce potential impacts to stormwater quality.

3.2 Selecting Deicers

Select deicers and anti-icers that result in the least adverse environmental impact. Apply only as needed using minimum quantities. Where feasible and practical, use roadway deicers, such as calcium magnesium acetate, potassium acetate, or similar materials, that cause less adverse environmental impact than urea, and sodium chloride.

3.3 Maintenance after Deicing

Increase maintenance of stormwater structures as necessary. Sweep or clean up accumulated deicing and anti-icing materials and grit from roads as soon as possible after the road surface clears.

3.4 Debris Removal for Streets and Parking

Streets and parking areas can be the source of vegetative debris, paper, fine dust, vehicle liquids, tire and brake wear residues, heavy metals, soil and particles, ice control salts, domestic wastes, lawn chemicals, and vehicle combustion products. Conduct efficient street sweeping where and when appropriate to minimize the contamination of stormwater. Do not wash street debris into storm drains. Other BMPs include:

- Conduct vacuum sweeping at optimal frequencies. Optimal frequencies are those scheduled sweeping intervals that produce the most cost-effective annual reduction of pollutants normally found in stormwater and can vary depending on land use, traffic volume, and rainfall patterns.
- Train operators in those factors that result in optimal pollutant removal.

- Consider the use of periodic parking restrictions to ensure the sweeper's ability to sweep along the curb.
- Establish programs for prompt vacuum sweeping, removal, and disposal of debris from special events that will generate higher than normal loadings.
- Inform citizens about eliminating yard debris, oil, and other wastes in street gutters to reduce street pollutant sources.

4.0 STORAGE, WASHING, AND MAINTENANCE OF VEHICLES AND EQUIPMENT

Pollutants released while washing vehicles and equipment include surfactants, petroleum hydrocarbons, toxic organic compounds, oils and greases, nutrients, metals, and suspended solids. These pollutants must not be discharged to the storm drainage system or directly into receiving waters.

4.1 Vehicle and Equipment Storage

Ensure that stored vehicles are not leaking oil or other fluids into storm drains.

4.2 Vehicle and Equipment Washing

Wastewater from cleaning vehicles and equipment must be discharged into a sanitary sewer drain at a site that is approved for discharge.

- Conduct indoor vehicle and equipment washing in an area that drains to the sanitary sewer and that prevents the wash water from flowing outside and entering the storm drainage system.
- Conduct outdoor vehicle and equipment washing in a designated wash area that drains to a sump (such as a grit separator) and then to the sanitary sewer, or another appropriate wastewater treatment or recycling system. Close the inlet valve in the discharge pipe when washing is not occurring to prevent the entry of stormwater. The stormwater can then drain to the conveyance system outside of the wash pad.
- The wash area must be clearly marked.

4.3 Vehicle and Equipment Maintenance

The following BMPs or equivalent measures are required of all businesses and public agencies engaged in automotive repair and maintenance activities:

- Employees must be educated annually about the need for careful handling of automotive fluids. New employees must be trained upon hiring. Employees at businesses or public agencies that routinely change or handle these fluids must be trained in spill prevention and cleanup. All training must be documented.
- Spill cleanup materials, such as rags and absorbent materials, must always be kept close at hand when changing oil and other fluids. Soiled rags and other cleanup material must be properly disposed of or professionally cleaned and reused.
- Maintenance and repair activities must be conducted indoors.

- Drain all fluids that have the potential to leak from wrecked vehicles and equipment when they arrive. Store and dispose of fluids properly.
- If the work must be performed outdoors or at a mobile location, such as a construction site, drip pans or other containment devices must be used beneath the vehicle or equipment to capture all spills and drips.
- Make sure all outside materials that have the potential to leach or spill to the drainage system are covered, contained, or moved to an indoor location.
- Maintenance and repair areas cannot be hosed down. Instead, they must be swept weekly or more often (as needed) to collect dirt, and spills must be wiped up with rags and other absorbent materials. If pressure washing is necessary, the wastewater must be collected and disposed of properly. It cannot be discharged to the stormwater drainage system.
- Drains located inside buildings must be connected to the sanitary sewer.
- If floatable components are present, use an oil/water separator or other appropriate treatment to treat all runoff from the fluid changing area prior to discharge to the sanitary sewer.
- If extensive staining and oily sheen is present, absorbent pillows or booms must be used in or around catch basins and properly maintained to prevent oil from entering the stormwater drainage system.

4.4 Washing and Cleaning of Food Service Equipment

This section applies to washing and cleaning of commercial cooking equipment, such as vent filters, grills, floor mats, and grease and pretreatment devices. Such washing and cleaning should always occur indoors with discharges to the building sanitary sewer or to a holding tank for shipment to an off-site disposal facility or approved treatment system. If the washing activity cannot be moved indoors or contained in a tub, the washing area must drain to a sanitary sewer, holding tank, or process treatment system. Provisions must be made to prevent the flow of stormwater onto the washing area.

Wash water must be discharged into a sanitary sewer drain. It is illegal to discharge the dirty wash water to the stormwater drainage system. In addition:

- Wipe off the equipment before washing to remove fats, oil, grease, and food waste.
- Do not pour cooking grease down the drain. Collect and dispose of all grease properly.
- If roof equipment or hood vents are cleaned, ensure that no wastewater or process water is discharged to the roof drains or stormwater system.

5.0 EXTERNAL BUILDING MAINTENANCE

5.1 Pressure Washing

Eliminate or minimize building exterior pressure washing whenever possible. Avoid soap when pressure washing; use heat, steam, and/or water pressure instead. If pressure washing with cold water and the building exterior is not coated with lead-containing paint or other hazardous material, it is okay to discharge the wash water to a storm drain. Otherwise, collect wash water for appropriate disposal in the local sanitary sewer or off site as a hazardous waste. Install berms to keep contaminated wash water from entering storm drains. If the job generates a lot of sediment or debris, lay filter fabric on the ground or install a commercial catch basin insert in the drain to catch the debris. Dispose of this fabric and its contents appropriately. When washing loading docks or drain trenches, berm the area and/or block the drain. Collect the wash water in containers. Let solids settle before decanting liquid and skim the material off the top. Dispose of wash water in the sanitary sewer or, if the water contains hazardous materials (e.g., metals, paint), manage it as hazardous waste. Don't allow wash water to soak into landscaping unless you have made arrangements with grounds staff. Collect wash water for discharge to sanitary sewer.

5.2 Use of Solvents or Cleaners

Avoid the use of acids, solvents, soap, or detergents whenever possible. Products that are labeled "biodegradable" are not allowed to enter storm drains. If soap or detergents must be used, collect your wash water using berms, plastic, and other means. Dispose wash water into a sanitary sewer unless the building is coated in lead paint. If washing coatings that contain lead paint, determine if the washwater classifies as hazardous waste. If you must use solvents, collect the wash water for disposal as hazardous waste. If you must use acidic products, collect the wash water for neutralization or characterization.

5.3 Painting

Cover and contain painting and sanding operations and apply good housekeeping and preventative maintenance practices to prevent the contamination of stormwater with painting overspray and grit from sanding.

5.4 Dumpsters

Cover dumpsters, or keep them under cover such as a lean-to, to prevent the entry of stormwater. Replace or repair leaking garbage dumpsters. Drain dumpsters and/or dumpster pads to sanitary sewer. Keep dumpster lids closed. Install waterproof liners.

6.0 APPLICATION OF FERTILIZER/PESTICIDES AND LANDSCAPE MAINTENANCE

Avoid fertilizer and pesticide application whenever possible. If pesticides or herbicides are used, they must be carefully applied in accordance with label instructions and the Federal Insecticide, Rodenticide, and Fungicide Act (FIFRA) and applicable state laws. Maintain appropriate vegetation, properly apply fertilizer where necessary, or consider

the use of pest-resistant varieties when possible. Also, where practical, grow plant species appropriate for the site.

6.1 Application of Pesticides

Choose the least toxic pesticide that is capable of reducing the infestation to acceptable levels. Conduct any pest control during the life stage when the pest is most vulnerable. The pest control method should be site-specific rather than generic. When necessary to use, apply pesticides according to the directions on the label and use the following BMPs:

- Conduct spray applications according to specific label directions and the applicable local and state regulations.
- Do not apply pesticides if it is raining or immediately before expected rain (unless the label directs such timing).
- Ensure that the pesticide application equipment is capable of immediate shutoff in the event of an emergency.
- Do not apply pesticides within 100 feet of open waters, including wetlands, ponds, streams, sloughs, or any drainage ditch or channel that leads to open water, except when approved by Ecology. Take care to avoid contamination or site disturbance during applications.
- Never apply pesticides in quantities that exceed the manufacturer's instructions.
- Mix pesticides and clean the application equipment under cover in an area where accidental spills will not enter surface water or ground water and will not contaminate the soil.

6.2 Storage of Pesticides

- Store pesticides in enclosed areas or in covered impervious containment.
- Do not hose down the paved areas to a storm drain or conveyance ditch.
- Ensure that pesticide-contaminated waste materials are kept in designated covered and contained areas and disposed of properly.
- Rinse-water from equipment cleaning and/or triple-rinsing of pesticide containers should be used as product or recycled into product.

6.3 Application of Fertilizer

- Ensure that all fertilizers are applied by properly trained personnel. Document and keep all training records.
- For commercial and industrial facilities, ensure that fertilizers are not applied to grass swales, filter strips, or buffer areas that drain to sensitive receiving waters.

6.4 Landscape Maintenance

- Install engineered soil/landscape systems to improve the infiltration and regulation of stormwater in landscaped areas.
- Do not dispose of collected vegetation into waterways or storm sewer systems.
- Conduct mulch-mowing whenever practicable
- Dispose of grass clippings, leaves, sticks, or other collected vegetation by composting, if feasible.
- Use mulch or other erosion control measures on soils exposed for more than one week during the dry season or two days during the rainy season.
- Store and maintain appropriate oil and chemical spill cleanup materials in readily accessible locations when using oil or other chemicals.
- Ensure that employees are familiar with proper spill cleanup procedures.
- Till fertilizers into the soil rather than dumping or broadcasting onto the surface. Determine the proper fertilizer application rate for the types of soil and vegetation encountered.
- Till a topsoil mix or composted organic material into the soil to create a well-mixed transition layer that encourages deeper root systems and drought-resistant plants.
- Use manual and/or mechanical methods of vegetation removal rather than applying herbicides, where practical.

6.5 Trash and Pet Waste Management

The overall approach is to prevent, to the maximum extent practicable, the discharge of contaminated stormwater from animal handling and from daily trash accumulation. Trash collection bins are regularly placed across the campus to encourage disposal.

7.0 MATERIAL AND EQUIPMENT STORAGE

7.1 Outdoor Storage of Materials

This section applies to outdoor storage and transfer of solid raw materials, byproducts, or products such as, but not limited to, gravel, sand, salts, topsoil, compost, logs, sawdust, wood chips, lumber and other building materials, concrete, and metal products typically stored outside in large piles or stacks. Cover and contain materials to prevent erosion whenever possible. Erosion results in stormwater contamination and loss of valuable product. Sweep paved storage areas daily or more often (as necessary) to collect and dispose of loose solid materials. Do not hose down the contained stockpile area if the discharge will flow into a storm drain or a drainage conveyance. For stockpiles containing more than 5 cubic yards of erodible or water-soluble materials, such as soil, deicing salts for roads, compost, unwashed sand and gravel, and sawdust; and for outside storage areas for solid materials, such as logs, bark, lumber, and metal products, do one or more of the following:

- Store materials inside a building or on a covered outdoor paved area, preferably surrounded by a berm.
- Place temporary plastic sheeting (polyethylene, polypropylene, hypalon, or equivalent) over the material. Anchor sheeting to prevent contact with rainfall.

For large stockpiles that cannot be covered:

- Install containment devices, such as a berm or a low wall, around the perimeter of the pile and at any catch basins as needed to prevent erosion of the stockpiled material and to prevent discharge of leachate from the stockpiled material off the site or to a storm drain.
- Ensure that contaminated stormwater is not discharged directly to catch basins without being conveyed through a treatment BMP.
- Inspect and maintain catch basins regularly (weekly or more often, as needed).

Maintain the quantity of materials necessary to prevent the erosion of large stockpiles and loss of valuable materials.

7.2 Storage of Contaminated Soils

This section applies to the storage of soils contaminated with toxic organic compounds, petroleum products, or metals.

- Cover or enclose the storage area for the contaminated soils and contain it with a curb, dike, or berm constructed around the material storage area if possible.
- Sweep paved storage areas daily or as needed. Stock cleanup materials, such as brooms, dust pans, and vacuum cleaners, near the storage area.
- Regularly inspect and maintain catch basins and other drainage systems on the site to prevent contaminated materials from entering stormwater and leaving the site. Sediment from such cleaning must be disposed of properly in accordance with applicable law, which may include Washington State Dangerous Waste Regulations.

7.3 Outdoor Portable Container Storage

The following applies to outdoor portable containers used to store accumulated food wastes, vegetable or animal grease, used automotive fluids, liquid feedstock or cleaning compounds, chemicals, or dangerous wastes (liquid or solid), and contaminated stormwater.

- Wherever possible, store containers on a paved surface under a roof or other appropriate cover or in a building.
- Store materials in a leak-proof container with a tight-fitting lid.
- All containers must have labels identifying their contents. Apply labels and position containers so labels are clearly visible. If the material is hazardous waste it should have a hazardous waste label.

- Place drip pans beneath all taps on mounted containers and at all potential drip and spill locations during the filling and unloading of containers.
- Inspect container storage areas regularly for corrosion, structural failure, spills, leaks, overfills, and failure of piping systems. Check containers daily for leaks and spills. Replace containers and replace and tighten bungs in drums as needed.
- Secure drums in a manner that prevents accidental spillage, pilferage, or any unauthorized use.
- Place containers mounted for direct removal of a liquid chemical for use by employees inside a containment area as described above. Use a drip pan during liquid transfer.
- Keep the minimum amount of materials necessary on hand to prevent large quantities of liquids on site.
- Consult state and local standards and codes for storage of hazardous or flammable materials.

7.4 Parking Lot Maintenance and Storage of Vehicles and Equipment

This section applies to parking lots and areas where vehicles or equipment are stored outside. The following BMPs or equivalent measures are required for activities related to the parking and storage of vehicles and equipment:

- Sweep or vacuum parking lots, storage areas, and driveways regularly to collect dirt, waste, and debris and dispose as solid waste.
- Do not hose down or pressure wash areas that drain to a storm drain or to the surface water ultimately receiving drainage water.
- If a parking lot must be washed, discharge the wash water to a sanitary sewer or other approved wastewater treatment system or collect it for off-site disposal. Cover storm drains to prevent wash water from entering the surface water ultimately receiving drainage water. In some cases, contaminated stormwater may need to be pretreated before it is discharged to the sanitary sewer.
- Make sure all outside materials that have the potential to leach or spill to the drainage system are covered, contained, or moved to an indoor location.
- An oil removal system, such as an API or coalescing plate oil/water separator, catch basin filter, or equivalent BMP, is required for parking lots that meet the threshold vehicle traffic intensity of a high-use site. Refer to Volume III of Ecology's Stormwater Flow Control and Water Quality Treatment Technical Requirements Manual for information on traffic intensity thresholds. If a catch basin filter is used, maintain the filter regularly (weekly or as needed) to prevent plugging.

8.0 OTHER FACILITIES

8.1 Cleaning and Maintenance of Swimming Pools and Spas

Many manufacturers do not recommend draining pools, spas, hot tubs, or fountains. If the water feature must be drained, convey discharges to a sanitary sewer if approved by the local sewer authority. Discharges to the storm drain requires extensive pretreatment and chemical adjustment.

8.2 Roadside Ditches

The following BMPs or equivalent measures are required for activities related to the maintenance of roadside ditches:

- Inspect roadside ditches regularly (as needed) to identify sediment accumulations and areas of localized erosion.
- Clean ditches on a regular basis, as needed:
- Keep ditches free of rubbish and debris.
- Conduct ditch maintenance (seeding, fertilizer application, and mowing) when most effective, usually in late spring and/or early fall.
- Do not apply fertilizer unless needed to maintain vegetative growth.
- Do not leave material from the ditch cleaning on roadway surfaces.
- Sweep and remove dirt and debris that remains on the pavement at the completion of ditch cleaning operations.
- Segregate clean materials from suspect or contaminated materials. Non-contaminated soils may be handled as "clean soils" and non-contaminated vegetative matter can be composted or disposed of in a municipal waste landfill, if permitted. Suspected contaminated or contaminated material removed from ditches must be tested and handled according to the Dangerous Waste Regulations unless testing indicates that it is not dangerous waste.
- Use grass vegetation for natural drainage systems. Vegetation prevents erosion and cleanses runoff.
- Remove vegetation only when flow is blocked or excess sediments have accumulated.
- Establish vegetation from the edge of the pavement if possible or at least from the top of the slope of the ditch.
- Construct diversion ditches on top of cut slopes to prevent slope erosion by intercepting surface drainage. Perform regular maintenance to retain their diversion shape and capability.
- Inspect culverts on a regular basis for scour or sedimentation at the inlet and outlet, and repair as necessary. Give priority to culverts that are conveying perennial or

salmon-bearing streams and to culverts near streams in areas of high sediment load, such as those near subdivisions during construction.

8.3 Roof and Building Drains

Evaluate the potential sources of stormwater pollutants and apply source control BMPs where feasible. Applicable Operational Source Control BMPs are as follows:

- If leachates and/or emissions from buildings are suspected sources of stormwater pollutants, then sample and analyze the stormwater draining from the building.
- Sweep the area routinely to remove any zinc residuals.
- If a roof or building stormwater pollutant source is identified, implement appropriate source control measures, such as air pollution control equipment, selection of materials, operational changes, material recycle, process changes, etc.
- Paint or coat the galvanized surfaces as described in Ecology Publication No. 08-10-025.

Appendix B
Spill Control Plan

Clark College

Updated June 2016

Stormwater Management Plan

Spill Control Plan

Overview

Secondary Permittees are required to maintain a spill control plan that includes coordination with a qualified spill responder.

Spill Planning and Prevention

Develop spill prevention and containment plans when engaged in projects that represent a high potential for spills or releases of pollutants. Have materials available to control and contain a spill. Examples of high-risk activities include:

- Fueling
- Vehicle, equipment, or building cleaning
- Outside storage of non-containerized materials
- Outside storage of liquids in portable containers
- Any near-water or overwater work

Minor Spills

A spill can be classified as a "minor spill" if it does not present an immediate physical or health risk and will not cause environmental contamination. As a rule of thumb, a "minor spill" can be cleaned by one person in one hour. Call Environmental Health and Safety at (360) 992-2956 to help determine whether it is a "minor spill" and to request assistance in assessing and cleaning up the spill.

If classified as a "minor spill", follow these steps:

1. Use appropriate personal protective equipment to prevent any contact, including inhalation.
2. Contain the spill using regulated equipment and absorbents.
3. Only clean up the spill using specific cleanup materials appropriate for the chemicals spilled.
4. Dispose of contaminated spill materials through the College's hazardous waste disposal contractor.
5. If safe to do so, cover and protect storm and floor drains.
6. When finished, make sure that there has been no contamination or environmental damage.

Hazardous Spills

A spill can be classified as a "hazardous spill" if the spill presents an immediate physical or health risk or if it will cause environmental contamination (release of petroleum or other hazardous substances to the ground, air, or water bodies). If there is an immediate physical or health risk call 911 to alert the local fire department.

For "hazardous spills", follow these steps:

1. Evacuate the building/area immediately, and alert others to do the same.
2. Seal off a spill/release in a building by closing the door to the area.
3. Activate a fire alarm on the way out of the building if the spill presents an imminent danger, such as fire, explosion, injuries, etc.
4. Report the spill/release to Security (360-992-2133), Facilities (360-992-2336), and/or 911 from a safe location.
5. Move to an area at least 500 feet upwind from affected building/area, and keep streets, fire lanes and hydrant areas, and walkways clear for emergency vehicles and personnel. Instructors and supervisors have the responsibility of assuring that all students and staff have evacuated their classrooms and work areas.
6. If safe to do so, cover and protect storm and floor drains.
7. Call Environmental Health and Safety for technical and clean up assistance.
8. Return to building(s) only when they are declared safe to occupy.

Hazardous Spills or Releases off College Property

This section is referring to an airborne chemical release caused by a natural disaster or an industrial, railway, or freeway accident occurring near the College.

1. Seek shelter inside a building.
2. Stay inside. Do not evacuate buildings or “peek” outside buildings.
3. Close all building doors and windows.
4. Notify Facilities Services to shut off building ventilation.
5. Wait for instructions from College President or designee.

Potential Spills

If you see a situation on campus that could likely cause a spill in the future, call Environmental Health and Safety during business hours.

Qualified Spill Responder

Clark College has an arrangement with a spill control company as a qualified spill responder.

“Minor Spill” Kit

Have on hand the following spill control kit items:

- Sorbent booms
- Kitty litter
- Sorbent pads
- Plastic sheeting (for drain cover)
- Garbage bags and zip ties
- Acid/base neutralizer
- Safety gloves and goggles

Appendix C
Stormwater Brochures

Environment Education Guide

Protecting Washington's waters from stormwater pollution

Stormwater runoff is damaging salmon habitat. It's the Number 1 water pollution problem in the urban areas of our state, and it causes and contributes to flooding.

Photo: Toni Weyman Droscher

WASHINGTON STATE DEPARTMENT OF ECOLOGY

Did you know Washington has a stormwater runoff problem?

Stormwater runoff is damaging salmon habitat. It's the Number 1 water pollution problem in the urban areas of our state, and it causes and contributes to flooding.

Chances are pretty good you've seen stormwater runoff. It's the water from rain or snow that runs off yards, roofs and roadways. As gravity pulls it downhill into low spots, ditches and storm drains, the water picks up soil, chemicals and other pollutants and carries them into our lakes, rivers and marine waters.

Our waters and salmon as well as other fish and wildlife species aren't the only things at risk. Stormwater problems also affect the health and safety of people.

As we develop land to accommodate Washington's growing population, our state's stormwater problem grows, too. The good news is we can do something about it—all of us.

In Washington, the state Department of Ecology, the U.S. Environmental Protection Agency and local governments all work together to regulate stormwater.

The key to solving the problem isn't really in the rules and permits. It's in people—how we live on the land and the everyday choices each of us makes.

From rain to runoff — what comes down must go somewhere...

If you want to understand stormwater, watch what happens the next time it rains. Pay attention to how shapes and surfaces determine what happens to the water.

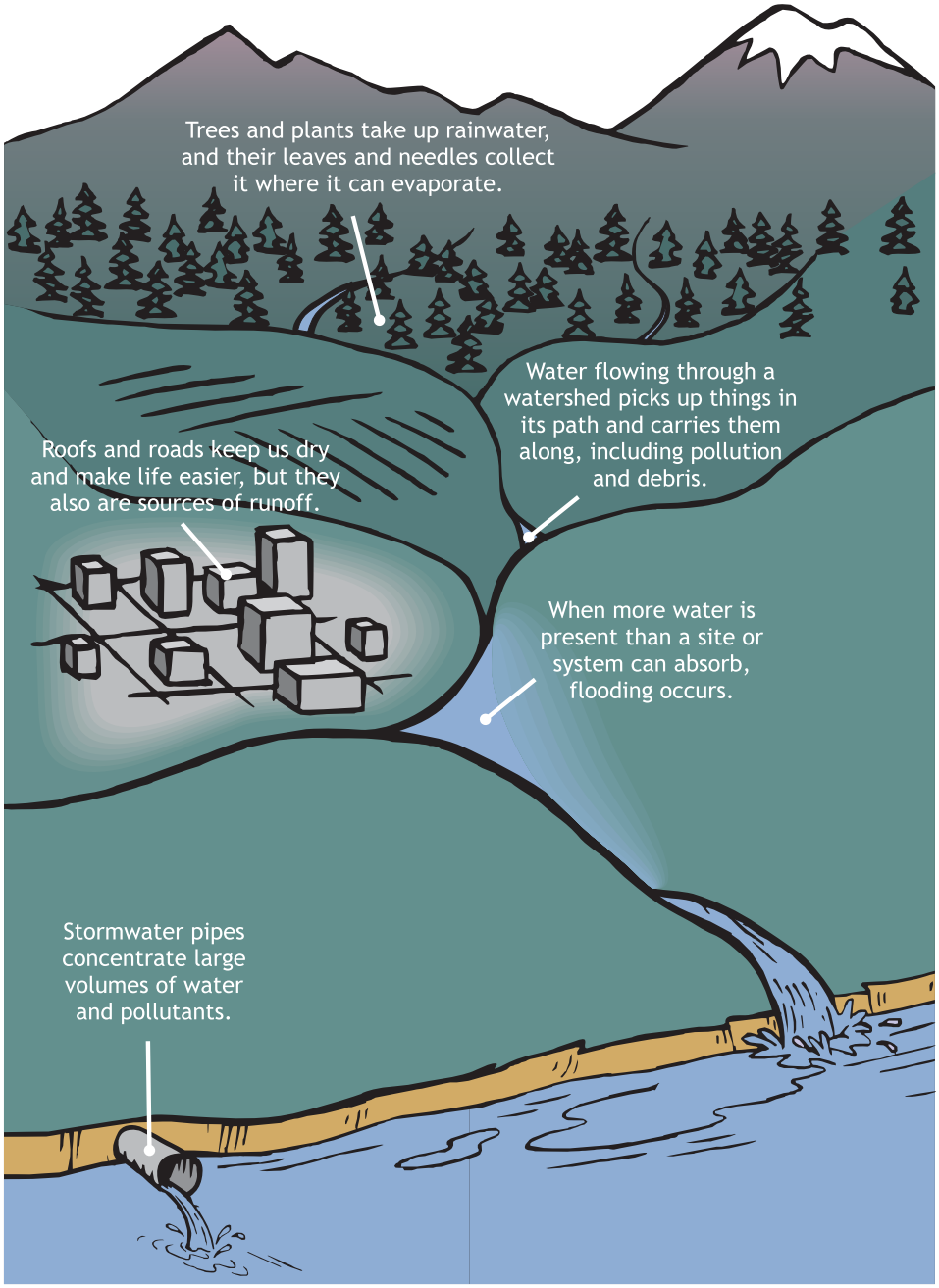
Watch how rainwater flows downhill and collects in low places. See how quickly it starts running down a downspout or into a gutter. Feel how pavement stays hard but soil gets soft. Pay attention to what the water sweeps along in the gutter and where there's an oily sheen on a puddle. Notice what happens to streams and rivers. Notice how runoff seems to be everywhere in the city and is harder to find in the forest.

In Washington's forests, the needles of evergreen trees hold a lot of rain—as much as 40 percent of a low intensity rainfall.

The landscape connection is the key to stormwater runoff

On undeveloped sites, water from rain or snow follows natural patterns of drainage and circulation. Much of the water seeps down into the soil and into underground water supplies. In forests and grasslands, trees and other plants will take up some of this water. Water will also collect on their leaves and needles and evaporate.

Wetlands absorb and hold runoff. In a natural or near-natural setting, the water that does run off directly into streams or other waters is usually filtered and slowed by the web of plants it runs through, a sort of natural purifying system.



A watershed is all the land that drains to the same body of water. A watershed's natural drainage system includes a network of streams and rivers. In a large watershed, many different sources and land uses can contribute to stormwater runoff.

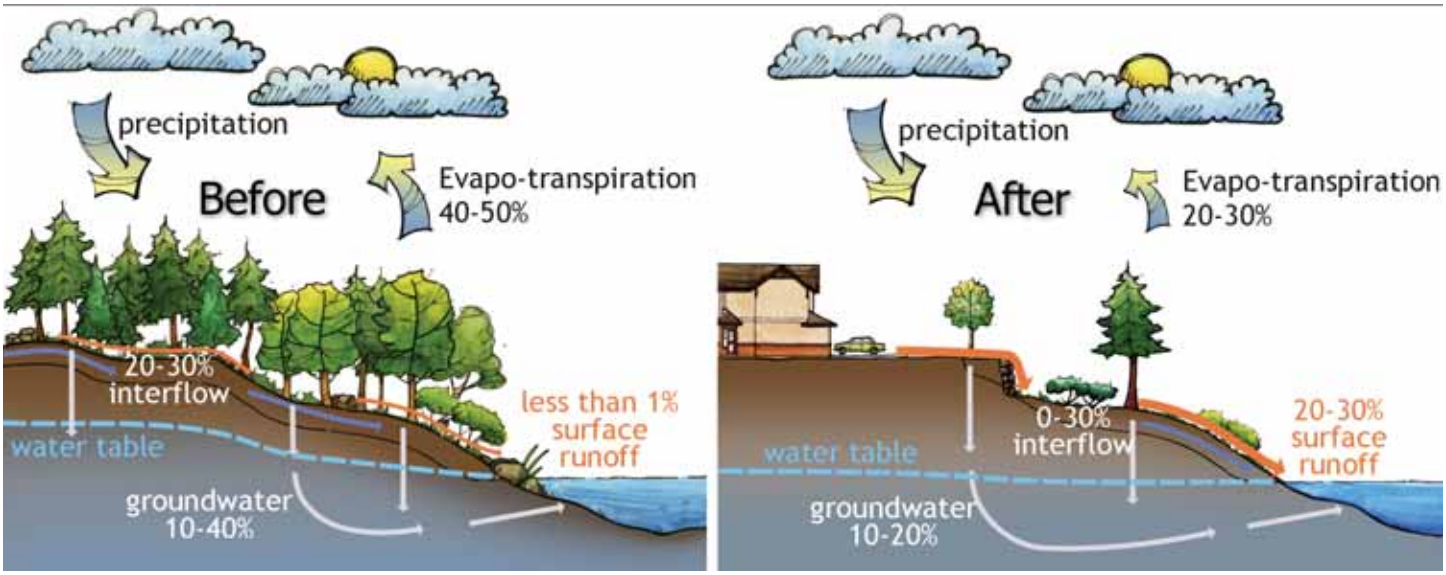


Image courtesy of Puget Sound Partnership

Before *development almost all rainfall is taken up by plants, evaporates or infiltrates through the ground.*
After *conventional development, surface runoff increases significantly while evaporation and infiltration into the ground decrease.*

Developing land typically has meant removing trees or other vegetation, reshaping the land, compacting soil, and creating hard surfaces. These changes alter the natural water patterns, or hydrology, of a site. Much of the water that plants and soil previously would have absorbed now runs off into local waters, either directly or through a system of gutters, ditches, swales, or pipes. These systems collect runoff and concentrate the flow, quickly conveying it into streams or other waters.

Covering as little as 10 percent of a watershed with impervious surfaces can degrade streams, harming salmon, trout and other aquatic life.

The way we use and develop the land changes not only where stormwater goes and how fast it gets there, but also what it meets along the way—parking lots, roads, roofs, farms, ranches, ball fields and more. Whatever stormwater runoff picks up from these places, it carries into Washington's waters.

Water flowing through a watershed picks up things in its path and carries them along, including pollution and debris.

How much stormwater do we make?

POTENTIAL RUNOFF	1,200-square ft. roof	1-acre of pavement
1 inch of rain or snow melt	748 gallons	27,150 gallons
Average annual precipitation		
Seattle (37 in./yr)	27,700 gallons	1 million gallons
Spokane (17 in./yr)	12,700 gallons	0.5 million gallons
Olympia (51 in./yr)	38,100 gallons	1.4 million gallons

Roofs, roads and paved parking lots keep us dry and make life easier, but they are also common sources of runoff. Imagine all the roofs and roads in your area and across the state, and imagine how much runoff they generate.

Precipitation data source: NOAA - Average annual precipitation, 1971-2000. Figures have been rounded.

Washington's growing problem with stormwater runoff

Altered flows — too much, too soon and too little, too late

Stormwater often gets to where it's going faster after an area is developed. Runoff quickly flows into streams and other surface waters instead of seeping into the ground to recharge groundwater and slowly feeding those streams year round.

The results include much higher stream flows and flooding when it rains (especially during heavy rains), and much lower stream flows in the dry season. These extreme high and low flows are bad for salmon, trout and other fish as well as people and communities.

The high-energy, faster, heavier flows erode stream channels and scour streambeds, churning up silt and damaging spawning areas. The energy from high flows also flushes away tiny aquatic life that serve as part of trout and salmon's diets and part of a healthy stream.

Extreme low flows are also a problem for fish. Some urban streams that used to run year round sometimes dry up in the summer. Others have too little flow to allow salmon to swim up them to spawn. Hardened surfaces contribute to this problem by interrupting the natural water-absorbing process. Rainfall hits these hard surfaces and escapes directly into rivers rather than soaking into the ground to recharge underground water supplies that feed small streams in the summer months.

Did you know...?

- *Economic costs related to stormwater in the Puget Sound region are expected to exceed $1 billion over the next decade.**
- *Even the drier east side of the state has to deal with stormwater, especially in urban areas. If laid end-to-end, Spokane's storm sewers would stretch all the way to Seattle and back.*

There are other flow-related impacts, too. Flooding from extreme high flows can damage private property, public roads and utilities. And when stormwater runs off instead of seeping into groundwater, some wells may go dry.

With high amounts of hardened or paved surfaces, urban areas generate more and faster runoff, increasing the risk of flooding.

Stormwater runoff can affect both the quality and quantity of drinking water supplies. Cities and counties require more stormwater protection in areas near public supply wells to protect them from pollution.

** Damages and Costs of Stormwater Runoff in the Puget Sound Region, 2006; Derek B. Booth, Bernadette Visitacion and Anne C. Steinemann*

Polluted waters

Most stormwater runoff carries pollution and more pollution comes from highly urbanized areas. More importantly, most of it is not treated, or "cleaned up" before it enters Washington's waters.

Stormwater runoff is the Number 1 urban water pollution problem in the state.

As runoff flows over roofs, pavement and developed land, it picks up soil particles, oil and grease (mostly from cars and trucks), and many different toxic chemicals, including those from fertilizers, weed-killers, and pesticides. It also picks up bacteria from pet and livestock waste and failing septic systems.

About one-third of the state's waters are too polluted to meet state water quality standards. Frequently, the cause of this pollution is stormwater. This water is not fit for drinking or swimming.

Photo: Jill Williams

Contaminated stormwater runoff can create hazards to human health and affect recreation, tourism, fishing, and businesses.

Beaches have been closed for swimming and shellfish harvesting.

Salmon suffer not only from chemical pollutants, but also from soil washed in from construction sites and other bare ground. Mud can cover spawning areas, suffocating salmon eggs. It also can clog gills, making it harder or impossible for salmon, trout, and other fish to breathe.

Shared connections

Polluted stormwater runoff is an issue across the state. It's easy to see how it connects to issues about Puget Sound, the Spokane River, the Columbia River, and salmon recovery. Stormwater runoff connects to other issues, too:

- *Many of the same things that pollute runoff and surface waters can also pollute aquifers, which are sources of drinking water.*
- *The danger from landslides and unstable slopes increases in areas with stormwater problems.*
- *As we prepare for climate change, we must consider how changes in rain and snowfall could affect flooding and water supplies.*

The good news is that solutions for stormwater can help us deal with many of these connected issues.

Salmon and trout need cool water to survive, but stream temperatures can rise when cool groundwater isn't available to feed a stream year round. Also, stormwater runoff entering a stream is often warmer than the stream itself.

Rethinking stormwater runoff

Dealing with stormwater has traditionally focused on getting it out of the way quickly. In Washington, many communities have rules for managing stormwater as part of regulating development and preventing erosion and flooding.

However, many communities are not as used to dealing with stormwater runoff as a major source of pollution or destroyer of habitat. With increasing stormwater runoff problems and new state and federal requirements, Washington is rethinking how it handles stormwater.

Washington has successfully tackled other pollution problems. By combining regulations with cooperation, creativity and good long-term planning, we can reduce the problems with stormwater runoff.

Our transportation choices are part of the runoff picture. Many pollutants in runoff from roads, driveways and parking lots come from cars and trucks. Some sources are:

- *Antifreeze*
- *Brake fluid*
- *Brake lining*
- *Exhaust particles*
- *Oil*
- *Pavement particles*
- *Tire particles*
- *Transmission fluid*

A new approach — reduce runoff at its source

Stormwater runoff accumulates, and so do the problems it creates as it flows downhill. It makes sense to try to stop the problems before they start or get too big to manage.

Innovative developers, engineers and designers are already looking at ways to reduce runoff at its source and better mimic nature's systems by:

- Retaining more natural vegetative cover.
- Reducing hardened surfaces and soil compaction.
- Keeping more stormwater on site to percolate into the ground.

Better designs for new developments can make a difference for the future, but improvements to existing developments can help deal with today's stormwater problems, too. The Department of Ecology is providing grants to local governments to help fund innovative approaches to preventing stormwater runoff.

Photo: Seattle Public Utilities

Seattle's SEA (Street Edge Alternatives) Streets pilot project reduced the amount of stormwater runoff leaving a street by 98 percent for a small rain event. This successful project has inspired similar projects, and the City expects that future projects will cost less than traditional street improvements.

Permeable pavement like this provides a hard, drivable surface, but it also lets some stormwater soak back into the ground.

Choices for the future

Stormwater pollution often goes hand in hand with growth. Since 1982, Washington's population has grown by two million people, adding the equivalent of 10 new cities the size of Spokane or Tacoma. Millions more people are expected to be added in the next few decades. As the state's population grows, we can choose to limit polluted runoff and the harm it does, or risk losing some of what makes Washington a special place to live.

While new regulations and technologies can help, we can't expect them to completely make up for the impacts of converting forests and grasslands into shopping malls or subdivisions.

Choices we make about how we use the land, including how much development to allow, where it occurs, and how much vegetated land is retained, are crucial for successfully managing stormwater and for keeping Washington's watersheds healthy.

Washington Waters — Ours to Protect

People really can make a difference when it comes to reducing stormwater runoff and the problems and costs that go with it. Because we all contribute to the problem, we all can be a part of the solution. It starts with paying attention to stormwater — at home, at work and in our communities.

We can reduce the amount of runoff.

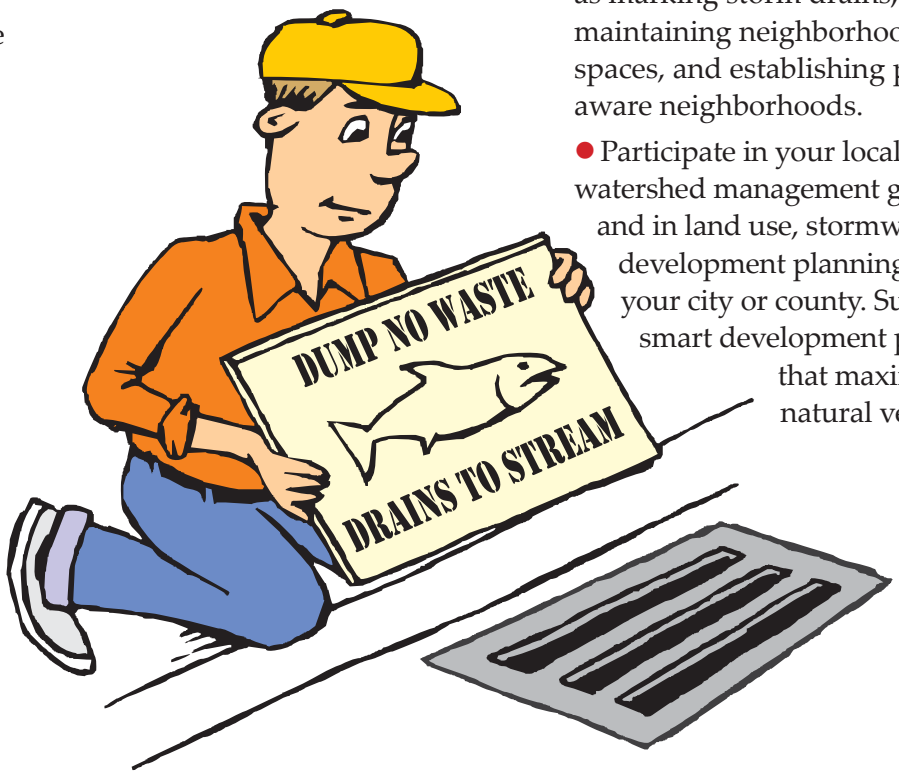
- Reduce the amount of paved or hard surface areas. Consider permeable paving for that new patio or driveway.
- Look for ways to keep runoff out of the stormwater system so it can soak into the ground. Plant rain gardens. Use rain barrels. Wash your car on the lawn or at commercial car wash that recycles water. (This helps prevent runoff pollution, too!)

We can create cleaner runoff.

- Reduce fertilizers, turf builders and pesticides on your lawn and garden. Use small amounts of slow-release fertilizer and environment-friendly products for problem areas.
- Reduce pollution from roads, driveways and parking lots. Wear and tear on roads, tires and brakes leaves a lot of pollutants behind. Fix vehicle fluid leaks immediately, and consider alternatives to driving solo.
- Reduce bacterial pollution from animal waste. Scoop pet waste and put it in your garbage. Cover and control animal manure on small farms.
- Maintain your septic system. This will keep it from failing and causing pollution.

We can work together.

- Get involved with community stormwater projects such as marking storm drains, maintaining neighborhood green spaces, and establishing pesticide-aware neighborhoods.
- Participate in your local watershed management group and in land use, stormwater and development planning with your city or county. Support smart development practices that maximize the natural vegetation.



For more information

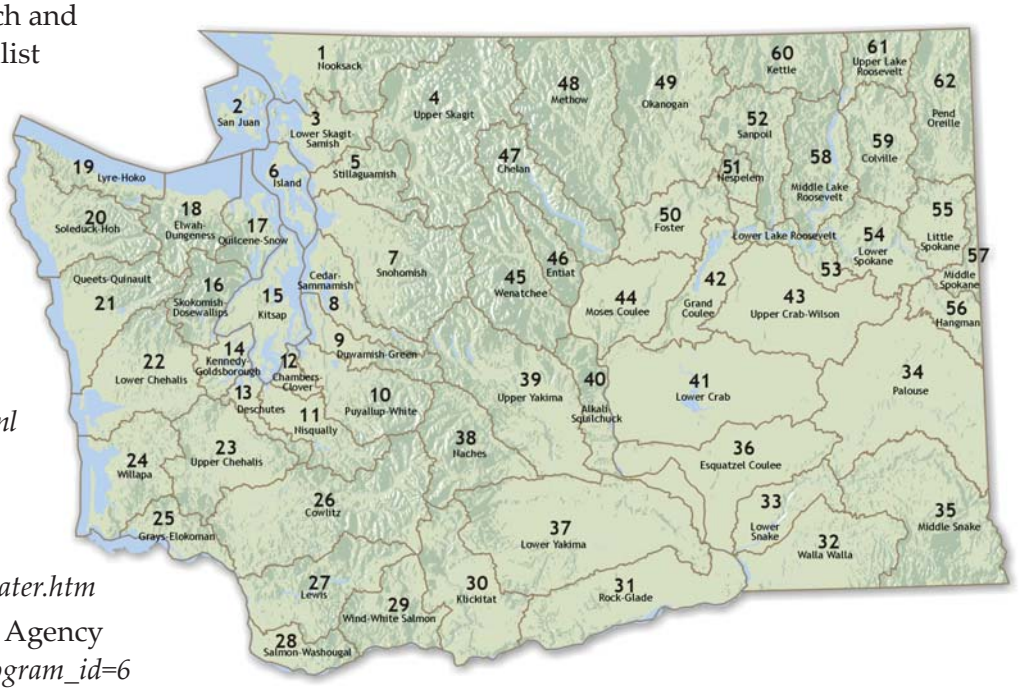
Washington Department of Ecology

Water Quality Program
www.ecy.wa.gov/programs/wq/stormwater/index.html

Jocelyn Jones
Stormwater Community Outreach and Environmental Education Specialist
360-407-7529

Sandy Howard
Communications Manager
360-407-6408

Water Resource Inventory Areas are administrative and planning boundaries for water basins, commonly known as watersheds.



Watershed planning

To find out what watershed you live in and how to get involved:
www.ecy.wa.gov/watershed/index.html

Helpful websites

- Puget Sound Partnership
www.psp.wa.gov/our_work/stormwater.htm
- U.S. Environmental Protection Agency
cfpub1.epa.gov/npdes/home.cfm?program_id=6
- Seattle Public Utilities SEA Streets Project
www.seattle.gov/util/About_SPU/Drainage_&_Sewer_System/Natural_Drainage_Systems/Street_Edge_Alternatives/index.asp

Other resources

- For local information, contact your city or county.
- Search the Internet for more information on stormwater, runoff, rain gardens, low impact development, etc.

To view this publication online, go to: http://www.ecy.wa.gov/biblio/0710058.html

If you need this publication in an alternate format, please call (360) 407-7006. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call (877) 833-6341.

Environment Education Guide

Working for Washington's future:

Healthy Watersheds, Healthy People

Photo: *Debbie Smith, Tumwater Stream Team*

Our future is linked to the health of our watersheds - and our watersheds have many challenges. You can make a difference.

What is a watershed?

Everyone lives in a watershed. You know your county and city, but do you know your watershed address?

Unlike states and counties, watersheds have natural boundaries defined by the shape of the land and the flow of water. In basic terms, a watershed, or basin, is all the land that drains to the same body of water, such as a lake or river. Smaller watersheds become part of larger watersheds, as streams feed into rivers, and rivers flow into oceans. This means wherever you are and wherever you go, you're in a watershed.

Why should you care?

You are a citizen of a watershed.

Your health and the health of your watershed are inseparable. This is because a watershed is an interconnected system of land, water, air, and the life they support—including people and cities. Your everyday actions affect your watershed.

When a watershed is unhealthy, everything living in it suffers. The symptoms are easy to see: Beaches are closed because of pollutants. Fish populations dwindle because there isn't enough water or the quality is too poor to support them. Air pollution endangers our health and damages soil, water, crops, forests, and wildlife.

A polluted watershed puts our drinking water supplies at risk. Our food sources are affected: Contaminated shellfish are unsafe to eat. Toxic chemicals in fish can accumulate in our bodies. Your watershed's health can directly impact you and your family's health.

DEPARTMENT OF ECOLOGY
State of Washington

WASHINGTON waters
OURS TO PROTECT

Ecology publication #08-01-018

What defines a healthy watershed?

A healthy watershed is a well-balanced system, capable of sustaining a variety of environments and many forms of life.

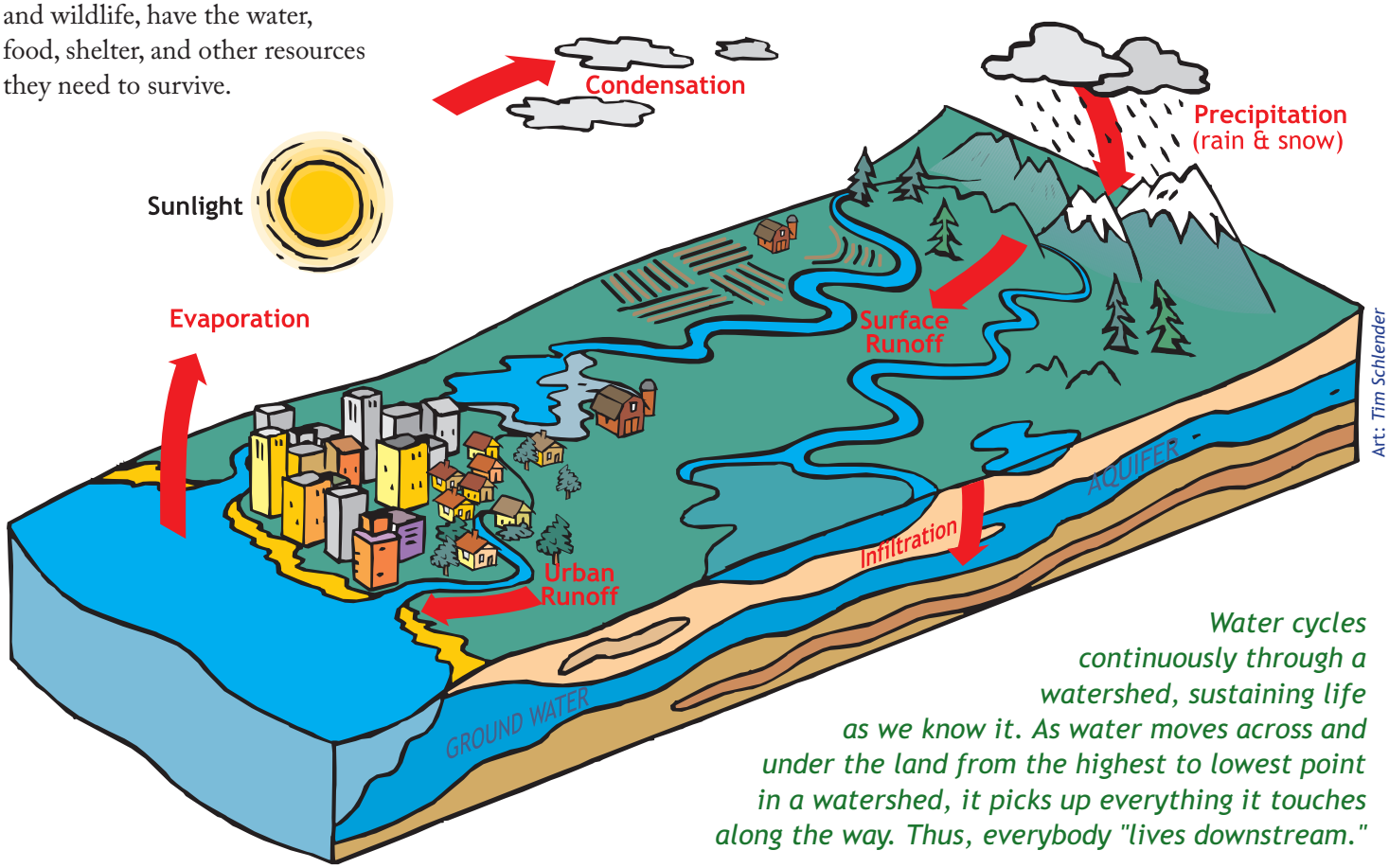
Healthy watersheds perform a number of "jobs." As water continually cycles through (see graphic below), the watershed stores and releases water and filters many pollutants. Trees and plants help anchor soil and absorb rain and snowmelt, so flooding and landslides are less severe. Vegetation also provides shade, keeping water temperatures cool and stable so fish and other aquatic life can thrive. In a healthy watershed, water, soil and air are clean. People, as well as fish and wildlife, have the water, food, shelter, and other resources they need to survive.

The health of our watersheds is in danger.

Many of our watersheds are unhealthy, and all are in need of protection.

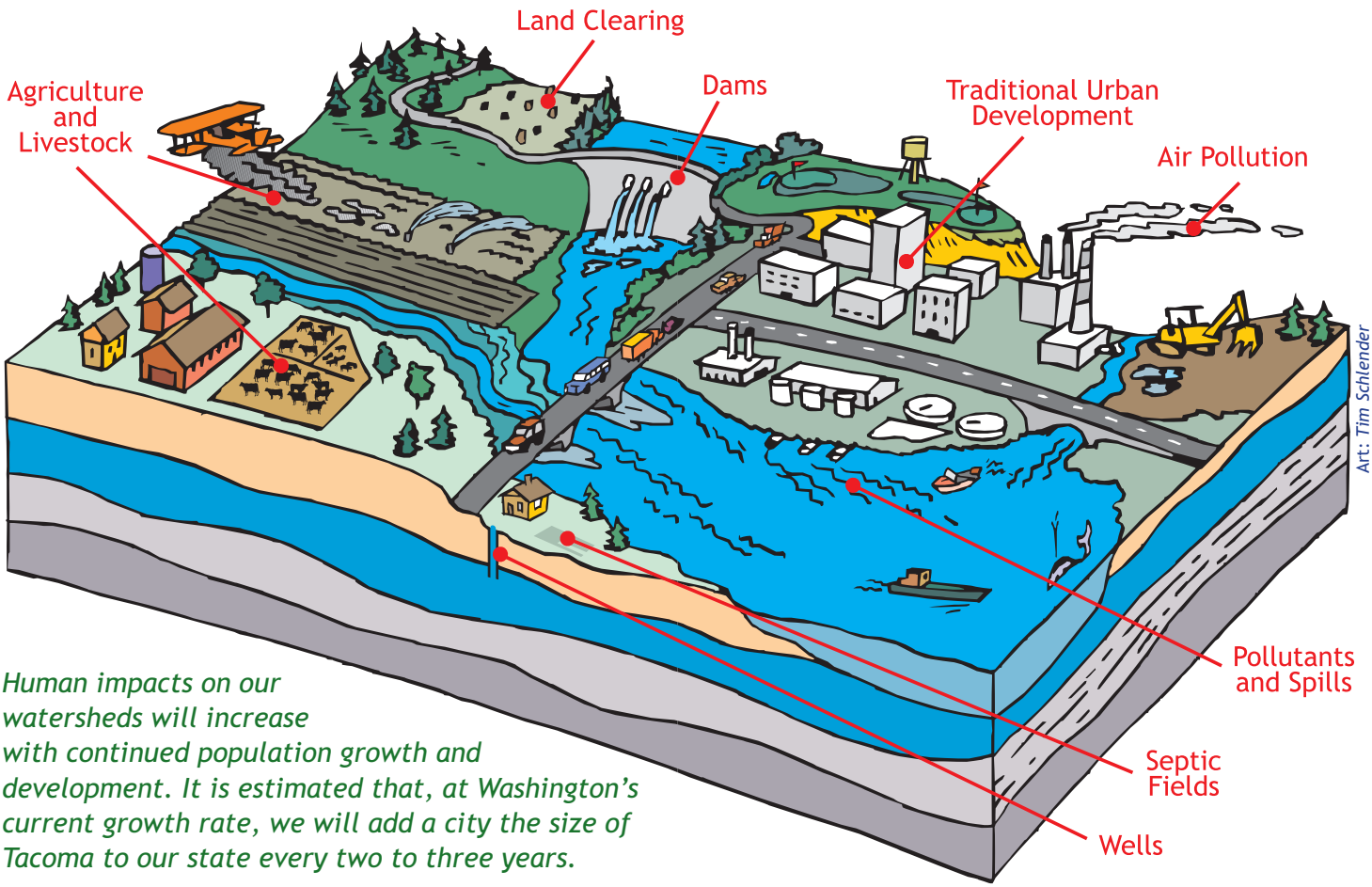
Increased population and increased pollution go hand-in-hand. In urban areas, stormwater runoff is the Number 1 water pollution problem. Developing land typically creates changes in the natural water patterns of an area. As more surfaces can't absorb water, polluted runoff from rain or snowfall carries oil, fertilizers, pesticides, trash and pet waste into lakes, streams and the Puget Sound. Bacteria from failing septic systems are released into the earth. Our waters, both on the surface and underground, become contaminated.

Despite occasional high-snowfall years, such as the winter of 2007-08, global warming and climate change are shrinking snow packs and lengthening droughts. Increasingly, Washington lacks water where and when it is needed for communities and the environment.



Art: *Tim Schlender*

Water cycles continuously through a watershed, sustaining life as we know it. As water moves across and under the land from the highest to lowest point in a watershed, it picks up everything it touches along the way. Thus, everybody "lives downstream."



Art: *Tim Schlender*

Human impacts on our watersheds will increase with continued population growth and development. It is estimated that, at Washington's current growth rate, we will add a city the size of Tacoma to our state every two to three years.

"Small" matters.

The good news? Even small actions contribute to a healthy watershed.

Turning off the water when you brush your teeth saves as much as three gallons of water each time! Conserving water leaves more water in the watershed to support natural processes and meet future needs. What's good for the watershed is also good for your budget: Using less hot water reduces your energy bills; and less water use lowers your water bill.

Other actions you can take include driving less, cleaning up after your pets, and being smart about your use of pesticides and fertilizers.

These simple steps make a difference, and the more of us who take them, the healthier our watersheds will be.

Just as there are many ways you can have a positive impact, poor choices have the opposite effect.

Like a set of dominos, what you do to the watershed at one point will eventually affect everything else.

Organic materials make up over half of the solid waste generated in Washington. By composting, we can transform "wastes" such as yard debris and food scraps into valuable products. For example, compost can be applied to lawns and gardens to build soil health and replenish nutrients. Composting also means less garbage in our landfills.

Washington's Watershed Communities Roll Up Their Sleeves

Our watersheds have many challenges. Your neighbors and friends are already working to protect and restore the health of their watersheds. Here are a few of the important efforts being made across the state.

Alpowa Creek:

benefiting agriculture and wildlife by better stream health

Alpowa Creek in southeastern Washington supports wheat, barley, and cattle, as well as steelhead trout and other wildlife. Yet, before 2001, erosion, flooding, and high levels of bacteria from animal waste and failing septic systems threatened the health and productivity of this area.

In response, the local landowners, Pomeroy Conservation District, and Natural Resource Conservation Service have been working together to restore stream-side habitat and water quality. To prevent damage by grazing livestock, they've fenced the creek and created off-stream water sources for cattle. By planting native trees and shrubs, they've reduced erosion, provided shade, and improved habitat.

Recent monitoring shows lower bacteria levels; and livestock owners say the new watering sites better distribute animals across their range, so grasses do better, animals are healthier, and landowners save money on supplemental feed. The partners are now extending their efforts to other streams in Garfield County.

Before 2001: *Erosion, flooding and high bacteria levels threatened the health of Alpowa Creek.*

Today: *Alpowa Creek stream-side habitat is restored as cattle use off-stream water sources.*

Photo: *The Green Zone*

"Grass grid pavers," which replace traditional cement walks, and drought-tolerant landscaping are both part of Spokane's Green Zone environmental learning center.

The Green Zone:

demonstrating better options for building & landscaping

Spokane's Green Zone has served as an environmental learning center since its debut at the Spokane Interstate Fair in 1996. Here, you can wander through indoor and outdoor exhibits exploring sustainable choices for building, landscaping, and daily living. Students come here for field trips, and visitors participate in hands-on workshops to learn how to install everything from drought-tolerant landscaping to recycled-content building materials.

Exhibits also let visitors see how materials perform. The "grass grid pavers," for example, reduce runoff by allowing more rain to drain through patios and walkways, lessening flooding and water pollution. The use of such materials can help sustain the quality and quantity of ground water beneath the urban landscape—no small matter in Spokane, where residents live directly over the aquifer that supplies drinking water to more than 600,000 people.

The Green Zone is a non-profit Washington state corporation, and its board of directors partners with the Spokane County Conservation District, WSU/Spokane County Extension, Master Gardeners and Master Composters. It also receives support from area businesses and agencies.

http://www.thegreenzone.org/

Nisqually River Basin:

exceptional collaboration leads to exceptional watershed health

Flowing from Mount Rainier to Nisqually National Wildlife Refuge, the Nisqually River crosses a diverse landscape before entering Puget Sound. It supports salmon runs and wildlife habitat, along with a range of human activities, from farming to recreation to hydropower generation. Thanks to the ongoing efforts of the Nisqually River Council and its community partners and supporters, the Nisqually River is one of the healthiest in Puget Sound. It's also a model for collaborative, voluntary stewardship.

Interest in a management plan for the river began more than 20 years ago, and resulted in a 1985 legislative order prompting the Department of Ecology to set up a planning task force. Government agencies, area businesses, the Nisqually Indian Tribe, and interested citizens came together to produce a plan, and the Nisqually River Council was formed to implement it. The Council and the community have accomplished a lot since then. Their projects include restoring the estuary, conserving forest lands and habitat, initiating salmon recovery efforts, and creating Nisqually-Mashel State Park.

The watershed community has met the key goals of the first plan; they're now working to implement a new plan for the health of the entire watershed.

The success of the first plan and the development of the next step — the Nisqually Watershed Stewardship Plan — demonstrate the advantages of cooperative stewardship. Long-term commitment and monthly meetings have built trust between partners, allowing them to anticipate challenges and find solutions that effectively balance the needs of the community, the economy, and the environment. *http://www.nisquallyriver.org/*

The ongoing efforts of the Nisqually River Council and its community partners and supporters have made the Nisqually River one of the healthiest in Puget Sound.

Wetlands

Beautiful and diverse, wetlands are the vital link between land and water and are essential to the health of both. Wetlands are found throughout the state in all shapes and sizes, next to bodies of water or in isolation. Our wetlands provide flood control, recharge aquifers, filter and purify water, control erosion, and provide wildlife habitat. They're also great spots for bird watching, nature photography, and other recreation.

But there's bad news. Each year, the United States loses about 60,000 acres of wetlands—along with all the benefits they provide. More than half of America's original wetlands have already been destroyed.

For more information, and to find out what you can do to preserve this precious natural resource:
> http://www.ecy.wa.gov/programs/sea/wetlands/index.html
> http://www.epa.gov/OWOW/wetlands

Photo: *Dan Kowlaski*

Jimmycomelately Creek:
restoring a watershed

Flowing north from the Olympic Peninsula into Sequim Bay, Jimmycomelately Creek is making a comeback thanks to the determined efforts of a partnership including the Jamestown S'Klallam Tribe, the Washington Departments of Fish & Wildlife and Transportation, Clallam County, Clallam Conservation District, and 22 others.

More than a century of development had straightened the creek, drained and filled wetlands, and degraded habitat. By the 1990s, the impacts were acute, including severe flooding and declining numbers of summer chum salmon: In 1999, only seven of this threatened species returned to the creek to spawn.

With help from landowners, government agencies, and consultants, the partners secured funding to restore the creek. The work took over four years to complete and included reconstruction of a half-mile section of the creek channel. Jimmycomelately now meanders across the landscape into the bay, where the estuary has also been restored. A culvert under Highway 101 was replaced with a bridge to accommodate flood flows and improve passage for fish and wildlife. The project addressed water quality concerns by cleaning up petroleum-contaminated soil and creosote-treated pilings.

Monitoring will continue through 2014, but so far, Jimmycomelately shows every sign of again becoming a fully functioning watershed. The number of salmon returning to the creek to spawn has risen dramatically, and the creek and tidal areas offer greatly improved habitat for fish, shellfish, and birds. Native plants are voluntarily returning to some parts of the estuary, and flooding appears to have been successfully addressed.
http://www.jamestowntribe.org/jstweb_2007/programs/nrs/nrs_jimmy.htm

Before 2001: *More than a century of development had straightened Jimmycomelately Creek, destroyed wetlands and degraded habitat.*

Photos: *Jamestown S'Klallam Tribe*

Today: *Restoration efforts are helping bring the area back to a fully functioning watershed. The Creek now meanders across the landscape into the bay.*

Friends of the Trail:
cleaning up our environment, one site at a time

Wade and Tania Holden of North Bend show what a difference two people can make to watershed health. Concerned about illegal dumping, they formed Friends of the Trail in 1996 and have been working ever since to clean up our public lands and waterways.

Illegal dumping is ugly and hazardous to human health and wildlife. Since Friends of the Trail formed, they've mobilized some 2,000 people to clean up more than 1,700 tons of trash — and that's not counting all the appliances, abandoned vehicles, and tires they've removed. Wade coordinates the fieldwork and ensures that toxic materials are handled properly and recyclables sent to the right facilities. Tania focuses on obtaining the necessary funding.

With ongoing support from King and Snohomish counties, REI, the U.S. Forest Service, and others, Friends of the Trail has expanded beyond King County and now organizes cleanup activities across the state.
http://www.friendsofthetrail.org/

Friends of the Trail (FOT) volunteer with a trailer house dumped in the Middle Fork Snoqualmie River. This is one of hundreds of illegal dump sites cleaned up by FOT volunteers.

Photo: *Friends of the Trail*

Thomason Creek Adoption Project:

students give a creek a new lease on life

Thomason Creek in northeastern Washington is healthier thanks to Chewelah School District students and teachers, the Stevens County Conservation District, and volunteers.

A large section of the creek was overgrown with invasive weeds such as watercress. These clogged the stream and changed water conditions so the creek was less able to support healthy fish and insects.

As part of a Jenkins High School science project in 2002, students spent two days harvesting watercress. In 2003, a Gess Elementary School teacher worked with the conservation district to initiate a stream adoption program. Classroom lessons were combined with fieldwork to teach elementary and high school students about stream ecology and water quality. From 2005 to 2007, students removed more than 12 tons of wet weeds and muck from the creek. They also monitored results. Their work made the stream less sluggish, reduced the weed grow-back rate, and improved the quality of the water. The school district is now seeking grants to continue their watershed field studies.

Before 2007: *Thomason Creek was overgrown with invasive weeds. Local elementary and high school students removed more than 12 tons of wet weeds and muck.*

Today: *The creek is flowing better, with a reduced weed grow-back rate and improved water quality.*

Photos: *Stevens County Conservation District*

Photo: *Kelly Jenkins*

The health of the Columbia River is important to the people and economy of Washington.

SEH America, Inc.:

protecting watershed health is good business

SEH America, Inc. in Vancouver is a major manufacturer of the silicon wafers used to make computer chips. As a voluntary participant in the U.S. Environmental Protection Agency's National Environmental Performance Track program, the company demonstrates that protecting watershed health is good business.

Having set rigorous environmental goals, SEH America has taken great strides to meet them. By changing its manufacturing processes, the company reduced its use of manufacturing chemicals. The facility once produced 270,000 pounds of chromium wastewater per year; now that number is *zero*. Isopropyl alcohol is also being phased out, and has been reduced by 200,000 pounds per year. These efforts are helping improve the health of the Columbia River.

The company conserves water by collecting and reusing high-purity waste water. It also recycles metal, paper, and cardboard. With Clark County, SEH sponsors an annual household hazardous waste collection day.

Among the economic benefits of these efforts, the company cites lower municipal waste bills and improved employee and public safety.

The Lower Yakima River Watershed:
working together to improve water quality

The Lower Yakima River Basin in south-central Washington is one of the most intensively irrigated areas in the U.S.

Before 1996, irrigation washed some 300 tons of pesticide-contaminated soil into the river every day during the irrigation season. The river's DDT levels were among the highest in the country: Although banned in 1972 because of its toxic effects on wildlife, this pesticide lingers in soil and so continued to enter the water. In 1993, people were advised against eating fish from the river. The lower Yakima had become so polluted, it was placed on the state's list of impaired waters.

Thanks to the efforts of farmers and irrigation districts, the Yakima is changing for the better. The Sunnyside Valley and Roza irrigation districts formed a partnership to ensure that irrigators meet water quality goals. Conservation districts are helping irrigators improve their irrigation methods.

Monitoring in 2003 revealed dramatic progress: The amount of soil entering the river was reduced by more than 50 percent; water quality overall improved by nearly 80 percent. The benefits are extensive. Cleaner water is better for fish, wildlife, and human health. By switching to drip and sprinkler irrigation systems, farmers retain more top soil, use less pesticide, and distribute water more efficiently, thus saving both money and valuable resources.

The efforts of irrigation districts, farmers and landowners, government agencies, and the Yakama Nation are ongoing, and monitoring of the river's health continues.

Photo: *USDA NRCS*

Salmon and other fish are indicators of the vitality of our river ecosystems. Basic requirements for salmon spawning, rearing and migration include adequate amounts of cool, clean water, and sufficient food, cover and refuge from predators. Salmon and related fisheries are important to our state's economic base and cultural identity, and hold particular significance for northwest Indian tribes.

Before 2003: *Topsoil and pesticides flow from the Sulfur Creek drain into the Lower Yakima River.*

Today: *Thanks to the efforts of farmers and irrigation districts, the river is changing for the better. Monitoring shows water quality has improved by nearly 80 percent.*

How healthy is your watershed?

Take a minute to review this checklist and assess the health of your watershed. If you can answer "yes" to most or all of these, congratulations! If you don't know, or answered "no" to any of these questions, it is time to learn more about your watershed and get involved with protecting and improving it. A Watershed Pledge campaign is a great way to start (see next page). Refer to our list of resources for many more ideas and opportunities.

Yes No Don't Know

☐☐☐ *The water from my tap is clean enough to drink.*

☐☐☐ *There is enough clean water year-round for people, salmon and the natural environment.*

☐☐☐ *The indoor and outdoor air is healthy to breathe.*

☐☐☐ *There are sustainable, non-polluting energy sources to meet our needs both today and into the future.*

☐☐☐ *There is an abundance of locally grown food, and it is safe to eat.*

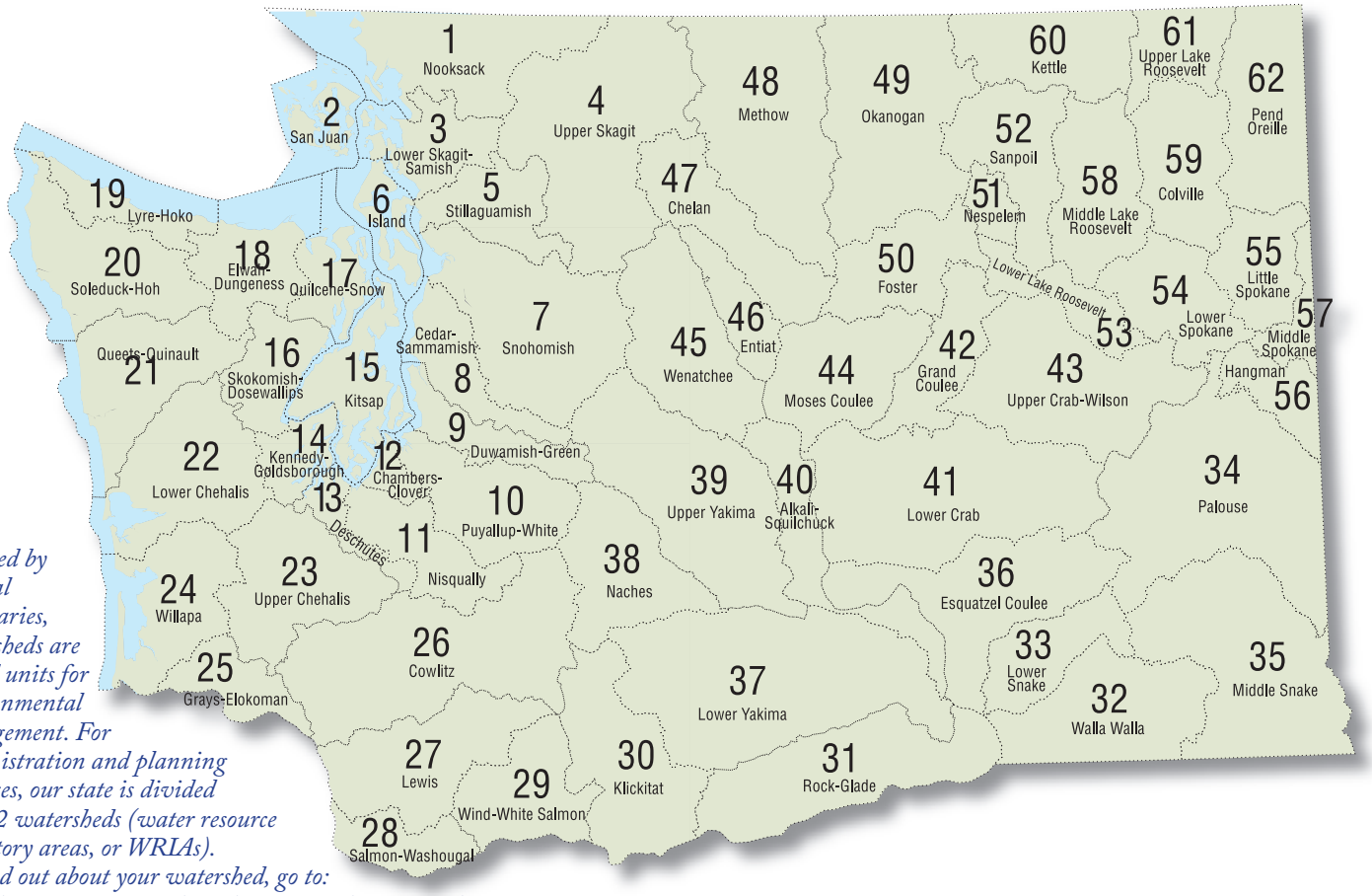
☐☐☐ *There are effective programs for reducing and managing garbage and trash (for example, recycling).*

☐☐☐ *There are effective programs for reducing, cleaning up and managing hazardous wastes (for example, collection sites for used motor oil and household cleaners).*

☐☐☐ *Our wetlands and shorelines are healthy and doing the jobs they are supposed to.*

☐☐☐ *Our watershed supports healthy populations of plant and animal life.*

☐☐☐ *Our community values are environmentally sustainable (for example, your community supports water conservation and public transportation efforts).*



Defined by natural boundaries, watersheds are logical units for environmental management. For administration and planning purposes, our state is divided into 62 watersheds (water resource inventory areas, or WRIAs). To find out about your watershed, go to: http://www.ecy.wa.gov/apps/watersheds/wriapages/index.html.

Now it's your turn!

"Small" matters: even small actions can improve the health of your watershed.

Find out about activities in your watershed:

- County Web sites and offices
- Conservation Districts: *http://www.scc.wa.gov/* 360.407.6200
- Washington State University Extension offices: *http://ext.wsu.edu/locations/* 509.335.2837
- Ecology watershed planning: *http://www.ecy.wa.gov/apps/watersheds/wriapages/index.html* 360.407.6548
- Environmental Protection Agency: *http://www.epa.gov/adopt/*

Washington Waters - Ours to Protect

The Department of Ecology, along with local, state and federal agencies, is encouraging people to make simple changes to help protect Washington waters from pollution. We are focusing our water campaign on the following areas:

- Septic systems
- Yard care
- Dog waste
- Manure management on small farms
- Recreational boating spills.

Watershed Pledges

A number of Washington communities have adopted "watershed pledge" programs to help improve the condition of their watersheds, one person at a time. Through these programs, individuals learn about their watershed and can commit to protecting the environment by pledging to change their daily routines.

Check out existing pledges for ideas on what you can do around your home and yard—and consider starting a pledge campaign in your neighborhood! Here are some examples of local campaigns:

- **Hood Canal Watershed Pledge:** *http://mason.wsu.edu/WaterQual/Hood%20Canal%20Pledge.pdf*
- **Liberty Lake Watershed Pledge:** *http://207.88.115.227/watershedpledge/index.htm*
- **Walla Walla Backyard Streamteam Pledge:** *http://www.wallawallawatershed.org/streamteam.html*
- **Whatcom Watersheds Pledge:** http://www.watershedpledge.org/
  > Residential Pledge: *http://www.watershedpledge.org/pledges/respledge.htm*
  > Business Pledge: *http://www.watershedpledge.org/pledges/bizpledge.htm*

Stormwater pollution

Did you know stormwater runoff is damaging salmon habitat, and causes and contributes to flooding? It is the Number 1 water pollution problem in the urban areas of our state.

"*Protecting Washington's waters from stormwater pollution*" is an eight-page color brochure from Ecology, illustrating the problems associated with stormwater and what can be done to help fight the problem. Read it online at *http://www.ecy.wa.gov/biblio/0710058.html*. (Publication #07-10-058.)

Sustaining our remaining wetlands

"*Sustaining our remaining wetlands for people, fish and wildlife*" is an Ecology publication which looks at the important role of wetlands, and the legal requirements for mitigation when land is converted to roads and commercial and residential expansion. Compensating for building impacts will help wetlands continue to do their vital work for the people and environment of Washington. Read it online at *http://www.ecy.wa.gov/biblio/0601009.html*. (Publication #06-01-009.)

Volunteers cleaning up Golden Gardens Park in Seattle.

Photo: *Friends of the Trail*

Healthy Watersheds, Healthy People: *Resource List*

General information

- Center for Watershed Protection
  http://www.cwp.org/
- Governor's Salmon Recovery Office
  http://www.governor.wa.gov/gsro/default.asp
- Puget Sound Partnership
  http://www.psp.wa.gov/
- Toxic-Free Legacy Coalition
  http://www.toxicfreelegacy.org/index.html
- University of Washington
  > The Water Center:
  http://water.washington.edu/
  > Washington NatureMapping Program:
  http://depts.washington.edu/natmap/
- U.S. Environmental Protection Agency
  > Find Your Watershed:
  http://cfpub.epa.gov/surf/locate/index.cfm
  > How to get involved in restoring and protecting your watershed: Adopt Your Watershed Campaign:
  http://www.epa.gov/adopt/
- USGS Washington Water Science Center
  http://wa.water.usgs.gov/
- Washington Organic Recycling Council
  http://www.compostwashington.org/
- Washington Shore Stewards
  http://www.shorestewards.org/

Picking up after your dog is one of the many small actions that will help keep our waters clean.

"Bike Your Watershed" events are a great way to get to know your watershed up-close.

- Washington State Department of Ecology
  > Home page: *http://www.ecy.wa.gov/*
  > Climate Change: *http://www.ecy.wa.gov/climatechange/index.htm*
  > Governor's Award for Pollution Prevention and Sustainable Practices:
  http://www.ecy.wa.gov/programs/hwtr/GovAward/index.html
  > Waste Reduction Program:
  http://www.ecy.wa.gov/beyondwaste
  > Watershed Information:
  http://www.ecy.wa.gov/apps/watersheds/wriapages/index.html
- Washington State Department of Health Office of Drinking Water:
  http://www.doh.wa.gov/ehp/dw/default.htm
- Washington State Department of Transportation Watershed Management:
  http://www.wsdot.wa.gov/Environment/Watershed/default.htm
- Washington State University
  > Master Gardeners:
  http://mastergardener.wsu.edu/
  > Washington's Water:
  http://wawater.wsu.edu/
  > The Water Center:
  http://depts.washington.edu/cuwrm
- Washington Toxics Coalition
  http://www.watoxics.org/
- Water Education for Teachers: Project WET
  http://www.projectwet.org/

Things you can do

- 1-800-RECYCLE
  http://1800recycle.wa.gov/
- Earth Day Network
  http://ww2.earthday.net/
- Environmental Protection Agency
  http://www.epa.gov/water/citizen/thingstodo.html
- King County
  http://dnr.metrokc.gov/WTD/community/thingstodo.htm
- Partnership for Water Conservation
  http://www.bewatersmart.net/conservationtips_home.html
- Washington State Department of Ecology
  Enviro-Tips: http://www.ecy.wa.gov/news/envirotips/tips_main.htm

Local examples

- Bike the Deschutes
  http://web.mac.com/bikeyourwatershed/Site/Welcome.html
- King County Watersheds
  http://dnr.metrokc.gov/wlr/watersheds.htm
- Lands Council (Spokane River)
  http://www.landscouncil.org/water/river_toxics.asp
- Thurston Stream Team
  http://www.co.thurston.wa.us/wwm/Stream%20Team/stream_team.htm
- Spokane Aquifer
  http://www.spokaneaquifer.org/kids/index.htm
- Vancouver Water Resources Education Center
  http://www.cityofvancouver.us/watercenter.asp?menuid=10466&submenuID=26863
- WSU Clark County Extension: Watershed Stewards
  http://clark.wsu.edu/volunteer/ws/

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Photo: Paul Collins

The opportunity to hike in scenic areas like Lake of the Angels contributes to the quality of life in Washington State.

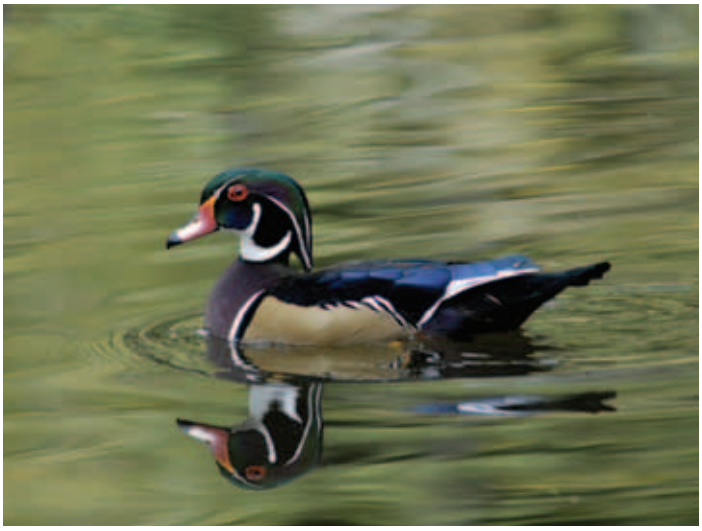

Photo: Brian Walsh

Healthy watersheds support beautiful wildlife like this Wood Duck.

State fish biologist measuring stream flow levels. The data collected will help protect our streams.

Appendix D
Guidance for UIC Wells that Manage Stormwater

Guidance for UIC Wells that Manage Stormwater

December 2006
Publication Number 05-10-067

Guidance for UIC Wells that Manage Stormwater

Prepared by:

Washington State Department of Ecology
Water Quality Program

December 2006
Publication Number 05-10-067

You can print or download this document from our Web site at:
http://www.ecy.wa.gov/biblio/0510067.html

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Olympia, WA 98504-7600

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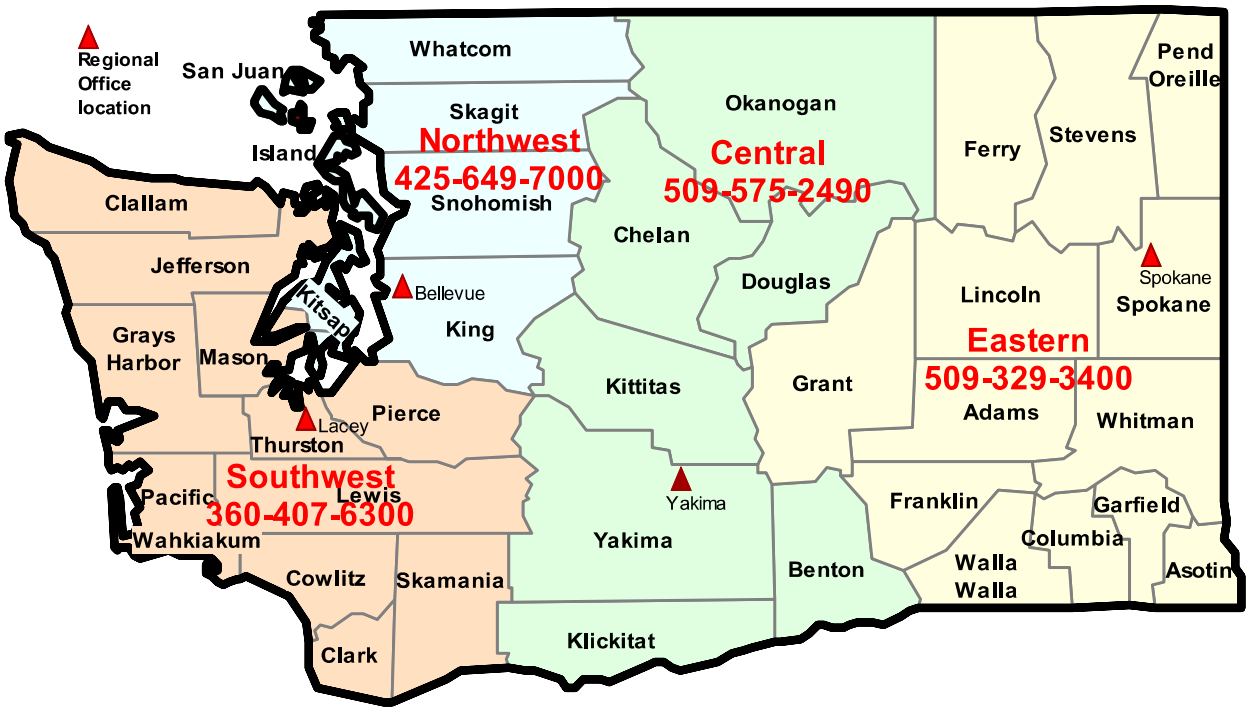

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Table of Contents

Acknowledgements

Ecology would like to thank the following people who contributed their valuable commitment of time and energy in helping develop, review, and shape the contents of this document.

Nancy Aldrich, City of Richland
Mike Barbar, Washington State University
Tony Barrett, Department of Ecology
Susan Braley, Department of Ecology
Gary Beeman, Washington Department of Transportation, South Central Region
Brad Bogus, Kennedy/Jenks Consulting
Michele Brich, Home Builders Association of Tri-Cities
Mike Brunfelt, Inter-Fluve
Doug Busko, David Evans
Paula Cox, Chelan County
Karen Dinicola, Department of Ecology
Mark Ewbank, Herrera Environmental
Rick Frye, Department of Ecology
Don Gatchalian, Yakima County
Jocelyne Gray, JUB Engineers
Steve Hansen, City of Spokane
Jim Harakas, Geo Engineers
John Heinley, Washington Dept. of Transportation
Mike Hepp, Department of Ecology, Eastern Region
Paul Hill, U Fix It Honda
John Hohman, City of Spokane Valley
Heather Kibbey, Pierce County
Steve King, City of Wenatchee
Dave Kliewer, JUB Engineers
John Knutson, Otak
Greg Lahti, Washington Dept. of Transportation, Eastern Region
Arthur Lee, Tetra Tech, KCM
Sandra Levey, Grant County
Kevin Lindsay, Kennedy/Jenks Consultants
Colleen Little, Spokane County
Ryan Lyyski, City of Ellensburg
Gloria Mantz, Spokane County
Khalid Marcus, Yakima County
Ann McDonald, URS Corp.
Stan Miller
Bill Moore, Department of Ecology
Dave Moss, Tetra Tech/KCM
Laurie Morgan, Department of Ecology
Gary Nelson, City of Spokane
Heather Ostenson, RH2 Engineering

Larry Pearson, County Road Administration Board
Bill Peacock, City of Spokane
Wayne Peterson, Department of Ecology, Eastern Region
Don Phelps, AAA Auto Wrecking & Sales Inc.
Steve Plummer, City of Kennewick
Mitch Reister, Washington Department of Transportation
Bill Rice, Otak
Bill Rickard, City of Spokane
Tony Righellis, Harper Houf Righellis
Mel Schaefer, MGS Engineering Consultants
Mary Shaleen Hansen, Department of Ecology
Brett Sheffield, City of Yakima
Brenda Simms, Spokane County
Gary Smith, Independent Business Association
Jim St. John, David Evans and Associates
Rod Thompson, Department of Ecology
Steve Worley, City of Spokane Valley
Matt Zarecor, Spokane County

Chapter 1 – Introduction and Background

This document provides technical guidance for stormwater wells regulated under the Underground Injection Control (UIC) program. For convenience, we will refer to these as UIC wells. UIC wells that are used for stormwater are also commonly referred to as drywells.

The purpose of this document is to provide design and pretreatment best management practices (BMPs) for UIC wells used along roads, parking areas and also roof runoff and built on or after February 3, 2006. These UIC wells are referred to as "new" UIC wells.

The UIC rule, Chapter 173-218 WAC, requires a well assessment for UIC wells that were constructed prior to February 3, 2006. These UIC wells are referred to as "existing" UIC wells. This document can also be used to complete the well assessment for existing wells.

Stormwater

Stormwater is the water from rainstorms or snow melt that runs over land into ponds, lakes, streams, marine waters, wetlands, drainage ditches, evaporation ponds, and drywells.

As stormwater flows, it contacts surfaces that contain pollutants. Roads and parking lots can contribute oils and metals. Roofs on industrial buildings can collect chemicals that are vented out of the building and wash off when it rains. Grassy areas like golf courses, cemeteries, and playing fields may contribute fertilizers and pesticides.

The purpose of managing stormwater is two fold: to prevent flooding and to prevent water pollution. Drainage systems are designed to collect and transport stormwater runoff to prevent flooding, and treatment systems are designed to control pollution. Managing stormwater at the site, such as by using a UIC well, can also contribute to the recharge of ground water resources.

For chemicals that are not easy to remove from stormwater, pollution control means going to the source and preventing it from contacting stormwater in the first place. The methods of preventing stormwater pollution are referred to as "best management practices."

UIC Program

The Underground Injection Control program was created by Congress to protect underground sources of drinking water from discharges of fluids to the ground. The UIC program in the state of Washington is administered by the Department of Ecology. In 1984, the Department of Ecology adopted Chapter 173-218 WAC - Underground Injection Control to implement the program.

In Washington all ground water is protected equally under RCW 90.48 and Chapter 173-200 WAC Water Quality Standards for Ground Waters of the State of Washington.

The two basic requirements of the UIC Program are:

- Register UIC wells with the Washington State Department of Ecology unless the wells are located on tribal land. (Those wells should be registered with the Environmental Protection Agency).
- Make sure that current and future underground sources of ground water are not endangered by pollutants in the discharge (non-endangerment standard).

Since stormwater picks up contaminants as it runs over the land surface, it can pollute ground water once infiltration occurs.

Pollution of ground water from stormwater discharges can be prevented by careful design of the UIC well, strategic siting and effective operation and maintenance. Pollution can also be prevented by use of treatment before discharge to the sub-surface and by reducing the stormwater contact with potential sources of contamination. These methods are covered in this technical guidance.

1.1 Development of this technical guidance

The UIC rule was revised in consultation with the UIC Rule Advisory Committee. The UIC rule was adopted and became effective on February 3, 2006. A subcommittee of the Stormwater Management Manual for Eastern Washington committee developed the draft version of this document with statewide stakeholder input and public review. This document was originally published as interim technical guidance in Ecology Publication Number 04-10-076, the *Stormwater Management Manual for Eastern Washington*.

This guidance replaces the section in the Department of Ecology *Stormwater Management Manual for Eastern Washington (SMMEW)*, Section 5.6 that refers to UIC wells; however, the rest of the manual applies.

When using this document, please refer also to the Ecology stormwater management manuals for eastern and western Washington or an equivalent department approved manual. An example of an equivalent manual is the Washington State Department of Transportation Highway Runoff Manual:
http://www.wsdot.wa.gov/fasc/EngineeringPublications/Manuals/HighwayRunoffManual.pdf

1.2 Definition of a UIC well

A UIC well is a manmade subsurface fluid distribution system designed to discharge fluids into the ground and consists of an assemblage of perforated pipes, drain tiles, or other similar mechanisms, or a dug hole that is deeper than the largest surface dimension (WAC 173-218-030).

Subsurface infiltration systems include drywells, pipe or French drains, drain fields, and other similar devices that are used to discharge stormwater directly into the ground.

Drywells are UIC wells completed above the water table so that the bottom and sides are typically dry except when receiving fluids. Drywells may be stand-alone or as part of a larger drainage system, such as the overflow for a bio-infiltration swale or other stormwater treatment BMP.

Infiltration trenches with perforated pipe are considered to be UIC wells. This type of infiltration trench must be registered with Ecology. However, they must be designed, constructed, operated, and maintained according to an Ecology stormwater manual or another equivalent department approved manual to be rule authorized. This guidance does not apply except for the registration requirement.

Typical UIC stormwater wells (drywells)

The following are not UIC wells; therefore, this guidance does not apply:

- Buried pipe and/or tile networks that serve to collect water and discharge that water to a conveyance system or to surface water.
- Surface infiltration basins and flow dispersion stormwater infiltration facilities.
- Infiltration trenches designed **without** perforated pipe or a similar mechanism.

Chapter 2 – How UIC Stormwater Wells are Regulated

2.1 Using a UIC well for stormwater

This guidance document applies to UIC wells that receive stormwater from roads, parking areas and also roof runoff.

A UIC well may be used to manage stormwater when pollutant concentrations that reach ground water are not expected to exceed Washington State ground water quality standards (Chapter 173-200 WAC). This guidance document describes conditions and requirements that are expected to result in meeting these standards.

UIC wells may be used for overflow from a stormwater facility that is greater than the runoff treatment design storm without further treatment.

2.2 Prohibitions

Stormwater from the areas listed below **may not** be discharged to UIC wells because of the potential to contaminate ground water unless authorized under a permit. Conventional stormwater treatment is not considered protective of ground water in these situations.

Stormwater from these areas must be handled on site with a closed-loop system or discharged to the sanitary sewer if allowed by the local jurisdiction.

> *The term "area" used here refers to a specific physical portion of an industrial or business facility where the activities occur. Stormwater from other portions of the site that do not contact the areas listed below, such as roofs and parking areas, may be discharged to UIC wells. The requirements for roofs and parking areas described elsewhere in this document must be met.*

See 173-218-040(5)(b) for a list of examples of prohibited UIC wells. UIC wells may not receive stormwater from the following types of areas:

- Vehicle maintenance, repair and service.
- Commercial or fleet vehicle washing.
- Airport de-icing activities.
- Storage of treated lumber.
- Storage or handling of hazardous materials.
- Generation, storage, transfer, treatment or disposal of hazardous wastes.
- Handling of radioactive materials.
- Recycling facilities, except for those that recycle only glass, paper, plastic, or cardboard.

- Industrial or commercial areas that have outdoor processing, handling, or storage of raw solid materials or finished products at the facility and are without management plans for proper storage and spill prevention, control, and containment appropriate to the types of materials handled at the facility (see the Ecology stormwater management manuals for information on stormwater pollution prevention plans and source control).
- UIC wells may not be used at contaminated sites when the stormwater would increase the mobility of the contaminants at the site. For example, a drywell could not be used up gradient of or over the contaminant plume at a leaking underground storage tank site. This is because the stormwater could increase the movement of the contaminants.

2.3 Rule-authorization or permit

UIC wells must either be rule-authorized or covered by a state waste discharge permit to operate. If a UIC well is rule-authorized, a permit is not required. Rule-authorization can be rescinded if a UIC well no longer meets the non-endangerment standard. Ecology can also require corrective action or closure of a UIC well that is not in compliance.

A UIC well may be rule-authorized when both of the following requirements are met:

1. A registration form must be submitted to the Department of Ecology.
2. Discharge from the UIC must not contaminate ground water. This is the "non-endangerment performance standard."

The requirements to meet the non-endangerment standard are detailed in this guidance document.

2.4 Registration

Residential UIC wells used for roof runoff or basement flooding control are exempt from the registration requirement. All other UIC wells must be registered.

The registration form can be found at the Ecology Web site at http://www.ecy.wa.gov/programs/wq/grndwtr/uic/index.html.

UIC wells constructed on or **after** February 3, 2006 are considered to be new. The registration provides the department with information needed to determine if the new UIC well meets the conditions to be rule-authorized.

- The registration form must be submitted prior to construction.
- The non-endangerment standard must be met (see the next section).

UIC wells constructed **prior** to February 3, 2006, are considered to be "existing."

- Owners of 50 wells or fewer must register their wells by February 3, 2009, and complete their well assessment by February 3, 2011.
- Owners of more than 50 wells must register their wells by February 3, 2011, and complete their well assessment by February 3, 2013.

See section 2.6 and Chapter 173-218-090(2) WAC for more on well assessments.

2.5 Meeting the non-endangerment standard for new wells

The Department of Ecology makes the decision that a UIC well is either rule-authorized or needs a permit based on whether the UIC well meets the non-endangerment standard.

There are two ways for a registrant of a new UIC well to show that the well meets the non-endangerment standard and therefore, isn't required to have an individual permit.

- One way is to follow the requirements in this technical guidance. The Department of Ecology will *presume* that the UIC well meets the non-endangerment standard and the well will be rule-authorized. This is called the *presumptive approach*.
- The other way is for the registrant to *demonstrate* that the non-endangerment standard has been met in some other way. This is called the *demonstrative approach.* This is designed to allow alternative methods to demonstrate that the non-endangerment standard has been met and therefore the UIC well may be rule-authorized.

2.5.1 Using the presumptive approach

To be eligible for rule-authorization using the presumptive approach, the following must be addressed according to this guidance or another equivalent department approved local stormwater manual that includes the requirements in this guidance:

- The potential pollutant loading expected in the stormwater runoff.
- Source control of pollutants, especially those that are difficult to remove from stormwater by filtration, settlement, or other treatment technologies.
- Known treatment methods.
- The potential treatment capacity of the vadose zone.
- Siting.
- Design.
- Operation and maintenance.

The presumptive approach may not be used when BMPs do not exist to remove or reduce a contaminant and/or the vadose zone has no treatment capacity (WAC 173-218-090 (1) (i) (D)).

2.5.2 Using the demonstrative approach

The documentation for the demonstrative approach is a site-specific analysis that demonstrates that the proposed discharge will comply with ground water quality standards.

To be eligible for rule-authorization using the demonstrative approach, the following topic areas must be documented with the UIC well registration.

- Site-specific analysis of pollutant loading.
- Site-specific analysis of the treatment capacity of the vadose zone, if used for treatment.
- How stormwater best management practices (BMPs) were selected.
- Pollutant removal expected from the selected BMPs.
- Technical basis supporting the performance claims for the selected BMPs.
- Assessment of how the selected BMPs will comply with state ground water quality standards and satisfy state AKART requirements.

2.6 Existing UIC wells

UIC wells that were constructed *before* February 3, 2006, have different requirements than wells constructed on or after the revised rule became effective. Existing UIC wells are grandfathered in with respect to the rules that became effective on February 3, 2006.

A well assessment must be completed to determine if any of the existing UIC wells are a high threat to ground water. UIC wells that are a high threat to ground water must be retrofitted to protect ground water quality.

UIC wells constructed prior to February 3, 2006, must also be registered, if this was not previously done.

The following is the definition of a well assessment (WAC 173-218-030):

Well assessment means an evaluation of the potential risks to ground water from the use of UIC wells. A well assessment includes information such as the land use around the well which may affect the quality of the discharge and whether the UIC well is located in a ground water protection area. It may include the local geology and depth of the ground water in relation to the UIC well if the well is considered a high threat to ground water.

This technical guidance may be used as a helpful guide for the well assessment. Here is an excerpt from WAC 173-218-090(2):

"The approach to conducting the well assessment will be determined by the owner. The well assessment evaluates the potential risks to ground water from the use of UIC wells and includes information such as the land use around the well which may affect the quality of the discharge,

and whether the UIC well is located in a ground water protection area. It may include the local geology and depth of the ground water in relation to the UIC well if the well is considered a high threat to ground water. The well assessment requirements will be met if an owner or operator applies the storm water best management practices contained in a guidance document approved by the department to their UIC wells and determines if the UIC well is located in a ground water protection area."

2.6.1 Evaluating high threat to ground water for existing wells

If an existing well was built according to the specifications in this guidance it is **not** considered a high threat to ground water and does not need to be retrofitted, unless site specific information indicates that a ground water quality problem exists.

The following conditions are considered a high threat to ground water for which existing wells need retrofitting:

- UIC wells receiving prohibited discharges (see Section 2.2 Prohibitions).
- UIC wells receiving a high pollutant load where the vadose zone between the bottom of the UIC well and the top of the ground water has no treatment capacity or the vadose zone conditions are unknown, according to Tables 5.2-5.4 of this guidance.
- UIC well structures completed in ground water. If a UIC well has water in it during the dry season when it has not received any recent discharges, chances are it is sitting in ground water.

2.6.2 Preservation and maintenance projects

A preservation and maintenance project involves removing and replacing a road surface without expanding the impervious surface (*Stormwater Management Manual for Eastern Washington*, pp. 2-9).

The question is whether UIC wells involved in these types of projects are regulated as existing or new wells.

A UIC well that was in use prior to the project is considered an existing well only if it remains in place. The well may be retrofitted or reconstructed in place without being considered a new well. Otherwise, it is considered a new well, and the new UIC requirements apply.

2.6.3 Emergency situations

In emergency situations, such as roadway flooding, a jurisdiction may install a UIC well that does not meet the requirements of this guidance on a temporary basis. When weather permits, and within a year of the event, the jurisdiction should ensure that the UIC well meets the requirements of this guidance.

For example, excessive winter rainfall overwhelms the capacity of the existing drainage system along a road. The water drains onto the road and turns to ice. The jurisdiction installs a new

UIC well to fix the immediate problem and, once the weather permits, implements the required best management practices.

2.7 Requirements for municipalities with national pollutant discharge elimination system (NPDES) permits

Municipalities that are under an NPDES stormwater permit may also have stormwater discharges to UIC wells. The Stormwater Management Program required by the NPDES stormwater permit includes best management practices that also may be applied to stormwater discharges to UIC wells. To avoid duplication, municipalities that are under an NPDES stormwater permit may meet UIC program requirements by applying their Stormwater Management Program to areas served by UIC wells. See Chapter 173-218-090(1) WAC.

Since the NPDES permit does not fulfill all the requirements of the UIC Program, the following must be added to the Stormwater Management Program (SWMP) and implemented:

- UIC wells must be registered.
- New UIC wells must be constructed according to the specifications in this guidance.
- A well assessment must be completed for all existing wells.
- Existing UIC wells that are determined to be a high threat to ground water must be retrofitted.

See the previous section for timelines for registration and well assessments and also for evaluating high threats to ground water.

Chapter 3 – Siting, Design and Construction, Operation and Maintenance

The requirements in this chapter apply to UIC wells built on or after February 3, 2006.

3.1 Siting

3.1.1 Minimum siting requirements for rule-authorization under the presumptive approach

For new UIC wells, the following siting restrictions apply in order to meet the non-endangerment standard under the presumptive approach. See Chapter 2 for an explanation of the presumptive and demonstrative approaches.

- Prohibited areas: A UIC well may not be sited in prohibited areas - see Chapter 2.2 for a list of types of areas where stormwater discharges to UIC wells are prohibited.
- Soil contamination: UIC wells should not be sited where there are soil contaminants that could be transported to ground water unless the site is remediated prior to construction.
- Drinking water wells: A UIC well is a potential source of contamination and should be sited at least 100 feet away from a drinking water well or spring used for drinking water supplies (WAC 173-160-171).

3.1.2 Further siting considerations for UIC wells near drinking water wells

Stormwater infiltrated through UIC wells can contaminate ground water that supplies a drinking water well. Factors that affect the potential for contamination to occur include:

- The direction and rate of ground water flow.
- How far the proposed UIC well site is from a drinking water well.
- The vulnerability of drinking water supply wells to contamination.

A site is not suitable if the placement of the UIC well would cause a violation of Washington State ground water quality standards, WAC 173-200.

3.1.3 Local siting considerations

Check with the local jurisdiction to find out if there are further siting requirements for UIC wells. Setbacks required by local regulations, building code requirements, or other state regulations should be followed.

Local governments may have ordinances that apply to development within groundwater protection areas, such as sole source aquifers, groundwater management areas, wellhead protection areas, and in areas designated as Critical Aquifer Recharge Areas. For more information about well-head protection areas and Critical Aquifer Recharge Areas, consult with your local jurisdiction.

Whether a UIC well may be sited in a wellhead protection zone depends on local ordinances. A jurisdiction may have different requirements for the six month, one-year, five-year, and ten-year time-of-travel zones. These zones express the time it would take a contaminant in ground water to reach the well. Thus if a spill of gasoline entered the ground water within the one-year time of travel, it would show up at the well within a year.

3.1.4 Advisory on infiltration and geologic instability

The focus of the UIC program is to protect the quality of ground water. Slope stability and effects on building foundations are not a regulatory component of the program. However, because infiltration of water can cause extensive problems, this section has been included as an advisory in this guidance to alert UIC well owners to this siting concern.

Ground water is a major factor for slope failures and also can cause major problems with building foundations. Therefore, the effect of the infiltration of water from UIC wells on slope stability and building foundations should be considered when siting UIC wells. These effects should be considered for the site itself and neighboring properties.

Certain observable conditions indicate a higher potential for slope stability problems, including where there is evidence of:

- Existing slope instability, such as landslides or cracks in the ground.
- Existing hydraulic loading, such as slopes with known seeps.
- Other factors that heighten the probability of slope failure, such as the presence of a clay layer or improperly placed fill.

A qualified professional engineer or engineering geologist is needed to evaluate slope failure potential.

3.1.5 Advisory setbacks for slopes and building foundations

The following siting considerations are *advised* due to the potential effects of injecting too much water near foundations or near slopes. They are *not* meant to replace the judgment of a professional engineer, engineering geologist, or standard engineering best practices.

- Drywells should be no closer than 30 feet center to center or twice the depth, whichever is greater.
- Drywells should not be built on slopes greater than 25 percent (4:1).
- Drywells should not be placed on or above a landslide hazard area or slopes greater than 15 percent without evaluation by a professional engineer with geotechnical expertise or qualified geologist and jurisdiction approval.

- Drywells should be sited at least 100 feet up-slope and 20 feet down-slope from building foundations.
- Where a UIC well will be situated up-slope from a structure or behind the top of a slope inclined in excess of 15 percent, the minimum setback is typically equal to the height of the slope. This evaluation would need to be done by a qualified licensed professional engineer or engineering geologist.

3.2 Design and construction

3.2.1 Use an approved stormwater manual

In order to be rule-authorized under the presumptive approach, UIC wells must be designed and installed in accordance with the stormwater manual current at the time of construction.

They must also be operated in conformance with stormwater best management practices. This includes the proper selection, implementation, and maintenance of on-site pollution controls using the current stormwater manual published by the department for your region. An equivalent local manual approved by the department may be used instead (WAC 173-218-090(1) (B)).

3.2.3 Prevent clogging during construction

In order to prevent clogging, UIC wells must be protected from sediment in runoff generated during construction. See Ecology stormwater management manuals for source controls to prevent other pollutants from entering the UIC well during the construction phase of a project.

3.2.3 Stormwater runoff flow control

If a UIC well is used to meet stormwater program requirements, the combination of UIC wells and other stormwater facilities at the site must be capable of handling the water quality design runoff treatment storm volume.

The water quality design runoff treatment storm volume is the amount of runoff predicted from the 6-month, 24-hour storm. The objective is to design a facility that accommodates the runoff expected from a typical large storm event.

For UIC wells, an evaluation of the infiltration capacity is necessary to determine if the well will be able to accommodate the necessary volume of water. Infiltration rates lessen over time due to clogging, so the long-term infiltration rate under the worst-case scenario should be accommodated by the design.
The amount of time it takes for water to drain out of a UIC well depends on how fast the soil allows water to infiltrate and how much water the UIC well holds.

The *soil infiltration rate* is the amount of water that infiltrates into the ground in a specified amount of time, usually in inches per hour.

The *drawdown time* is the amount of time it takes for water to drain out of the UIC well, and depends on the construction of the well and the infiltration rate.

In most cases, facilities are designed to completely drain ponded runoff from the flow control design storm within 48 to 72 hours after flow to the UIC facility has stopped.

For stormwater flow requirements under the stormwater program, refer to the Ecology stormwater management manuals or other equivalent department approved local stormwater manuals. Local jurisdictions may also have requirements.

3.2.4 Depth to bedrock, water table, or impermeable layer

Chapter 173-218-090 WAC requires that new Class V UIC wells used for storm water management must *not* directly discharge into ground water. A separation between the bottom of the well and the top of the ground water is required. New UIC wells are those that were constructed on or after February 3, 2006.

Vertical separation for rule-authorization using the presumptive approach

The required vertical separation for rule-authorization using the presumptive approach depends on the treatment capacity of the unsaturated zone and the pollutant loading of the discharge. Chapter five of this guidance includes a method of arriving at the vertical separation and subsequent pretreatment requirements.

The *minimum* vertical separation is five feet between the base of a UIC well and the high seasonal water table, bedrock, hardpan, or other low permeability layer.

When the five-foot minimum separation cannot be met

If the vertical separation required to meet the presumptive approach cannot be met, rule-authorization may be obtained using the demonstrative approach. The demonstrative approach is described in section 2.5.2 of this document.

If the pretreatment requirements are met, a separation down to three feet may be considered if the ground water mounding analysis, the volumetric water holding capacity of the zone receiving the water, and the design of the overflow and/or bypass structures are judged by the design professional to be adequate to prevent overtopping and meet the site suitability criteria specified in this section.

3.2.5 Other advisory design considerations

- Filter fabric (geotextile) may be useful in appropriate situations to prevent sedimentation.
- Check with the local jurisdiction for outflow capacity and other requirements.

The Department of Ecology recommends a two-stage drywell for new drywell installations or when replacing an existing drywell.

3.3 Operation and maintenance

UIC wells need to be maintained in order to avoid clogging and to prevent contamination from materials that collect in the well over time. The following practices help to maintain UIC function:

- Pre-treatment for solids removal is recommended to ensure protection of long-term infiltration capacity and reduced frequency of maintenance.
- Pre-treatment will also reduce the long-term accumulation of contaminants in the vadose zone.
- Frequent inspections and regular maintenance will improve the long-term performance of the facilities.
- The removal of debris and sediment from the drywell prevents the buildup of materials that could inhibit infiltration.

Please refer to the appropriate stormwater manual for maintenance requirements for particular BMPs.

Chapter 4 - Potential Contaminants in Stormwater Runoff

Urban areas and roads may contribute to stormwater contamination. A review of available urban and road runoff data provides information about the following potential pollutants:

- **Cadmium, chromium, lead, iron, and arsenic**

Although these metals are potential pollutants of concern, most of the suspended portion of the total concentrations of these metals in urban and road runoff may be removed by settling or filtration.

This typically leaves dissolved fractions that are expected to meet state ground water quality standards, except for arsenic.

Arsenic from natural sources is known to be present at levels of concern in ground water in many areas of Washington State.

- **Copper, zinc, and total suspended solids**

Typical concentrations in urban and road runoff do not generally appear to be an issue of concern for meeting Washington State ground water quality standards.

- **Coliform bacteria and other pathogens**

Concentrations in urban and road runoff commonly exceed ground water quality standards, and may exceed the capacity of the vadose zone to remove bacteria to a level that meets standards.

Filtration and separation from ground water are considered the most effective means of removing coliform bacteria. Existing runoff treatment technologies have mixed and unreliable results in addressing this issue.

- **Oil, grease and polynuclear aromatic hydrocarbons (PAHs), and fuel additives**

Oil, grease, and PAHs are of potential concern, particularly in the event of a large spill reaching an unprotected UIC well. Fuel additives are also of concern, as they may travel great distances in ground water.

- **Pesticides and nitrates**

Pesticides and nitrates may be a concern in areas where they are intensively applied. Nitrates and pesticides that are water soluble are very difficult to remove from stormwater.

- **Chloride**

Typical concentrations of chloride in urban and road runoff do not generally appear to be an issue of concern for meeting Washington State ground water quality standards. Frequent use of road salts and other de-icers and anti-icers may result in pollutant concentrations that exceed ground water quality standards.

No runoff treatment technology currently exists to address this issue in a practical manner.

- **Phosphorus**

Typical concentrations of phosphorus in urban and road runoff do not generally appear to be an issue of concern for meeting Washington State ground water quality standards. Phosphorus in ground water may still be a concern in small lake watersheds.

Table 4.1: Common Pollutants in Stormwater and Some Potential Sources[1]

Pollutant	Potential Sources
Lead	Motor oil, transmission bearings, gasoline[2]
Zinc	Motor oil, galvanized roofing, tire wear, down spouts
Cadmium	Tire wear, metal plating, batteries
Copper	Brake linings, thrust bearings, bushings
Chromium	Metal plating, rocker arms, crank shafts, brake linings, yellow lane strip paint
Arsenic	Smelters, fossil fuel combustion, natural occurrence
Bacterial/Viral Agents	Domestic animals, septic systems, animal & manure transport
Oil & Grease	Motor vehicles, illegal disposal of used oil
Organic Toxins	Pesticides, combustion products, petroleum products, paints & preservatives, plasticizers, solvents
Sediments	Construction sites, stream channel erosion, poorly vegetated lands, slope failure, vehicular deposition
Nutrients	Sediments, fertilizers, domestic animals, septic systems, vegetative matter
Heat	Pavement runoff, loss of shading along streams
Oxygen Demanding Organics	Vegetative matter, petroleum products

[1] Adapted from a number of sources: Novotny, V. and G. Chesters, 1981. *Handbook of Nonpoint Pollution.* Van Nostrand Reinhold Company, New York, p. 322. Galvin D. and R. Moore, 1982. *Toxicants in Urban Runoff*, METRO Toxicant Program, Report #2. METRO, Seattle, pp 3-89 - 3-92. PTI Environmental Services, 1991. *Pollutants of Concern in Puget Sound. Puget Sound Estuary Program*, U.S. EPA, Seattle, pp 47-51. URS *et al*., 1988. City of Puyallup, Stormwater Management Program. Technical Memorandum WQ-1: Stormwater Quality Issues. Table 1.

[2] Although lead is no longer an additive to gasoline, it is still present in the environment in trace amounts and the remaining lead on the ground can be picked up by stormwater runoff.

Chapter 5 – Source Control, Pre-Treatment and Vadose Zone Treatment Requirements

The requirements in this chapter apply to UIC wells built on or after February 3, 2006.

Source control and treatment requirements are based on the types and quantities of pollutants expected from the proposed land use contributing storm runoff to the UIC well.

A UIC well is presumed to meet the non-endangerment standard and is rule-authorized if the guidelines in this document are followed, based on one or more of the following:

(1) Application of source control measures to control loading of pollutants that are difficult to remove from stormwater by filtration, settlement, or other treatment technologies.

(2) Application of pre-treatment to remove pollutants before stormwater is discharged into the UIC well.

(3) Availability of appropriate vadose zone treatment capacity to remove the solid phase of pollutants in stormwater by filtration and adsorption.

5.1 Source Control

Source control BMPs can significantly reduce pollutants, especially solids, and should be employed at all project sites.

Where there are no existing stormwater treatment technologies to practically address a pollutant issue, and where filtration by the vadose zone cannot provide adequate removal of pollutants, source control must be used to meet the non-endangerment standard. Certain discharges to UIC wells are prohibited (see Section 2.2).

Source control is necessary to protect ground water from pathogens, pesticides, nitrates, road salts and other anti-icers and deicers, fuel additives, many other pollutants in urban runoff, and accidental spills.

Wherever practicable, reduce the exposure of stormwater to these contaminants by one or more of the following:

- Careful attention to the product label application rates.
- Targeted product use to avoid contamination of stormwater runoff.
- Careful management of the storage and use of products.
- Separation of areas where products are used from drainage areas that discharges to a UIC well.
- Spill response planning.

Source control best management practices required to meet the non-endangerment standard may be found in:

- Chapter 8 of the *Stormwater Management Manual for Eastern Washington* (Department of Ecology Publication # 04-10-076).
- Volume IV of the *Stormwater Management Manual for Western Washington* (Department of Ecology Publication # 99-14).
- Other equivalent department approved manuals.

Contact the local jurisdiction to determine whether specific source control requirements apply to your project in addition to those methods described in Ecology stormwater management manuals for the proposed land use.

5.1.1 General guidelines for spills and illegal dumping

Spill control guidance for various land use types is contained in Ecology's stormwater manuals and is not repeated here, except for some summary information. The spill control requirements in the stormwater manuals also apply to protection of stormwater discharge to UIC wells.

For specific details on spill control requirements, see the following sources:

- Chapter 8 of the *Stormwater Management Manual for Eastern Washington*. (Department of Ecology Publication # 04-10-076)
- Volume IV of the *Stormwater Management Manual for Western Washington*. (Department of Ecology Publication # 99-14)
- Other equivalent department approved manuals.

The following information should be considered:

- UIC wells should be inspected regularly to check for unreported spills.
- All spills must be reported to the Department of Ecology. See http://www.ecy.wa.gov/programs/spills/other/reportaspill.htm or Appendix B.
- In the event that a spill occurs and spreads through the vadose zone, the owner or operator must remove and properly dispose of the contaminated soils and replace them with clean materials as soon as practicable.

> *Depths greater than 25 feet are difficult to clean up with soil removal equipment. If removal of deeper contaminated sediments is not practical, remediation and long-term ground water monitoring may be required. Spill control can help avoid the high costs and difficulties associated with cleanup.*

- Local or state authorities may prohibit the use of UIC wells subject to frequent spills or illegal dumping.

These may be areas where incidents have occurred or where there is sufficient evidence that a UIC well would be attractive to illegal dumping. For example, UIC wells at many auto parts shops, restaurants, and food processing facilities have been subject to frequent illicit discharges by customers or employees.

Designers should discuss potential problems with their clients and take care to locate UIC wells to minimize easy, unobtrusive access for illegal dumping.

5.1.2 Spill containment structures

The type of land use will determine if a spill control containment structure is required. See the stormwater manual chapter on source control for more information on spill containment structures and when they are required.

High vehicle traffic areas (see definition below), fueling stations, and other facilities where fueling activities take place, and areas where petroleum products are stored and/or transferred in amounts greater than 1,500 gallons per year, must include:

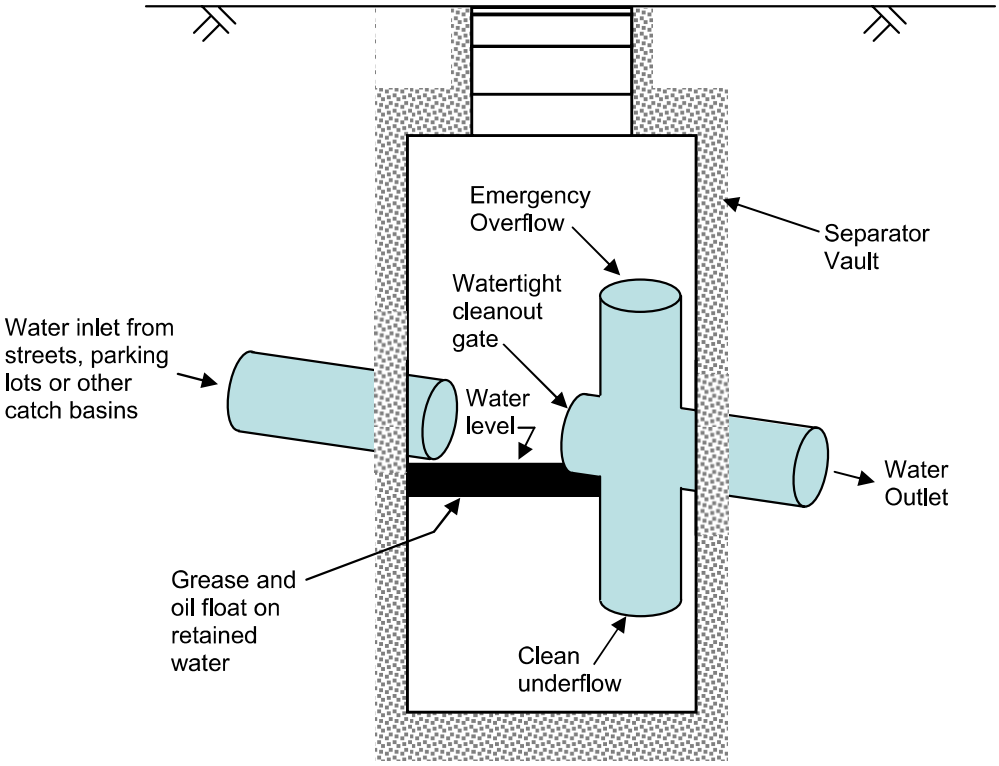
- A spill containment structure.
- A spill prevention control and containment plan (see stormwater management manual).

High vehicle traffic areas are:

- *Commercial or industrial sites subject to an expected average daily traffic count (ADT) ≥ 100 vehicles/1000 ft² gross building area (trip generation).*
- *Road intersections with an ADT of ≥ 25,000 on the main roadway, and ≥ 15,000 on any intersecting roadway.*

5.1.3 Spill control devices

Examples of a *spill control device* are a tee section or turn down elbow designed to retain a limited volume of pollutant that floats on water, such as oil or antifreeze. Spill control devices are passive and must be cleaned out to remove the spilled pollutant



Source: 1992 Ecology Stormwater Manual.

Figure 5.1: A spill control (SC) separator. A catchbasin with a T-inlet for temporarily trapping small volumes. Source: 1992 Ecology Stormwater Manual.

At high-use sites except for those listed in the previous section (high traffic areas), the UIC well must include a spill control device.

These high-use sites include:

- Parking areas with trip end count equal to or greater than 300 vehicles or 100 trip ends per 1000 square feet of gross building area.
- A commercial or industrial site subject to use, storage, or maintenance of a fleet of 25 or more diesel vehicles that are over 10 tons gross weight (trucks, buses, trains, heavy equipment, etc.). See Chapter 2.2 for prohibitions.
- A commercial or industrial site subject to petroleum storage and transfer in excess of 1,500 gallons per year (does not include locations where heating fuel is routinely delivered to end users and the annual amount of heating oil used at the site is the sole basis for the site meeting this definition; except for heating fuel handling and storage facilities).
- Maintenance and repair facilities for vehicles, aircraft, construction equipment, railroad equipment, or industrial machinery and equipment. See Chapter 2.2 for prohibitions.
- Fueling stations and facilities.
- Outdoor areas where hydraulic equipment is stored.

- Log storage and sorting yards and other sites subject to frequent use of forklifts and (or) other hydraulic equipment.
- Railroad yards.

In eastern Washington only: the following are also high use sites:

- All roads with ADT equal to or greater than 30,000 vehicles per day.
- Commercial on-street parking areas on streets with an expected total ADT count equal to or greater than 7,500.

A spill response plan and employee training are required to reduce the risk of stormwater contamination.

5.1.4 Evaluating the need for spill containment structures or control devices for other situations

A spill containment structure or spill control device should also be used if in the designer's judgment spills are likely during the life of the project (see stormwater management manual).

Impervious surfaces contributing stormwater to UIC structures should be evaluated for risk of exposure to potential spills.

For *traffic surfaces*, the designer should consider whether any of the following conditions are present.

- Locations where traffic accidents are likely to occur, such as the bottom of a steep hill, a dangerous intersection, or a sharp turn in a road.
- Roads in industrial areas or with frequent daily travel by tanker trucks.
- Other situations that increase the risk for accidental spills.

For *commercial and industrial sites,* the designer should consider:

- The types of materials that will be handled and stored at the site.
- Site layout and spill response plans.
- Probable employee training and preparation for responding to a spill
- Protecting the UIC well from receiving spilled material.

5.2 Pre-treatment

The best management practices chosen for the site must remove or reduce the target pollutants to levels that will comply with state ground water quality standards when the discharge reaches the water table or first comes into contact with an aquifer (see WAC 173-200). Each best management practice is designed to reduce or eliminate certain pollutants. See Ecology's stormwater management manuals, to determine the required best management practices that apply to the pollutants at your site, see Chapter 5 of the *Stormwater Management Manual for Eastern Washington* or Volume V of the *Stormwater Management Manual for Western Washington* for best management practices applicable to your site.

These best management practices include filtration and bio-infiltration, water quality vaults and wetpools, oil/water separators, manufactured devices (such as catch basin inserts, media filters, and other emerging technology), and other approved facilities that provide treatment of expected pollutants (using filtration, adsorption, or sedimentation processes) for flows up to the water quality design storm.

Alternatively, project proponents may request conditional approval from Ecology for a new or experimental treatment method following the protocol described in Ecology stormwater management manuals, see *Stormwater Management Manual for Western Washington* (SMMWW), chapter 12 Emerging technologies, or *Stormwater Management Manual for Eastern Washington* (SMMEW) chapter 5.

Pretreatment when space is limited

The Ecology stormwater manuals list treatment technologies that have a relatively small footprint. These include filter systems, such as the Contech Stormfilter, the CDS Media filter, the Contech Vortfilter, the Ecology Embankment, the Aquashield Aquafilter, and the HydroInternational Downstream Defender. More information on the technologies can be found at: http://www.ecy.wa.gov/programs/wq/stormwater/newtech/index.html.

Example: A jurisdiction needs to install a UIC well to prevent flooding of the road. The right-of-way is too narrow to allow a basic treatment structure such as a swale. One solution is to use basic treatment that has a small footprint, including some that fit inside the UIC well.

Alternatively, the demonstrative approach (see Chapter 2) may be used.

5.2.1 Preserving infiltration rates

Removing solids from stormwater runoff before it is discharged to a UIC well helps preserve infiltration rates over the long term. UIC wells used for flow control are required to have solids removed prior to discharge. Pre-treatment for solids removal must be designed, constructed, operated and maintained in accordance with an Ecology stormwater manual or an equivalent department approved local manual.

Coliform bacteria and other pathogens in stormwater come from many sources. Examples are manure fertilizers, pet waste, and confined animal feeding operations.

The NPDES Phase II stormwater permit requires subject municipalities to control sources of pathogens to prevent stormwater contamination. Under the permit, they must address illicit discharges to sewers and educate target audiences about preventing pet wastes from contaminating stormwater. These measures help prevent pathogens from contaminating stormwater. Similar measures can be applied to discharges to UIC wells.

Private well owners must ensure that their UIC wells are appropriately protected from sources of bacterial contamination.

The following conditions increase the risk for contamination and require additional precautions:

- The UIC well is less than 100 feet from a drinking water supply well and the seasonal high water table is less than 15 feet below the bottom of the UIC well.

Pre-treatment for solids removal is required. This is called *basic treatment* in Ecology's stormwater management manuals.

- The UIC well is less than 1000 feet from a drinking water supply well or less than 100 feet from a surface water body that is impaired due to coliform bacteria, and the vadose zone treatment capacity is categorized as "low" or "none." See Table 5.2 at the end of this chapter.

Pre-treatment for solids removal is required. This is called *basic treatment* in Ecology's stormwater management manuals.

- The UIC well is located where it could receive runoff from areas or sites that generate high coliform bacteria loadings.

Stormwater treatment facilities are unreliable in removing coliform bacteria and other pathogens from runoff. Because of this, UIC wells shall not receive direct stormwater discharges from areas or sites that generate high coliform bacteria loadings, such as concentrated animal feeding operations.

Alternatively, this type of runoff may be:

- Discharged to the sanitary sewer, if this is allowed by the local jurisdiction.
- Used for crop irrigation, as long as other applicable requirements are met.
- Directed to a biofiltration or bioinfiltration system.
- Diverted through constructed wetlands prior to discharge to a UIC well.

5.2.3 Soluble pollutants

Many soluble pollutants that are commonly found in stormwater (including pesticides, fertilizers, road salts, and other chemical pollutants) are very difficult to remove from stormwater. Source controls applicable to the land use and activities at the site are required to reduce the contamination of stormwater from these chemicals.

See Chapter 8 of the *Stormwater Management Manual for Eastern Washington* (Department of Ecology Publication # 04-10-076) or Volume IV of the *Stormwater Management Manual for Western Washington* (Department of Ecology Publication # 99-14) for best management practices applicable to your site.

5.2.3.1 Special requirements

The following land uses, conditions, and activities have special requirements. However, UIC wells located in parking lots or other impervious areas would follow the source control and treatment requirements for solids, metals, and oils.

A. Sites with pesticides, fertilizer, and nutrients in runoff

Areas such as golf courses, public ball fields, and cemeteries typically use pesticides and fertilizers for landscape management. Examples of other activities that generate high nutrient loads include commercial composting, commercial animal handling areas, and nurseries.

Runoff that would violate ground water quality standards because it is contaminated by pesticides or fertilizers and other nutrients should ***not*** be discharged directly to UIC wells.

Non-biological treatment systems, such as catch basins, are ineffective at removing these pollutants from runoff. Instead, runoff from these types of landscaped areas should be directed to biofiltration or bioinfiltration systems or to constructed wetlands prior to discharge to UIC wells. Stormwater with fertilizer or nutrients may be used to irrigate crops in accordance with other applicable requirements.

The following practices are encouraged:

- Limit use of applied chemicals.
- Design the site to minimize runoff from the landscaped surface.

The term "pesticides" includes a host of chemicals with varying chemical fate and transport characteristics. Some pesticides travel to ground water more readily because they are more water soluble and less likely to "stick" or sorb to particles of earth. These pesticides need to be treated by a biological treatment method, such as a bioswale or constructed wetland. UIC wells that receive stormwater with pesticides that use one of these biological treatment methods are rule-authorized when they are registered, providing this technical guidance is followed.

If UIC owners wish to use a different treatment method for pesticides, they may apply to the department for rule-authorization using the demonstrative approach outlined in this guidance.

B. Industrial activities

The Environmental Protection Agency has listed industrial activities that have monitoring requirements for nitrate, nitrite, ammonia, or phosphorus. This list is reproduced in Appendix A. Runoff from these sites must be directed to one of the following:

- Biofiltration or bioinfiltration systems.
- Constructed wetlands prior to discharge.
- Sanitary sewer if allowed by the local jurisdiction.
- Municipal storm sewer, if allowed by the local jurisdiction and following pre-treatment for removal of solids.

Facilities may complete a *no exposure* certification as part of Ecology's UIC well registration process to be exempted from these requirements. In order to qualify, no outdoor processing, handling, or storage of raw solid materials or finished products may take place at the facility. Industrial facilities that qualify for no-exposure certification may use the Tables 5.2 – 5.4 at the end of this section to determine pre-treatment requirements.

5.2.4 Solids, metals, and oil

5.2.4.1 Tables to determine treatment requirements

Table 5.2, Table 5.3 and Table 5.4 at the end of this chapter are intended for use in meeting the requirements of the presumptive approach. Project proponents and local jurisdictions following the demonstrative approach may define other treatment capacity categories and pollutant loading requirements (see section 2.5.2).

Where adequate geologic and groundwater depth information are available, Table 5.2, Table 5.3, and Table 5.4 at the end of this chapter can be used to evaluate whether a stormwater discharge from a road, commercial site, or residential site to a UIC well is presumed to meet the non-endangerment standard for solids, metals, oil, grease, and PAHs.

Used together, the tables identify the extent to which the vadose zone is presumed to provide sufficient treatment for a given pollutant loading classification and whether additional pretreatment is necessary to meet the groundwater quality standards for these pollutants.

At sites where the vadose zone is presumed to provide sufficient treatment to protect groundwater quality, pretreatment is not required prior to discharge to the UIC well.

Industrial sites with no outdoor processing, storage, or handling of raw or finished products may also use these tables.

5.2.4.2 Treatment requirements

Commercial roofs

Roof runoff from commercial businesses with ventilation systems specifically designed to remove commercial indoor pollutants must be evaluated on a case-by-case basis to identify the pollutants of concern and the appropriate pre-treatment requirements.

In general, this runoff may be classified as a "medium" pollutant loading source (see Table 5.3 at the end of this chapter), and the requirements of this section may be applied to discharges from these areas to UIC wells.

Industrial roofs

Roof runoff from industrial facilities must be evaluated on a case-by-case basis and should be treated according to the other best management practice requirements for the facility. See the previous page for special requirements for industrial facilities (section 5.4.3.1).

5.2.4.3 Oil control

Treatment to remove oil means to apply one of the separation or adsorption technologies identified in an Ecology stormwater manual.

Stormwater with pollutant loadings in the "high" category, as described in Table 5.4, must be pre-treated for removal of oil.

An oil-water separator should be used at high-density intersections and at commercial or industrial sites subject to an expected average daily traffic count (ADT) ≥100 vehicles/1000 ft^2 gross building area. These areas are expected to generate sufficient quantities of oil to justify the operation of a separator.

Basic treatment that also provides adsorptive capacity may be used at:

- Other sites where oil control is required except for the ones listed above.
- Commercial parking and streets with ADT > 7500. Alternatively, a simple passive oil control device, such as a turned down elbow, may be used.
- In eastern Washington, roads with ADT > 30,000. See table 5.4, footnote 3.

Examples of basic treatment that provide adsorptive capacity include biofiltration swales, bioinfiltration swales, filters, and catch basin inserts. See Ecology's stormwater management

manuals or other equivalent department approved manuals for more examples and information on these BMPs.

5.2.4.4 Solids removal

Pre-treatment for solids removal is required:

- At commercial sites with outdoor handling or storage of raw solid materials. Examples include gravel, sands, logs, salts and compost.
- At industrial sites listed in Appendix A where outdoor processing, handling, or storage of raw solid materials or finished products, including outdoor loading areas for these materials or products, takes place. These are sites defined by EPA (40 CFR 122.26(b)(14)).

Stormwater associated with construction activities classified under the federal rules, 40 CFR 122.26(b)(14)(x) are exempt from this requirement.

- When an evaluation of storm runoff from roofs subject to ventilation systems that are specifically designed to remove commercial indoor pollutants identifies the need for pre-treatment for solids removal.

5.3 Vadose zone treatment capacity

Studies of stormwater pollutant concentrations in water through and below infiltration systems show mixed results in the effectiveness of vadose zone filtration in protecting ground water quality (USEPA 1999; Pitt *et al.*1999; Mason *et al.* 1999; and Appleyard 1993).

Many of the problems documented in these studies can be corrected by proper siting, design and use of the facilities, enhanced source control, additional pre-treatment prior to discharge to the facilities, or prohibition of the discharge.

Studies of sub-surface infiltration systems also indicate that filtered and adsorbed pollutants accumulate in the vadose zone at depths of less than a few feet below the facilities at concentrations that may require soil cleanup activities upon decommissioning of a UIC well (Mikkelsen *et al.* 1996 #1 and #2; Appleyard 199.).

Because contaminated soil removal and disposal costs can be considerable, project proponents may wish to consider including pre-treatment facilities to remove solids from stormwater runoff and avoid potential cleanup requirements following long-term use of the UIC well. This caution is addressed to UIC wells receiving runoff from commercial and industrial areas and from traffic areas with moderate to high use. For examples of traffic areas with moderate and high use, see Table 5.3.

In general, the vadose zone may provide adequate filtration, adsorption, and other pollutant reduction capacity to meet the non-endangerment standard for solids, metals, oil, grease, and PAHs. The tables at the end of this section may be used to evaluate the use of the vadose zone for treatment and to determine pre-treatment requirements for these pollutants.

5.3.1 Classification of vadose zone treatment capacity

Table 5.2 classifies the treatment capacity of the vadose zone as high, medium, low, and none. These classifications are based on minimum thickness and the geologic materials that make up the treatment layer.

Several different ways of describing the geologic materials are used, including grain-size distribution, sand-to-fines ration, well log lithology, and geologic names. Examples of these are given in Table 5.1.

Table 5.1: Examples of Geologic Material Descriptions

Geologic Material Description Method	Example
Grain size distribution	Materials with median grain size <0.125mm
Sand-to-fines ratio	Having a sand to silt/clay ratio of less than 1:1 and sand plus gravel less than 50%
Well log lithology	Sandy or silty clay Silt Clayey or sandy silt Sandy loam or loamy sand Silt/clay with inter-bedded sand
Geologic name	This category generally includes till, hardpan, caliche, and loess

The ability of geologic materials to filter or adsorb pollutants such as solids, oils, and metals is related to grain size, the amount of organic matter, and the presence of clays, among other factors. Native organic matter improves adsorption and filtration (Ingloria et. al., 1997) but is rarely found at depths below UIC wells.

High Treatment Capacity

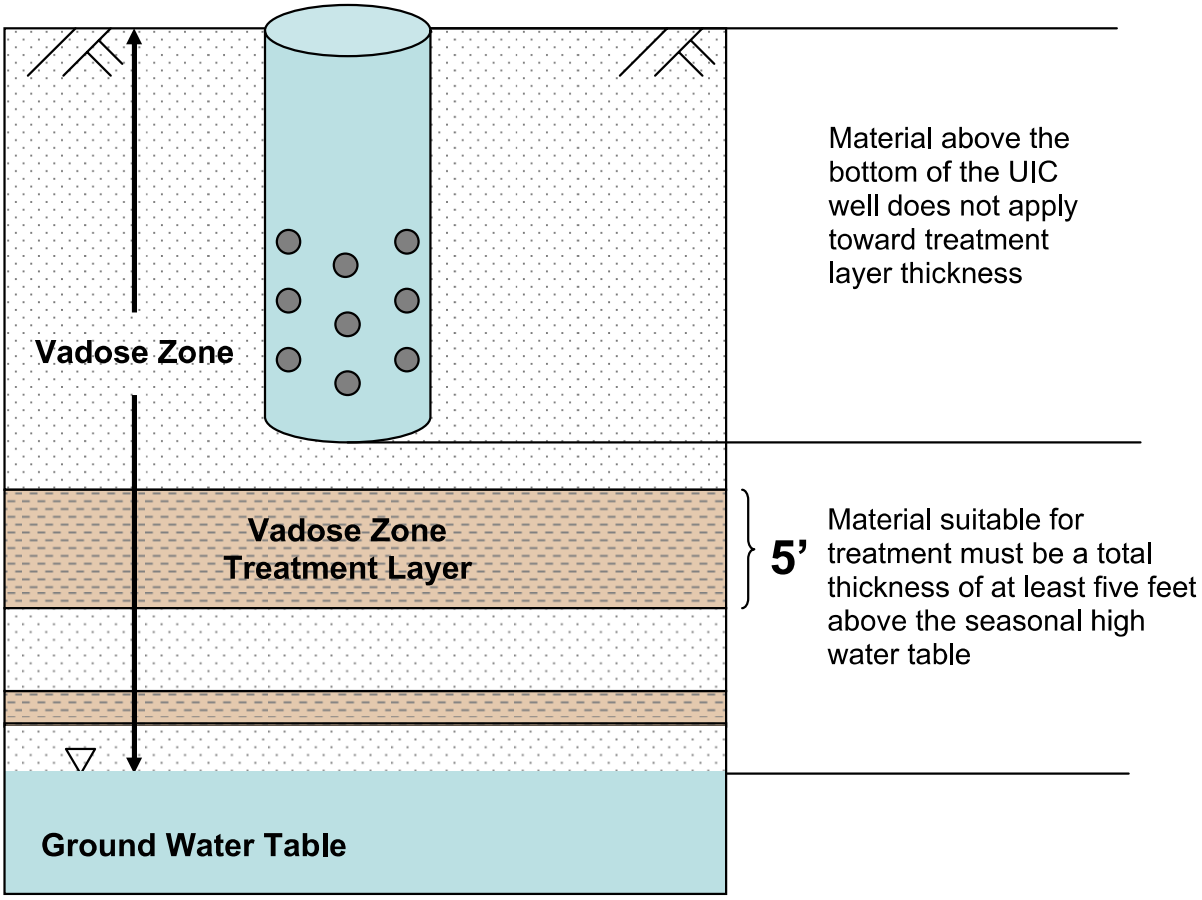


Figure 5.2: Schematic Vadose Zone Treatment Layer Example

Geologic materials that are classified as having a *high treatment capacity* are fine-grained with a greater capacity to filter discharges. These materials also tend to remove pollutants by chemical reactions such as cation exchange capacity and sorption. These may be mixtures of materials where silt and clay fill the void spaces in the matrix of the coarser materials. More compaction results in better filtration. High treatment capacity layers must total a minimum of five feet between the bottom of the UIC well and the seasonal high water table.

Geologic materials that are classified as having a *medium treatment capacity* provide moderate to high filtration and have minor or no chemically reactive characteristics. Medium treatment capacity layers must total a minimum of ten feet.

Geologic materials that are classified as having a *low treatment capacity* provide some minimal filtration. Although the sand and gravel mixtures in this category may provide moderate filtration when the UIC well is initially installed, preferential flow paths develop that reduce this capacity. Low treatment capacity layers must total a minimum of 25 feet between the bottom of the UIC well and the seasonal high water table.

Geologic materials that are classified as having *no treatment capacity* do not provide filtration to remove pollutants. Since this type of material does not have treatment capacity, pre-treatment is always required except for sites that are classified as having an insignificant pollutant load in Table 5.3.

5.3.2 Vadose zone materials

In most cases, site exploration will be required to obtain sufficient data to determine the treatment capacity of the vadose zone materials using Table 5.2, in particular where reliable regional information or nearby borehole logs are not readily available.

In some cases, geologic information may be available from regional geology maps in publications from the Department of Natural Resources or U.S. Geological Survey, from a well borehole log(s) in the same quarter-section on the Ecology Web site, see http://apps.ecy.wa.gov/welllog/ or from local governments.

The following should be kept in mind when using these sources.

- Surface soils maps generally do not provide adequate information although the parent material information provided may be helpful in some locations.
- Well borehole log locations should be verified as electronic data bases contain many errors of this type.
- When using borehole logs, a nearby site is generally within a quarter of a mile and preferably within 50 to 500 feet, depending on the heterogeneity of the region
- Subsurface geology can vary considerably in a very short horizontal distance in many areas of the state. Professional judgment should be used to determine whether the available data are adequate or site exploration is necessary.

Alternatively, for small projects where site exploration is not cost-effective, a design professional might apply a conservative design approach subject to the approval of the local jurisdiction.

5.3.3 Depth to ground water

The minimum required separation between the bottom of the facility and the highest seasonal water table depends upon the characteristics of the vadose zone, the potential for mounding of infiltrating stormwater above the water table, and the degree of certainty of available data as to the seasonal high water table elevation.

Knowledge of the seasonal high water table is especially important for siting UIC wells in areas with seasonal high water table less than fifteen feet below the bottom of the UIC well.

Significant mounding of infiltrating stormwater can occur above the water table (Appleyard, 1993) and UIC wells must not discharge stormwater directly into ground water at any time. This applies even if the groundwater level is rising in response to the UIC discharge.

Water level information is also needed to confirm the thickness of the treatment layer in the vadose zone between the bottom of the UIC well and the highest known ground water level. Ground water depths may be available from the following sources.

- Site exploration
- Department of Ecology, http://apps.ecy.wa.gov/welllog/
- Department of Natural Resources
- U.S. Geological Survey publications
- Local governments

Water level data associated with a single borehole log may be insufficient to determine the seasonal high water table. This is especially true if the borehole drilling followed a wet season with lower than normal precipitation or occurred outside of the season when water tables are normally the highest. Seasonal high water tables generally occur during late winter through mid-spring in most of Washington State. In heavily irrigated areas, the seasonal high water table elevation may occur in late summer.

At sites where the fluctuation of the seasonal water table is large (several feet) or unknown, designers should err on the side of caution. UIC wells must not discharge stormwater directly into ground water.

5.3.4 Exceptions to tables 5.1 through 5.3 based on site-specific or local studies

Exceptions to the tables may be made when:

- Local planning efforts generate an alternative method that meets the non-endangerment standard based on local conditions.
- More detailed site-specific data are gathered by the project proponent and local permission is granted under a locally developed stormwater management program.

When local planning efforts generate an alternative method
Local planning may generate alternate methods that may be used instead of the one used in Table 5.2, Table 5.3 and Table 5.4. For example, local jurisdictions may choose to allow changes in the pollutant loading categories in Table 5.3 based on source control activities at a site. The local alternative method must meet the non-endangerment standard based on local conditions.

When there is site-specific data and local permission is granted
The minimum vadose zone treatment layer thicknesses listed in Table 5.2 may be changed to three feet for a high-capacity treatment matrix and to six feet for a medium-capacity treatment matrix when the following requirements are met.

- The UIC well is regulated under a local stormwater management program approved by the department, and the local authority approves the change in minimum thicknesses.
- The discharge is to a publicly-owned UIC well.
- The pollutant loadings are insignificant or low.

- Reliable on-site information is available. If local geology does not vary greatly, borehole logs within one-quarter mile of the proposed UIC well may be used.
- If the three feet of high-capacity treatment matrix provides the entire separation between the bottom of the structure and the seasonal high water table, site specific water level data must be collected to justify the minimal separation from the water table.
- The potential for mounding of infiltrating stormwater above the water table must be evaluated. If mounding is likely, then additional separation or pre-treatment is needed

5.3.5 Tables to determine pre-treatment requirements for solids, metals, and oils

The following three tables help UIC well owners determine what pre-treatment is required for discharges from roads, parking areas or roofs for solids, metals, and oil. These tables may also be used at industrial sites where stormwater has no contact with outdoor industrial activities outdoors. In this case, a *no-exposure certificate* must be submitted (see Ecology's website at http://www.ecy.wa.gov/biblio/ecy070228.html).

- **Vadose zone treatment capacity**: Table 5.2 categorizes the treatment capacity of the vadose zone beneath the UIC well. If vadose zone conditions are unknown or the minimum thickness is not present, use "None" for treatment capacity.

- **Pollutant loading:** Table 5.3 categorizes the amount of pollutant loading for solids, metals and oil in stormwater runoff that will be discharged to a UIC well.

- **Pre-treatment requirements:** Table 5.4 crosses Table 5.2 and Table 5.3 to give the appropriate treatment level for the vadose zone conditions and the expected pollutant loading.

Example of how to use tables 5.2 – 5.4

A customer-only parking lot for a proposed retail store will average 250 vehicles per day according to estimates. A well log from a location within one-quarter mile shows that ground water is at an estimated depth of 26 feet below ground surface. The well log also shows that there is a layer of fine sand from 2 feet to 28 feet below ground surface. The bottom of the UIC well is at 14 feet.

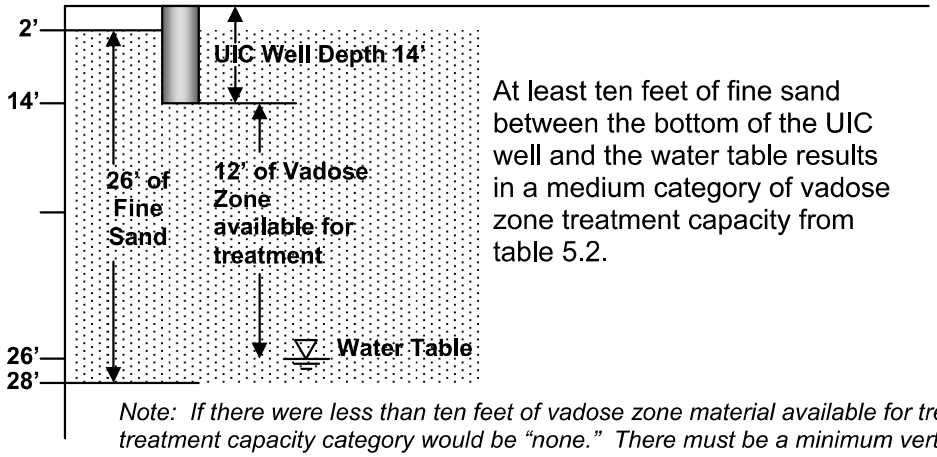
Table 5.2 shows us that fine sand is in the medium vadose zone treatment category.

We now need to determine if there is a minimum of ten feet of vadose zone material that qualifies for the medium treatment category. We also need a vertical separation of five feet between the bottom of the UIC well and the water table; however, if there is at least ten feet of vadose zone material between the bottom of the well and the water table, this condition has been met.

The distance between the bottom of the UIC well and the water table is 12 feet and the entire 12 feet consists of medium sand.

⇒ **A minimum of ten feet of medium sand is present. The vadose zone treatment capacity is medium.**
Table 5.3 shows us that the medium category includes parking lots with traffic from 100 to 300 total trip ends.

⇒ **Therefore, the pollutant loading category from table 5.3 for 250 visits to the parking lot per day is medium.**



Note: If there were less than ten feet of vadose zone material available for treatment, the vadose zone treatment capacity category would be "none." There must be a minimum vertical separation of five feet between the bottom of the UIC well and *the* water *table except as noted in this document.*

Figure 5.3: Vadose Zone Treatment Capacity Example Diagra

Table 5.4 shows us that a medium vadose zone treatment (from table 5.2) capacity and medium pollutant load (from table 5.3) requires the use of a two-stage drywell.

Table 5.2: Vadose Zone Treatment Capacity

The treatment capacity classifications describe the vadose zone between the bottom of the UIC well and the top of the highest known seasonal water table. This table will be used to determine pre-treatment requirements when using Table 5.4. If vadose zone conditions are unknown, use *None* for treatment capacity. If thicknesses are less than those listed, use *None* for treatment capacity or you may consider using the demonstrative approach, see section 2.5.2. Separation between the bottom of the UIC well and the top of the water table is still required, see WAC 173-218-090(1) (b).

Treatment Capacity Classification and Required Minimum Thickness	Description of Vadose Zone Layer
HIGH A minimum thickness of five feet	Materials with median grain size < 0.125 mm Having a sand to silt/clay ratio of less than 1:1 and sand plus gravel < 50% Lean, fat, or elastic clay Sandy or silty clay Silt Clayey or sandy silt Sandy loam or loamy sand Silt/clay with inter-bedded sand Well-compacted, poorly-sorted materials This category generally includes till, hardpan, caliche, and loess
MEDIUM A minimum thickness of ten feet	Materials with median grain size 0.125mm to 4mm Sand to silt/clay ratio from 1:1 to 9:1 and percent sand > percent gravel Fine, medium or coarse sand Sand with interbedded clay and/or silt Poorly-compacted, poorly-sorted materials This category includes some alluvium and outwash deposits
LOW A minimum thickness of twenty-five feet	Materials with median grain size > 4mm to 64mm Having a sand to silt/clay ratio greater than 9:1 and percent sand less than percent gravel Poorly-sorted, silty or muddy gravel Sandy gravel, gravelly sand, or sand and gravel This category includes some alluvium and outwash deposits
NONE Minimum thickness not applicable	Materials with median grain size >64mm Having total fines (sand and mud) less than 5% Well-sorted or clean gravel Boulders and/or cobbles Fractured rock This category generally includes fractured basalt, other fractured bedrock, and cavernous limestone

Table 5.3: Pollutant Loading Classifications for Solids, Metals, and Oil in Stormwater Runoff Directed to UIC Wells

These are the categories of pollutant loadings used to determine whether the facility is exempt from the pre-treatment requirement when using Table 5.4.

Classification	Areas Contributing Runoff to the UIC Well (ADT = Average Daily Traffic)
Insignificant	Impervious surfaces not subject to motorized vehicle traffic or application of sand or deicing compounds Un-maintained open space
Low	Parking areas with <40 trip ends per 1000 SF of gross building area or <100 total trip ends Other land uses with similar traffic/use characteristics (e.g. most residential parking and employee-only parking areas for small office parks or other commercial buildings) **Inside Urban Growth Management Areas** Fully controlled and partially controlled limited access highways with ADT less than 15000 Other roads with ADT less than 7500 vehicles per day **Outside Urban Growth Management Areas** All roads with ADT less than 15000 vehicles per day
Medium	Parking areas with between 40 and 100 trip ends per 1000 SF of gross building area or between 100 and 300 total trip ends Primary access points for high-density residential apartments Intersections controlled by traffic signals that do not meet the definition of a high-density intersection (see Glossary) Transit center bus stops Other land uses with similar traffic/use characteristics (e.g. visitor parking for small to medium commercial buildings with a limited number of daily customers) **Inside Urban Growth Management Areas** Fully controlled and partially controlled limited access highways with ADT between 15000 and 30000 vehicles per day Other roads with ADT between 7500 and 30000 vehicles per day **Outside Urban Growth Management Areas** All roads with ADT between 15,000 and 30,000 vehicles per day
High	High Use Sites In eastern Washington, all roads with ADT >30000 vehicles per day High-density intersections Parking areas with >100 trip ends per 1000 SF of gross building area or >300 total trip ends On-street parking areas of municipal streets in commercial and industrial areas Highway rest areas Other land uses with similar traffic/use characteristics (e.g., commercial buildings with a frequent turnover of visitors, such as grocery stores, shopping malls, restaurants, drive-through services, etc.

Table 5.4: Pre-treatment Required for Solids, Oil and Metals

Find the *Treatment Capacity Classification* from Table 5.2 and the *Pollutant Loading Classification* from Table 5.3. Use Table 5.4 to determine the pre-treatment requirements for solids, oil, and metals based on these classifications. Pre-treatment technologies for solids, oil, and metals removal are provided by the Department of Ecology stormwater manuals.

Treatment capacity / **Pollutant loading**	*High*	*Medium*	*Low*	*None*
Insignificant	None	None	None	None
Low	None	None	None	Remove solids[2]
Medium	Two-stage drywells[1]	Two-stage drywells[1]	Remove solids[2]	Remove solids[2]
High	Remove oil[3]	Remove oil[3]	Remove oil and solids[2,3]	Remove oil and solids[2,3]

[1] A **two-stage drywell** is a catch basin or other pre-settling/spill control structure that traps small quantities of oils and solids. The catch basin or other pre-settling/spill control device must be inspected and cleaned regularly (see the operation and maintenance requirements in Ecology stormwater management manuals).

[2] **Treatment to remove solids** means basic treatment. See the definition for basic treatment in the glossary. Removal of solids should remove a large portion of the metals in most stormwater runoff. Any special treatment requirements in this chapter still apply. For **low** pollutant loading sites, implementation of appropriate source control BMPs may be employed in lieu of structural treatment BMPs (see Ecology stormwater management manuals).

[3] **Treatment to remove oil** is to be accomplished by applying one of the technologies identified in the Ecology stormwater management manuals.

At high-density intersections and at commercial or industrial sites subject to an expected average daily traffic count (ADT) of 100 vehicles/1000 ft² gross building area, sufficient quantities of oil will be generated to justify operation of a separator BMP.

At other high-use sites, project proponents may select a basic runoff treatment BMP that also provides adsorptive capacity, such as a biofiltration or bioinfiltration swale, a filter or catch basin insert, or other adsorptive technology, in lieu of a separator BMP.

The requirement to remove oil for all roads with ADT> 30,000 applies only in eastern Washington. For these roads in eastern Washington, an oil control facility is not required; instead a basic treatment facility with sorptive characteristics (i.e., swale or sand filter) is required.

This requirement to apply a basic treatment facility with adsorptive characteristics also applies to commercial parking and to streets with ADT > 7500; alternatively a simple passive oil control device such as a turned down elbow may be used.

Chapter 6 – Bibliography

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Chapter 7 – Glossary

All known and reasonable treatment (AKART)	All known, available, and reasonable methods of prevention, control, and treatment. The most current methodology that can be reasonably required for preventing, controlling, or abating the pollutants associated with a discharge. The concept of AKART applies to both point and nonpoint sources of pollution. Best management practices (BMPs) typically applied to nonpoint source pollution controls are considered a subset of the AKART requirement. The *Stormwater Management Manual for Eastern Washington* may be used as a guideline, to the extent appropriate, for developing best management practices to apply AKART for stormwater discharges. AKART and Best Available Treatment (BAT) are roughly equivalent state and federal terms for the same concept.
Average daily traffic (ADT)	The average daily traffic is an estimate of how many cars use a roadway in a day, on average. Average daily traffic counts are generated when roadways are designed. ADT count estimates may be obtained from: 1. The document *Trip Generation* (Institute of Transportation Engineers). 2. A traffic study prepared by a professional engineer. 3. A transportation specialist with expertise in traffic volume estimation. Where used for UIC projects, ADT counts are to be estimated for twenty years after project completion. For project sites with seasonal or varied use, evaluate the highest period of expected traffic impacts.
Basic treatment	Treatment of stormwater with the goal of removing at least 80 percent of the solids present in the runoff using one of the treatment facilities or methods identified in Ecology stormwater management manuals. Basic treatment is required for all discharges where removal of solids is identified as a requirement. Additional treatment to remove metals, oil or phosphorus may be required at some sites or for some receiving water bodies.
Design storm	A prescribed hyetograph or precipitation distribution, and the total precipitation amount for a specific duration recurrence frequency. The design storm is used to estimate runoff for a hypothetical rainstorm of interest or concern for the purposes of analyzing existing drainage, designing new facilities, or assessing other impacts of a proposed project on the flow of surface water. Different design storms are

described for eastern and western Washington in Ecology stormwater management manuals.

High-use sites

High-use sites generate high concentrations of oil either because of a high traffic turnover or the frequent transfer of oil and other petroleum products. These sites generate enough oil to be effectively removed with treatment. A high-use site is any one of the following.

- High-density road intersections with an expected ADT of 25,000 vehicles or more on the main roadway and 15,000 vehicles or more on any intersecting roadway. This does not include improvements that are primarily for pedestrian or bicycle use.
- Commercial or industrial sites with an expected trip end count equal to or greater than 100 vehicles per 1000 square feet of gross building area.
- Fueling stations and facilities.
- Petroleum storage and transfer in excess of 1,500 gallons per year at commercial or industrial sites. This includes heating fuel, handling, and storage facilities. This does not include locations where heating fuel is routinely delivered to end users.
- Fleets of 25 or more diesel vehicles that are over 10 tons gross weight (trucks, buses, trains, heavy equipment, etc.) used, stored, or maintained at commercial or industrial sites.
- Maintenance and repair facilities for vehicles, aircraft, construction equipment, railroad equipment, or industrial machinery, and equipment.
- Outdoor areas where hydraulic equipment is stored.
- Log storage and sorting yards and other sites subject to frequent use of forklifts and (or) other hydraulic equipment.
- Railroad yards.
- In eastern Washington only, the following are also high use sites:
    - Customer or visitor parking lots with an expected trip end count equal to or greater than 300 vehicles.
    - Commercial on-street parking areas on streets with an expected total ADT count equal to or greater than 7,500.

Metals treatment

Treatment of stormwater with the goal of removing dissolved metals in the runoff by applying one of the technologies identified in Ecology stormwater management manuals.

Non-endangerment	To prevent the movement of fluid containing any contaminant into the ground water if the contaminant many cause a violation of the *Water Quality Standards for Ground Waters of the State of Washington,* or may cause health concerns. (See Chapter 173-218 WAC Underground Injection Control Program.)
Oil control	Treatment of stormwater with the goal of removing oil by applying one of the technologies identified in Ecology stormwater management manuals.
Poorly-sorted	The grain size distribution of a solid material composed of a mixture of grain sizes.
Solids removal	Structural pre-treatment of stormwater using any of the methodologies in Ecology stormwater management manuals that are intended to provide for removal of at least 80 percent of the particles in the runoff by settling and/or filtration. Called *basic treatment* in Ecology stormwater management manuals.
Source control	A structure or operation intended to prevent pollutants from coming into contact with stormwater through physical separation of areas or careful management of activities that are sources of pollutants. See Chapter 8 of the *Stormwater Management Manual for Eastern Washington* (Ecology Publication # 04-10-076) or Volume IV of the *Stormwater Management Manual for Western Washington* (Ecology Publication # 99-14).
Stormwater management program (SWMP)	A combination of stormwater management activities planned and implemented by a local jurisdiction to reduce pollutants in urban runoff and protect water quality in the receiving waters. An SWMP may also be called, or include, a UIC management plan developed by the local government.
Stormwater treatment	Use of a structural BMP or the vadose zone below a UIC well to remove pollutants from stormwater.
Well-sorted	The grain size distribution of a solid material composed of grains of the same size.

Appendix A – Benchmark Monitoring of Runoff for Nitrate, Nitrite, Ammonia, or Phosphorus for Certain Industrial Activities

EPA rules (40 CFR 122.26(b)(14)) require benchmark monitoring of runoff for nitrate, nitrite, ammonia or phosphorus for certain industrial activities, as follows:

- Facilities subject to stormwater effluent limitations guidelines, or new source performance standards specified in 40 CFR Subchapter N, or Toxic Pollutant Effluent Standards under 40 CFR Subchapter D.

- Facilities listed under the following Standard Industrial Classifications (SIC):

24xx	Lumber and Wood Products (except 2434 - Wood Kitchen Cabinets, see last bullet in this Appendix)
26xx	Paper and Allied Products (except 265 - Paperboard Containers; and 267 - Converted Paper and Paperboard Products, see last bullet in this Appendix)
28xx	Chemicals and Allied Products (except 283 - Drugs; and 285 Paints, Varnishes, Lacquers, Enamels, and Allied Products, see last bullet in this Appendix)
29xx	Petroleum and Coal Products, (except 2951 - Asphalt Concrete Plants, must apply for the sand and gravel general permit)
311x	Leather Tanning and Finishing
32xx	Stone, Clay and Glass Products (except 323 - Glass Products made from purchased glass, see category 11) and (except 3273 - Ready-Mixed Concrete, must apply for the sand and gravel general permit)
33xx	Primary Metals Industries
3441	Fabricated Structural Metal
373x	Ship and Boat Building and Repairing
10xx	Metal Mining
12xx	Coal Mining
13xx	Oil and Gas Extraction
14xx	Mining and Quarrying of Nonmetallic Minerals, except Fuels (except 1411 - dimension stone; 1422 - Crushed and Broken Limestone; 1423 - Crushed and Broken Granite; 1429 - Crushed and Broken Stone, Not Elsewhere Classified; 1442 - Construction Sand and Gravel; 1446 - Industrial Sand, 1445 - Kaolin and Ball Clay; 1459 - Clay, Ceramic, and Refractory Minerals, Not Otherwise Classified; 1499 - Miscellaneous Nonmetallic Minerals, Except Fuels; must apply for the sand and gravel general permit)

- Hazardous waste treatment, storage, or disposal facilities, including those operating under interim status or a permit under Subtitle C of the Resource Conservation and Recovery Act (RCRA).

- Landfills, land application sites, and open dumps that receive or have received any industrial wastes (waste that is received from any of the facilities described in this appendix) including those subject to regulation under Subtitle D of RCRA.

- Recycling facilities, facilities involved in the recycling of materials, including metal scrapyards, battery reclaimers, salvage yards, and automobile junkyards, including but limited to those classified as Standard Industrial Classification 5015 and 5093.

- Steam electric power generating facilities, including coal handling sites.

- Transportation facilities classified under SICs below, which have vehicle maintenance shops, equipment cleaning operations, or airport deicing operations. Only those portions of the facility that are either involved in vehicle maintenance (including vehicle rehabilitation, mechanical repairs, painting, fueling, and lubrication), equipment cleaning operations, airport deicing operations, or that are otherwise identified under one of the other 11 categories of industrial activities listed in this appendix that are associated with industrial activity.

40xx	Railroad Transportation
41xx	Local and Interurban Passenger Transportation
42xx	Motor Freight Transportation and Warehousing (except 4221Farm Product Warehousing and Storage; 4222 Refrigerated Warehousing and Storage; and 4225 General Warehousing and Storage; see last bullet in this Appendix)
43xx	United States Postal Service
44xx	Water Transportation
45xx	Transportation by Air
5171	Petroleum Bulk Stations and Terminals

- Treatment works treating domestic sewage or any other sewage sludge or wastewater treatment device or system, used in the storage, treatment, recycling, and reclamation of municipal or domestic sewage, including land dedicated to the disposal of sewage sludge, that are located within the confines of the facility, with a design flow of one million gallons per day or more, or required to have an approved pretreatment program under 40 CFR Part 403. Not included are farm lands, domestic gardens or lands used for sludge management where sludge is beneficially reused and which are not physically located in the confines of the facility or areas that are in compliance with Section 405 of the CWA.

- Facilities under the following Standard Industrial Classifications:

20xx	Food and Kindred Products
21xx	Tobacco Products
22xx	Textile Mill Products
23xx	Apparel and Other Textile Products
2434	Wood Kitchen Cabinets
25xx	Furniture and Fixtures
265x	Paperboard Containers and Boxes
267x	Converted Paper and Paperboard Products
27xx	Printing, Publishing and Allied Industries
283x	Drugs
285x	Paints, Varnishes, Lacquers, Enamels, and Allied Products
30xx	Rubber and Miscellaneous Plastic Products
31xx	Leather and Leather Products (except 311 Leather Tanning and Finishing, see Category 2)
323x	Glass Products Made of Purchased Glass
34xx	Fabricated Metal Products (except 3441 Fabricated Structural Metal, see Category 2)
35xx	Industrial and Commercial Machinery and Computer Equipment
36xx	Electronic and Other Electrical Equipment
37xx	Transportation Equipment (except 373 Ship and Boat Building and Repair, see Category 2)
38xx	Measuring, Analyzing, and Controlling Instruments, Photographic, Medical and Optical Goods; Watches and Clocks
39xx	Miscellaneous Manufacturing Industries
4221	Farm Product Warehousing and Storage
4222	Refrigerated Warehousing and Storage
4225	General Warehousing and Storage

Appendix B – Report a Spill

Washington State Department of Ecology : Spills Home

How To Report a Spill

Spills of oil or hazardous materials must be reported.

Who to Call

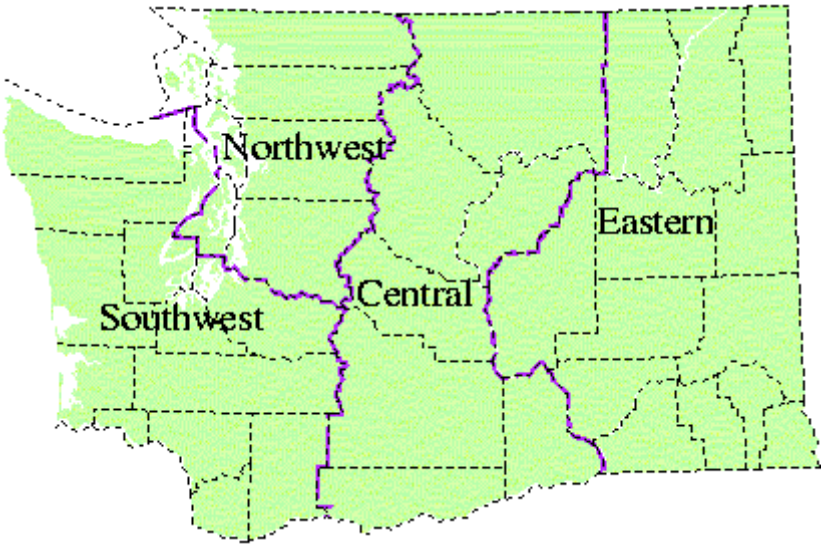
National Response Center: 1-800-424-8802

AND

Washington Emergency Management Division: 1-800-258-5990 OR 1-800-OILS-911

AND

Appropriate Ecology regional office:



Northwest Region: 1-425-649-7000
(Island, King, Kitsap, San Juan, Skagit, Snohomish, and Whatcom counties)

Southwest Region: 1-360-407-6300
(Clallam, Clark, Cowlitz, Grays Harbor, Jefferson, Mason, Lewis, Pacific, Pierce, Skamania, Thurston, and Wahkiakum counties)

Central Region: 1-509-575-2490
(Benton, Chelan, Douglas, Kittitas, Klickitat, Okanogan, and Yakima counties)

Eastern Region: 1-509-329-3400
(Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Spokane, Stevens, Walla Walla, and Whitman counties)

Useful Information

NOTE: *You may request that your personal information be kept confidential.*

To the best of your ability, please be ready with the following information:

- Where is the spill?
- What spilled?
- How much spilled?
- How concentrated is the spilled material?
- Who spilled the material?
- Is anyone cleaning up the spill?
- Are there resource damages (e.g. dead fish or oiled birds)?
- Who is reporting the spill?
- How can we get back to you?