

Farr West City Corporation

# 2016 Storm Water Management Plan



**Updated June 2016**

Prepared by  
JONES & ASSOCIATES  
*Consulting Engineers*





# **STORM WATER MANAGEMENT PLAN**

for

**FARR WEST CITY CORPORATION**

June 2016

Prepared by

**JONES AND ASSOCIATES**  
Consulting Engineers

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## LIST OF ACRONYMS

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BMP	Best Management Practice
DEQ	Department of Environmental Quality
DWQ	Division of Water Quality
EPA	Environmental Protection Agency
HHW	Household Hazardous Waste
IDDE	Illicit Discharge Detection and Elimination
LID	Low Impact Development
MOU	Memorandum of Understanding
MS4	Municipal Separate Storm Sewer
NOI	Notice of Intent
NOT	Notice of Termination
PUAB	Public Utilities Advisory Board
RSI	Registered Storm Water Inspector
RSR	Registered Storm Water Reviewer
SOP	Standard Operating Procedure
SSO	Sanitary Sewer Overflows
SWMA	Storm Water Maintenance Agreement
SWMP	Storm Water Management Plan
SWPPP	Storm Water Pollution Prevention Plan
TMDL	Total Maximum Daily Load
UDEQ	Utah Department of Environmental Quality
UDOT	Utah Department of Transportation
UPDES	Utah Pollutant Discharge Elimination System
USGS	United States Geological Survey

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**STORM WATER MANAGEMENT PLAN**

**CHAPTER 1**

**INTRODUCTION**

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## **FARR WEST CITY - UTR090021 STORM WATER MANAGEMENT PLAN**

### **Purpose**

The purpose of the Storm Water Management Plan (SWMP) is to revise, implement, and enforce a plan designed to reduce the discharge of pollutants from the Municipal Separate Storm Sewer (MS4), protect water quality, and satisfy the appropriate water quality requirements of the *Utah Water Quality Act*. The development and implementation of the SWMP is to fulfill requirements under the State of Utah Small MS4 General UPDES Permit No. UTR090000 (hereafter referred to as the General Permit) in accordance with Section 402(p)(3)(B) of the *Federal Clean Water Act*, and the State of Utah Storm Water Regulations (UAC R317-8-3.9). Farr West City is a Renewal Permittee and is required to submit a revised SWMP document by July 1, 2016.

This General Permit applies to cities with populations less than 100,000 located within or partially within, an urbanized area and that operate a MS4 which discharges to a water of the State of Utah. Urbanized areas are defined as population centers with greater than 50,000 people and densities of at least 1,000 people per square mile, and are based on the 2010 census. For future permits, the urbanized area will be based on the most recent federal census. Farr West City falls under this requirement by way of being located in Weber County.

### **Responsible Person(s)**

Nate Carver  
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### **SWMP Implementation**

Section 4.0 of the General Permit states: “Permittees covered under the previous General Permit for Storm Water Discharges from Small Municipal Separate Storm Sewer Systems, i.e. Renewal Permittees, are expected to have fully implemented all of the following six minimum control measures as required in the previous Permit term....A Renewal Permittee must continue to implement its SWMP designed to reduce the discharge of pollutants from the MS4 as described in the application and submittals provided in accordance with the previous MS4 General Permit, while updating its SWMP document pursuant to this Permit. This Permit does not extend the compliance deadlines set forth in the previous MS4 General Permit unless specifically noted. All requirements contained in this renewal Permit are effective immediately unless an alternative timeframe is indicated.”

### **SWMP Documentation, Review, and Modification**

Section 4.1.2 of the General Permit states, “Each Permittee shall have an ongoing documentation process for gathering, maintaining, and using information to conduct planning, set priorities, track the development and implementation of the SWMP, evaluate Permit compliance/non-



compliance, and evaluate the effectiveness of the SWMP implementation.” In an effort to comply with this requirement the City maintains a storm water map which shows all the existing piping and conveyance structures. This map is updated on an ongoing basis and will be used to ensure permit compliance. The City will also use documents to track inspections required for permit compliance. These inspection forms and all other documentation used to show permit compliance will be kept in one central location, either in hard-copy files or electronically, where all employees can access them. All documentation will be kept for the entire permit term (five years).

This SWMP includes the Best Management Practices (BMPs) and measurable goals intended to reduce the quantity of storm water and the discharge of pollutants to the storm water system. The SWMP will be reviewed, at a minimum, on an annual basis, and any changes or modifications will be described and submitted to the State Division of Water Quality as part of the Annual Report. This review will include the following:

- A review of the status of program implementation and compliance;
- A review of any revision or change of BMPs during the year and an assessment of the effectiveness of such revision ;
- A review of all documentation collected including; number and type of inspections performed, official enforcement actions taken, and types of public education activities implemented;
- An overall assessment of the goals and direction of the SWMP and effectiveness of BMPs;
- A review of questions asked on the Annual Report and address deficient areas as part of the SWMP; and
- A review of the capital and operating and maintenance expenses and a determination of funds needed to comply with this requirement of the *Clean Water Act* .

Changes adding (but not subtracting or replacing) components, controls, or requirements to the SWMP document may be made at any time upon written notification to the State Division of Water Quality. Changes replacing an ineffective or unfeasible BMP specifically identified in the SWMP document with an alternate BMP may be adopted any time provided the analysis is clearly outlined and subsequently approved by the Division of Water Quality. Further procedures for removing or replacing an ineffective or unfeasible BMP can be found in section 4.4 of the General Permit if the situation arises.

### **Staffing and Resource Allocations**

Management and oversight of the Storm Water Management Plan is funded by the City’s Storm Sewer Utility and in some instances by the General Fund. The City is working in conjunction with two other parties for portions of the implementation of the Storm Water Management Plan: the Weber County Storm Water Coalition and the Weber-Morgan Health Department. Farr West City funds a portion of the Storm Water Coalition’s expenses in exchange for educational supplies and community informational materials. The Weber-Morgan Health Department responds to complaints regarding spills and illegal discharges and follows up on the complaints with tracking and enforcement.

Within the City, many staff will contribute toward meeting permit requirements. Currently the SWMP is primarily the responsibility of the Public Works Department. In order for the SWMP to be successful, the support of all City staff is needed. Section 4.1.2.2 of the General Permit states that “Each Permittee must secure the resources necessary to meet all requirements of this permit. Each Permittee must conduct an annual analysis of the capital and operation and maintenance expenditures needed, allocated, and spent as well as the necessary staff resources needed and allocated to meet the requirements of this permit, including any development, implementation, and enforcement activities required. Each Permittee must submit a summary of its fiscal analysis with each annual report.” City Administrators and the City Council are primarily responsible for meeting the financial and administrative obligations required to make the Storm Water Management Plan successful.

## **System Overview**

Farr West City is located on the north end of Weber County. The population of the community was 5,928 at the 2010 census. The majority of the land use in the community is residential and agricultural with some commercial. The City was first settled in 1858 and was incorporated in 1981. The City has a total area of 5.8 square miles. A USGS map showing the City is shown at the end of this section.

The storm drain system is composed of pipes, detention basins, ditches and canals. The Willard Canal runs through the middle of the City, the Western Canal runs down the east side of the City, and Six Mile Creek runs along the south side of the City. The overall concerns, priorities, and goals of the City and this SWMP document are to protect the water quality of the streams, canals, and other water bodies in and around the City.

## **Program Summary**

Farr West City is a renewal permittee and plans to continue to implement a program similar to what other MS4s have implemented for addressing the Six Minimum Control Measures. An outline of the proposed program and some future goals is found below:

Farr West City is currently implementing and participating in several storm water programs that are designed to reduce pollution, including:

- **Public Education and Outreach**
  - Weber County Storm Water Coalition participation
  - Educational material such as: newsletters, pamphlets, curb markers, etc.
  - Water Fair
  - Training for public works employees and contractors
  - TV advertisements
  
- **Public Involvement and Participation**
  - Storm drain inlet labeling projects
  - Community cleanup projects
  - Public is given opportunity to provide input before ordinances, resolutions or plans impacting storm water are adopted in City Council Meetings.

- Illicit Discharge Detection and Elimination
  - Storm drain system map is kept in order to track illicit discharges and improper disposals
  - An ordinance has been adopted prohibiting illicit discharges and defining penalties for violations.
- Construction Site Storm water Runoff Control
  - Construction site runoff ordinance and land disturbance guidelines for sites greater than one acre are in place
  - Site plan review and permitting process for sites greater than one acre are performed
- Long-Term Storm Water Management in New Development and Redevelopment (Post Construction Storm Water Management)
  - Specification that requires the evaluation of Low Impact Development measures
  - Standard that requires projects to manage rainfall on-site and prevent the off-site discharge of all rainfall event's less than or equal to the 90<sup>th</sup> percentile rainfall event.
  - Ordinance that gives the MS4 authority to inspect storm water projects and controls, at all reasonable times, for storm water compliance
- Pollution Prevention and Good Housekeeping
  - Street sweeping program in place
  - Salt pile management
  - Storm Water Pollution Plan for the Public Works Facility
  - Storm drain system maintenance program

The SWMP has been developed to meet the terms of the UPDES permit and consists of six minimum control measures established by EPA for Phase II storm water discharges, as well as meeting the special storm water needs within the City. Implementation of these control measures are expected to result in a reduction of pollutants discharged into receiving water bodies. These control measures are addressed in separate chapters.

Each control measure contains tasks, measurable goals, and BMPs necessary for proper storm water management. The measurable goals contain specific tasks for meeting the objective of that control measure. The measurable goals are mandated by the EPA and a community must be showing improvement over time with these goals. This SWMP is intended to be a living document with tasks, goals, and BMPs added and deleted as new management practices arise and other management practices are found to be ineffective.

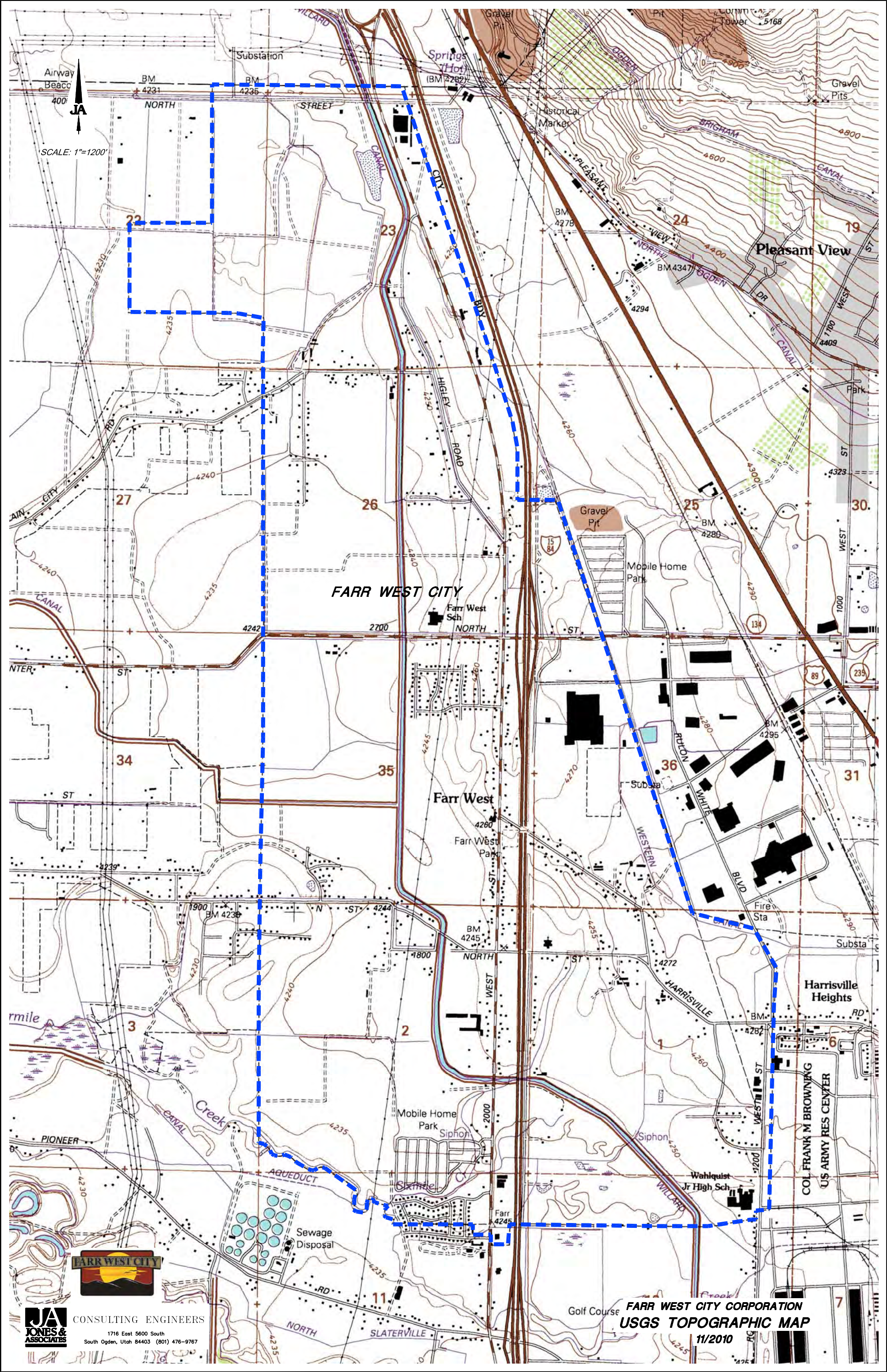
### **Minimum Control Measures (MCMs)**

The following six chapters of this document cover the Minimum Control Measures established by the EPA. All municipalities must address these measures. The six minimum Control Measures are as follows:

1. Public Education and Outreach on Storm Water Impacts

2. Public Involvement/Participation
3. Illicit Discharge Detection and Elimination (IDDE)
4. Construction Site Storm Water Runoff Control
5. Long-Term Storm Water Management in New Development and Redevelopment (Post Construction Storm Water Management)
6. Pollution Prevention and Good House Keeping for Municipal Operation

Each MCM is discussed in the order given with the associated tasks, measurable goals, BMPs, required resources, and the estimated implementation schedule. Much of the introductory information for each Minimum Control Measure has been gathered from the EPA's Storm Water Phase II Final Rule Fact Sheet Series which is an excellent resource for small MS4 operators. The fact sheets can be found at the following website: <https://www.epa.gov/npdes/stormwater-phase-ii-final-rule-fact-sheet-series>.



Airway  
Beacon  
400'  
JA  
SCALE: 1"=1200'



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FARR WEST CITY CORPORATION  
USGS TOPOGRAPHIC MAP  
11/2010



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**STORM WATER MANAGEMENT PLAN**

**CHAPTER 2**

**PUBLIC EDUCATION AND OUTREACH**

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## PUBLIC EDUCATION AND OUTREACH

The Public Education and Outreach program addresses increasing public and professional awareness of water quality concerns and BMPs that may be implemented with respect to protection of the storm water within Farr West City. These education and outreach training programs will introduce the UPDES program and focus on known contaminant sources and control of these sources.

An informed and knowledgeable community is crucial to the success of a storm water management program since it helps to ensure the following:

- **Greater support** for the program as the public gains a greater understanding of the reasons why it is necessary and important. Public support is particularly beneficial when operators of small MS4s attempt to institute new funding initiatives for the program or seek volunteers to help implement the program.
- **Greater compliance** with the program as the public becomes aware of the personal responsibilities expected of them and others in the community, including the individual actions they can take to protect or improve the quality of area waters.

Three main actions areas are important for successful implementation of a public education and outreach program:

- **Forming Partnerships** - Operators of regulated small MS4s are encouraged to utilize partnerships with other governmental entities to fulfill this minimum control measure's requirements. It is generally more cost-effective to use an existing program, or to develop a new regional or state-wide education program, than to have numerous operators developing their own local programs. Operators also are encouraged to seek assistance from non-governmental organizations (e.g., environmental, civic, and industrial organizations), since many already have educational materials and perform outreach activities.
- **Using Educational Materials and Strategies** - Operators of regulated small MS4s may use storm water educational information provided by their State, EPA Region, or environmental, public interest, or trade organizations instead of developing their own materials. Operators should strive to make their materials and activities relevant to local situations and issues, and incorporate a variety of strategies to ensure maximum coverage. Some examples include: brochures or fact sheets, web sites, stickers, refrigerator magnets, posters, educational materials for community and school groups, educational programs for school-age children and storm drain stenciling.
- **Reaching Diverse Audiences** - The public education program should use a mix of appropriate local strategies to address the viewpoints and concerns of a variety of audiences and communities. Directing materials or outreach programs toward specific groups of commercial, industrial, and institutional entities likely to have significant storm



water impacts is also recommended. For example, information could be provided to auto garages on the effects of dumping used oil into storm drains.

Measurable goals, which are required for each minimum control measure, are intended to gauge permit compliance and program effectiveness. The measurable goals, as well as the BMPs, should reflect the needs and characteristics of the operator and the area served by its small MS4. Furthermore, they should be chosen using an integrated approach that fully addresses the requirements and intent of the minimum control measure. Finally, they should allow the MS4 to make improvements to its program over each 5-year permit term by providing data on program successes and shortfalls. For example, an MS4 could encourage “do-it yourselfers” to recycle used motor oil by establishing and advertising a municipal drop-off center. The MS4 could measure progress toward this goal by tracking the amount of motor oil collected and correlating those data to the timing of public education efforts and other advertisements to see if their message is being received.

## Public Education and Outreach Strategy

The following is a summary table listing each minimum performance measure, activities or products, measurable goals, how documentation will be kept, target pollutant and audience, and responsible party as called for in the General Permit. The summary table is provided to meet the General Permit requirement 4.2.1.7.

PUBLIC EDUCATION AND OUTREACH								
<b>TARGET AUDIENCE</b>	(1) Residents (2) Institutions, and Commercial & Industrial Facilities (3) Developers & Contractors (4) City Staff (MS4-Owned or Operated Facilities)							
<b>TARGET POLLUTANTS</b>	(1) E Coli (2) Pet Waste (3) Sediment (4) Grass (5) Oil (6) Fertilizer (7) Trash (8) Construction Site Waste (9) Septic Waste (10) Hydrocarbons (11) Automotive Fluids (12) Chlorinated Swimming Pool Water (13) Wash Water (14) Household Hazardous Waste (15) Illicit Discharges & Spills (16) Landscaping Materials (17) Fuels (18) Non-emergency firefighting							
<p><b>Minimum Performance Measure 4.2.1.1</b> - Target specific pollutants and pollutant sources that impact or have the potential to impact the beneficial uses of receiving waters. Provide information which describes the potential impacts from storm water discharges. Provide methods for avoiding, minimizing, reducing, and/or eliminating the adverse impacts of storm water discharges. Provide actions individuals can take to improve water quality including participation in local environmental stewardship activities, based on land uses and target audiences found within the community.</p> <p><b>Minimum Performance Measure 4.2.1.2</b> – Provide and document information given to the general public of the Permittee’s prohibitions against and the water quality impacts associated with illicit discharges and improper disposal of waste. Provide information to the general public on maintenance of septic systems; effects of outdoor activities such as lawn care (use of pesticides, herbicides, and fertilizers); benefits of on-site infiltration of storm water; effects of automotive work and car washing on water quality; proper disposal of swimming pool water; and proper management of pet waste.</p>								
Activity/Product	Measurable Goals	Documentation	Target Pollutant	Target Audience	Related BMPs	Resources Needed	Due Date/Frequency	Responsible Party
County Water Fair	Hold one event to educate school children each year	Coalition invoices and event advertisement	1-7, 15	1,4	PEP	4 hours \$120	Annually	Storm Water Coalition & City
Installation of curb markers on catch basins or replace old or worn out ones	Have all inlets in the City marked with readable curb markers	City documents showing number of markers installed on a yearly basis.	1-18	1-4	SDSS IDC	8 hours \$240	Annually	City
City website to address storm water impacts	Place information about storm water impacts on	Completed website. Keep a document that shows the	1-18	1-4	PEP	40 hours \$1200	July 2016	City

	City website and social media	number of website hits each year						
Pay fees for TV spots in cooperation with Salt Lake County as part of fees paid to County	Pay for annually	Coalition invoice	1-17	1-4	PEP	1 hour \$300	Annually	County Storm Water Coalition and Salt Lake County
Collect and distribute information about storm water pollution in City newsletter or stuffer with utility billings	Distribute article of information to all households on mailing list once per year and social media	Completed article with date recorded that information was sent out	1-18	1	PEP	5 hours \$300	Annually	City

**Minimum Performance Measure 4.2.1.3** – Provide and document information given to businesses and institutions annually of the Permittee’s prohibitions against and the water quality impacts associated with illicit discharges and improper disposal of waste. Provide information to businesses and institutions on effects of outdoor activities such as lawn care (use of pesticides, herbicides, and fertilizers); benefits of on-site infiltration of storm water; building and equipment maintenance (proper management of waste water); use of salt or other deicing materials (cover/prevent runoff to storm system and contamination to ground water) proper storage of materials (emphasize pollution prevention) proper management of waste materials and dumpsters (cover and pollution prevention) and proper management of parking lot surfaces (sweeping).

Activity/Product	Measureable Goal	Documentation	Target Pollutant	Target Audience	Related BMPs	Resources Needed	Due Date/Frequency	Responsible Party
Coalition to develop and City to distribute brochures to businesses and institutions within the City	Distribute one brochure, addressing a specific audience and potential pollutants from that audience each year and track number of brochures distributed	Finished brochure and documentation of number of brochures distributed	2,3,6 9-14,16,18	2	PEP	4 hours \$240	Annually	Storm Water Coalition & City

**Minimum Performance Measure 4.2.1.4** – Provide and document information given to engineers, construction contractors, developers, development review staff, and land use planners concerning the development of storm water pollution prevention plans (SWPPPs) and BMPs for reducing adverse impacts from storm water runoff from development sites.

Activity/Product	Measureable Goal	Documentation	Target Pollutant	Target Audience	Related BMPs	Resources Needed	Due Date/Frequency	Responsible Party
Provide example SWPPP and Checklist on City website	Track the number of hits the SWPPP information receives on the website when the webpage is complete	Completed website. Keep a document that shows the number of website hits each year	3,7,8,10,11, 13,15,17	3,4	PEP ET	16 hours \$480	July 2016; annual tracking thereafter	City web administrator

**Minimum Performance Measure 4.2.1.5** – Provide and document information and training given to employees of Permittee-owned or operated facilities concerning the Permittee’s prohibition against and the water quality impacts associated with illicit discharges and improper disposal of waste. The Permittee must at a minimum consider the following topics: equipment inspection to ensure timely maintenance; proper storage of industrial materials (emphasize pollution prevention); proper management and disposal of wastes; proper management of dumpsters; minimization of use of salt and other de-icing materials (cover/prevent runoff to MS4 and ground water contamination); benefits of appropriate on-site infiltration (areas with low exposure to industrial materials such as roofs or employee parking); and proper maintenance of parking lot surfaces (sweeping).  
**Minimum Performance Measure 4.2.1.6** – Provide and document information and training given to MS4 engineers, development and plan review staff, land use planners, and other parties as applicable to learn about Low Impact Development (LID) practices, green infrastructure practices, and to communicate the specific requirements for post-construction control and the associated Best Management Practices (BMPs) chosen within the SWMP.

Activity/Product	Measureable Goal	Documentation	Target Pollutant	Target Audience	Related BMPs	Resources Needed	Due Date/Frequency	Responsible Party
Registered storm water inspector training	Have at least one registered and trained storm water inspector for city inspections	Certification	1-18	4	ET	16 hours \$680	July 2016	Storm Water Coalition & City
Storm water pollution prevention training for employees	Send one employee to attend at least 4 hours of storm water training each year	Attendance roll or receipt with number of hours attended	1-18	4	ET	4 hours \$120	Annually	City
Monthly Storm Water Coalition Meetings	Attend 75% of monthly meetings	Coalition minutes and attendance roster	1-18	3,4	ET	3 hours \$90	Monthly	Storm Water Coalition & City
Review, update and perform training using the Standard Operating Procedures (SOPs)	Review and update to reflect actual city procedures once per year. Train employees on SOPs at least once per year	SOP document is included in SWMP as Appendix H. Keep attendance roster for annual training.	1-18	4	ET	5 hours \$240	Annually	City
Train public works employees yearly on storm water issues	Train all employees on a yearly basis	Attendance roll	1-18	4	ET	30 hours \$900	Annually	Public Works

**Minimum Performance Measure 4.2.1.7** – The Permittee must identify methods used to evaluate the effectiveness of the educational messages and overall education program. Methods to evaluate effectiveness of the program must be tied to a defined goal of the program and overall objective of changes in behavior and knowledge.

Goal	Method of Evaluation
Resident Education	<ul style="list-style-type: none"> <li>Document physical observations of activities such as <b>proper</b> disposal of pet waste, automotive fluids, and household hazardous waste.</li> <li>Track the amount of motor oil and/or household hazardous waste collected and compare that data to the timing of public education efforts and other advertisements to gauge the effectiveness of messages.</li> </ul>
Education of Institutions, and Commercial & Industrial Facilities	<ul style="list-style-type: none"> <li>Increase in the amount of curb markers installed by student service organizations</li> <li>Document physical observations of activities such as proper use of pesticides, herbicides, and fertilizers; proper building and equipment maintenance; proper use of salt and de-icers; proper storage of materials; proper management of water materials and dumpsters; and proper management of parking lot surfaces (i.e. sweeping).</li> </ul>

Goal	Method of Evaluation
City Staff Education	<ul style="list-style-type: none"> <li>• Increase in ability to enforce Storm Water Management Plan, including requiring SWPPP when necessary.</li> <li>• Lesser or no enforcement actions by State during inspection.</li> </ul>
<b>Minimum Performance Measure 4.2.1.8</b> – The Permittee must include written documentation or rationale as to why particular BMPs (Activities/Products) were chosen for its public education and outreach program. Note: Each activity or product has associated Best Management Practices (BMPs) that can be referenced as needed and are listed in Appendix I.	
County Water Fair	The County has been doing a water fair for elementary students for several years. The elementary school curriculum teaches about the water cycle and ways students can keep the environment clean. To support, attend, and volunteer at this activity is an effective because this program will eventually reach all those who are educated in public schools.
Pay fees for TV spots in cooperation with Salt Lake County as part of fees paid to County	Every city pays a yearly fee to the County Storm Water Coalition for television commercials. This was chosen because a portion of this fee goes towards television advertisements that educate the general public about the negative impact non-storm water discharges. Each year the message changes and is directed at different audiences.
Install curb markers on catch basins or replace old or worn out ones	Many of the inlet boxes in the City are already marked with messages such as “Dumping is illegal, we all live downstream.” This measure was chosen because it warns those who may dump pollutants downstream and educates the public about storm water impacts. This can also be done as part of an eagle scout or community service project. See Appendix A for program using public service.
City website to address storm water impacts	Many people will visit the City website on a daily basis when it is complete. Providing information on the City website will help to educate the public about what they can do to work towards the goal of keeping the storm water clean.
Collect and distribute information about storm water pollution in City newsletter or stuffer with utility billings	This method was chosen because the mailer reaches all City residents that are on the mailing list. This way the City can educate those City residents that may not be reached by other methods such as television advertisements or the City website.
City will distribute brochures to businesses and institutions within the City	These brochures will be developed by the County Storm Water Coalition and will address potential pollution that is likely to be associated with different types of businesses and institutions. This task will educate a large audience by targeting a different type of business or institution each year.
Provide example SWPPP and Checklist on City website	This will serve as an educational resource for contractors, developers, and City personnel. They can reference a SWPPP template and a SWPPP checklist to ensure the SWPPP submitted meets the required guidelines. A SWPPP template can be found at: <a href="http://www.deq.utah.gov/Permits/water/updes/stormwatercon.htm">http://www.deq.utah.gov/Permits/water/updes/stormwatercon.htm</a> . SWPPP templates for CGP and Common Plan are available. A SWPPP checklist can be found in Appendix D.
Registered storm water inspector training	Having a City employee trained as a registered storm water inspector will ensure that the requirements of the General Permit are met and that construction site inspections are being done correctly. Information about the Registered Storm Water Inspector Program can be found at: <a href="https://www.utahltap.org/stormwater/rsi.php">https://www.utahltap.org/stormwater/rsi.php</a>
Storm water pollution prevention training for employees	Training City employees at least 4 hours per year will help to keep their registration as a storm water inspector current and will help to ensure that they are staying current on the latest topics and issues.

Monthly Storm Water Coalition Meetings	Monthly Storm Water Coalition Meetings are an excellent source of education. By attending employees are educated on the latest storm water issues and provide valuable input into the future direction of the program.
Review, update and perform training using the Standard Operating Procedures (SOPs)	The County Storm Water Coalition developed excellent Standard Operating Procedures (SOPs) activities which municipalities are likely to perform. These SOPs show City staff how to perform tasks without polluting the environment and storm water. The SOPs can be placed in areas where activities that have a high pollution risk take place (such as maintenance shops) and serve as a reminder of the proper way to perform daily tasks.

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**STORM WATER MANAGEMENT PLAN**

**CHAPTER 3**

**PUBLIC PARTICIPATION AND INVOLVEMENT**

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## PUBLIC PARTICIPATION AND INVOLVEMENT

The public can provide valuable input and assistance to a regulated small City's municipal storm water management program and should be given opportunities to play an active role in both the development and implementation of the program. An active and involved community is crucial to the success of a storm water management program because it allows for:

- **Broader public support** since citizens who participate in the development and decision making process are partially responsible for the program and, therefore, may be less likely to raise legal challenges to the program and more likely to take an active role in its implementation
- **Shorter implementation schedules** due to fewer obstacles in the form of public and legal challenges and increased sources in the form of citizen volunteers
- **A broader base of expertise and economic benefits** since the community can be a valuable, and free, intellectual resource

Operators of regulated small MS4s should include the public in developing, implementing, updating, and reviewing their storm water management programs. The public participation program should make every effort to reach out and engage all economic and ethnic groups. There are challenges associated with public involvement. Nevertheless, these challenges can be addressed through an aggressive and inclusive program. Challenges and example practices that can help ensure successful participation are discussed below.

The best way to handle common notification and recruitment challenges is to know the audience and think creatively about how to gain its attention and interest. Traditional methods of soliciting public input are not always successful in generating interest, and subsequent involvement, in all sectors of the community. For example, municipalities often rely solely on advertising in local newspapers to announce public meetings and other opportunities for public involvement. Since there may be large sectors of the population who do not read the local press, the audience reached may be limited. Therefore, alternative advertising methods should be used whenever possible, including announcements in neighborhood newsletters.

In addition, advertising and soliciting help should be targeted at specific population sectors. The goal is to involve a diverse cross-section of people who can offer a multitude of concerns, ideas, and connections during the program development process.

There are a variety of practices that could be incorporated into a public participation and involvement program, such as:

- **Public meetings/citizen panels** allow citizens to discuss various viewpoints and provide input concerning appropriate storm water management policies and BMPs.
- **Storm drain stenciling** is an important and simple activity that concerned citizens, especially students, can do.



- *Community clean-ups* along local waterways, beaches, and around storm drains.

Measurable goals, which are required for each minimum control measure, are intended to gauge permit compliance and program effectiveness. The measurable goals, as well as the BMPs, greatly depend on the needs and characteristics of the operator and the area served by the small MS4. Furthermore, they should be chosen using an integrated approach that fully addresses the requirements and intent of the minimum control measure.

For example, a City could identify a certain section of town has an incident of used motor oil dumping. The area also has numerous automotive businesses including small repair shops, large auto dealerships, gas stations, and body shops. The City could organize a public meeting to not only educate residents about storm water issues and permit requirements, but also to ask for input regarding possible dumping areas and to determine if the community needs an oil recycling facility or some other way to safely dispose of used motor oil. In this way, the City might better understand who the target audience is for illegal dumping control while implementing a valuable service for the community.

## Public Involvement and Participation Strategy

The following is a summary table listing each minimum performance measure, activities or products, measurable goals, how documentation will be kept, target pollutant and audience, and responsible party as called for in the General Permit.

PUBLIC INVOLVEMENT/PARTICIPATION								
<b>TARGET AUDIENCE</b>	(1) Residents (4) Environmental Groups (2) Industries, Commercial & Industrial Businesses (5) Homeowners Associations (3) Trade Associations (6) Educational Organizations							
<b>TARGET POLLUTANTS</b>	(1) E Coli (7) Trash (13) Wash Water (2) Pet Waste (8) Construction Site Waste (14) Household Hazardous Waste (3) Sediment (9) Septic Waste (15) Illicit Discharges & Spills (4) Grass (10) Hydrocarbons (16) Landscaping Materials (5) Oil (11) Automotive Fluids (17) Fuels (6) Fertilizer (12) Chlorinated Swimming Pool Water (18) Non-emergency firefighting							
<p><b>Minimum Performance Measure 4.2.2.1</b> - Permittees shall adopt a program or policy directive to create opportunities for the public to provide input during the decision making processes involving the development, implementation and update of the SWMP document including development and adoption of all required ordinances or regulatory mechanisms.</p> <p><b>Minimum Performance Measure 4.2.2.4</b> - The Permittee must at a minimum comply with State and Local public notice requirements when implementing a public involvement/participation program.</p>								
Activity/Product	Measureable Goal	Documentation	Target Pollutant	Target Audience	Related BMPs	Resources Needed	Due Date/Frequency	Responsible Party
Matters relating to development, implementation, and updates to the SWMP, ordinances and resolutions will be discussed and passed in City Council meetings with the public present. Noticing requirements will be met as necessary	Provide public notice as necessary and discuss all development, implementation, and updates of the SWMP with the public and address questions before updates or changes are made	City Council meeting minutes PUAB meeting minutes	1-18	1-6	PEP	4 hours \$120	as necessary	City Council City Admin. Engineering Public Works

**Minimum Performance Measure 4.2.2.2** - Renewal Permittees shall make the revised SWMP document available to the public for review and input within 120 days from the effective date of this Permit.

**Minimum Performance Measure 4.2.2.3** - A current version of the SWMP document shall remain available for public review and input for the life of the Permit. If the Permittee maintains a website, the latest version of the SWMP document shall be posted on the website to allow the public to review and provide input.

Activity/Product	Measureable Goal	Documentation	Target Pollutant	Target Audience	Related BMPs	Resources Needed	Due Date/Frequency	Responsible Party
Place a Copy of the SWMP at City Hall for public review	Place copy of the most current SWMP at City Hall	SWMP document	1-18	1-6	PEP	2 hours \$140	July 2016; update as necessary	City Engineer
Place SWMP on City website for public review	Always have the most current SWMP posted on the City website	SWMP on website	1-18	1-6	PEP	2 hours \$140	July 2016; update as necessary	City web administrator



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**STORM WATER MANAGEMENT PLAN**

**CHAPTER 4**

**ILLCIT DISCHARGE DETECTION AND ELIMINATION**

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## ILLICIT DISCHARGE DETECTION AND ELIMINATION

Federal regulations define an illicit discharge as “any discharge to an MS4 that is not composed entirely of storm water” with some exceptions. According to the General Permit these exceptions include the following:

- Water line flushing
- Landscape irrigation
- Diverted stream flows
- Rising ground waters
- Uncontaminated ground water infiltration
- Uncontaminated pumped ground water
- Discharges from potable water sources
- Fountain drains
- Air conditioning condensate
- Irrigation Water
- Springs
- Water from crawl space pumps
- Footing drains
- Lawn watering runoff
- Individual residential car washing
- Flows from riparian habitats and wetlands
- Dechlorinated swimming pool discharges
- Residual street wash water
- Dechlorinated water reservoir discharges
- Discharges/flows from emergency firefighting activity

Other discharges that are not composed entirely of storm water are considered illicit discharges because MS4s are not designed to accept, process, or discharge such non-storm water wastes.

Discharges from MS4s can include wastes and wastewater from non-storm water sources. Illicit discharges enter the system through either direct connections (e.g., wastewater piping either mistakenly or deliberately connected to the storm drains) or indirect connections (e.g., infiltration into the MS4 from cracked sanitary systems, spills collected by drain outlets, or paint or used oil dumped directly into a drain). The result is untreated discharges that contribute high levels of pollutants, including heavy metals, toxics, oil and grease, solvents, nutrients, viruses, and bacteria to receiving waterbodies. Pollutant levels from these illicit discharges have been shown in studies to be high enough to significantly degrade receiving water quality and threaten aquatic, wildlife, and human health.

Recognizing the adverse effects illicit discharges can have on receiving waters, permitted MS4s are required to develop, implement and enforce an illicit discharge detection and elimination program. This program must include the following:

- A storm sewer system map, showing the location of all outfalls and the names and location of all waters of the United States that receive discharges from those outfalls
- Through an ordinance, or other regulatory mechanism, a prohibition (to the extent allowable under State or local law) on non-storm water discharges into the MS4, and appropriate enforcement procedures and actions

- A plan to detect and address non-storm water discharges, including illegal dumping, into the MS4
- The education of public employees, businesses, and the general public about the hazards associated with illegal discharges and improper disposal of waste
- The determination of appropriate best management practices (BMPs) and measurable goals for this minimum control measure.

The objective of the illicit discharge detection and elimination minimum control measure is to have regulated small MS4 operators gain a thorough awareness of their systems. This awareness allows them to determine the types and sources of illicit discharges entering their system; and establish the legal, technical, and educational means needed to eliminate these discharges. Permittees could meet these objectives in a variety of ways depending on their individual needs and abilities, but some general guidance for each requirement is provided below.

A storm sewer system map is meant to demonstrate a basic awareness of the intake and discharge areas of the system. It is needed to help determine the extent of discharged dry weather flows, the possible sources of the dry weather flows, and the particular waterbodies these flows may be affecting. It is also recommended that all existing information on outfall locations be collected and shown on the map.

Some permittees may have limited authority under State or local law to establish and enforce an ordinance or other regulatory mechanism prohibiting illicit discharges. In such a case, the permittee is encouraged to obtain the necessary authority, if possible.

The plan to detect and address illicit discharges is the central component of this minimum control measure. The plan is dependent upon several factors, including the permittee's available resources, size of staff, and degree and character of its illicit discharges. As guidance only, the four steps of a recommended plan are outlined below:

- 1. Locate Problem Areas** - It is recommended that priority areas be identified for detailed screening of the system based on the likelihood of illicit connections (e.g., areas with older sanitary sewer lines). Methods that can locate problem areas include: visual screening; water sampling from manholes and outfalls during dry weather; the use of infrared and thermal photography, cross-training field staff to detect illicit discharges, and public complaints.
- 2. Find the Source** - Once a problem area or discharge is found, additional efforts usually are necessary to determine the source of the problem. Methods that can find the source of the illicit discharge include tracing the discharge upstream in the storm sewer and using video to inspect the storm sewers.
- 3. Remove/Correct Illicit Connections** - Once the source is identified, the offending discharger should be notified and directed to correct the problem. Education efforts and working with the discharger can be effective in resolving the problem before taking legal action.

- 4. Document Actions Taken** - As a final step, all actions taken under the plan should be documented. This illustrates that progress is being made to eliminate illicit connections and discharges. Documented actions should be included in annual reports and include information such as: the number of outfalls screened; any complaints received and corrected; the number of discharges and the quantities of flow eliminated.

Studies have shown that one of the most-cost effective and efficient techniques that can be employed to identify and correct inappropriate discharges is to use the citizens of a community to report suspicious activities. Public education and labeling of outfalls and other storm drain infrastructure is an important element of establishing a successful citizen hotline. Outreach to public employees, businesses, property owners, the general public, and elected officials regarding ways to detect and eliminate illicit discharges is an integral part of this minimum measure.

Suggested educational outreach efforts include:

- Developing informative brochures, and guidance for specific audiences (e.g., carpet cleaning businesses) and school curricula
- Designing a program to publicize and facilitate public reporting of illicit discharges
- Coordinating volunteers for locating, and visually inspecting, outfalls or to stencil storm drains
- Initiating recycling programs, or provide information on locations, for commonly dumped wastes, such as motor oil, antifreeze, and pesticides

Measurable goals, which are required for each minimum control measure, are intended to gauge permit compliance and program effectiveness. The measurable goals, as well as the BMPs, should reflect the needs and characteristics of the operator and the area served by its small MS4. Furthermore, they should be chosen using an integrated approach that fully addresses the requirements and intent of the minimum control measure.

For example, an MS4 could establish a measurable goal of responding to all complaints received by the citizen complaint hotline within 24 hours to minimize water quality impacts or recurrent dumping. A complaint tracking system could be used to log response and enforcement activity.

The educational outreach measurable goals for this minimum control measure could be combined with the measurable goals for the Public Education and Outreach minimum control measure.



### Illicit Discharge Detection and Elimination Strategy

The General Permit states that “All Permittees shall revise as necessary, implement, and enforce an IDDE program to systematically find and eliminate sources of non-storm water discharges from the MS4 and to implement defined procedures to prevent illicit connections and discharges according to the minimum performance measures listed below.” The IDDE program must be described in writing, incorporated as part of the Permittee’s SWMP document, and contain the elements detailed in this part of the Permit. The following is a summary table listing each minimum performance measure, activities, or products, measurable goals, how documentation will be kept, and responsible party to meet the requirements of the General Permit.

Illicit Discharge Detection and Elimination						
<b>Minimum Performance Measure 4.2.3.1</b> – Maintain a current storm sewer system map of the MS4, showing the location of all municipal storm sewer outfalls with the names and location of all State waters that receive discharges from those outfalls, storm drain pipe and other storm water conveyance structures within the MS4.						
Activity/Product	Measureable Goal	Documentation	Related BMPs	Resources Needed	Due Date/Frequency	Responsible Party
Maintain and keep current a storm water system map.	Update the storm water system map on an ongoing basis	Current storm water system map kept with this SWMP. The current map is at the end of this chapter.	IDC	5 hours \$300	Annually	Public Works City Engineer
<b>Minimum Performance Measure 4.2.3.2</b> – Effectively prohibit, through ordinance or other regulatory mechanism, non-storm water discharges to the MS4, including spills, illicit connections, illegal dumping and sanitary sewer overflows (“SSOs”) into the storm sewer system, require removal of such discharges consistent with Part 4.2.3.6. of this Permit, and implement appropriate enforcement procedures and actions. The Permittee must have a variety of enforcement options in order to apply escalating enforcement procedures as necessary for the severity of violation and/or the recalcitrance of the violator. Exceptions are discharges pursuant to a separate UPDES Permit (other than the UPDES Permit for discharges from the MS4) and non-storm water discharges listed in Part 1.2.2.2. An SSO is a discharge of untreated sanitary wastewater. SSOs are illegal and must be eliminated. All SSOs must be reported to the Division of Water Quality and to the Permittee’s local wastewater treatment plant.						
<b>Minimum Performance Measure 4.2.3.2.1</b> - The IDDE program must have adequate legal authority to detect, investigate, eliminate and enforce against non-storm water discharges, including illegal dumping, into the MS4. Adequate legal authority consists of an effective ordinance, by-law, or other regulatory mechanism. The documented IDDE program that is included in the Permittee’s SWMP must include a reference or citation of the authority the Permittee will use to implement all aspects of the IDDE program.						
Activity/Product	Measureable Goal	Documentation	Related BMPs	Resources Needed	Due Date/Frequency	Responsible Party
Update storm water ordinance to address escalating enforcement procedures and other legal matters addressed in the General Permit	Update the storm water ordinance to reflect the new General Permit requirements	Copy of updated ordinance	IDC	80 hours \$5,000	July 2016	Storm Water Coalition City Attorney City Administration City Council City Engineer

**Minimum Performance Measure 4.2.3.3** – Implement a written plan to detect and address non-storm water discharges to the MS4, including spills, illicit connections, sanitary sewer overflows and illegal dumping. The plan shall include:

**Minimum Performance Measure 4.2.3.3.1** – Develop and implement written systematic procedures for locating and listing the following priority areas likely to have illicit discharges (if applicable to the jurisdiction):

- Areas with older infrastructure that are more likely to have illicit connections;
- Industrial, commercial, or mixed use areas;
- Areas with a history of past illicit discharges;
- Areas with a history of illegal dumping;
- Areas with onsite sewage disposal systems;
- Areas with older sewer lines or with a history of sewer overflows or cross-connections;
- Areas upstream of sensitive waterbodies; and

**Other areas the Permittee determines to be likely to have illicit discharges.**

The Permittee must document the basis for its selection of each priority area and create a list of all priority areas identified in the system. This priority area list must be updated annually to reflect changing priorities.

**Minimum Performance Measure 4.2.3.3.2** – Field inspections of areas considered priority areas as identified in Part 4.2.3.3.1. Compliance shall be achieved by inspecting each priority area annually at a minimum. All field assessment activities shall utilize an inspection form to document findings.

**Minimum Performance Measure 4.2.3.3.3** – Dry weather screening activities for verifying outfall locations and detecting illicit discharges to receiving water. All outfalls shall be inspected at least once during the 5-year Permit term. Dry weather screening activities shall utilize an inspection form to document findings.

**Minimum Performance Measure 4.2.3.3.4** – Notify DEQ if Permittee discovers or suspects that a discharger may need a separate UPDES permit (industrial, dewatering, etc.).

Activity/Product	Measureable Goal	Documentation	Related BMPs	Resources Needed	Due Date/Frequency	Responsible Party
A written plan will be developed to detect and address non-storm water discharges to the MS4. Priority areas will be identified. Outfall locations and priority areas will be identified.	1. Development of written plan 2. Identification of priority areas.	1. Priority areas will be shown on the storm water map. 2. All known outfall locations will be shown on the storm water map	IDC	20 hours \$600	Annually	Public Works City Engineers
Inspections of priority areas and all outfalls (see Appendix C for sample inspection form)	1. Inspect each priority area annually 2. Inspect at least 20% of all outfalls annually (all outfalls within 5-year Permit term) 3. Notify DEQ if suspect discharge	1. Outfall Reconnaissance Inventory/Sample Collection Field Sheet along with written procedures in Appendix C 2. Documented phone call or email to DEQ.	IDC	40 hours \$1200	Annually	Public Works

**Minimum Performance Measure 4.2.3.4** – Implement standard operating procedures (SOPs) or similar type of documents for tracing the source of an illicit discharge; including visual inspections, and when necessary, opening manholes, using mobile cameras, using field tests of selected chemical parameters as indicators of discharge sources, collecting and analyzing water samples for the purpose of determining sanctions or penalties, and/or other detailed inspection procedures.

**Minimum Performance Measure 4.2.3.5** – Implement standard operating procedures (SOPs) or similar type of documents for characterizing the nature of, and the potential public or environmental threat posed by, any illicit discharges found by or reported to the Permittee by the hotline or other telephone number described in 4.2.3.9. These procedures shall include detailed instructions for evaluating how the discharge shall be immediately contained and steps to be taken for containment of the discharge. Compliance with this provision will be achieved by initiating an investigation immediately upon being alerted of a potential illicit discharge.

**Minimum Performance Measure 4.2.3.5.1** – When the source of a non-storm water discharge is identified and confirmed, the Permittee must record the following information in an inspection report: the date the Permittee became aware of the non-storm water discharge, the date the Permittee initiated an investigation of the discharge, the date the discharge was observed, the location of the discharge, a description of the discharge, the method of discovery, date of removal, repair, or enforcement action; date, and method of removal verification. Analytical monitoring may be necessary to aid in the identification of potential sources of an illicit discharge and to characterize the nature of the illicit discharge. The decision process for utilizing analytical monitoring must be fully documented in the inspection report.

**Minimum Performance Measure 4.2.3.6** – Implement standard operating procedures (SOPs) or similar type of documents for ceasing the illicit discharge, including notification of appropriate authorities; notification of the property owner; technical assistance for removing the source of the discharge or otherwise eliminating the discharge; follow-up inspections; and escalating enforcement and legal actions if the discharge is not eliminated. Illicit discharges to the MS4 are prohibited and any such discharges violate this Permit and remain in violation until they are eliminated. Upon detection, the Permittee shall require immediate cessation of improper disposal practices upon confirmation of responsible parties in accordance with its enforceable legal authorities established pursuant to Part 4.2.3.2.1 of this Permit.

Activity/Product	Measureable Goal	Documentation	Related BMPs	Resources Needed	Due Date/Frequency	Responsible Party
A written plan or SOP will be developed to detect and address non-storm water discharges to the MS4.	All Illicit Discharge Detection and Elimination (IDDE) investigations will be thoroughly investigated and documented.	Illicit Discharge Hotline, Tracking Sheet (see Appendix C), along with SOP in Appendix H	IDC	On an as-needed basis	On an as-needed basis	Public Works Environmental Response Companies

**Minimum Performance Measure 4.2.3.7** – Permittees shall inform public employees, businesses, and the general public of hazards associated with illicit discharges and improper disposal of waste.

Activity/Product	Measureable Goal	Documentation	Related BMPs	Resources Needed	Due Date/Frequency	Responsible Party
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See Public Education and Outreach Chapter Minimum Performance Measures 4.2.1.1 – 4.2.1.3 for this information

**Minimum Performance Measure 4.2.3.8** – Permittees shall promote or provide services for the collection of household hazardous waste.

Activity/Product	Measureable Goal	Documentation	Related BMPs	Resources Needed	Due Date/Frequency	Responsible Party
Promote services for the collection of household hazardous waste. See included information in Appendix A for advertising examples	Post information on disposal locations on City website once or place article in City newsletter annually	City website or newsletter article	HWM	5 hours \$150	Website by July 2016 or Newsletter Annually	Public Works Administration

**Minimum Performance Measure 4.2.3.9** – Permittees shall publicly list and publicize a hotline or other local telephone number for public reporting of spills and other illicit discharges. A written record shall be kept of all calls received, all follow-up actions taken, and any feedback received from public education efforts.

**Minimum Performance Measure 4.2.3.9.1** - The Permittee must develop a written spill/dumping response procedure, and a flow chart for internal use, that shows the procedures for responding to public referrals of illicit discharges, the various responsible agencies and their contacts, and who would be involved in illicit discharge incidence response, even if it is a different entity other than the Permittee. The procedure and list must be incorporated as part of the IDDE program and incorporated into the Permittee’s SWMP document. The list must be maintained and updated as changes occur.

Activity/Product	Measureable Goal	Documentation	Related BMPs	Resources Needed	Due Date/Frequency	Responsible Party
Publicize hotline for the public to report an illicit discharge, and dumping into the storm drain system.	Track the number of calls each year. All calls to be addressed and resolved.	Complete Illicit discharge tracking sheet in Appendix C	IDC PEP	30 hours \$900	July 2016	City
A written spill/dumping response document and flow chart will be developed.	Completed spill response document	An example spill/dumping response document can be found in Appendix C	IDC	1 hour \$30	July 2016	City

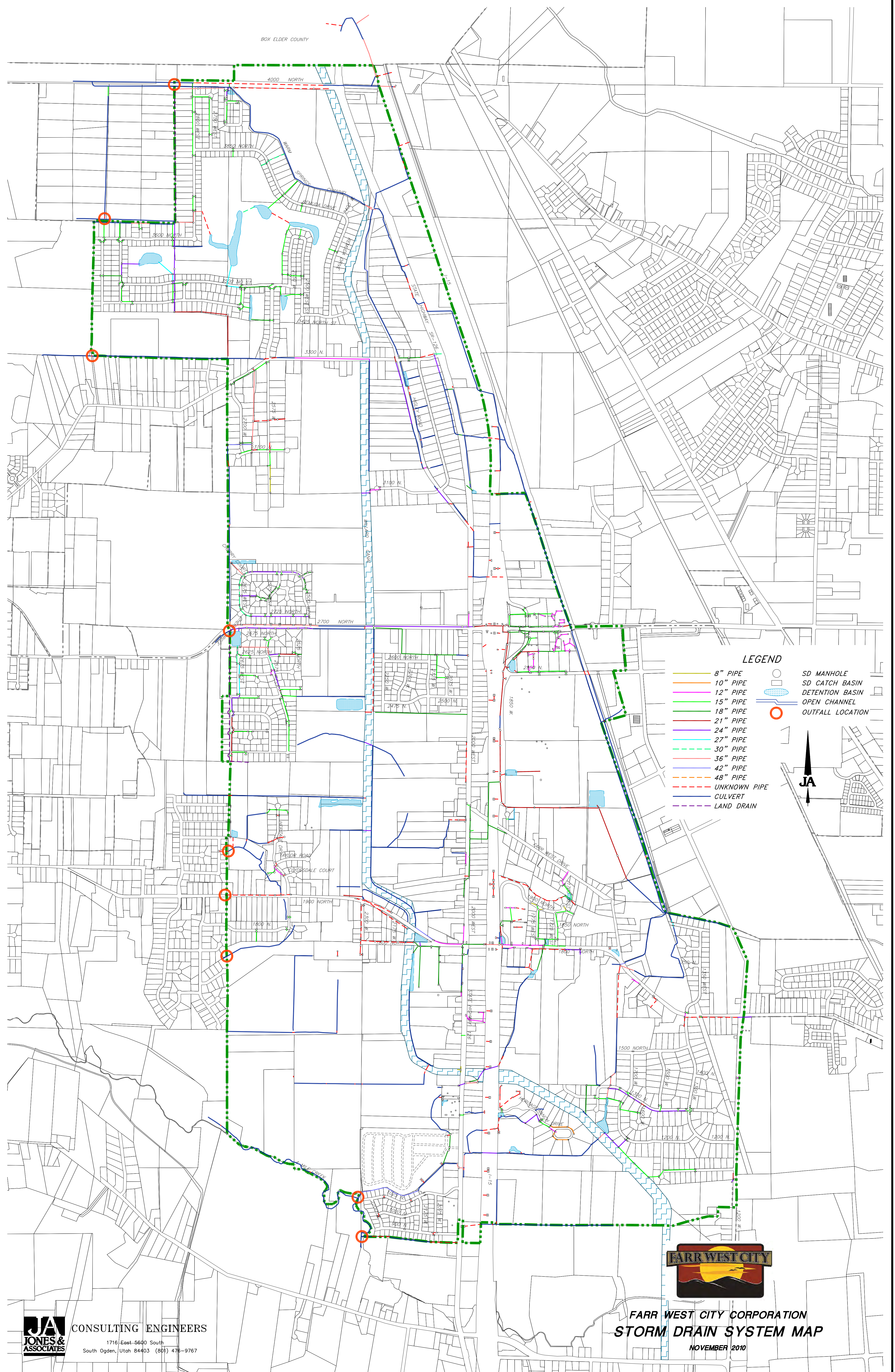
**Minimum Performance Measure 4.2.3.10** – Permittees shall adopt and implement procedures for program evaluation and assessment which includes maintaining a database for mapping, tracking of the number and type of spills or illicit discharges identified; and inspections conducted.

Activity/Product	Measureable Goal	Documentation	Related BMPs	Resources Needed	Due Date/Frequency	Responsible Party
A database will be kept which includes hard files or electronic documents of all inspections, and a storm water map showing outfalls and spill or illicit discharge locations. All data will be used to evaluate compliance with requirements.	Keep all documents relating to spills or illicit discharges and all inspections conducted in one location where all employees can access the information	Illicit discharge tracking sheet (Appendix C), construction site inspection form (Appendix D), and outfall inspection form (Appendix C)	IDC	4 hours \$120	July 2016	Public Works

**Minimum Performance Measure 4.2.3.11** – Permittees shall, at a minimum, annually train employees about the IDDE program including identification, investigation, termination, cleanup, and reporting of illicit discharges including spills, improper disposal, and illicit connections. Permittees shall provide training to all field staff that as part of their normal job responsibilities might come into contact with or otherwise observe an illicit discharge or illicit connection to the MS4. Permittees shall also train office personnel who might receive initial reports of illicit discharges. Training shall include how to identify a spill, an improper disposal, or an illicit connection to the MS4 and proper procedures for reporting the illicit discharge.

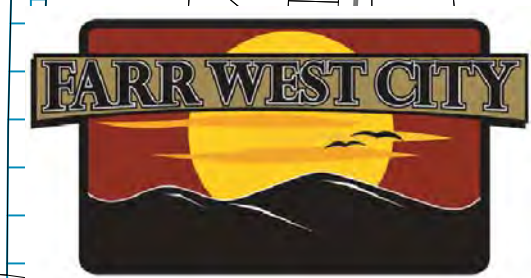
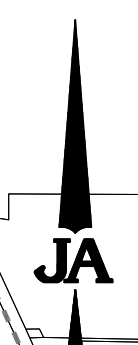
Activity/Product	Measureable Goal	Documentation	Related BMPs	Resources Needed	Due Date/Frequency	Responsible Party
Training will be provided for new hires and employees including field staff and office personnel on how to handle a spill or illicit discharge	<ol style="list-style-type: none"> <li>1. Annually provide training to City staff who are likely to encounter an illicit discharge as part of their job duties</li> <li>2. Immediately train new hires</li> </ol>	Training sign in sheet or similar proof of training	PEP	12 hours \$750	<ol style="list-style-type: none"> <li>1. All employees: July 2016; annually thereafter</li> <li>2. New hires: Immediately upon hire; annually thereafter</li> </ol>	Public Works

BOX ELDER COUNTY



LEGEND

- 8" PIPE
- 10" PIPE
- 12" PIPE
- 15" PIPE
- 18" PIPE
- 21" PIPE
- 24" PIPE
- 27" PIPE
- 30" PIPE
- 36" PIPE
- 42" PIPE
- 48" PIPE
- UNKNOWN PIPE
- CULVERT
- LAND DRAIN
- SD MANHOLE
- SD CATCH BASIN
- DETENTION BASIN
- OPEN CHANNEL
- OUTFALL LOCATION



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**STORM WATER MANAGEMENT PLAN**

**CHAPTER 5**

**CONSTRUCTION SITE RUNOFF CONTROL**

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## CONSTRUCTION SITE STORM WATER RUNOFF CONTROL

Polluted storm water runoff from construction sites often flows to MS4s and ultimately is discharged into local rivers and streams. Pollutants of concern are; sediment, solid and sanitary wastes, oil and grease, concrete truck washout, construction chemicals, and constructions debris. Of the pollutants listed, sediment is usually the main pollutant of concern. During a short period of time, construction sites can contribute more sediment to streams than can be deposited naturally during several decades. The resulting siltation, and the contribution of other pollutants from construction sites, can cause physical, chemical, and biological harm to surrounding waters. For example, excess sediment can quickly fill rivers and lakes, requiring dredging and destroying aquatic habitats.

An operator of a regulated small MS4 is required to develop, implement, and enforce a program to reduce pollutants in storm water runoff to their MS4 from construction activities that result in a land disturbance of greater than or equal to one acre. The small MS4 operator is required to:

- Have an ordinance or other regulatory mechanism requiring the implementation of proper erosion and sediment controls, and controls for other wastes, on applicable construction sites
- Have procedures for site plan review of construction plans that consider potential water quality impacts
- Have procedures for site inspection and enforcement of control measures
- Have sanctions to ensure compliance (established in the ordinance or other regulatory mechanism)
- Establish procedures for the receipt and consideration of information submitted by the public
- Determine the appropriate best management practices (BMPs) and measurable goals for this minimum control measure. Suggested BMPs (i.e., the program actions/activities) and measurable goals

Further explanation and guidance for each component of a regulated small MS4's construction program is provided below:

- 1. Regulatory Mechanism** - Through the development of an ordinance or other regulatory mechanism, the small MS4 operator must establish a construction program that controls polluted runoff from construction sites with a land disturbance of greater than or equal to one acre.
- 2. Site Plan Review** - The small MS4 operator must include in its construction program requirements for the implementation of appropriate BMPs on construction sites to control erosion and sediment and other waste at the site. To determine if a construction site is in



compliance with such provisions, the small MS4 operator should review the site plans submitted by the construction site operator before ground is broken. Site plan review aids in compliance and enforcement efforts since it alerts the small MS4 operator early in the process to the planned use or non-use of proper BMPs and provides a way to track new construction activities. The tracking of sites is useful not only for the small MS4 operator's recordkeeping and reporting purposes, which are required under their UPDES storm water permit, but also for members of the public interested in ensuring that the sites are in compliance.

- 3. Inspections and Penalties** - Once construction commences, BMPs should be in place and the small MS4 operator's enforcement activities should begin. To ensure that the BMPs are properly installed, the small MS4 operator is required to develop procedures for site inspection and enforcement of control measures to deter infractions. Procedures could include steps to identify priority sites for inspection and enforcement based on the nature and extent of the construction activity, topography, and the characteristics of soils and receiving water quality. Inspections give the MS4 operator an opportunity to provide additional guidance and education, issue warnings, or assess penalties. A website has been developed to use as a tool for builders and developers ([www.cicacenter.org](http://www.cicacenter.org)). Inspectors can use the Web site to find plain language explanations of the major environmental laws affecting the construction industry as well as guidance that can be distributed developers and construction site operators. To conserve staff resources, one possible option for small MS4 operators is to have inspections performed by the same inspector that visits the sites to check compliance with health and safety building codes.

Measurable goals, which are required for each minimum control measure, are intended to gauge permit compliance and program effectiveness. The measurable goals, as well as the BMPs, should reflect the needs and characteristics of the operator and the area served by its small MS4. Furthermore, they should be chosen using an integrated approach that fully addresses the requirements and intent of the minimum control measure.

Measurable Goals Guidance for Phase II MS4s has been developed that is designed to help program managers comply with the requirement to develop measurable goals. The guidance presents an approach for MS4 operators to develop measurable goals as part of their storm water management plan. For example, an MS4 program goal might be to educate at least 80 percent of all construction site operators and contractors about proper selection, installation, inspection, and maintenance of BMPs by the end of the permit term, which will help to ensure compliance with erosion and sediment control requirements. This goal could be tracked by documenting attendance at local, State, or Federal training programs. Attendance can be encouraged by decreasing permitting fees for those contractors who have been trained and provide proof of attendance when applying for permits.

### Construction Site Runoff Control Strategy

The General Permit states that “All Permittees shall revise as necessary, implement and enforce a program to reduce pollutants in any storm water runoff to the MS4 from construction sites with a land disturbance of greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale according to the minimum performance measures listed below. Public and private projects, including projects proposed by the Permittee’s own departments and agencies, shall comply with these requirements.” The following is a summary table listing each minimum performance measure, activities or products, measurable goals, how documentation will be kept, and responsible party to meet the requirements of the General Permit.

#### Construction Site Runoff Control

**Minimum Performance Measure 4.2.4.1** – Revise as necessary and enforce an ordinance or other regulatory mechanism that requires the use of erosion and sediment control practices at construction sites. The ordinance or other regulatory mechanism shall, at a minimum, be equivalent with the technical requirements set forth in the UPDES Storm Water General Permit for Construction Activities, UTRC00000, and UPDES General Storm Water Permit for Construction Activity Connected with Single Lot Housing Projects, UTRH00000, which both can be found at <http://www.deq.utah.gov/Permits/water/updes/stormwatercon.htm>. The ordinance or other regulatory mechanism shall include sanctions to ensure compliance. The ordinance or other regulatory mechanism shall apply, at a minimum, to construction projects disturbing greater than or equal to one acre and to construction projects of less than one acre that are part of a larger common plan of development or sale. Existing local requirements to apply storm water controls at smaller sites shall be retained.

**Minimum Performance Measure 4.2.4.1.1** – The ordinance or other regulatory mechanism shall, at a minimum, require construction operators to prepare a Storm Water Pollution Prevention Plan (SWPPP) and apply sediment and erosion control BMPs as necessary to protect water quality, reduce the discharge of pollutants, and control waste such as, but not limited to, discarded building materials, concrete truck washout, chemicals, litter and sanitary waste at the construction site that may cause adverse impacts to water quality. The SWPPP requirements must be, at a minimum, equivalent with the SWPPP requirement set forth in the UPDES General Permit for Discharges from Construction Activities, UTRC00000, or UPDES General Storm Water Permit for Construction Activity Connected with Single Lot Housing Projects, UTRH00000.

**Minimum Performance Measure 4.2.4.1.2** – Permittee shall ensure construction operators obtain and maintain coverage under the current UPDES Storm Water General Permits for Construction Activities for the duration of the project. Coverage can be obtained by completing an NOI as well as renewed at: <https://secure.utah.gov/account/log-in.html>.

**Minimum Performance Measure 4.2.4.1.3** – The ordinance shall include a provision for access by qualified personnel to inspect construction storm water BMPs on private properties that discharge to the MS4.

Activity/Product Related BMPs	Measureable Goal	Documentation	Related BMPs	Resources Needed	Due Date/ Frequency	Responsible Party
The city will revise as necessary a storm water ordinance that addresses requirements for construction sites that are one acre or greater or part of a common plan of development.	Storm water ordinance that reflects the General Permit requirements	Copy of ordinance		See Minimum Performance Measure 4.2.3.2 & 4.2.3.2.1 in Chapter 4	July 2016; update as necessary	City Attorney City Administration City Council City Engineers Public Works

**Minimum Performance Measure 4.2.4.2** – Develop a written enforcement strategy and implement the enforcement provisions of the ordinance or other regulatory mechanism which shall include:  
**Minimum Performance Measure 4.2.4.2.1** – Standard operating procedures (SOPs) or similar type of documents that include specific processes and sanctions to minimize the occurrence of, and obtain compliance from violators which shall include appropriate, escalating enforcement procedures and actions.  
**Minimum Performance Measure 4.2.4.2.2** – Documentation and tracking of all enforcement actions.

Activity/Product	Measureable Goal	Documentation	Related BMPs	Resources Needed	Due Date/Frequency	Responsible Party
SOPs have been developed and can be found in Appendix H The SOPs will be reviewed and updated to correspond to the updated ordinance and address escalation of force procedures	Updated SOPs. Documentation of all enforcement actions including verbal warnings	Updated SOP Document and documentation of enforcement actions	ET	4 hours \$120	July 2016; Update as necessary	Public Works City Engineers

**Minimum Performance Measure 4.2.4.3** – Develop and implement SOPs or similar type of documents for pre-construction Storm Water Pollution Prevention Plan (SWPPP) review and keep records for, at a minimum, all construction sites that disturb greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale, to ensure plans are complete and in compliance with State and Local regulations. Permittees shall keep records of these projects for five years or until construction is completed, whichever is longer. Prior to construction, the Permittee shall:  
**Minimum Performance Measure 4.2.4.3.1** – Conduct a pre-construction SWPPP review which includes a review of the site design, the planned operations at the construction site, planned BMPs during the construction phase, and the planned BMPs to be used to manage runoff created after development.  
**Minimum Performance Measure 4.2.4.3.2** – Incorporate into the SWPPP review procedures the consideration of potential water quality impacts and procedures for pre-construction review which shall include the use of a checklist.  
**Minimum Performance Measure 4.2.4.3.3** –Identify priority construction sites considering the following factors at a minimum: soil erosion potential; site slope; project size and type; sensitivity of receiving water bodies; proximity to receiving waterbodies; and non-storm water discharges and past record of non-compliance by the operators of the construction site.

Activity/Product	Measureable Goal	Documentation	Related BMPs	Resources Needed	Due Date/Frequency	Responsible Party
A SWPPP checklist & Storm Water Construction Activity Permit Application have been developed and can be found in Appendix D. The preconstruction process will be re-evaluated to better address storm water issues including identifying priority construction sites, etc.	Develop a SOP that addresses pre-construction storm water issues.	Finished SOP		8 hours \$240	July 2016	City Administration City Engineers Public Works

**Minimum Performance Measure 4.2.4.4** – All Permittees shall develop and implement SOPs or similar type of documents for construction site inspection and enforcement of construction storm water pollution control measures. The procedures must clearly define who is responsible for site inspections as well as who has authority to implement enforcement procedures. The Permittee must have the authority to the extent authorized by law to impose sanctions to ensure compliance with the local program. These procedures and regulatory authorities must be written and documented in the SWMP. The construction site storm water runoff control inspection program must provide:  
**Minimum Performance Measure 4.2.4.4.1** – Inspections of all new construction sites with a land disturbance of greater than or equal to one acre, including projects less than one

acre that are part of a larger common plan of development or sale at least monthly by qualified personnel using the Construction Storm Water Inspection Form (Checklist) found on the Division's website at <http://www.deq.utah.gov/Permits/water/updes/stormwatercon.htm>. The checklist can also be found in Appendix D.

**Minimum Performance Measure 4.2.4.4.2** – The Permittee must inspect all phases of construction: prior to land disturbance, during active construction, and following active construction. The Permittee must include in its SWMP document a procedure for being notified by construction operators/owners of their completion of active construction so that verification of final stabilization and removal of all temporary control measures may be conducted.

**Minimum Performance Measure 4.2.4.4.3** – Inspections by the MS4 of priority construction sites defined in Part 7.36 must be conducted at least biweekly using the Construction Storm Water Inspection Form (Checklist) found on the Division's website at <http://www.deq.utah.gov/Permits/water/updes/stormwatercon.htm>. The checklist can also be found in Appendix D.

**Minimum Performance Measure 4.2.4.4.4** – Based on -site inspection findings, the permittee must take all necessary follow-up actions (i.e., re-inspection, enforcement) to ensure compliance in accordance with the permittee's enforcement strategy. These follow-up and enforcement actions must be tracked and documented.

**Minimum Performance Measure 4.2.4.4.5** – Permittee shall publicly provide and publicize a hotline for public reporting of storm water related issues on construction sites. Records of violations, enforcement actions, and corrective actions taken shall be tracked and documented.

Activity/Product	Measureable Goal	Documentation	Related BMPs	Resources Needed	Due Date/Frequency	Responsible Party
A SOP will be developed which addresses who will be responsible for construction site inspections as well as who has enforcement authority according to the City ordinance. All phases of construction will be inspected.	Develop a SOP that addresses construction site inspections. Inspect all required construction sites monthly and during all phases of construction. Identify priority construction sites. Use Construction Storm Water Inspection Form for inspections.	Finished SOP. Construction Storm Water Inspection Form		Initial 4 hours - \$120  Ongoing (monthly) 32 hours \$960	SOP by July 2016; Inspections monthly	City Engineers Public Works
Provide and publicize hotline for reporting of storm water related issues on construction sites.	1. Establish hotline. 2. Require on-site notice to include phone number.	1. Hotline established. 2. Requirement added to City standards.		2 hours - \$200	July 2016	Public Works City

**Minimum Performance Measure 4.2.4.5** – The Permittee must ensure that all staff whose primary job duties are related to implementing the construction storm water program, including permitting, plan review, construction site inspections, and enforcement, are trained annually to conduct these activities. New hires shall be trained immediately, then annually thereafter. The training can be conducted by the MS4 or outside training can be attended. Such training must extend to third-party inspectors and plan reviewers as well. The training records to be kept include dates, activities or course descriptions, and names and positions of staff in attendance.

Activity/Product	Measureable Goal	Documentation	Related BMPs	Resources Needed	Due Date/Frequency	Responsible Party
Staff whose job duties are related to the storm water will be trained on the construction program	Have all related staff attend at least one training per year	Attendance roll, training invoice	ET	24 hours \$720	Annually	City

**Minimum Performance Measure 4.2.4.6** – All Permittees shall adopt and implement a procedure to maintain records of all projects disturbing greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale. Permittees shall keep records which include but are not limited to, site plan reviews, SWPPPs, inspections and enforcement actions including verbal warnings, stop work orders, warning letters, notices of violation, and other enforcement records. Permittees shall keep records of these projects for five years or until construction is completed, whichever is longer.

Activity/Product	Measureable Goal	Documentation	Related BMPs	Resources Needed	Due Date/ Frequency	Responsible Party
Keep records of all SWPPP reviews, inspections, and all enforcement actions	Keep accurate records of all required items in a central spot	SWPPP Checklist see Appendix D		5 hours \$150	July 2016; As needed	Public Works City Engineers



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**STORM WATER MANAGEMENT PLAN**

**CHAPTER 6**

**LONG-TERM STORM WATER MANAGEMENT IN NEW  
DEVELOPMENT AND REDEVELOPMENT  
(POST-CONSTRUCTION RUNOFF CONTROL)**

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## **LONG-TERM STORM WATER MANAGEMENT IN NEW DEVELOPMENT AND REDEVELOPMENT (POST-CONSTRUCTION STORM WATER MANAGEMENT)**

Post-construction storm water management in areas undergoing new development or redevelopment is necessary because runoff from these areas has been shown to significantly affect receiving waterbodies. Studies indicate that prior planning and design for the minimization of pollutants in post-construction storm water discharges is the most cost-effective approach to storm water quality management.

There are generally two forms of substantial impacts of post-construction runoff. The first is caused by an increase in the type and quantity of pollutants in storm water runoff. As runoff flows over areas altered by development, it picks up harmful sediment and chemicals such as oil and grease, pesticides, heavy metals, and nutrients (e.g., nitrogen and phosphorus). These pollutants often become suspended in runoff and are carried to receiving waters, such as lakes, ponds, and streams. Once deposited, these pollutants can enter the food chain through small aquatic life, eventually entering the tissues of fish and humans. The second kind of post-construction runoff impact occurs by increasing the quantity of water delivered to the waterbody during storms. Increased impervious surfaces (e.g., parking lots, driveways, and rooftops) interrupt the natural cycle of gradual percolation of water through vegetation and soil. Instead, water is collected from surfaces such as asphalt and concrete and routed to drainage systems where large volumes of runoff quickly flow to the nearest receiving water. The effects of this process include streambank scouring and downstream flooding, which often lead to a loss of aquatic life and damage to property.

### **Requirements**

An operator of a regulated small MS4 is required to revise as necessary, implement, and enforce a program to address post-construction storm water runoff to their MS4 from new development and redevelopment projects that result in the land disturbance of greater than or equal to 1 acre or that are part of a common plan of development. The small MS4 operator is required to:

- Develop and implement strategies which include a combination of structural and/or non-structural best management practices (BMPs);
- Have an ordinance or other regulatory mechanism requiring the implementation of post-construction runoff controls to the extent allowable under State or local law, including the evaluation of Low Impact Development (LID) and on-site retainage of the 90<sup>th</sup> percentile rainfall event;
- Develop and define specific hydrologic method(s) for calculating runoff volumes and rates to ensure consistent sizing of structural BMPs in their jurisdiction;
- Ensure adequate long-term operation and maintenance of controls; and
- Determine the appropriate best management practices and measurable goals for this minimum control measure.



The storm water requirements apply to “redevelopment” projects that alter the “footprint” of an existing site or building in such a way that there is a disturbance of equal to or greater than 1 acre of land. Redevelopment projects do not include such activities as exterior remodeling. Because redevelopment projects may have site constraints not found on new development sites, the requirements provide flexibility for implementing post-construction controls on redevelopment sites.

### **BMPs**

Structural and non-structural BMPs can be used to satisfy the requirements of the post-construction control measure. It is important to recognize that many BMPs are climate-specific and not all BMPs can be used in every geographic area. Because the requirements of this measure are closely tied to the requirements of the construction site runoff control minimum measure it is recommended that small MS4 operators develop and implement these two measures in tandem.

#### ○ **Non-Structural BMPs**

- **Planning Procedures.** Runoff problems can be addressed efficiently with sound planning procedures. Local master plans, comprehensive plans, and zoning ordinances can promote improved water quality in many ways, such as guiding the growth of a community away from sensitive areas to areas that can support it without compromising water quality.
- **Site-Based BMPs.** These BMPs can include buffer strip and riparian zone preservation, minimization of disturbance and imperviousness, and maximization of open space.

#### ○ **Structural BMPs**

- **Storm Water Detention BMPs.** detention BMPs control storm water by gathering runoff in wet ponds, dry basins, or multichamber catch basins and slowly releasing it to receiving waters or drainage systems. These practices can be designed to both control storm water volume and settle out particulates for pollutant removal.
- **Infiltration BMPs.** Infiltration BMPs are designed to facilitate the percolation of runoff through the soil to ground water, and, thereby, result in reduced storm water runoff quantity and reduced mobilization of pollutants. Examples include infiltration basins/trenches, retention basins, dry wells, and porous pavement.
- **Vegetative BMPs.** Vegetative BMPs are landscaping features that, with optimal design and good soil conditions, remove pollutants, and facilitate percolation of runoff, thereby maintaining natural site hydrology, promoting healthier habitats, and increasing aesthetic appeal. Examples include grassy swales, filter strips, artificial wetlands, and rain gardens.

Measurable goals, which are required for each minimum control measure, are intended to gauge permit compliance and program effectiveness. The measurable goals, as well as the BMPs,

should reflect needs and characteristics of the operator and the area served by its small MS4. Furthermore, the measurable goals should be chosen using an integrated approach that fully addresses the requirements and intent of the minimum control measure. For example, an MS4 program goal might be to reduce by 30 percent the road surface areas directly connected to storm sewer systems (using traditional curb and gutter infrastructure) in new developments and redevelopment areas over the course of the first permit term. Using “softer” storm water conveyance approaches, such as grassy swales, will increase infiltration and decrease the volume and velocity of runoff leaving development sites. Progress toward the goal could be measured by tracking the linear feet of curb and gutter not installed in development projects that historically would have been used.

**Long-Term Storm Water Management in New Development and Redevelopment (Post-Construction Storm Water Management Strategy)**

The General Permit states that “All Permittees shall revise as necessary, implement and enforce a program to address post-construction storm water runoff to the MS4 from new development and redevelopment construction sites disturbing greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale, according to the minimum performance measures listed below. The objective of this control measure is for the hydrology associated with new development to mirror the pre-development hydrology of the previously undeveloped site or to improve the hydrology of a redeveloped site and reduce the discharge of storm water. The water quality considerations of this minimum control measure do not replace or substitute for water quantity or flood management requirements implemented on the local level for new developments. The water quality controls may be incorporated into the design of structures intended for flow control; or water quality control may be achieved with separate control measures. The program must apply to private and public development sites, including roads.” The following is a summary table listing each minimum performance measure, activities, or products, measurable goals, how documentation will be kept, and responsible party to meet the requirements of the General Permit.

**Long-Term Storm Water Management in New Development and Redevelopment  
(Post-Construction Storm Water Management)**

**Minimum Performance Measure 4.2.5.1** – Develop and adopt an ordinance or other regulatory mechanism that requires long-term post-construction storm water controls at new development and redevelopment sites. The ordinance or other regulatory mechanism shall apply, at a minimum, to new development and redevelopment sites that discharge to the MS4 and that disturb greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale. The ordinance or other regulatory mechanism shall, at a minimum, be equivalent with the technical requirements set forth in the UPDES Storm Water General Permit for Construction Activities, UTRC00000 which can be found at <http://www.deq.utah.gov/Permits/water/updes/stormwatercon.htm>. Existing local requirements to apply storm water controls at smaller sites shall be retained. The ordinance or other regulatory mechanism shall require BMP selection, design, installation, operation and maintenance standards necessary to protect water quality and reduce the discharge of pollutants to the MS4.

Activity/Product	Measureable Goal	Documentation	Related BMPs	Resources Needed	Due Date/Frequency	Responsible Party
City storm water ordinance. The ordinance will be completed and ensure that that it addresses the most current General Permit requirements	Update storm water ordinance to reflect the General Permit requirements	Copy of updated ordinance		See Minimum Performance Measure 4.2.3.2 & 4.2.3.2.1 in Chapter 4	July 2016	City Attorney City Administration City Council City Engineers Public Works

**Minimum Performance Measure 4.2.5.2** – Implement an enforcement strategy and implement the enforcement provisions of the ordinance or other regulatory mechanism. Procedures for enforcement of BMPs include:

**Minimum Performance Measure 4.2.5.2.1** – Procedures that include specific processes and sanctions to minimize the occurrence of, and obtain compliance from, chronic and recalcitrant violators which shall include appropriate, escalating enforcement procedures and actions.

**Minimum Performance Measure 4.2.5.2.2** – Documentation on how the requirements of the ordinance or other regulatory mechanism will protect water quality and reduce the discharge of pollutants to the MS4. Documentation shall include:

- How long-term storm water BMPs were selected;
- The pollutant removal expected from the selected BMPs; and
- The technical basis which supports the performance claims for the selected BMPs.

Activity/Product	Measureable Goal	Documentation	Related BMPs	Resources Needed	Due Date/Frequency	Responsible Party
Enforcement strategy BMPs to help address long-term storm water BMPs, pollutant removal from BMPs, and the technical basis for the BMPs	Completed enforcement strategy BMP	Written enforcement strategy with documentation	IDC LUPM	12 hours \$720	July 2016	City Attorney City Administration City Council Public Works City Engineers

**Minimum Performance Measure 4.2.5.3** – The Permittee’s new development/redevelopment program must have requirements or standards to ensure that any storm water controls or management practices for new development and redevelopment will prevent or minimize impacts to water quality.

**Minimum Performance Measure 4.2.5.3.1** – The Permittee’s new development/redevelopment program should include non-structural BMPs such as requirements and standards to minimize development in areas susceptible to erosion and sediment loss; to minimize the disturbance of native soils and vegetation; to preserve areas in the municipality that provide important water quality benefits; to implement measures for flood control; and to protect the integrity of natural resources and sensitive areas.

**Minimum Performance Measure 4.2.5.3.2** – For new development or redevelopment projects that disturb greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale, the program shall include a process which requires evaluation of a Low Impact Development (LID) approach which encourages the implementation of structural BMPs, where practicable, that infiltrate, evapotranspire or harvest and use storm water from the site to protect water quality. Structural controls may include green infrastructure practices such as rainwater harvesting, rain gardens, permeable pavement, and vegetated swales. If an LID approach cannot be utilized, the Permittee must document an explanation of the reasons preventing this approach and the rationale *for the chose alternative controls* on a case by case basis for each project.

**Minimum Performance Measure 4.2.5.3.3** – The Permittee must develop a plan to retrofit existing developed sites that are adversely impacting water quality. The retrofit plan must be developed to emphasize controls that infiltrate, evapotranspire or harvest and use storm water discharges. The plan must include a ranking of control measures to determine those best suited for retrofitting as well as those that could later be considered for retrofitting. The Permittee must include the following when developing the criteria for the retrofit plan:

- Proximity to waterbody
- Status of waterbody to improve impaired waterbodies and protect unimpaired waterbodies
- Hydrologic condition of the receiving waterbody
- Proximity to sensitive ecosystem or protected area
- Any upcoming sites that could be further enhanced by retrofitting storm water controls

**Minimum Performance Measure 4.2.5.3.4** – Each Permittee shall develop and define specific hydrologic method or methods for calculating runoff volumes and flow rates to ensure consistent sizing of structural BMPs in their jurisdiction and to facilitate plan review. New development or redevelopment projects that disturb greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale must manage rainfall on-site, and prevent the off-site discharge of the

precipitation from all rainfall events less than or equal to the 90th percentile rainfall event. This objective must be accomplished by the use of practices that are designed, constructed, and maintained to infiltrate, evapotranspire and/or harvest and reuse rainwater. The 90th percentile rainfall event is the event whose precipitation total is greater than or equal to 90 percent of all storm events over a given period of record. If meeting this retention standard is technically infeasible, a rationale shall be provided on a case by case basis for the use of alternative design criteria. The project must document and quantify that infiltration, evapotranspiration and rainwater harvesting have been used to the maximum extent technically feasible and that full employment of these control are infeasible due to site constraints.

Activity/Product	Measureable Goal	Documentation	Related BMPs	Resources Needed	Due Date/Frequency	Responsible Party
Develop SOPs that address the impacts to water quality by identifying sensitive areas, evaluating LID approaches, identifying possible retrofit areas, specify post-construction BMP design criteria, etc.	SOPs in place to address permit requirements by due date	Written SOPs kept in SWMP	LUPM DIDM	40 hours \$2800	July 2016	Public Works City Engineers
Develop a list of LID measures acceptable to the City.	List of acceptable LID measures/ practices	List of acceptable LID measures/ practices in city standards		12 hours \$1200	July 2016; update as needed	Public Works City Engineers
Develop and define specific hydrologic method(s) for calculating runoff volumes and flow rates	Development of specific hydrologic method	Incorporate specific hydrologic method into city standards		12 hours \$1200	September 2016	Public Works City Engineers

**Minimum Performance Measure 4.2.5.4** – All Permittees shall adopt and implement procedures for site plan review which incorporate consideration of water quality impacts. The procedures shall apply through the life of the project from conceptual design to project closeout. Prior to construction, Permittees shall:

**Minimum Performance Measure 4.2.5.4.1** – Review post-construction plans for, at a minimum, all new development and redevelopment sites that disturb greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale, to ensure that the plans include long-term storm water management measures that meet the requirements of this minimum control measure.

**Minimum Performance Measure 4.2.5.4.2** – Permittees shall provide developers and contractors with preferred design specifications to more effectively treat storm water for different development types such as industrial parks, commercial strip malls, retail gasoline outlets, restaurants, parking lots, automotive service facilities, street and road construction, and projects located in, adjacent to, or discharging to environmentally sensitive areas.

**Minimum Performance Measure 4.2.5.4.3** – Permittees shall keep a representative copy of information that is provided to design professionals; and if information is distributed to a large number of design professionals at once, the dates of the mailings and lists of recipients.

Activity/Product	Measureable Goal	Documentation	Related BMPs	Resources Needed	Due Date/Frequency	Responsible Party
SOPs for site plan review to consider the water quality impacts including: post-construction plans review, giving contractors & developers information regarding preferred design methods, keeping documentation	SOPs to address permit requirements. Develop and keep a copy of information given to design professionals	Written procedure. Copy of design information given to design professionals		20 hours \$1400	July 2016	City Administration Public Works City Engineers

**Minimum Performance Measure 4.2.5.5** – All Permittees shall adopt and implement SOPs or similar type of documents for site inspection and enforcement of post-construction storm water control measures. These procedures must ensure adequate ongoing long-term operation and maintenance of approved storm water control measures.

**Minimum Performance Measure 4.2.5.5.1** – The ordinance or other regulatory mechanism shall include provisions for both construction-phase and post-construction access for Permittees to inspect storm water control measures on private properties that discharge to the MS4 to ensure that adequate maintenance is being performed. The ordinance or other regulatory mechanism may, in lieu of requiring g that the Permittee’s staff inspect and maintain storm water controls on private property, instead require private property owner/operators or qualified third parties to conduct maintenance and provide annual certification that adequate maintenance has been performed and the structural controls are operating as designed to protect water quality. In this case, the Permittee must require a maintenance agreement addressing maintenance requirements for any control measures installed on site. The agreement must allow the Permittee to conduct oversight inspections of the storm water control measures and also account for transfer of responsibility in leases and/or deeds. The agreement must also allow the Permittee to perform necessary maintenance or corrective actions neglected by the property owner/operator, and bill or recoup costs from the property owner/operator as needed.

**Minimum Performance Measure 4.2.5.5.2** – Permanent structural BMPs shall be inspected at least once during installation by qualified personnel. Upon completion, the Permittee must verify that long-term BMPs were constructed as designed.

**Minimum Performance Measure 4.2.5.5.3** – Inspections and any necessary maintenance must be conducted annually by either the Permittee or through a maintenance agreement, the property owner/operator. On sites where the property owner/operator is conducting maintenance, the Permittee shall inspect those storm water control measures at least once every five years, or more frequently as determined by the Permittee to verify and ensure that adequate maintenance is being performed. The Permittee must document its findings in an inspection report which includes the following:

- Inspection date;
- Name and signature of inspector;
- Project location
- Current ownership information
- A description of the condition of the storm water control measure including the quality of: vegetation and soils; inlet and outlet channels and structures; catch basins; spillways; weirs, and other control structures; and sediment and debris accumulation in storage as well as in and around inlet and outlet structures;
- Specific maintenance issues or violations found that need to be corrected by the property owner or operator along with deadlines and reinspection dates.

Activity/Product	Measureable Goal	Documentation	Related BMPs	Resources Needed	Due Date/Frequency	Responsible Party
SOPs have been developed to address post-construction issues – see Appendix E Procedure Relating to MS4 Regulation 4.2.5.5.1.	Completed SOPs	SOPs can be found in Appendix H.		See Minimum Performance Measure 4.2.3.2 & 4.2.3.2.1 in Chapter 4	July 2016	City Attorney City Administration City Council City Engineers Public Works

**Minimum Performance Measure 4.2.5.6** – Permittees shall provide annual training for all staff involved in post-construction storm water management, planning and review, and inspections and enforcement. New hires shall be trained upon hire and before commencing storm water related duties. Training shall be provided or made available for staff in the fundamentals of long-term storm water management through the use of structural and non-structural control methods. The training records to be kept include dates, activities or course descriptions, and names and positions of staff in attendance.

Activity/Product	Measureable Goal	Documentation	Related BMPs	Resources Needed	Due Date/Frequency	Responsible Party
Staff whose job duties are related to the storm water will be trained on the post-construction program	Have all related staff attend training	Attendance roll, training invoice	ET	24 hours \$720	Annually	City

**Minimum Performance Measure 4.2.5.7** – The Permittee must maintain an inventory of all post-construction structural storm water control measures installed and implemented at new development and redeveloped sites that disturb greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale. This inventory shall include both public and private sector sites located within the Permittee’s service area.

**Minimum Performance Measure 4.2.5.7.1** – Each entry to the inventory must include basic information on each project, such as project’s name, owner’s name and contact information, location, start/end date, etc. In addition, inventory entries must include the following for each project:

- Short description of each storm water control measure (type, number, design or performance specifications);
- Short description of maintenance requirements (frequency of required maintenance and inspections); and
- Inspection information (date, findings, follow up activities, prioritization of follow-up activities, compliance status).

**Minimum Performance Measure 4.2.5.7.2** – Based on inspections conducted pursuant to Part 4.2.5.5., the Permittee must update the inventory as appropriate where changes occur in property ownership or the specific control measures implemented at the site.

Activity/Product	Measureable Goal	Documentation	Related BMPs	Resources Needed	Due Date/Frequency	Responsible Party
Maintain an inventory of all post-construction storm water controls for required sites, update the inventory as necessary	Inventory of all post-construction storm water controls. Update the inventory as required	Inventory forms with required information		4 hours \$120	July 2016; as needed thereafter	Public Works





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**STORM WATER MANAGEMENT PLAN**

**CHAPTER 7**

**POLLUTION PREVENTION/GOOD HOUSEKEEPING**

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## POLLUTION PREVENTION/GOOD HOUSEKEEPING

The Pollution Prevention/Good Housekeeping for municipal operations minimum control measure is a key element of the small MS4 storm water management program. This measure requires the small MS4 operator to examine and subsequently alter their own actions to help ensure a reduction in the amount and type of pollution that: (1) collects on streets, parking lots, open spaces, and storage and vehicle maintenance areas and is discharged into local waterways; and (2) results from actions such as environmentally damaging land development and flood management practices or poor maintenance of storm sewer systems.

While this measure is meant primarily to improve or protect receiving water quality by altering municipal or facility operations, it also can result in a cost savings for the small MS4 operator, since proper and timely maintenance of storm sewer systems can help avoid repair costs from damage caused by age and neglect.

Recognizing the benefits of pollution prevention practices, the rule requires an operator of a regulated small MS4 to:

- Develop and implement an operation and maintenance program with the ultimate goal of preventing or reducing pollutant runoff from municipal operations into the storm sewer system
- Include employee training on how to incorporate pollution prevention/good housekeeping practices into municipal operations such as park and open space maintenance, fleet and building maintenance, new construction and land disturbances, and storm water system maintenance. To minimize duplication of effort and conserve resources, the MS4 operator can use training materials that are available from the EPA, the State, or County Storm Water Coalitions
- Determine the appropriate best management practices (BMPs) and measureable goals for this minimum control measure.

The intent of this control measure is to ensure that existing municipal, State or Federal operations are performed in ways that will minimize contamination of storm water discharges. The small MS4 operator to consider the following components when developing their program for this measure:

- ***Maintenance activities, maintenance schedules, and long-term inspection procedures*** for structural and non-structural controls to reduce floatables and other pollutants discharged from the separate storm sewers
- ***Controls for reducing or eliminating the discharge of pollutants*** from areas such as roads and parking lots, maintenance and storage yards (including salt/sand storage and snow disposal areas), and waste transfer stations. These controls could include programs

that promote recycling (to reduce litter), minimize pesticide use, and ensure the proper disposal of animal waste

- ***Procedures for the proper disposal of waste*** removed from separate storm sewer systems and areas listed in the bullet above, including dredge spoil, accumulated sediments, floatables, and other debris
- ***Ways to ensure that new flood management projects assess the impacts on water quality*** and examine existing projects for incorporation of additional water quality protection devices or practices. EPA encourages coordination with flood control managers for the purpose of identifying and addressing environmental impacts from such projects

The effective performance of this control measure hinges on the proper maintenance of the BMPs used, particularly for the first two bullets above. For example, structural controls, such as grates on outfalls to capture floatables, typically need regular cleaning, while non-structural controls, such as training materials and recycling programs, need periodic updating.

Measurable goals, which are required for each minimum control measure, are meant to gauge permit compliance and program effectiveness. The measurable goals, as well as the BMPs, should consider the needs and characteristics of the operator and the area served by its small MS4. The measurable goals should be chosen using an integrated approach that fully addresses the requirements and intent of the minimum control measure. For example, an MS4 program goal might be to incorporate the use of road salt alternatives for highway deicing and reduce traditional road salt use by 50 percent in the first year of the permit term.

### Pollution Prevention and Good Housekeeping for Municipal Operations Strategy

The General Permit states that “All Permittees shall implement a program for Permittee-owned or operated facilities, operations and structural storm water controls that includes standard operating procedures (SOPs), pollution prevention BMPs, storm water pollution prevention plans or similar type of documents, and a training component that have the ultimate goal of preventing or reducing the runoff of pollutants to the MS4 and Waters of the State. All components of the program shall be included in the SWMP document and must identify the department (and where appropriate, the specific staff) responsible for performing each activity described in this section. The Permittee must develop an inventory of all such Permittee-owned or operated facilities. The Permittee must review this inventory annually and update as necessary.”

#### Pollution Prevention and Good Housekeeping for Municipal Operations

**Minimum Performance Measure 4.2.6.1** – Permittees shall develop and keep current a written inventory of Permittee-owned or operated facilities and storm water controls that may include but is not limited to: Composting facilities Equipment storage and maintenance facilities; Fuel farms; Hazardous waste disposal facilities; Hazardous waste handling and transfer facilities ; Incinerators; Landfills; Landscape maintenance on municipal property; Materials storage yards; Pesticide storage facilities; Public buildings, including libraries, police stations, fire stations, municipal; buildings, and similar Permittee-owned or operated buildings; Public parking lots; Public golf courses; Public swimming pools; Public works yards; Recycling facilities; Salt storage facilities; Solid waste handling and transfer facilities; Street repair and maintenance sites; Vehicle storage and maintenance yards; and Permittee-owned and/or maintained structural storm water controls. Facilities covered under the General UPDES Permit for Storm Water Discharges Associated with Industrial Activities do not need to develop an O & M program but must instead maintain the Storm Water Pollution Prevention Plan (SWPPP) required by that permit.

**Minimum Performance Measure 4.2.6.2** – All Permittees shall assess the written inventory of Permittee-owned or operated facilities, operations and storm water controls identified in Part 4.2.6.1. for their potential to discharge to storm water the following typical urban pollutants: sediment, nutrients, metals, hydrocarbons (e.g., benzene, toluene, ethylbenzene and xylene), pesticides, chlorides, and trash. Other pollutants may be associated with, but not generated directly from, the municipally-owned or operated facilities, such as bacteria, chlorine, organic matter, etc. Therefore, the Permittee must determine additional pollutants associated with its facilities that could be found in storm water discharges. A description of the assessment process and findings must be included in the SWMP document.

**Minimum Performance Measure 4.2.6.3** – Based on the assessment required in Part 4.2.6.2., the Permittee must identify as “high-priority” those facilities or operations that have a high potential to generate storm water pollutants. Among the factors that must be considered in giving a facility a high priority ranking is the amount of urban pollutants stored at the site, the identification of improperly stored materials, activities that must be performed outside (e.g., changing automotive fluids), proximity to waterbodies, poor housekeeping practices, and discharge of pollutant(s) of concern to impaired water(s).

Activity/Product	Measureable Goal	Documentation	Related BMPs	Resources Needed	Due Date/Frequency	Responsible Party
Create a list of city owned facilities. Assess the list for each facility’s potential to discharge pollutants and identify any high priority facilities	Written list of each facility the city owns with associated pollutants, listing any facilities that are high priority. Update the list as new facilities are built	Written document that is kept in this SWMP		3 hours\$90	July 2016	Public Works

**Minimum Performance Measure 4.2.6.4** – Permittee shall develop and implement a Storm Water Pollution Prevention Plan (SWPPP) or similar type document for each “high-priority” Permittee-owned or operated facility. The SWPPP shall identify potential sources of pollution that may reasonably be expected to affect the quality of storm water discharges associated with activity from the facility. The SWPPP shall describe and ensure the implementation of standard operating practices (SOPs) that are to be used to reduce the pollutants in storm water discharges associated with activity at the facility and to ensure compliance with the terms and conditions of this Permit. This document shall be tailored and retained at all “high priority” facility locations. The SWPPP shall include a site map showing the information listed in paragraph 4.2.6.4.

Activity/Product Related BMPs	Measureable Goal	Documentation	Related BMPs	Resources Needed	Due Date/Frequency	Responsible Party
Develop and implement SWPPP for each “high-priority” Permittee-owned or operated facility.	Have SWPPP developed and implemented	SWPPP onsite		15 hours / facility \$1500/facility	September 2016; update as needed	Public Works City Engineers

**Minimum Performance Measure 4.2.6.5** – The following inspections shall be conducted at “high priority” Permittee-owned or operated facilities:

**Minimum Performance Measure 4.2.6.5.1 – Weekly visual inspections:** The Permittee must perform weekly visual inspections of “high priority” facilities in accordance with the developed SOPs to minimize the potential for pollutant discharge. The Permittee must look for evidence of spills and immediately clean them up to prevent contact with precipitation or runoff. The weekly inspections must be tracked in a log for every facility and records kept with the SWMP document. The inspection log should also include any identified deficiencies and the corrective actions taken to fix the deficiencies.

**Minimum Performance Measure 4.2.6.5.2 - Quarterly comprehensive inspections:** At least once per quarter, a comprehensive inspection of “high priority” facilities, including all storm water controls, must be performed, with specific attention paid to waste storage areas, dumpsters, vehicle and equipment maintenance/fueling areas, material handling areas, and similar pollutant-generating areas. The quarterly inspection results must be documented and records kept with the SWMP document. This inspection must be done in accordance with the developed SOPs. An inspection report must also include any identified deficiencies and the corrective actions taken to remedy the deficiencies.

**Minimum Performance Measure 4.2.6.5.3 - Quarterly visual observation of storm water discharges:** At least once per quarter, the Permittee must visually observe the quality of the storm water discharges from the “high priority” facilities (unless climate conditions preclude doing so, in which case the Permittee must attempt to evaluate the discharges four times during the wet season). Any observed problems (e.g., color, foam, sheen, turbidity) that can be associated with pollutant sources or controls must be remedied to prevent discharge to the storm drain system. Visual observations must be documented and records kept with the SWMP document. This inspection must be done in accordance with the developed SOPs. The inspection report must also include any identified deficiencies and the corrective actions taken to remedy the deficiencies.

Activity/Product Related BMPs	Measureable Goal	Documentation	Related BMPs	Resources Needed	Due Date/Frequency	Responsible Party
Perform weekly visual inspections of “high priority” facilities.	Perform weekly inspections	Track in log to be kept with SWMP		2 hours/wk \$120/wk	Weekly	Public Works
At least once per quarter, perform a comprehensive inspection of “high priority” facilities.	Perform quarterly inspections	Inspection report to be kept with SWMP		12 hours/qtr \$720/quarter	Quarterly	Public Works
At least once per quarter, visually observe the quality of the storm water discharges from the “high priority” facilities.	Perform quarterly inspections	Inspection report to be kept with SWMP		2 hours/qtr \$120/quarter	Quarterly	Public Works

**Minimum Performance Measure 4.2.6.6** – Each “high priority” facility identified in Part 4.2.6.3. must develop facility-specific standard operating procedures (SOPs) or similar type of documents. The SOPs shall include BMPs that, when applied to the municipal operation, facility or storm water control will protect water quality and reduce the discharge of pollutants to the MS4. Low impact development (LID) techniques should be considered for all new and redeveloped Permittee-owned or operated facilities. The SOPs shall include appropriate pollution prevention and good housekeeping procedures for all of the following types of facilities and/or activities listed below:

**Minimum Performance Measure 4.2.6.6.1** – Buildings and facilities: The O & M program shall address, but is not limited to: Permittee-owned or operated offices, police and fire stations, pools, parking garages, and other Permittee-owned or operated buildings or utilities. The SOPs must address the use, storage and disposal of chemicals and ensure through employee training, that those responsible for handling these products understand and implement the SOPs. All Permittee-owned or operated facilities must develop and ensure that spill prevention plans are in place, if applicable, and coordinate with the local fire department as necessary. The SOPs must address dumpsters and other waste management which includes, but is not limited to, cleaning, washing, painting and other maintenance activities. The O & M program must include schedules and SOPs for sweeping parking lots and keeping the area surrounding the facilities clean to minimize runoff of pollutants. Within 180 days of receiving coverage from this Permit, all Permittees must maintain an inventory of all floor drains inside all Permittee-owned or operated buildings. The inventory must be kept current. The Permittee must ensure that all floor drains discharge to appropriate locations. Within 180 days of receiving coverage from this Permit, all Permittees must develop an inventory including a map of all storm drains located on the property of all Permittee-owned or operated buildings and facilities. The Permittee must ensure that only storm water is allowed into these drains and that the appropriate BMPs are in place to minimize pollutants from entering the MS4.

**Minimum Performance Measure 4.2.6.6.2** – Material storage areas, heavy equipment storage areas and maintenance areas. Permittees shall develop and implement SOPs to protect water quality at each of these facilities owned or operated by the Permittee and not covered under the General UPDES Permit for Storm Water Discharges Associated with Industrial Activities.

**Minimum Performance Measure 4.2.6.6.3** – Parks and open space. The O & M program shall address, but is not limited to: SOPs for the proper application, storage, and disposal of fertilizer, pesticides, and herbicides including minimizing the use of these products and using only in accordance with manufacturer’s instruction; sediment and erosion control; evaluation of lawn maintenance and landscaping activities to ensure practices are protective of water quality such as, proper disposal of lawn clippings and vegetation, and use of alternative landscaping materials such as drought tolerant plants. The SOPs must address the management of trash containers at parks and other open spaces which include scheduled cleanings and establishing a sufficient number of containers, and for placing signage in areas concerning the proper disposal of pet wastes. The SOPs must also address the proper cleaning of maintenance equipment, building exterior, trash containers and the disposal of the associated waste and wastewater. Permittees shall implement park and open space maintenance pollution prevention/good housekeeping practices at all park areas, and other open spaces owned or operated by the Permittee.

**Minimum Performance Measure 4.2.6.6.4** – Vehicle and Equipment. The O & M program shall address, but it not limited to: SOPs that address vehicle maintenance and repair activities that occur on Permittee-owned or operated vehicles. BMPs should include using drip pans and absorbents under or around leaky vehicles and equipment or storing indoors where feasible. Fueling areas for Permittee-owned or operated vehicles shall be evaluated. If possible, place fueling areas under cover in order to minimize exposure. The O & M program shall include SOPs to ensure that vehicle wash waters are not discharged to the MS4 or surface waters. This Permit strictly prohibits such discharges.

**Minimum Performance Measure 4.2.6.6.5** – Roads, highways, and parking lots. The O & M program shall address, but it not limited to: SOPs and schedule for sweeping streets and Permittee-owned or operated parking lots and any other BMPs designed to reduce road and parking lot debris and other pollutants from entering the MS4; road and parking lot maintenance, including pothole repair, pavement marking, sealing and repaving; cold weather operations, including plowing, sanding, and application of deicing compounds and maintenance of snow disposal areas; right-of-way maintenance, including mowing, herbicide and pesticide application; and municipally-sponsored events such as large outdoor festivals, parades or street fairs. The Permittee must ensure that areas used for snow disposal will not result in discharges to receiving waters.

**Minimum Performance Measure 4.2.6.6.6** – Storm water collection and conveyance system. The O & M program shall address, but is not limited to: SOPs and schedule for the regular inspection, cleaning, and repair of catch basins, storm water conveyance pipes, ditches and irrigation canals, culverts, structural storm water controls, and structural runoff treatment and/or flow control facilities. Permittees shall implement catch basin cleaning, storm water system maintenance, scheduled structural BMP inspections and maintenance, and pollution prevention/good housekeeping practices. Permittees should prioritize storm sewer system maintenance, with the highest priority areas being maintained at the greatest frequency. Priorities should be driven by water quality concerns, the condition of the receiving water, the amount and type of material that typically accumulates in an area, or other location-specific factors. All Permittee-owned or operated storm water structural BMPs including but not limited to, swales, retention/detention basins or other structures must be inspected annually to ensure that they are properly maintained to reduce the discharge of pollutants into receiving waters. Permittees shall ensure and document

proper disposal methods of all waste and wastewater removed from the storm water conveyance system. These disposal methods apply to, but are not limited to, street sweeping and catch basin cleaning. Materials removed from the MS4 should be dewatered in a contained, impervious area and discharged to the local sanitary sewer (with approval of local authorities) where feasible. The solid material will need to be stored and disposed of properly to avoid discharge to Waters of the State during a storm event. Any other treatment and disposal measures must be reviewed and approved by the Division. Some materials removed from storm drains and open channels may require special handling and disposal, and may not be authorized to be disposed of in a landfill.

**Minimum Performance Measure 4.2.6.6.7 – Other facilities and operations** Permittees shall identify any facilities and operations not listed above that would reasonably be expected to discharge contaminated runoff, and revise as necessary, implement, and document the appropriate BMPs to protect water quality from discharges from these sites in the O&M program.

Activity/Product	Measureable Goal	Documentation	Related BMPs	Resources Needed	Due Date/Frequency	Responsible Party
Many facilities the city owns are not high priority. SOPs have been developed for many facilities and the activities that have the potential to contaminate storm water. These SOPs can be found in Appendix H.	Update SOPs to reflect current city operations	Updated SOPs kept in this SWMP		8 hours \$240	July 2016	Public Works

**Minimum Performance Measure 4.2.6.7** – If a Permittee contracts with a third-party to conduct municipal maintenance or allows private developments to conduct their own maintenance, the contractor shall be held to the same standards as the Permittee. This expectation must be defined in contracts between the Permittee and its contractors or the contractors of private developments. The Permittee shall be responsible for ensuring, through contractually-required documentation or periodic site visits that contractors are using appropriate storm water controls and following the standard operating procedures, storm water control measures, and good housekeeping practices of the Permittee.

Activity/Product	Measureable Goal	Documentation	Related BMPs	Resources Needed	Due Date/Frequency	Responsible Party
Obtain contract with any third-parties that conduct municipal maintenance activities.	A signed contract that requires the same storm water standards the city is held to will be developed and used	A copy of the signed contract		4 hours \$120	July 2016	City Administration Public Works

**Minimum Performance Measure 4.2.6.8** – The Permittee must develop and implement a process to assess the water quality impacts in the design of all new flood management structural controls that are associated with the Permittee or that discharge to the MS4. This process must include consideration of controls that can be used to minimize the impacts to site water quality and hydrology while still meeting project objectives. A description of this process must be included in the SWMP document.

**Minimum Performance Measure 4.2.6.8.1** – Existing flood management structural controls must be assessed to determine whether changes or additions should be made to improve water quality. A description of this process and determinations should be included in the SWMP document.

Activity/Product	Measureable Goal	Documentation	Related BMPs	Resources Needed	Due Date/Frequency	Responsible Party
Develop and implement SOPs to assess water quality impacts of new flood management structural controls. Assess existing flood management structural controls for water quality impacts	Develop a written SOP	Written process kept in SWMP		4 hours \$120	July 2016	Public Works City Engineers
<b>Minimum Performance Measure 4.2.6.9 – Construction Projects.</b> Public construction projects shall comply with the requirements applied to private projects. All construction projects disturbing greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale, owned or operated by the Permittee are required to be covered under the General UPDES Permit for Storm Water Discharges Associated with Construction Activities.						
Activity/Product	Measureable Goal	Documentation	Related BMPs	Resources Needed	Due Date/Frequency	Responsible Party
The city will follow the UPDES permit process for all private and public projects.	Use the UPDES Storm Water Inspection Form for SWPPP Compliance found in Appendix D and the SWPPP Checklist found in Appendix D which address construction and post-construction controls	Keep records of the UPDES Storm Water Inspection Form for SWPPP Compliance and the SWPPP Checklist		1 hour for each inspection form  Assume 2 forms completed per month \$60	Ongoing	Public Works
<b>Minimum Performance Measure 4.2.6.10 –</b> The Permittee shall ensure that all employees, contracted staff, and other responsible entities that have primary construction, operation, or maintenance job functions that are likely to impact storm water quality receive annual training. The Permittee shall identify target individuals to participate in the training sessions and ensure that all such employees receive training upon being hired and annually thereafter, at a minimum. Training shall address the importance of protecting water quality, the requirements of this Permit, operation and maintenance requirements, inspection procedures, ways to perform their job activities to prevent or minimize impacts to water quality, SOPs and SWPPPs for the various Permittee-owned or operated facilities and procedures for reporting water quality concerns, including potential illicit discharges. Training records must be kept and shall include dates, activities or course descriptions, and names and positions of staff in attendance. Follow-up training shall be provided as needed to address changes in procedures, methods or staffing. .						
Activity/Product	Measureable Goal	Documentation	Related BMPs	Resources Needed	Due Date/Frequency	Responsible Party
Staff whose job duties are related to the storm water will be trained on the post-construction program	Have all target employees attend at the specified frequency	Attendance roll, training invoice	ET	24 hours \$720	Annually	Public Works



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**STORM WATER MANAGEMENT PLAN**

**CHAPTER 8**

**CONCLUSION AND CERTIFICATION**

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## CONCLUSION

The new General Permit provides clarification and gives many additional requirements to cities that are classified as small MS4s. In order to strive for permit compliance, the small MS4s will need to devote additional time, effort, and resources to their storm water program. The time and money required to meet each minimum performance measure provided in this SWMP are only estimates. It is recommended that the City evaluate these estimated costs and also evaluate their current storm water utility rate to determine if the current revenue will cover the cost of these additional requirements.

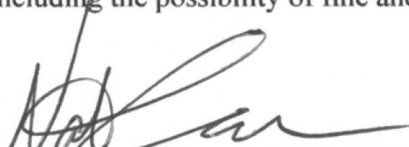
The ultimate goal of this SWMP document should to make the local rivers and streams cleaner; to do this, an effective program is needed. The EPA has provided guidance on how to evaluate the program effectiveness and its goals. The following are the levels of effectiveness:

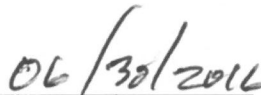
- Level 1 – Compliance with Activity Bases Permit Requirements
- Level 2 – Changes in Attitudes, Knowledge, & Awareness
- Level 3 – Behavioral Change & BMP Implementation
- Level 4 – Load Reductions
- Level 5 – Changes in Urban Runoff & Discharge Quality
- Level 6 – Changes in Receiving Water Quality

As stated in the introduction, the measurable goals are mandated by the EPA, and a community must be showing improvement with their program and goals over time. This SWMP is intended to be a living document with tasks, goals, and BMPs added and deleted as new management practices arise and other management practices are found to be ineffective. Communities that are making a concerted effort to comply with permit requirements are less likely to be penalized when inspected and audited. Penalties for not complying with General Permit requirements can be severe including fines as much as \$25,000 per day per violation and jail time of up to six months for tampering or falsifying information (see General Permit sections 6.2, 6.10, & 6.11).

## CERTIFICATION

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

  
\_\_\_\_\_  
Name of Certifying Official, Title

  
\_\_\_\_\_  
Date (mm/dd/yy)







# **STORM DRAIN DECAL PROGRAM**

## **COMMUNITY SERVICE or EAGLE SCOUT PROJECT**

### CONTACT INFORMATION

Nate Carver  
Farr West City, Public Works Department  
1896 North 1800 West  
Farr West, UT 84404  
(801) 731-4187

### PURPOSE

Storm drain decals and brochures have become a popular method of teaching the public about the effects and prohibitions against waste disposal in the storm drain system. The decals are glued to the side of the drain inlet, and the brochures are distributed door-to-door with a message that informs the public that water that enters the storm drain system is not treated prior to discharge into local waters. The brochures also offer tips on how to prevent storm water pollution.

### INSTRUCTIONS

1. Obtain a street map of the area and receive the decals from the City. The map shows the location of each storm drain inlet box. Any area not completed may be chosen for the decal program.
2. Use the map as a guide to help you find each inlet box. If the map shows incorrect information about the location of inlet boxes, please indicate the new information on the map or a separate sheet of paper. Use the street address as the locator.
3. Materials provided by the City at no charge:
  - a. Decals
  - b. Brochures and box of rubber bands
  - c. Glue
  - d. Caulking Guns
  - e. Wire Brushes
  - f. Gloves
  - g. Map

NOTE: Upon completion of the project, please return any unused items as well as the caulking guns and the wire brushes.

4. This project requires adult supervision (where applicable) to ensure (1) the safety of youths working in the roadway and (2) the proper use and safe handling of the adhesive, which is harmful if not properly handled.
5. Once at your location, clean the existing grate so it is free from debris. Apply the decals according to the instruction sheet. Distribute the two (2) different brochures door-to-door to neighboring houses. Once all decals have been applied and brochures have been handed out, any unused supplies and the updated map should be returned to the City.
6. Final inspection by the City will take place after completion.

# **CURB MARKER INSTALLATION INSTRUCTIONS**

## **1. Clean Surface**

Make sure application surface is flat, dry and free of any loose debris. **The minimum application temperature is 40° F, and the maximum temperature is 100° F.**

## **2. Apply Adhesive**

Coming in 1/8" from the outside edge of the marker, apply a bead of adhesive and then work in to the center.



Step 1



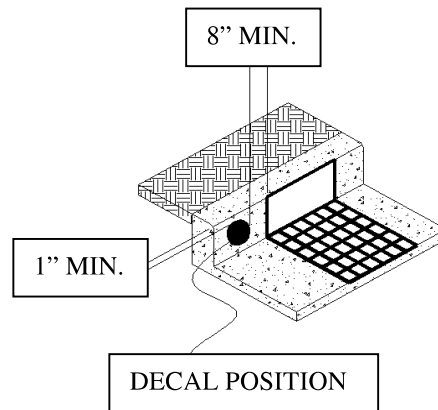
Step 2

## **3. Stick It!**

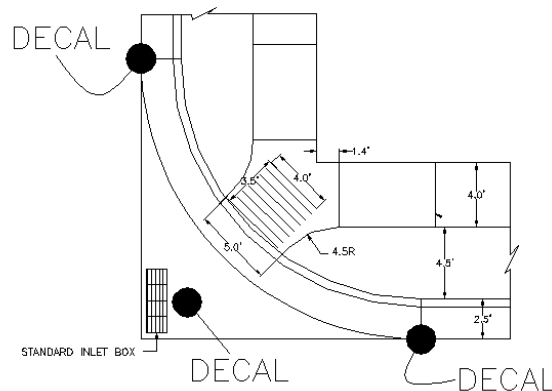
Apply the marker to the application surface pushing down **HARD** forcing adhesive out around the entire edge. It is important that the entire edge of the marker is sealed to the application surface. Hold the decal in position for a minimum of 2 minutes.



Step 3



**NOTE: If grate is not located at the curb, install decal on closest adjacent curb. If the vertical curb surface is less than 6 inches high and you are not able to install the decal on the vertical surface, install the decal on the top of the curb.**





- **CURB MARKER ADHESIVE IS HARMFUL AND MUST BE PROPERLY HANDLED. ADULT SUPERVISION IS REQUIRED TO ENSURE SAFE HANDLING.**

### **HINTS FOR USE OF CURB MARKER ADHESIVE**

- **Wear gloves and other protective clothing, as necessary.**
- **It is not necessary to use a large amount of adhesive.**
- **Push down on the marker so that it is "TIGHT" to the surface. Large amounts of adhesive trapped under the surface of the marker can retard cure time. Hold the decal in place for 2 minutes.**
- **Make sure that the edge has approximately 1/8" of adhesive all around to seal edge to the surface.**
- **Wash hands with hand cleaner then soap and water.**
- **At 75° F, adhesive will skin over in 1-hour, become hard to touch in 4-hours, and achieve a full cure in 18-hours.**
- **MIN APPLICATION TEMPERATURE = 40° F**
- **MAX APPLICATION TEMPERATURE = 100° F**

### **FIRST AID PROCEDURES**

**INHALATION: Remove to fresh air, administer oxygen or artificial respiration. Contact physician. EYES: Flush eyes with water for at least 15 minutes. SKIN CONTACT: Wash with soap and water. Contact physician if irritation persists. INGESTION: Do not induce vomiting. Contact physician immediately.**

**DANGER: Extremely flammable. Vapor harmful. Vapors may ignite explosively. Keep away from and do not use near heat, sparks, and open flame.**

# Davis County Stormwater

## Coalition

Bountiful City	801-298-6125 <a href="http://www.bountifulutah.gov">www.bountifulutah.gov</a>
Centerville City	801-292-8232 <a href="http://www.centervilleut.net">www.centervilleut.net</a>
Clearfield City	801-525-2700
Clinton City	801-614-0870 <a href="http://www.clintoncity.net">www.clintoncity.net</a>
Davis County	801-444-2230
Farmington City	801-939-9212
Fruit Heights City	801-546-0861 <a href="http://www.fruitheightscity.com">www.fruitheightscity.com</a>
Hill Air Force Base	801-775-6916
Kaysville City	801-546-1235
Layton City	801-336-3700 <a href="http://www.laytoncity.org">www.laytoncity.org</a>
North Salt Lake City	801-936-1122
South Weber City	801-479-3177 <a href="http://www.southwebercity.com">www.southwebercity.com</a>
Sunset City	801-614-0014
Syracuse City	801-825-7235 <a href="http://www.syracuseut.com">www.syracuseut.com</a>
West Bountiful City	801-292-4486
West Point City	801-776-0971
Woods Cross City	801-292-4421 <a href="http://www.woodscross.com/stormwater">www.woodscross.com/stormwater</a>

Davis County Stormwater Coalition  
1500 East 650 North  
Fruit Heights, UT 84037



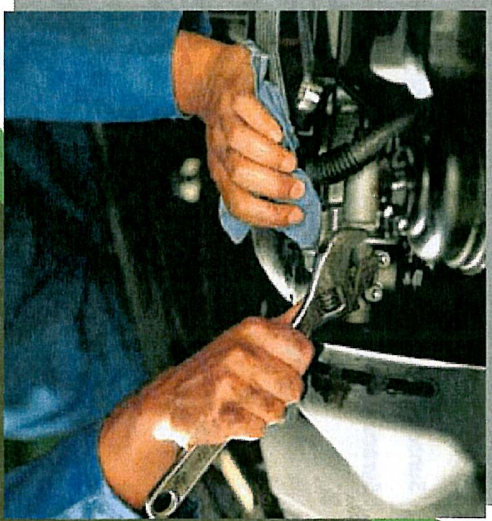
# Stormwater Pollution Prevention

## Tips for the Automotive Industry



### Areas of Concern:

- Cleaning Engines and Parts
- Storage of Hazardous Materials
- Waste Recycling and Disposal
- Drainage in Work and Fueling Areas
- Preventing Leaks and Spills



### Cleaning Engines and Parts

Do not wash parts or equipment in a shop sink, parking lot, driveway or street. Scrape parts with a wire brush or use a bake oven rather than liquid cleaners. Arrange drip pans, drying racks and drain boards so that fluids are directed back into the parts washer or the fluid holding tank.

### Storage of Hazardous Materials

Store all materials under cover with spill containment or inside to prevent contamination of rainwater runoff. Keep liquid waste segregated. Many fluids can be recycled by hazardous waste disposal companies if they are not mixed.

### Waste Recycling and Disposal

When possible, recycle and reuse liquids, tires, batteries, and metal scraps. Combining different types of hazardous waste will limit recycling options and can be dangerous. A licensed hazardous waste hauler can provide information on waste storage and disposal costs.

### Drains in Work and Fueling Areas

Locate storm drains on or near your property. Know the sources of pollution from your business and do not allow materials to flow into the drains. Perform automotive projects under cover and in a controlled area. Identify specific activities with the potential to cause spills or release pollutants such as oil, grease, fuel, etc. Post signs and train employees on how to prevent and clean up spills during these activities

### Preventing Leaks and Spills

Train employees on how to properly clean up spills and waste. Document employee training. Keep a spill kit with absorbent materials in the work area. Empty drip pans into a labeled, sealed container before they are full. Check equipment, wipe up spills and repair leaks daily. Place large pans under wrecked cars until all fluids are drained. Promptly dispose of collected fluids in a hazardous waste drum.

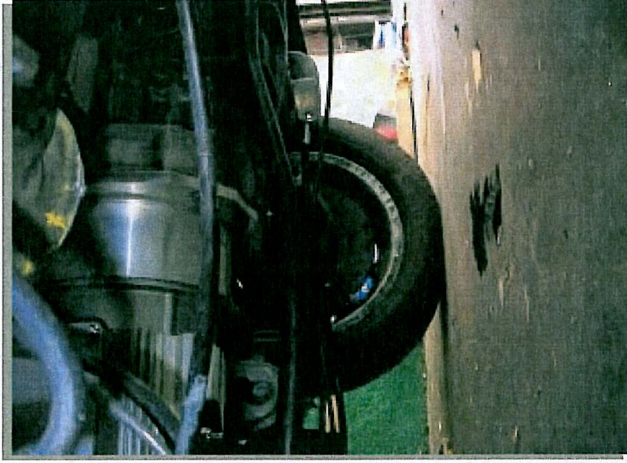
## Stormwater 101

Clean wetlands and healthy streams are important to Davis County. The water from parking lots, driveways, and streets flow into the storm drain and into streams, wetlands, etc. eventually discharging into the Great Salt Lake. Stormwater runoff is **never treated**. Pollution entering the storm drain makes the waterways unsafe for people and wildlife. Following these management practices will prevent pollution, comply with regulations, and protect public health.

### CLEANING SPILLS

Clean up spills immediately by using absorbents such as rags, kitty litter or sand. If the material spilled is hazardous (solvents, gasoline, oil, etc.), dispose of the soiled absorbents at a hazardous waste facility. If the material spilled is not hazardous, dispose of these items in the trash.

scrap. Combining different types of hazardous waste will limit recycling options and can be dangerous. A licensed hazardous waste hauler can provide information on waste storage and disposal costs.



# Stop!

# Davis County Stormwater Coalition

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Layton City	801-336-3700 <a href="http://www.laytoncity.org">www.laytoncity.org</a>
North Salt Lake City	801-936-1122
South Weber City	801-479-3177 <a href="http://www.southwebercity.com">www.southwebercity.com</a>
Sunset City	801-614-0014
Syracuse City	801-825-7235 <a href="http://www.syracuseut.com">www.syracuseut.com</a>
West Bountiful City	801-292-4486
West Point City	801-776-0971
Woods Cross City	801-292-4421 <a href="http://www.woodsross.com/stormwater">www.woodsross.com/stormwater</a>

Davis County Stormwater Coalition  
1500 East 650 North  
Fruit Heights, UT 84037



## Stormwater Pollution Prevention

### Tips for Fueling Stations



#### Areas of Concern:

- Emergency Response Plans
- Know Storm Drain Locations
- No "Topping-Off"
- Uphold Cleanliness and Order
- Keep Suitable Clean-up Material.

# Did you know?

**Storm drain water is NEVER treated.**

# Stormwater 101

Clean wetlands and healthy streams are important to Davis County. The water from parking lots, driveways, and streets flow into the storm drain which goes untreated into the streams, wetlands, and eventually enters the Great Salt Lake. Pollution entering the storm drain makes the waterways unsafe for people and wildlife. Following these management practices will prevent pollution, comply with regulations, and protect public health.

## **Emergency Spill Response Plan**

Maintain an Emergency Spill Response Plan. Keep employees trained in spill response procedures.

## **Know Storm Drain Locations**

Locate storm drains on or near your property. Know the sources of pollution from your business and do not allow materials to flow into the drains

## **No Topping-Off**

Encourage customers to not top-off their fuel tanks by posting "No Topping-Off" signs

## **Uphold Cleanliness and Order**

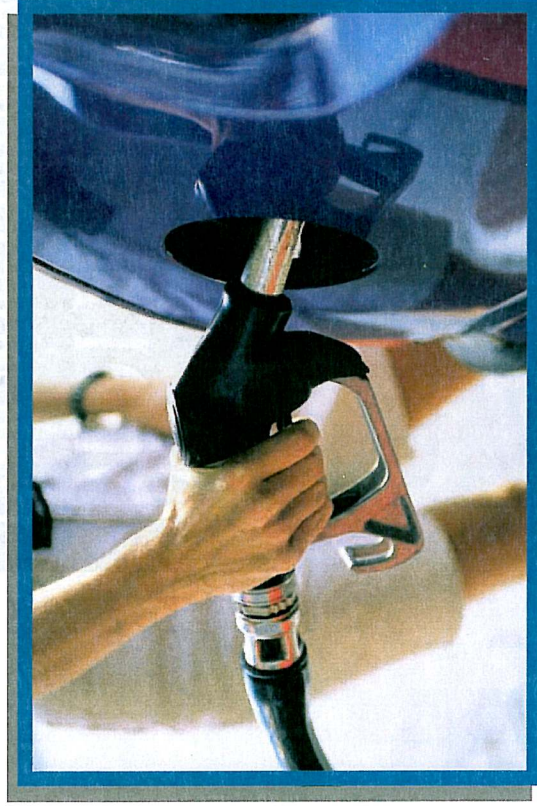
Uphold cleanliness and order of the site by keeping waste picked up and regularly sweeping the parking and fueling areas

## **Keep Suitable Cleanup Material**

Keep suitable cleanup material at the site for prompt cleaning of all spills

- Absorbent materials like spill pads, rags, kitty litter, or sand will be effective in containing certain spills
- Do not wash any spills into the gutter or storm drain
- If the material spilled is hazardous, dispose of the soiled absorbents in the same manner as hazardous waste. If the material spilled is not hazardous, dispose of these items in the trash.

*Operate fueling areas so that spills can be contained and runoff cannot carry spills into the street, gutter, or storm drain.*



# Davis County Stormwater Coalition

Bountiful City	801-298-6125	<a href="http://www.bountifulutah.gov">www.bountifulutah.gov</a>
Centerville City	801-292-8232	<a href="http://www.centervilleut.net">www.centervilleut.net</a>
Clearfield City	801-525-2700	
Clinton City	801-614-0870	<a href="http://www.clintoncity.net">www.clintoncity.net</a>
Davis County	801-444-2230	
Farmington City	801-939-9212	
Fruit Heights City	801-546-0861	<a href="http://www.fruitheightscity.com">www.fruitheightscity.com</a>
Hill Air Force Base	801-775-6916	
Kaysville City	801-546-1235	
Layton City	801-336-3700	<a href="http://www.laytoncity.org">www.laytoncity.org</a>
North Salt Lake City	801-936-1122	
South Weber City	801-479-3177	<a href="http://www.southwebercity.com">www.southwebercity.com</a>
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## Stormwater Pollution Prevention

### Tips for Mobile Cleaners



#### Best Management

#### Practices for:

- Carpet Cleaners
- Upholstery Cleaners
- Drapery Cleaners
- Window Washers
- Janitorial & Housekeeping Service Providers
- High Pressure, Steam Cleaners

# Stop!

*Never discharge/place wastewater into a street, gutter, parking lot or storm drain.*



## Stormwater 101

In Davis County, any water that enters our storm drain system from rain storms, snow melt, irrigation etc. discharges into our creeks and eventually enters wetlands and/or the Great Salt Lake. This water travels over the ground picking up various pollutants.

***This water is never treated.***

*Both residents and professional carpet cleaners should be sure that the carpet was not contaminated with hazardous materials. Hazardous materials cannot be discharged to the sanitary sewer, and need to be disposed of at a hazardous waste facility.*

### Hazardous Waste

Although mobile cleaners and pressure washers discharge waste water at various locations, professional carpet cleaners as well as residents should use the following practices in order to prevent waste or wastewater from entering the storm drains where it flows untreated to our streams, wetlands and to the Great Salt Lake:

#### General Practices

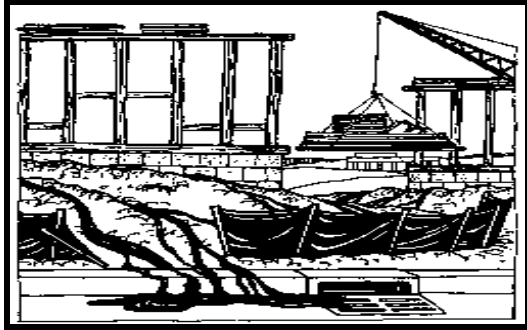
- Waste resulting from cleaning activities cannot be discharged into a storm drain.
- Mobile cleaners should have the equipment, materials and personnel to handle a spill. Take preventative action to act quickly to reduce illegal discharge.
- If a spill occurs, use environmentally-friendly products (e.g. kitty litter) to contain the spilled materials.
- Protect storm drains. Report all spills and discharges that cannot be contained to local authorities for their help.
- Dispose of spill clean-up material properly in a garbage container.

### Consider Your Options

Consider your options for wastewater disposal. DO NOT discharge into a street, storm drain or gutter as these are all part of the stormwater system. An acceptable discharge option would be to dispose into sanitary sewers at the job site. These include sinks, showers, bath tubs, toilets or floor drains. Be sure to obtain the consent of the property owner before dumping and use a lint trap or filter to prevent debris from clogging the drain and pipes. Dispose of the lint in the regular trash.



## Storm Water Pollution Prevention: It's Up To Us



In Weber County, storm water flows through storm drains directly to local creeks and rivers with **NO TREATMENT**.

*Water quality can be affected by a number of natural elements as well as chemical elements introduced by humans.*

### What kind of contaminants might reach our rivers and streams?

- Contaminants resulting from unwise landscaping practices such as over applying or over watering might include: dirt, leaves, grass clippings, fertilizers, herbicides, and pesticides.
- Chemicals from chemicals used in washing equipment, painting, cleaners, or construction debris.
- Toxins such as oil or antifreeze that may leak from vehicles or heavy equipment.

Local recreation areas are affected by storm water contamination and can result in harmful situations for humans and wildlife. These areas include the Weber River, Ogden River (including North, Middle & South Fork), Pineview Reservoir among others.

## What Can You Do?

### General Practices

- Schedule excavation and grading work for dry weather.
- Perform major equipment repairs away from the job site.
- When refueling or when vehicle/equipment maintenance must be done on site, designate a location away from storm drains or drainage ways.
- Do not use diesel oil to lubricate equipment or parts.



### Storm Water Pollution from Construction Activities

Soil excavation and grading operations uncover and loosen large amounts of soil that can flow or blow into storm drains if handled improperly. These activities can be a major source of sediment and contaminants in storm water

Recent regulations require construction activities that disturb five acres or more to obtain a UPDES storm water discharge permit from the State Division of Water Quality. Also required is the development and implementation of a Storm Water Pollution Prevention Plan. See the reverse side of this brochure for the Division's phone number.

## What Can You Do?

### During Construction

- Remove existing vegetation only when absolutely necessary.
- Consider planting temporary vegetation for erosion control on slopes or where construction is not immediately planned.
- Protect downslope drainage courses, streams, and storm drains with hay bales or temporary drainage swales.
- Use check dams or ditches to divert runoff around excavations.
- Cover stockpiles and excavated soil with secured tarps or plastic sheeting.



### After Construction

- Re-vegetate and stabilize denuded areas as soon as possible.
- Remove dirt and debris from sidewalks, gutters, and drainage structures.
- Remove or stabilize stockpiled material.





For additional information on Storm Water Protection refer to the following brochures:

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- Pet Waste Water Quality
- Utah and its Water, Why Conserve
- Water Conservation Inside the Home
- Water Conservation Outside the Home
- Xeriscaping

## Spill Response

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-or-

State Of Utah

Environmental Response

(801) 536-4123

Utah Division of Water Quality

(801) 538-6146

## Local Pollution Control Agencies:

Environmental Health Division of the Weber/Morgan Health Department

(801) 591-7168



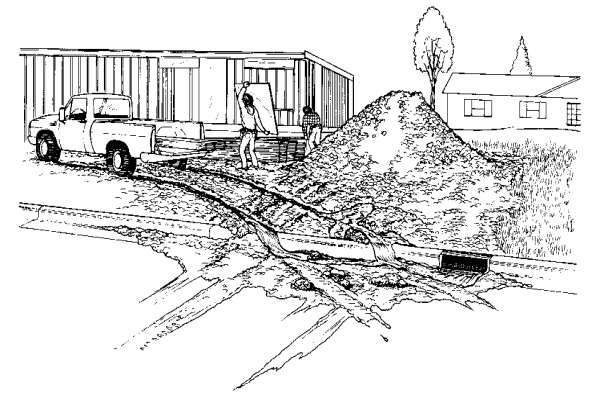
1-800-458-0145

Used Oil Recyclers  
(for DIYers in Weber County)

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- Checker Auto Parts Stores
- NAPA Auto Parts Stores
- Pep Boys Stores
- Little Tire & Lube
- Jiffy Lube

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# EROSION CONTROL



## RECOMMENDED METHODS FOR STORM WATER PROTECTION



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Dr. George S. Burbidge

444-24th St. Ogden, UT 84401

Office (801)399-8677

Fax (801)625-3699

[www.co.weber.ut.us/stormwater](http://www.co.weber.ut.us/stormwater)

Brochure created by Salt Lake County Engineering Division modified by Weber County Storm Water Management Division



## Storm Water Pollution Prevention: It's Up To Us



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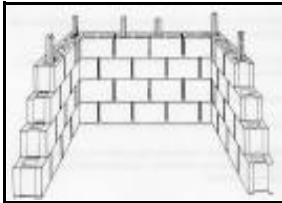
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- **Toxins** such as oil or antifreeze that may leak from vehicles or equipment.


Local recreation areas are affected by storm water contamination and can result in harmful situations for humans and wildlife. These areas include the Weber River, Ogden River (including North, Middle & South Fork), Pineview Reservoir among others.

### Who Should Use this Pamphlet?


- ✓ Home builders
- ✓ Developers
- ✓ General contractors
- ✓ Sidewalk and patio construction workers




## What Can You Do? General Business Practices

 Both at your yard and the construction site, always store dry and wet materials under cover, protected from rainfall and runoff. Protect dry materials from wind



 Secure bags of cement after they are open. Be sure to keep wind-blown cement powder away from gutters, storm drains, rainfall, and runoff.


 Wash out concrete mixers only in designated wash-out areas in your yard, where the water will flow into containment ponds. Whenever possible, recycle washout by pumping back into mixers for reuse. **Never dispose of washout into the street, storm drains, drainage ways, or streams!**


For more information regarding the disposal of unused concrete and washout, contact the Health Department at the number listed on the other side of this brochure.


### Storm Water Pollution from Masonry and Paving


Fresh concrete and cement-related mortars that wash into lakes, rivers, and streams are toxic to fish and the aquatic environment. Disposing of these materials to storm drains or streams causes serious problems - and is **prohibited by law!**


## What Can You Do? General Practices


 Don't mix up more fresh concrete or cement than you will use in a day.


 Set up and operate small mixers on tarps or heavy plastic drop cloths.


 When cleaning up after driveway or sidewalk construction, wash fines onto dirt areas, not down the driveway or into the street or storm drain.

 Place hay bales or other erosion controls down-slope to capture runoff carrying mortar or cement before it reaches the storm drain.

 When breaking up paving, be sure to pick up all the pieces and dispose of properly.

 Recycle large chunks of broken concrete at a landfill.

 Dispose of small amounts of excess dry concrete, grout, and mortar in the trash.

 Never bury waste material. Never illegally dump or abandon waste material.



For additional information on Storm Water Protection refer to the following brochures:

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- Utah and its Water, Why Conserve
- Water Conservation Inside the Home
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444-24th St. Ogden, UT 84401  
Office (801)399-8677  
Fax (801)625-3699  
[www.co.weber.ut.us/stormwater](http://www.co.weber.ut.us/stormwater)

Brochure created by Salt Lake County Engineering Division modified by Weber County Storm Water Management Division

## Spill Response

Dial 911  
-or-  
State Of Utah  
Environmental Response  
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Utah Division of Water Quality  
(801) 538-6146

Local Pollution Control  
Agencies:

Environmental Health Division of the  
Weber/Morgan Health Department  
(801)591-7168



1-800-458-0145

Used Oil Recyclers  
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NAPA Auto Parts Stores  
Pep Boys Stores  
Little Tire & Lube  
Jiffy Lube

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## FRESH CONCRETE and MORTAR APPLICATION



## RECOMMENDED METHODS FOR STORM WATER PROTECTION



## Storm Water Pollution: It's Up To Us

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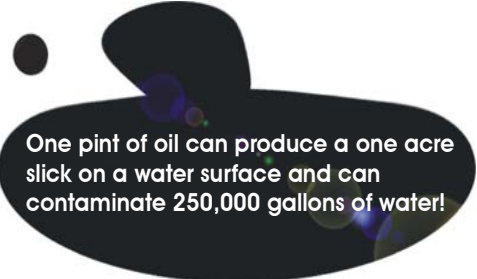
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**What kind of contaminants might reach our rivers and streams?**

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• **Chemicals** from household products from washing your car, painting, or household cleaners.

• **Toxins** such as oil or antifreeze that may leak from your car.



One pint of oil can produce a one acre slick on a water surface and can contaminate 250,000 gallons of water!

## What Can You Do?

### General Practices



Never use the gutter or storm drain system for disposal of household hazardous waste. If you wouldn't drink it, don't dump it.

- Store toxic products and chemicals indoors or in a shed or storage cabinet.
- Take unwanted hazardous materials and containers to the household hazardous waste disposal facility.

There is a Household Hazardous Waste Facility now located at the Weber County Solid Waste Facility at 867 West Wilson Lane. It is open from 8:00 am to 1:00 pm. on the 3rd Saturday April-September. Weber County homeowners can bring their household hazardous waste to the facility and it will be taken off their hands for **free!** Call 399-8803 for more information.

- **DO NOT WASH INTO THE STREET!** Do not wash tools and equipment in driveways, gutters or drainage ways. Wash over grassed or soil areas where wash water won't reach the street.

### Automotive

Take used motor oil and antifreeze to a recycling center or household hazardous waste facility.

Inspect and maintain vehicles to reduce leakage of fluids.

Reduce automotive emissions through regular maintenance and by limiting vehicle usage.

Clean up spills with kitty litter or absorbent material and let dry. Dispose of cleanup as solid waste.

Vehicles should be washed at a commercial car wash. Vehicles can be washed on the lawn with biodegradable soap to reduce wash water flows to the storm drain system.

### Recycling Oil

Pour waste oil into an unbreakable container (plastic milk jug), seal and label. Call 399-8381 or 1-800-458-0145 or check the list on the reverse side for facilities that accept used oil.

Do not mix other materials with oil.



Recycling used oil could reduce national petroleum imports by 25.5 million barrels per year!

For additional information on Storm Water Protection refer to the following brochures:

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# HOUSEHOLD AND VEHICLE MAINTENANCE



## RECOMMENDED METHODS FOR STORM WATER PROTECTION



# What is an Impervious Surface?

An impervious surface is any surface that covers the soil and repels or prevents water from filtering into the soil. The most commonly constructed impervious surfaces are rooftops, sidewalks, roads, highly compacted soil and parking lots.



## Did you know?

- Impervious surfaces cause untreated storm water and irrigation water to run directly into the storm drains that lead to the rivers.
- Water that drains over impervious surfaces carry pollutants such as litter, pet waste, vehicle fluid, soil, fertilizers, and pesticides to rivers and streams.
- One acres of parking lot produces 15 times more run off than one acres of meadow.
- Permeable surfaces actually help improve water quality by filtering out sediment and other pollutants and helps replenish the water table.
- The temperature of traditional pavement in the summer can reach over 120°F
- Nationwide, pavement covers 50-70 percent of most urban areas.

## What can you do?

- Direct storm water from the driveways into vegetative strips.
- Install detention basins in large areas to store water, filter out sediment, and recharge the ground water.
- Disconnect your down spouts, redirect water to green areas, or save water in a rain barrel.
- Limit discharge by not over watering your landscape or “watering” sidewalks and patios.



## Consider Alternative Surfaces

- Permeable pavement or cement\*
- White Line Wall Stone
- widely spaced wood decking
- stamped concrete paving blocks
- interlocking pavers
- gravel, brick, river rock, lava rock, cobblestone, slate crushed brick.

\*If you choose to install pervious surfaces over a large area consider the soil conditions and type, infiltration rate, depth to bedrock, and water table. Contact the Weber County Engineering Department for more information.

Also alternative underlayment and filler such as:

- rice stone
- course stone dust
- stone dust

These surfaces compared to traditional asphalt and concrete allow more water to filtrate in to the soil, recharges ground water, improves water quality and in some cases eliminates the need for detention basins.

## Something to think about

Lawn areas are actually less efficient than landscaped areas of shrubs, trees, and ground covers in recharging the ground water.

## The Benefits of Pervious Surfaces

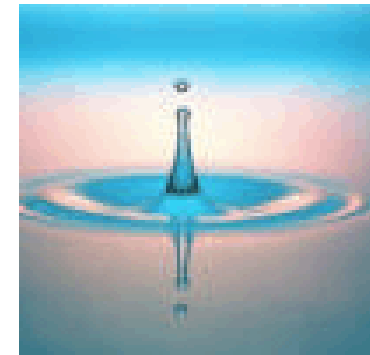
### Financial Benefits

- Reduces the volume of water that enters the storm drain system and decreases the amount of revenue needed to maintain these systems.
- Decreases the cost and need for the development and installation of new systems.



### Benefits to Water Quality and Environment.

- Improves water quality in rivers, streams, and the water table.
- Decreases the amount of chemical contaminants that pollute water habitats.
- Reduces stream and river velocity which lessens the severity of channel down cutting erosion.
- Reduces the amount of soil, sand, silt, and clay that enters the waterways and harms habitats.
- Helps keep recreation areas safe from pollutants that can be dangerous to humans.



For additional information on Storm Water Protection refer to the following brochures:

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# Impervious Surfaces



**RECOMMENDED METHODS FOR  
 STORM WATER PROTECTION**



## Storm Water Pollution Prevention: It's Up To Us



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**What kind of contaminants might reach our rivers and streams?**

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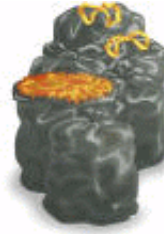
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**Who Should Use this Pamphlet?**

- ☞ Residents
- ☞ Landscapers
- ☞ Gardeners
- ☞ Swimming pool/spa service and repair workers
- ☞ General contractors

## What Can You Do? General Practices

- ☞ Take tree & grass trimmings to Weber County Compost Facility (801-726-8212). You can also pick up ground cover to stabilize erosion, and compost is available for a natural fertilizer.



- ☞ Use biodegradable pesticides/herbicides and cleaners.

- ☞ Never use the gutter or storm drain system for disposal of household or garden waste.

- ☞ Remove all pet waste from yard and curb and dispose of in trash. -to prevent spread of bacteria.



- ☞ Store pesticides, fertilizers and other chemicals indoors, in a shed, or storage cabinet.

- ☞ Wash household tools over grassed area away from curbs and gutters.



- ☞ Clean leaves, sediment, and trash out of gutter and dispose of in garden or trash.

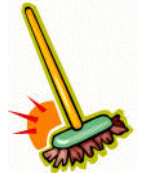
## Landscaping/Garden Maintenance

- ☞ Control erosion on your property by planting groundcover and stabilizing erosion-prone areas.

- ☞ Use up pesticides. Rinse containers and use rinse water as product. Dispose of rinsed containers in the trash

- ☞ Collect lawn and garden clippings, pruning waste, and tree trimmings. Chip if necessary and compost.

- ☞ Sweep and collect dirt from driveways or walks and dispose of in garden.



- ☞ Apply lawn and garden chemicals sparingly and according to instructions. Rinse containers and dispose of in trash.

## Pool/Spa Maintenance



- ☞ Never discharge pool or spa water into a street or storm drain.

☞ When emptying a pool or spa, let chlorine dissipate for a few days, then recycle/reuse it by draining it gradually onto a landscaped area.

- ☞ Do not use copper-based algaecides unless absolutely necessary. Copper is an especially strong herbicide and doesn't degrade to less toxic forms quickly. Control algae with chlorine or other alternatives.

- ☞ Perform regular inspections to detect leaks.

- ☞ Try to keep the water in the pool.





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## LANDSCAPING, GARDENING AND YARD MAINTENANCE



## RECOMMENDED METHODS FOR STORM WATER PROTECTION



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**Contaminants** resulting from unwise landscaping practices such as over applying or over watering might include: dirt, leaves, grass clippings, fertilizers, herbicides, and pesticides.

**Chemicals** from household products from washing your car, painting, or household cleaners.

**Toxins** such as oil or antifreeze that may leak from your car.

*Local recreation areas are affected by storm water contamination and can result in harmful situations for humans and wildlife.*

*These areas include the Weber River, Ogden River (including North, Middle & South Fork), Pineview Reservoir among others.*

## What Can You Do? General Practices

Never use the gutter or storm drain system for disposal of household waste. Liquid residue from paints, thinners, solvents, glues, and cleaning fluids are **hazardous wastes.**



When thoroughly dry-used kitty litter, empty water base paint cans, spent brushes, rags, and drop cloths may be disposed of in the trash.

Rinse containers and dispose them in the trash.

Properly use and store all toxic products including cleaners, solvents, and paints.

Use kitty litter or other absorbent material to clean up spills from paved surfaces.

**DO NOT WASH INTO THE STREET!** Depending on the substance, dispose of absorbents in trash or at the household hazardous waste facility.

**FREE!**  
Household Hazardous Waste Facility -  
**Weber County Solid Waste Facility**

867 West Wilson Lane  
8:00 am to 1:00 pm.  
3rd Saturday April-September

Call 399-8803 for more information

## Paint Solvents and Adhesives

Select water based or latex paints whenever possible.



Sweep up dust and paint chips from sanding or stripping. Dispose of in trash- **UNLESS** the activity involved marine paints or paints containing leads. These should be disposed of as hazardous waste.

When high-pressure water stripping or cleaning building exteriors, block storm drains. Wash water onto dirt area and spade in soil if no chemicals were used. Contact the City or County Health Department for more specific guidelines, especially if chemicals are used.



For water based paint, paint out brushes to the extent possible and rinse in sink.

For oil based paint, paint out the brushes to the extent possible, filter and reuse thinners and solvents. Disposed of excess liquids and residue as hazardous waste.



*A Couple Good Ideas: Give unused products to a neighbor or community group and try to buy only what you need.*

For additional information on Storm Water Protection refer to the following brochures:

- Erosion Control
- Fresh Concrete and Mortar Application
- Household and Vehicle Maintenance
- Impervious Surfaces
- Landscaping, Gardening, and Yard Maintenance
- Paint and Household Hazardous Waste
- Pet Waste Water Quality
- Utah and its Water, Why Conserve
- Water Conservation Inside the Home
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- Xeriscaping



For more information about the Weber County Storm water quality management program and additional pamphlets, contact:

Weber County Storm Water Management  
Dr. George S. Burbidge  
444-24th St. Ogden, UT 84401  
Office (801)399-8677  
Fax (801)625-3699  
[www.co.weber.ut.us/stormwater](http://www.co.weber.ut.us/stormwater)

Brochure created by Salt Lake County Engineering Division modified by Weber County Storm Water Management Division

## Spill Response

Dial 911  
-or-  
State Of Utah  
Environmental Response  
(801) 536-4123

Utah Division of Water Quality  
(801) 538-6146

Local Pollution Control  
Agencies:  
Environmental Health Division of the  
Weber/Morgan Health Department  
(801) 591-7168



1-800-458-0145

Used Oil Recyclers  
(for DIYers in Weber County)

Weber County Transfer Station  
Auto Zone Stores  
Checker Auto Parts Stores  
NAPA Auto Parts Stores  
Pep Boys Stores  
Little Tire & Lube  
Jiffy Lube

The preceding list is not all encompassing nor does it constitute an endorsement by Weber County of any particular company

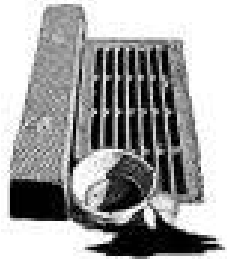
## PAINT AND HOUSEHOLD HAZARDOUS WASTE



## RECOMMENDED METHODS FOR STORM WATER PROTECTION



In Weber County, storm water flows through storm drains directly to local creeks and rivers with **NO TREATMENT.**



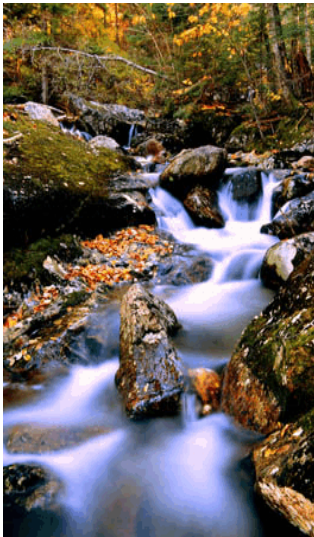
*Water quality can be affected by a number of natural elements as well as chemical elements introduced by humans.*

## What kind of contaminants might reach our rivers and streams?

•**Contaminants** resulting from unwise landscaping practices such as over applying or over watering might include: dirt, leaves, grass clippings, fertilizers, herbicides, and pesticides.

•**Chemicals** from household products from washing your car, painting, or household cleaners.

•**Toxins** such as oil or antifreeze that may leak from your car.



## Are You Polluting Lakes and Streams?

Pet Owners... When you clean up after your pet, do you dump the waste in the street or storm drainage system? Do you leave it to decay on the sidewalk or on the parkway? If so, you may be causing pollution or health problems.

**Pollutants from improperly disposed pet waste may be washed into the storm drainage system by rain or melting snow. Storm runoff in Weber County receives NO treatment.**

☞ When pet waste is washed into lakes or streams, the waste decays, using up oxygen and releases ammonia. Low oxygen levels and ammonia combined with warm temperatures kill fish.



☞ Pet wastes also contain nutrients that encourage weed and algae growth. Overly fertile water becomes cloudy and green—unattractive for swimming, boating, and fishing.

☞ Perhaps most importantly, pet waste can carry diseases which could make water unsafe for contact.

## What Can You Do?

Cleaning up after you pet can be as simple as taking a plastic bag or pooper scooper along on your next walk. What should you do with the waste you pick up? No solution is perfect, but we recommend two:

1. Flush It down the toilet.

The water in your toilet goes to a sewage treatment plant that removes most pollutants before the water reaches a river or stream.



To prevent plumbing problems, don't flush debris, cat litter. Cat feces may be flushed but used litter should be put in a securely closed bag in the trash.

2. Put waste in a securely closed bag and deposit it in the trash.



Because pet waste may carry diseases, you should not bury it in a vegetable garden. Do not put waste in a compost pile. The pile will not get hot enough to kill diseases organisms in the waste.

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# PET WASTE and WATER QUALITY



## RECOMMENDED METHODS FOR STORM WATER PROTECTION



# Xeriscaping and the Utah Desert

## What is Xeriscaping?

*Xeriscape is a word created by combining the Greek word "xeros" which means dry and "scape" from the word "landscape".*

## ***Xeriscaping is water-wise landscaping.***

This practice of landscaping focuses on using natural forces such as rainfall and careful plant selection to create beautiful sites that requires minimal maintenance. Usually the plants chosen are native plants or those that can survive in the local habitat with little intervention. With patience and planning, this method can be a successful and worthwhile venture that is beneficial and compatible with the Utah habitat.



## ***Why is water-wise gardening so important in Utah?***

Most simply stated because Utah is a desert. As our population increases the demand for drinking and irrigation water increases. Water can not be created. If water conservation is not practiced our future

drinking water supply will be depleted, our recreation areas jeopardized, and our natural habitats compromised.

## ***Other Reasons to Xeriscape***

Saving water isn't the only reason to Xeriscape. Other reasons include reducing storm water run off preventing erosion and decreasing the effects of soil expansion which causes pavement to crack.



## **Reducing Storm water run off**

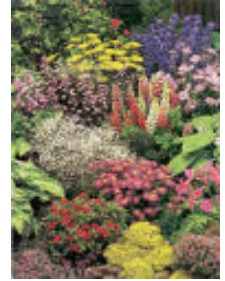
If your property has even a mild to moderate slope it invites runoff. If you do not have the necessary plants to hold it in place the runoff increases. Using mulches and other plants that require little water will decrease the occurrence of run off by allowing the water time to absorb into the soil. This also decreases erosion of the soil.

## **Decreasing Soil Expansion**

Soil expansion happens when soil expands when it gets wet. This is also known as soil swelling. When the soil swells it can cause cracking in pavement and foundations. Xeriscaping can help prevent this because it requires little water thus preventing the soil from expanding and cracking the pavement.



You don't have to take drastic measures like tearing out all of your existing plants in order to begin xeriscaping. Start small.



- Consider removing a few feet of grass along your driveway and sidewalk. Plant these areas with ground cover, small shrubs or perennials.
- Or maybe replace a part of your sloping lawn with a rock garden, rock wall or some low-spreading evergreens.

## ***Xeriscaping Helps Utah***

Remember with xeriscaping you will get the most out of every gallon of water you apply to the landscape and that means you are helping to save one of our most precious resources, Water!



For more information including lists of Utah native plants and where to purchase them visit-

[www.unps.org](http://www.unps.org)  
[www.slowtheflow.com](http://www.slowtheflow.com)  
[www.xeriscape.org](http://www.xeriscape.org)  
[www.hort.usu.edu](http://www.hort.usu.edu)



## ***How to get Started***

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## Xeriscaping



***Getting the most out of every gallon of water!***



















## UOCC BASIC LOCATION INFORMATION

### BOX ELDER County

#### BRIGHAM CITY

		Type *	Phone #
AUTOZONE INC 872 1025 SOUTH MAIN ST	UOCC #0288	A	(435)734-1732
BOX ELDER HIGH SCHOOL AUTO SHOP 380 SOUTH 600 WEST	UOCC #0438	A	(435)734-4840
BOX ELDER SCHOOL DIST MAINT FACILITY 1675 NORTH 2000 WEST	UOCC #0308	B	(435)734-4839
JIFFY LUBE 1925 692 SOUTH MAIN ST	UOCC #0330	A	(435)723-3777
O'REILLY 3103 932 SOUTH MAIN ST	UOCC #0306	A	(435)723-1029
STS COMMERCIAL LLC 2340 WEST HIGHWAY 13	UOCC #0628	B	(435)744-5501

#### HONEYVILLE

		Type *	Phone #
BRYCES AUTO & TRUCK 2480 WEST 7000 NORTH	UOCC #0579	B	(435)279-8167

#### PERRY

		Type *	Phone #
WAL-MART TIRE & LUBE EXPRESS 3454 1200 SOUTH COMMERCE WAY	UOCC #0462	A	(435)734-9834

#### TREMONTON

		Type *	Phone #
ARCHIBALD & SONS INC 925 WEST MAIN	UOCC #0333	B	(435)257-5661
BOX ELDER COUNTY LANDFILL-LITTLE MTN 9595 WEST 6800 NORTH	UOCC #0317	B	(435)744-2275
BOX ELDER COUNTY ROAD DEPARTMENT 5730 WEST 8800 NORTH	UOCC #0618	B	(435)257-5450
BOX ELDER SCHOOL DISTRICT BUS SHOP 370 SOUTH 200 WEST	UOCC #0226	A	(435)257-5584

- \* A. DO-IT-YOURSELFERS (DIYER) UP TO 5 GALLONS PER VISIT  
 B. FARMERS UP TO 55 GALLONS AND DO-IT-YOURSELFERS UP TO 5 GALLONS PER VISIT  
 C. BUSINESSES AND FARMERS UP TO 55 GALLONS AND DO-IT-YOURSELFERS UP TO 5 GALLONS PER V  
 D. BUSINESSES ONLY UP TO 55 GALLONS PER VISITS

# Got Drugs?

**Most abused prescription drugs  
come from family and friends.  
You could be a drug dealer and  
not even know it.**

Visit [www.dea.gov](http://www.dea.gov)  
for more information.

- ◆ Unused or expired prescription medications are a public safety issue, leading to accidental poisoning, overdose, and abuse.
- ◆ Pharmaceutical drugs can be just as dangerous as street drugs when taken without a prescription or a doctor's supervision.
- ◆ The non-medical use of prescription drugs ranks second only to marijuana as the most common form of drug abuse in the United States.
- ◆ The majority of teenagers abusing prescription drugs got them from family and friends, with the home medicine cabinet a primary source.
- ◆ Unused drugs thrown in the trash in their bottles can be retrieved and abused or illegally sold. Proper disposal of unused prescription drugs can save lives.
- ◆ Take-back programs are the best way to dispose of old drugs. But if a program is not available :
  - ◆ Take the meds out of their bottles;
  - ◆ Mix them with something unappealing like used kitty litter or coffee grounds;
  - ◆ Seal them in a bag or disposable container, and throw that away.



# Clean Out Your Medicine Cabinet!

PLEASE! **Do Not Flush** your unused prescription and over-the-counter medications. You can prevent **abuse, poisoning and pollution** by taking them to the event listed on the front of this flyer or to one of 51 permanent community disposal locations throughout the state listed at:

<http://www.medicationdisposal.utah.gov>



## Why Should I Take the Time To Do This?

Proper disposal of unwanted medicines may be a chore, but there are important reasons to do this in a safe and responsible way.

### **It's your environment - Please don't flush!**

- Many drugs flushed down the toilet cannot be removed by the sewer treatment plant or septic system.
- These substances then get into our streams, rivers, lakes, groundwater and our soil and may cause harm to the environment.

### **Drug abuse is very common.**

- Abuse of prescription drugs, particularly painkillers, has increased among teenagers and young adults.
- More than half of people who abuse painkillers get the drugs for free from friends or relatives.

### **You can make a difference!**

- Children and pets can find medicine in your home or in your trash.
- Drugs may be taken by accident, on purpose or illegally sold.
- You can prevent accidental poisoning and drug abuse.



## What can I expect if I go to the Medication Take-Back Event?

- This take-back event is only for households. Medical waste, including medications from hospitals, long term care facilities, clinics, group homes, Dr.'s offices or other medical facilities is not allowed.
- Leave medications in the original container and leave the label on. You can black out or remove your personal information but keep the information about the medication legible.
- This is a completely anonymous and free drop-off. There is no refund and medications will not be resold or used. All medications will be destroyed through incineration.
- Thermometers will not be accepted.
- Sharps will be collected
- Events are held in parking lots to facilitate "Drive-Up and Drop-Off" collections.
- Police are present to comply with federal laws regarding controlled substances as they are the only personnel who can legally take possession of controlled substances after they have been prescribed.



## What if I cannot go to the Medication Take-Back Event?

- You can find permanent community collection sites near you at [www.medicationdisposal.utah.gov](http://www.medicationdisposal.utah.gov), and directions for safe disposal in your trash if there is no site near you. This website also lists other one-time Take-Back events occurring at different times and locations around the state.

# Clean Out Your **MEDICATIONS** Cabinet!

**POISON**  
**Help**  
1-800-222-1222

Bring unused over-the-counter and prescription medications to the following location so they can be safely destroyed.



Ogden

## **Weber-Morgan Health Department**

477 23rd Street

**Saturday September 25, 2010  
10:00 AM to 2:00 PM**

To find permanent disposal bins call the DEQ Hotline

**1-800-458-0145**

or visit [www.medicationdisposal.utah.gov](http://www.medicationdisposal.utah.gov)

Weber-Morgan Health Department 801-399-7160 [webermorganhealth.org](http://webermorganhealth.org)  
Weber Human Services Prevention 801-625-3674 [whsprevention@weberhs.org](mailto:whsprevention@weberhs.org)



Weber Human Services  
**PREVENTION**







## OUTFALL RECONNAISSANCE INVENTORY/ SAMPLE COLLECTION FIELD SHEET

### Section 1: Background Data

Subwatershed:		Outfall ID:	
Today's date:		Time (Military):	
Investigators:		Form completed by:	
Temperature (°F):	Rainfall (in.):	Last 24 hours:	Last 48 hours:
Latitude:	Longitude:	GPS Unit:	GPS LMK #:
Camera:		Photo #s:	
Land Use in Drainage Area (Check all that apply):			
<input type="checkbox"/> Industrial		<input type="checkbox"/> Open Space	
<input type="checkbox"/> Ultra-Urban Residential		<input type="checkbox"/> Institutional	
<input type="checkbox"/> Suburban Residential		Other: _____	
<input type="checkbox"/> Commercial		Known Industries: _____	
Notes (e.g., origin of outfall, if known):			

### Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE	DIMENSIONS (IN.)	SUBMERGED
<input type="checkbox"/> Closed Pipe	<input type="checkbox"/> RCP <input type="checkbox"/> CMP <input type="checkbox"/> PVC <input type="checkbox"/> HDPE <input type="checkbox"/> Steel <input type="checkbox"/> Other: _____	<input type="checkbox"/> Circular <input type="checkbox"/> Single <input type="checkbox"/> Elliptical <input type="checkbox"/> Double <input type="checkbox"/> Box <input type="checkbox"/> Triple <input type="checkbox"/> Other: _____	Diameter/Dimensions: _____	In Water: <input type="checkbox"/> No <input type="checkbox"/> Partially <input type="checkbox"/> Fully  With Sediment: <input type="checkbox"/> No <input type="checkbox"/> Partially <input type="checkbox"/> Fully
<input type="checkbox"/> Open drainage	<input type="checkbox"/> Concrete <input type="checkbox"/> Earthen <input type="checkbox"/> rip-rap <input type="checkbox"/> Other: _____	<input type="checkbox"/> Trapezoid <input type="checkbox"/> Parabolic <input type="checkbox"/> Other: _____	Depth: _____ Top Width: _____ Bottom Width: _____	
<input type="checkbox"/> In-Stream	<b>(applicable when collecting samples)</b>			
Flow Present?	<input type="checkbox"/> Yes <input type="checkbox"/> No <i>If No, Skip to Section 5</i>			
Flow Description (If present)	<input type="checkbox"/> Trickle <input type="checkbox"/> Moderate <input type="checkbox"/> Substantial			

### Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER	RESULT	UNIT	EQUIPMENT	
<input type="checkbox"/> Flow #1	Volume		Liter	Bottle
	Time to fill		Sec	
<input type="checkbox"/> Flow #2	Flow depth		In	Tape measure
	Flow width	_____', _____"	Ft, In	Tape measure
	Measured length	_____', _____"	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature		°F	Thermometer	
pH		pH Units	Test strip/Probe	
Ammonia		mg/L	Test strip	

## Outfall Reconnaissance Inventory Field Sheet

### Section 4: Physical Indicators for Flowing Outfalls Only

Are Any Physical Indicators Present in the flow?  Yes  No (If No, Skip to Section 5)

INDICATOR	CHECK if Present	DESCRIPTION	RELATIVE SEVERITY INDEX (1-3)		
Odor	<input type="checkbox"/>	<input type="checkbox"/> Sewage <input type="checkbox"/> Rancid/sour <input type="checkbox"/> Petroleum/gas <input type="checkbox"/> Sulfide <input type="checkbox"/> Other:	<input type="checkbox"/> 1 – Faint	<input type="checkbox"/> 2 – Easily detected	<input type="checkbox"/> 3 – Noticeable from a distance
Color	<input type="checkbox"/>	<input type="checkbox"/> Clear <input type="checkbox"/> Brown <input type="checkbox"/> Gray <input type="checkbox"/> Yellow <input type="checkbox"/> Green <input type="checkbox"/> Orange <input type="checkbox"/> Red <input type="checkbox"/> Other:	<input type="checkbox"/> 1 – Faint colors in sample bottle	<input type="checkbox"/> 2 – Clearly visible in sample bottle	<input type="checkbox"/> 3 – Clearly visible in outfall flow
Turbidity	<input type="checkbox"/>	See severity	<input type="checkbox"/> 1 – Slight cloudiness	<input type="checkbox"/> 2 – Cloudy	<input type="checkbox"/> 3 – Opaque
Floatables -Does Not Include Trash!!	<input type="checkbox"/>	<input type="checkbox"/> Sewage (Toilet Paper, etc.) <input type="checkbox"/> Suds <input type="checkbox"/> Petroleum (oil sheen) <input type="checkbox"/> Other:	<input type="checkbox"/> 1 – Few/slight; origin not obvious	<input type="checkbox"/> 2 – Some; indications of origin (e.g., possible suds or oil sheen)	<input type="checkbox"/> 3 – Some; origin clear (e.g., obvious oil sheen, suds, or floating sanitary materials)

### Section 5: Physical Indicators for Both Flowing and Non-Flowing Outfalls

Are physical indicators that are not related to flow present?  Yes  No (If No, Skip to Section 6)

INDICATOR	CHECK if Present	DESCRIPTION	COMMENTS
Outfall Damage	<input type="checkbox"/>	<input type="checkbox"/> Spalling, Cracking or Chipping <input type="checkbox"/> Peeling Paint <input type="checkbox"/> Corrosion	
Deposits/Stains	<input type="checkbox"/>	<input type="checkbox"/> Oily <input type="checkbox"/> Flow Line <input type="checkbox"/> Paint <input type="checkbox"/> Other:	
Abnormal Vegetation	<input type="checkbox"/>	<input type="checkbox"/> Excessive <input type="checkbox"/> Inhibited	
Poor pool quality	<input type="checkbox"/>	<input type="checkbox"/> Odors <input type="checkbox"/> Colors <input type="checkbox"/> Floatables <input type="checkbox"/> Oil Sheen <input type="checkbox"/> Suds <input type="checkbox"/> Excessive Algae <input type="checkbox"/> Other:	
Pipe benthic growth	<input type="checkbox"/>	<input type="checkbox"/> Brown <input type="checkbox"/> Orange <input type="checkbox"/> Green <input type="checkbox"/> Other:	

### Section 6: Overall Outfall Characterization

Unlikely   
  Potential (presence of two or more indicators)   
  Suspect (one or more indicators with a severity of 3)   
  Obvious

### Section 7: Data Collection

1. Sample for the lab?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
2. If yes, collected from:	<input type="checkbox"/> Flow	<input type="checkbox"/> Pool	
3. Intermittent flow trap set?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	If Yes, type: <input type="checkbox"/> OBM <input type="checkbox"/> Caulk dam

### Section 8: Any Non-Illicit Discharge Concerns (e.g., trash or needed infrastructure repairs)?

## Procedures for Dry Weather Screening of Outfalls

**Definition:** Dry weather screening is described as monitoring done in the absence of storm events to discharges representing, as much as possible, the entire storm drainage system for the purpose of obtaining information about illicit connections and improper dumping.

### Procedures:

1. Dry weather screening of outfalls should be performed before or after the water season when flows in outfall flows should be at their minimums.
2. The minimum requirement for screening outfalls is to inspect at least 20% of all outfalls per year.
3. The inspector shall use a camera, measuring tape, and clear container. The camera will be used to take pictures and document the condition of the outfall and water. The measuring tape will be used to measure the size of the pipe or channel being inspected. The clear container will be used to take a sample of the water, if any, and visually monitor the water condition.
4. A record of the inspection must be kept. Use the EPA form *Outfall Reconnaissance Inventory/Sample Collection Field Sheet*. Fill out all applicable information.
5. If any water contamination or irregularities are observed use the *Procedures for Tracing and Removing Illicit Discharges*.
6. Keep a record of all inspections performed.

## Procedures for Tracing and Removing Illicit Discharges

**Definition:** Illicit discharge means any discharge to a municipal separate storm sewer that is not composed entirely of storm water.

The following non-storm water discharges do not need to be addressed and are not considered illicit discharges:

- De-chlorinated Water line flushing
- Landscape irrigation
- Diverted stream flows
- Rising ground waters
- Uncontaminated ground water infiltration
- Uncontaminated pumped ground water
- Discharges from potable water sources
- Foundation drains
- Air conditioning condensate
- Irrigation water
- Springs
- Water from crawl space pumps
- Footing drains
- Lawn watering runoff
- Individual residential car washing
- Flows from riparian habitats and wetlands
- De-chlorinated swimming pool discharges
- Residual street wash water
- De-chlorinated water reservoir discharges
- Discharges or flows from firefighting activity

### Procedures:

1. The storm drain system map shall be kept up to date to include all new storm drain pipe, manholes, and any other conveyance structures located within the city.
2. Priority sites that are likely to have illicit discharges will be identified (if contained within the city) and at least 20% of these areas will be inspected annually. Examples of such sites are:
  - Areas with older infrastructure or history of sewer overflows or cross connections
  - Industrial, commercial, or mixed use areas
  - Areas with a history of illicit discharges
  - Areas with a history of illegal dumping
  - Areas with onsite sewage disposal systems
  - Areas upstream of sensitive waterbodies
3. The city shall publically list and promote a hotline or local telephone number for the public to report spills and other illicit discharges. This number is (801) 627-1919 during business hours and 911 after business hours. This hotline will be publicized on the city website and newsletter. During non-business hours such calls will be forwarded to...
4. The city will train office personnel who might receive initial reports of illicit discharges to use the *EPA Illicit Discharge Hotline Incident Tracking Sheet*.



5. The city will train field personnel who might respond to reports of illicit discharges how to trace and eliminate spills. When necessary open manholes and trace the spill upstream and to its source. If available the use of mobile cameras, dye testers, etc. to trace the spill upstream and to its source.
6. Provide a list of those city personnel that will be notified in case of a spill or illicit discharge and the order they will be contacted, phone numbers, and associated responsibilities. Update this list as changes to personnel occur.
7. If a large spill or illicit discharge takes place contact the Weber-Morgan Health Department at (801) 399-7169, or Weber County Spill Response at (801) 536-4123, or the Davis County Health Department at (801) 807-8872. Notify nearby property owners of the spill or illicit discharge if necessary. Other environmental response companies that are available 24 hours a day are listed below as a resource.
8. When the spill or illicit discharge has been eliminated the *Illicit Discharge Hotline Incident Tracking Sheet* will be completed kept on record, any other necessary paper work will be completed and kept on record. Determine what actions are necessary to prevent similar spills or illicit discharges in the future. If the incident was intentional legal enforcement actions may be considered.

**Environmental Response Companies:**

<b>Name</b>	<b>Location</b>	<b>Telephone</b>
A Plus Environmental LLC	Ogden, Layton	(801) 392-6545 or (801) 391-2050
Enviro Care, Inc	North Salt Lake	(801) 299-1900 or (801) 820-9058
HMHTTC Response Inc.	Ogden	(801) 627-2240 or 800-927-9303
Lincoln Environmental Services	Ogden	800-257-5370
S & M Diesel Environmental Services	Brigham City	800-735-2004 or (435) 279-8124
USA Environmental	Layton, Ogden	(801) 390-4934







## Illicit Discharge Hotline Incident Tracking Sheet

<b>Incident ID:</b>				
<b>Responder Information</b>				
Call taken by:			Call date:	
Call time:			Precipitation (inches) in past 24-48 hrs:	
<b>Reporter Information</b>				
Incident time:			Incident date:	
Caller contact information ( <i>optional</i> ):				
<b>Incident Location</b> ( <i>complete one or more below</i> )				
Latitude and longitude:				
Stream address or outfall #:				
Closest street address:				
Nearby landmark:				
<b>Primary Location Description</b>		<b>Secondary Location Description:</b>		
<input type="checkbox"/> Stream corridor ( <i>In or adjacent to stream</i> )		<input type="checkbox"/> Outfall	<input type="checkbox"/> In-stream flow	<input type="checkbox"/> Along banks
<input type="checkbox"/> Upland area ( <i>Land not adjacent to stream</i> )		<input type="checkbox"/> Near storm drain	<input type="checkbox"/> Near other water source (storm water pond, wetland, etc.):	
Narrative description of location:				
<b>Upland Problem Indicator Description</b>				
<input type="checkbox"/> Dumping		<input type="checkbox"/> Oil/solvents/chemicals	<input type="checkbox"/> Sewage	
<input type="checkbox"/> Wash water, suds, etc.		<input type="checkbox"/> Other: _____		
<b>Stream Corridor Problem Indicator Description</b>				
Odor	<input type="checkbox"/> None	<input type="checkbox"/> Sewage	<input type="checkbox"/> Rancid/Sour	<input type="checkbox"/> Petroleum (gas)
	<input type="checkbox"/> Sulfide (rotten eggs); natural gas	<input type="checkbox"/> Other: Describe in "Narrative" section		
Appearance	<input type="checkbox"/> "Normal"	<input type="checkbox"/> Oil sheen	<input type="checkbox"/> Cloudy	<input type="checkbox"/> Suds
	<input type="checkbox"/> Other: Describe in "Narrative" section			
Floatables	<input type="checkbox"/> None:	<input type="checkbox"/> Sewage (toilet paper, etc)	<input type="checkbox"/> Algae	<input type="checkbox"/> Dead fish
	<input type="checkbox"/> Other: Describe in "Narrative" section			
Narrative description of problem indicators:				
Suspected Violator (name, personal or vehicle description, license plate #, etc.):				

<b>Investigation Notes</b>	
Initial investigation date:	Investigators:
<input type="checkbox"/> No investigation made	Reason:
<input type="checkbox"/> Referred to different department/agency:	Department/Agency:
<input type="checkbox"/> Investigated: No action necessary	
<input type="checkbox"/> Investigated: Requires action	Description of actions:
Hours between call and investigation:	Hours to close incident:
Date case closed:	
Notes:	

## Storm Sewer Connection Permit

for sites disturbing less than one acre

Fees (Office Use)	Receipt Number (Office Use)	Permit Number (Office Use)	Priority Site (Office Use) <input type="checkbox"/> Yes <input type="checkbox"/> No
-------------------	-----------------------------	----------------------------	--

<b>Property Owner Contact Information</b>	<b>Authorized Representative Contact Information</b>
---	--

Name of Property Owner(s)		Name of Person Authorized to Represent the Property Owner(s)	
Phone	Fax	Phone	Fax
Email Address		Email Address	
Mailing Address of Property Owner(s)		Mailing Address of Authorized Person	

<b>Project Information</b>	<b>Applicant Narrative</b>
----------------------------	----------------------------

Project Name		Please explain your request
Project Address		
Estimated Project Length (mo)	Previous Permit No. (If applicable)	
Start Date	Total Hard Surface (sf)	

### Submittal Checklist

**BMP Plan.** A plan incorporating storm water BMP's that meet the requirements of the city storm water and drainage ordinance.

**Maintenance Plan.** A plan outlining how the applicant will maintain the storm water improvements listed in the application.

**Discharge Rate.** Discharges to the storm sewer system shall be designed so that the discharge to the storm sewer system does not exceed 0.1 Cubic Feet Per Second (cfs) per acre.

As per the city ordinance: **No person shall connect to the city storm sewer system, either directly or indirectly, without first obtaining a storm sewer discharge permit from the city.**

### Authorization

By signing below the Owner / Representative authorizes the city to enter the property to perform inspections.

Owner or Authorized Representative Signature	Date
Signature of Approval (City Official)	Date















# UPDES STORM WATER INSPECTION EVALUATION FORM FOR SWPPP COMPLIANCE

Insert City  
Logo Here

## BACKGROUND INFORMATION

Site Name:		UPDES Permit #:	
Site Address:			
Local Jurisdiction or County:			
Permit Effective Date:		Permit Expiration Date:	
Total Project Area:		Total Disturbed Area:	
Project Type: (circle) <i>Subdivision</i> <i>Commercial</i> <i>Industrial</i> <i>Linear (Road/Pipe/Power)</i> <i>Land Disturbance</i>			

## OPERATOR CONTACT INFORMATION

	NAMES	PHONE NUMBERS	E-MAIL
Operator:			
Onsite Facility Contact:			
Important Contacts:			
Important Contacts:			

## SWPPP PRE-SITE REVIEW INFORMATION

	YES	NO
1. Has a pre-construction review of the SWPPP been conducted by the appropriate municipal agency?		
2. Are contact names and telephone numbers listed in the SWPPP?		
3. Does the SWPPP include a site map showing storm drains, slopes/surface drainage patterns, SW discharge points, construction boundaries, limits of disturbance, surface waters (name of receiving water), structural controls, and does it define/explain non-structural controls?		
4. Does the SWPPP have an estimate of the area to be disturbed, a sequence of construction activities, the SW runoff coefficient for after completion, a description of the soil types, controls for discharges from (asphalt/concrete) batch plants if any, show wetland areas, and have a description of the nature of the construction activity?		
5. Does the SWPPP and site map show erosion and sediment controls placement & details (e.g. erosion blankets, mulch, slope drains, check dams, sediment basins, grass-lined channels, fiber rolls, sediment traps, silt fence, inlet protection, curb cut-back, dust control, etc?)		
6. Does the SWPPP and site map show and describe good housekeeping controls (e.g. track out pad, street sweeping, material storage, construction waste containment and removal, sanitary waste, concrete washout pits, etc)		
7. Are post-construction elements included in the SWPPP? (i.e. grass swales, detention basins, vegetated filter strips, infiltration, depression storage, landscaping/xeriscaping, discontinuous concrete or hard surface SW conveyance, etc.)		
8. Does the SWPPP address endangered species and historic preservation?		
9. Is the SWPPP signed by a responsible corporate officer with the certification statement (see permit part 5.16.c.)?		
10. Are the NOI and a copy of the State permit in the SWPPP?		

## NOTICE OF TERMINATION (NOT) INSPECTION

Site Name:		Date of Evaluation:	
Site Address:			
Inspected By:		Title/Organization:	
	YES	NO	COMMENTS:
1. Has the site been properly stabilized according to permit requirements?			
2. Have all temporary BMPs been removed?			
3. Have post-construction (permanent storm water system) elements been constructed and inspected in accordance with approved project drawings?			
4. Is the site acceptably clean?			

*I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.*

Inspector:	(Print Name)	(Title)	(Signature)	(Date)
Operator:	(Print Name)	(Title)	(Signature)	(Date)

modified 8/12/10

**(Attach additional sheets of narrative, pictures and checklists, as necessary)**





# SWPPP COMPLIANCE INSPECTION FORM

Insert City  
Logo Here

Project Name:		Address:		Date:
Owner:		Contractor (Gen/Sub):		Start time:
Site Contact:		Phone:		Stop time:
UPDES Permit #:	Expiration:	Weather: Sunny Cloudy Raining Snowing Other:		
Date of last rain event:		Duration:	Approx. Rainfall (in):	
Inspected By (Print):		Local Jurisdiction or County:		
Reason for Inspection:		Scheduled		Complaint/Tip
Reason for Inspection:		Random		Receiving Waters:
Inspection Code (circle):	SW sampling	Inspector Code (circle):	(S) State	Type Code (circle):
Inspection Code (circle):	SW non-sampling	Inspector Code (circle):	(L) Local	1 - Municipal 2 - Industrial 3 - State

<b>SWPPP, EROSION, SEDIMENT AND HOUSEKEEPING BMP'S INFORMATION</b>	YES	NO	N/A
1. Is the SWPPP on site and accessible, or is the SWPPP location posted in an obvious place and reasonably accessible (in a short time)?			
2. Are erosion control, sediment control, and good housekeeping BMP's installed on the site as shown in the SWPPP?			
3. Has the SWPPP been updated to reflect the current site conditions (modifications dated & initialed on site map, new BMPs on site map, discontinued BMPs crossed off site map, new BMP details & spec's in SWPPP, SWPPP amendment Log, etc.)?			
4. Are on-site inspections being performed and recorded by a qualified person on a weekly or biweekly basis, reporting items required by permit? (Inspector name & qualifications, weather, problems/repairs, corrective action, new BMPs, removed BMPs, discharges, etc.)			
5. Have all corrective action items from previous inspections been addressed and documented within the time frame allotted by the inspector?			
6. Are SW flows entering and leaving the construction site controlled, managed, or diverted around the site? (e.g. perimeter controls, berms, silt fence, upgradient boundary diversion, down gradient boundary sediment control, etc.)			
7. Is there evidence of sediment discharge such as mud flows or soil deposits from the construction site in downstream locations?			
8. Is there evidence of vehicles tracking soil off the construction site?			
9. Is there soil, construction material, landscaping items, or other debris piled on impervious surfaces (roads, drives) that could be washed with SW to a storm drain or water body?			
10. Is there a need to repair, maintain, or improve erosion control BMPs (temporary stabilization, erosion blankets, mulch, vegetated strips, rip rap, surface roughening, pipe slope drain, dust control, etc)?			
11. Is there a need to repair, maintain, or improve sediment control BMPs (silt fence, check dams, fiber rolls, sediment trap/basin, inlet protection, waddles, straw bails, curb cut-back, etc)?			
12. Is there a need to repair, maintain, or improve good housekeeping controls (clean track out pad, sweeping, construction materials management, litter/trash control, port-o-potties staked down, fueling areas, concrete wash out area, proper curb ramps, spill prevention, etc)?			
13. Are there disturbed areas that have not had construction activities for 14 to 21 days without stabilization? (except snow or frozen ground)?			
14. Are there places where BMPs are needed and should be installed or not needed and should be removed?			

<b>COMMENTS AND CORRECTIVE ACTIONS FOR SWPPP COMPLIANCE</b>
<i>Identify the problem and its location. If appropriate, describe (in general terms) what needs to be completed. However, only if qualified (e.g., you are a designer) should you be mandating specific BMPs to install. Include the date when corrections are made.</i>

Inspector, please list all applicable SEV codes:			
<p>I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.</p>			
Inspector:	(Print Name)	(Title)	(Signature) (Date)
Operator:	(Print Name)	(Title)	(Signature) (Date)
modified 8/12/10			













## Storm Sewer Connection Permit

for sites disturbing less than one acre or are part of a common plan of development

Fees (Office Use)	Receipt Number (Office Use)	Permit Number (Office Use)	Priority Site (Office Use) <input type="checkbox"/> Yes <input type="checkbox"/> No
<b>Property Owner Contact Information</b>		<b>Authorized Representative Contact Information</b>	
Name of Property Owner(s)		Name of Person Authorized to Represent the Property Owner(s)	
Phone	Fax	Phone	Fax
Email Address		Email Address	
Mailing Address of Property Owner(s)		Mailing Address of Authorized Person	
<b>Project Information</b>		<b>Applicant Narrative</b>	
Project Name		Please explain your request	
Project Address			
Estimated Project Length (mo)	Previous Permit No. (If applicable)		
Start Date	Total Hard Surface (sf)		
<b>Submittal Checklist</b>			
<input type="checkbox"/> <b>BMP Plan.</b> A plan incorporating storm water BMP's that meet the requirements of the city storm water and drainage ordinance.			
<input type="checkbox"/> <b>Maintenance Plan.</b> A plan outlining how the applicant will maintain the storm water improvements listed in the application.			
<input type="checkbox"/> <b>Discharge Rate.</b> Discharges to the storm sewer system shall be designed so that the discharge to the storm sewer system does not exceed 0.1 Cubic Feet Per Second (cfs) per acre.			
<u>As per the city ordinance:</u> <b>No person shall connect to the city storm sewer system, either directly or indirectly, without first obtaining a storm sewer discharge permit from the city.</b>			
<b>Authorization</b>			
By signing below the Owner / Representative authorizes the city to enter the property to perform inspections.			
Owner or Authorized Representative Signature			Date
Signature of Approval (City Official)			Date

## Storm Water Construction Activity Permit

for sites disturbing one acre or greater or part of a common plan of development

Fees (Office Use)	Receipt Number (Office Use)	Permit Number (Office Use)	Priority Site (Office Use) <input type="checkbox"/> Yes <input type="checkbox"/> No
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<b>Property Owner Contact Information</b>	<b>Authorized Representative Contact Information</b>
---	--

Name of Property Owner(s)		Name of Person Authorized to Represent the Property Owner(s)	
Phone	Fax	Phone	Fax
Email Address		Email Address	
Mailing Address of Property Owner(s)		Mailing Address of Authorized Person	

<b>Project Information</b>	<b>Applicant Narrative</b>
----------------------------	----------------------------

Project Name		Please explain your request	
Project Address			
Total Hard Surface (sf)	Start Date	Estimated Project Length (mo)	Previous Permit No. (If applicable)

### Submittal Checklist

- SWPPP.** The application shall include a Storm Water Pollution Prevention Plan which meets the criteria set forth in UPDES Storm Water General Permit for construction activities, UTR300000.
- NOI.** The application shall include a copy of the Notice of Intent filed with the State of Utah.
- Discharge Rate.** Discharges to the storm sewer system shall be designed so that the discharge to the storm sewer system does not exceed 0.1 Cubic Feet Per Second (cfs) per acre.

The applicant shall file the application on or before the following dates:

- Subdivision:** The date that the applicant submits the preliminary subdivision development plat application
- Site Plan:** The date that the applicant submits a site plan application or amends site plan.
- Building Permit:** The date that the applicant submits a building permit application if the applicant proposes to construct a building on an existing lot or parcel.
- Land use Permit:** The date that the applicant submits a land use permit application.
- Other:** at least two (2) weeks before the developer intends to perform any type of work not listed above that would require a Storm Water Construction Activity Permit pursuant to this Chapter.

Failure to acquire a required Storm Water Construction Activity Permit is grounded for tabling a related subdivision application, site plan application, conditional use permit application, or building permit application. It is unlawful to commence work (move dirt) on a development site before obtaining a required Storm Water Connection Activity Permit.

Note: A pre-construction meeting is required before performing any on-site earth work, unless waived by the city engineer.

- NOT.** It is understood that a Permittee is legally responsible for the permit requirements until a NOT (Notice of Termination) is submitted. Final site stabilization, removal of temporary BMPs, and City notification is required before a NOT can be submitted. A Permittee cannot submit a NOT without final stabilization unless another party has agreed to file a NOI (Notice of Intent) to assume responsibility for final stabilization of the site.

\*information regarding requirements can be found at: <http://www.waterquality.utah.gov/UPDES/Stormwatercon.htm>

### Authorization

By signing below the Owner / Representative authorizes the city to enter the property to perform inspections.

Owner or Authorized Representative Signature	Date
Signature of Approval (City Official)	Date

## Storm Water Pollution Prevention Plan Checklist

This checklist needs to be filled out prior to work commencing on any construction site disturbing 1 acre or more in size, or is part of a common plan of development. The use of this checklist does not guarantee compliance with the General Permit for Storm Water Discharges from Construction Activities.

Development Name:

No.	Checklist Item	Answer / Location in SWPPP & Notes
<b>General:</b>		
1	Did owner and all "operators" sign the SWPPP?	<input type="checkbox"/> NO <input type="checkbox"/> Yes
2	Did the signatures include the certification statement?	<input type="checkbox"/> NO <input type="checkbox"/> Yes
3	Were the signatures authorized to sign?	<input type="checkbox"/> NO <input type="checkbox"/> Yes
<b>Site Description:</b>		
4	Is there a site description?	<input type="checkbox"/> NO <input type="checkbox"/> Yes
5	Does it identify nature/sequence of construction activities?	<input type="checkbox"/> NO <input type="checkbox"/> Yes
6	Does it identify major grading activities?	<input type="checkbox"/> NO <input type="checkbox"/> Yes
7	Does it identify total area of site and total area to be disturbed?	<input type="checkbox"/> NO <input type="checkbox"/> Yes
8	Does it identify pre/post runoff coefficient/soils description?	<input type="checkbox"/> NO <input type="checkbox"/> Yes
9	Does it identify receiving water(s) or MS4 listed?	<input type="checkbox"/> NO <input type="checkbox"/> Yes
10	Is the receiving water a tributary to waters of the U.S.?	<input type="checkbox"/> NO <input type="checkbox"/> Yes
11	Is there a site map?	<input type="checkbox"/> NO <input type="checkbox"/> Yes
12	Does the site map show drainage patterns/outfalls on map?	<input type="checkbox"/> NO <input type="checkbox"/> Yes
13	Does the site map show area of soil disturbances?	<input type="checkbox"/> NO <input type="checkbox"/> Yes
14	Does the site map show locations of major structural and nonstructural controls?	<input type="checkbox"/> NO <input type="checkbox"/> Yes
15	Does the site map show locations of storm water discharges to a surface water?	<input type="checkbox"/> NO <input type="checkbox"/> Yes
16	Does the site map show locations of materials or equipment storage (on-site or off-site)?	<input type="checkbox"/> NO <input type="checkbox"/> Yes
<b>Controls to Reduce Pollutants:</b>		
17	Does the SWPPP include a description of interim and permanent stabilization practices (e.g. seeding, mulching, rip rap) for the site?	<input type="checkbox"/> NO <input type="checkbox"/> Yes

18	Does the SWPPP Identify the contractor(s) and timing by which stabilization practices will be implemented	<input type="checkbox"/> NO <input type="checkbox"/> Yes
19	Does the SWPPP include a description of structural practices (e.g. off-site vehicle tracking, silt fences, sediment traps, storm drain inlet protection) for the site?	<input type="checkbox"/> NO <input type="checkbox"/> Yes
20	Where the structural practices are a sediment basin that drains over 10 acres, is it adequately designed? (3,600 cu.ft./acre x total drainage acres)	<input type="checkbox"/> NO <input type="checkbox"/> Yes
21	Does the SWPPP identify the contractor(s) who will implement the structural practices?	<input type="checkbox"/> NO <input type="checkbox"/> Yes
22	Does the SWPPP identify storm water management measures to address storm water runoff once the construction is completed (e.g. retention ponds, velocity dissipation controls)?	<input type="checkbox"/> NO <input type="checkbox"/> Yes
<b>Maintenance:</b>		
23	Does the SWPPP describe the procedures to ensure the timely maintenance of sediment control measures identified in the SWPPP in effective operating condition.	<input type="checkbox"/> NO <input type="checkbox"/> Yes
<b>Inspections:</b>		
24	Is the inspection frequency to be once every seven days, or at least once every 14 days and within 24 hours of the end of a storm event of 0.5 inches or greater?	<input type="checkbox"/> NO <input type="checkbox"/> Yes
25	Are the inspection reports signed and certified by an authorized person?	<input type="checkbox"/> NO <input type="checkbox"/> Yes
26	Are the inspections being performed by a qualified person and are the qualifications in the SWPPP?	<input type="checkbox"/> NO <input type="checkbox"/> Yes



Long Term Storm Water  
Management References and  
Documentation

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# APPENDIX E







Pollution Prevention / Good  
Housekeeping References and  
Documentation

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## APPENDIX F





**CITY-OWNED OR -OPERATED FACILITIES AND  
STORM WATER CONTROLS INVENTORY**  
Section 4.2.6.1 - 4.2.6.3

Facility Name/Description	Location/Address	Pollutant(s)	*High Priority Facility?

\*See 4.2.6.3 and 4.2.6.4 of the General Permit for description of "high-priority" facility.



Example Facilities include, but are not limited to:

- Composting facilities
- Equipment storage and maintenance facilities
- Fuel farms
- Hazardous waste disposal facilities
- Hazardous waste handling and transfer facilities
- Incinerators
- Landfills
- Landscape maintenance on municipal property
- Materials storage yards
- Pesticide storage facilities
- Public buildings, including libraries, police stations, fire stations, municipal buildings, and similar Permittee-owned or operated buildings
- Public parking lots
- Public golf courses
- Public swimming pools
- Public works yards
- Recycling facilities
- Salt storage facilities
- Solid waste handling and transfer facilities
- Street repair and maintenance sites
- Vehicle storage and maintenance yards
- Permittee-owned and/or maintained structural storm water controls

Potential Pollutants include, but are not limited to:

- Sediment
- Nutrients
- Metals
- Hydrocarbons (e.g., benzene, toluene, ethylbenzene, and xylene)
- Pesticides
- Chlorides
- Trash
- Bacteria
- Chlorine
- Organic matter









U.S. ENVIRONMENTAL PROTECTION AGENCY

# National Pollutant Discharge Elimination System (NPDES)

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## Materials Management

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**Minimum Measure:** Pollution Prevention/Good Housekeeping for Municipal Operations

**Subcategory:** Municipal Facilities

### Description

Responsible management of common chemicals, such as fertilizers, solvents, paints, cleaners, and automotive products, can significantly reduce polluted runoff (WEF and ASCE, 1998). Such products must be handled properly in all stages of development, use, and disposal. Materials management entails the selection of the individual product, the correct use and storage of the product, and the responsible disposal of associated waste(s).

### Applicability

In many cases, industries can implement simple housekeeping practices in order to manage materials more effectively. Proper management reduces the likelihood of accidental spills or releases of hazardous materials during storm events. In addition, health and safety conditions at the facility will improve.

Some simple practices for managing materials are improving maintenance of industrial machinery, establishing material storage and inventory controls, improving routine cleaning and inspection of facilities where materials are stored or processed, maintaining organized workplaces, and educating employees about the benefits of the above practices (USEPA, 1992).

### Maintenance Considerations

Maintenance associated with materials management should be designed to minimize the amounts of materials used and the wastes generated by industrial processes. Procedures for operation and maintenance can be easily integrated into an industry's management plan. Simple processes, such as routine cleaning of work spaces, proper collection and disposal of wastes, maintenance of machinery, regular inspections of equipment and facilities, and training employees to respond to spills or leaks, have significant effects on reducing the potential to pollute stormwater runoff.



**Secondary containment should be used to prevent materials from contaminating stormwater**

Another consideration is regular [material inventories](#) [PDF - 109 KB - 4 pp]. Such inventories reduce the occurrence of overstocking hazardous materials, increase knowledge about what hazardous materials are present and how they are stored, and provide documentation of proper handling of hazardous materials. An inventory of hazardous materials present at a particular facility consists of three major steps (USEPA, 1992):

- Identify all hazardous and nonhazardous substances present at a facility. This can be accomplished by reviewing all purchase orders for the facility and walking through the facility itself. Compile a list of all chemicals present at a facility and obtain a Material Safety Data Sheet (MSDS) for each one.
- Label all containers with the name of the chemical, unit number, expiration date, handling instructions, and health or environmental hazards. Much of this information will be found on the MSDS. Often, insufficient labeling leads to improper handling or disposal of hazardous substances.
- Make special note on the inventory of hazardous chemicals that require special handling, storage, or disposal.

### Cost Considerations

The major costs of these BMPs can be attributed to additional labor. Depending on the extent of the program, varying amounts of staff hours will be required for the necessary education of municipal employees, local businesses, and the public. In addition, posters and bulletin boards that encourage the proper management of materials should be displayed throughout the facility.

### References

WEF and the ASCE. 1998. *Urban Runoff Quality Management*. WEF Manual of Practice No. 23 and ASCE Manual and Report on Engineering Practice No. 87. Water Environment Federation, Technical Practice Committee, Water Quality and Ecology Subcommittee, Alexandria, VA, and American Society of Civil Engineers, Urban Water Resources Research Council, Reston, VA.

USEPA. 1992. *Stormwater Management for Industrial Activities*. U.S. Environmental Protection Agency, Office of Water, Washington, DC.

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Last updated on May 24, 2006

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## Municipal Facilities Management

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**Minimum Measure:** Pollution Prevention/Good Housekeeping for Municipal Operations

**Subcategory:** Municipal Facilities

### Description

Municipalities own and operate numerous facilities, including maintenance yards, parks, office buildings, schools, and other city-owned properties. The objective of managing stormwater at municipal facilities is to prevent pollutants released during city activities from entering storm drain systems or receiving waters. Activities associated with municipal facilities that are a potential threat to water quality include, but are not limited to, [Automobile Maintenance](#), [Residential Car Washing](#), [Hazardous Materials Storage](#), [Materials Management](#), sign painting, [Pest Control](#), [Parking Lot and Street Cleaning](#), and waste storage and disposal. To effectively prevent or reduce stormwater pollution, a municipality should inventory its facilities and associated activities to assess potential impacts on stormwater quality and revise activities or implement new measures as needed. These activities and control measures should be described in a stormwater pollution prevention plan (SWPPP) or a similar document that describes management actions that will be taken to reduce pollution from the site or activity. [Training on stormwater best management practices \(BMPs\) and principles](#) should be provided to all municipal facilities maintenance staff, and they should have clear guidance on how to use appropriate stormwater practices during typical maintenance operations and facility management activities.

### Applicability

The Phase II rule specifies that municipalities develop a program to prevent and reduce pollutant runoff from municipal operations, using training and controls for reducing or eliminating the discharge of pollutants from municipal parking lots, maintenance and storage yards, fleet maintenance shops, salt/sand storage locations, snow disposal areas, and waste transfer stations. The rule also includes development of procedures for properly disposing of waste removed from the separate storm sewers and areas listed above (such as dredge spoil, accumulated sediments, floatables, and other debris). Other municipal facilities that should be evaluated for pollution potential and BMP implementation include those where chemicals are stored, those with outdoor trash storage areas, and areas where potentially hazardous materials are stored or disposed of (e.g., animal shelters, hospitals, clinics).

Some municipalities are required to have coverage under an industrial stormwater permit for municipal facilities they own and manage. If a municipal facility, such as a landfill or

transportation facility, has activities included in one of the [11 categories of industrial activity](#) described in 40 CFR 122.26(b)(14)(i)-(xi), the operator must obtain coverage under an NPDES industrial stormwater permit, unless they are conditionally excluded. For those areas where EPA is the permitting authority (in some states, on Indian Country lands, and at some federal facilities), the [Multi-Sector General Permit \(MSGP\)](#) provides facility-specific requirements for many types of industrial facilities in one permit. Most states, however, are authorized to implement the NPDES stormwater program ([click here for a list of authorized states](#)) and have their own industrial stormwater permits.

## Implementation

Each facility will have different activities and pollutants of concern. Facility managers should consider the housekeeping and pollution prevention BMPs outlined in the [Menu of BMPs](#) and develop a SWPPP that outlines how the BMPs will be implemented. If the facility is covered by an industrial stormwater permit, the development and implementation of a SWPPP is one of the permit requirements.

SWPPP development includes a step-by-step process to ensure that pollutants do not enter the storm drain system or receiving waters. BMPs include scheduling activities to reduce the potential for offsite migration of pollutants, such as not scheduling activities immediately before or during rainstorms; prohibiting certain practices, such as the outside storage and use of chemicals; requiring specific maintenance procedures; and other management practices to prevent or reduce pollution. A set of worksheets and a model plan are available in EPA's (1992) [Stormwater Management for Industrial Facilities: Development Pollution Prevention Plans and Best Management Practices Summary Document](#) [PDF - 2.59 MB - 52 pp] to assist municipal operators. This document describes the five major phases of developing a pollution prevention plan: (1) planning and organization, (2) assessment, (3) BMP selection and plan design, (4) implementation, and (5) evaluation and site inspection.

*Planning and Organization:* An individual should be designated who will be responsible for developing and implementing the municipal facility SWPPP and other existing environmental facility plans, such as plans governing pesticide use or hazardous materials storage, to ensure consistency and overlap. The municipality should build on relevant portions of other environmental plans as appropriate, although it is important that the SWPPP be a comprehensive, stand-alone document.

*Assessment:* Municipal facilities that have been identified as having potential to contribute pollutants to the storm drain system should be inspected to identify possible pollution sources and BMP implementation opportunities. It is helpful to create a map of the facility site that identifies pollutant sources, storm drains, drainage ditches, BMPs requiring periodic maintenance, and areas suitable for new BMP implementation or retrofit. The municipality should also conduct an inventory of potentially polluting materials, evaluate past spills and leaks, identify and eliminate sources of nonstormwater discharges and illicit connections, collect and evaluate any existing stormwater quality data, and summarize the findings of the assessment.

*Identify BMPs:* BMPs should be selected with special consideration given to areas where materials are handled or stored, outdoor processing areas, loading and unloading areas, and onsite waste management and disposal areas. At a minimum, the plan should address appropriate good housekeeping, [preventive maintenance](#) [PDF - 49.5 KB - 3 pp], [spill prevention and response](#) [PDF - 55 KB - 5 pp], erosion and sediment control, and [structural stormwater management controls](#). [Employee training](#), [visual inspections](#) [PDF - 55 KB - 6 pp], [recordkeeping](#) [PDF - 53 KB - 4 pp], and reporting should be addressed and included in the SWPPP as well. Additional activity- or site-specific BMPs might also be appropriate.

*Implementation:* The selected stormwater BMPs should be implemented according to a schedule that reflects the priority level and funding/labor constraints. Also, all municipal employees should receive training [link to the Municipal Employee Training and Education fact sheet] to understand and carry out the goals of the SWPPP.

*Evaluation:* Periodic site evaluations should be conducted and records should be kept of BMP implementation, illicit discharge or spill incidents, employee training, inspections, and monitoring, if any is being conducted. The plan should be revised if parts are shown to be ineffective or if activities or conditions at the facility change.

### Limitations

Developing and implementing an effective SWPPP at a municipal facility requires time and commitment, not only from managers, but also from staff and laborers. After development of the SWPPP, facilities should be self-inspected annually, with regular inspections conducted more often to detect leaks, spills, or other pollution issues as soon as possible. Also, without the proper training, municipal employees can be unable or unwilling to implement and maintain the BMPs included in the SWPPP.

### Case Studies

The following are examples of municipalities that have successfully implemented municipal facility BMPs. Links are provided for more information.

- The City of Gresham, Oregon, conducted an internal audit of a local maintenance yard where materials such as paint, gasoline, oil, grease, pesticides, and herbicides are stored to identify problems and recommend changes that would improve stormwater quality (see [Municipal Stormwater Toolbox for Maintenance Practices](#) EXIT Disclaimer). Municipal staff studied stormwater drainage on the site, inventoried equipment and materials, determined the potential for polluting stormwater, inspected the outfalls to a local creek, and interviewed facility operators to learn about existing practices. By participating in the audit, all the facility operators were educated about stormwater drainage and quality and are now actively involved in implementing solutions (Oregon Association of Clean Water Agencies, 1998).
- The [City of Santa Monica, California](#), has implemented numerous practices to control dry and wet weather discharges from municipal areas and activities and has conducted urban runoff training for city employees (USEPA, 2004).

### Cost Considerations

The costs of formalizing stormwater management at municipal facilities will vary by facility and by municipality. The majority of the costs are associated with the staff time necessary to develop a SWPPP, train staff, and inspect the facilities to ensure that selected BMPs are applicable and effective.

### References

Oregon Association of Clean Water Agencies. 1998. *Oregon Municipal Stormwater Toolbox for Maintenance Practices*. [<http://www.oracwa.org/Pages/toolbox.htm> EXIT Disclaimer]. Last updated June 1998. Accessed July 6, 2005.

U.S. Environmental Protection Agency. 1992. *Stormwater Management for Industrial Facilities: Development Pollution Prevention Plans and Best Management Practices Summary Document*. EPA 833-R-92-002. [<http://www.epa.gov/npdes/pubs/owm0236a.pdf>] [PDF - 2.59 MB - 52 pp]. Last updated October 1992. Accessed July 6, 2005.

U.S. Environmental Protection Agency. 2004. Stormwater Case Studies Search Results, Case Study Location: California: Santa Monica. [[http://cfpub.epa.gov/npdes/stormwater/casestudies\\_specific.cfm?case\\_id=2&CFID=2785611&CFTOKEN=65295474](http://cfpub.epa.gov/npdes/stormwater/casestudies_specific.cfm?case_id=2&CFID=2785611&CFTOKEN=65295474)]. Last updated November 12, 2004. Accessed July 6, 2005.

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# National Pollutant Discharge Elimination System (NPDES)

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## Road Salt Application and Storage

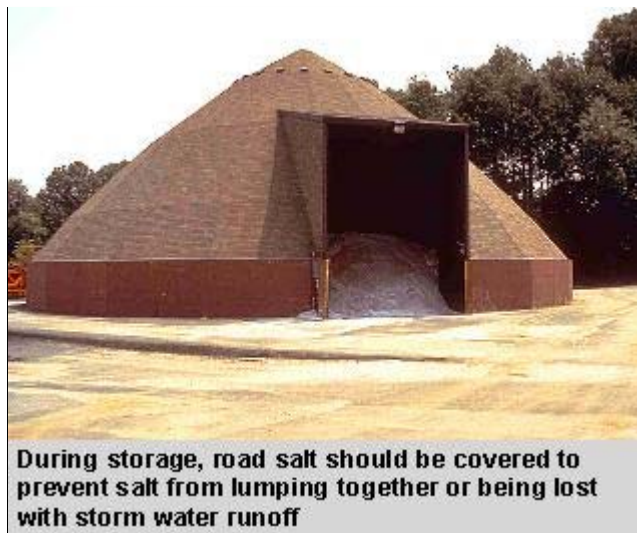
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**Minimum Measure:** Pollution Prevention/Good Housekeeping for Municipal Operations

**Subcategory:** Municipal Activities

### Description

The application and storage of deicing materials, most commonly salts such as sodium chloride, can lead to water quality problems for surrounding areas (Koppelman et al., 1984). Salts, gravel, sand, and other materials are applied to highways and roads to reduce the amount of ice during winter storm events. Salts lower the melting point of ice, allowing roadways to stay free of ice buildup during cold winters. Sand and gravel increase traction on the road, making travel safer.



**During storage, road salt should be covered to prevent salt from lumping together or being lost with storm water runoff**

### Applicability

This practice occurs in areas that receive snowfall in winter months and require deicing materials. Municipalities in these areas must ensure proper storage and application for equipment and materials.

### Siting and Design Considerations

Many of the problems associated with contamination of local waterways stem from the improper storage of deicing materials (Koppelman et al., 1984). Salts are very soluble when they come into contact with stormwater. They can migrate into ground water used for public water supplies and also contaminate surface waters.

More information about road deicing materials can be found at the [American Association of State Highway and Transportation Officials](#) [EXIT Disclaimer](#) website.

### Limitations

Road salt is the least expensive material for deicing operations; however, once the full social costs are taken into account, alternative products and better management and application of salts become increasingly attractive options.

**Table 1. Deicing Alternatives (Keating, 2004)**

Substance	Cost	Characteristics
Calcium Chloride (CaCl <sub>2</sub> )	Flake \$290/ton, pellet \$340/ton	<ul style="list-style-type: none"> <li>• Melts ice at temperatures of -25 ° F</li> <li>• If used as recommended, will not harm vegetation</li> </ul>
Magnesium Chloride (MgCl <sub>2</sub> )	Flake \$260/ton, pellet \$300/ton	<ul style="list-style-type: none"> <li>• Lowest practical temperature: 5 ° F</li> <li>• If used as recommended, will not harm vegetation; however, MgCl<sub>2</sub>, on a percentage basis, contains 17-56% more chloride ion than other salt-type deicers</li> </ul>
Potassium Chloride (KCl)	\$240/ton	<ul style="list-style-type: none"> <li>• Lowest practical temperature: 12 ° F</li> <li>• Will not harm vegetation</li> </ul>
Urea	\$280/ton	<ul style="list-style-type: none"> <li>• Lowest practical temperature: 15 ° F</li> <li>• Will not harm vegetation</li> </ul>
Calcium Magnesium Acetate (CMA)	\$2,000/ton	<ul style="list-style-type: none"> <li>• Will work below 0 ° F</li> <li>• Low toxicity and biodegradable</li> </ul>

### Maintenance Considerations

Covering stored road salts may be costly; however, the benefits are greater than the perceived costs. Properly storing road salts prevents the salt from lumping together, which makes it easier to load and apply. In addition, covering salt storage piles reduces salt loss from stormwater runoff and potential contamination to streams, aquifers, and estuarine areas. Salt storage piles should be located outside the 100-year floodplain for further protection against surface water contamination.

If used during road salt application, certain best management practices can produce significant environmental benefits. The amount of road salt applied should be regulated to prevent oversalting of roadways and increasing runoff concentrations. The amount of salt applied should be varied to reflect site-specific characteristics, such as road width and design, traffic concentration, and proximity to surface waters. Calibration devices mounted in the cabs of spreader-trucks help maintenance workers apply the proper amount of road salt. Alternative materials, such as sand or gravel, should be used in especially sensitive areas.

**Cost Considerations** See Table 1 for the costs of different deicing alternative

substances.

### References

American Association of State Highway and Transportation Officials. 2000. *AASHTO: Transportation Center of Excellence*. [[www.transportation.org](http://www.transportation.org) EXIT Disclaimer]. Accessed September 15, 2005.

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USEPA. 1995. *Planning Considerations for Roads, Highways and Bridges*. U.S. Environmental Protection Agency, Office of Water, Washington, DC. [[www.epa.gov/OWOW/NPS/education/planroad.html](http://www.epa.gov/OWOW/NPS/education/planroad.html)].

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## Spill Response and Prevention

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**Minimum Measure:** Pollution Prevention/Good Housekeeping for Municipal Operations

**Subcategory:** Municipal Facilities

### Description

Spill response and prevention plans should clearly state how to stop the source of the spill, how to contain and clean up the spill, how to dispose of contaminated materials, and how to train personnel to prevent and control future spills.

### Applicability

Construction sites that use or store hazardous materials should have a spill prevention and control plan. Hazardous materials include pesticides, paints, cleaners, petroleum products, fertilizers, and solvents. See the [Hazardous Materials Storage](#) fact sheet for more information on storing these materials.

### Siting and Design Considerations

Identify potential spill or source areas, such as loading and unloading, storage and processing areas, places that generate dust or particulate matter, and areas designated for waste disposal. Also, spill potential should be evaluated for stationary facilities, including manufacturing areas, warehouses, service stations, parking lots, and access roads.

Material handling procedures and storage requirements should be defined and actions should be taken to reduce spill potential and impacts on stormwater quality. This can be achieved by:

- Recycling, reclaiming, or reusing process materials, thereby reducing the amount of process materials that are brought into the facility.
- Installing leak detection devices, overflow controls, and diversion berms.
- Disconnecting drains from processing areas that lead to the storm sewer.
- Performing preventative maintenance on storm tanks, valves, pumps, pipes, and other equipment.



- Using material transfer or filling procedures that minimize spills from tanks and other equipment.
- Replacing toxic materials with less or non-toxic products.

Provide documentation of spill response equipment and procedures to be used, ensuring that procedures are clear and concise. Give step-by-step instructions for spill response at a particular facility. This spill response plan can be presented as a procedural handbook or a sign.

The spill response plan should:

- Identify individuals responsible for implementing the plan.
- Describe safety measures to take with each kind of waste.
- Specify how to notify appropriate authorities, such as police and fire departments, hospitals, or publicly-owned treatment works for assistance.
- State procedures for containing, diverting, isolating, and cleaning up the spill.
- Describe spill response equipment to be used, including safety and cleanup equipment.

Education is essential for reducing spills. By informing people of actions they can take to reduce spill potential, spills will be reduced or prevented. Some municipalities have set up 1-800 numbers for citizens to call in the event of spills. This helps ensure that spills are cleaned up in a safe, proper, and timely manner.

### **Limitations**

A spill prevention and control plan must be well planned and clearly defined. A well conceived plan reduces the likelihood of accidental spills and helps speed an effective response if they occur. Training might be necessary to ensure that all workers can follow procedures. Equipment and materials for cleanup must be readily accessible and clearly marked for workers to be able to follow procedures.

### **Maintenance Considerations**

Update the spill prevention and control plan to accommodate any changes in the site or procedures. Regularly inspect areas where spills might occur to ensure that procedures are posted and cleanup equipment is readily available.

### **Effectiveness**

A spill prevention and control plan effectively reduces the risk of surface and ground water contamination. However, to be effective, workers must be trained, materials and cleanup equipment available, and procedures followed.

### **Cost Considerations**

Spill prevention and control plans are inexpensive to implement. However, extra time is needed to properly handle and dispose of spills, which increases labor costs.

### **References**

DAWG. 2000. *Flexible Spill Berm For Quick Spill Containment*.

[<http://www.dawginc.com/secondary-spill-containment/secondary-spill-containment.php> EXIT Disclaimer]. Accessed September 15, 2005.

USEPA. 1992. *Stormwater Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices*. EPA 832-R-92-005. U.S. Environmental Protection Agency, Office of Water, Washington, DC.

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## Municipal Vehicle and Equipment Washing

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**Minimum Measure:** Pollution Prevention/Good Housekeeping for Municipal Operations

**Subcategory:** Municipal Activities

### Description

Municipal vehicle washing can generate dry weather runoff contaminated with detergents, oils, grease, and heavy metals. Vehicle washing BMPs can eliminate contaminated wash water discharges to the sanitary sewer system. Such BMPs include installing wash racks that discharge wash water to the sanitary sewer, and contracting the services of commercial car washes, which are permitted to discharge wash water to the sanitary sewer system. Finally, employees and subcontractors should be trained in the municipality's vehicle washing procedures to avoid illicit discharges.

### Applicability

Municipalities typically operate a fleet of vehicles, including public works trucks, fire trucks, ambulances, police cars, school buses, and other types of vehicles. Municipalities with a large fleet of vehicles might consider building municipal-operated vehicle washing facilities. Municipalities with small fleets might consider contracting with a commercial car wash. Municipalities that own and operate concrete trucks should look at the [Concrete Washout](#) fact sheet for proper washing procedures. For information on how to educate the public about reducing pollution while washing personal vehicles, see the [Residential Car Washing](#) and [Stormwater Outreach for Commercial Businesses](#) fact sheets.

### Siting & Design Considerations

#### *Wash Racks*

When installing a wash rack at a municipal facility, several design features should be considered. A designated wash area should be paved and bermed or sloped to contain and direct wash water to a sump connected to the sanitary sewer or to a holding tank, process treatment system, or enclosed recycling system. Note that you must seek the permission of the sewer authority before discharging wastewater to the sanitary sewer, and that special treatment requirements may be placed on such discharges. Alternately, the wash rack could be designed to recycle wash water, thereby eliminating the pretreatment costs of discharging to the sanitary sewer.

The following good housekeeping practices can minimize the risk of contamination from vehicle wash water discharges at municipal facilities (adapted from CASQA, 2003):

- Wash all vehicles in areas designed to collect and hold wash water before its

discharge to the sanitary sewer system. Normally, wastewater treatment regulations require wash water to be pretreated prior to its discharge to the treatment plant. Contact your sewer authority to ensure that all requirements are met before designing, building, and operating the wash rack.

- Avoid detergents whenever possible. If detergents are necessary, a phosphate-free, non-toxic, biodegradable soap is recommended. Detergents should be avoided if an oil/water separator is used for pretreatment prior to discharge to the sanitary sewer.
- Municipal facilities that store vehicles should stencil their storm drains to remind employees to wash vehicles within the designated wash area. Signage can also be posted with this message.
- Mount spill kits with absorbent containment materials and instructions near wash racks. Immediately contain and treat all spills.

#### *Commercial Car Washes*

Municipalities can negotiate with commercial car washes and steam cleaning businesses to handle their fleet vehicle washing. This option eliminates the cost of building and the liability of operating a wash facility. This option may be limited to smaller sized vehicles, however, since many car washes do not have bays large enough to handle buses, fire trucks, ambulances, and other large vehicles.

#### *Other BMPs*

If a vehicle must be washed outside of a facility plumbed to the sanitary sewer, take precautions to avoid wash water discharges to the storm drain system. For small jobs, berm the area surrounding the vehicle and use a wet/dry vacuum to capture the wash water for discharge to the sanitary sewer. For larger jobs, use a combination of berms and a vacuum truck, such as those used to clean storm and sanitary sewer systems, to capture and safely dispose of wash water. If detergents are used, clean the pavement to prevent this material from being carried to the storm drain during the next rainstorm.

### **Maintenance Considerations**

A wash rack's paved surfaces and sump should be inspected and cleaned periodically to remove buildups of particulate matter or other pollutants. Plumbing, recycling, and pretreatment systems also require periodic inspection and maintenance. The area surrounding the wash rack should be visually inspected for leaks, overspray, or other signs of ineffective containment due to faulty design or physical damage to berms. Any defects should be corrected.

### **Limitations**

Building a new wash rack can be expensive. Also, for facilities that cannot recycle their wash water, the cost of pretreating wash water prior to discharge to the sanitary sewer can represent a cost limitation. If the appropriate facilities are available, vehicle washing BMPs are relatively inexpensive housekeeping measures.

### **Effectiveness**

Studies have yet to demonstrate the effectiveness of car washing management practices at reducing stormwater pollutant loads.

### **Cost Considerations**

Municipal wash racks plumbed to the sanitary sewer can be expensive to build. They need to be pursued as a capital improvement project or through other measures based on your local policies for such projects. Costs for contracting with commercial car washes can vary depending on the size of the fleet. Rates are subject to negotiation, but they would constitute an annual operating cost that could be included as part of the municipal budget. Other measures to control discharge of incidental washing to the storm drain system (berms, wet/dry vacuums, etc.) are relatively inexpensive.



## References

California Stormwater Quality Association (CASQA). 2004. California Stormwater Industrial/Commercial Best Management Practice Handbook. Stormwater Quality Task Force, Sacramento, CA.

Center for Watershed Protection. 1999. On Watershed Behavior. Watershed Protection Techniques 3(3): 671-679.

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Small MS4 UPDES General  
Permit

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**APPENDIX G**



**STATE OF UTAH DEPARTMENT OF ENVIRONMENTAL QUALITY  
DIVISION OF WATER QUALITY**

**Authorization to Discharge Under the  
Utah Pollutant Discharge Elimination System (UPDES)**

**General Permit for Discharges from Small Municipal Separate  
Storm Sewer Systems (MS4s)**

This Permit is issued in compliance with the provisions of the Utah Water Quality Act, Title 19, Chapter 5, Utah Code Annotated 2004, as amended (the "Act") and the Federal Water Pollution Control Act (33 U.S.C. §§ 1251 et. seq., as amended to date), and the rules and Regulations made pursuant to those statutes.


This Permit authorizes storm water discharges to Waters of the State of Utah resulting from a Small Municipal Separate Storm Sewer System (Small MS4 ) as provided in Part 1.0 of this Permit. This authorization is conditioned upon an operator of a Small MS4 meeting the eligibility requirements in Part 1.2 of this Permit prior to filing a Notice of Intent ("NOI") to discharge under this General Permit. An operator of a Small MS4 is not covered by this General Permit if the operator submits an NOI but has not met these conditions.

This authorization is subject to the authority of the Utah Water Quality Board or the *Division* of the Utah Water Quality Board to reopen this Permit (see Part 6.22 of Permit), or to require a discharger to obtain an individual Permit (see Part 6.15 of this Permit). The issuance of a discharge Permit authorization under this General Permit does not relieve Permittees of other duties and responsibilities under the Act or rules made under that Act. Significant terms used in this Permit are defined in Part 7.0 of this Permit.

This Permit shall become effective on March 1, 2016.

This Permit and the authorization to discharge shall expire at midnight, February 28, 2021, except as described in Part 6.3 of this Permit.

Signed this 26 day of February 2016.

  
Walter L. Baker, P.E.  
Director

**UPDES GENERAL PERMIT FOR DISCHARGES FROM  
SMALL MUNICIPAL SEPARATE STORM SEWER SYSTEMS (MS4s)**

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## 1.0 Coverage Under this Permit

### 1.1. Authority to Discharge

This General Permit authorizes the discharge, to Waters of the State of Utah, of storm water from a Small MS4 as that term is defined in R317-8-1.6(14) and Part 7.39. of this Permit. This authorization is subject to all of the terms and conditions of this Permit. This General Permit does not authorize discharges prohibited under Part 1.4. of this Permit.

### 1.2. Permit Area and Eligibility

1.2.1. This Permit covers all areas of the State of Utah except Indian Country (see Part 7.22. of this Permit for a definition of “Indian Country”).

1.2.1.1. No operator of a Small MS4 described in 40 CFR 122.32 may discharge from that system without authorization from the *Division*. (See Utah Administrative Code Section R317-8-3.9(1)(h)(1)(a), which sets forth the Permitting requirement, and R317-8-1.10(13), which incorporates 40 CFR 122.32 by reference.) Authorization to discharge under the terms and conditions of this Permit is granted if:

1.2.1.1.1 It applies to an operator of a Small MS4 within the State of Utah but not within Indian Country;

1.2.1.1.2 The operator is not a “large” or “medium” MS4 as defined in 40 CFR 122.26(b)(4) or (7);

1.2.1.1.3 The operator submits a Notice of Intent (NOI) in accordance with Part 2.0 of this Permit;

1.2.1.1.4 The MS4 is located fully or partially within an urbanized area as determined by the latest Decennial Census by the Bureau of Census;

1.2.1.1.5 The operator is ordered by the *Division* to obtain coverage under this Permit, as provided in the UPDES rules, R317-8.

1.2.2. The following are types of authorized discharges:

1.2.2.1. *Storm water discharges.* This Permit authorizes storm water discharges to waters of the State from the Small MS4s identified in 1.2.1., except as excluded in Part 1.4.

1.2.2.2. *Non-storm water discharges.* The following non-storm water discharges do not need to be addressed unless the Permittee or the *Division* identifies these discharges as significant sources of pollutants to Waters of the State or as causing or contributing to a violation of water quality standards:

- Water line flushing
- Landscape irrigation
- Diverted stream flows



- Rising ground waters
- Uncontaminated ground water infiltration
- Uncontaminated pumped ground water
- Discharges from potable water sources
- Foundation drains
- Air conditioning condensate
- Irrigation water
- Springs
- Water from crawl space pumps
- Footing drains
- Lawn watering runoff
- Individual residential car washing
- Flows from riparian habitats and wetlands
- Dechlorinated swimming pool discharges
- Residual street wash water
- Dechlorinated water reservoir discharges
- Discharges or flows from emergency firefighting activity

### 1.3. **Local Agency Authority**

This Permit does not pre-empt or supersede the authority of local agencies to prohibit, restrict, or control discharges to storm drain systems or other water courses within their jurisdiction.

### 1.4. **Limitations on Coverage**

This Permit does not authorize:

- 1.4.1. Discharges that are mixed with sources of non-storm water unless such non-storm water discharges are in compliance with a separate UPDES Permit or are determined not to be a substantial contributor of pollutants to Waters of the State.
- 1.4.2. Storm water discharges associated with industrial activity as defined in *Utah Administrative Code (UAC) R317-8-3.9(6)(c)*.
- 1.4.3. Storm water discharges associated with construction activity as defined in *UAC R317-8-3.9(6)(d)(10)* and *R317-8-3.9(6)(d)(11)*.
- 1.4.4. Storm water discharges currently covered under another Permit.
- 1.4.5. Discharges that would cause or contribute to in-stream exceedances of water quality standards as contained in *UAC R317-2*.
- 1.4.6. Discharges of any pollutant into any Waters of the State for which a Total Maximum Daily Load (TMDL) has been approved by EPA unless the discharge is consistent with the TMDL. This consistency determination applies at the time a Notice of Intent is submitted. If conditions change after coverage is issued, the coverage may

remain active provided the conditions and requirements of Part 3.1. of this Permit are complied with.

## **2.0 Notice of Intent and Storm Water Management Program Requirements**

**2.1.** The requirements of this Part apply only to Permittees **not** covered under the previous General Permit for Storm Water Discharges from Small Municipal Separate Storm Sewer Systems, i.e. **New Applicants**. Permittees that were covered under the previous MS4 General Permit and have submitted a notice of intent (NOI) at least **180 days** prior to the expiration date of the previous Permit, are covered by this Permit and instead must follow the requirements of Part 2.3.

2.1.2. New applicants must meet the following application requirements. The Notice of Intent (NOI) must include submittal of the Storm Water Management Program (SWMP) document. Detailed information on SWMP requirements can be found in Part 4.0 of this Permit.

2.1.3. Within **180 days** of notification from the *Division*, the operator of the MS4 shall submit a NOI form as provided by the Division at <http://www.deq.utah.gov/Permits/water/updes/stormwatermun.htm>. (The *Division* retains the right to grant permission for a later submission date upon good cause shown). One original completed NOI shall be submitted, by mail or hand delivery to:

Attention: UPDES IES  
Department of Environmental Quality  
Division of Water Quality  
195 North 1950 West  
PO Box 144870  
Salt Lake City, UT 84114-4870

2.1.4. Late submittal of an NOI is prohibited (unless permission has been granted by the *Division*). If a late NOI is submitted, authorization is only for discharges that occur after Permit coverage is granted. The *Division* reserves the right to take appropriate enforcement actions for any unpermitted discharges.

2.1.5. Where application is made by a new applicant that has assumed operational control of an MS4 for which coverage under this Permit was previously held by a separate entity, the Division may determine that the new applicant shall comply with the Permit requirements in this Permit, as directed for Renewal Permittees. Notification shall be made by the *Division* of this requirement in writing to the New Applicant prior to issuance of Permit coverage

2.1.6. Implementation of the Permittee's SWMP must include the six minimum control areas, including Measurable Goals, described in Part 4.2. Measurable Goals for each of the program areas must include, as appropriate, the year by which the Permittee will undertake required actions, including interim milestones and the frequency of the action if applicable.

- 2.1.7. Implementation of the Permittee's SWMP as described in the Permittee's application is required to begin within **30 days** after the completed application is submitted. The Permittee must fully develop and implement the SWMP as discussed in Part 4.0 of the Permit by the end of the Permit term unless a more restrictive timeframe is indicated.
- 2.1.8. If an Operator is designated by the Division as requiring Permit coverage later than one year after the effective date of this General Permit, the Division may approve alternative deadlines that would allow the Permittee to have its program areas implemented.

## **2.2. Contents of the Notice of Intent**

The Notice of Intent requires, at a minimum, the following information:

- 2.2.1. Name, address, and telephone number of the principal executive officer, ranking elected official or other duly authorized employee in charge of municipal resources used for implementation of the SWMP;
- 2.2.2. Name(s)/ identification of Waters of the State as defined by UAC R317-1-1.32 that receive discharges from the Permittee's MS4;
- 2.2.3. Name of the person responsible for overseeing implementation and coordination of the SWMP;
- 2.2.4. Summary description of the overall water quality concerns, priorities, and measurable goals specific to the Permittee that were considered in the development of the SWMP;
- 2.2.5. The SWMP document shall consist of, at a minimum, a description of the program elements that will be implemented (or already exist) for each of the SWMP minimum control measures. The plan must be detailed enough for the Division to determine the Permittee's general strategy for complying with the required items in each of the six minimum control measures in the SWMP document (see Part 4.2 of this Permit);
- 2.2.6. Information on the chosen Best Management Practices (BMPs) and the measurable goals for each of the storm water minimum control measures in Part 4.2 of this Permit and, as appropriate, the timeframe by which the Permittee will achieve required actions, including interim milestones;
- 2.2.7. Permittees which are applying as Co-Permittees shall each submit an NOI and individual SWMP document which will clearly identify the areas of the MS4 for which each of the Co-Permittees are responsible. Permittees which are relying on another entity (ies) to satisfy one or more of their Permit obligations shall include with the NOI, a summary of the Permit obligations that will be carried out by the other entity (ies). During the term of the Permit, Permittees may terminate or amend shared responsibility arrangements by notifying the *Division*, provided this does not alter implementation deadlines.
- 2.2.8. Certification and signature requirements in accordance with Part 6.8.

**2.3. Storm Water Management Program Plan Description for Renewal Permittees**

- 2.3.1. The requirements of this part apply only to **Renewal Permittees** that were previously covered under the last MS4 General Permit. New applicants are not required to meet the requirements of this Part and instead must follow the requirements of Part 2.0.
- 2.3.2. Renewal Permittees must submit a **revised SWMP document** to the Division within **120 days** of the effective date of this Permit, which includes at a minimum, the following information:
  - 2.3.2.1. Permit number;
  - 2.3.2.2. MS4 location description and map;
  - 2.3.2.3. Information regarding the overall water quality concerns, priorities, measurable goals, and interim milestones specific to the Permittee that were considered in the development and/or revisions to the SWMP document;
  - 2.3.2.4. A description of the program elements that will be implemented (or are already being implemented) in each of the six minimum control measures (see Part 4.0);
  - 2.3.2.5. A description of any modifications to ordinances or long-term/ongoing processes implemented in accordance with the previous MS4 General Permit for each of the six minimum control measures;
  - 2.3.2.6. A description of how the Permittee intends to meet the requirements of the Permit as described in Part 4.0 by either referencing existing program areas that already meet the Permit requirements or a description and relevant measurable goals that include, as appropriate, the year by which the Permittee will achieve required actions, including interim milestones.
  - 2.3.2.7. Indicate the joint submittal (s) of Co-Permittees (if applicable) and the associated responsibility (ies) in meeting requirements of the SWMP.
  - 2.3.2.8. Certification and signature requirements in accordance with Part 6.8.
  - 2.3.2.9. The revised SWMP document must contain specific details for complying with the required items in each of the six minimum control measures contained within the SWMP document (See Part 4.2.).

### **3.0 Special Conditions**

#### **3.1. Discharges to Water Quality Impaired Waters**

- 3.1.1. Applicability: Permittees must:
- 3.1.1.1. Determine whether storm water discharge from any part of the MS4 contributes to a 303(d) listed (i.e., impaired) waterbody. A 303(d) list of impaired waterbodies is available at: <http://www.deq.utah.gov/ProgramsServices/programs/water/wqmanagement/assessment/PreviousIR.htm>. Water quality impaired waters means any segment of surface waters that has been identified by the Division as failing to support classified uses. If the Permittee has discharges meeting these criteria, the Permittee must comply with Part 3.1.2. below and if no such discharges exist, the remainder of this Part 3.1 does not apply.
- 3.1.1.2. If the Permittee has “303(d)” discharges described above, the Permittee must also determine whether a Total Maximum Daily Load (TMDL) has been developed by the Division and approved by EPA for the listed waterbody. If there is an approved TMDL, the Permittee must comply with all requirements associated with the TMDL as well as the requirements of Part 3.1.2. below and if no TMDL has been approved, the Permittee must comply with Part 3.1.2. below and any TMDL requirements once it has been approved.
- 3.1.2. Water Quality Controls for Discharges to Impaired Waterbodies. If the Permittee discharges to an impaired waterbody, the Permittee must include in its SWMP document a description of how the Permittee will control the discharge of the pollutants of concern. This description must identify the measures and BMPs that will collectively control the discharge of the pollutants of concern. The measures should be presented in the order of priority with respect to controlling the pollutants of concern.
- 3.1.3. Where a discharge is already authorized under this Permit and is later determined to cause or have the reasonable potential to cause or contribute to the violation of an applicable water quality standard, the Division will notify the Permittee of such violation(s). The Permittee must take all necessary actions to ensure future discharges do not cause or contribute to the violation of a water quality standard and document these actions as required by the Division. If violations remain or re-occur, coverage under this Permit may be terminated by the Division and an alternative General Permit or individual Permit may be issued. Compliance with this requirement does not preclude any enforcement activity as provided by the Utah Water Quality Act for the underlying violation.

### **3.2. Nitrogen and Phosphorus Reduction**

- 3.2.1. As part of the Permittee's Storm Water Management Program (SWMP), all Permittees must specifically address the reduction of water quality impacts associated with nitrogen and phosphorus in discharges from the MS4.
  - 3.2.1.1. The Permittee can meet the requirements of this section through contribution to a collaborative program (e.g., storm water coalitions) to evaluate, identify, target, and provide outreach that addresses sources State-wide or within a specific region or watershed.
  - 3.2.1.2. The Permittee must determine and target sources (e.g., residential, industrial, agricultural, or commercial) that are contributing to, or have the potential to contribute, nitrogen and phosphorus to the waters receiving the discharge authorized under this Permit.
  - 3.2.1.3. The Permittee must prioritize which targeted sources are likely to obtain a reduction in nitrogen and phosphorus discharges through education. The Permittee must distribute educational materials or equivalent outreach to the prioritized targeted sources. Educational materials or equivalent outreach must describe storm water quality impacts associated with nitrogen and phosphorus in storm water runoff and illicit discharges, the behaviors of concern, and actions that the target source can take to reduce nitrogen and phosphorus. The Permittee may incorporate the education and outreach to meet this requirement into the education and outreach strategies provided in accordance with Permit Part 4.2.1.

### **3.3. Co-Permittees**

- 3.3.1. Two or more operators of interrelated or neighboring Small MS4s may apply as Co-Permittees.
- 3.3.2. In order to be Permitted as Co-Permittees, the MS4(s) must each submit an NOI complete with BMP measurable goals and implementation milestones. Each description of the MS4(s) Storm Water Management Program Plan(s) must clearly describe which Permittees are responsible for implementing each of the control measures.
- 3.3.3. Each Co-Permittee is individually liable for:
  - 3.3.3.1. Permit compliance for discharges from portions of the MS4 where it is the operator and for areas within its legal jurisdiction;
  - 3.3.3.2. Ensuring that the six minimum control measures described in Part 4.2 are implemented for portions of the MS4 where it is the operator and in areas within its legal jurisdiction; and
  - 3.3.3.3. If any Permit conditions are established for specific portions of the MS4, Co-Permittees need only comply with the Permit conditions relating to those portions of the MS4 for which they are the operator.

- 3.3.4. Each Co-Permittee is jointly liable for compliance with annual reporting requirements listed in Part 5.5, except that a Co-Permittee is individually liable for any parts of the annual report that relate exclusively to portions of the MS4 where it is the operator.
- 3.3.5. Specific Co-Permittees are jointly liable for Permit compliance on portions of the MS4 as follows:
  - 3.3.5.1. Where operational or storm water management program implementation authority over portions of the MS4 has been transferred from one Co-Permittee to another in accordance with legally binding interagency agreements, both the owner and the operator may be jointly liable for Permit compliance on those portions of the MS4; and;
  - 3.3.5.2. Where one or more Co-Permittees jointly own or operate a portion of the MS4, each owner/operator is jointly liable for compliance with Permit conditions on the shared portion of the MS4.

#### **4.0 Storm Water Management Program**

Permittees covered under the previous General Permit for Storm Water Discharges from Small Municipal Separate Storm Sewer Systems, i.e. **Renewal Permittees**, are expected to have fully implemented all of the following six minimum control measures as required in the previous Permit term. Permittees that were newly designated during the previous Permit term have 5 years from the date of their submitted NOI to develop, fully implement and enforce their Storm Water Management Program (SWMP). A Renewal Permittee must continue to implement its SWMP designed to reduce the discharge of pollutants from the MS4 as described in the application and submittals provided in accordance with the previous MS4 General Permit, while updating its SWMP document pursuant to this Permit. This Permit does not extend the compliance deadlines set forth in the previous MS4 General Permit unless specifically noted. All requirements contained in this renewal Permit are effective immediately unless an alternative timeframe is indicated.

#### **4.1. Requirements**

- 4.1.1. All Permittees must develop, implement, and enforce a SWMP designed to reduce the discharge of pollutants from the MS4, protect water quality, and satisfy the appropriate water quality requirements of the *Utah Water Quality Act*. The SWMP must include the six minimum control measures described in Part 4.2 of this Permit.
  - 4.1.1.1. The SWMP shall be developed and implemented in accordance with the schedules contained in Part 4.0. of this Permit.
- 4.1.2. Each Permittee shall have an ongoing documentation process for gathering, maintaining, and using information to conduct planning, set priorities, track the development and implementation of the SWMP, evaluate Permit compliance/non-compliance, and evaluate the effectiveness of the SWMP implementation.
  - 4.1.2.1. Each Permittee shall track the number of inspections performed, official enforcement actions taken, and types of public education activities implemented as required for each SWMP component. This information shall be provided to the Division upon request and used by the Division to determine compliance with this Permit.
  - 4.1.2.2. Each Permittee must secure the resources necessary to meet all requirements of this permit. Each Permittee must conduct an annual analysis of the capital and operation and maintenance expenditures needed, allocated, and spent as well as the necessary staff resources needed and allocated to meet the requirements of this permit, including any development, implementation, and enforcement activities required. Each permittee must submit a summary of its fiscal analysis with each annual report.
- 4.1.3. The SWMP document shall include BMPs that the Permittee or another entity will implement for each of the storm water minimum control measures.
  - 4.1.3.1. The measurable goals for each of the BMPs shall include, as appropriate, the months and years in which the Permittee will undertake required actions, including interim milestones and the frequency of the actions.



- 4.1.3.2. The SWMP document shall indicate the person or persons responsible for implementing or coordinating the BMPs contained within the SWMP document.
- 4.1.3.3. The revised SWMP document shall clearly identify the roles and responsibilities of all offices, departments, divisions, or sub-sections and if necessary other responsible entities and it shall include any necessary agreements, contracts, or memorandum of understanding (MOUs) between said entities that affect the implementation and operation of the SWMP. Necessary agreements, contracts, and MOUs shall deal with coordination or clarification of the responsibilities associated with the detection and elimination of improper connections or illicit discharges to the MS4, BMP coordination or other coordinated programs or sensitive issues of unclear or overlapping responsibility. Such agreements, contracts, and MOUs shall be retained by the Permittee as required by the SWMP document.

## 4.2. Minimum Control Measures

The six minimum control measures that must be included in the storm water management program are:

### 4.2.1. *Public Education and Outreach on Storm Water Impacts*

The Permittee must implement a public education and outreach program to promote behavior change by the public to reduce water quality impacts associated with pollutants in storm water runoff and illicit discharges. Outreach and educational efforts shall include a multimedia approach and shall be targeted and presented to specific audiences for increased effectiveness. The educational program must include documented education and outreach efforts for the following four audiences: (1) residents, (2) institutions, industrial and commercial facilities, (3) developers and contractors (construction), and (4) MS4-owned or operated facilities. The minimum performance measures which should be based on the land uses and target audiences found within the community include:

- 4.2.1.1. Target specific pollutants and pollutant sources determined by the Permittee to be impacting, or have the potential to impact, the beneficial uses of receiving water. This includes providing information which describe the potential impacts from storm water discharges; methods for avoiding, minimizing, reducing and /or eliminating the adverse impacts of storm water discharges; and the actions individuals can take to improve water quality, including encouraging participation in local environmental stewardship activities, based on the land uses and target audiences found within the community;
- 4.2.1.2. Provide and document information given to the general public of the Permittee's prohibitions against and the water quality impacts associated with illicit discharges and improper disposal of waste. The Permittee must at a minimum consider the following topics. These topics are not inclusive and the Permittee must focus on those topics most relevant to the community: maintenance of septic systems; effects of outdoor activities such as lawn care (use of pesticides, herbicides, and fertilizers); benefits of on-site infiltration of storm water; effects of automotive work and car washing on water quality; proper disposal of swimming pool water; and proper management of pet waste.
- 4.2.1.3. Provide and document information given to institutions, industrial, and commercial facilities on an annual basis of the Permittee's prohibition against and the water quality impacts associated with illicit discharges and improper disposal of waste. The Permittee must at a minimum consider the following topics. These topics are not inclusive and the Permittee must focus on those topics most relevant to the community: proper lawn maintenance (use of pesticides, herbicides and fertilizer); benefits of appropriate on-site infiltration of storm water; building and equipment maintenance (proper management of waste water); use of salt or other deicing materials (cover/prevent runoff to storm system and contamination to ground water); proper storage of materials (emphasize pollution prevention); proper management of waste materials and dumpsters (cover and pollution prevention); and proper management of parking lot surfaces (sweeping). This education can also be a part of the Illicit Discharge Detection and Elimination measure detailed in Part 4.2.3.

- 4.2.1.4. Provide and document information given to engineers, construction contractors, developers, development review staff, and land use planners concerning the development of storm water pollution prevention plans (SWPPPs) and BMPs for reducing adverse impacts from storm water runoff from development sites. This education can also be a part of the Construction Site Storm Water Runoff minimum control measure detailed in Part 4.2.4.
- 4.2.1.5. Provide and document information and training given to employees of Permittee-owned or operated facilities concerning the Permittee's prohibition against and the water quality impacts associated with illicit discharges and improper disposal of waste. The Permittee must at a minimum consider the following topics: equipment inspection to ensure timely maintenance; proper storage of industrial materials (emphasize pollution prevention); proper management and disposal of wastes; proper management of dumpsters; minimization of use of salt and other de-icing materials (cover/prevent runoff to MS4 and ground water contamination); benefits of appropriate on-site infiltration (areas with low exposure to industrial materials such as roofs or employee parking); and proper maintenance of parking lot surfaces (sweeping).
- 4.2.1.6. Provide and document information and training given to MS4 engineers, development and plan review staff, land use planners, and other parties as applicable to learn about Low Impact Development (LID) practices, green infrastructure practices, and to communicate the specific requirements for post-construction control and the associated Best Management Practices (BMPs) chosen within the SWMP.
- 4.2.1.7. An effective program must show evidence of focused messages and audiences as well as demonstration that the defined goal of the program has been achieved. The Permittee must define the specific messages for each audience. The Permittee must identify methods that will be used to evaluate the effectiveness of the educational messages and the overall education program. Any methods used to evaluate the effectiveness of the program must be tied to the defined goals of the program and the overall objective of changes in behavior and knowledge.
- 4.2.1.8. The Permittee must include written documentation or rationale as to why particular BMPs were chosen for its public education and outreach program.

#### **4.2.2. *Public Involvement/Participation***

The Permittee must implement a program that complies with applicable State and Local public notice requirements. The SWMP shall include ongoing opportunities for public involvement and participation such as advisory panels, public hearings, watershed committees, stewardship programs, environmental activities, other volunteer opportunities, or other similar activities. The Permittee should involve potentially affected stakeholder groups, which include but is not limited to, commercial and industrial businesses, trade associations, environmental groups, homeowners associations, and education organizations. The minimum performance measures are:

- 4.2.2.1. Permittees shall adopt a program or policy directive to create opportunities for the public to provide input during the decision making processes involving the development, implementation and update of the SWMP document including development and adoption of all required ordinances or regulatory mechanisms.
- 4.2.2.2. Renewal Permittees shall make the revised SWMP document available to the public for review and input within **120** days from the effective date of this Permit. New Applicants shall make the SWMP document available to the public for review and input within **180** days of receiving notification from the *Division* of the requirement for Permit coverage.
- 4.2.2.3. A current version of the SWMP document shall remain available for public review and input for the life of the Permit. If the Permittee maintains a website, the latest version of the SWMP document shall be posted on the website within **120 days** from the effective date of this Permit and shall clearly denote a specific contact person and phone number or email address to allow the public to review and provide input for the life of the Permit.
- 4.2.2.4. The Permittee must at a minimum comply with State and Local public notice requirements when implementing a public involvement/participation program.

#### **4.2.3. *Illicit Discharge Detection and Elimination (IDDE)***

All Permittees shall revise as necessary, implement and enforce an IDDE program to systematically find and eliminate sources of non-storm water discharges from the MS4 and to implement defined procedures to prevent illicit connections and discharges according to the minimum performance measures listed below. The IDDE program must be described in writing, incorporated as part of the Permittee's SWMP document, and contain the elements detailed in this part of the Permit. The minimum performance measures are:

- 4.2.3.1. Maintain a current storm sewer system map of the MS4, showing the location of all municipal storm sewer outfalls with the names and location of all State waters that receive discharges from those outfalls, storm drain pipe and other storm water conveyance structures within the MS4.
- 4.2.3.2. Effectively prohibit, through ordinance or other regulatory mechanism, non-storm water discharges to the MS4, including spills, illicit connections, illegal dumping and

sanitary sewer overflows (“SSOs”) into the storm sewer system, require removal of such discharges consistent with Part 4.2.3.6. of this Permit, and implement appropriate enforcement procedures and actions. The Permittee must have a variety of enforcement options in order to apply escalating enforcement procedures as necessary for the severity of violation and/or the recalcitrance of the violator. Exceptions are discharges pursuant to a separate UPDES Permit (other than the UPDES Permit for discharges from the MS4) and non-storm water discharges listed in Part 1.2.2.2.

- 4.2.3.2.1 The IDDE program must have adequate legal authority to detect, investigate, eliminate and enforce against non-storm water discharges, including illegal dumping, into the MS4. Adequate legal authority consists of an effective ordinance, by-law, or other regulatory mechanism. The documented IDDE program that is included in the Permittee’s SWMP must include a reference or citation of the authority the Permittee will use to implement all aspects of the IDDE program.
- 4.2.3.3. Implement a written plan to detect and address non-storm water discharges to the MS4, including spills, illicit connections, sanitary sewer overflows and illegal dumping. The plan shall include:
- 4.2.3.3.1 Written systematic procedures for locating and listing the following priority areas likely to have illicit discharges (if applicable to the jurisdiction):
- Areas with older infrastructure that are more likely to have illicit connections;
  - Industrial, commercial, or mixed use areas;
  - Areas with a history of past illicit discharges;
  - Areas with a history of illegal dumping;
  - Areas with onsite sewage disposal systems;
  - Areas with older sewer lines or with a history of sewer overflows or cross-connections;
  - Areas upstream of sensitive waterbodies; and,
  - Other areas the Permittee determines to be likely to have illicit discharges.

The Permittee must document the basis for its selection of each priority area and create a list of all priority areas identified in the system. This priority area list must be updated annually to reflect changing priorities.

- 4.2.3.3.2 Field inspections of areas which are considered a priority area as identified in Permit Part 4.2.3.3.1. Compliance with this provision shall be achieved by inspecting each priority area annually at a minimum. All field assessment activities shall utilize an inspection form to document findings.
- 4.2.3.3.3 Dry weather screening (See Definition 7.13) activities for the purpose of verifying outfall locations and detecting illicit discharges that discharge within the Permittee’s jurisdiction to a receiving water. All outfalls shall be inspected at least once during the 5-year Permit term. Dry weather screening activities shall utilize an inspection form to document findings.

- 4.2.3.3.4 If the Permittee discovers or suspects that a discharger may need a separate UPDES Permit (e.g., Industrial Storm Water Permit, Dewatering Permit), the Permittee shall notify the Division.
- 4.2.3.4. Implement standard operating procedures (SOPs) or similar type of documents for tracing the source of an illicit discharge; including visual inspections, and when necessary, opening manholes, using mobile cameras, using field tests of selected chemical parameters as indicators of discharge sources, collecting and analyzing water samples for the purpose of determining sanctions or penalties, and/or other detailed inspection procedures.
- 4.2.3.5. Implement standard operating procedures (SOPs) or similar type of documents for characterizing the nature of, and the potential public or environmental threat posed by, any illicit discharges found by or reported to the Permittee by the hotline or other telephone number described in 4.2.3.9. These procedures shall include detailed instructions for evaluating how the discharge shall be immediately contained and steps to be taken for containment of the discharge. Compliance with this provision will be achieved by initiating an investigation immediately upon being alerted of a potential illicit discharge.
- 4.2.3.5.1 When the source of a non-storm water discharge is identified and confirmed, the Permittee must record the following information in an inspection report: the date the Permittee became aware of the non-storm water discharge, the date the Permittee initiated an investigation of the discharge, the date the discharge was observed, the location of the discharge, a description of the discharge, the method of discovery, date of removal, repair, or enforcement action; date, and method of removal verification. Analytical monitoring may be necessary to aid in the identification of potential sources of an illicit discharge and to characterize the nature of the illicit discharge. The decision process for utilizing analytical monitoring must be fully documented in the inspection report.
- 4.2.3.6. Implement standard operating procedures (SOPs) or similar type of documents for ceasing the illicit discharge, including notification of appropriate authorities; notification of the property owner; technical assistance for removing the source of the discharge or otherwise eliminating the discharge; follow-up inspections; and escalating enforcement and legal actions if the discharge is not eliminated. Illicit discharges to the MS4 are prohibited and any such discharges violate this Permit and remain in violation until they are eliminated. Upon detection, the Permittee shall require immediate cessation of improper disposal practices upon confirmation of responsible parties in accordance with its enforceable legal authorities established pursuant to Part 4.2.3.2.1. of this Permit.
- 4.2.3.6.1 All IDDE investigations must be thoroughly documented and may be requested at any time by the *Division*. If a Permittee is unable to meet the minimum performance measures outlined in Parts 4.2.3.5. or 4.2.3.6., the Permittee must immediately submit to the *Division* written documentation or rationale describing the circumstances why compliance with the minimum performance measures was not possible. All IDDE documentation shall be retained by the Permittee as required by the SWMP document.

- 4.2.3.7. Permittees shall inform public employees, businesses, and the general public of hazards associated with illicit discharges and improper disposal of waste.
- 4.2.3.8. Permittees shall promote or provide services for the collection of household hazardous waste.
- 4.2.3.9. Permittees shall publicly list and publicize a hotline or other local telephone number for public reporting of spills and other illicit discharges. A written record shall be kept of all calls received, all follow-up actions taken, and any feedback received from public education efforts.
- 4.2.3.9.1 The Permittee must develop a written spill/dumping response procedure, and a flow chart for internal use, that shows the procedures for responding to public referrals of illicit discharges, the various responsible agencies and their contacts, and who would be involved in illicit discharge incidence response, even if it is a different entity other than the Permittee. The procedure and list must be incorporated as part of the IDDE program and incorporated into the Permittee's SWMP document. The list must be maintained and updated as changes occur.
- 4.2.3.10. Permittees shall implement procedures for program evaluation and assessment which includes maintaining a database for mapping, tracking of the number and type of spills or illicit discharges identified; and inspections conducted.
- 4.2.3.11. Permittees shall at a minimum, ensure that all staff, contracted staff, or other responsible entities receives annual training in the IDDE program including identification, investigation, termination, cleanup, and reporting of illicit discharges including spills, improper disposal, and illicit connections. All Permittees shall ensure that all new hires are trained immediately upon hire and annually thereafter, at a minimum. Follow-up training shall be provided as needed to address changes in procedures, methods or staffing. The Permittee shall provide training to all field staff that as part of their normal job responsibilities might come into contact with or otherwise observe an illicit discharge or illicit connection to the MS4. The Permittee shall also train office personnel who might receive initial reports of illicit discharges. Training shall include how to identify a spill, an improper disposal, or an illicit connection to the MS4 and proper procedures for reporting the illicit discharge. Training records must be kept and shall include dates, activities or course descriptions, and names and positions of staff in attendance. The Permittee shall include a summary of such training in the annual report.
- 4.2.3.12. The Division reserves the right to request documentation or further study of a particular non-storm water discharge of concern, to require a reasonable basis for allowing the non-storm water discharge and excluding the discharge from the Permittee's program, and to require inclusion of the discharge in the Permittee's program, if water quality concerns cannot otherwise be reasonably satisfied.

#### **4.2.4. *Construction Site Storm Water Runoff Control***

All Permittees shall revise as necessary, implement and enforce a program to reduce pollutants in any storm water runoff to the MS4 from construction sites with a land disturbance of greater than or equal to one acre, including projects less than one acre

that are part of a larger common plan of development or sale according to the minimum performance measures listed below. Public and private projects, including projects proposed by the Permittee's own departments and agencies, shall comply with these requirements. The minimum performance measures are:

- 4.2.4.1. Revise as necessary and enforce an ordinance or other regulatory mechanism that requires the use of erosion and sediment control practices at construction sites. The ordinance or other regulatory mechanism shall, at a minimum, be equivalent with the requirements set forth in the most current UPDES Storm Water General Permits for Construction activities which can be found at <http://www.deq.utah.gov/Permits/water/updes/stormwatercon.htm>. The ordinance or other regulatory mechanism shall include sanctions to ensure compliance. The ordinance or other regulatory mechanism shall apply, at a minimum, to construction projects disturbing greater than or equal to one acre and to construction projects of less than one acre that are part of a larger common plan of development or sale. Existing local requirements to apply storm water controls at sites less than 1 acre or not part of a Common Plan of Development may be retained.
  - 4.2.4.1.1 The ordinance or other regulatory mechanism shall, at a minimum, require construction operators to prepare a Storm Water Pollution Prevention Plan (SWPPP) and apply sediment and erosion control BMPs as necessary to protect water quality, reduce the discharge of pollutants, and control waste such as, but not limited to, discarded building materials, concrete truck washout, chemicals, litter and sanitary waste at the construction site that may cause adverse impacts to water quality. The SWPPP requirements must be, at a minimum, equivalent with the SWPPP requirement set forth in the most current UPDES Storm Water General Permits for Construction Activities, which can be found at: <http://www.deq.utah.gov/Permits/water/updes/stormwatercon.htm>.
  - 4.2.4.1.2 Permittees shall ensure construction operators obtain and maintain coverage under the current UPDES Storm Water General Permits for Construction Activities for the duration of the project. Coverage can be obtained by completing a NOI as well as renewed online at [https://secure.utah.gov/account/login.html?returnToUrl=https%3A//secure.utah.gov/stormwater/uii\\_authentication](https://secure.utah.gov/account/login.html?returnToUrl=https%3A//secure.utah.gov/stormwater/uii_authentication).
  - 4.2.4.1.3 The ordinance shall include a provision for access by qualified personnel to inspect construction storm water BMPs on private properties that discharge to the MS4.
- 4.2.4.2. Develop a written enforcement strategy and implement the enforcement provisions of the ordinance or other regulatory mechanism which shall include:
  - 4.2.4.2.1 Standard operating procedures (SOPs) or similar type of documents that include specific processes and sanctions to minimize the occurrence of, and obtain compliance from violators which shall include appropriate, escalating enforcement procedures and actions.
  - 4.2.4.2.2 Documentation and tracking of all enforcement actions.
  - 4.2.4.3. Develop and implement SOPs or similar type of documents for pre-construction Storm Water Pollution Prevention Plan (SWPPP) review and keep records for, at a



minimum, all construction sites that disturb greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale, to ensure plans are complete and in compliance with State and Local regulations. Permittees shall keep records of these projects for five years or until construction is completed, whichever is longer. Prior to construction, the Permittee shall:

- 4.2.4.3.1 Conduct a pre-construction SWPPP review which includes a review of the site design, the planned operations at the construction site, planned BMPs during the construction phase, and the planned BMPs to be used to manage runoff created after development.
- 4.2.4.3.2 Incorporate into the SWPPP review procedures the consideration of potential water quality impacts and procedures for pre-construction review which shall include the use of a checklist.
- 4.2.4.3.3 Identify priority construction sites considering the following factors at a minimum:
  - Soil erosion potential;
  - Site slope;
  - Project size and type;
  - Sensitivity of receiving waterbodies;
  - Proximity to receiving waterbodies; and,
  - Non-storm water discharges and past record of non-compliance by the operators of the construction site.
- 4.2.4.4. All Permittees shall develop and implement SOPs or similar type of documents for construction site inspection and enforcement of construction storm water pollution control measures. The procedures must clearly define who is responsible for site inspections as well as who has authority to implement enforcement procedures. The Permittee must have the authority to the extent authorized by law to impose sanctions to ensure compliance with the local program. These procedures and regulatory authorities must be written and documented in the SWMP. The construction site storm water runoff control inspection program must provide:
  - 4.2.4.4.1 Inspections of all new construction sites with a land disturbance of greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale at least monthly by qualified personnel using the Construction Storm Water Inspection Form (Checklist) found on the Division's website at <http://www.deq.utah.gov/Permits/water/updes/stormwatermun.htm>.
  - 4.2.4.4.2 The Permittee must inspect all phases of construction: prior to land disturbance, during active construction, and following active construction. The Permittee must document in its SWMP the procedure for being notified by construction operators/owners of their completion of active construction so that verification of final stabilization and removal of all temporary control measures may be conducted. This procedure must be provided to the construction operator/owner before active construction begins.
  - 4.2.4.4.3 Inspections by the MS4 of priority construction sites defined in Part 7.36. must be conducted at least biweekly (every two weeks) using the Construction Storm Water

Inspection Form (Checklist) found on the Division's website at <http://www.deq.utah.gov/Permits/water/updes/stormwatermun.htm>.

- 4.2.4.4.4 Based on site inspection findings, the permittee must take all necessary follow-up actions (i.e., reinspection, enforcement) to ensure compliance in accordance with the permittee's enforcement strategy. These follow-up and enforcement actions must be tracked and documented.
- 4.2.4.4.5 Permittees shall publicly provide and publicize a hotline or other local telephone number for public reporting of storm water related issues on construction sites, such as tracking onto streets. Records of violations, enforcement actions and corrective actions taken shall be tracked and documented.
- 4.2.4.5 The Permittee must ensure that all staff whose primary job duties are related to implementing the construction storm water program, including permitting, plan review, construction site inspections, and enforcement, are annually trained to conduct these activities. The training can be conducted by the MS4 or outside training can be attended. Such training must extend to third-party inspectors and plan reviewers as well. The Permittee shall ensure that all new hires are trained upon hire and before commencing storm water related duties and annually thereafter, at a minimum. Follow-up training shall be provided as needed to address changes in procedures, methods or staffing. The training records to be kept include dates, activities or course descriptions, and names and positions of staff in attendance.
- 4.2.4.6. All Permittees shall implement a procedure to maintain records of all projects disturbing greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale. Permittees shall keep records which include but are not limited to, site plan reviews, SWPPPs, inspections and enforcement actions including verbal warnings, stop work orders, warning letters, notices of violation, and other enforcement records. Permittees shall keep records of these projects for five years or until construction is completed, whichever is longer.

**4.2.5. *Long-Term Storm Water Management in New Development and Redevelopment (Post-Construction Storm Water Management)***

All Permittees shall revise as necessary, implement and enforce a program to address post-construction storm water runoff to the MS4 from new development and redevelopment construction sites disturbing greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale, according to the minimum performance measures listed below. The objective of this control measure is for the hydrology associated with new development to mirror the pre-development hydrology of the previously undeveloped site or to improve the hydrology of a redeveloped site and reduce the discharge of storm water. The water quality considerations of this minimum control measure do not replace or substitute for water quantity or flood management requirements implemented on the local level for new developments. The water quality controls may be incorporated into the design of structures intended for flow control; or water quality control may be achieved with separate control measures. The program must apply to private and public development sites, including roads.

The minimum performance measures are:

- 4.2.5.1. Develop and adopt an ordinance or other regulatory mechanism that requires long-term post-construction storm water controls at new development and redevelopment sites. The ordinance or other regulatory mechanism shall apply, at a minimum, to new development and redevelopment sites that discharge to the MS4 and that disturb greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale. Existing local requirements to apply storm water controls at smaller sites shall be retained. The ordinance or other regulatory mechanism shall require BMP selection, design, installation, operation and maintenance standards necessary to protect water quality and reduce the discharge of pollutants to the MS4.
- 4.2.5.2. Implement an enforcement strategy and implement the enforcement provisions of the ordinance or other regulatory mechanism. Procedures for enforcement of BMPs include:
  - 4.2.5.2.1 Procedures that include specific processes and sanctions to minimize the occurrence of, and obtain compliance from, chronic and recalcitrant violators which shall include appropriate, escalating enforcement procedures and actions.
  - 4.2.5.2.2 Documentation on how the requirements of the ordinance or other regulatory mechanism will protect water quality and reduce the discharge of pollutants to the MS4. Documentation shall include:
    - How long-term storm water BMPs were selected;
    - The pollutant removal expected from the selected BMPs; and
    - The technical basis which supports the performance claims for the selected BMPs.
  - 4.2.5.3. The Permittee's new development/redevelopment program must have requirements or standards to ensure that any storm water controls or management practices for new development and redevelopment will prevent or minimize impacts to water quality. BMPs must be selected that address pollutants known to be discharged or anticipated to be discharged from the site.
    - 4.2.5.3.1 The Permittee's new development/redevelopment program shall include non-structural BMPs such as requirements and standards to minimize development in areas susceptible to erosion and sediment loss; to minimize the disturbance of native soils and vegetation; to preserve areas in the municipality that provide important water quality benefits; to implement measures for flood control; and to protect the integrity of natural resources and sensitive areas.
    - 4.2.5.3.2 For new development or redevelopment projects that disturb greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale, the program shall include a process which requires the evaluation of a Low Impact Development (LID) approach which encourages the implementation of BMPs that infiltrate, evapotranspire or harvest and use storm water from the site to protect water quality. Structural controls may include green infrastructure practices such as rainwater harvesting, rain gardens, permeable

pavement, and vegetated swales. If an LID approach cannot be utilized, the Permittee must document an explanation of the reasons preventing this approach and the rationale *for the chosen alternative controls* on a case by case basis for each project.

Since 2010, rainwater harvesting is legal in the State of Utah. Depending on the volume of rainwater collected and stored for beneficial use, the Permittee must meet the requirements of the Utah Division of Water Rights to harvest rainwater found on their website: <http://waterrights.utah.gov/forms/rainwater.asp>

- 4.2.5.3.3 The Permittee must develop a plan to retrofit existing developed sites that are adversely impacting water quality. The retrofit plan must be developed to emphasize controls that infiltrate, evapotranspire or harvest and use storm water discharges. The plan must include a ranking of control measures to determine those best suited for retrofitting as well as those that could later be considered for retrofitting. The Permittee must include the following when developing the criteria for the retrofit plan:
- Proximity to waterbody
  - Status of waterbody to improve impaired waterbodies and protect unimpaired waterbodies
  - Hydrologic condition of the receiving waterbody
  - Proximity to sensitive ecosystem or protected area
  - Any upcoming sites that could be further enhanced by retrofitting storm water controls
- 4.2.5.3.4 Each Permittee shall develop and define specific hydrologic method or methods for calculating runoff volumes and flow rates to ensure consistent sizing of structural BMPs in their jurisdiction and to facilitate plan review. Within **180 days** from the effective date of this Permit, new development or redevelopment projects that disturb greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale must manage rainfall on-site, and prevent the off-site discharge of the precipitation from all rainfall events less than or equal to the 90th percentile rainfall event. This objective must be accomplished by the use of practices that are designed, constructed, and maintained to infiltrate, evapotranspire and/or harvest and reuse rainwater. The 90th percentile rainfall event is the event whose precipitation total is greater than or equal to 90 percent of all storm events over a given period of record. If meeting this retention standard is technically infeasible, a rationale shall be provided on a case by case basis for the use of alternative design criteria. The project must document and quantify that infiltration, evapotranspiration and rainwater harvesting have been used to the maximum extent technically feasible and that full employment of these control are infeasible due to site constraints.
- 4.2.5.4. All Permittees shall adopt and implement procedures for site plan review which evaluate water quality impacts. The procedures shall apply through the life of the project from conceptual design to project closeout. Prior to construction, Permittees shall:

- 4.2.5.4.1 Review post-construction plans for, at a minimum, all new development and redevelopment sites that disturb greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale, to ensure that the plans include long-term storm water management measures that meet the requirements of this minimum control measure.
- 4.2.5.4.2 Permittees shall provide developers and contractors with preferred design specifications to more effectively treat storm water for different development types such as industrial parks, commercial strip malls, retail gasoline outlets, restaurants, parking lots, automotive service facilities, street and road construction, and projects located in, adjacent to, or discharging to environmentally sensitive areas.
- 4.2.5.4.3 Permittees shall keep a representative copy of information that is provided to design professionals; and if information is distributed to a large number of design professionals at once, the dates of the mailings and lists of recipients.
- 4.2.5.5. All Permittees shall adopt and implement SOPs or similar type of documents for site inspection and enforcement of post-construction storm water control measures. These procedures must ensure adequate ongoing long-term operation and maintenance of approved storm water control measures.
- 4.2.5.5.1 The ordinance or other regulatory mechanism shall include provisions for post-construction access for Permittees to inspect storm water control measures on private properties that discharge to the MS4 to ensure that adequate maintenance is being performed. The ordinance or other regulatory mechanism may, in lieu of requiring that the Permittee's staff inspect and maintain storm water controls on private property, instead require private property owner/operators or qualified third parties to conduct maintenance and provide annual certification that adequate maintenance has been performed and the structural controls are operating as designed to protect water quality. In this case, the Permittee must require a maintenance agreement addressing maintenance requirements for any control measures installed on site. The agreement must allow the Permittee to conduct oversight inspections of the storm water control measures and also account for transfer of responsibility in leases and/or deeds. The agreement must also allow the Permittee to perform necessary maintenance or corrective actions neglected by the property owner/operator, and bill or recoup costs from the property owner/operator as needed.
- 4.2.5.5.2 Permanent structural BMPs shall be inspected at least once during installation by qualified personnel. Upon completion, the Permittee must verify that long-term BMPs were constructed as designed.
- 4.2.5.5.3 Inspections and any necessary maintenance must be conducted annually by either the Permittee or through a maintenance agreement, the property owner/operator. On sites where the property owner/operator is conducting maintenance, the Permittee shall inspect those storm water control measures at least once every five years, or more frequently as determined by the Permittee to verify and ensure that adequate maintenance is being performed. The Permittee must document its findings in an inspection report which includes the following:
- Inspection date;
  - Name and signature of inspector;

- Project location;
  - Current ownership information;
  - A description of the condition of the storm water control measure including the quality of: vegetation and soils; inlet and outlet channels and structures; catch basins; spillways; weirs, and other control structures; and sediment and debris accumulation in storage as well as in and around inlet and outlet structures; and,
  - Specific maintenance issues or violations found that need to be corrected by the property owner or operator along with deadlines and reinspection dates.
- 4.2.5.6. Permittees shall ensure that all staff involved in post-construction storm water management, planning and review, and inspections and enforcement receive adequate training on an annual basis. Training shall be provided or made available for staff in the fundamentals of long-term storm water management through the use of structural and non-structural control methods. The training records to be kept include dates, activities or course descriptions, and names and positions of staff in attendance. The Permittee shall ensure that all new hires are trained upon hire and before commencing storm water related duties and annually thereafter, at a minimum. Follow-up training shall be provided as needed to address changes in procedures, methods or staffing.
- 4.2.5.7. The Permittee must maintain an inventory of all post-construction structural storm water control measures installed and implemented at new development and redeveloped sites that disturb greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale. This inventory shall include both public and private sector sites located within the Permittee's service area.
- 4.2.5.7.1 Each entry to the inventory must include basic information on each project, such as project's name, owner's name and contact information, location, start/end date, etc. In addition, inventory entries must include the following for each project:
- Short description of each storm water control measure (type, number, design or performance specifications);
  - Short description of maintenance requirements (frequency of required maintenance and inspections); and
  - Inspection information (date, findings, follow up activities, prioritization of follow-up activities, compliance status).
- 4.2.5.7.2 Based on inspections conducted pursuant to Part 4.2.5.5., the Permittee must update the inventory as appropriate where changes occur in property ownership or the specific control measures implemented at the site.

**4.2.6. *Pollution Prevention and Good Housekeeping for Municipal Operations***

All Permittees shall implement a program for Permittee-owned or operated facilities, operations and structural storm water controls that includes standard operating procedures (SOPs), pollution prevention BMPs, storm water pollution prevention plans or similar type of documents, and a training component that have the ultimate goal of preventing or reducing the runoff of pollutants to the MS4 and Waters of the State. All components of the program shall be included in the SWMP document and must identify the department (and where appropriate, the specific staff) responsible for performing each activity described in this section. The Permittee must develop an inventory of all such Permittee-owned or operated facilities. The Permittee must review this inventory annually and update as necessary. The minimum performance measures are:

4.2.6.1. Permittees shall develop and keep current a written inventory of Permittee-owned or operated facilities and storm water controls that may include but is not limited to:

- Composting facilities
- Equipment storage and maintenance facilities
- Fuel farms
- Hazardous waste disposal facilities
- Hazardous waste handling and transfer facilities
- Incinerators
- Landfills
- Landscape maintenance on municipal property
- Materials storage yards
- Pesticide storage facilities
- Public buildings, including libraries, police stations, fire stations, municipal buildings, and similar Permittee-owned or operated buildings
- Public parking lots
- Public golf courses
- Public swimming pools
- Public works yards
- Recycling facilities
- Salt storage facilities
- Solid waste handling and transfer facilities
- Street repair and maintenance sites
- Vehicle storage and maintenance yards
- Permittee-owned and/or maintained structural storm water controls

4.2.6.2. All Permittees shall assess the written inventory of Permittee-owned or operated facilities, operations and storm water controls identified in Part 4.2.6.1. for their potential to discharge to storm water the following typical urban pollutants: sediment, nutrients, metals, hydrocarbons (e.g., benzene, toluene, ethylbenzene and xylene), pesticides, chlorides, and trash. Other pollutants may be associated with, but not generated directly from, the municipally-owned or operated facilities, such as bacteria, chlorine, organic matter, etc. Therefore, the Permittee must determine additional pollutants associated with its facilities that could be found in storm water

discharges. A description of the assessment process and findings must be included in the SWMP document.

- 4.2.6.3. Based on the assessment required in Part 4.2.6.2., the Permittee must identify as “high-priority” those facilities or operations that have a high potential to generate storm water pollutants. Among the factors that must be considered in giving a facility a high priority ranking is the amount of urban pollutants stored at the site, the identification of improperly stored materials, activities that must be performed outside (e.g., changing automotive fluids), proximity to waterbodies, poor housekeeping practices, and discharge of pollutant(s) of concern to impaired water(s).
- 4.2.6.4. Within **180 days** from the effective date of this Permit, the Permittee shall develop and implement a Storm Water Pollution Prevention Plan (SWPPP) or similar type document for each “high-priority” Permittee-owned or operated facility. The SWPPP shall identify potential sources of pollution that may reasonably be expected to affect the quality of storm water discharges associated with activity from the facility. The SWPPP shall describe and ensure the implementation of standard operating practices (SOPs) that are to be used to reduce the pollutants in storm water discharges associated with activity at the facility and to ensure compliance with the terms and conditions of this Permit. This document shall be tailored and retained at all “high priority” facility locations. The SWPPP shall include a site map showing the following information:
- Property boundaries;
  - Buildings and impervious surfaces;
  - Directions of storm water flow (use arrows);
  - Locations of structural control measures;
  - Location and name of the nearest defined drainage(s) which could receive runoff from the facility, whether it contains water or not;
  - Locations of all storm water conveyances including ditches, pipes, basins, inlets, and swales;
  - Locations where the following activities are exposed to storm water:
    - Fixed fueling operations;
    - Vehicle and equipment maintenance and/or cleaning areas;
    - Brine making areas;
    - Loading/unloading areas;
    - Waste storage or disposal areas;
    - Liquid storage tanks;
    - Process and equipment operating areas;
    - Materials storage or disposal areas;
  - Locations where significant spills or leaks have occurred;
  - Locations of all visual storm water monitoring points;
  - Locations of storm water inlets and outfalls, with a unique identification code for each outfall and an approximate outline of the areas draining to each outfall;



- Locations of all non-storm water discharges;
- Locations of sources of run-on to your site from adjacent property.

4.2.6.5. The following inspections shall be conducted at “high priority” Permittee-owned or operated facilities:

4.2.6.5.1 Weekly visual inspections: The Permittee must perform weekly visual inspections of “high priority” facilities in accordance with the developed SOPs to minimize the potential for pollutant discharge. The Permittee must look for evidence of spills and immediately clean them up to prevent contact with precipitation or runoff. The weekly inspections must be tracked in a log for every facility and records kept with the SWMP document. The inspection log should also include any identified deficiencies and the corrective actions taken to fix the deficiencies.

4.2.6.5.2 Quarterly comprehensive inspections: At least once per quarter, a comprehensive inspection of “high priority” facilities, including all storm water controls, must be performed, with specific attention paid to waste storage areas, dumpsters, vehicle and equipment maintenance/fueling areas, material handling areas, and similar pollutant-generating areas. The quarterly inspection results must be documented and records kept with the SWMP document. This inspection must be done in accordance with the developed SOPs. An inspection report must also include any identified deficiencies and the corrective actions taken to remedy the deficiencies.

4.2.6.5.3 Quarterly visual observation of storm water discharges: At least once per quarter, the Permittee must visually observe the quality of the storm water discharges from the “high priority” facilities (unless climate conditions preclude doing so, in which case the Permittee must attempt to evaluate the discharges four times during the wet season). Any observed problems (e.g., color, foam, sheen, turbidity) that can be associated with pollutant sources or controls must be remedied to prevent discharge to the storm drain system. Visual observations must be documented and records kept with the SWMP document. This inspection must be done in accordance with the developed SOPs. The inspection report must also include any identified deficiencies and the corrective actions taken to remedy the deficiencies.

4.2.6.6. SOPs shall be developed and implemented for the following types of facilities and/or activities listed below:

4.2.6.6.1 Buildings and facilities: SOPs shall address, but is not limited to: Permittee-owned or operated offices, police and fire stations, pools, parking garages, and other Permittee-owned or operated buildings or utilities. The SOPs must address the use, storage and disposal of chemicals and ensure through employee training, that those responsible for handling these products understand and implement the SOPs. All Permittee-owned or operated facilities must develop and ensure that spill prevention plans are in place, if applicable, and coordinate with the local fire department as necessary. The SOPs must address dumpsters and other waste management which includes, but is not limited to, cleaning, washing, painting and other maintenance activities. The Permittee must include a description of schedules and SOPs for sweeping parking lots and keeping the area surrounding the facilities clean to minimize runoff of pollutants. All Permittees must maintain an inventory of all floor drains inside all Permittee-owned or operated buildings. The inventory must be kept

current. The Permittee must ensure that all floor drains discharge to appropriate locations.

- 4.2.6.6.2 Material storage areas, heavy equipment storage areas and maintenance areas. Permittees shall develop and implement SOPs to protect water quality at each of these facilities owned or operated by the Permittee.
- 4.2.6.6.3 Parks and open space. SOPs shall address, but are not limited to: the proper application, storage, and disposal of fertilizer, pesticides, and herbicides including minimizing the use of these products and using only in accordance with manufacturer's instructions; sediment and erosion control; evaluation of lawn maintenance and landscaping activities to ensure practices are protective of water quality such as, proper disposal of lawn clippings and vegetation, and use of alternative landscaping materials such as drought tolerant plants. The SOPs must address the management of trash containers at parks and other open spaces which include scheduled cleanings and establishing a sufficient number of containers, and for placing signage in areas concerning the proper disposal of pet wastes. The SOPs must also address the proper cleaning of maintenance equipment, building exterior, trash containers and the disposal of the associated waste and wastewater. Permittees shall implement park and open space maintenance pollution prevention/good housekeeping practices at all park areas, and other open spaces owned or operated by the Permittee.
- 4.2.6.6.4 Vehicle and Equipment. SOPs shall address, but are not limited to: vehicle maintenance and repair activities that occur on Permittee-owned or operated vehicles. BMPs should include using drip pans and absorbents under or around leaky vehicles and equipment or storing indoors where feasible. Fueling areas for Permittee-owned or operated vehicles and equipment shall be evaluated. If possible, place fueling areas under cover in order to minimize exposure. The O & M program shall include SOPs to ensure that vehicle wash waters are not discharged to the MS4 or Waters of the State. This Permit strictly prohibits such discharges.
- 4.2.6.6.5 Roads, highways, and parking lots. SOPs shall address, but are not limited to: SOPs and schedule for sweeping streets and Permittee-owned or operated parking lots and any other BMPs designed to reduce road and parking lot debris and other pollutants from entering the MS4; road and parking lot maintenance, including pothole repair, pavement marking, sealing and repaving; cold weather operations, including plowing, sanding, and application of deicing compounds and maintenance of snow disposal areas; right-of-way maintenance, including mowing, herbicide and pesticide application; and municipally-sponsored events such as large outdoor festivals, parades or street fairs. The Permittee must ensure that areas used for snow disposal will not result in discharges to receiving waters.
- 4.2.6.6.6 Storm water collection and conveyance system. SOPs shall address, but are not limited to: SOPs and schedules for the regular inspection, cleaning, and repair of catch basins, storm water conveyance pipes, ditches and irrigation canals, culverts, structural storm water controls, and structural runoff treatment and/or flow control facilities. Permittees shall implement catch basin cleaning, storm water system maintenance, scheduled structural BMP inspections and maintenance, and pollution prevention/good housekeeping practices. Permittees shall prioritize storm sewer system maintenance, with the highest priority areas being maintained at the greatest

frequency. Priorities should be driven by water quality concerns, the condition of the receiving water, the amount and type of material that typically accumulates in an area, or other location-specific factors. All Permittee-owned or operated storm water structural BMPs including but not limited to, swales, retention/detention basins or other structures must be inspected annually to ensure that they are properly maintained to reduce the discharge of pollutants into receiving waters. Permittees shall ensure and document proper disposal methods of all waste and wastewater removed from the storm water conveyance system. These disposal methods apply to, but are not limited to, street sweeping and catch basin cleaning. Materials removed from the MS4 shall be dewatered in a contained, impervious area and discharged to the local sanitary sewer (with approval of local authorities) where feasible. The solid material shall be stored and disposed of properly to avoid discharge to Waters of the State during a storm event. Any other treatment and disposal measures shall be reviewed and approved by the Division. Some materials removed from storm drains and open channels may require special handling and disposal, and may not be authorized to be disposed of in a landfill.

- 4.2.6.6.7. Other facilities and operations Permittees shall identify any facilities and operations not listed above that would reasonably be expected to discharge contaminated runoff, and develop, implement, and document the appropriate BMPs and SWPPP to protect water quality from discharges from these sites.
- 4.2.6.7. If a Permittee contracts with a third-party to conduct municipal maintenance or allows private developments to conduct their own maintenance, the contractor shall be held to the same standards as the Permittee. This expectation must be defined in contracts between the Permittee and its contractors or the contractors of private developments. The Permittee shall be responsible for ensuring, through contractually-required documentation or periodic site visits that contractors are using appropriate storm water controls and following the standard operating procedures, storm water control measures, and good housekeeping practices of the Permittee.
- 4.2.6.8. The Permittee must develop and implement a process to assess the water quality impacts in the design of all new flood management structural controls that are associated with the Permittee or that discharge to the MS4. This process must include consideration of controls that can be used to minimize the impacts to site water quality and hydrology while still meeting project objectives. A description of this process must be included in the SWMP document
  - 4.2.6.8.1 Existing flood management structural controls must be assessed to determine whether changes or additions should be made to improve water quality. A description of this process and determinations should be included in the SWMP document.
- 4.2.6.9. Public construction projects shall comply with the requirements applied to private projects. All construction projects disturbing greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale, owned or operated by the Permittee are required to be covered under the General UPDES Permits for Storm Water Discharges Associated with Construction Activities.
- 4.2.6.10. The Permittee shall ensure that all employees, contracted staff, and other responsible entities that have primary construction, operation, or maintenance job functions that

are likely to impact storm water quality receive annual training. The Permittee shall identify target individuals to participate in the training sessions and ensure that all such employees receive training upon being hired and annually thereafter, at a minimum. Training shall address the importance of protecting water quality, the requirements of this Permit, operation and maintenance requirements, inspection procedures, ways to perform their job activities to prevent or minimize impacts to water quality, SOPs and SWPPPs for the various Permittee-owned or operated facilities and procedures for reporting water quality concerns, including potential illicit discharges. Training records must be kept and shall include dates, activities or course descriptions, and names and positions of staff in attendance. Follow-up training shall be provided as needed to address changes in procedures, methods or staffing.

#### **4.3. Sharing Responsibility**

- 4.3.1. Implementation of one or more of the six minimum measures may be shared with another entity, or the entity may fully take over the measure. A Permittee may rely on another entity only if:
- 4.3.2. The other entity, in fact, implements the control measure;
- 4.3.3. The particular control measure, or component of that measure, is at least as stringent as the corresponding Permit requirement; and
- 4.3.4. The other entity agrees to implement the control measure through a written agreement. This obligation must be maintained as part of the description given in the Permittee's SWMP document. If the other entity agrees to report on the minimum control measure, the Permittee must supply the other entity with the reporting requirements contained in Part 5.5. of this Permit. If the other entity fails to implement the control measure, then the Permittee remains liable for any discharges due to that failure to implement.
- 4.3.5. The Permittee conducts training of the responsible entity on the Permit requirements and applicable standard operating procedures.

#### **4.4. Reviewing and Updating Storm Water Management Programs**

- 4.4.1. *Storm Water Management Program Review:* All Permittees must conduct, at a minimum, an annual review of the SWMP document in conjunction with preparation of the annual report required in Part 5.5.
- 4.4.2. *Storm Water Management Program Update:* A Permittee may change the SWMP document during the life of the Permit in accordance with the following procedures:
  - 4.4.2.1. Changes adding (but not subtracting or replacing) components, controls, or requirements to the SWMP document may be made at any time upon written notification to the Division.

- 4.4.2.2. Changes replacing an ineffective or unfeasible BMP specifically identified in the SWMP document with an alternate BMP may be adopted at any time, provided the analysis is clearly outlined and subsequently approved by the Division. An analysis shall include:
  - 4.4.2.2.1 An explanation of why the BMP is ineffective or infeasible,
  - 4.4.2.2.2 Expectations or report on the effectiveness of the replacement BMP, and
  - 4.4.2.2.3 An analysis of why the replacement BMP is expected to achieve the goals of the BMP to be replaced, or has achieved those goals.
- 4.4.3. Change requests or notifications must be made in writing and signed in accordance with Part 6.8.
- 4.4.4. Change requests or notifications will receive confirmation and approval or denial in writing from the Division.
- 4.4.5. Storm Water Management Program Updates required by the Division: The Division may require changes to the SWMP as needed to:
  - 4.4.5.1. Address impacts on receiving water quality caused, or contributed to, by discharges from the MS4;
  - 4.4.5.2. Include more stringent requirements necessary to comply with new Federal regulatory requirements; or
  - 4.4.5.3. Include such other conditions deemed necessary by the Division to comply with the goals and requirements of the Clean Water Act.

## 5.0 **Narrative Standard, Monitoring, Recordkeeping and Reporting**

### 5.1. **Narrative Standard**

It shall be unlawful, and a violation of this Permit, for the Permittee to discharge or place any waste or other substance in such a way as will be or may become offensive such as unnatural deposits, floating debris, oil, scum or other nuisances such as color, odor or taste, or conditions which produce undesirable aquatic life or which produces objectionable tastes in edible aquatic organisms; or concentrations or combinations of substances which produce undesirable physiological responses in desirable resident fish, or other desirable aquatic life, or undesirable human health effects, as determined by bioassay or other tests performed in accordance with standard procedures

### 5.2. **Analytical Monitoring**

Permittees are not required to conduct analytical monitoring (see definition in Part 7.3) during the effective term of this Permit, with the following exceptions:

- 5.2.1. Water quality sampling may be required for compliance with TMDLs, pursuant to Part 3.1. of this Permit.
- 5.2.2. Sampling or testing may be required for characterizing illicit discharges pursuant to Parts 4.2.3.4., 4.2.3.5., and 4.2.3.5.1 of this Permit.
- 5.2.3. In the event that the MS4 elects to conduct analytical monitoring as part of its Storm Water Management Program, the Permittee is required to comply with Part 6.18. of this Permit.

### 5.3. **Non-analytical Monitoring**

- 5.3.1. Non-analytical monitoring (see definition in Part 7.32.) such as visual dry weather screening is required to comply with Part 4.2.3.3.2 of this Permit.

### 5.4. **Record keeping**

- 5.4.1. Permittees must keep all supplementary documents associated with this Permit (e.g., Storm Water Management Program (SWMP) document, SWMP Implementation Schedule) current and up to date to achieve the purpose and objectives of the required document.
- 5.4.2. All modifications to supplementary documents must be submitted to the *Division* in accordance with Parts 4.4 and 6.8.
- 5.4.3. The *Division* may at any time make a written determination that parts or all of the supplementary documents are not in compliance with this Permit, wherein the Permittee must make modifications to these parts within a time frame specified by the *Division*.
- 5.4.4. The Permittee shall retain all required plans, records of all programs, records of all monitoring information, copies of all reports required by this Permit, and records of

all other data required by or used to demonstrate compliance with this Permit, for at least five years. This period may be explicitly modified by alternative provisions of this Permit or extended by request of the *Division* at any time.

- 5.4.5. The Permittee must make records, including the Notice of Intent (NOI) and the SWMP document, available to the public if requested.

**5.5. Reporting**

- 5.5.1. The Permittee must submit an annual report to the Division by October 1 for the reporting period of July 1 to June 30 of each year of the Permit term.
- 5.5.2. The report must be submitted using the report form provided on the *Division's* website at <http://www.deq.utah.gov/Permits/water/updes/stormwatermun.htm>.
- 5.5.3. The Permittee shall sign and certify the annual report in accordance with Part 6.8.
- 5.5.4. Signed copies of the Annual Report and all other reports required herein, shall be submitted to:

Department of Environmental Quality  
Division of Water Quality  
PO Box 144870  
195 North 1950 West  
Salt Lake City, UT 84114-4870

## **6.0 Standard Permit Conditions**

### **6.1. Duty to Comply**

The Permittee must comply with all conditions of this Permit. Any Permit noncompliance constitutes a violation of the Act and is grounds for enforcement action; for Permit termination, revocation and reissuance, or modification; or for denial of a Permit renewal application. The Permittee shall give advance notice to the Division of any planned changes in the Permitted facility or activity, which may result in noncompliance with Permit requirements.

### **6.2. Penalties for Violations of Permit Conditions**

The Act provides that any person who violates a Permit condition implementing provisions of the Act is subject to a civil penalty not to exceed \$10,000 per day of such violation. Any person who willfully or negligently violates Permit conditions or the Act is subject to a fine not exceeding \$25,000 per day of violation. Any person convicted under *UCA 19-5-115(2)* a second time shall be punished by a fine not exceeding \$50,000 per day.

### **6.3. Duty to Reapply**

If the Permittee wishes to continue an activity regulated by this Permit after the expiration date of this Permit, the Permittee shall apply for and obtain a new Permit. The application shall be submitted at least **180 days** before the expiration date of this Permit. Continuation of expiring Permits shall be governed by regulations promulgated at *UAC R317-8-5* and any subsequent amendments.

### **6.4. Need to Halt or Reduce Activity not a Defense**

It shall not be a defense for a Permittee in an enforcement action that it would have been necessary to halt or reduce the Permitted activity in order to maintain compliance with the conditions of this Permit.

### **6.5. Duty to Mitigate**

The Permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this Permit, which has a reasonable likelihood of adversely affecting human health or the environment.

### **6.6. Duty to Provide Information**

The Permittee shall furnish to the Division, within a time specified by the Division, any information which the Division may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Permit, or to determine compliance with this Permit. The Permittee shall also furnish to the Division, upon request, copies of records required to be kept by this Permit.



## 6.7. **Other Information**

When the Permittee becomes aware that it failed to submit any relevant facts in a Permit application, or submitted incorrect information in a Permit application or any report to the Division, it shall promptly submit such facts or information.

## 6.8. **Signatory Requirements**

All notices of intent, storm water management programs, storm water pollution prevention plans, reports, certifications or information either submitted to the *Division* or that this Permit requires to be maintained by the Permittee, shall be signed, dated and certified as follows:

- 6.8.1. All Permit applications shall be signed by either a principal executive officer or ranking elected official.
- 6.8.2. All reports required by the Permit and other information requested by the Division shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:
  - 6.8.2.1. The authorization is made in writing by a person described above and submitted to the Division, and,
  - 6.8.2.2. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility, such as the position of plant manager, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters. A duly authorized representative may thus be either a named individual or any individual occupying a named position.
  - 6.8.2.3. Changes to authorization. If an authorization under *Part 6.8.2.* is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of *Part 6.8.2.* must be submitted to the Division prior to or together with any reports, information, or applications to be signed by an authorized representative.
- 6.8.3. *Certification.* Any person signing documents under this Part shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

**6.9 Availability of Reports**

Except for data determined to be confidential under the Government Records Access and Management Act (*see* particularly Utah Code Ann. § 63-2-309) and Utah Code Ann. § 19-1-3-6, all reports prepared in accordance with the terms of this Permit shall be available for public inspection at the office of the Division. As required by the *Act*, Permit applications, Permits and effluent data shall not be considered confidential.

**6.10. Penalties for Falsification of Reports**

The *Act* provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this Permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction be punished by a fine of not more than \$10,000.00 per violation, or by imprisonment for not more than six months per violation, or by both. Utah Code Ann. § 19-5-115(4)

**6.11. Penalties for Tampering**

The *Act* provides that any person who falsifies, tampers with, or knowingly renders inaccurate, any monitoring device or method required to be maintained under this Permit shall, upon conviction, be punished by a fine of not more than \$10,000 per violation, or by imprisonment for not more than six months per violation, or by both.

**6.12. Oil and Hazardous Substance Liability**

Nothing in this Permit shall be construed to preclude the institution of any legal action or relieve the Permittee from any responsibilities, liabilities, or penalties to which the Permittee is or may be subject under the "*Act*".

**6.13. Property Rights**

The issuance of this Permit does not convey any property rights of any sort, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State or Local laws or regulations.

**6.14. Severability**

The provisions of this Permit are severable, and if any provision of this Permit, or the application of any provision of this Permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this Permit shall not be affected thereby.

**6.15. Requiring a Different Permit**

The *Division* may require the Permittee authorized by this Permit to obtain an individual *UPDES* Permit. Any interested person may petition the *Division* to take action under this paragraph. The *Division* may require the Permittee authorized to discharge under this Permit to apply for an individual *UPDES* Permit only if the Permittee has been notified in writing that a Permit application is required. This notice shall include a brief statement of the reasons for this decision, an application form (as necessary), a statement setting a deadline for the Permittee to file the application, and a statement that on the effective date of the municipal *UPDES* Permit, coverage

under this Permit shall automatically terminate. Permit applications shall be submitted to the address of the *Division of Water Quality* shown in *Part 5.5.* of this Permit. The *Division* may grant additional time to submit the application upon request of the applicant. If the municipality fails to submit in a timely manner a municipal *UPDES* Permit application as required by the *Division*, then the applicability of this Permit to the Permittee is automatically terminated at the end of the day specified for application submittal.

**6.16. State/Federal Laws**

Nothing in this Permit shall be construed to preclude the institution of any legal action or relieve the Permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law or regulation under authority preserved by *UCA 19-5-117* and *Section 510* of the *Clean Water Act* or any applicable Federal or State transportation regulations, such as but not limited to the Department of Transportation regulations.

**6.17. Proper Operation and Maintenance**

The Permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Permittee to achieve compliance with the conditions of this Permit and with the requirements of the SWMP. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. Proper operation and maintenance requires the operation of backup or auxiliary facilities or similar systems, installed by the Permittee only when necessary to achieve compliance with the conditions of the Permit.

**6.18. Monitoring and Records**

- 6.18.1. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.
- 6.18.2. The Permittee shall retain records of all monitoring information including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of the reports required by this Permit, and records of all data used to complete the application for this Permit, for a period of at least five years from the date of the sample, measurement, report or application. This period may be extended by request of the *Division* at any time.
- 6.18.3. Records of monitoring information shall include:
  - 6.18.3.1 The date, exact place, and time of sampling or measurements;
  - 6.18.3.2 The name(s) of the individual(s) who performed the sampling or measurements;
  - 6.18.3.3 The date(s) and time(s) analyses were performed;
  - 6.18.3.4 The name(s) of the individual(s) who performed the analyses;
  - 6.18.3.5 The analytical techniques or methods used; and
  - 6.18.3.6 The results of such analyses.

**6.19. Monitoring Procedures**

Monitoring must be conducted according to test procedures approved under *Utah Administrative Code ("UAC") R317-2-10*, unless other test procedures have been specified in this Permit.

**6.20. Inspection and Entry**

The Permittee shall allow the *Division* or an authorized representative, upon the presentation of credentials and other documents as may be required by law, to:

- 6.20.1. Enter upon the Permittee's premises where a regulated facility or activity is located or conducted or where records must be kept under the conditions of this Permit;
- 6.20.2. Have access to and copy at reasonable times, any records that must be kept under the conditions of this Permit; and
- 6.20.3. Inspect at reasonable times any facilities or equipment (including monitoring and control equipment).
- 6.20.4. Sample or monitor at reasonable times, for the purposes of assuring Permit compliance or as otherwise authorized by law, any substances or parameters at any location.

**6.21. Permit Actions**

This Permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the Permittee for a Permit modification, revocation and re-issuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any Permit condition.

**6.22. Storm Water-Reopener Provision**

At any time during the duration (life) of this Permit, this Permit may be reopened and modified (following proper administrative procedures) as per *UAC R317.8*, to include, any applicable storm water provisions and requirements, a storm water pollution prevention plan, a compliance schedule, a compliance date, monitoring and/or reporting requirements, or any other conditions related to the control of storm water discharges to "Waters-of-State".

## 7.0 **Definitions**

Definitions related to this Permit and small municipal separate storm sewers (MS4s).

- 7.1. “40 CFR” refers to Title 40 of the Code of Federal Regulations, which is the codification of the general and permanent rules published in the Federal Register by the executive departments and agencies of the Federal government.
- 7.2. "Act" means the *Utah Water Quality Act*.
- 7.3. “Analytical monitoring” refers to monitoring of waterbodies (streams, ponds, lakes, etc.) or of storm water, according to UAC R317-2-10 and 40 CFR 136 "Guidelines Establishing Test Procedures for the Analysis of Pollutants,” or to State or Federally established protocols for biomonitoring or stream bioassessments.
- 7.4. “Beneficial Uses” means uses of the Waters of the State, which include but are not limited to: domestic, agricultural, industrial, recreational, and other legitimate beneficial uses.
- 7.5. “Best Management Practices” (BMPs) means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of Waters of the State. BMPs also include treatment requirements, operating procedures, and practices to control facility site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.
- 7.6. “CWA” means *The Clean Water Act of 1987*, formerly referred to as the Federal Water Pollution Control Act.
- 7.7. "Co-Permittee" means any operator of a regulated Small MS4 that is applying jointly with another applicant for coverage under this Permit. A Co-Permittee owns or operates a regulated Small MS4 located within or adjacent to another regulated MS4. A Co-Permittee is only responsible for complying with the conditions of this Permit relating to discharges from the MS4 the Co-Permittee owns or operates. See also 40 CFR 122.26(b)(1).
- 7.8. “Control Measure” refers to any Best Management Practice or other method used to prevent or reduce the discharge of pollutants to Waters of the State.
- 7.9. “Common plan of development or sale” means one plan for development or sale, separate parts of which are related by any announcement, piece of documentation (including a sign, public notice or hearing, sales pitch, advertisement, drawing, plat, blueprint, contract, Permit application, zoning request, computer design, etc.), physical demarcation (including contracts) that identify the scope of the project. A plan may still be a common plan of development or sale even if it is taking place in separate stages or phases, is planned in combination with other construction activities, or is implemented by different owners or operators.
- 7.10. “Director” means the director of the Utah Division of Water Quality, otherwise known as the *Division* of the Utah Water Quality Board.
- 7.11. “Division” means the Utah Division of Water Quality.
- 7.12. "Discharge" for the purpose of this Permit, unless indicated otherwise, refers to discharges from the Municipal Separate Storm Sewer System (MS4).

- 7.13.** "Dry weather screening" is monitoring done in the absence of storm events to discharges representing, as much as possible, the entire storm drainage system for the purpose of obtaining information about illicit connections and improper dumping.
- 7.14.** "Escalating enforcement procedures" refers to a variety of enforcement actions in order to apply as necessary for the severity of the violation and/or the recalcitrance of the violator.
- 7.15.** "Entity" means a governmental body or a public or private organization.
- 7.16.** "EPA" means the United States Environmental Protection Agency.
- 7.17.** "General Permit" means a Permit which covers multiple dischargers of a point source category within a designated geographical area, in lieu of individual Permits being issued to each discharger.
- 7.18.** "Ground water" means water in a saturated zone or stratum beneath the surface of the land or below a surface water body.
- 7.19.** "High quality waters" means any water, where, for a particular pollutant or pollutant parameter, the water quality exceeds that quality necessary to support the existing or designated uses, or which supports an exceptional use.
- 7.20.** "Illicit connection" means any man-made conveyance connecting an illicit discharge directly to a municipal separate storm sewer.
- 7.21.** "Illicit discharge" means any discharge to a municipal separate storm sewer that is not composed entirely of storm water except discharges pursuant to a UPDES Permit (other than the UPDES Permit for discharges from the municipal separate storm sewer) and discharges resulting from emergency firefighting activities.
- 7.22.** "Impaired waters" means any segment of surface waters that has been identified by the Division as failing to support classified uses. The Division periodically compiles a list of such waters known as the 303(d) List.
- 7.23.** "Indian Country" is defined as in 40 CFR §122.2 to mean:
- 7.23.1.** All land within the limits of any Indian reservation under the jurisdiction of the United States Government, notwithstanding the issuance of any patent, and, including rights-of-way running through the reservation;
  - 7.23.2.** All dependent Indian communities within the borders of the United States whether within the originally or subsequently acquired territory thereof, and whether within or without the limits of a state; and
  - 7.23.3.** All Indian allotments, the Indian titles to which have not been extinguished, including right-of-ways running through the same.

- 7.24.** “Large MS4” *Large municipal separate storm sewer system* means all municipal separate storm sewers that are located in an incorporated place with a population of 250,000 or more as determined by the current Decennial Census by the Bureau of the Census.
- 7.25.** “Low Impact Development” (LID) is an approach to land development (or re-development) that works with nature to more closely mimic pre-development hydrologic functions. LID employs principles such as preserving and recreating natural landscape features, minimizing effective imperviousness to create functional and appealing site drainage that treat storm water as a resource rather than a waste product. There are many practices that have been used to adhere to these principles such as bioretention facilities, rain gardens, vegetated rooftops, rain barrels, and permeable pavements.
- 7.26.** "MS4" is an acronym for "municipal separate storm sewer system".
- 7.27.** "Maximum Extent Practicable" (MEP) is the technology-based discharge standard for Municipal Separate Storm Sewer Systems established by paragraph 402(p)(3)(B)(iii) of the Federal Clean Water Act (CWA), which reads as follows: “Permits for discharges from municipal storm sewers shall require controls to reduce the discharge of pollutants to the maximum extent practicable, including management practices, control techniques, and system, design, and engineering methods, and other such provisions as the Administrator or the State determines appropriate for the control of such pollutants.”
- 7.28.** “Medium MS4” *Medium municipal separate storm sewer system* means all municipal separate storm sewers that are located in an incorporated place with a population of 100,000 or more but less than 250,000, as determined by the 1990 Decennial Census by the Bureau of the Census
- 7.29.** “Monitoring” refers to tracking or measuring activities, progress, results, etc.;
- 7.30.** "Municipal separate storm sewer system" means a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains) pursuant to paragraphs R317-8-1.6(4), (7), & (14), or designated under UAC R317-8-3.9(1)(a)5:
- 7.30.1.** that is owned or operated by a state, city, town, county, district, association, or other public body (created by or pursuant to State Law) having jurisdiction over disposal of wastes, storm water, or other wastes, including special districts under State Law such as a sewer district, flood control district or drainage district, or similar entity, or a designated and approved management agency under section 208 of the CWA that discharges to Waters of the State;
- 7.30.2.** that is designed or used for collecting or conveying storm water;
- 7.30.3.** which is not a combined sewer; and
- 7.30.4.** which is not part of a Publicly Owned Treatment Works (POTW) as defined in 40 CFR 122.2.
- 7.31.** “NOI” is an acronym for “Notice of Intent” to be covered by this Permit and is the mechanism used to “register” for coverage under a General Permit.

- 7.32.** “Non-analytical monitoring” refers to monitoring for pollutants by means other than UAC R317-2-10 and 40 CFR 136, such as visually or by qualitative tools that provide comparative or rough estimates.
- 7.33.** “Operator” is the person or entity responsible for the operation and maintenance of the MS4.
- 7.34.** "Outfall" means a point source as defined by UAC R317-8-1.5(34) at the point where a municipal separate storm sewer discharges to Waters of the State and does not include open conveyances connecting two municipal separate storm sewers, or pipes, tunnels or other conveyances which connect segments of the same stream or other Waters of the State and are used to convey waters of the State.
- 7.35.** “Phase II areas” means areas regulated under UPDES storm water regulations encompassed by Small MS4's (see definition 7.39.).
- 7.36.** “Priority construction site” means a construction site that has potential to threaten water quality when considering the following factors: soil erosion potential; site slope; project size and type; sensitivity of receiving waterbodies; proximity to receiving waterbodies; non-storm water discharges and past record of non-compliance by the operators of the construction site.
- 7.37.** “Redevelopment” is the replacement or improvement of impervious surfaces on a developed site.
- 7.38.** “Runoff” is water that travels across the land surface, or laterally through the ground near the land surface, and discharges to water bodies either directly or through a collection and conveyance system. Runoff includes storm water and water from other sources that travels across the land surface.
- 7.39.** “SWMP” is an acronym for storm water management program. The SWMP document is the written plan that is used to describe the various control measures and activities the Permittee will undertake to implement the storm water management plan.
- 7.40.** “SWPPP” is an acronym for storm water pollution prevention plan.
- 7.41.** “Small municipal separate storm sewer system” is any MS4 not already covered by the Phase I program as a medium or large MS4. The Phase II Rule automatically covers on a nationwide basis all Small MS4s located in “urbanized areas” (UAs) as defined by the Bureau of the Census (unless waived by the UPDES Permitting authority), and on a case-by-case basis those Small MS4s located outside of UAs that the UPDES Permitting authority designates.
- 7.41.1.** This term includes systems similar to separate storm sewer systems in municipalities, such as systems at military bases, large hospital or prison complexes, and highways and other thoroughfares. The term does not include separate storm sewers in very discrete areas, such as individual buildings.
- 7.42.** “SOP” is an acronym for standard operating procedure which is a set of written instructions that document a routine or repetitive activity. For the purpose of this Permit, SOPs should emphasize pollution control measures to protect water quality.
- 7.43.** "Storm water" means storm water runoff, snowmelt runoff, and surface runoff and drainage.



- 7.43.** “Storm water management program” means a set of measurable goals, actions, and activities designed to reduce the discharge of pollutants from the Small MS4 to the maximum extent practicable and to protect water quality.
- 7.44.** “TMDL” is an acronym for “Total Maximum Daily Load” and in this Permit refers to a study that: 1) quantifies the amount of a pollutant in a stream; 2) identifies the sources of the pollutant; and 3) recommends regulatory or other actions that may need to be taken in order for the impaired waterbody to meet water quality standards.
- 7.45.** “Urbanized area” is a land area comprising one or more places and the adjacent densely settled surrounding area that together have a residential population of at least 50,000 and an overall population density of at least 1,000 people per square mile.
- 7.46.** “Waters of the State” means all streams, lakes, ponds, marshes, water-courses, waterways, wells, springs, irrigation systems, drainage systems, and all other bodies or accumulations of water, surface and underground, natural or artificial, public or private which are contained within, flow through, or border upon this state or any portion thereof, except bodies of water confined to and retained within the limits of private property, and which do not develop into or constitute a nuisance, or a public health hazard, or a menace to fish and wildlife which shall not be considered to be “Waters of the State” under this definition (“UAC” R317-1-1).



Standard Operating  
Procedures (SOPs)

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**APPENDIX H**



## Procedures for Dry Weather Screening of Outfalls

**Definition:** Dry weather screening is described as monitoring done in the absence of storm events to discharges representing, as much as possible, the entire storm drainage system for the purpose of obtaining information about illicit connections and improper dumping.

### Procedures:

1. Dry weather screening of outfalls should be performed before or after the water season when flows in outfall flows should be at their minimums.
2. The minimum requirement for screening outfalls is to inspect at least 20% of all outfalls per year.
3. The inspector shall use a camera, measuring tape, and clear container. The camera will be used to take pictures and document the condition of the outfall and water. The measuring tape will be used to measure the size of the pipe or channel being inspected. The clear container will be used to take a sample of the water, if any, and visually monitor the water condition.
4. A record of the inspection must be kept. Use the EPA form *Outfall Reconnaissance Inventory/Sample Collection Field Sheet*. Fill out all applicable information.
5. If any water contamination or irregularities are observed use the *Procedures for Tracing and Removing Illicit Discharges*.
6. Keep a record of all inspections performed.

## Procedures for Tracing and Removing Illicit Discharges

**Definition:** Illicit discharge means any discharge to a municipal separate storm sewer that is not composed entirely of storm water.

The following non-storm water discharges do not need to be addressed and are not considered illicit discharges:

- De-chlorinated Water line flushing
- Landscape irrigation
- Diverted stream flows
- Rising ground waters
- Uncontaminated ground water infiltration
- Uncontaminated pumped ground water
- Discharges from potable water sources
- Foundation drains
- Air conditioning condensate
- Irrigation water
- Springs
- Water from crawl space pumps
- Footing drains
- Lawn watering runoff
- Individual residential car washing
- Flows from riparian habitats and wetlands
- De-chlorinated swimming pool discharges
- Residual street wash water
- De-chlorinated water reservoir discharges
- Discharges or flows from firefighting activity

### Procedures:

1. The storm drain system map shall be kept up to date to include all new storm drain pipe, manholes, and any other conveyance structures located within the city.
2. Priority sites that are likely to have illicit discharges will be identified (if contained within the city) and at least 20% of these areas will be inspected annually. Examples of such sites are:
  - Areas with older infrastructure or history of sewer overflows or cross connections
  - Industrial, commercial, or mixed use areas
  - Areas with a history of illicit discharges
  - Areas with a history of illegal dumping
  - Areas with onsite sewage disposal systems
  - Areas upstream of sensitive waterbodies
3. The city shall publically list and promote a hotline or local telephone number for the public to report spills and other illicit discharges. **This number is (801-XXX-XXXX). This hotline will be publicized on the city website or newsletter???** During non-business hours such calls will be forwarded to...
4. The city will train office personnel who might receive initial reports of illicit discharges to use the *EPA Illicit Discharge Hotline Incident Tracking Sheet*.

5. The city will train field personnel who might respond to reports of illicit discharges how to trace and eliminate spills. When necessary open manholes and trace the spill upstream and to its source. If available the use of mobile cameras, dye testers, etc. to trace the spill upstream and to its source.
6. Provide a list of those city personnel that will be notified in case of a spill or illicit discharge and the order they will be contacted, phone numbers, and associated responsibilities. Update this list as changes to personnel occur.
7. If a large spill or illicit discharge takes place contact the Weber-Morgan Health Department at (801) 399-7169, or Weber County Spill Response at (801) 536-4123, or the Davis County Health Department at (801) 807-8872. Notify nearby property owners of the spill or illicit discharge if necessary. Other environmental response companies that are available 24 hours a day are listed below as a resource.
8. When the spill or illicit discharge has been eliminated the *Illicit Discharge Hotline Incident Tracking Sheet* will be completed kept on record, any other necessary paper work will be completed and kept on record. Determine what actions are necessary to prevent similar spills or illicit discharges in the future. If the incident was intentional legal enforcement actions may be considered.

**Environmental Response Companies:**

<b>Name</b>	<b>Location</b>	<b>Telephone</b>
A Plus Environmental LLC	Ogden, Layton	(801) 392-6545 or (801) 391-2050
Enviro Care, Inc	North Salt Lake	(801) 299-1900 or (801) 820-9058
HMHTTC Response Inc.	Ogden	(801) 627-2240 or 800-927-9303
Lincoln Environmental Services	Ogden	800-257-5370
S & M Diesel Environmental Services	Brigham City	800-735-2004 or (435) 279-8124
USA Environmental	Layton, Ogden	(801) 390-4934

# STANDARD OPERATING PROCEDURES

Weber County Storm Water Coalition

Created: February 2010  
Davis County Storm Water Coalition  
revised for Weber County Coalition April 2010



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## **BUILDINGS – Dumpsters/Garbage Storage**

1. Preparation.
  - a. Train employees on proper trash disposal.
  - b. Locate dumpsters and trash cans in convenient, easily observable areas.
  - c. Provide properly-labeled recycling bins to reduce the amount of garbage disposed.
  - d. Install berms, curbing, or vegetation strips around storage areas to control water entering/leaving storage areas.
  - e. Whenever possible store garbage containers beneath a covered structure or inside to prevent contact with storm water.
2. Process.
  - a. Inspect garbage bins for leaks regularly, and have repairs made immediately by responsible party.
  - b. Request/use dumpsters, and trash cans with lids and without drain holes.
  - c. Locate dumpsters on a flat, hard surface that does not slope or drain directly into the storm drain system.
3. Clean-up.
  - a. Keep areas around dumpsters clean of all garbage.
  - b. Have garbage bins emptied regularly to keep from overflowing.
  - c. Wash out bins or dumpsters as needed to keep odors from becoming a problem.
4. Documentation
  - a. Document training of employees

## **BUILDINGS – Parking Lot Maintenance**

1. Preparation.
  - a. Conduct regular employee training to reinforce proper housekeeping.
  - b. Restrict parking in areas to be swept prior to and during sweeping using regulations as necessary.
  - c. Perform regular maintenance and services in accordance with the recommended vehicle maintenance schedule on sweepers to increase and maintain efficiency.
2. Process.
  - a. Sweep parking areas, as needed, or as directed by the city's responsible official.
  - b. Hand sweep sections of gutter if soil and debris accumulate.
  - c. Pick-up litter as required to keep parking areas clean and orderly.
3. Clean-up.
  - a. Dispose of sweepings properly (appropriate solid waste facility).
  - b. Street sweepers to be cleaned out in a manner as instructed by the manufacturer and in a location that swept materials cannot be introduced into a stormdrain.
  - c. Swept materials will not be stored in locations where storm water could transport fines into the stormdrain system.
4. Documentation.
  - a. Keep accurate logs to track swept parking areas and approximate quantities.
  - b. Document training of employees.

## **IDDE - Call-in Inspections**

1. Preparation
  - a. Have a system in place to receive phone calls and collect information regarding suspected illicit discharges.
2. Process
  - a. Use the Incident Tracking Sheet to collect the appropriate information from the caller. Then, transfer the Incident Tracking Sheet to the proper authority (ie. department head, stormwater specialist, construction inspector, code enforcement officer, or other assigned personnel).
  - b. Promptly investigate reported incidents.
  - c. If an illicit discharge of unknown source is confirmed, follow the procedure of SOP IDDE - Tracing Illicit Discharges.
  - d. If an illicit discharge known source is confirmed, follow the procedure of SOP IDDE - Removing Illicit Discharges.
3. Clean up
  - a. Clean catch basin, clean storm drain, or initiate spill response, as applicable. Follow relevant SOPs.
4. Documentation
  - a. File all completed forms (ie. incident tracking, catch basins cleaning, storm drain cleaning).
  - b. Document any further action taken.
  - c. Review incidents reported by citizens on an annual basis to look for patterns of illicit discharges and to evaluate the call-in inspection program.

## **IDDE - Opportunistic Illicit Discharge Observation**

1. Preparation
  - a. Be alert for potential illicit discharges to the municipal storm water system while going about normal work activities.
2. Process
  - a. Call the appropriate authority (ie. department head, stormwater specialist, construction inspector, code enforcement officer or a supervisor) if you see evidence of an illicit discharge.
  - b. Assess the general area of the illicit discharge to see if you can identify its source.
  - c. Whenever possible, take photographs of the suspected illicit discharge.
  - d. Responding stormwater department personnel or code enforcement officer will complete the following:
    1. Use the IDDE Incident Tracking Sheet to document observations.
    2. Obtain sample for visual observation and complete an Outfall Inspection Form, if applicable.
    3. Follow the procedure of SOP IDDE - Tracing Illicit Discharges.
3. Clean-up
  - a. Clean catch basin, clean storm drain, or initiate spill response, as needed. Follow relevant SOPs.
4. Documentation
  - a. File all completed forms (ie. Incident Tracking Form, Outfall Inspection Form, Catch Basin Cleaning Form, and Storm Drain Cleaning Log).
  - b. Document any further action taken.

## IDDE - Outfall Inspections

1. Preparation:
  - a. Know the past and present weather conditions. Conduct inspections during dry weather periods.
  - b. Gather all necessary equipment including: tape measure, clear container, clipboard with necessary forms, flashlight, and camera (optional).
  - c. Obtain maps showing outfall locations and identifiers.
  - d. Obtain outfall description and observations from previous inspections, so the outfall can be accurately identified and observations compared.
  
2. Process
  - a. Perform an inspection of each outfall at least once per year. Whenever, possible use the same personnel for consistency in observations.
  - b. Identify each outfall with a consistent and unique identifier. For example "Howard Slough-#13". Use maps and previous inspection reports to confirm the outfall identity and location.
  - c. If dry weather flow is present at the outfall, then document and evaluate the discharge by completing the following steps:
    1. Collect field samples for visual observations in a clean, clear container and in a manner that avoids stirring up sediment that might distort the observation.
    2. Characterize and record observations on basic sensory and physical indicators (e.g., outfall condition, flow, odor, color, oil sheen) on the Outfall Inspection Form.
    3. Compare observations to previous inspections.
    4. If the flow does not appear to be an obvious illicit discharge (e.g., flow is clear, odorless, etc.), attempt to identify the source of the flow (groundwater, intermittent stream, etc.)
  - d. If an illicit discharge (such as raw sewage, petroleum products, paint, etc.) is encountered or suspected, follow the procedure of SOP IDDE - Tracing Illicit Discharges.
  
3. Cleanup - as necessary
  
4. Documentation
  - a. File completed outfall inspection forms.
  - b. Update maps if new outfalls are observed and inspected.

## **IDDE - Removing Illicit Discharges**

1. Preparation
  - a. Obtain available property ownership information for the source of the illicit discharge.
2. Process
  - a. Determine who is financially responsible; and follow associated procedures as given below.

For Private Property Owner:  
Contact Owner,  
Issue Notice of Violation for violations of the municipal ordinance, and  
Determine schedule for removal.

For Municipal Facility:  
Notify appropriate municipal authority or department head,  
Schedule removal, and  
Remove illicit connection.
  - b. Suspend access to storm drain if threats of serious physical harm to humans or the environment are possible.
  - c. Direct responsible party to initiate repairs/corrections/cleanup. Coordinate with enforcement official for escalating penalties in accordance with the municipal ordinance.
  - d. Repair/correct cause of discharge if municipality is responsible. Schedule the work through the appropriate municipal authority or department head..
  - e. Seek technical assistance from the Weber-Morgan Health Department or Utah Department of Water Quality, if needed.
3. Clean up
  - a. Confirm illicit discharge is removed or eliminated by follow-up inspection.
4. Documentation
  - a. Maintain records of notice of violation and penalties.
  - b. Document repairs, corrections, and any other actions required.



## IDDE - Tracing Illicit Discharges

1. Preparation
  - a. Review / consider information collected when illicit discharge was initially identified and document using Incident Tracking Form or Outfall Inspection Form.
  - b. Obtain storm drain mapping for the area of the reported illicit discharge.
  - c. Gather all necessary equipment including: tape measure, clear container, clipboard with necessary forms, flashlight, and camera (optional).
2. Process
  - a. Survey the general area / surrounding properties to identify potential sources of the illicit discharge as a first step.
  - b. Trace illicit discharges using visual inspections of upstream points as a second step. Use available mapping to identify tributary pipes, catch basins, etc.
  - c. If the source of the illicit discharge cannot be determined by a survey of the area or observation of the storm drain system, then consider the following additional steps:
    1. Use weirs, sandbags, dams, or optical brightener monitoring traps to collect or pool intermittent discharges during dry weather.
    2. Smoke test or televise the storm drain system to trace high priority, difficult to detect illicit discharges.
    3. Dye test individual discharge points within suspected buildings.
    4. Consider collecting bacterial samples of flowing discharges to confirm/refute illicit discharge.
  - d. If the source is located, follow SOP IDDE - Removing Illicit Discharges.
  - e. If the source cannot be found, add the location to a future inspection program.
3. Clean up
  - a. Clean catch basin, clean storm drain, or initiate spill response, as applicable. Follow relevant SOPs.
4. Documentation
  - a. Document tracing results for future reference.

## **PARKS – Chemical Application Pesticides, Herbicides, Fertilizers**

1. Preparation
  - a. Make sure your state Chemical Handling Certification is complete and up-to-date before handling any chemicals.
  - b. Calibrate fertilizer and pesticide application equipment to avoid excessive application.
  - c. Use pesticides only if there is an actual pest problem and periodically test soils for determining proper fertilizer use
  - d. Time and apply the application of fertilizers, herbicides or pesticides to coincide with the manufacturer's recommendation for best results ("Read the Label").
  - e. Know the weather conditions. Do not use pesticides if rain is expected. Apply pesticides only when wind speeds are low (less than 5 mph).
  
2. Process
  - a. Always follow the manufacturer's recommendations for mixing, application and disposal. ("Read the Label").
  - b. Do not mix or prepare pesticides for application near storm drains, preferably mix inside a protected area with impervious secondary containment (preferably indoors) so that spills or leaks will not contact soils.
  - c. Employ techniques to minimize off-target application (e.g. spray drift, over broadcasting.) of pesticides and fertilizers.
  
3. Clean-up
  - a. Sweep pavements or sidewalks where fertilizers or other solid chemicals have fallen, back onto grassy areas before applying irrigation water.
  - b. Triple rinse containers, and use rinse water as product. Dispose of unused pesticide as hazardous waste.
  - c. Always follow all federal and state regulations governing use, storage and disposal of fertilizers, herbicides or pesticides and their containers. ("Read the Label")
  
4. Documentation
  - a. Keep copies of MSD sheets for all pesticides, fertilizers and other hazardous products used.
  - b. Record fertilizing and pesticide application activities, including date, individual who did the application, amount of product used and approximate area covered.

## **PARKS – Cleaning Equipment**

1. Preparation
  - a. Review process with all Parks employees
  
2. Process
  - a. Wipe off dirt, dust and fluids with disposable towel
  - b. Wash equipment in approved wash station
  
3. Clean-up
  - a. Dispose of towels in proper trash receptacle
  - b. Sweep floor and dispose of debris.

## **PARKS – Mowing and Trimming**

1. Preparation
  - a. Process overview with all employees
  - b. Check the oil and fuel levels of the mowers and other equipment; fill if needed.
  
2. Process
  - a. Install temporary catch basin protection installed on affected basins
  - b. Put on eye and hearing protection
  - c. Mow and trim the lawn
  - d. Sweep or blow clippings to grass areas
  - e. Remove inlet protection
  
3. Clean-up
  - a. Mowers are to be scraped and brushed at shop – dry spoils are dry swept and disposed of
  - b. Wash equipment in approved wash station

## **PARKS – Open Space Management**

1. Preparation
  - a. Provide a regular observation and maintenance of parks, golf courses, and other public open spaces.
  - b. Identify public open spaces that are used for stormwater detention and verify that detention areas are included on the storm drain system mapping, inspection schedules, and maintenance schedules.
  
2. Process
  - a. Ensure that any storm drain or drainage system components on the property are properly maintained.
  - b. Avoid placing bark mulch (or other floatable landscaping materials) in stormwater detention areas or other areas where stormwater runoff can carry the mulch into the storm drainage system.
  - c. Follow all SOPs related to irrigation, mowing, landscaping, and pet waste management.
  
3. Clean Up
  - a. Keep all outdoor work areas neat and tidy. Clean by sweeping instead of washing whenever possible. If areas must be washed, ensure that wash water will enter a landscaped area rather than the storm drain. Do not use soap for outdoor washing.
  - b. Pick up trash on a regular basis.
  
4. Documentation
  - a. Document any observed deficiencies for correction or repair.

## **PARKS – Pet Waste**

1. Preparation
  - a. Adopt and enforce ordinances that require pet owners to clean up pet wastes and use leashes in public areas. If public off-leash areas are designated, make sure they are clearly defined. Avoid designating public off-leash areas near streams and water bodies.
  - b. Whenever practical and cost effective, install dispensers for pet waste bags and provide disposal containers at locations such as trail heads or parks where pet waste has been a problem. Provide signs with instructions for proper cleanup and disposal.
2. Process
  - a. Check parks and trails for pet waste as needed.
  - b. Check public open space for pet waste prior to mowing and watering.
  - c. Provide ordinance enforcement as needed.
3. Clean up
  - a. Remove all pet waste, provide temporary storage in a covered waste container, and dispose of properly. Preferred method of disposal is at a solid waste disposal facility.
4. Documentation
  - a. Document problem areas for possible increased enforcement and/or public education signs.

## **PARKS – Planting Vegetation (Starters)**

1. Preparation
  - a. Call the Blue Stakes Center of Utah at least 2 working days before any digging will be done, to reveal the location of any underground utilities.
  - b. Dial 811 or 1-800-662-4111
  - c. Decide where any spoils will be taken.
  
2. Process
  - a. Dig holes; place spoils near the hole where they may easily be placed back around roots. Avoid placing spoils in the gutter.
  - b. Bring each plant near the edge of the hole dug for it.
  - c. Check the depth of the hole, and adjust the depth if necessary. The depth of the hole for a tree should be as deep as the root ball, so that the top of the root ball is level with the top of the hole.
  - d. Carefully remove pot or burlap.
  - e. Place the plant in the hole.
  - f. Backfill the hole with existing spoils, compost, and a litter fertilizer if desired. Do not use excessive amendments.
  - g. Water the plant.
  - h. Stake the plant, if necessary, to stabilize it.
  
3. Clean-up
  - a. Move any extra spoils into truck or trailer. Place the spoils on a tarp if there is a likelihood that some of the dirt would be lost through openings in the bed.
  - b. Sweep dirt from surrounding pavement(s) into the planter area
  - c. Transport spoils to their designated fill or disposal area.

## **PARKS – Planting Vegetation (Seeds)**

1. Preparation
  - a. Call the Blue Stakes Center of Utah at least 2 working days before any digging will be done, to reveal the location of any underground utilities.
  - b. Dial 811 or 1-800-662-4111
  - c. Decide on the application rate, method, water source, and ensure adequate materials are on hand.
  - d. Grade and prepare the soil to receive the seed. Place any extra soil in a convenient location to collect.
  
2. Process
  - a. Place the seed and any cover using the pre-determined application method (and rate).
  - b. Lightly moisten the seed.
  
3. Clean-up
  - a. Move any extra spoils into truck or trailer. Place the spoils on a tarp if there is a likelihood that some of the dirt would be lost through openings in the bed.
  - b. Sweep dirt, seed, and any cover material from surrounding pavement(s) into the planter area
  - c. Transport spoils to their designated fill or disposal area.



## **PARKS – Transporting Equipment**

1. Preparation
  - a. Determine equipment needed for transport and method (trailer, truck bed) needed to transport equipment.
  - b. Conduct pre- trip inspection of equipment
2. Process
  - a. Load and secure equipment on trailer or truck
  - b. Load and secure fuel containers for equipment usage
3. Clean-up
  - a. Off load equipment
  - b. Store equipment and trailer in proper locate on
  - c. Conduct post-trip inspection of equipment
  - d. Wash equipment, if needed, according to the SOP for Cleaning Equipment SOP
4. Documentation
  - a. Pre-trip and post trip inspection report

## STREETS/STORM DRAIN – Catch Basin Cleaning

1. Preparation:
  - a. Clean sediment and trash off grate.
  - b. Do visual inspection on outside of grate.
  - c. Make sure nothing needs to be replaced.
  - d. Do inside visual inspection to see what needs to be cleaned.
  
2. Process
  - a. Clean using a high powered vacuum truck to start sucking out standing water and sediment.
  - b. Use a high pressure washer to clean any remaining material out of catch basin, while capturing the slurry with the vacuum.
  - c. After catch basin is clean, send the rodder of the vacuum truck downstream to clean pipe and pull back sediment that might have gotten down stream of pipe.
  - d. Move truck downstream of pipe to next catch basin.
  
3. Clean-up
  - a. When vacuum truck is full of sediment take it to the designated location to dump all the sediment out of truck into a drying bed.
  - b. When it evaporates, clean it up with a backhoe, put it into a dump truck and take it to the landfill.
  
4. Documentation
  - a. Keep logs of number of catch basins cleaned.
  - b. Record the amount of waste collected.
  - c. Keep any notes or comments of any problems.

## STREETS/STORM DRAIN – Curb Painting

1. Preparation
  - a. Calculate the amount of paint required for the job
  - b. Use water based paints if possible.
  - c. Determine whether the wastes will be hazardous or not and the required proper disposal of said wastes
  - d. Determine locations of storm drain inlets and sewer inlets that may need to be protected
  - e. Prepare surfaces to be painted without generating wastewater by sandblasting and/or scraping.
  - f. Thoroughly sweep up all sand, blastings, and/or paint scrapings
  - g. If paint stripping is needed, use a citrus-based paint remover whenever possible, which is less toxic than chemical strippers
  - h. If wastewater will be generated, use curb, dyke, etc. around the activity to collect the filter and collect the debris.
2. Process
  - a. Paint curb.
  - b. Prevent over-spraying of paints and/or excessive sandblasting
  - c. Use drip pans and drop clothes in areas of mixing paints and painting
  - d. Store latex paint rollers and brushes in air tight bags to be reused later with the same color.
  - e. Have available absorbent material and other BMP's ready for an accidental paint spill.
3. Clean-up
  - a. Paint out brushes and rollers as much as possible. Squeeze excess paint from brushes and rollers back into the containers prior to cleaning them.
  - b. Pour excess paint from trays and buckets back into the paint can containers and wipe with cloth or paper towels. Dispose of the towels according to the recommendations on the paint being used.
  - c. Rinse water-based paint brushes in the sink after pre-cleaning. Never pour excess paint or wastewater from cleanup of paint in the storm drain.
  - d. Cleanup oil based paints with paint thinner. Never clean oil based brushes in a sink or over a storm drain. Filter solvents for reuse if possible and/or store in approved drum for recycling.
  - e. Dispose of waste collected by placing it in a garbage container. Left-over paint and solvents should be stored for later use (do not place these liquids in the garbage).

4. Documentation
  - a. Write-up/report of any discharges into storm drain system

## STREETS/STORM DRAIN – Detention Pond Cleaning

1. Preparation:
  - a. Schedule the Pond cleaning work for a time when dry weather is expected.
  - b. Remove any sediment and trash from grates, placing it in a truck for disposal.
  - c. Do a visual inspection to make sure any grates, structures, manholes, boxes, and pipes are in good working order. Remove manhole covers and grates as necessary for inspecting.
  
2. Process
  - a. Provide outlet protection where feasible to minimize the amount of debris that might leave basin during cleaning process.
  - b. Start cleaning basin by using backhoe to remove debris and sediment off the bottom.
  - c. Continue cleaning structures and pond bottom as necessary by sweeping and shoveling.
  - d. Put all material removed from the pond into a dump truck.
  - e. Some structures may require use of a vector truck. If so use the same procedures described for cleaning catch basins.
  
3. Clean-up
  - a. After cleaning basins, clean off the concrete pads using dry methods (sweeping and shoveling).
  - b. Make sure they are swept up and clean.
  - c. Take the material that was removed to the landfill for final disposal.
  
4. Documentation
  - a. Keep a logs of each detention basins/pond cleaned including date, individuals involved in cleaning, and a description of the type of debris removed.
  - b. Record the amount of waste collected.
  - c. Keep any notes or comments of any problems.

## STREETS/STORM DRAIN – Creek Management

1. Preparation
  - a. Monitor streams on a regular basis (Suggested interval?).
  - b. Check culverts and crossings after every storm.
  - c. Maintain access to stream channels wherever possible.
  - d. Identify areas requiring maintenance
  - e. Determine what manpower or equipment will be required.
  - f. Identify access and easements to area requiring maintenance.
  - g. Determine method of maintenance that will be least damaging to the channel.
  - h. Obtain Stream Alteration Permit.
  
2. Process
  - a. Remove unwanted material (debris, branches, soil) from the creek channel and place it in a truck to be hauled away
  
3. Clean-up
  - a. Stabilize all disturbed soils.
  - b. Remove all tracking from paved surfaces near maintenance site, if applicable.
  - c. Haul all debris or sediment removed from area to approved dumping site.
  
4. Documentation
  - a. Keep log of actions performed including date and individuals involved.
  - b. Record the amount of materials removed or imported.
  - c. Keep any notes or comments of any problems.
  - d. Use “before” and “after” photographs to document activities as applicable.

## STREETS/STORM DRAIN – Ditch Management

1. Preparation
  - a. Monitor ditches on a regular basis (Suggested interval?).
  - b. Maintain access to ditch channels wherever possible.
  - c. Contact affected property owners and utility owners.
  
2. Process
  - a. Identify areas requiring maintenance
  - b. Determine what manpower or equipment will be required.
  - c. Identify access and easements to area requiring maintenance.
  - d. Determine method of maintenance that will be least damaging to the channel and adjacent properties or utilities.
  
3. Clean-up
  - a. Stabilize all disturbed soils.
  - b. Remove all tracking from paved surfaces near maintenance site, if applicable.
  - c. Haul all debris or sediment removed from area to approved dumping site.
  
4. Documentation
  - a. Keep log of actions performed including date and individuals involved.
  - b. Record the amount of materials removed or imported.
  - c. Keep any notes or comments of any problems.
  - d. Use “before” and “after” photographs to document activities as applicable.

## STREETS/STORM DRAIN – Chip Seal

1. Preparation
  - a. Clean and dry areas where materials are to be applied.
  - b. Apply temporary covers to manholes and catch basins to prevent oil and materials from getting inside of them.
  
2. Process
  - a. Apply emulsion at recommended rate.
  - b. Spread chips closely behind emulsion distributor, slowly such that the chips do not roll when they hit the surface.
  - c. Roll chips. Rollers follow closely behind the chip spreader. Roll entire surface twice.
  - d. Maximum speed 5 mph.
  
3. Clean-up
  - a. All loose aggregate is removed from the roadway by sweeping it up (see SOP for Street Sweeping).
  - b. Excessive asphalt applications and spills are removed with shovels and scraping tools.
  - c. Remove the temporary covers from manholes and catch basins. If it appears that any chip seal materials have gotten into the inlet boxes, remove the material according to the SOP for inlet boxes.
  - d. Dispose of the waste material that has been swept and scraped up by taking it to the landfill.
  
4. Documentation
  - a. Record location and date on the maintenance database and map



## STREETS/STORM DRAIN – Slurry Seal

1. Preparation
  - a. Remove weeds from the roads. Sweep areas where materials are to be applied, and allow to dry, if necessary. Verify that existing pavement has been inspected for detrimental effects of poor drainage.
  - b. Cover/protect catch basins and manholes.
  
2. Process
  - a. Apply materials in a smooth and uniform manner. Slurry material should not run onto adjacent pavement surface, curb and gutter or waterways.
  
3. Clean-up
  - a. If loose aggregate is remaining in street or curb, sweep it up.
  - b. Ensure that excess emulsion materials are removed from the site and stored for later use in an area or container that is not exposed to the weather.
  - c. Remove covers/protection from catch basins and manholes, and valves.
  
4. Documentation
  - a. Record location and date on the maintenance database and map

## STREETS/STORM DRAIN – Overlays and Patching

1. Preparation
  - a. Measure and mark locations of manholes and valves on the curb
  - b. Manholes and catch basins are covered as needed to prevent oil and materials from getting inside the structures or system.
  - c. Cracks should be properly sealed. Alligator cracks and potholes should be removed and patched. Rutting should be milled.
  - d. Surface should be clean and dry.
  - e. Uniform tack coat applied and cured prior to placement of overlay.
  - f. If milling is required, install inlet protection as needed.
  
2. Process
  - a. Check hot asphalt mix for proper temperature, percentage asphalt, gradation, air voids and any other agency requirements.
  - b. Raise manhole lids and valves to elevation of new asphalt surface with riser rings.
  - c. Surface texture should be uniform, no tearing or scuffing.
  - d. Rolling should be done to achieve proper in-place air void specification.
  
3. Clean-up
  - a. Covering should be removed as soon as the threat of imported materials entering the system is reduced and prior to a storm event.
  - b. After pavement has cooled, sweep gutters to remove loose aggregate.
  
4. Documentation
  - a. Record location and date on the maintenance database and map

## **STREETS/STORM DRAIN – Crack Seal**

1. Preparation
  - a. Cover Manholes and catch basins to prevent oil and materials from getting inside the structures or system.
  - b. Remove weeds from the road
  - c. Air-blast the cracks to remove sediments from the crack to allow for proper adhesion.
  - d. Ensure that surface is clean and dry.
  
2. Process
  - a. Proper temperature of material should be maintained.
  - b. Sufficient material is applied to form the specified configuration.
  
3. Clean-up
  - a. Excessive sealant application or spills are removed.
  - b. Sweep all loose debris from the pavement and dispose of it in the local landfill.
  
4. Documentation
  - a. Record location and date on the maintenance database and map

## **STREETS/STORM DRAIN – Shouldering and Mowing**

1. Preparation
  - a. Set up temporary traffic control devices according to part VI of the MUTCD.
  
2. Process
  - a. Place import material as needed and perform grading to achieve proper drainage.
  - b. Mulch clippings to help reduce the amount of supplemental fertilizer required
  
3. Clean-up
  - a. Clean any loose material off asphalt or gutter.
  
4. Documentation
  - a. Record location and date on the maintenance database and map

## STREETS/STORM DRAIN – Secondary Road Maintenance

1. Preparation
  - a. Determine length amount and type of roadbase or gravel that will be needed.
  - b. Determine proper equipment to be used and or any safety hazards.
  - c. Design proper drainage: slopes, berms etc.
  
2. Process
  - a. Have truck drivers follow a designated route for hauling in the soil (See SOP for transporting Soil and Gravel).
  - b. If soil is too dry to achieve compaction, loosen surface material and moisture condition.
  - c. Smooth or grade soil with the desired crown or cross-slope.
  - d. Compact soil.
  
3. Clean-up
  - a. Replace filter fabric with washed rock (if necessary) on monthly maintenance.
  - b. Clean up equipment according to the SOP for Cleaning Equipment
  - c. Clean up any debris on traveled roads, and dispose of it in the landfill.
  
4. Documentation
  - a. Fill out daily activity report in log book or journal. Include Date, time, personnel, and location.

## STREETS/STORM DRAIN – Concrete Work

1. Preparation
  - a. Train employees and contractors in proper concrete waste management.
  - b. Store dry and wet materials under cover, away from drainage areas
  - c. Remove any damaged concrete that may need to be replaced.
  - d. Prepare and compact sub-base.
  - e. Set forms and place any reinforcing steel that may be required.
  - f. Determine how much new concrete will be needed.
  - g. Locate or construct approved concrete washout facility.
  
2. Process
  - a. Install inlet protection as needed.
  - a. Avoid mixing excess amounts of fresh concrete on-site.
  - b. Moisten subbase just prior to placing new concrete. This helps keep the soil from wicking moisture out of the concrete into the ground.
  - c. Place new concrete in forms.
  - d. Consolidate new concrete
  - e. Screed off surface
  - f. Let concrete obtain its initial set
  - g. Apply appropriate surface finish
  - h. Remove forms when concrete will not slump
  
3. Clean-up
  - a. Perform washout of concrete trucks and equipment in designated areas only
  - b. Do not washout concrete trucks or equipment into stormdrains, open ditches, streets or streams
  - c. Cement and concrete dust from grinding activities is swept up and removed from the site.
  - d. Remove dirt or debris from street and gutter.

## STREETS/STORM DRAIN – Garbage Storage

1. Preparation
  - a. Locate dumpsters and trash cans with lids in convenient, easily observable areas.
  - b. Provide properly-labeled recycling bins to reduce the amount of garbage disposed.
  - c. Provide training to employees to prevent improper disposal of general trash.
  
2. Process
  - a. Inspect garbage bins for leaks regularly, and have repairs made immediately by responsible party.
  - b. Locate dumpsters on a flat, impervious surface that does not slope or drain directly into the storm drain system.
  - c. Install berms, curbing or vegetation strips around storage areas to control water entering/leaving storage areas.
  - d. Keep lids closed when not actively filling dumpster.
  
3. Clean-up
  - a. Keep areas around dumpsters clean of all garbage.
  - b. Have garbage bins emptied as often as needed to keep from overfilling.
  - c. Wash out bins or dumpsters as needed to keep odors from becoming a problem. Wash out in properly designated areas only.

## **STREETS/STORM DRAIN – Snow Removal and De-icing**

1. Preparation
  - a. Store de-icing material under a covered storage area or in an area where water coming off the de-icing materials is collected and delivered to the sanitary sewer or reused as salt brine.
  - b. Slope loading area away from storm drain inlets
  - c. Design drainage from loading area to collect runoff before entering storm water system
  - d. Wash out vehicles (if necessary) in approved washout area before preparing them for snow removal.
  - e. Calibrate spreaders to minimize amount of de-icing material used and still be effective
  - f. Provide vehicles with spill cleanup kits in case of hydraulic line rupture or other spills
  - g. Train employees in spill cleanup procedures and proper handling and storage of de-icing materials
  
2. Process
  - a. Load material into trucks carefully to minimize spillage
  - b. Periodically dry sweep loading area to reduce the amount of de-icing materials exposed to runoff
  - c. Distribute the minimum amount of de-icing material to be effective on roads
  - d. Do not allow spreaders to idle while distributing de-icing materials.
  - e. Park trucks loaded with de-icing material inside when possible
  
3. Cleanup
  - a. Sweep up all spilled de-icing material around loading area
  - b. Clean out trucks after snow removal duty in approved washout area
  - c. Provide maintenance for vehicles in covered area
  - d. If sand is used in de-icing operations, sweep up residual sand from streets when weather permits



## STREETS/STORM DRAIN – Street Sweeping

4. Preparation
  - a. Prioritize cleaning routes to use at the highest frequency in areas with the highest pollutant loading.
  - b. Restrict street parking prior to and during sweeping using regulations as necessary
  - c. Increase sweeping frequency just before the rainy season, unless sweeping occurs continuously throughout the year.
  - d. Perform preventative maintenance and services on sweepers to increase and maintain their efficiency
  
5. Process
  - a. Streets are to be swept as needed or specified by the city. Street maps are used to ensure all streets are swept at a specified interval
  - b. Drive street sweeper safely and pickup debris
  - c. When full, take the sweeper to an approved street sweeper cleaning station.
  
6. Clean-up
  - a. Street sweepers are to be cleaned out in an approved street sweeper cleaning station
  - b. Street sweeping cleaning stations shall separate the solids from the liquids.
  - c. Once solids have dried out, haul them to the local landfill
  - d. Decant water is to be collected and routed to an approved wastewater collection system area only.
  - e. Haul all dumped material to the landfill.
  
7. Documentation
  - a. Keep accurate logs to track streets swept and streets still requiring sweeping.
  - b. Log the amount of debris collected and hauled off.

## STREETS/STORM DRAIN – Transporting Soil and Gravel

1. Preparation
  - a. Dry out wet materials before transporting.
  - b. Spray down dusty materials to keep from blowing.
  - c. Make sure you know and understand the SWPPP requirements for the site you will be working at.
  - d. Determine the location that the truck and other equipment will be cleaned afterwards
  
2. Process
  - a. Use a stabilized construction entrance to access or leave the site where materials are being transported to/from.
  - b. Cover truck bed with a secured tarp before transporting.
  - c. Follow the SWPPP requirements for the specific site to/from which the materials are being hauled.
  - d. Make sure not to overfill materials when loading trucks.
  
3. Clean up
  - a. Use sweeper to clean up any materials tracked out on the roads from site.
  - b. Wash out truck and other equipment when needed in properly designated areas.
  
4. Documentation
  - a. Keep records of any material that is tracked out of site and what was done to clean it up and how long it took to clean up and what the weather conditions were at the time.

## VEHICLES – Fueling

1. Preparation
  - a. Train employees on proper fueling methods and spill cleanup techniques.
  - b. Install a canopy or roof over aboveground storage tanks and fuel transfer areas.
  - c. Absorbent spill clean-up materials and spill kits shall be available in fueling areas and on mobile fueling vehicles and shall be disposed of properly after use.
2. Process
  - a. Shut off the engine.
  - b. Ensure that the fuel is the proper type of fuel for the vehicle.
  - c. Nozzles used in vehicle and equipment fueling shall be equipped with an automatic shut off to prevent overfill.
  - d. Fuel vehicle carefully to minimize drips to the ground.
  - e. Fuel tanks shall not be ‘topped off’.
  - f. Mobile fueling shall be minimized. Whenever practical, vehicles and equipment shall be transported to the designated fueling area in the Facilities area.
  - g. When fueling small equipment from portable containers, fuel in an area away from storm drains and water bodies.
3. Clean Up
  - a. Immediately clean up spills using dry absorbent (e.g., kitty litter, sawdust, etc.) sweep up absorbent material and properly dispose of contaminated clean up materials.
  - b. Large spills shall be contained as best as possible and the HazMat team should be notified ASAP.
4. Records
  - a. Comply with underground storage tank records and monitoring requirements.
  - b. Document training of employees.

## VEHICLES – Vehicle and Equipment Storage

1. Preparation
  - a. Inspect parking areas for stains/leaks on a regular basis.
  - b. Provide drip pans or adsorbents for leaking vehicles.
2. Process
  - a. Whenever possible, store vehicles inside where floor drains have been connected to sanitary sewer system.
  - b. When inside storage is not available, Vehicles and equipment will be parked in the approved designated areas.
  - c. Maintain vehicles to prevent leaks as much as possible.
  - d. Address any known leaks or drips as soon as possible. When a leak is detected a drip pan will be placed under the leaking vehicle to collect the drip.
  - e. The shop will provide a labeled location to empty and store drip pans.
  - f. If any leaks are discovered, a drip pan will be used to collect the fluids and vehicle will be scheduled for repairs.
  - g. Clean up all spills using dry methods.
  - h. Never store leaking vehicles over a storm drain.
3. Clean Up
  - a. Any leaks that are spilled on the asphalt will be cleaned up with dry absorbent; the dry absorbent will be swept up and disposed of in the garbage.
  - b. The paved surfaces around the building will be swept every two weeks, weather permitting.

## VEHICLES – Washing

1. Preparation
  - a. Provide wash areas for small vehicles inside the maintenance building that has a drain system which is attached to the sanitary sewer system.
  - b. Provide wash areas for large vehicles on an approved outside wash pad that has a drain system which is attached to the sanitary sewer system.
  - c. No vehicle washing will be done where the drain system is connected to the storm sewer system.
2. Process
  - a. Minimize water and soap use when washing vehicles inside the shop building.
  - b. Soap should not be used when washing vehicles outside the shop building. Water Only.
  - c. Use hoses with automatic shut off nozzles to minimize water usage.
  - d. When washing outside the building, it is the operators' responsibility to make sure all wash water is contained on the wash pad and does not have access to the storm drain.
  - e. Never wash vehicles over or a storm drain.
3. Clean Up
  - a. Sweep wash areas after every washing to collect what solids can be collected to prevent them from washing down the drain system.
  - b. Clean solids from the settling pits on an as needed basis.

## **WATER – Planned Waterline Excavation Repair/Replacement**

1. Preparation
  - a. Determine where discharge flow will go
  - b. Place inlet protection at nearest downstream storm drain inlet
  - c. Clean Gutters leading to inlet
  - d. Isolate waterline to be worked on
  - e. Neutralize any chlorine residual before discharging water
  
2. Process
  - a. Make efforts to keep water from pipeline from entering the excavation
  - b. Direct any discharge to pre-determined area
  - c. Backfill and compact excavation
  - d. Haul of excavated material or stock pile nearby
  
3. Clean up
  - a. Clear gutter/waterway where water flowed
  - b. Clean up all areas around excavation
  - c. Clean up travel path of trucked material
  
4. Documentation
  - a. Complete paperwork

## **WATER – Unplanned Waterline Excavation Repair/Replacement**

1. Preparation
  - a. Make sure service trucks have wattles, gravel bags, or other materials for inlet protection.
  
2. Process
  - a. Slow the discharge.
  - b. Inspect flow path of discharged water
  - c. Protect water inlet areas
  - d. Follow planned repair procedures.
  - e. Haul off spoils of excavation
  - f. Consider use of silt filter bags on pumps
  
3. Clean-up
  - a. Repair eroded areas as needed
  - b. Follow planned repair procedures
  - c. Clean up the travel path of trucked excavated material

## **WATER – Transporting Dry Excavated Materials & Spoils**

1. Preparation
  - a. Utilize truck with proper containment of materials
  - b. Determine disposal site of excavated materials
  
2. Process
  - a. Load
  - b. Check truck after loading for possible spillage
  - c. Transport in manner to eliminate spillage & tracking
  - d. Utilize one route for transporting
  
3. Clean-up
  - a. Clean loading area
  - b. Clean transporting route
  - c. Wash off truck and other equipment in a designated equipment cleaning area



## **WATER – Transporting Wet Excavated Materials & Spoils**

1. Preparation
  - a. Utilize truck with containment for material
  - b. Determine disposal site of excavated material
  
2. Process
  - a. Load and Transport in manner to minimize spillage & tracking of material
  - b. Check truck for spillage
  - c. Utilize one route of transport
  
3. Clean-up
  - a. Clean route of transport to provide cleaning of any spilled material
  - b. Wash out equipment truck and other equipment in designated wash area

## **WATER – Waterline Flushing for Routine Maintenance**

1. Preparation
  - a. Determine flow path of discharge to inlet of waterway.
  - b. Determine chlorine residual
  - c. Neutralize chlorine residual
  
2. Process
  - a. Clean flow path.
  - b. Protect inlet structures.
  - c. Use diffuser to dissipate pressure to reduce erosion possibilities.
  
3. Clean-up
  - a. Clean flow path
  - b. Remove inlet protection .
  
4. Documentation
  - a. Residual tests of discharge water.

## **WATER – Waterline Flushing after Construction/System Disinfection with Discharge to Storm Drain**

1. Preparation
  - a. Determine chlorine content of discharged water, and select de-chlorination equipment to be used.
  - b. Determine flow path of discharge.
  
2. Process
  - a. Protect inlets in flow path
  - b. Install de-chlorination equipment
  - c. Sweep and clean flow path
  - d. Use diffuser to reduce velocities
  
3. Clean-up
  - a. Pick up inlet protection
  - b. Clean flow paths
  - c. Remove equipment from flush point
  
4. Documentation
  - a. Residual test of discharged water

**WATER – Waterline Flushing after Construction/System Disinfection with Discharge with Haul Off (Used for Dust Control/Compaction)**

1. Preparation
  - a. Determine chlorine content of discharged water
  - b. Determine appropriate construction activity for treatment
  
2. Process
  - a. Flush to tanker for disposal on unpaved construction activity for dust control or compaction
  - b. Conform that application of water is in appropriate location
  
3. Clean-up
  - a. Remove equipment from flush point
  
4. Documentation
  - a. Residual test of discharged water
  - b. Location of water discharged

## WATER – Chemical Handling/Transporting and Spill Response

1. Preparation
  - a. Understand MSDS sheets for handling of product
  - b. Determine proper place of handling
  - c. Have necessary containment and spill kits at handling place
  
2. Process
  - a. Begin transfer process
  - b. Discontinue operations if spill levels occurs
  - c. Disconnect and store handling equipment
  
3. Clean-up
  - a. Clean up spills with proper material
  - b. Dispose of contaminated material at appropriate facility
  
4. Documentation
  - a. Report spills to Davis County
    - 5 gallons of hydro fluoride acid
    - Work hours      451-3296
    - After hours      451-4151      Davis County dispatch



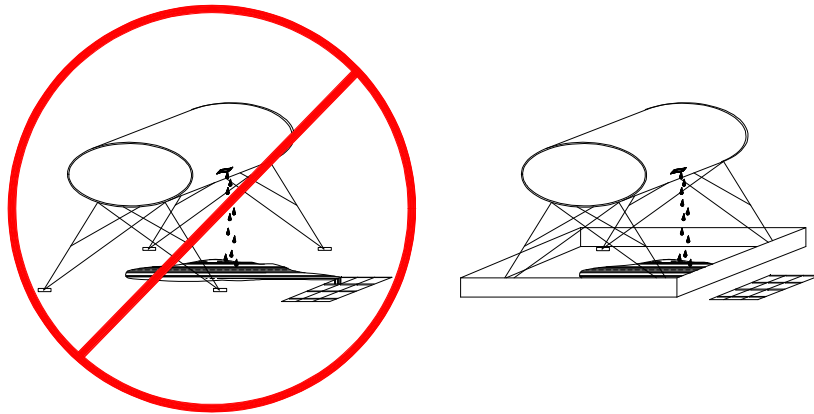
Best Management Practices  
(BMPs)

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# APPENDIX I







**PROGRAM ELEMENTS**

- New Development
- Residential
- Commercial Activities
- Industrial Activities
- Municipal Facilities
- Illegal Discharges

**DESCRIPTION:**

Prevent or reduce the discharge of pollutants to stormwater from aboveground storage tanks by installing safeguards against accidental releases, installing secondary containment, conducting regular inspections, and training employees in standard operating procedures and spill cleanup techniques.

The most common causes of unintentional releases are:

- < Installation problems,
- < Failure of piping systems (pipes, pumps, couplings, hoses, and valves),
- < External corrosion and structural failure,
- < Spills and overfills due to operator error, and
- < Leaks during pumping of liquids or gases from a truck to a storage tank or vice versa.

**APPROACH:**

- < Integrate efforts with existing aboveground petroleum storage tank programs through the local Fire Department and Health Department, and area and business emergency response plans through the City, County, or Fire District.
- < Use engineering safeguards to reduce the chance for spills.
- < Perform regular maintenance.

**LIMITATIONS:**

For larger spills, a private spill clean-up company or Hazmat team may be necessary.

**MAINTENANCE:**

Maintenance is critical to preventing leaks and spills. Conduct routine weekly inspections and:

- < Check for external corrosion and structural failure,
- < Check for spills and overfills due to operator error,
- < Check for failure of piping system (pipes, pumps, flanger, coupling, hoses, and valves),
- < Check for leaks or spills during pumping of liquids or gases from truck to storage facility or vice versa.
- < Periodically, integrity testing should be conducted by a qualified professional.

**TARGETED POLLUTANTS**

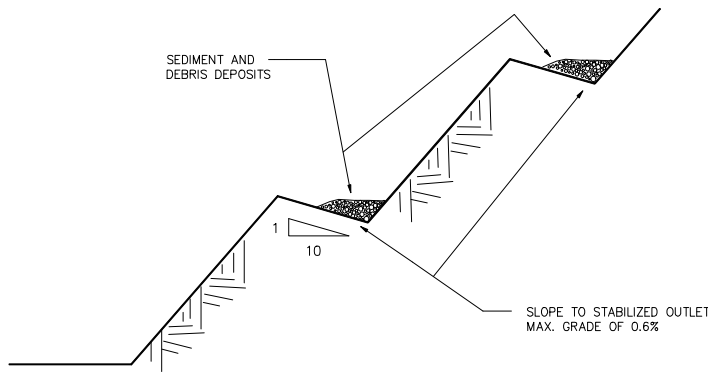
- Sediment
- Nutrients
- Heavy Metals
- Toxic Materials
- Oxygen Demanding Substances
- Oil & Grease
- Floatable Materials
- Bacteria & Viruses

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Regulatory
- Training
- Staffing
- Administrative

- High     Medium     Low



**OBJECTIVES**

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

**DESCRIPTION:**

Slope construction with benches spaced at regular intervals perpendicular to the slope which intercept and collect sheet flow and direct it to a stable outfall point.

**APPLICATION:**

- Unstabilized cut and fill slopes
- Large stockpiles
- Existing unstable slopes

**INSTALLATION/APPLICATION CRITERIA:**

- Benches should be formed as slope is constructed and graded to the outlet point.
- Stabilized outlet with sediment controls should be in place prior to slope construction.

**LIMITATIONS:**

- Construction slope design must accommodate benching
- Not appropriate for sandy or rocky soil
- Only effective if suitable outlet provided

**MAINTENANCE:**

- Inspect after major storm events and at least biannually, repair any damaged areas
- Remove debris blocking water flow
- Inspect outlet, repair/replace sediment controls and remove sediment build up.

**TARGETED POLLUTANTS**

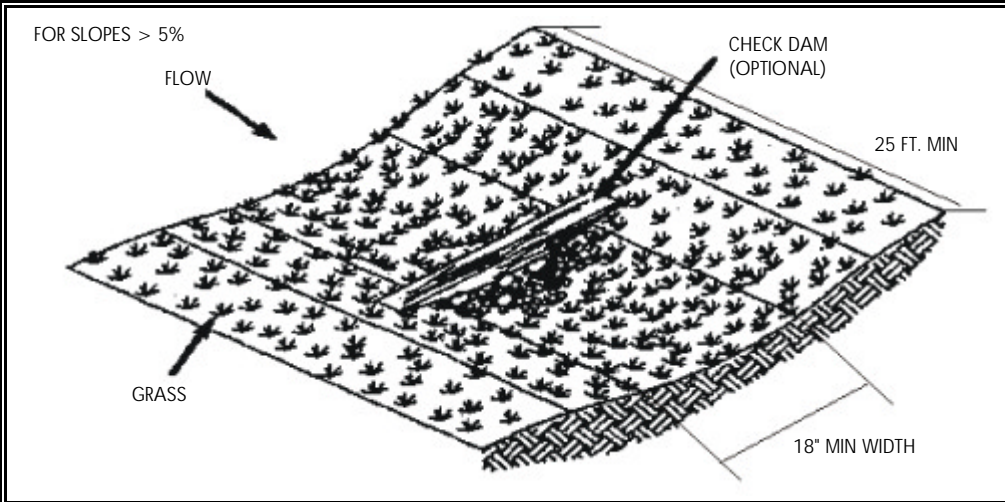
- Sediment
- Nutrients
- Toxic Materials
- Oil & Grease
- Floatable Materials
- Other Waste

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High     Medium     Low



**DESCRIPTION:**

Biofilters are of two general types: vegetated channel and vegetated filter strip. The vegetated channel is sloped like a standard storm drain channel; the stormwater is treated as it passes through the channel. With filter strips the flow is distributed broadly along the width of the vegetated area.

**APPLICATION:**

- < Comparable performance to wet ponds and constructed wetlands.
- < Limited to treating a few acres.

**INSTALLATION/APPLICATION CRITERIA:**

- < Limited to treating a few acres and availability of water during dry season.
- < The surface area must be defined.
- < The minimum width for a swale is determined by Mannings Equation.
- < Minimum length of a strip is 10 feet.
- < The longitudinal slope must not exceed 5%.
- < Use a flow spreader and energy dissipator at the entrance of a swale.
- < Good soils are important to achieve good vegetation cover.

**LIMITATIONS:**

- < Poor performance has occurred but this appears to be due to poor design.
- < May be limited to areas where summer irrigation is feasible.
- < Can be difficult to maintain sheet flow in strips.
- < Can be difficult to avoid channelization in swales.
- < Cannot be placed on steep slope.
- < Area required may make infeasible on industrial sites.
- < Proper maintenance required to maintain health and density of vegetation.
- < Limited to treating a few acres and availability of water during dry season.

**MAINTENANCE:**

- < Make sure soils are suitable for healthy vegetation.
- < Level cross-section and even longitudinal slope for swales.
- < Any damage to the channel such as rutting must be repaired with suitable soil, properly tamped and seeded.

**CONSIDERATIONS**

- Soils
- Area Required
- Slope
- Water Availability
- Aesthetics
- Hydraulic Head
- Environmental Side Effects

**TARGETED POLLUTANTS**

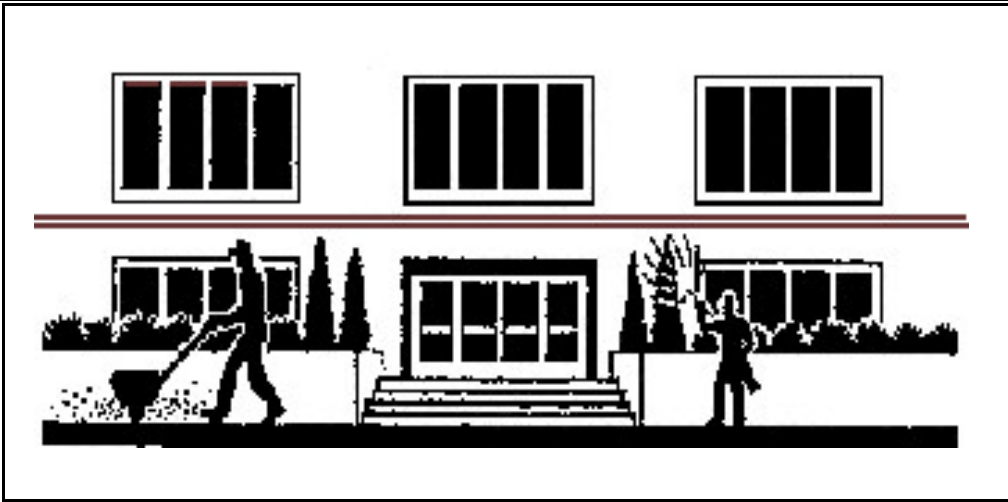
- Sediment
- Nutrients
- Heavy Metals
- Toxic Materials
- Oxygen Demanding Substances
- Oil & Grease
- Floatable Materials
- Bacteria & Viruses

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High
- Medium
- Low



**DESCRIPTION:**

Prevent or reduce the discharge of pollutants to stormwater from buildings and grounds maintenance by washing and cleaning up with as little water as possible, preventing and cleaning up spills immediately, and maintaining the stormwater collection system.

**APPROACH:**

- < Preserve existing native vegetation to reduce water, fertilizer, and pesticide needs.
- < Carefully use pesticides and fertilizers in landscaping.
- < Take care in over-watering landscape sites to reduce the risk of discharge of water contaminated with nutrients and pesticides.
- < Integrate pest management where appropriate.
- < Sweep paved surfaces.
- < Clean the storm drainage system at appropriated intervals, includes marking storm drain inlets to minimize the dumping of inadvertent liquids.
- < Properly dispose wash water, sweepings, and sediments.
- < Take care of landscaped areas around the facility.
- < Clean parking lots and areas other than industrial activity.
- < Clean all catch basins in parking lots every 6 to 12 months or whenever the sump is full.
- < Sweeping, either vacuum or mechanical, is the most appropriate BMP for cleaning parking lots and basins.

**LIMITATIONS:**

Alternative pest/weed controls may not be available, suitable or effective in every case.

**MAINTENANCE:**

The BMPs themselves relate to maintenance and do not require maintenance as they do not involve structures.

**PROGRAM ELEMENTS**

- New Development
- Residential
- Commercial Activities
- Industrial Activities
- Municipal Facilities
- Illegal Discharges

**TARGETED POLLUTANTS**

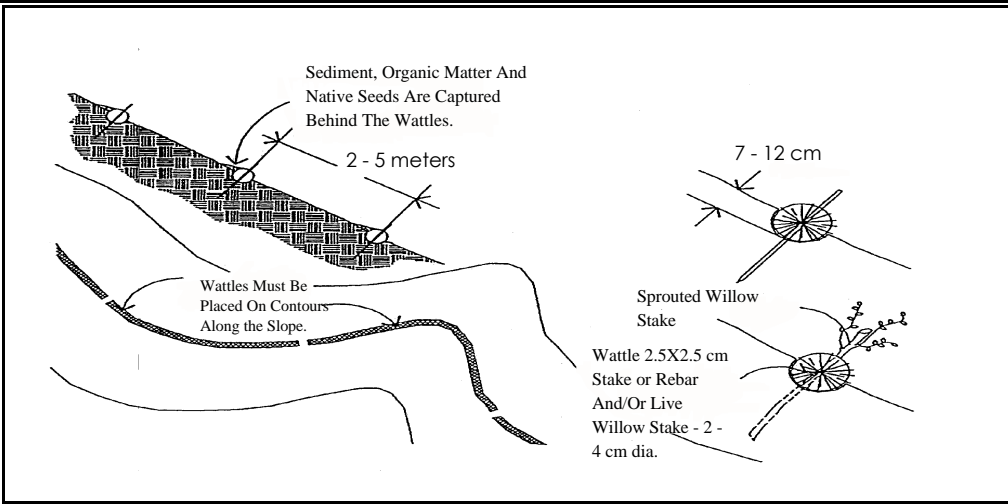
- Sediment
- Nutrients
- Heavy Metals
- Toxic Materials
- Oxygen Demanding Substances
- Oil & Grease
- Floatable Materials
- Bacteria & Viruses

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Regulatory
- Training
- Staffing
- Administrative

- High     Medium     Low



- OBJECTIVES**
- Housekeeping Practices
  - Contain Waste
  - Minimize Disturbed Areas
  - Stabilize Disturbed Areas
  - Protect Slopes/Channels
  - Control Site Perimeter
  - Control Internal Erosion

**GENERAL DESCRIPTION:**

Bioengineering methods combine vegetative and mechanical techniques to stabilize eroding slopes. Bioengineering methods include sprigging, tubeling, and wattling. Sprigging involves planting rhizomes, stolons, shoots, or sprouts of a desirable species. Tubelings are forbs, shrubs, or trees commercially available in reusable plastic tubes or sleeves. Wattles are bundles of cuttings from live willows, alders, or similar plants placed and secured in trenches across a slope to aid in slope stabilization.

**APPLICATIONS:**

- < Sprigging may be performed on cut and fill slopes or other areas needing permanent soil stability.
- < Tubelings may be placed on any area needing revegetation, but are most useful on slopes or flat areas where poor topsoil conditions inhibit successful seed germination and early plant growth.
- < Wattlings act to reduce slope length and aid in stabilizing slopes due to surface runoff, frost heaving, needle ice, or other soil movement.

**INSTALLATION/APPLICATION CRITERIA:**

- < Sprigging involves tearing sod apart, planting rhizomes or stolons, or transplanting shoots or sprouts. Sprigs are placed by broadcast, punching-in or with a special sprig planter.
- < Tubelings involve drilling holes to the depth necessary to accommodate roots.
- < Wattles are best applied to slopes no steeper than 2:1.

**LIMITATIONS:**

- < Availability of plant materials may affect what species can be used.
- < May be necessary to arrange for commercially grown tubelings.
- < Cannot be used as a substitute for retaining walls or similar devices to stabilize oversteepened slopes.

**MAINTENANCE:**

- < Sprigging and tubeling plantings should be checked periodically until they are permanently established.
- < Assess the need for replacement plantings or supplemental fertilizer.
- < The wattlings should be inspected at regular intervals to make sure bundles are still secure and check for sprouting of the wattling material.

**TARGETED POLLUTANTS**

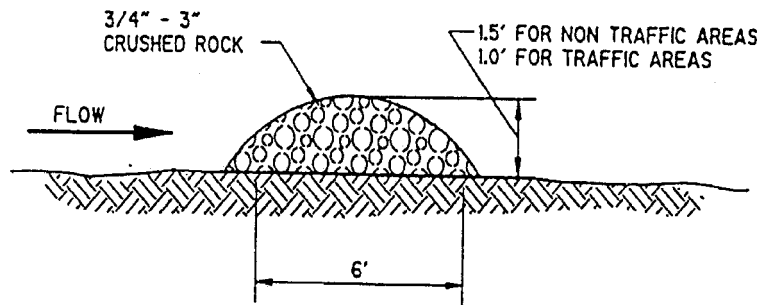
- Sediment
- Nutrients
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- Floatable Materials
- Other Waste

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High
- Medium
- Low



**OBJECTIVES**

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

**DESCRIPTION:**

A rock filter is made of rock 3/4 - 3" in diameter and placed along a level contour. A brush filter is composed of brush (usually obtained during the site clearing) wrapped in filter cloth and anchored to the toe of the slope. If properly anchored brush or rock filters may be used for sediment trapping and velocity reduction.

**APPLICATION:**

- < As check dams across mildly sloped construction roads.
- < Below the toe of slopes.
- < Along the site perimeter.
- < In areas where sheet or rill flow occurs.
- < Around temporary spoil areas.
- < At sediment traps or culvert/pipe outlets.

**INSTALLATION/APPLICATION CRITERIA:**

- < For rock filter, use larger rock and place in a staked, woven wire sheathing if placed where concentrated flows occur.
- < Install along a level contour.
- < Leave area behind berm where runoff can pond and sediment can settle.
- < Drainage areas should not exceed 5 acres.

**LIMITATIONS:**

- < Rock berms may be difficult to remove.
- < Removal problems limit their usefulness in landscaped areas.
- < Runoff will pond upstream of the filter, possibly causing flooding if sufficient space does not exist.

**MAINTENANCE:**

- < Inspect monthly after each rainfall.
- < If berm is damaged, reshape and replace lost/dislodged rock.
- < Remove sediment when depth reaches 1/3 of berm height, or 1 ft.

**TARGETED POLLUTANTS**

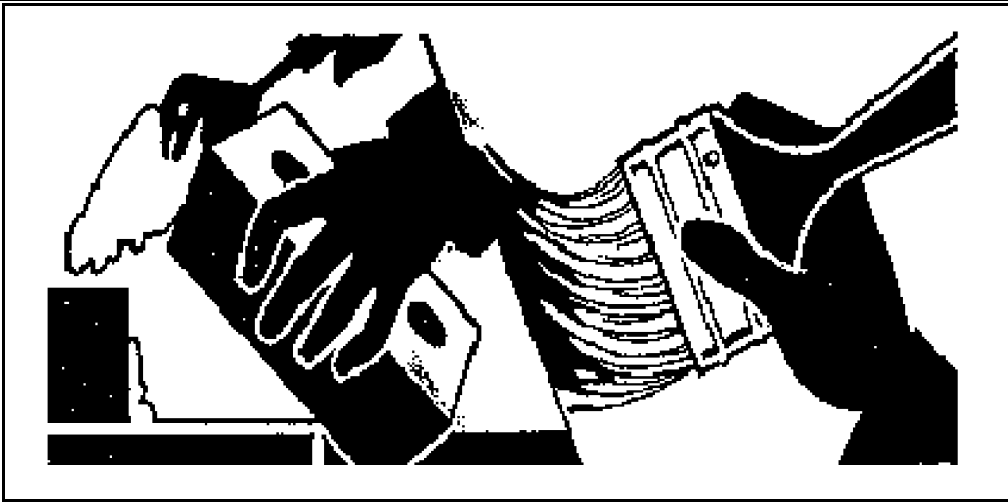
- Sediment
- Nutrients
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- Oil & Grease
- Floatable Materials
- Other Waste

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High
- Medium
- Low



**PROGRAM ELEMENTS**

- New Development
- Residential
- Commercial Activities
- Industrial Activities
- Municipal Facilities
- Illegal Discharges

**DESCRIPTION:**

Prevent or reduce the discharge of pollutants to stormwater from building repair, remodeling and construction by using soil erosion controls, enclosing or covering building material storage areas, using good housekeeping practices, using safer alternative products, and training employees.

**APPROACH:**

- < Use soil erosion control techniques if bare ground is temporarily exposed.
- < Use permanent soil erosion control techniques if the remodeling clears buildings that are not to be replaced.
- < Enclose painting operations consistent with local air quality regulations and OSHA.
- < Properly store materials that are normally used in repair and remodeling such as paints and solvents.
- < Properly store and dispose waste materials generated from the activity.
- < Maintain good housekeeping practices while work is underway.

**LIMITATIONS:**

- < This BMP is for minor construction only.
- < Hazardous waste that cannot be re-used or recycled must be disposed of by a licensed hazardous waste hauler.
- < Safer alternative products may not be available, suitable, or effective in every case.
- < Be certain that actions to help stormwater quality are consistent with OSHA and air quality regulations.

**TARGETED POLLUTANTS**

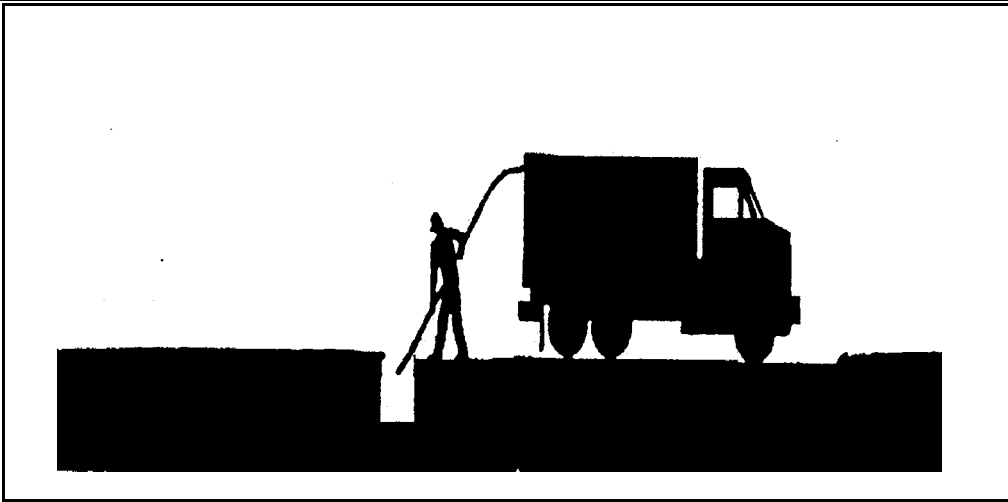
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- Nutrients
- Heavy Metals
- Toxic Materials
- Oxygen Demanding Substances
- Oil & Grease
- Floatable Materials
- Bacteria & Viruses

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- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Regulatory
- : Training
- : Staffing
- : Administrative

- High     Medium     Low



**DESCRIPTION:**

Maintain catch basin and stormwater inlets on a regular basis to remove pollutants, reduce high pollutant concentrations during the first flush of storms, prevent clogging of the downstream conveyance system, and restore the catch basins' sediment trapping capacity. A catch basin is distinguished from a stormwater inlet by having at its base a sediment sump designed to catch and retain sediments below the overflow point. This information sheet focuses on the cleaning of accumulated sediments from catch basins.

**APPROACH:**

Regular maintenance of catch basins and inlets is necessary to ensure their proper functioning. Clogged catch basins are not only useless but may act as a source of sediments and pollutants. In general, the key to effective catch basins are:

- < At least annual inspections.
- < Prioritize maintenance to clean catch basins and inlets in areas with the highest pollutant loading.
- < Clean catch basins in high pollutant load areas just before the wet season to remove sediments and debris accumulated during the summer.
- < Keep accurate logs of the number of catch basins cleaned.
- < Record the amount of waste collected.

**LIMITATIONS:**

There are no major limitations to this best management practice.

**MAINTENANCE:**

Regular maintenance of public and private catch basins and inlets is necessary to ensure their proper functioning. Clogged catch basins are not only useless but may act as a source of sediments and pollutants. In general, the keys to effective catch basins are:

- < Annual/monthly inspection of public and private facilities to ensure structural integrity, a clean sump, and a stenciling of catch basins and inlets.
- < Keep logs of the number of catch basins cleaned.
- < Record the amount of waste collected.

**PROGRAM ELEMENTS**

- New Development
- Residential
- Commercial Activities
- Industrial Activities
- Municipal Facilities
- Illegal Discharges

**TARGETED POLLUTANTS**

- Sediment
- Nutrients
- Heavy Metals
- Toxic Materials
- Oxygen Demanding Substances
- Oil & Grease
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- Bacteria & Viruses

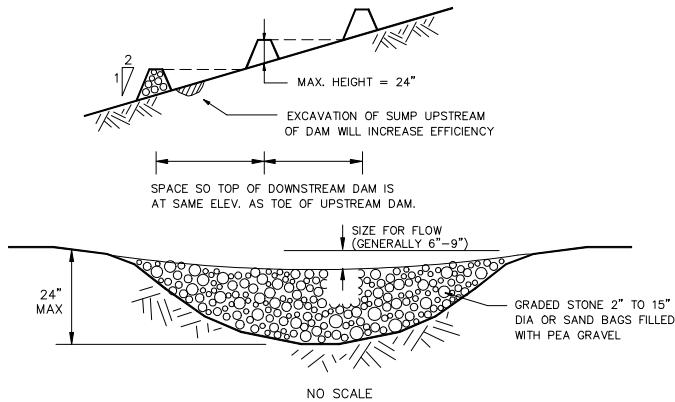
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- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Regulatory
- Training
- # Staffing
- Administrative

- High     Medium     Low





**OBJECTIVES**

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

**DESCRIPTION:**

A small, temporary dam constructed across a drainage ditch to reduce velocity of concentrated storm water flows, thereby reducing the erosion of the ditch.

**APPLICATION:**

- < Temporary drainage paths
- < Permanent drainage ways not yet stabilized
- < Existing drainage paths receiving increased flows due to construction

**INSTALLATION/APPLICATION CRITERIA:**

- < Prepare location of dam by removing any debris and rough grading any irregularities in channel bottom
- < Place rocks by hand or with appropriate machinery, do not dump
- < Construct dam with center lower to pass design flow
- < Construct 50% side slopes on dam

**LIMITATIONS:**

- < Maximum recommended drainage area is 10 acres
- < Maximum recommended height is 24"
- < Do not use in running stream

**MAINTENANCE:**

- < Inspect dams daily during prolonged rainfall, after each major rain event and at a minimum of once monthly.
- < Remove any large debris and repair any damage to dam, channel or sideslopes
- < Remove accumulated sediment when it reaches one half the height of the dam

**TARGETED POLLUTANTS**

- Sediment
- Nutrients
- Toxic Materials
- Oil & Grease
- Floatable Materials
- Other Waste

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High
- Medium
- Low



**PROGRAM ELEMENTS**

- New Development
- Residential
- Commercial Activities
- Industrial Activities
- Municipal Facilities
- Illegal Discharges

**DESCRIPTION:**

Prevent or reduce the discharge of pollutants to stormwater from contaminated or erodible surface areas by leaving as much vegetation on-site as possible, minimizing soil exposure time, stabilizing exposed soils, and preventing stormwater runoff and runoff.

**APPROACH:**

This BMP addresses soils which are not so contaminated as to exceed criteria but the soil is eroding and carrying pollutants off in the stormwater.

Contaminated or erodible surface areas can be controlled by:

- < Preservation of natural vegetation,
- < Re-vegetation,
- < Chemical stabilization,
- < Removal of contaminated soils, or
- < Geosynthetics.

**LIMITATIONS:**

Disadvantages of preserving natural vegetation or re-vegetating include:

- < Requires substantial planning to preserve and maintain the existing vegetation.
- < May not be cost-effective with high land costs.
- < Lack of rainfall and/or poor soils may limit the success of re-vegetated areas.

Disadvantages of chemical stabilization include:

- < Creation of impervious surfaces.
- < May cause harmful effects on water quality.
- < Is usually more expensive than vegetative cover.

**MAINTENANCE:**

Maintenance should be minimal, except if irrigation of vegetation is necessary.

**TARGETED POLLUTANTS**

- Sediment
- Nutrients
- Heavy Metals
- Toxic Materials
- Oxygen Demanding Substances
- Oil & Grease
- Floatable Materials
- Bacteria & Viruses

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Regulatory
- Training
- Staffing
- Administrative

- High
- Medium
- Low



**CONSIDERATIONS**

- Soils
- Area Required
- Slope
- Water Availability
- Aesthetics
- Hydraulic Head
- Environmental Side Effects

**DESCRIPTION:**

Applying materials such as vinyl, asphalt, plastics, or rubber on an unprotected slope to temporarily stabilize the slope.

**APPLICATION:**

- < As a tacking agent to aid the stabilization of mulches (where matting is not used).
- < As a short-term alternative in areas where temporary seeding practices cannot be used because of seasonal condition or climate.
- < On steep and rocky slopes where neither mechanical methods or mulches and protective netting can be effectively applied.

**INSTALLATION/APPLICATION CRITERIA:**

- < The application rates and procedures recommended by the manufacturer of a chemical stabilization product should be followed to prevent the products from forming ponds and from creating large areas where moisture cannot get through.
- < For permanent application, chemical mulches (when used with seed and mulch) should be applied over wood fiber or straw mulch.

**LIMITATIONS:**

- < Chemical mulches can create impervious surfaces and impact water quality if not properly applied.
- < Some products may not be suitable for use near natural streams.

**MAINTENANCE:**

- < Inspect at regular intervals and after each runoff-producing storm event.
- < Replace chemical mulch as needed to ensure adequate level of coverage.

**TARGETED POLLUTANTS**

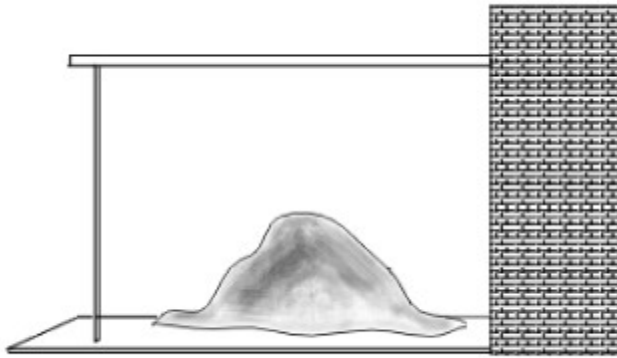
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- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High     Medium     Low



**APPLICATIONS**

- Manufacturing
- Material Handling
- Vehicle Maintenance
- Construction
- Commercial Activities
- Roadways
- Waste Containment
- Housekeeping Practices

**DESCRIPTION:**

Covering is the partial or total physical enclosure of materials, equipment, process operations, or activities. Covering certain areas or activities prevents stormwater from coming into contact with potential pollutants and reduces material loss from wind blowing. Tarpaulins, plastic sheeting, roofs, buildings, and other enclosures are examples of covering that are effective in preventing stormwater contamination. Covering can be temporary or permanent.

**APPROACH:**

- < Covering is appropriate for outdoor material storage piles (e.g., stockpiles of dry materials, gravel, sand, compost, sawdust, wood chips, and de-icing salt) as well as areas where liquids and solids in containers are stored or transferred.
- < While it may be too expensive to cover all industrial activities, cover all high-risk areas first (e.g., chemical preparation areas, vehicle maintenance areas, and areas where salts are stored), then according to budget cover the rest of the materials.
- < Evaluate the strength and longevity of the covering, as well as its compatibility with the material or activity being enclosed.
- < When designing an enclosure, consider access to materials, their handling, and transfer.
- < Materials that pose environmental and safety dangers require special ventilation and temperature considerations.
- < Covering alone may not protect the materials. When designing, consider placing materials on an elevated, impermeable surface or build curbing around the outside of the materials to prevent problems from runoff of uncontaminated stormwater from adjacent areas.
- < Anchor all coverings with stakes, tie-down ropes, large rocks, tires or other easily available heavy objects.

**LIMITATIONS:**

- < Requires frequent inspection.
- < May pose health or safety problems if enclosure is built over certain activities.

**MAINTENANCE:**

- < Frequently inspect coverings for rips, holes and general wear.

**TARGETED POLLUTANTS**

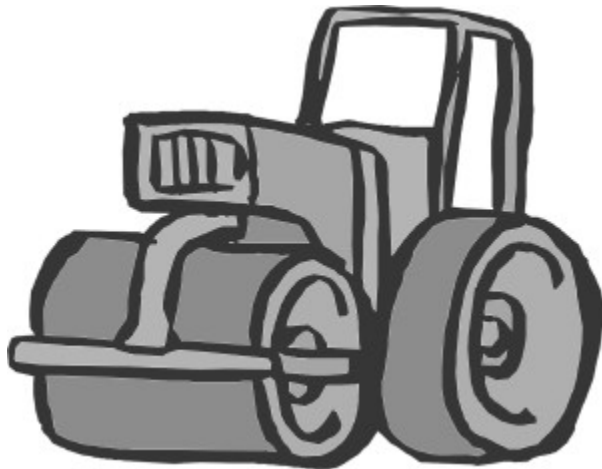
- # Sediment
- Nutrients
- # Heavy Metals
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- Floatable Materials
- Bacteria & Viruses

- # High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- # High     Medium     Low



**OBJECTIVES**

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

**DESCRIPTION:**

Use of rolling, tamping, or vibration to stabilize fill materials and control erosion by increasing the soil density. Increasing the density of soil improves soil strength, reduces long-term soil settlement, and provides resistance to erosion.

**APPLICATIONS:**

- < Stabilize fill material placed around various structures.
- < Improve soil in place as foundation support for roads, parking lots, and buildings.

**INSTALLATION/APPLICATION CRITERIA:**

- < Make sure soil moisture content is at optimum levels.
- < Use proper compaction equipment.
- < Install sediment control and storm water management devices below compacted areas and runoff interceptor devices above these areas. Drainage from compacted areas must be carefully planned to protect adjacent uncompacted soils.
- < The surface of compacted areas should be scarified and seeded or mulched and seeded to increase the effectiveness of compaction.

**LIMITATIONS:**

- < Compaction tends to increase runoff.
- < Over-compaction will hamper revegetation efforts.

**MAINTENANCE:**

No maintenance required.

**TARGETED POLLUTANTS**

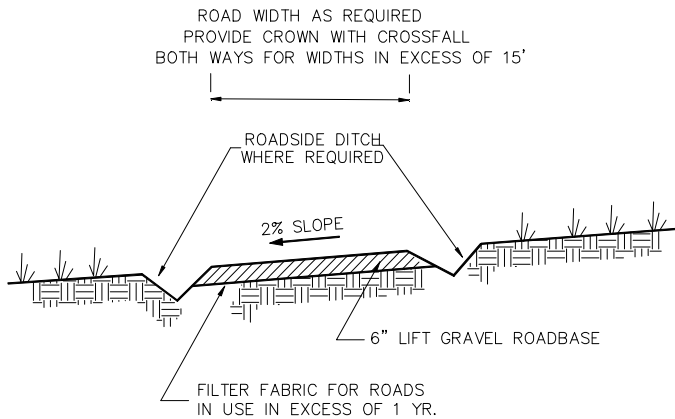
- Sediment
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- Oil & Grease
- Floatable Materials
- Other Waste

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High     Medium     Low



**OBJECTIVES**

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

**DESCRIPTION:**

Temporary stabilization of on-site roadway by placement of gravel roadbase.

**APPLICATION:**

- < On-site roadways used daily by construction traffic (may not apply to gravelly type soils)
- < Parking or staging areas susceptible to erosion due to traffic use

**INSTALLATION/APPLICATION CRITERIA:**

- < Grade temporary access road with 2% cross fall, for two-way width provide crown.
- < Provide roadside ditch and outlet controls where required.
- < Place 6 inches of 2-inch to 4-inch crushed rock on driving area

**LIMITATIONS:**

- < May require removal of gravel roadbase at completion of activities if final cover is not impervious
- < May require controls for surface storm water runoff

**MAINTENANCE:**

- < Inspect after major rainfall events and at least monthly.
- < Place additional gravel as needed and repair any damaged areas.
- < Maintain any roadside drainage controls.

**TARGETED POLLUTANTS**

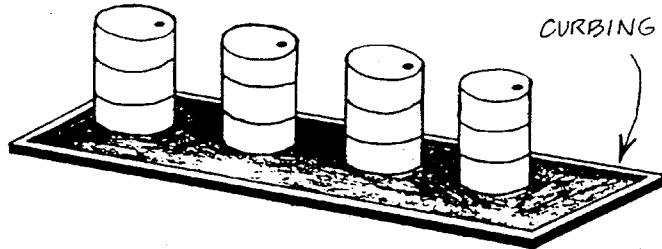
- Sediment
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- Toxic Materials
- Oil & Grease
- Floatable Materials
- Other Waste

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High
- Medium
- Low



**APPLICATIONS**

- Manufacturing
- Material Handling
- Vehicle Maintenance
- Construction
- Commercial Activities
- Roadways
- Waste Containment
- Housekeeping Practices

**DESCRIPTION:**

Curbing is a barrier that surrounds an area of concern, much like containment diking (See Containment Diking BMP). Curbing prevents spills, leaks, etc. from being released to the environment by routing runoff to treatment or control areas. The terms curbing and diking are sometimes used interchangeably.

**APPROACH:**

- < Curbing can be used at all industrial facilities. It is particularly useful in areas where liquid materials are transferred and as a stormwater runoff control.
- < As with diking, common materials for curbing include earth, concrete, synthetic materials, metal, or other impenetrable materials. Asphalt is also a common material used in curbing.
- < For maximum efficiency, spilled materials should be removed immediately, to allow space for future spills.
- < Curbs should have pumping systems, instead of drainage systems, for collecting spilled materials.
- < Curb systems should be maintained through curb repair (patching and replacement).
- < To minimize the amount of spilled material tracked outside of the area by personnel, grade within the curbing to direct the spilled materials to a down-slope side of the curbing, thus keeping the spilled materials away from personnel and equipment. Grading will also facilitate clean-up.

**LIMITATIONS:**

- < Curbing is not effective for holding large spills.
- < May require more maintenance than diking.

**MAINTENANCE:**

- < Inspection should be conducted before and after storm events.
- < When certain spills occur, cleanup should start immediately, thus preventing overflows and contamination of stormwater runoff.
- < Inspection should also be made to clear clogging debris, prevent dilution by rainwater, and to again prevent overflow of any materials.

**TARGETED POLLUTANTS**

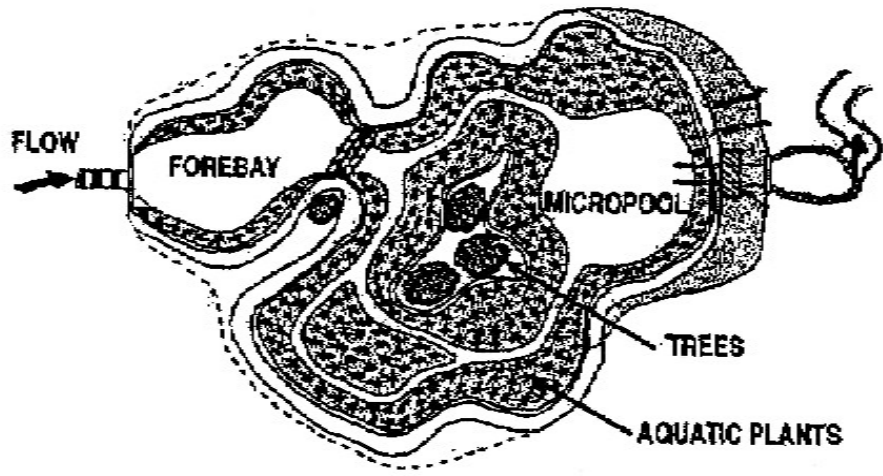
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- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High     Medium     Low



**CONSIDERATIONS**

- Soils
- Area Required
- Slope
- Water Availability
- Aesthetics
- Hydraulic Head
- Environmental Side Effects

**DESCRIPTION:**

Constructed wetlands have a significant percentage of the facility covered by wetland vegetation.

**APPLICATION:**

- < Need to achieve high level of particulate and some dissolved contaminant removal.
- < Ideal for large, regional tributary areas.
- < Multiple benefits of passive recreation and wildlife.

**INSTALLATION/APPLICATION CRITERIA:**

- < Suitable soils for wetland vegetation are required.
- < Surface area equal to at least 1% and preferably 2% of the tributary watershed.
- < Include a forebay for extra storage and to trap incoming sediment.
- < Involve qualified wetland ecologist to design and install wetland vegetation.
- < Establishing wetland vegetation may be difficult.

**LIMITATIONS:**

- < Concern for mosquitoes.
- < Cannot be placed on steep unstable slopes.
- < Need base flow to maintain water level.
- < Not feasible in densely developed areas.
- < Nutrient release may occur during winter.
- < Overgrowth can lead to reduced hydraulic capacity.
- < Regulatory agencies may limit water quality to constructed wetlands.

**MAINTENANCE:**

- < Remove foreign debris and sediment build-up.
- < Areas of bank erosion should be repaired.
- < Remove nuisance species.
- < Control mosquitoes.

**TARGETED POLLUTANTS**

- Sediment
- Nutrients
- Heavy Metals
- Toxic Materials
- Oxygen Demanding Substances
- Oil & Grease
- Floatable Materials
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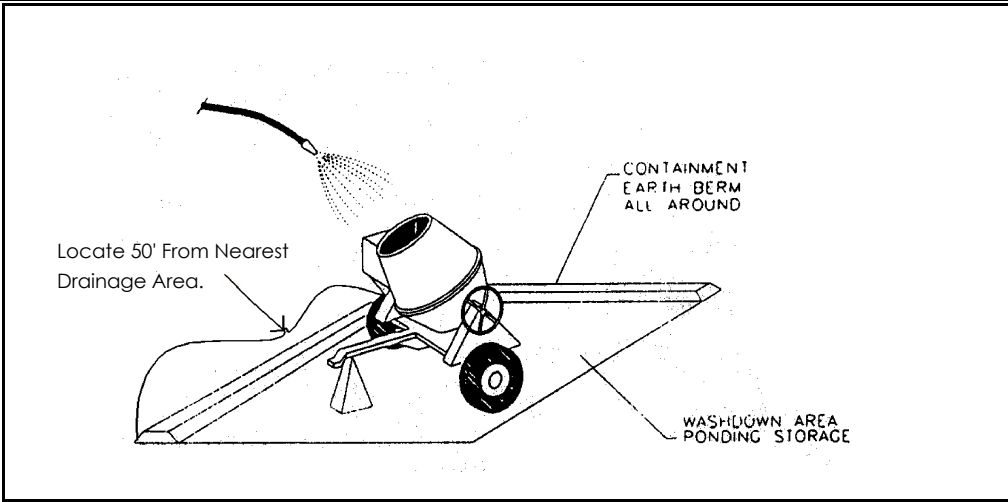
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- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High     Medium     Low





**DESCRIPTION:**

Prevent or reduce the discharge of pollutants to storm water from concrete waste by conducting washout off-site, performing on-site washout in a designated area, and training employees and subcontractors.

**APPLICATIONS:**

This technique is applicable to all types of sites.

**INSTALLATION/APPLICATION CRITERIA:**

- < Store dry and wet materials under cover, away from drainage areas.
- < Avoid mixing excess amounts of fresh concrete or cement on-site.
- < Perform washout of concrete trucks off-site or in designated areas only.
- < Do not wash out concrete trucks into storm drains, open ditches, streets, or streams.
- < Do not allow excess concrete to be dumped on-site, except in designated areas.
- < When washing concrete to remove fine particles and expose the aggregate, avoid creating runoff by draining the water within a bermed or level area. (See Earth Berm Barrier information sheet.)
- < Train employees and subcontractors in proper concrete waste management.

**LIMITATIONS:**

- < Off-site washout of concrete wastes may not always be possible.

**MAINTENANCE:**

- < Inspect subcontractors to ensure that concrete wastes are being properly managed.
- < If using a temporary pit, dispose hardened concrete on a regular basis.

**OBJECTIVES**

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

**TARGETED POLLUTANTS**

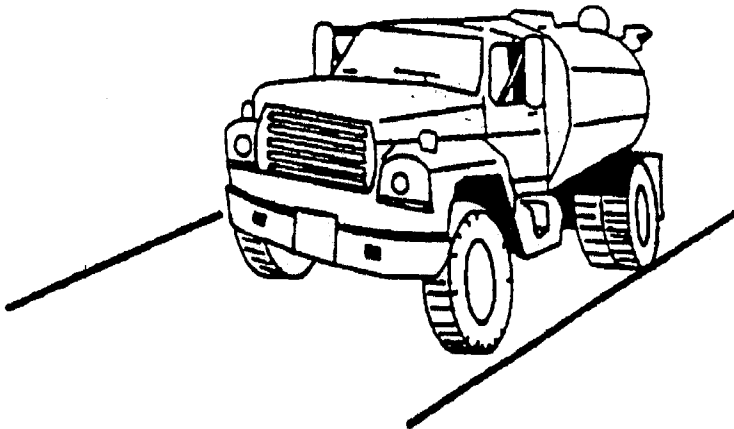
- Sediment
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- Floatable Materials
- Other Waste

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High
- Medium
- Low



**OBJECTIVES**

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

**DESCRIPTION:**

Dust control measures are used to stabilize soil from wind erosion, and reduce dust by construction activities.

**APPLICATION:**

Dust control is useful in any process area, loading and unloading area, material handling areas, and transfer areas where dust is generated. Street sweeping is limited to areas that are paved.

**INSTALLATION/APPLICATION CRITERIA:**

- < Mechanical dust collection systems are designed according to the size of dust particles and the amount of air to be processed. Manufacturers' recommendations should be followed for installation (as well as the design of the equipment).
- < Two kinds of street sweepers are common: brush and vacuum. Vacuum sweepers are more efficient and work best when the area is dry.
- < Mechanical equipment should be operated according to the manufacturers' recommendations and should be inspected regularly.

**LIMITATIONS:**

- < Is generally more expensive than manual systems.
- < May be impossible to maintain by plant personnel (the more elaborate equipment).
- < Is labor and equipment intensive and may not be effective for all pollutants (street sweepers).

**MAINTENANCE:**

If water sprayers are used, dust-contaminated waters should be collected and taken for treatment. Areas will probably need to be resprayed to keep dust from spreading.

**TARGETED POLLUTANTS**

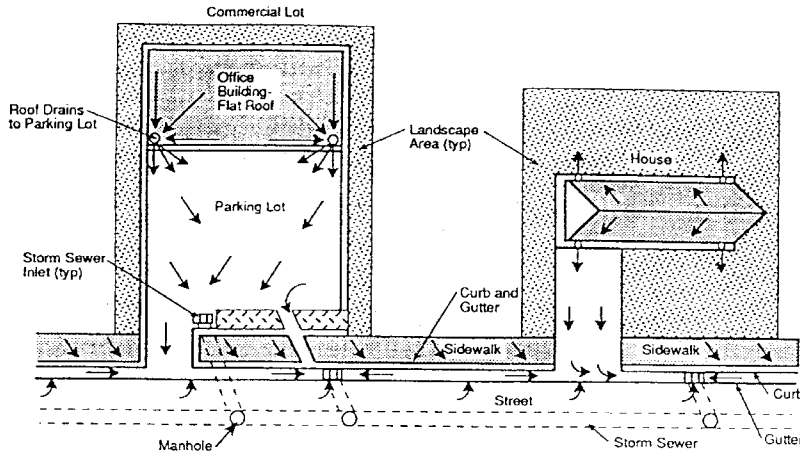
- Sediment
- Nutrients
- Toxic Materials
- Oil & Grease
- Floatable Materials
- Other Waste

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High
- Medium
- Low



**CONSIDERATIONS**

- Soils
- Area Required
- Slope
- Water Availability
- Aesthetics
- Hydraulic Head
- Environmental Side Effects

**DESCRIPTION:**

Minimizing directly connected impervious areas (DCIAs) is a structural BMP strategy that requires a basic change in drainage design philosophy. The basic principle is to direct stormwater runoff to landscaped areas, grass buffer strips, and vegetated swales to slow down the rate of runoff, reduce runoff volumes, attenuate peak flows, and encourage filtering and infiltration of stormwater.

**APPLICATIONS:**

It can be made an integral part of drainage planning for any development.

**INSTALLATION/APPLICATION CRITERIA:**

- < Use on sites with general terrain slopes flatter than 3-4%.
- < Design the site drainage flowpath to maximize flow over vegetated areas before leaving a site.
- < Minimize ground slopes to limit erosion and slow down water flow.
- < Select vegetation that will not only survive, but also enhance water quality.

**LIMITATIONS:**

- < Potential increase in site open space requirements over the traditional development systems.
- < Introduction of a nonconventional development design strategy.
- < Infiltration of water near building foundations and parking lots is a concern.
- < Will likely result in increased maintenance along the swales.

**MAINTENANCE:**

- < Maintain grass and other vegetation.
- < Pick up debris.
- < Conduct ongoing inspections for potential erosion problems and changes in drainage patterns.
- < Remove sediment buildup and replace damaged grass cover.

**TARGETED POLLUTANTS**

- Sediment
- Nutrients
- Heavy Metals
- Toxic Materials
- Oxygen Demanding Substances
- Oil & Grease
- Floatable Materials
- Bacteria & Viruses

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High     Medium     Low



**APPLICATIONS**

- Manufacturing
- Material Handling
- Vehicle Maintenance
- Construction
- Commercial Activities
- Roadways
- Waste Containment
- Housekeeping Practices

**DESCRIPTION:**

A sizeable amount of de-icing chemicals are used each winter on roads, parking lots, and sidewalks in Utah. Sodium chloride (salt) is the main chemical used. Proper use and storage of salt will reduce the chance of high chloride concentration in runoff that may damage the environment.

**APPROACH:**

- < Proper storage practices can control sodium chloride pollution in runoff from stockpiles.
- < For de-icing use, preventing over-application of salt will reduce quantities of chloride reaching surface or ground water.
- < All salt piles should be covered with polyethylene if not stored in a shed. All sand/salt piles should be moved to empty salt sheds or covered during the spring and summer.
- < Any runoff from stockpiles should be contained.
- < To prevent over-application of salt one must properly calibrate the equipment and monitor the need for de-icing material.
- < Another method to prevent the over-application of salt is to limit salt application on low traffic areas and straight level areas, critical areas will, however, need higher levels of service.

**LIMITATIONS:**

- < All deicers hold the potential for damaging grass and plant biota should their concentration within the soil becomes unusually high. In amounts recommended for sidewalk and driveway deicing, there is minimal chance of damage to trees, grass, and shrubs. This is especially true if the chemical is used sparingly -- only to undercut snow and ice -- and the slush is not plowed or shoveled into grassy or planted areas.
- < Another concern of many businesses and homeowners is the visible deicer residue that may be tracked into a building. This residue occurs because these deicers are solids in their natural state. However, since the residue is water soluble, it cleans up readily using plain water or ordinary household cleaner.
- < Salt should not be used to melt every bit of snow and ice. Use only enough to break the ice/pavement bond, then remove the remaining slush by plowing or shoveling.

**TARGETED POLLUTANTS**

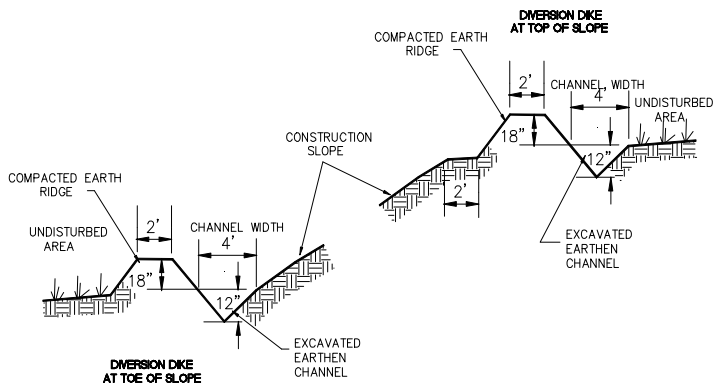
- Sediment
- Nutrients
- Heavy Metals
- Toxic Materials
- Oxygen Demanding Substances
- Oil & Grease
- Floatable Materials
- Bacteria & Viruses

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High     Medium     Low



**OBJECTIVES**

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

**DESCRIPTION:**

A temporary sediment barrier and storm runoff conveyance consisting of an excavation channel and compacted earth ridge.

**APPLICATION:**

- < Construct along top of construction slope to intercept upgradient runoff and convey around construction site.
- < Construct along toe of construction to divert sediment laden runoff.
- < Construct along midpoint of construction slope to intercept runoff and channel to controlled discharge point.
- < Construct around base of soil stockpiles to capture sediment.
- < Construct around perimeter of disturbed areas to capture sediment.

**INSTALLATION/APPLICATION CRITERIA:**

- < Clear and grub area for dike construction.
- < Excavate channel and place soil on downgradient side.
- < Shape and machine compact excavated soil to form ridge.
- < Place erosion protection (riprap, mulch) at outlet.
- < Stabilize channel and ridge as required with mulch, gravel, or vegetative cover.

**LIMITATIONS:**

- < Recommended maximum drainage area of 5 acres
- < Recommended maximum sideslopes of 2h:1v (50%)
- < Recommended maximum slope on channel of 1%

**MAINTENANCE:**

- < Inspect immediately after any rainfall and at least daily during prolonged rainfall.
- < Look for runoff breaching dike or eroding channel or sideslopes.
- < Check discharge point for erosion or bypassing of flows.
- < Repair and stabilize as necessary.
- < Inspect daily during vehicular activity on slope, check for and repair any traffic damage.

**TARGETED POLLUTANTS**

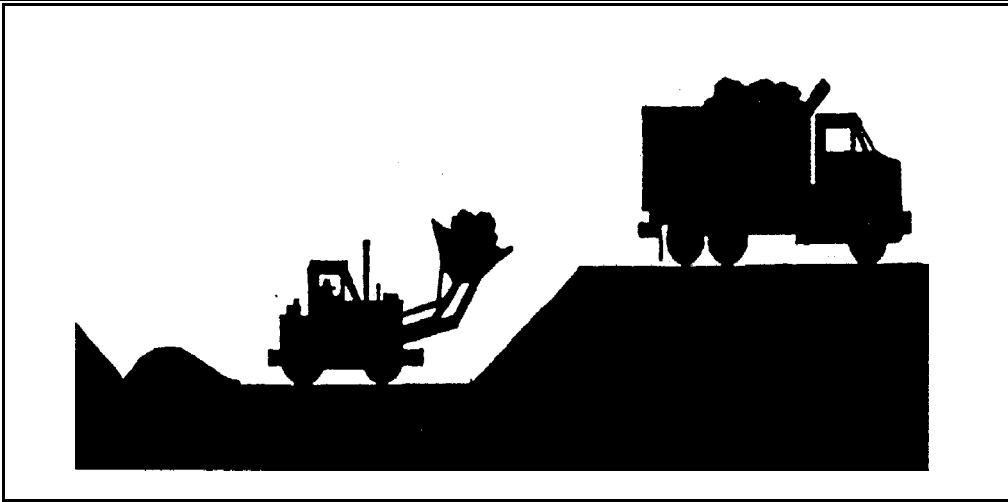
- Sediment
- Nutrients
- Toxic Materials
- Oil & Grease
- Floatable Materials
- Other Waste

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High     Medium     Low



**DESCRIPTION:**

Proper maintenance and siltation removal is required on both a routine and corrective basis to promote effective stormwater pollutant removal efficiencies for wet/dry detention pond and infiltrative devices.

**APPROACH:**

- < Remove silt after sufficient accumulation.
- < Periodically clean accumulated sediment and silt out of pre-treatment inlets.
- < Infiltration device silt removal should occur when the infiltration rate drops below 1/2 inch per hour.
- < Removal of accumulated paper, trash, and debris should occur every six months or as needed to prevent clogging of control devices.
- < Vegetation growth should not be allowed to exceed 18 inches in height.
- < Mow the slopes periodically and check for clogging, erosion and tree growth on the embankment.
- < Corrective maintenance may require more frequent attention (as required).
- < Create a public education campaign to explain the function of wet/dry detention pond/infiltration devices and their operation requirements for proper effectiveness.
- < Encourage the public to report wet/dry detention pond/infiltration devices needing maintenance.

**LIMITATIONS:**

- < Wet detention pond dredging can produce slurried waste that often exceeds the requirements of many landfills.
- < Frequent sediment removal is labor and cost intensive.

**PROGRAM ELEMENTS**

- New Development
- Residential
- Commercial Activities
- Industrial Activities
- Municipal Facilities
- Illegal Discharges

**TARGETED POLLUTANTS**

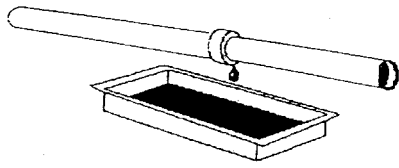
- Sediment
- Nutrients
- Heavy Metals
- Toxic Materials
- Oxygen Demanding Substances
- Oil & Grease
- Floatable Materials
- Bacteria & Viruses

- High Impact
- Medium Impact
- Low or Unknown Impact

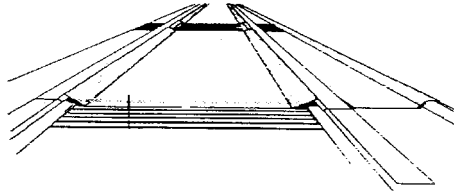
**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Regulatory
- Training
- Staffing
- Administrative

- High     Medium     Low



**Use Drip Pans for Leaking Equipment**



**Use Drip Pans in Loading and Unloading Areas**

**APPLICATIONS**

- Manufacturing
- Material Handling
- Vehicle Maintenance
- Construction
- Commercial Activities
- Roadways
- Waste Containment
- Housekeeping Practices

**DESCRIPTION:**

Drip pans are small depressions or pans used to contain very small volumes of leaks, drips, and spills that occur at a facility. Drip pans can be depressions in concrete, asphalt, or other impenetrable material. They can be made of metal, plastic, or any material that does not react with the dripped chemicals. Drip pans can be temporary or permanent.

Drip pans are used to catch drips from valves, pipes, etc. so that the materials or chemicals can be cleaned up easily or recycled before they contaminate stormwater. Although leaks and drips should be repaired and eliminated as part of a preventative maintenance program, drip pans can provide a temporary solution where repair or replacement must be delayed. In addition, drip pans can be an added safeguard when they are positioned beneath areas where leaks and drips may occur.

**APPROACH:**

- < When using drip pans, consider the location of the drip pan, weather conditions, the type of material used for the drip pan, and how it will be cleaned.
- < The location of the drip pan is important. Because drip pans must be inspected and cleaned frequently, they must be easy to reach and remove. However, take special care to avoid placing drip pans where they can be easily overturned or be a safety hazard.
- < Secure pans by installing or anchoring them. Drip pans may be placed on platforms, behind wind blocks or tied down.
- < Employees must pay attention to the pans and empty them when they are nearly full.
- < Frequent inspection of the drip pans is necessary due to the possibility of leaks in the pan itself or in piping or valves that may occur randomly or irregular slow drips that may increase in volume.

**LIMITATIONS:**

- < Contain small volumes only.
- < Must be inspected and cleaned frequently.
- < Must be secured during poor weather conditions.
- < Contents may be disposed of improperly unless facility personnel are trained in proper disposal methods.

**TARGETED POLLUTANTS**

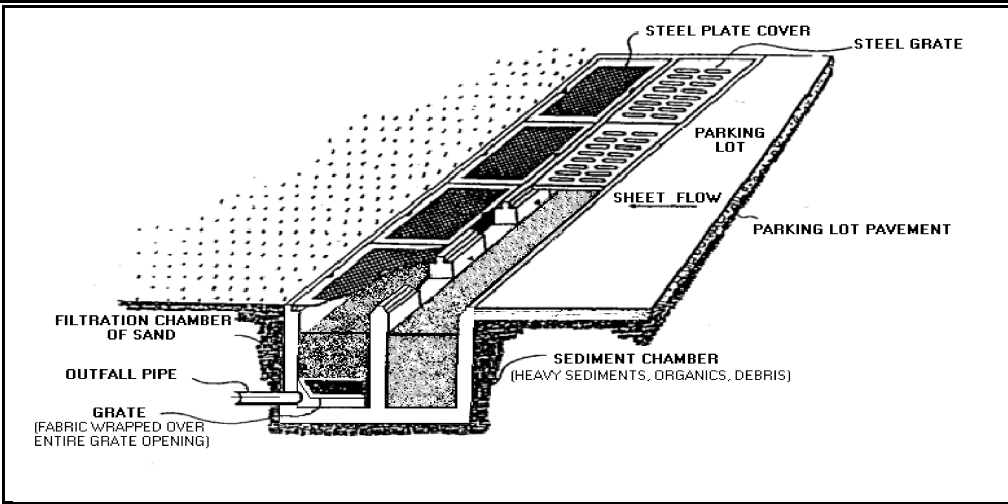
- Sediment
- Nutrients
- Heavy Metals
- Toxic Materials
- Oxygen Demanding Substances
- Oil & Grease
- Floatable Materials
- Bacteria & Viruses

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High     Medium     Low



**CONSIDERATIONS**

- Soils
- Area Required
- Slope
- Water Availability
- Aesthetics
- Hydraulic Head
- Environmental Side Effects

**DESCRIPTION:**

The double trench sand filter (aka Delaware sand filter) is a BMP consisting of parallel sedimentation and sand filter trenches connected by a series of level weir notches to assure sheet flow onto the filter. Filtered runoff is conveyed to a storm sewer by gravity flow or by pumping.

**APPLICATIONS:**

- < Commercial and institutional parking lots, small shopping centers, and infill developments.
- < Smaller redevelopment sites where the use of conventional BMPs is not practical.

**INSTALLATION/APPLICATION CRITERIA:**

- < Requires very little hydraulic head.
- < Need to consider structural design with traffic load.

**LIMITATIONS:**

- < Will not prevent small floatable debris from entering through the grate openings.
- < Disposing of petroleum-contaminated sand may require expertise in hazardous waste disposal.
- < Sand filter may clog sooner than other BMPs requiring more frequent maintenance.

**MAINTENANCE:**

- < System should be inspected yearly and after storm events to assess the filtration capacity of the filter.
- < Filter sand should be replaced every few years to maintain pollutant removal efficiency.

**TARGETED POLLUTANTS**

- Sediment
- Nutrients
- Heavy Metals
- Toxic Materials
- Oxygen Demanding Substances
- Oil & Grease
- Floatable Materials
- Bacteria & Viruses

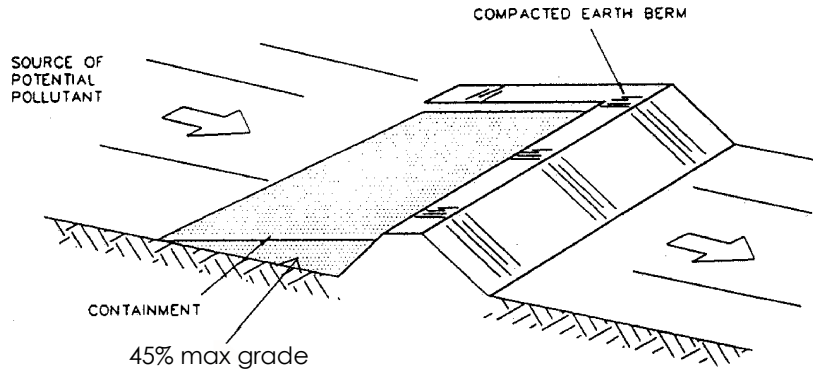
- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High     Medium     Low





**OBJECTIVES**

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

**DESCRIPTION:**

A temporary containment control constructed of compacted soil.

**APPLICATION:**

- < Construct around waste and materials storage area.
- < Construct around staging and maintenance areas.
- < Construct around vehicle parking and servicing areas.

**INSTALLATION/APPLICATION CRITERIA:**

- < Construct an earthen berm down hill of the area to be controlled. The berm should surround fueling facilities and maintenance areas on three sides to provide containment.
- < Berm needs to be a minimum of 1 foot tall by 1 foot wide and be compacted by earth moving equipment.

**LIMITATIONS:**

- < Not effective on steep slopes.
- < Limits access to controlled area.
- < Personnel need to quickly respond to spills with remedial actions.

**MAINTENANCE:**

- < Observe daily for any non-stormwater discharge.
- < Look for runoff bypassing ends of berms or undercutting berms.
- < Repair or replace damaged areas of the berm and remove accumulated sediment.
- < Recompact soil around berm as necessary to prevent piping.

**TARGETED POLLUTANTS**

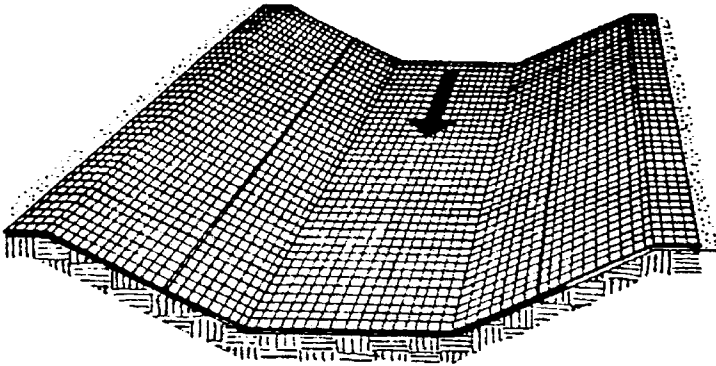
- Sediment
- Nutrients
- Toxic Materials
- Oil & Grease
- Floatable Materials
- Other Construction Waste

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High
- Medium
- Low



**DESCRIPTION:**

Erosion control blankets are used in place of mulch on areas of high velocity runoff and/or steep grade, to aid in controlling erosion on critical areas by protecting young vegetation.

**APPLICATIONS:**

- < Where vegetation is likely to grow too slowly to provide adequate cover.
- < In areas subject to high winds where mulch would not be effective.

**INSTALLATION/APPLICATION CRITERIA:**

- < Install erosion control blankets parallel to the direction of the slope.
- < In ditches, apply in direction of the flow.
- < Place erosion control blankets loosely on soil - do not stretch.
- < Ends of blankets should be buried no less than six inches deep.
- < Staple the edges of the blanket at least every three feet.

**LIMITATIONS:**

- < Not recommended in areas which are still under construction.

**MAINTENANCE:**

- < Check for erosion and undermining periodically, particularly after rainstorms.
- < Repair dislocations or failures immediately.
- < If washouts occur, reinstall after repairing slope damage.
- < Monitor until permanently stabilized.

**OBJECTIVES**

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

**TARGETED POLLUTANTS**

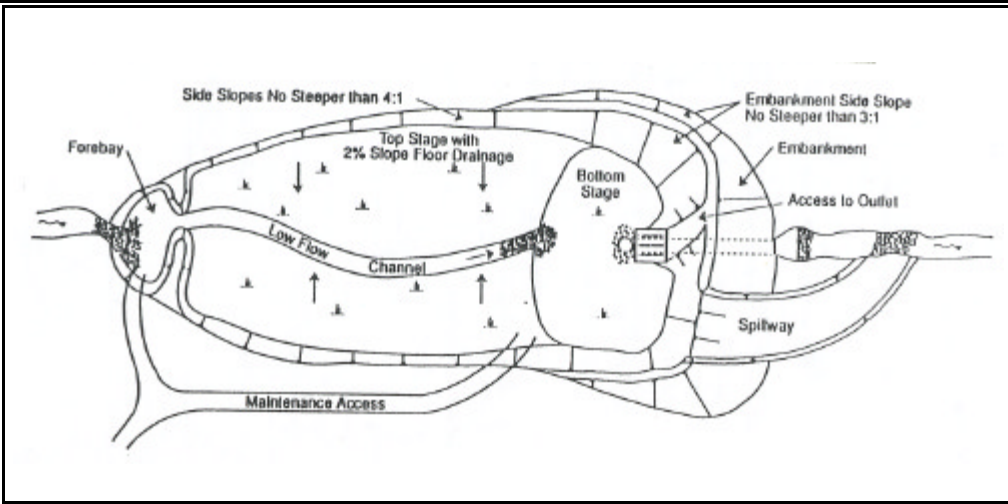
- Sediment
- Nutrients
- Toxic Materials
- Oil & Grease
- Floatable Materials

- High Impact
- Medium Impact
- Low or Unknown Impact

Other Waste  
**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High     Medium     Low



**CONSIDERATIONS**

- Soils
- Area Required
- Slope
- Water Availability
- Aesthetics
- Hydraulic Head
- Environmental Side Effects

**DESCRIPTIONS:**

Extended detention basins are dry between storms. During a storm the basin fills. A bottom outlet releases the stormwater slowly to provide time for sediments to settle.

**APPLICATION:**

- < Objective is to remove only particulate pollutants.
- < Use where lack of water prevents the use of wet ponds, wetlands or biofilters.
- < Use where wet ponds or wetlands would cause unacceptable mosquito conditions.

**INSTALLATION/APPLICATION CRITERIA:**

- < Basin volume is sized to capture a particular fraction of the runoff.
- < Drawdown time of 24 to 40 hours is required.
- < A shallow basin with large surface area performs better than a deep basin with the same volume.
- < Place energy dissipators at the entrance to minimize bottom erosion and resuspension.
- < Vegetate side slopes and bottom to the maximum extent practical.
- < If side erosion is particularly severe, consider paving or soil stabilization.
- < If floatables are a problem, protect outlet with a trash rack or other device.
- < Provide bypass or pass through capabilities for 100-year storm.

**LIMITATIONS:**

- < May be less reliable than other treatment control BMPs. Inability to vegetate banks and bottom may result in erosion and resuspension.
- < Limitation of the orifice diameter may preclude use in small watersheds.
- < Requires differential elevation between inlet and outlet.

**MAINTENANCE:**

- < Check outlet regularly for clogging.
- < Check banks and bottom of basin for erosion and correct as necessary.
- < Remove sediment when accumulation reaches 6-inches, or if resuspension is observed.

**TARGETED POLLUTANTS**

- Sediment
- Nutrients
- Heavy Metals
- Toxic Materials
- Oxygen Demanding Substances
- Oil & Grease
- Floatable Materials
- Bacteria & Viruses

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High     Medium     Low



**DESCRIPTION:**

Employee training, like equipment maintenance, is a method by which to implement BMPs. Employee training should be used in conjunction with all other BMPs as part of the facility's SWPPP.

The specific employee training aspects of each of the source controls are highlighted in the individual information sheets. The focus of this information sheet is more general, and includes the overall objectives and approach for assuring employee training in stormwater pollution prevention. Accordingly, the organization of this information sheet differs somewhat from the other information sheets in this chapter.

**OBJECTIVES:**

Employee training should be based on four objectives:

- < Promote a clear identification and understanding of the problem, including activities with the potential to pollute stormwater;
- < Identify solutions (BMPs);
- < Promote employee ownership of the problems and the solutions; and
- < Integrate employee feedback into training and BMP implementation.

**APPROACH:**

- < Integrate training regarding stormwater quality management with existing training programs that may be required for other regulations.
- < Employee training is a vital component of many of the individual source control BMPs included in this manual.

**PROGRAM ELEMENTS**

- New Development
- Residential
- Commercial Activities
- Industrial Activities
- Municipal Facilities
- Illegal Discharges

**TARGETED POLLUTANTS**

- Sediment
- Nutrients
- Heavy Metals
- Toxic Materials
- Oxygen Demanding Substances
- Oil & Grease
- Floatable Materials
- Bacteria & Viruses

- High Impact
- Medium Impact
- Low or Unknown Impact

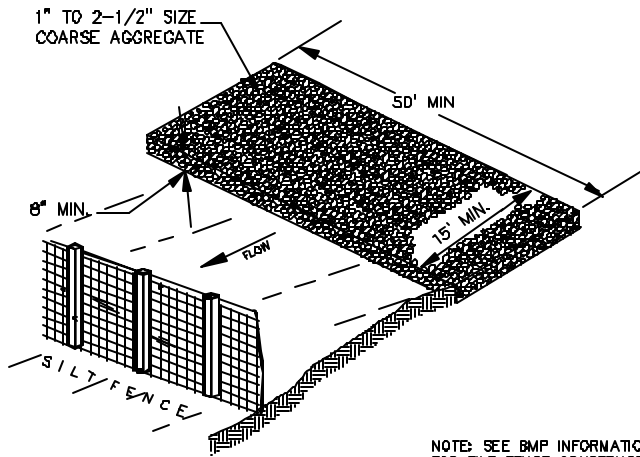
**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Regulatory
- Training
- Staffing
- Administrative

- High     Medium     Low

# BMP: Equipment and Vehicle Wash Down Area

EVWA



NOTE: SEE BMP INFORMATION SHEET FOR SILT FENCE CONSTRUCTION

**DESCRIPTION:**

A stabilized pad of crushed stone for general washing of equipment and construction vehicles.

**APPLICATION:**

At any site where regular washing of vehicles and equipment will occur. May also be used as a filling point for water trucks limiting erosion caused by overflow or spillage of water.

**INSTALLATION/APPLICATION CRITERIA:**

- < Clear and grub area and grade to provide maximum slope of 1%
- < Compact subgrade and place filter fabric if desired (recommended for wash areas to remain in use for more than 3 months).
- < Place coarse aggregate, 1 to 2-1/2 inches in size, to a minimum depth of 8-inches.
- < Install silt fence downgradient (see silt fence BMP information sheet).

**LIMITATIONS:**

Cannot be utilized for washing equipment or vehicles that may cause contamination of runoff such as fertilizer equipment or concrete equipment. Solely used to control sediment in wash water.

**MAINTENANCE:**

- < Inspect daily for loss of gravel or sediment buildup.
- < Inspect adjacent area for sediment deposit and install additional controls as necessary.
- < Repair area and replace gravel as required to maintain control in good working condition.
- < Expand stabilized area as required to accommodate activities.
- < Maintain silt fence as outlined in specific silt fence BMP information sheet.

**OBJECTIVES**

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

**TARGETED POLLUTANTS**

- Sediment
- Nutrients
- Toxic Materials
- Oil & Grease
- Floatable Materials
- Other Waste

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High     Medium     Low



**CONSIDERATIONS**

- Soils
- Area Required
- Slope
- Water Availability
- Aesthetics
- Hydraulic Head
- Environmental Side Effects

**DESCRIPTION:**

Floatable skimmers are devices used to retain floating debris and oil in detention areas. The floating debris and oil eventually sinks to the bottom of the detention area and becomes part of the sediments or is removed from the surface through regular maintenance.

The effect of floatable skimmers on water quality will depend upon the amount and type of floating material transported by runoff. Typically, a well designed floatable skimmer can trap virtually all floating debris that reaches it. In an area with large amounts of floating leaves, trash or oil, this can provide significant water quality benefits.

**APPLICATION:**

Applicable in areas where detention basins are used.

**INSTALLATION/APPLICATION CRITERIA:**

- < For structures with a weir outlet, a baffle weir should be used. It should be located far enough upstream of the weir outlet to prevent high velocity flow through it.
- < Generally, it is best to keep velocities at the skimmer less than 1 foot per second.

**LIMITATIONS:**

Tend to clog with debris.

**MAINTENANCE:**

Maintenance is very important for the proper function of a floatable skimmer. After runoff events that transport large amounts of floating debris and trash, the skimmer can become clogged with a mat of trapped material. This debris must be removed promptly to maintain the capacity of the structure for future storms.

**TARGETED POLLUTANTS**

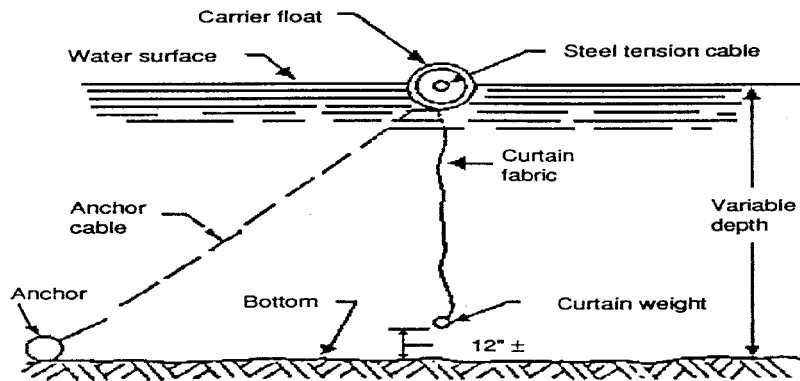
- Sediment
- Nutrients
- Heavy Metals
- Toxic Materials
- Oxygen Demanding Substances
- Oil & Grease
- Floatable Materials
- Bacteria & Viruses

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High     Medium     Low



**DESCRIPTION:**

A flotation silt curtain is a silt barrier for use within a lake or pond. The flotation silt curtain consists of a filter fabric curtain weighted at the bottom and attached to a flotation device at the top. This structure is used to isolate an active construction area within a lake or pond to prevent silt-laden water from migrating out of the construction zone.

**APPLICATIONS:**

Where construction is conducted within a lake or pond area.

**INSTALLATION/APPLICATION CRITERIA:**

- < The curtain should be constructed of a nylon fabric with a minimum tensile strength of 300 pounds per inch of fabric.
- < The top of the curtain should have a flotation carrier consisting of a floating plastic tube (6-inch minimum diameter) filled with marine quality polyethylene foam. The flotation carrier should also have a 5/16" diameter coated steel cable in it to carry loads imposed upon the curtain.
- < The bottom edge should be weighted by cable or chain with a minimum weight of 1.1 pounds per foot.
- < One 24-pound anchor should be used per 100 feet of curtain.
- < Where the curtain is made up of sections, the sections should be joined so that silt cannot permeate through the connection.

**LIMITATIONS:**

Not recommended in very shallow water bodies.

**MAINTENANCE:**

The silt curtain should be maintained until the construction area is stabilized and turbidity is reduced to acceptable levels.

**OBJECTIVES**

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

**TARGETED POLLUTANTS**

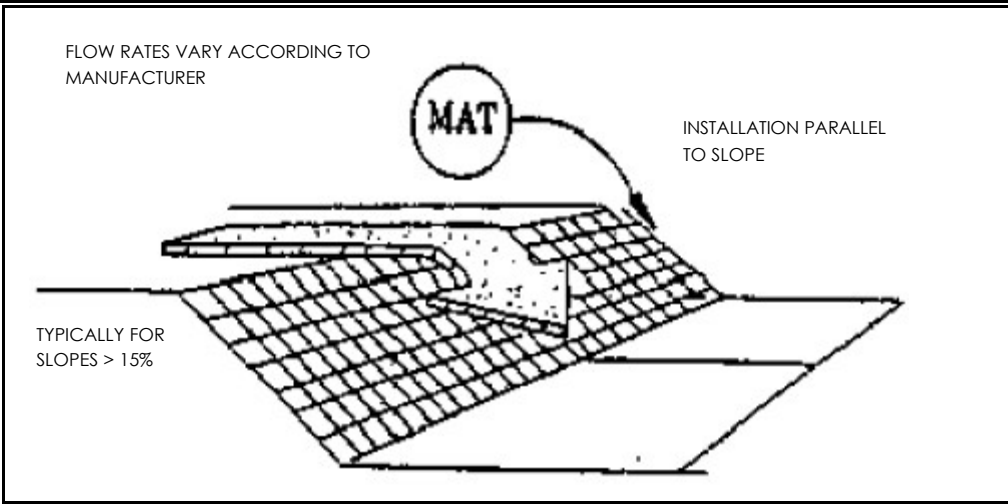
- Sediment
- Nutrients
- Toxic Materials
- Oil & Grease
- Floatable Materials
- Other Waste

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High
- Medium
- Low



**OBJECTIVES**

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

**DESCRIPTION:**

Mattings made of natural or synthetic material which are used to temporarily or permanently stabilize soil.

**APPLICATION:**

- < Typically suited for post-construction site stabilization, but may be used for temporary stabilization of highly erosive soils.
- < Channels and streams.
- < Steep slopes.

**INSTALLATION/APPLICATION CRITERIA:**

- < Mattings may be applied to disturbed soils and where existing vegetation has been removed.
- < The following organic matting materials provide temporary protection until permanent vegetation is established, or when seasonal circumstances dictate the need for temporary stabilization until weather or construction delays are resolved: Jute mattings and straw mattings.
- < The following synthetic mattings may be used for either temporary or post-construction stabilization, both with and without vegetation: excelsior matting, glass fiber matting, mulch matting.
- < Staples are needed to anchor the matting.

**LIMITATIONS:**

- < Mattings are more costly than other BMP practices, limiting their use to areas where other BMPs are ineffective (e.g., channels, steep slopes).
- < May delay seed germination, due to reduction in soil temperature.
- < Installation requires experienced contractor to ensure soil stabilization and erosion protection.

**MAINTENANCE:**

- < Inspect monthly and after significant rainfall.
- < Re-anchor loosened matting and replace missing matting and staples as required.

**TARGETED POLLUTANTS**

- Sediment
- Nutrients
- Toxic Materials
- Oil & Grease
- Floatable Materials
- Other Waste

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High     Medium     Low





**OBJECTIVES**

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

**DESCRIPTION:**

A combination of wood fiber mulch, processed grass, or hay or straw mulch and a tacking agent. It is made into a slurry, then applied to bare slopes or other bare areas to provide temporary stabilization.

**APPLICATIONS:**

- < Small roadside slopes.
- < Large, relatively flat areas.

**INSTALLATION/APPLICATION CRITERIA:**

- < Legume seeds should be pellet inoculated with the appropriate bacteria.
- < The seed should not remain in the hydromulcher tank for more than 30 minutes.
- < Wood fiber may be dyed to aid in uniform application.
- < Slurry should be uniformly applied until an adequate coverage is achieved.
- < The applicator should not be directed at one location for a long period of time; erosion will occur.

**LIMITATIONS:**

- < Will lose effectiveness after 1 year.
- < Can use only on physically stable slopes (at natural angle of repose, or less).

**MAINTENANCE:**

- < Periodically inspect for damage caused by wind, water, or human disturbance.
- < Promptly repair damaged areas.

**TARGETED POLLUTANTS**

- Sediment
- Nutrients
- Toxic Materials
- Oil & Grease
- Floatable Materials
- Other Waste

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High     Medium     Low

# BMP: Housekeeping Practices

HP



### PROGRAM ELEMENTS

- New Development
- Residential
- Commercial Activities
- Industrial Activities
- Municipal Facilities
- Illegal Discharges

### DESCRIPTION:

Promote efficient and safe housekeeping practices (storage, use, and cleanup) when handling potentially harmful materials such as fertilizers, pesticides, cleaning solutions, paint products, automotive products, and swimming pool chemicals.

### APPROACH:

- < Pattern a new program after the many established programs from municipalities around the country. Integrate this best management practice as much as possible with existing programs at your municipality.
- < This BMP has two key audiences: municipal employees and the general public.
- < For the general public, municipalities should establish a public education program that provides information on such items as storm water pollution and beneficial effects of proper disposal on water quality; reading product labels; safer alternative products; safe storage, handling, and disposal of hazardous products; list of local agencies; and emergency phone numbers. The programs listed below have provided this information through brochures or booklets that are available at a variety of locations including municipal offices, household hazardous waste collection events or facilities, and public information fairs.

Municipal facilities should develop controls on the application of pesticides, herbicides, and fertilizers in public right-of-ways and at municipal facilities. Controls may include:

- < List of approved pesticides and selected uses.
- < Product and application information for users.
- < Equipment use and maintenance procedures.
- < Record keeping and public notice procedures.

### LIMITATIONS:

There are no major limitations to this best management practice.

### TARGETED POLLUTANTS

- Sediment
- Nutrients
- Heavy Metals
- Toxic Materials
- Oxygen Demanding Substances
- Oil & Grease
- Floatable Materials
- Bacteria & Viruses

- High Impact
- Medium Impact
- Low or Unknown Impact

### IMPLEMENTATION REQUIREMENTS

- Capital Costs
- O&M Costs
- Regulatory
- Training
- Staffing
- Administrative

- High  Medium  Low



**PROGRAM ELEMENTS**

- New Development
- Residential
- Commercial Activities
- Industrial Activities
- Municipal Facilities
- Illegal Discharges

**DESCRIPTION:**

Prevent or reduce the discharge of pollutants to stormwater from hazardous waste through proper material use, waste disposal, and training of employees and subcontractors.

**APPLICATION:**

Many of the chemicals used on-site can be hazardous materials which become hazardous waste upon disposal. These wastes may include:

- < Paints and solvents; petroleum products such as oils; fuels and greases; herbicides and pesticides; acids for cleaning masonry; and concrete curing compounds.

In addition, sites with existing structures may contain wastes which must be disposed of in accordance with federal, state and local regulations, including:

- < Sandblasting grit mixed with lead, cadmium or chromium based paints, asbestos, and PCBs.

**INSTALLATION/APPLICATION CRITERIA:**

The following steps will help reduce stormwater pollution from hazardous wastes:

- < Use all of the product before disposing of the container.
- < Do not remove the original product label, it contains important safety and disposal information.
- < Do not over-apply herbicides and pesticides. Prepare only the amount needed. Follow the recommended usage instructions. Over-application is expensive and environmentally harmful. Apply surface dressings in several smaller applications, as opposed to one large application, to allow time for infiltration and to avoid excess material being carried off-site by runoff. Do not apply these chemicals just before it rains. People applying pesticides must be certified in accordance with federal and state regulations.

**LIMITATIONS:**

Hazardous waste that cannot be reused or recycled must be disposed of by a licensed hazardous waste collector.

**MAINTENANCE:**

- < Inspect hazardous waste receptacles and areas regularly.
- < Arrange for regular hazardous waste collection.

**TARGETED POLLUTANTS**

- Sediment
- Nutrients
- Heavy Metals
- Toxic Materials
- Oxygen Demanding Substances
- Oil & Grease
- Floatable Materials
- Bacteria & Viruses

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Regulatory
- Training
- Staffing
- Administrative

- High     Medium     Low



**DESCRIPTION:**

Implement measures to detect, correct, and enforce against illegal dumping of pollutants on streets, into the storm drain system, and into creeks. Substances illegally dumped on streets, into the storm drain system, and into creeks includes paints, used oil and other automotive fluids, construction debris, chemicals, fresh concrete, leaves, grass clippings, and pet wastes. All of these wastes can cause storm water and receiving water quality problems as well as clog the storm drain system.

**APPROACH:**

One of the keys to success is increasing the general public's awareness of the problem and to at least identify the incident, if not correct it. There are a number of ways of accomplishing this:

- < Train municipal staff from all departments to recognize and report incidents.
- < Deputize municipal staff who may come into contact with illegal dumping with the authority to write illegal dumping tickets for offenders caught in the act.
- < Educate the public.
- < Provide the public with a mechanism for reporting such as a hot line.

Establish system for tracking incidents which will identify:

- < Illegal dumping "hot spots",
- < Types and quantities (in some cases) of wastes,
- < Patterns in time of occurrence (time of day/night, month, or year),
- < Mode of dumping (abandoned containers, "midnight dumping" from moving vehicles, direct dumping of materials, accident/spills), and
- < Responsible parties.

A tracking system also helps manage the program by indicating trends, and identifying who, what, when, and where efforts should be concentrated.

**LIMITATIONS**

The elimination of illegal dumping is dependent on the availability, convenience, and cost of alternative means of disposal.

**PROGRAM ELEMENTS**

- New Development
- Residential
- Commercial Activities
- Industrial Activities
- Municipal Facilities
- Illegal Discharges

**TARGETED POLLUTANTS**

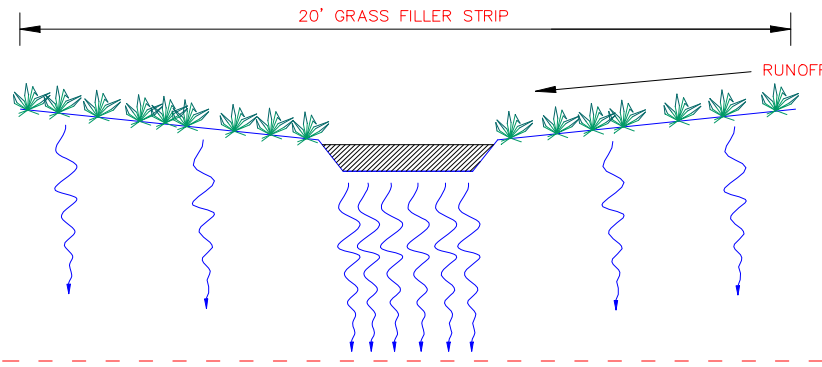
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- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Regulatory
- Training
- Staffing
- Administrative

- High
- Medium
- Low



**CONSIDERATIONS**

- Soils
- Area Required
- Slope
- Water Availability
- Aesthetics
- Hydraulic Head
- Environmental Side Effects

**DESCRIPTION:**

A family of systems in which the majority of the runoff from small storms is infiltrated into the ground rather than discharged to a surface water body. Infiltration systems include: ponds, vaults, trenches, dry wells, porous pavement, and concrete grids.

**APPLICATION:**

Suitable site soils and geologic conditions; low potential for long-term erosion in the watershed.

**INSTALLATION/APPLICATION CRITERIA:**

- < Volume sized to capture a particular fraction of annual runoff.
- < Pretreatment is necessary in fine soils.
- < Emergency overflow or bypass for larger storms is needed.
- < Observation wells are required in trenches.
- < Infiltration surface must be protected during construction.
- < Pond sides need vegetation to prevent erosion.
- < During construction frequent inspection for clogging is necessary.
- < Line sides of trench with permeable filter fabric
- < Trench should be filled with clean washed stone or gravel. (1.5-3.0 in.)
- < A six inch sand filter layer; cloth lines the bottom of trench.

**LIMITATIONS:**

- < Loss of infiltrative capacity and high maintenance cost in fine soils.
- < Low removal of dissolved pollutants in very coarse soils.
- < Not suitable on fill sites or steep slopes.
- < The risk of ground water contamination in very coarse soils, may require ground water monitoring.

**MAINTENANCE:**

- < Remove sediment at a frequency appropriate to avoid excessive concentrations of pollutants and loss of infiltrative capacity.
- < Frequent cleaning of porous pavements is required.
- < Maintenance is difficult and costly for underground trenches.

**TARGETED POLLUTANTS**

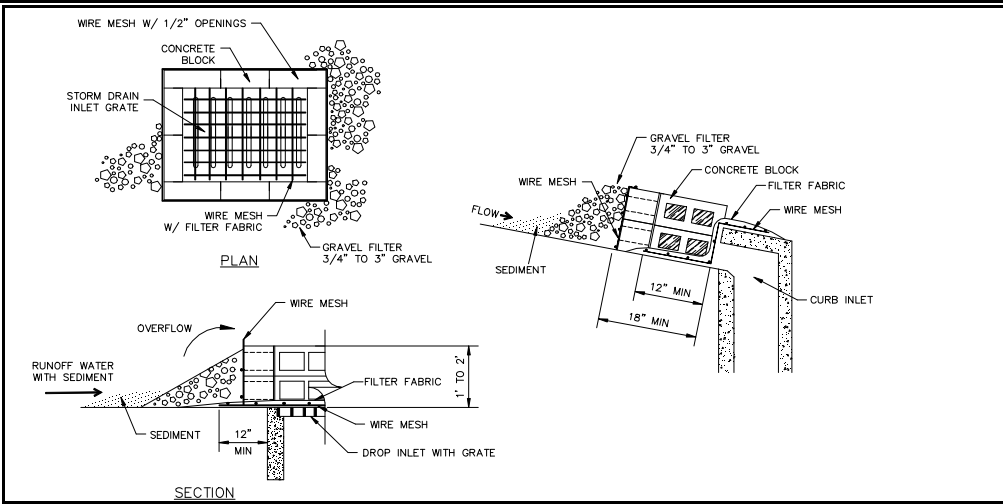
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- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High     Medium     Low



**OBJECTIVES**

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

**DESCRIPTION:**

Concrete block and gravel filter placed over inlet to storm drain system.

**APPLICATION:**

Construct at inlets in paved or unpaved areas where upgradient area is to be disturbed by construction activities.

**INSTALLATION/APPLICATION CRITERIA:**

- < Place wire mesh (with 1/2 inch openings) over the inlet grate extending one foot past the grate in all directions.
- < Place concrete blocks around the inlet with openings facing outward. Stack blocks to minimum height of 12-inches and maximum height of 24-inches.
- < Place wire mesh around outside of blocks.
- < Place gravel (3/4" to 3") around blocks.

**LIMITATIONS:**

- < Recommended for maximum drainage area of one acre.
- < Excess flows may bypass the inlet requiring down gradient controls.
- < Ponding will occur at inlet.

**MAINTENANCE:**

- < Inspect inlet protection after every large storm event and at a minimum of once monthly.
- < Remove sediment accumulated when it reaches 4-inches in depth.
- < Replace filter fabric and clean or replace gravel if clogging is apparent.

**TARGETED POLLUTANTS**

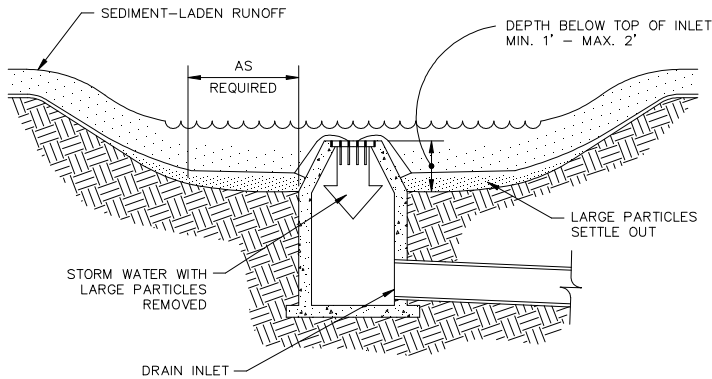
- Sediment
- Nutrients
- Toxic Materials
- Oil & Grease
- Floatable Materials
- Other Waste

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High     Medium     Low



**OBJECTIVES**

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

**DESCRIPTION:**

An area excavated around a storm drain inlet to impound water below the inlet.

**APPLICATION:**

Construct at storm drainage inlets located downgradient of areas to be disturbed by construction (for inlets in paved areas see other information sheets for inlet protection).

**INSTALLATION/APPLICATION CRITERIA:**

- < Provide upgradient sediment controls, such as silt fence during construction of inlet.
- < When construction of inlet is complete, excavate adjacent area 1 to 2 feet lower than the grate elevation. Size of excavated area should be based on soil type and contributing acreage.

**LIMITATIONS:**

- < Recommended maximum contributing drainage area of one acre.
- < Limited to inlets located in open unpaved areas.
- < Requires flat area adjacent to inlet.

**MAINTENANCE:**

- < Inspect inlet protection following storm event and at a minimum of once monthly.
- < Remove accumulated sediment when it reaches one half of the excavated sump below the grate.
- < Repair side slopes as required.

**TARGETED POLLUTANTS**

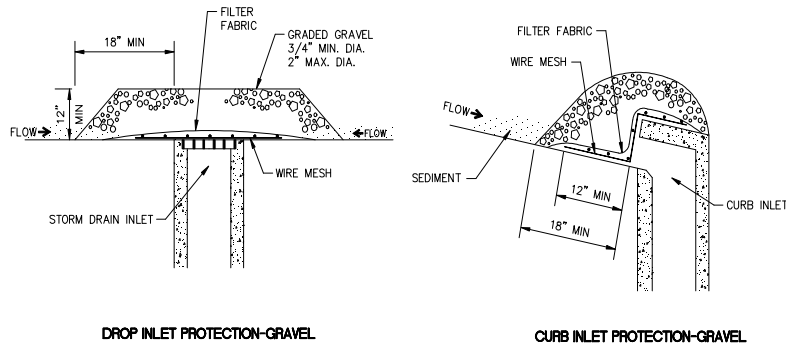
- Sediment
- Nutrients
- Toxic Materials
- Oil & Grease
- Floatable Materials
- Other Waste

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High     Medium     Low



**DESCRIPTION:**

Placement of gravel filter over inlet to storm drain to filter storm water runoff.

**APPLICATION:**

Construct at inlets in paved or unpaved areas where upgradient area is to be disturbed by construction activities.

**INSTALLATION/APPLICATION CRITERIA:**

- < Place wire mesh (with 1/2 inch openings) over the inlet grate extending one foot past the grate in all directions.
- < Place filter fabric over the mesh. Filter fabric should be selected based on soil type.
- < Place graded gravel, to a minimum depth of 12-inches, over the filter fabric and extending 18-inches past the grate in all directions.

**LIMITATIONS:**

- < Recommended for maximum drainage area of one acre.
- < Excess flows may bypass the inlet requiring down gradient controls.
- < Ponding will occur at inlet.

**MAINTENANCE:**

- < Inspect inlet protection after every large storm event and at a minimum of once monthly.
- < Remove sediment accumulated when it reaches 4-inches in depth.
- < Replace filter fabric and clean or replace gravel if clogging is apparent.

**OBJECTIVES**

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

**TARGETED POLLUTANTS**

- Sediment
- Nutrients
- Toxic Materials
- Oil & Grease
- Floatable Materials
- Other Waste

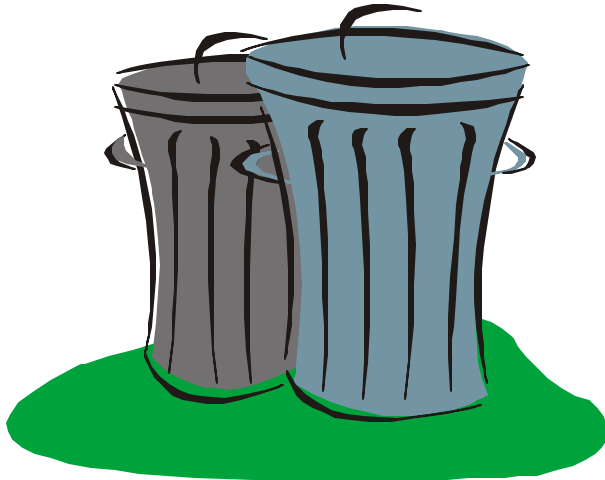
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**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High     Medium     Low





**PROGRAM ELEMENTS**

- New Development
- Residential
- Commercial Activities
- Industrial Activities
- Municipal Facilities
- Illegal Discharges

**DESCRIPTION:**

Litter control involves the removal of litter from streets and other surfaces before runoff or wind moves these materials to surface waters. This practice will prevent litter from becoming pollution as well as improving the aesthetics of the area.

**APPROACH:**

There are two categories of litter control programs: source reduction and removal programs.

Source reduction:

- < Litter containers should be conveniently placed and emptied frequently to prevent overflow.
- < Recycling programs should be promoted.
- < Public education programs should be developed since litter control programs depend upon public support.

Litter removal programs:

- < Litter control program include refuse and leaf collection, street cleaning, and catch basin cleaning.
- < Educational programs that explain the environmental benefit of leaf collection to water quality are helpful.
- < Municipal leaf collection is usually accomplished with street sweepers (see Street Cleaning BMP) or mechanical lawn sweepers.

**LIMITATIONS:**

No limitations.

**TARGETED POLLUTANTS**

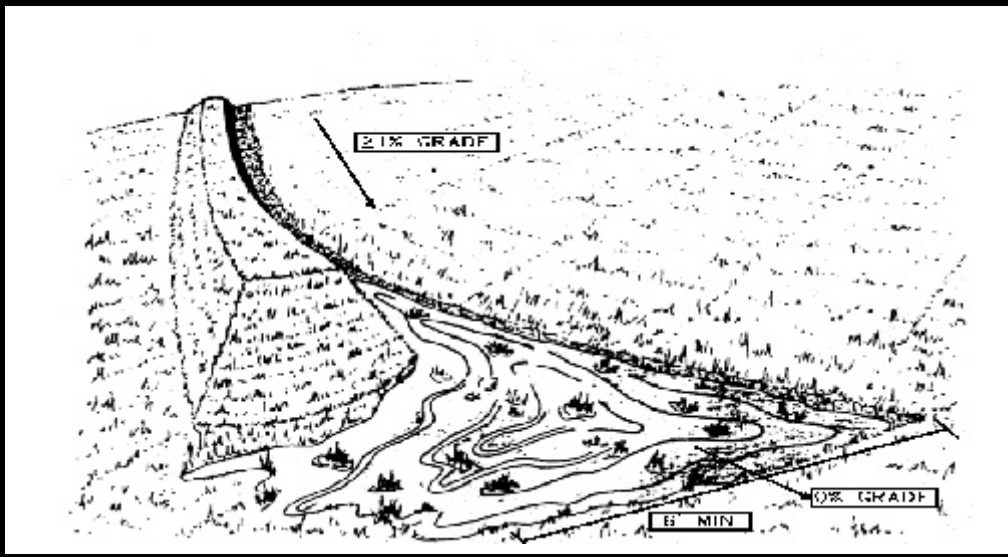
- Sediment
- Nutrients
- Heavy Metals
- Toxic Materials
- Oxygen Demanding Substances
- Oil & Grease
- Floatable Materials
- Bacteria & Viruses

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Regulatory
- Training
- Staffing
- Administrative

- High     Medium     Low



**DESCRIPTION:**

Level spreaders are devices used at stormwater outlets to spread out collected stormwater flows into sheetflow (runoff that flows over ground surface in a thin, even layer). Typically, a level spreader consists of a depression in the soil surface that spreads the flow onto a flat area across a gentle slope. Level spreaders then release the stormwater flow onto level areas stabilized by vegetation to reduce speed and increase infiltration.

**APPLICATION:**

Level spreaders are most often used as an outlet for temporary or permanent stormwater conveyances or dikes. Runoff that contains high sediment loads should be treated in a sediment trapping device prior to release into a level spreader.

**INSTALLATION/APPLICATION CRITERIA:**

- < The length of the spreader depends upon the amount of water that flows through the conveyance.
- < Larger volumes of water need more space to even out.
- < Level spreaders are generally used with filter strips (see Filter Strips BMP).
- < The depressions are seeded with vegetation (see Permanent & Temporary Seeding BMP).
- < Level spreaders should be constructed on natural soils and not on fill material.
- < The entrance to the spreader should be level so that the flow can spread out evenly.
- < Level Spreader should have a grade of 0%; minimum width should be 6' and minimum depth should be 6" minimum.

**LIMITATIONS:**

- < Can easily develop "short circuiting" (concentration of flows into small streams instead of sheetflow over the spreader) because of erosion or other disturbance.
- < Cannot handle large quantities of sediment-laden stormwater.

**MAINTENANCE:**

- < The spreader should be inspected after every storm event to check for damage.
- < If ponding or erosion channels develop, the spreader should be regraded.
- < Dense vegetation should be maintained and damaged areas reseeded as needed.

**CONSIDERATIONS**

- Soils
- Area Required
- Slope
- Water Availability
- Aesthetics
- Hydraulic Head
- Environmental Side Effects

**TARGETED POLLUTANTS**

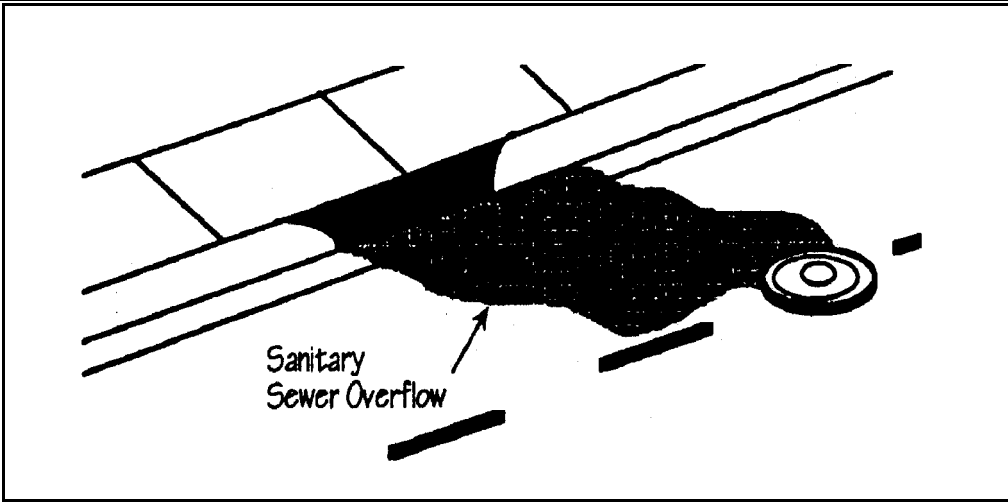
- Sediment
- Nutrients
- Heavy Metals
- Toxic Materials
- Oxygen Demanding Substances
- Oil & Grease
- Floatable Materials
- Bacteria & Viruses

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High
- Medium
- Low



**DESCRIPTION:**

Implement control procedures for identifying, repairing, and remediating sewer blockages, infiltration, inflow, and wet weather overflows from sanitary sewers into the storm drain conveyance system. Procedures include field screening, follow-up testing, and complaint investigation.

**APPROACH:**

- < Identify dry weather infiltration and inflow first. Wet weather overflow connections are very difficult to locate.
- < Locate wet weather overflows and leaking sanitary sewers using conventional source identification techniques.
- < Coordinate with ongoing infiltration and inflow (I & I) program to locate sources of exfiltration during I & I inspections.
- < Design, site, operate, and maintain on-site sewage disposal systems to prevent nutrient/pathogen loadings to surface waters and to reduce loadings to groundwater.

Leaking sanitary sewer detection techniques include:

- < Field screening program (including field analytical testing),
- < Fluorometric dye testing,
- < Zinc chloride smoke testing,
- < Television camera inspection,
- < Nessler Reagent test kits for ammonia detection,
- < Citizens' hotline reporting of wet weather sanitary overflows.

**LIMITATIONS:**

- < Private property access rights needed to perform field screening/testing along storm drain right-of-ways.
- < Requirements of municipal ordinance authority for suspected source verification testing necessary for guaranteed rights of entry.

**PROGRAM ELEMENTS**

- New Development
- Residential
- Commercial Activities
- Industrial Activities
- Municipal Facilities
- Illegal Discharges

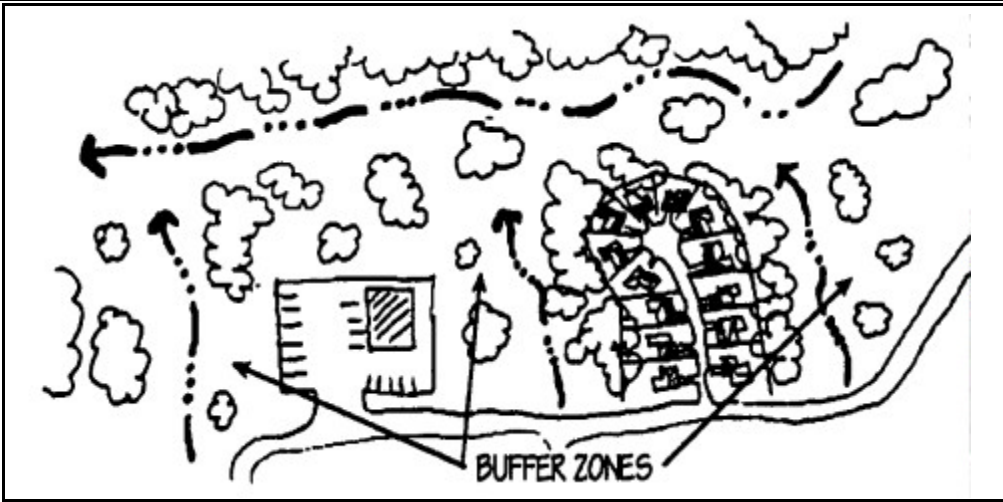
**TARGETED POLLUTANTS**

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- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
  - O&M Costs
  - Regulatory
  - Training
  - Staffing
  - Administrative
- High     Medium     Low



**DESCRIPTION:**

This BMP represents an important opportunity to reduce pollutants in stormwater runoff by using a comprehensive planning process to integrate water quality concerns into the development and redevelopment process. It is applicable to all types of land use and represents one of the most effective pollution prevention practices.

**APPROACH:**

The land use planning process need not be complex. A basic schematic model involves:

- < Phase 1 - Goals: Determine clear-cut water quality goals.
- < Phase 2 - Study: Identify planning area, gather pertinent data, and write a description of the planning area and its associated problems.
- < Phase 3 - Analysis and Synthesis: Determine and prioritize the water quality needs as they relate to land use.
- < Phase 4 - Recommendations: Future courses of action are developed to address the identified problems and needs determined previously.
- < Phase 5 - Adoption: The recommendations are presented to a political body for acceptance and implementation.
- < Phase 6 - Implementation: Recommendations adopted by the political body are implemented by the locality.

**LIMITATIONS:**

- < Land use planning/management frequently addresses sensitive public issues. Restrictions on certain land uses for the purpose of mitigating stormwater pollution may be politically unacceptable.
- < The use of land use controls and planning for water quality improvements may be limited by the lack of staff to enforce various aspects of local zoning and building codes.
- < The planning process addresses many public needs and legal requirements which often are in conflict with one another. It is difficult but extremely important to integrate and balance these sometimes competing programs.

**PROGRAM ELEMENTS**

- New Development
- Residential
- Commercial Activities
- Industrial Activities
- Municipal Facilities
- Illegal Discharges

**TARGETED POLLUTANTS**

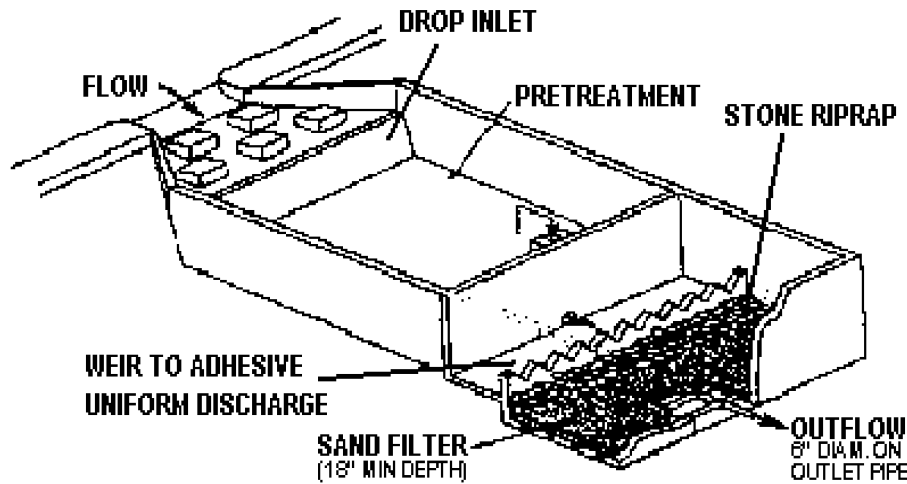
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**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Regulatory
- Training
- Staffing
- Administrative

- High     Medium     Low



**CONSIDERATIONS**

- Soils
- Area Required
- Slope
- Water Availability
- Aesthetics
- Hydraulic Head
- Environmental Side Effects

**DESCRIPTION:**

Consists of a settling basin followed by a filter. The most common filter media is sand; some use peat/sand mixture.

**APPLICATION:**

- < Objective is to remove only sediment (particulate pollutants).
- < Use where unavailability of water prevents the use of wet ponds, wetlands, or biofilters.
- < Can be placed underground.
- < Suitable for individual developments and small tributary areas up to about 100 acres.
- < May require less space than other treatment control BMPs.

**INSTALLATION/APPLICATION CRITERIA:**

- < Settling basin smaller than wet or extended detention basin.
- < Spread flow across filter.
- < Place filter offline to protect from extreme events.
- < Minimize erosion in settling basin.

**LIMITATIONS:**

- < Filter may require more frequent maintenance than most of the other BMPs.
- < Head loss.
- < Dissolved pollutants are not captured by sand.
- < Severe clogging potential if exposed soil surfaces exist upstream.

**MAINTENANCE:**

Clean filter surface about twice annually; or more often if watershed is excessively erosive.

**TARGETED POLLUTANTS**

- Sediment
- Nutrients
- Heavy Metals
- Toxic Materials
- Oxygen Demanding Substances
- Oil & Grease
- Floatable Materials
- Bacteria & Viruses

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High     Medium     Low

**DESCRIPTION:**

Placement of material such as straw, grass, woodchips, woodfibers or fabricated matting over open area.

**APPLICATION:**

- < Any exposed area to remain untouched longer than 14 days and that will be exposed less than 60 days (seed areas to be exposed in excess of 60 days).
- < Areas that have been seeded.
- < Stockpiled soil material.

Material	Application	Depth	Comments
Gravel: Washed 1/4" to 1-1/2"	9 cy/1000 sf	3 inches	Good for traffic areas Good for short slopes
Straw: Air-dried, free of seeds and coarse material	2-3 bales /1000 sf	2 inches min.	Subject to wind blowing Tack down or keep moist
Wood Fiber Cellulose: Free from growth inhibitors; dyed green	35 lb/1000 sf	1 inch	For critical areas, double application rate; Limit to slopes < 3% and < 150 feet

**INSTALLATION/APPLICATION CRITERIA:**

- < Roughen area to receive mulch to create depressions that mulch material can settle into.
- < Apply mulch to required thickness and anchor as necessary.
- < Ensure material used is weed free and does not contain any constituents that will inhibit plant growth.

**LIMITATIONS:**

- < Anchoring may be required to prevent migration of mulch material.
- < Downgradient control may be required to prevent mulch material being transported to storm water system.

**MAINTENANCE:**

- < Inspect mulched areas after every rainfall event and at a minimum of monthly.
- < Replace mulch on any bare areas and reanchor as necessary.
- < Clean and replace downgradient controls as necessary.

**OBJECTIVES**

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

**TARGETED POLLUTANTS**

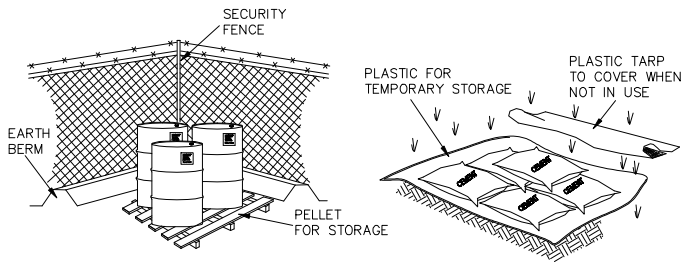
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**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High     Medium     Low



- ▶ CONTROLLED STORAGE LOCATION
- ▶ BERMED PERIMETER IMPOUNDMENT
- ▶ STORAGE OFF GROUND
- ▶ COVER WHEN NOT IN USE

**OBJECTIVES**

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

**DESCRIPTION:**

Controlled storage of on-site materials.

**APPLICATION:**

- < Storage of hazardous, toxic, and all chemical substances.
- < Any construction site with outside storage of materials.

**INSTALLATION/APPLICATION CRITERIA:**

- < Designate a secured area with limited access as the storage location. Ensure no waterways or drainage paths are nearby.
- < Construct compacted earthen berm (See Earth Berm Barrier Information Sheet), or similar perimeter containment around storage location for impoundment in the case of spills.
- < Ensure all on-site personnel utilize designated storage area. Do not store excessive amounts of material that will not be utilized on site.
- < For active use of materials away from the storage area ensure materials are not set directly on the ground and are covered when not in use. Protect storm drainage during use.

**LIMITATIONS:**

- < Does not prevent contamination due to mishandling of products.
- < Spill Prevention and Response Plan still required.
- < Only effective if materials are actively stored in controlled location.

**MAINTENANCE:**

- < Inspect daily and repair any damage to perimeter impoundment or security fencing.
- < Check materials are being correctly stored (i.e. standing upright, in labeled containers, tightly capped) and that no materials are being stored away from the designated location.

**TARGETED POLLUTANTS**

- Sediment
- Nutrients
- Toxic Materials
- Oil & Grease
- Floatable Materials
- Other Waste

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High     Medium     Low



**OBJECTIVES**

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

**DESCRIPTION:**

Prevent or reduce the discharge of pollutants to storm water from material use by using alternative products, minimizing hazardous material use on-site, and training employees and subcontractors.

**APPLICATION:**

The following materials are commonly used on construction sites:

- < Pesticides and herbicides, fertilizers, detergents, plaster and other products, petroleum products such as fuel, oil, and grease.
- < Other hazardous chemicals such as acids, lime, glues, paints, solvents, and curing compounds.

**INSTALLATION/APPLICATION CRITERIA:**

- < Use less hazardous, alternative materials as much as possible.
- < Minimize use of hazardous materials on-site.
- < Use only materials where and when needed to complete the construction activity.
- < Follow manufacturer's instructions regarding uses, protective equipment, ventilation, flammability, and mixing of chemicals.
- < Personnel who use pesticides should be trained in their use.
- < Do not over apply fertilizers, herbicides, and pesticides. Prepare only the amount needed.
- < Unless on steep slopes, till fertilizers in to the soil rather than hydroseeding.
- < Do not apply these chemicals just before it rains.

**LIMITATIONS:**

Alternative materials may not be available, suitable, or effective in every case.

**MAINTENANCE:**

Maintenance of this best management practice is minimal.

**TARGETED POLLUTANTS**

- Sediment
- Nutrients
- Toxic Materials
- Oil & Grease
- Floatable Materials
- Other Waste

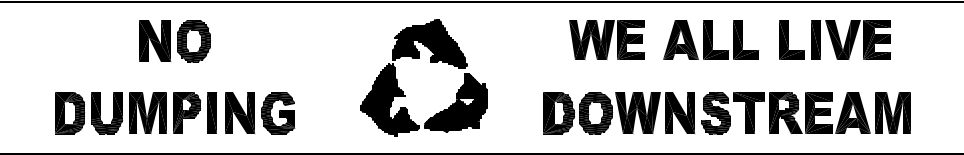
- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High     Medium     Low





APPLICATIONS

- Manufacturing
- Material Handling
- Vehicle Maintenance
- Construction
- Commercial Activities
- Roadways
- Waste Containment
- Housekeeping Practices

DESCRIPTION:

Eliminate non-stormwater discharges to the stormwater collection system. Non-stormwater discharges may include: process wastewaters, cooling waters, wash waters, and sanitary wastewater.

APPROACH:

The following approaches may be used to identify non-stormwater discharges:

- < Visual inspection: the easiest method is to inspect each discharge point during dry weather. Keep in mind that drainage from a storm event can continue for three days or more and groundwater may infiltrate the underground stormwater collection system.
- < Piping Schematic Review: The piping schematic is a map of pipes and drainage systems used to carry wastewater, cooling water, sanitary wastes, etc... A review of the "as-built" piping schematic is a way to determine if there are any connections to the stormwater collection system. Inspect the path of floor drains in older buildings.
- < Smoke Testing: Smoke testing of wastewater and stormwater collection systems is used to detect connections between the two systems. During dry weather the stormwater collection system is filled with smoke and then traced to sources. The appearance of smoke at the base of a toilet indicates that there may be a connection between the sanitary and the stormwater system.
- < Dye Testing: A dye test can be performed by simply releasing a dye into either the sanitary or process wastewater system and examining the discharge points from the stormwater collection system for discoloration.

LIMITATIONS:

- < Many facilities do not have accurate, up-to-date schematic drawings.
- < Video and visual inspections can identify illicit connections to the storm sewer, but further testing is sometimes required (e.g. dye, smoke) to identify sources.

TARGETED POLLUTANTS

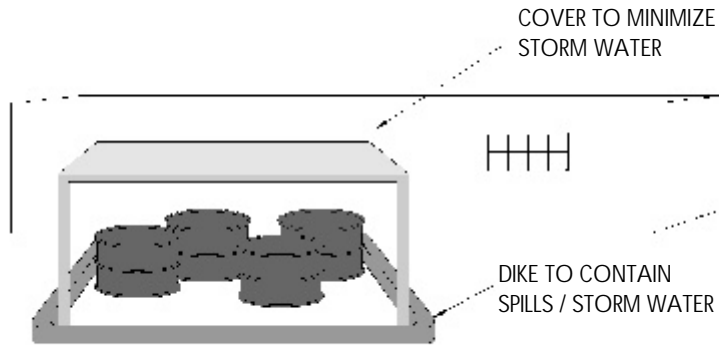
- Sediment
- Nutrients
- Heavy Metals
- Toxic Materials
- Oxygen Demanding Substances
- Oil & Grease
- Floatable Materials
- Bacteria & Viruses

- High Impact
- Medium Impact
- Low or Unknown Impact

IMPLEMENTATION REQUIREMENTS

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High  Medium  Low



**APPLICATIONS**

- Manufacturing
- Material Handling
- Vehicle Maintenance
- Construction
- Commercial Activities
- Roadways
- Waste Containment
- Housekeeping Practices

**DESCRIPTION:**

Prevent or reduce the discharge of pollutants to stormwater from outdoor container storage areas by installing safeguards against accidental releases, installing secondary containment, conducting regular inspections, and training employees in standard operating procedures and spill cleanup techniques.

**APPROACH:**

Protect materials from rainfall, runoff, and wind dispersal:

- < Store materials indoors.
- < Cover the storage area with roof.
- < Minimize stormwater runoff by enclosing the area or building a berm around it.
- < Use a "doghouse" for storage of liquid containers.
- < Use covered dumpsters for waste product containers.

Storage of oil and hazardous materials must meet specific federal and state standards including:

- < secondary containment,
- < integrity and leak detection monitoring, and
- < emergency preparedness plans.

Train operator on proper storage.

Safeguards against accidental releases:

- < Overflow protection devices to warn operator or automatic shut down transfer pumps, protection guards (bollards) around tanks and piping to prevent vehicle or forklift damage, clear tagging or labeling, and restricting access to valves to reduce human error.

Berm or surround tank or container with secondary containment system:

- < Dikes, liners, vaults, or double walled tanks.

Some municipalities require that secondary containment areas be connected to the sanitary sewer, prohibiting any hard connections to the storm drain.

**LIMITATIONS:**

Storage sheds often must meet building and fire code requirements.

**MAINTENANCE:**

Conduct routine weekly inspections.

**TARGETED POLLUTANTS**

- Sediment
- Nutrients
- Heavy Metals
- Toxic Materials
- Oxygen Demanding Substances
- Oil & Grease
- Floatable Materials
- Bacteria & Viruses

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High
- Medium
- Low



**APPLICATIONS**

- Manufacturing
- Material Handling
- Vehicle Maintenance
- Construction
- Commercial Activities
- Roadways
- Waste Containment
- Housekeeping Practices

**DESCRIPTION:**

Prevent or reduce the discharge of pollutants to stormwater from outdoor loading/unloading of materials.

**APPROACH:**

- < Park tank trucks or delivery vehicles so that spills or leaks can be contained.
- < Cover the loading/unloading docks to reduce exposure of materials to rain.
- < A seal or door skirt between trailer and building can also prevent exposure to rain.
- < Design loading/unloading area to prevent stormwater runoff: grade/berm and position roof downspouts to direct stormwater away from loading/unloading areas.
- < Contain leaks during transfer.
- < Use drip pans under hoses.
- < Make sure fork lift operators are properly trained.
- < Train employees for spill containment and cleanup.

**LIMITATIONS:**

- < Space and time limitations may preclude all transfers from being performed indoors or under cover.
- < It may not be possible to conduct transfers only during dry weather.

**MAINTENANCE:**

- < Conduct regular inspections and make repairs as necessary. The frequency of repairs will depend on the age of the facility.
- < Check loading and unloading equipment regularly for leaks: valves, pumps, flanges, and connections.

**TARGETED POLLUTANTS**

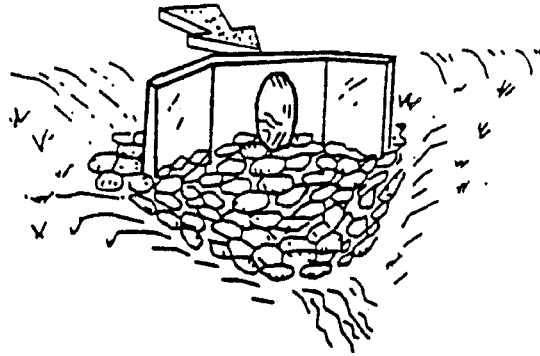
- Sediment
- Nutrients
- Heavy Metals
- Toxic Materials
- Oxygen Demanding Substances
- Oil & Grease
- Floatable Materials
- Bacteria & Viruses

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High  Medium  Low



**OBJECTIVES**

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

**DESCRIPTION:**

A rock outlet protection is a physical device composed of rock, grouted riprap, or concrete rubble which is placed at the outlet of a pipe to prevent scour of the soil caused by high pipe flow velocities, and to absorb flow energy to produce non-erosive velocities.

**APPLICATIONS:**

- < Wherever discharge velocities and energies at the outlets of culverts, conduits, or channels are sufficient to erode the next downstream reach.
- < Rock outlet protection is best suited for temporary use during construction because it is usually less expensive and easier to install than concrete aprons or energy dissipators.
- < A sediment trap below the pipe outlet is recommended if runoff is sediment laden.
- < Permanent rock riprap protection should be designed and sized by the engineer as part of the culvert, conduit or channel design.
- < Grouted riprap should be avoided in areas of freeze and thaw because the grout will break up.

**INSTALLATION/APPLICATION CRITERIA:**

Rock outlet protection is effective when the rock is sized and placed properly. When this is accomplished, rock outlets do much to limit erosion at pipe outlets. Rock size should be increased for high velocity flows. Best results are obtained when sound, durable, angular rock is used.

**LIMITATIONS:**

- < Large storms often wash away the rock outlet protection and leave the area susceptible to erosion.
- < Sediment captured by the rock outlet protection may be difficult to remove without removing the rock.
- < Outlet protection may negatively impact the channel habitat.

**MAINTENANCE:**

- < Inspect after each significant rain for erosion and/or disruption of the rock, and repair immediately.
- < Grouted or wire-tied rock riprap can minimize maintenance requirements.

**TARGETED POLLUTANTS**

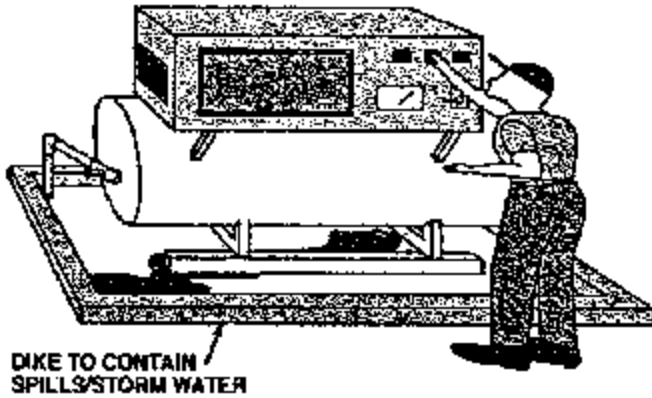
- Sediment
- Nutrients
- Toxic Materials
- Oil & Grease
- Floatable Materials
- Other Waste

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High
- Medium
- Low



**APPLICATIONS**

- Manufacturing
- Material Handling
- Vehicle Maintenance
- Construction
- Commercial Activities
- Roadways
- Waste Containment
- Housekeeping Practices

**DESCRIPTION:**

Prevent or reduce the discharge of pollutants to stormwater from outdoor process equipment operations and maintenance by reducing the amount of waste created, enclosing or covering all or some of the equipment, installing secondary containment, and training employees.

**APPROACH:**

- < Alter the activity to prevent exposure of pollutants to stormwater.
- < Move activity indoors.
- < Cover the area with a permanent roof.
- < Minimize contact of stormwater with outside manufacturing operations through berming and drainage routing (runon prevention).
- < Connect process equipment area to public sewer or facility wastewater treatment system.
- < Clean the storm drainage system regularly.
- < Use catch basin filtration inserts as a means to capture particulate pollutants.
- < Some municipalities require that secondary containment areas (regardless of size) be connected to the sanitary sewer, prohibiting any hard connections to the storm drain.

**LIMITATIONS:**

- < Providing cover may be expensive.
- < Space limitations may preclude enclosing some equipment.
- < Storage sheds often must meet building and fire code requirements.

**MAINTENANCE:**

Routine preventive maintenance, including checking process equipment for leaks.

**TARGETED POLLUTANTS**

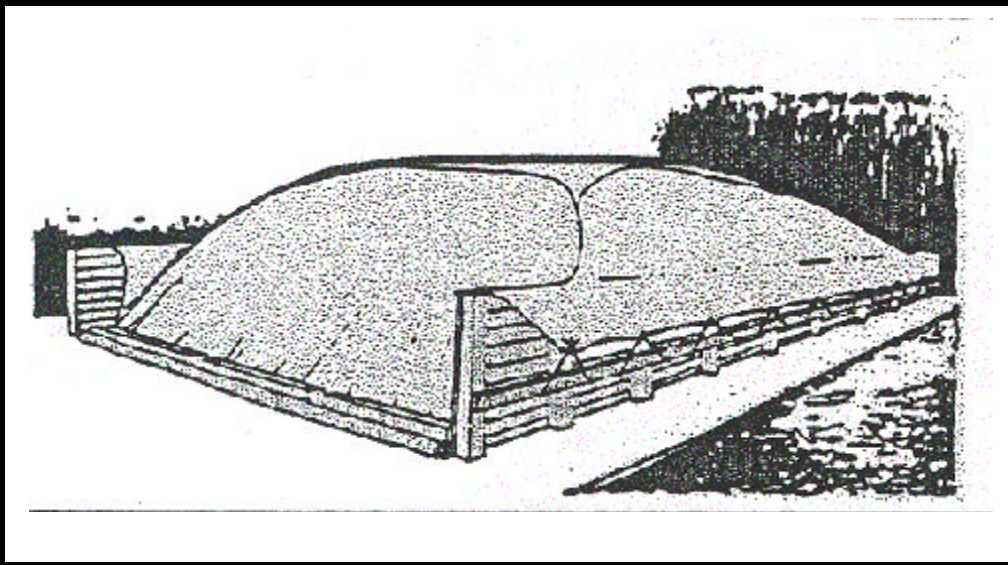
- Sediment
- Nutrients
- Heavy Metals
- Toxic Materials
- Oxygen Demanding Substances
- Oil & Grease
- Floatable Materials
- Bacteria & Viruses

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High    Medium    Low



**APPLICATIONS**

- Manufacturing
- Material Handling
- Vehicle Maintenance
- Construction
- Commercial Activities
- Roadways
- Waste Containment
- Housekeeping Practices

**DESCRIPTION:**

Prevent or reduce the discharge of pollutants to stormwater from outdoor materials and product storage areas by enclosing or covering materials, installing secondary containment, and preventing stormwater runoff.

**APPROACH:**

Protect materials from rainfall, runoff, runoff and wind dispersal:

- Store material indoors.
  - Cover the storage area with a roof.
  - Cover the material with a temporary covering made of polyethylene, polypropylene, or hypalon.
  - Minimize stormwater runoff by enclosing the area or building a berm around the area.
  - Use a "doghouse" for storage of liquid containers.
- < Parking lots or other surfaces near bulk materials should be swept periodically to remove debris blown or washed from storage area.
  - < Install pellet traps at stormwater discharge points where plastic pellets are loaded and unloaded.
  - < Keep liquids in a designated area on a paved impervious surface within a secondary containment.
  - < Keep outdoor storage containers in good condition.
  - < Use berms and curbing.
  - < Use catch basin filtration inserts.

**LIMITATIONS:**

- < Space limitations may preclude storing some materials indoors.
- < Some municipalities require that secondary containment areas (regardless of size) be connected to the sanitary sewer, prohibiting any hard connections to the storm drain.
- < Storage sheds often must meet building and fire code requirements.

**MAINTENANCE:**

Berm and curbing repair and patching.

**TARGETED POLLUTANTS**

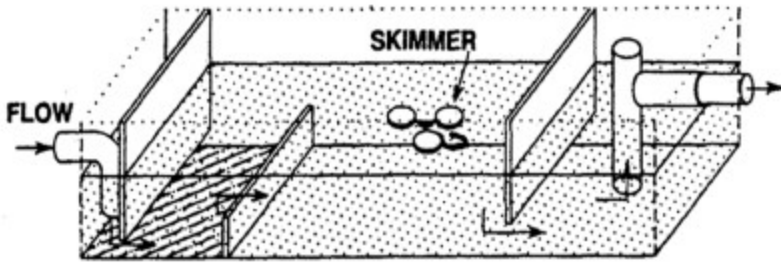
- Sediment
- Nutrients
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- Oil & Grease
- Floatable Materials
- Bacteria & Viruses

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High
- Medium
- Low



**CONSIDERATIONS**

- Soils
- Area Required
- Slope
- Water Availability
- Aesthetics
- Hydraulic Head
- Environmental Side Effects

**DESCRIPTION:**

Oil/Water separators are designed to remove a specific group of contaminants: petroleum compounds and grease. However, separators will also remove floatable debris and settleable solids. Two general types of oil/water separators are used: conventional gravity separator and the coalescing plate interceptor (CPI).

**APPLICATION:**

- < Applicable to situations where the concentration of oil and grease related compounds is abnormally high and source control cannot provide effective control. The general types of businesses where this situation is likely are truck, car, and equipment maintenance and washing businesses, as well as businesses that perform maintenance on their own equipment and vehicles.
- < Public facilities where separators may be required include marine ports, airfields, fleet vehicle maintenance and washing, facilities, and mass transit park-and-ride lots.
- < Conventional separators are capable of removing oil droplets with diameters equal to or greater than 150 microns.
- < A CPI separator should be used if smaller droplets must be removed.

**INSTALLATION/APPLICATION CRITERIA:**

- < Sizing relates to anticipated influent oil concentration, water temperature and velocity, and the effluent goal.
- < To maintain a reasonable separator size, it should be designed to bypass flows in excess of first flush.

**LIMITATIONS:**

- < The lack of data on oil characteristics in stormwater leads to considerable uncertainty about performance.
- < An air quality permit may be required.

**MAINTENANCE:**

Clean frequently of accumulated oil, grease, and floating debris.

**TARGETED POLLUTANTS**

- Sediment
- Nutrients
- Heavy Metals
- Toxic Materials
- Oxygen Demanding Substances
- Oil & Grease
- Floatable Materials
- Bacteria & Viruses

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High
- Medium
- Low



**DESCRIPTION:**

Public education/participation, like an ordinance or a piece of equipment, is not so much a best management practice as it is a method by which to implement BMPs. This information sheet highlights the importance of integrating elements of public education and participation into a municipality's overall plan for stormwater quality management.

A public education and participation plan provides the municipality with a strategy for educating its employees, the public, and businesses about the importance of protecting stormwater from improperly used, stored, and disposed of pollutants. Municipal employees must be trained, especially those that work in departments not directly related to stormwater but whose actions affect stormwater. Residents must become aware that a variety of hazardous products are used in the home and that their improper use and disposal can pollute stormwater. Increased public awareness also facilitates public scrutiny of industrial and municipal activities and will likely increase public reporting of incidents.

**APPROACH:**

- < Pattern a new program after the many established programs around the country.
- < Implement public education/participation as a coordinated campaign in which each message is related to the last.
- < Present a clear and consistent message and image to the public regarding how they contribute to stormwater pollution and what they can do to reduce it.
- < Utilize multi-media to reach the full range of audiences.
- < Translate messages into the foreign languages of the community to reach the full spectrum of your populace and to avoid misinterpretation of messages.
- < Create an awareness and identification with the local watershed.
- < Use everyday language in all public pieces. Use outside reviewers to highlight and reduce the use of technical terminology, acronyms, and jargon.
- < Make sure all statements have a sound, up-to-date technical basis. Do not contribute to the spread of misinformation.
- < Break complicated subjects into smaller more simple concepts. Present these concepts to the public in a metered and organized way to avoid "overloading" and confusing the audience.

**LIMITATIONS:**

None.

**PROGRAM ELEMENTS**

- New Development
- Residential
- Commercial Activities
- Industrial Activities
- Municipal Facilities
- Illegal Discharges

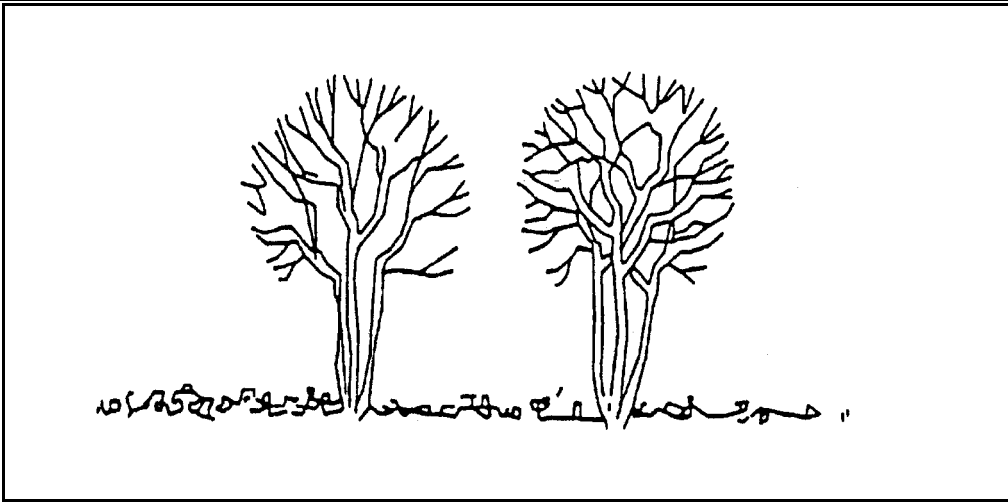
**TARGETED POLLUTANTS**

- Sediment
  - Nutrients
  - Heavy Metals
  - Toxic Materials
  - Oxygen Demanding Substances
  - Oil & Grease
  - Floatable Materials
  - Bacteria & Viruses
- High Impact
  - Medium Impact
  - Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
  - O&M Costs
  - Regulatory
  - Training
  - Staffing
  - Administrative
- High     Medium     Low





**OBJECTIVES**

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

**GENERAL DESCRIPTION:**

Carefully planned preservation of existing vegetation minimizes the potential of removing or injuring existing trees, vines, shrubs and/or grasses that serve as erosion controls.

**APPLICATIONS:**

This technique is applicable to all types of sites. Areas where preserving vegetation can be particularly beneficial are floodplains, wetlands, stream banks, steep slopes, and other areas where erosion controls would be difficult to establish, install, or maintain.

**INSTALLATION/APPLICATION CRITERIA:**

- < Clearly mark, flag or fence vegetation or areas where vegetation should be preserved.
- < Prepare landscaping plans which include as much existing vegetation as possible and state proper care during and after construction.
- < Define and protect with berms, fencing, signs, etc. a setback area from vegetation to be preserved.
- < Propose landscaping plans which do not include plant species that compete with the existing vegetation.
- < Do not locate construction traffic routes, spoil piles, etc. where significant adverse impact on existing vegetation may occur.

**LIMITATIONS:**

- < Requires forward planning by the owner/developer, contractor and design staff.
- < For sites with diverse topography, it is often difficult and expensive to save existing trees while grading the site satisfactorily for the planned development.
- < May not be cost effective with high land costs.

**MAINTENANCE:**

- < Inspection and maintenance requirements for protection of vegetation are low.
- < Maintenance of native trees or vegetation should conform to landscape plan specifications.

**TARGETED POLLUTANTS**

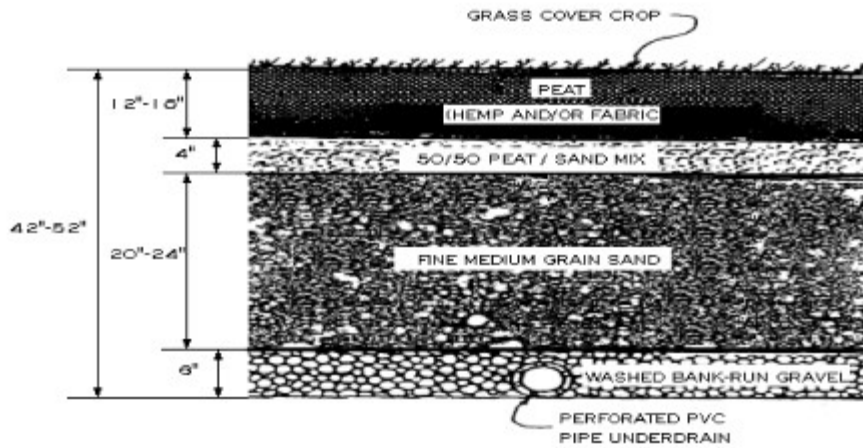
- Sediment
- Nutrients
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- Oil & Grease
- Floatable Materials
- Other Waste

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High
- Medium
- Low



**CONSIDERATIONS**

- Soils
- Area Required
- Slope
- Water Availability
- Aesthetics
- Hydraulic Head
- Environmental Side Effects

**DESCRIPTION:**

A filter system containing fabric or hemic peat and consisting of a sedimentation chamber or pond, a surface vertical filter system, a grass cover crop, and alternating layers of peat and sand all underlain by collector pipes in a gravel bed.

**APPLICATION:**

- < Development where insufficient space exists for a wet pond.
- < Development where higher rates of pollutant removal are preferred.

**INSTALLATION/APPLICATION CRITERIA:**

- < Use only fabric or hemic peat. Sapric peat will result in system failure.
- < Can be used in high water table areas.
- < Peat will not remove pollutants if it becomes oxygen depleted.

**LIMITATIONS:**

- < Suitable peat material may not always be available.
- < System must be shut down during the winter months.
- < Sites with little or no gradient may prevent sufficient gravity flow through the system.

**MAINTENANCE:**

- < During dry seasons or periods of drought the cover crop may require irrigation.
- < Remove silt when accumulation exceeds 6" (15.2 cm).
- < Remove accumulated trash and debris every 6 months or as necessary.

**TARGETED POLLUTANTS**

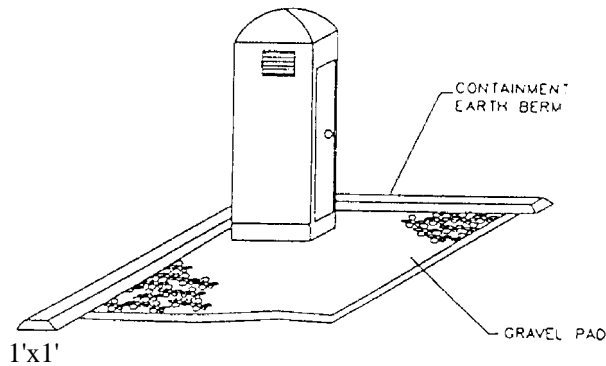
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- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High     Medium     Low



**OBJECTIVES**

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

**DESCRIPTION:**

Temporary on-site sanitary facilities for construction personnel.

**APPLICATION:**

All sites with no permanent sanitary facilities or where permanent facility is too far from activities.

**INSTALLATION/APPLICATION CRITERIA:**

- < Locate portable toilets in convenient locations throughout the site.
- < Prepare level, gravel surface and provide clear access to the toilets for servicing and for on-site personnel.
- < Construct earth berm perimeter (See Earth Berm Barrier Information Sheet), control for spill/protection leak.

**LIMITATIONS:**

No limitations.

**MAINTENANCE:**

- < Portable toilets should be maintained in good working order by licensed service with daily observation for leak detection.
- < Regular waste collection should be arranged with licensed service.
- < All waste should be deposited in sanitary sewer system for treatment with appropriate agency approval.

**TARGETED POLLUTANTS**

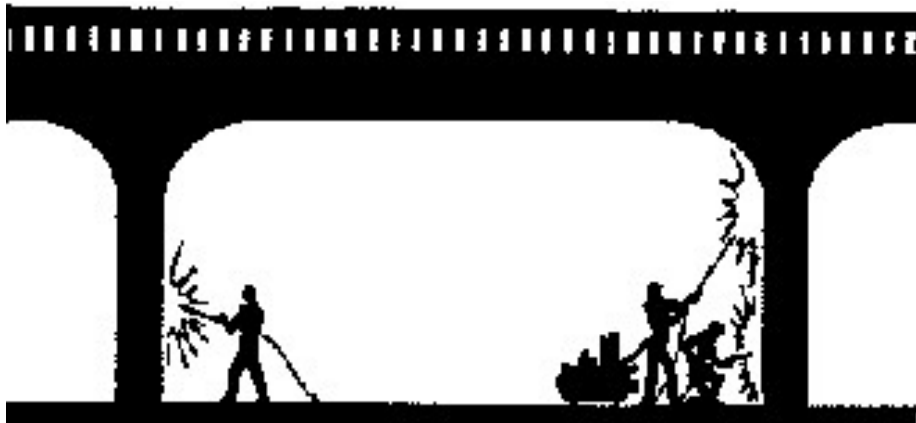
- Sediment
- Nutrients
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- Other Waste

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High
- Medium
- Low



**DESCRIPTION:**

Address stormwater pollution from roadway and bridge maintenance on a site-specific basis. The deposition and subsequent magnitude of pollutants found in road and bridge runoff is variable and affected by climate, surrounding land use, roadway or bridge design, traffic volume, and frequency and severity of accidental spills.

**APPROACH:**

Prevent or reduce the discharge of pollutants to stormwater from roadway and bridge maintenance by:

- < paving as little as possible,
- < designing bridges to collect and convey stormwater,
- < using measures to prevent runoff and runoff,
- < properly disposing of maintenance wastes, and
- < training employees and subcontractors.

Some general measures for roadway maintenance should be implemented:

- < Sweep and vacuum heavily traveled roadways to remove accumulated sediment and debris. (See the Street Sweeping BMP sheet).
- < Ensure proper handling, application, and disposal of pesticides, fertilizers, and paints.
- < Do not over-apply deicing salt and sand, and routinely calibrate spreaders.

The following steps will help reduce the stormwater impacts of bridge maintenance:

- < Site new bridges so that significant adverse impacts to wetlands, sensitive areas, critical habitat, and riparian vegetation are minimized.
- < Design new bridges to avoid the use of scupper drains and route runoff to land for treatment control. Existing scupper drains should be cleaned of debris on a regular basis.
- < Reduce the discharge of pollutants to surface waters during maintenance by using suspended traps, vacuums, or booms in the water to capture paint, rust, and removing agents.
- < Train employees and subcontractors to reduce the discharge of wastes during bridge maintenance.

**LIMITATIONS:**

- < The minimization of impervious areas may be limited by minimum required widths for roadways, shoulders, etc.
- < The siting of new bridges is limited by available land, socioeconomic, fiscal, and political issues.

**PROGRAM ELEMENTS**

- New Development
- Residential
- Commercial Activities
- Industrial Activities
- Municipal Facilities
- Illegal Discharges

**TARGETED POLLUTANTS**

- Sediment
- Nutrients
- Heavy Metals
- Toxic Materials
- Oxygen Demanding Substances
- Oil & Grease
- Floatable Materials
- Bacteria & Viruses

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Regulatory
- Training
- 9 Staffing
- 9 Administrative

- High     Medium    9 Low



**CONSIDERATIONS**

- Soils
- Area Required
- Slope
- Water Availability
- Aesthetics
- Hydraulic Head
- Environmental Side Effects

**DESCRIPTION:**

Riprap is a permanent, erosion-resistant protective layer made of loose stones. It is intended to protect soil from erosion in areas of concentrated runoff. Riprap may also be used to stabilize slopes that are unstable because of seepage problems.

**APPLICATION:**

- < Riprap is normally used at locations where erosive forces from water flow exceed the ability of the soil or vegetative cover to resist those forces.
- < Riprap can be used for pipe outlet protection, channel lining, scour protection, etc.
- < Riprap is commonly used for wave protection on lakes.

**INSTALLATION/APPLICATION CRITERIA:**

- < For slopes steeper than 2:1, consider using materials other than riprap for erosion protection.
- < If riprap is being planned for the bottom of a permanently flowing channel, the bottom can be modified to enhance fish habitat. This can be done by constructing riffles and pools which simulate natural conditions.
- < When working within flowing streams, measures should be taken to prevent excessive turbidity and erosion during construction. Bypassing base flows or temporarily blocking base flows are two possible methods. Work should be done during a period of low flow.

In designing riprap consider the following:

- < Use durable rock, such as granite, and a variety of rock sizes.
- < The thickness of riprap layers should be at least 1.25 times the max. stone diameter.
- < Filter material is usually required between riprap and the underlying soil surface.

**LIMITATIONS:**

- < Riprap may be unstable on very steep slopes.
- < The placement of a riprap in streams requires a state stream alteration permit.

**MAINTENANCE:**

- < Riprap should be inspected annually and after major storms.
- < If riprap has been damaged, repairs should be made promptly to prevent a progressive failure.
- < If repairs are needed repeatedly at one location, the site should be evaluated to see if original design conditions have changed.

**TARGETED POLLUTANTS**

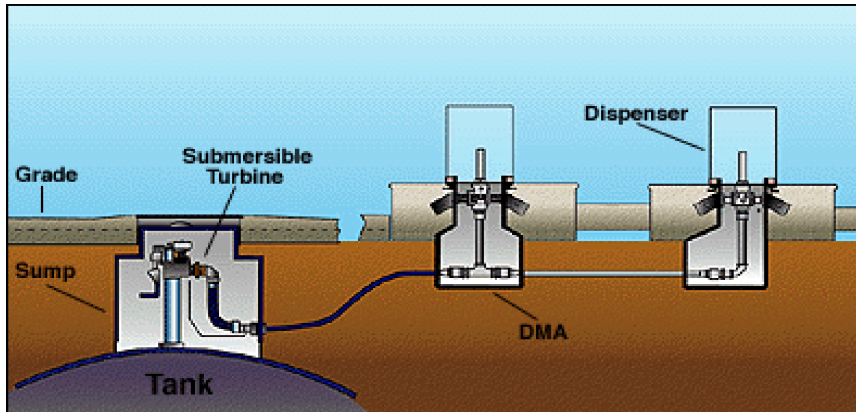
- Sediment
- Nutrients
- Heavy Metals
- Toxic Materials
- Oxygen Demanding Substances
- Oil & Grease
- Floatable Materials
- Bacteria & Viruses

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High
- Medium
- Low



**DESCRIPTION:**

Sumps are holes or low areas that are structured so that liquid spills or leaks will flow down toward a particular part of a containment area. Frequently, pumps are placed in a depressed area and are turned on automatically to transfer liquids away from the sump when the level of liquids gets too high. Sumps can be temporary or permanent.

**APPLICATION:**

Sumps can be used at all facilities. Sumps are used with other spill containment and treatment measures and can be located almost anywhere onsite. Sumps are frequently located in low lying areas within handling or storage areas.

**INSTALLATION/APPLICATION CRITERIA:**

- < Consider the pump location, function, and system alarms when designing a sump system.
- < Design and install the sump in the lowest lying area of a containment structure, allowing materials to gather in the area of the sump.
- < Construct the sump of impenetrable materials and provide a smooth surface so that liquids are funneled toward the sump.
- < It may be appropriate to house the pumps in a shed or other structure for protection and stabilization.

**LIMITATIONS:**

- < Pumps may clog easily if not designed correctly.
- < Costs for purchasing and/or replacing pumps may be high.

**MAINTENANCE:**

Where pumps are used, frequent inspection and maintenance should be performed. It may require a maintenance/servicing agreement with the pump dealers.

**CONSIDERATIONS**

- Soils
- Area Required
- Slope
- Water Availability
- Aesthetics
- Hydraulic Head
- Environmental Side Effects

**TARGETED POLLUTANTS**

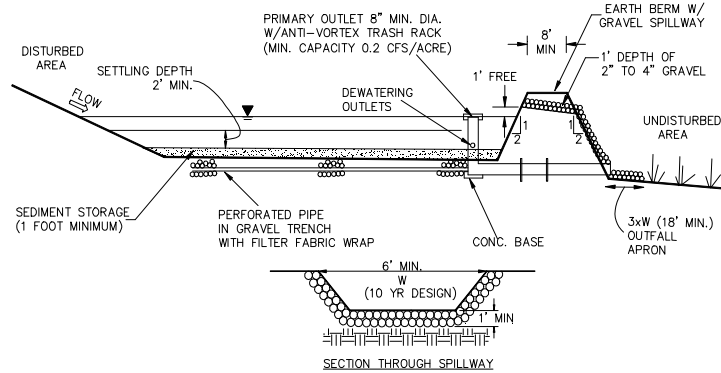
- Sediment
- Nutrients
- Heavy Metals
- Toxic Materials
- Oxygen Demanding Substances
- Oil & Grease
- Floatable Materials
- Bacteria & Viruses

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High     Medium     Low



**OBJECTIVES**

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

**DESCRIPTION:**

A pond created by excavation or construction of an embankment, and designed to retain or detain runoff sufficiently to allow excessive sediment to settle.

**APPLICATION:**

- < At the outlet of all disturbed watersheds 10 acres or larger.
- < At the outlet of smaller disturbed watersheds, as necessary.
- < Where post construction detention basins will be located.

**INSTALLATION/APPLICATION CRITERIA:**

- < Design basin for site specific location, maintain effective flow length 2 times width.
- < Excavate basin or construct compacted berm containment, ensure no downgradient hazard if failure should occur. (Provide minimum of 67 cy. per acre of drainage area).
- < Construct dewatering and outfall structure and emergency spillway with apron.

**LIMITATIONS:**

- High Impact
- Medium Impact
- Low or Unknown Impact

- < Should be sized based on anticipated runoff, sediment loading and drainage area size.
- < May require silt fence at outlet for entrapment of very fine silts and clays.
- < May require safety fencing to prevent public access.
- < Height restrictions for embankment regulated by Utah Division of Dam Safety.

**MAINTENANCE:**

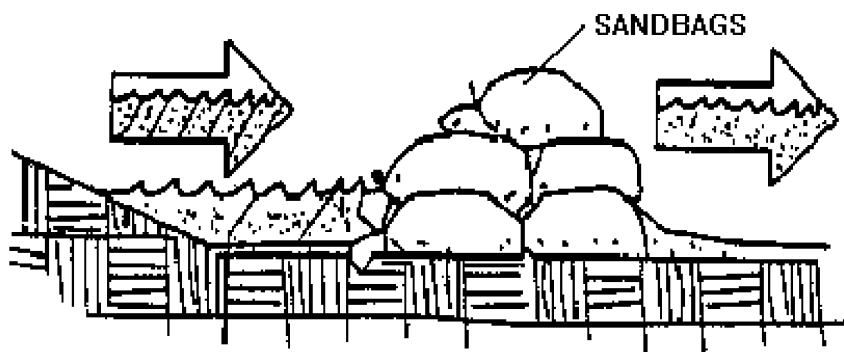
- < Inspect after each rainfall event and at a minimum of monthly.
- < Repair any damage to berm, spillway or sidewalls.
- < Remove accumulated sediment as it reaches 2/3 height of available storage.
- < Check outlet for sedimentation/erosion of downgradient area and remediate as necessary. Install silt fence if sedimentation apparent.

**TARGETED POLLUTANTS**

- Sediment
- Nutrients
- Toxic Materials
- Oil & Grease
- Floatable Materials
- Other Waste

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
  - O&M Costs
  - Maintenance
- High     Medium     Low
- Training



**DESCRIPTION:**

Stacking sand bags along a level contour creates a barrier which detains sediment-laden water, ponding water upstream of the barrier and promoting sedimentation.

**APPLICATION:**

- < Along the perimeter of the site.
- < May be used in drainage areas up to 5 acres.
- < Along streams and channels
- < Across swales with small catchments.
- < Around temporary spoil areas.
- < Below the toe of a cleared slope.

**INSTALLATION/APPLICATION CRITERIA:**

- < Install along a level contour.
- < Base of sand bag barrier should be at least 48 inches wide.
- < Height of sand bag barrier should be at least 18 inches high.
- < 4 inch PVC pipe may be installed between the top layer of sand bags to drain large flood flows.
- < Provide area behind barrier for runoff to pond and sediment to settle.
- < Place below the toe of a slope.

**LIMITATIONS:**

- < Sand bags are more expensive than other barriers, but also more durable.
- < Burlap should not be used.

**MAINTENANCE:**

- < Inspect after each rain.
- < Reshape or replace damaged sand bags immediately.
- < Replace sediment when it reaches six inches in depth.

**OBJECTIVES**

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

**TARGETED POLLUTANTS**

- Sediment
- Nutrients
- Toxic Materials
- Oil & Grease
- Floatable Materials
- Other Waste

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High
- Medium
- Low





**PROGRAM ELEMENTS**

- New Development
- Residential
- Commercial Activities
- Industrial Activities
- Municipal Facilities
- Illegal Discharges

**DESCRIPTION:**

Reduce the discharges of pollutants to stormwater from street surfaces by conducting street cleaning on a regular basis.

**APPROACH:**

- < Prioritize cleaning to use the most sophisticated sweepers, at the highest frequency, and in areas with the highest pollutant loading.
- < Restrict street parking prior to and during sweeping.
- < Increase sweeping frequency just before the rainy season.
- < Proper maintenance and operation of sweepers greatly increase their efficiency.
- < Keep accurate operation logs to track programs.
- < Reduce the number of parked vehicles using regulations.
- < Sweepers effective at removing smaller particles (less than 10 microns) may generate dust that would lead to concerns over worker and public safety.
- < Equipment selection can be key for this particular BMP. There are two types used, the mechanical broom sweepers (more effective at picking up large debris and cleaning wet streets), and the vacuum sweepers (more effective at removing fine particles and associated heavy metals). Many communities find it useful to have a compliment of both types in their fleet.

**LIMITATIONS:**

- < Conventional sweepers are not able to remove oil and grease.
- < Mechanical sweepers are not effective at removing finer sediments.
- < Effectiveness may also be limited by street conditions, traffic congestion, presence of construction projects, climatic conditions and condition of curbs.

**MAINTENANCE:**

- < Replace worn parts as necessary.
- < Install main and gutter brooms of the appropriate weight.

**TARGETED POLLUTANTS**

- Sediment
- Nutrients
- Heavy Metals
- Toxic Materials
- Oxygen Demanding Substances
- Oil & Grease
- Floatable Materials
- Bacteria & Viruses

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Regulatory
- Training
- Staffing
- Administrative

- High     Medium     Low



**PROGRAM ELEMENTS**

- New Development
- Residential
- Commercial Activities
- Industrial Activities
- Municipal Facilities
- Illegal Discharges

**DESCRIPTION:**

Reduce pollutant levels in stormwater by removing illegally dumped items and material from storm drainage channels and creeks. Modify channel characteristics to enhance pollutant removal and/or hydraulic capacity.

**APPROACH:**

- < Identify illegal dumping hot spots; regular inspection and clean up of hot spots and other storm drainage areas where illegal dumping and disposal occurs.
- < Post "No Littering" signs with a phone number for reporting a dumping in-progress.
- < Adopt and enforce substantial penalties for illegal dumping and disposal.
- < Modify storm channel characteristics to improve channel hydraulics, to increase pollutant removals, and to enhance channel/creek aesthetics and habitat value.
- < Maintain accurate logs to evaluate materials removed and improvements made.

**LIMITATIONS:**

- < Clean-up activities may create a slight disturbance for local aquatic species.
- < Access to items and material on private property may be limited.
- < Trade-offs may exist between channel hydraulics and water quality/riparian habitat.
- < Worker/public safety may be at risk in crime-ridden areas.
- < If storm channels or basins are recognized as wetlands, many activities, including maintenance, may be subject to regulation.

**TARGETED POLLUTANTS**

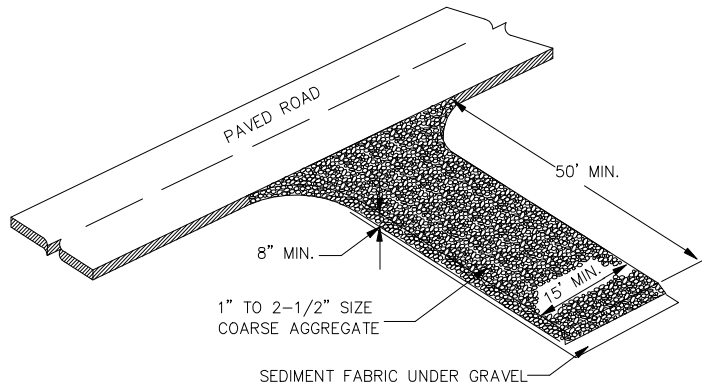
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- Nutrients
- Heavy Metals
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- Oxygen Demanding Substances
- Oil & Grease
- Floatable Materials
- Bacteria & Viruses

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Regulatory
- Training
- Staffing
- Administrative

- High     Medium     Low



**OBJECTIVES**

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

**DESCRIPTION:**

A stabilized pad of crushed stone located where construction traffic enters or leaves the site from or to paved surface.

**APPLICATIONS:**

At any point of ingress or egress at a construction site where adjacent traveled way is paved. Generally applies to sites over 2 acres unless special conditions exist.

**INSTALLATION/APPLICATION CRITERIA:**

- < Clear and grub area and grade to provide maximum slope of 2%.
- < Compact subgrade and place filter fabric if desired (recommended for entrances to remain for more than 3 months).
- < Place coarse aggregate, 1 to 2-1/2 inches in size, to a minimum depth of 8 inches.

**LIMITATIONS:**

- < Requires periodic top dressing with additional stones.
- < Should be used in conjunction with street sweeping on adjacent public right-of-way.

**MAINTENANCE:**

- < Inspect daily for loss of gravel or sediment buildup.
- < Inspect adjacent roadway for sediment deposit and clean by sweeping or shoveling.
- < Repair entrance and replace gravel as required to maintain control in good working condition.
- < Expand stabilized area as required to accommodate traffic and prevent erosion at driveways.

**TARGETED POLLUTANTS**

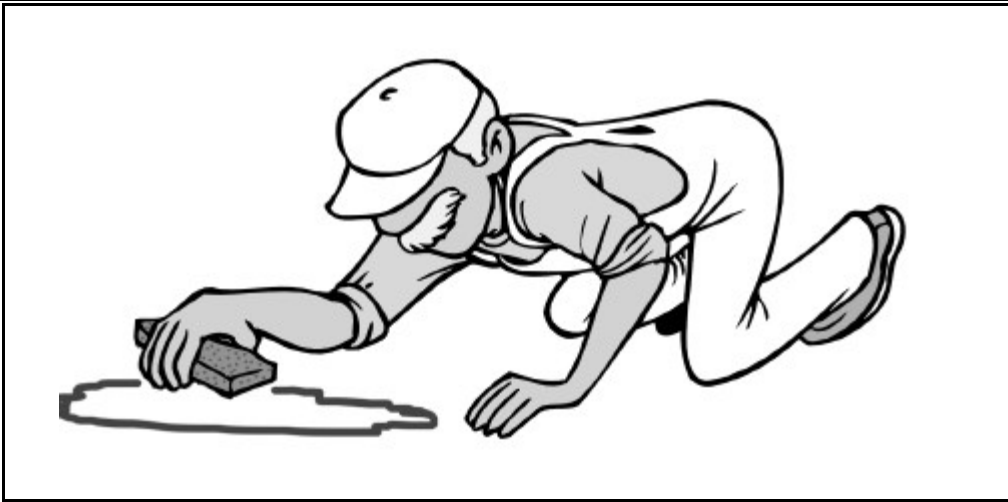
- Sediment
- Nutrients
- Toxic Materials
- Oil & Grease
- Floatable Materials
- Other Waste

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High     Medium     Low



**DESCRIPTION:**

Practices to clean-up leakage/spillage of on-site materials that may be harmful to receiving waters.

**APPLICATION:**

All sites

**GENERAL:**

- < Store controlled materials within a storage area.
- < Educate personnel on prevention and clean-up techniques.
- < Designate an Emergency Coordinator responsible for employing preventative practices and for providing spill response.
- < Maintain a supply of clean-up equipment on-site and post a list of local response agencies with phone numbers.

**METHODS:**

- < Clean-up spills/leaks immediately and remediate cause.
- < Use as little water as possible. NEVER HOSE DOWN OR BURY SPILL CONTAMINATED MATERIAL.
- < Use rags or absorbent material for clean-up. Excavate contaminated soils. Dispose of clean-up material and soil as hazardous waste.
- < Document all spills with date, location, substance, volume, actions taken and other pertinent data.
- < Contact local Fire Department and State Division of Environmental Response and Remediation (Phone #536-4100) for any spill of reportable quantity.

**OBJECTIVES**

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

**TARGETED POLLUTANTS**

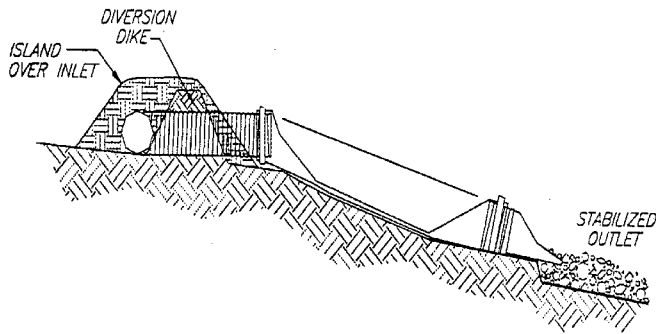
- Sediment
- Nutrients
- Toxic Materials
- Oil & Grease
- Floatable Materials
- Other Waste

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High
- Medium
- Low



**DESCRIPTION:**

A temporary pipe or lined channel that drains the top of a slope to a stable discharge point at the bottom of a slope without causing erosion.

**APPLICATIONS:**

- < Where concentrated flow of surface runoff must be conveyed down a slope in order to prevent erosion.
- < Drainage for top slope diversion dikes or swales.
- < Emergency spillway for a sediment basin.
- < Drainage for top of cut/fill slopes where water can accumulate.

**INSTALLATION/APPLICATION CRITERIA:**

- < Secure inlet and surround with dikes to prevent gully erosion, and anchor pipe to slope.
- < Size to convey at least the peak of a 10-year, storm event.
- < Stabilize outlet. (See Outlet Protection BMP).

**LIMITATIONS:**

- < Maximum drainage area per slope drain is 5 acres.
- < Clogged slope drains will force water around the pipe and cause slope erosion.
- < Dissipation of high flow velocities at the pipe outlet is required to avoid downstream erosion.
- < Failure can result in flooding and severe erosion.

**MAINTENANCE:**

- < Structure must be inspected weekly and after storms.
- < Inlet must be free of undercutting and no water should circumvent the entry.
- < Outlet should not produce erosion; velocity dissipators must be maintained.
- < Pipe anchors must be checked to ensure that the pipe remains anchored to the slope.

**OBJECTIVES**

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

**TARGETED POLLUTANTS**

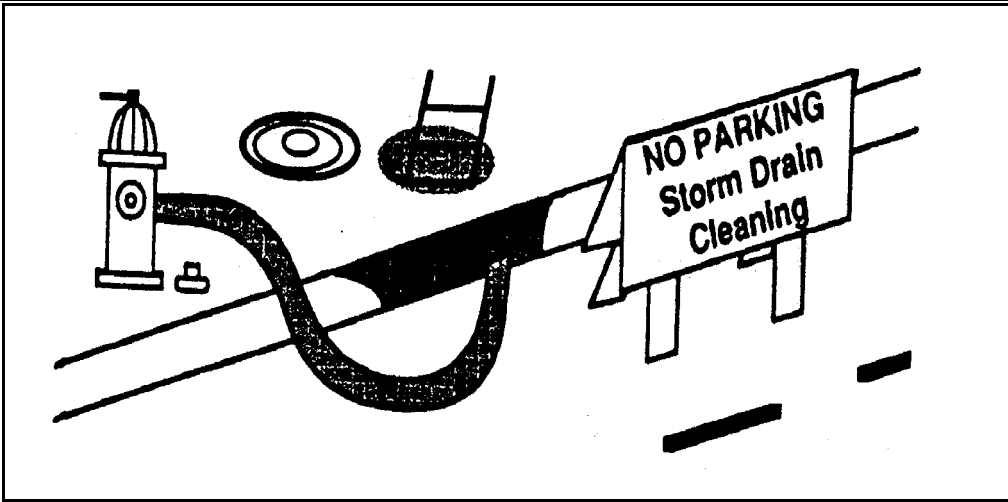
- Sediment
- Nutrients
- Toxic Materials
- Oil & Grease
- Floatable Materials
- Other Waste

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High
- Medium
- Low



**DESCRIPTION:**

A storm drain is “flushed” with water to suspend and remove deposited materials. Flushing is particularly beneficial for storm drain pipes with grades too flat to be self-cleansing. Flushing helps ensure pipes convey design flow and remove pollutants from the storm drain system.

**APPROACH:**

- < Locate reaches of storm drain with deposit problems and develop a flushing schedule that keeps the pipe clear of excessive buildup.
- < Whenever possible, flushed effluent should be collected, decanted, evaporated, and disposed of in a landfill.

**LIMITATIONS:**

- < Most effective in small diameter pipes (36-inch diameter pipe or less, depending on water supply and sediment collection capacity).
- < Water source must be available.
- < May have difficulty finding downstream area to collect sediments.
- < Requires liquid/sediment disposal.

**PROGRAM ELEMENTS**

- New Development
- Residential
- Commercial Activities
- Industrial Activities
- Municipal Facilities
- Illegal Discharges

**TARGETED POLLUTANTS**

- Sediment
- Nutrients
- Heavy Metals
- Toxic Materials
- Oxygen Demanding Substances
- Oil & Grease
- Floatable Materials
- Bacteria & Viruses

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Regulatory
- Training
- Staffing
- Administrative

- High     Medium     Low

**PROGRAM ELEMENTS**

- New Development
- Residential
- Commercial Activities
- Industrial Activities
- Municipal Facilities
- Illegal Discharges

**TARGETED POLLUTANTS**

- # Sediment
  - # Nutrients
  - Heavy Metals
  - # Toxic Materials
  - # Oxygen Demanding Substances
  - # Oil & Grease
  - # Floatable Materials
  - Bacteria & Viruses
- # High Impact
  - Medium Impact
  - Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
  - O&M Costs
  - Regulatory
  - Training
  - Staffing
  - Administrative
- # High     Medium     Low



**DESCRIPTION:**

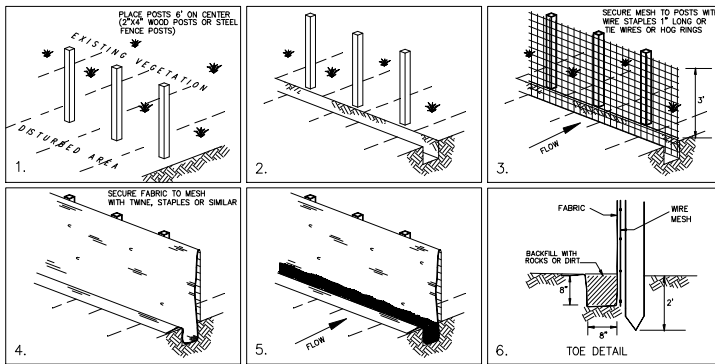
Stenciling of the storm drain system (inlets, catch basins, channels, and creeks) with prohibitive language/graphic icons discourages the illegal dumping of unwanted materials.

**APPROACH:**

- < Create a volunteer work force to stencil storm drain inlets.
- < An important aspect of a stenciling program is the distribution of informational flyers that educate the neighborhood (business and residential) about stormwater pollution, the storm drain system, and the watershed. The flyers should also provide information on alternatives such as recycling, household hazardous waste disposal, and safer products.
- < Because a stenciling program primarily involves volunteer services, liability release forms and volunteer identification notices should also be administered.
- < Readability of stencils is critical to their effectiveness. Wherever possible stencils should be painted on a smooth surface such as cement, as opposed to asphalt.
- < Use municipal staff to erect signs near drainage channels and creeks.
- < An effectively implemented stenciling program encourages change in personal behavior and helps minimize non-point source pollutants from entering the storm drain system. An additional benefit is that waste and catch basin maintenance is minimized through the reduction of disposed materials into storm drain inlets. Finally a well-implemented stenciling program encourages the use of household hazardous waste collection and used oil recycling programs.

**LIMITATIONS:**

- < Private property access limits stenciling to publicly-owned areas.
- < Program is highly dependent on volunteer response.
- < Storm drain inlets that are physically blocked will be missed or require follow-up.
- < High traffic/commercial/industrial zones are the responsibility of city staff.
- < Ongoing maintenance is needed to maintain readable signs.



**DESCRIPTION:**

A temporary sediment barrier consisting of entrenched filter fabric stretched across and secured to supporting posts.

**APPLICATION:**

- < Perimeter control: place barrier at downgradient limits of disturbance
- < Sediment barrier: place barrier at toe of slope or soil stockpile
- < Protection of existing waterways: place barrier at top of stream bank
- < Inlet protection: place fence surrounding catchbasins

**INSTALLATION/APPLICATION CRITERIA:**

- < Place posts 6 feet apart on center along contour (or use preassembled unit) and drive 2 feet minimum into ground. Excavate an anchor trench immediately upgradient of posts.
- < Secure wire mesh (14 gage min. With 6 inch openings) to upslope side of posts. Attach with heavy duty 1 inch long wire staples, tie wires or hog rings.
- < Cut fabric to required width, unroll along length of barrier and drape over barrier. Secure fabric to mesh with twine, staples, or similar, with trailing edge extending into anchor trench.
- < Backfill trench over filter fabric to anchor.

**LIMITATIONS:**

- < Recommended maximum drainage area of 0.5 acre per 100 feet of fence
- < Recommended maximum upgradient slope length of 150 feet
- < Recommended maximum uphill grade of 2:1 (50%)
- < Recommended maximum flow rate of 0.5 cfs
- < Ponding should not be allowed behind fence

**MAINTENANCE:**

- < Inspect immediately after any rainfall and at least daily during prolonged rainfall.
- < Look for runoff bypassing ends of barriers or undercutting barriers.
- < Repair or replace damaged areas of the barrier and remove accumulated sediment.
- < Reanchor fence as necessary to prevent shortcutting.
- < Remove accumulated sediment when it reaches 1/2 the height of the fence.

**OBJECTIVES**

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

**TARGETED POLLUTANTS**

- Sediment
- Nutrients
- Toxic Materials
- Oil & Grease
- Floatable Materials
- Other Waste

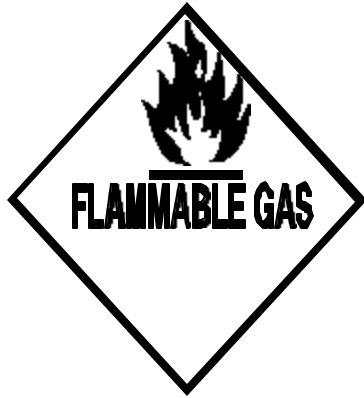
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**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High     Medium     Low





- APPLICATIONS**
- Manufacturing
  - Material Handling
  - Vehicle Maintenance
  - Construction
  - Commercial Activities
  - Roadways
  - Waste Containment
  - Housekeeping Practices

**DESCRIPTION:**

Signs and labels identify problem areas or hazardous materials at a facility. Warning signs, often found at industrial facilities, are a good way to suggest caution in certain areas. Signs and labels can also provide instructions on the use of materials and equipment. Labeling is a good way to organize large amounts of materials, pipes, and equipment, particularly on large sites.

**APPROACH:**

Signs and labels can be used at all types of facilities. Areas where they are particularly useful are material transfer areas, equipment areas, loading and unloading areas, or anywhere information might prevent contaminants from being released to stormwater.

Signs and labels should be visible and easy to read. Useful signs and labels might provide the following information:

- < Names of facility and regulatory personnel, including emergency phone numbers, to contact in case of an accidental discharge, spill, or other emergency.
- < Proper uses of equipment that could cause release of stormwater contaminants.
- < Types of chemicals used in high-risk areas.
- < The direction of drainage lines/ditches and their destination (treatment or discharge).
- < Information on a specific material.
- < Refer to OSHA standards for sizes and numbers of signs required for hazardous material labeling.

**LIMITATIONS:**

No limitations.

**MAINTENANCE:**

- < Periodic checks can ensure that signs are still in place and labels are properly attached.
- < Signs and labels should be replaced and repaired as often as necessary.

**TARGETED POLLUTANTS**

- Sediment
- Nutrients
- Heavy Metals
- Toxic Materials
- Oxygen Demanding Substances
- Oil & Grease
- Floatable Materials
- Bacteria & Viruses

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High
- Medium
- Low



**DESCRIPTION:**

Sorbents are materials that are capable of cleaning up spills through the chemical processes of adsorption and absorption. Sorbents adsorb (an attraction to the outer surface of a material) or absorb (taken in by the material like a sponge) only when they come in contact with the sorbent materials.

Sorbents include, but are not limited to, the following:

- < Common materials such as clays, sawdust, straw and fly ash
- < Polymers - polyurethane and polyolefin
- < Activated Carbon - powdered or granular
- < "Universal Sorbent Material" - a silicate glass foam consisting of rounded particles that can absorb the material.

**APPLICATION:**

Sorbents are useful BMPs for facilities with liquid materials onsite.

**INSTALLATION/APPLICATION CRITERIA:**

- < Personnel should know the properties of the spilled material(s) to know which sorbent is appropriate. To be effective, sorbents must adsorb the material spilled but must not react with the spilled material to form hazardous or toxic substances.
- < Apply immediately to the release area.
- < Application is generally simple: the sorbent is added to the area of release, mixed well, and allowed to adsorb or absorb.
- < Many sorbents are not reusable once they have been used.
- < Proper disposal is required.

**LIMITATIONS:**

- < Requires a knowledge of the chemical makeup of a spill (to choose the best sorbent).
- < May be an expensive practice for large spills.
- < May create disposal problems and increase disposal costs by creating a solid waste and potentially a hazardous waste.

**MAINTENANCE:**

No information available.

**CONSIDERATIONS**

- Soils
- Area Required
- Slope
- Water Availability
- Aesthetics
- Hydraulic Head
- Environmental Side Effects

**TARGETED POLLUTANTS**

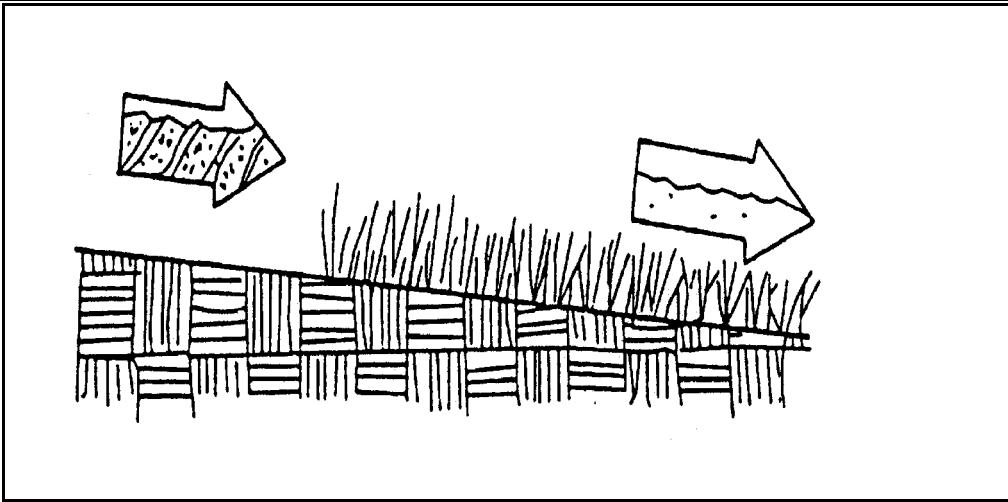
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- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High
- Medium
- Low



**DESCRIPTION:**

Seeding of grass and plantings of trees, shrubs, vines and ground covers provide long-term stabilization of soil. In some areas, with suitable climates, grasses can be planted for temporary stabilization.

**APPLICATION:**

- < Appropriate for site stabilization both during construction and post-construction.
- < Any graded/cleared areas where construction activities have ceased.
- < Open space cut and fill areas.
- < Steep slopes, spoil piles, vegetated swales, landscape corridors, stream banks.

**INSTALLATION/APPLICATION CRITERIA:**

Type of vegetation, site and seedbed preparation, planting time, fertilization and water requirements should be considered for each application.

Grasses:

- < Ground preparation: fertilize and mechanically stabilize the soil.
- < Tolerant of short-term temperature extremes and waterlogged soil composition.
- < Appropriate soil conditions: shallow soil base, good drainage, slope 2:1 or flatter.
- < Mowing, irrigating, and fertilizing are vital for promoting vigorous grass growth.

Trees and Shrubs:

- < Selection criteria: vigor, species, size, shape & wildlife food source.
- < Soil conditions: select species appropriate for soil, drainage & acidity.
- < Other factors: wind/exposure, temperature extremes, and irrigation needs.

Vines and Ground Covers:

- < Ground preparation: lime and fertilizer preparation.
- < Use proper seeding rates.
- < Appropriate soil conditions: drainage, acidity and slopes.
- < Generally avoid species requiring irrigation.

**LIMITATIONS:**

- < Permanent and temporary vegetation may not be appropriate in dry periods without irrigation.
- < Fertilizer requirements may have potential to create stormwater pollution.

**MAINTENANCE:**

- < Shrubs and trees must be adequately watered and fertilized and if needed pruned.
- < Grasses may need to be watered and mowed.

**OBJECTIVES**

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

**TARGETED POLLUTANTS**

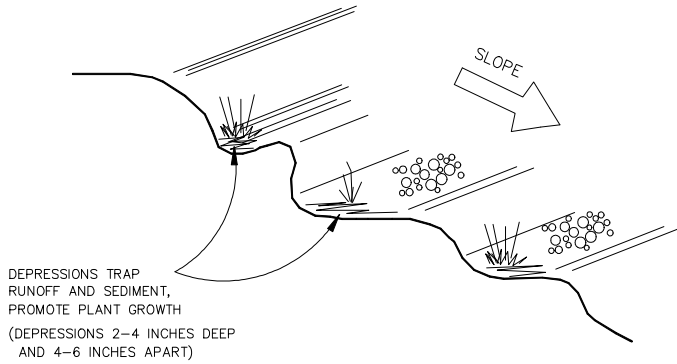
- Sediment
- Nutrients
- Toxic Materials
- Oil & Grease
- Floatable Materials
- Other Waste

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High     Medium     Low



**OBJECTIVES**

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

**DESCRIPTION:**

Rough preparation of working areas leaving depressions and uneven surface. Depressions should be done parallel to contours.

**APPLICATION:**

Surface roughening is appropriate for all construction that will not be receiving impervious cover within 14 days and that will be exposed less than 60 days (seed areas to be open in excess of 60 days).

**INSTALLATION/APPLICATION CRITERIA:**

- < Surface should be left in rough condition during initial earthwork activity.
- < Surfaces that have become smoothed or compacted due to equipment traffic should be roughened by use of disks, spring harrows, teeth on front end loader, or similar, operating along the contours of the slope. Tracking (by crawler tractor driving up and down slope) may also be used to provide depressions parallel to contours.
- < Avoid compaction of soils during roughening as this inhibits plant growth and promotes storm water runoff. Limit tracked machinery to sandy soil.
- < Seed or mulch areas to be exposed in excess of 60 days.
- < Employ dust controls. (See Dust Control Detail Sheet).

**LIMITATIONS:**

- < Will not withstand heavy rainfall.
- < Slopes steeper than 2:1 (50%) should be benched. (See Benching Detail Sheet).

**MAINTENANCE:**

- < Inspect following any storm event and at a minimum of weekly.
- < If erosion in the form of rills (small waterways formed by runoff) is evident, perform machine roughening of area.
- < For vegetated slopes reseed areas that are bare or have been reworked.

**TARGETED POLLUTANTS**

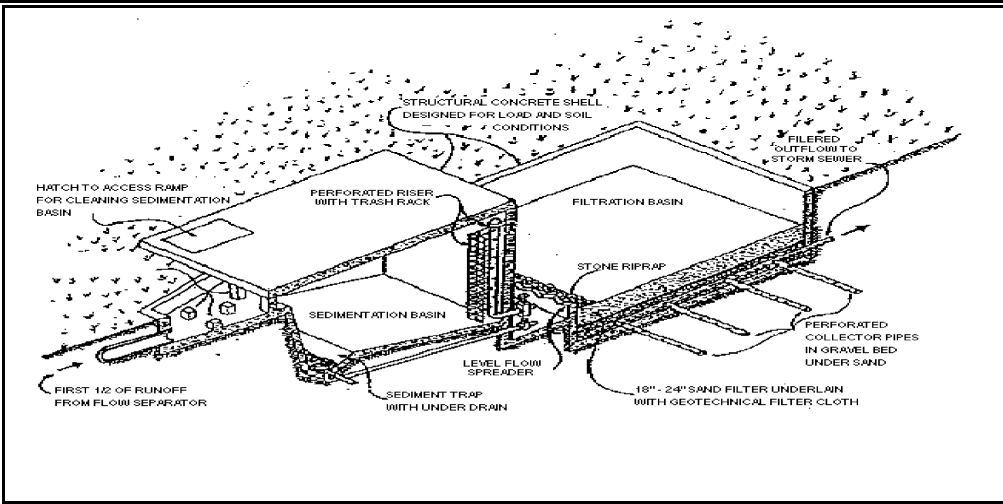
- Sediment
- Nutrients
- Toxic Materials
- Oil & Grease
- Floatable Materials
- Other Waste

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High     Medium     Low



**CONSIDERATIONS**

- Soils
- Area Required
- Slope
- Water Availability
- Aesthetics
- Hydraulic Head
- Environmental Side Effects

**DESCRIPTION:**

The surface sand filter system (aka Austin sand filter) consists of a sedimentation chamber or pond followed by a surface sand filter with collector under drains in a gravel bed. Filtered runoff is conveyed to a storm sewer or channel by gravity flow or by pumping.

**APPLICATIONS:**

- < Commercial and institutional parking lots, small shopping centers, and infill development.
- < Smaller redevelopment sites where the use of conventional BMPs is not practical.

**INSTALLATION/APPLICATION CRITERIA:**

- < Filter bed chambers that are too shallow could freeze, causing the filter to become ineffective.
- < Pretreatment may be necessary to protect the filter media from excessive sediment loading.
- < System should be designed for easy maintenance.

**LIMITATIONS:**

- < Sites with little to no gradient may prevent sufficient gravity flow through the system.
- < Extended periods of cold weather could affect pollutant removal efficiency.

**MAINTENANCE:**

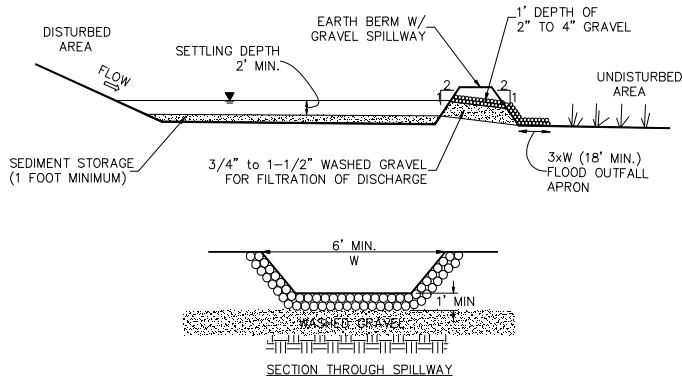
- < System should be inspected yearly and after storm events to assess the filtration capacity of the filter.
- < Filter sand should be replaced every few years to maintain pollutant removal efficiency.

**TARGETED POLLUTANTS**

- Sediment
  - Nutrients
  - Heavy Metals
  - Toxic Materials
  - Oxygen Demanding Substances
  - Oil & Grease
  - Floatable Materials
  - Bacteria & Viruses
- High Impact
  - Medium Impact
  - Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
  - O&M Costs
  - Maintenance
  - Training
- High     Medium     Low



**OBJECTIVES**

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

**DESCRIPTION:**

A sediment trap is a small excavated or bermed area where runoff from small drainage areas is detained and sediment can settle.

**APPLICATION:**

- < Temporary control for runoff from disturbed areas of less than 3 acres.
- < Temporary control for discharge from diversion dike, surface benching, or other temporary drainage measures.

**INSTALLATION/APPLICATION CRITERIA:**

- < Design basin for site specific location.
- < Excavate basin or construct compacted berm containment.
- < Construct outfall spillway with apron.
- < Provide downstream silt fence if necessary.

**LIMITATIONS:**

- < Should be sized based on anticipated runoff, sediment loading and drainage area size.
- < May require silt fence at outlet for entrapment of very fine silts and clays.

**MAINTENANCE:**

- < Inspect after each rainfall event and at a minimum of monthly.
- < Repair any damage to berm, spillway or sidewalls.
- < Remove accumulated sediment as it reaches 2/3 height of available storage.
- < Check outlet for sedimentation/erosion of downgradient area and remediate as necessary. Install silt fence if sedimentation apparent.

**TARGETED POLLUTANTS**

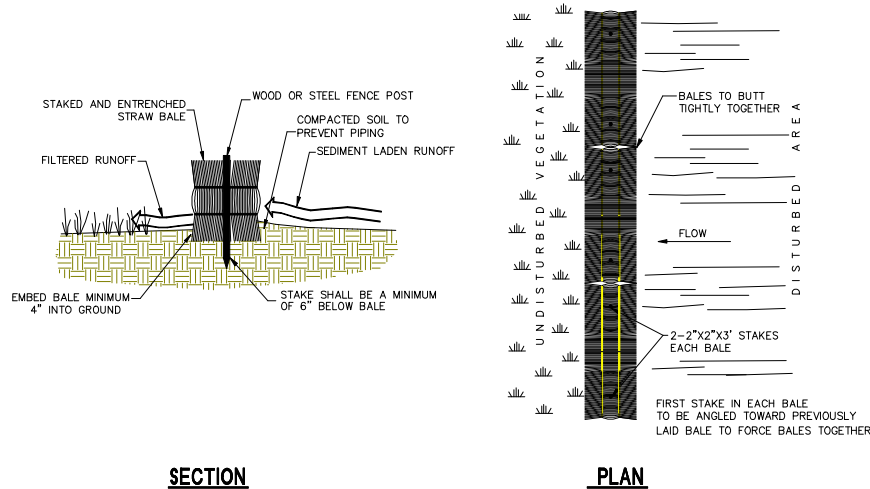
- Sediment
- Nutrients
- Toxic Materials
- Oil & Grease
- Floatable Materials
- Other Waste

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High     Medium     Low



**OBJECTIVES**

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

**DESCRIPTION:**

Temporary sediment barrier consisting of a row of entrenched and anchored straw bales.

**APPLICATION:**

- < Perimeter Control: place barrier at downgradient limits of disturbance.
- < Sediment barrier: place barrier at toe of slope or soil stockpile.
- < Protection of existing waterways: place barrier at top of stream bank.
- < Inlet Protection.

**INSTALLATION/APPLICATION CRITERIA:**

- < Excavate a 4-inch minimum deep trench along contour line, i.e. parallel to slope, removing all grass and other material that may allow underflow.
- < Place bales in trench with ends tightly abutting, fill any gaps by wedging loose straw into openings.
- < Anchor each bale with 2 stakes driven flush with the top of the bale.
- < Backfill around bale and compact to prevent piping, backfill on uphill side to be built up 4-inches above ground at the barrier.

**LIMITATIONS:**

- < Recommended maximum area of 0.5 acre per 100 feet of barrier
- < Recommended maximum upgradient slope length of 150 feet
- < Recommended maximum uphill grade of 2:1 (50%)

**MAINTENANCE:**

- < Inspect immediately after any rainfall and at least daily during prolonged rainfall.
- < Look for runoff bypassing ends of barriers or undercutting barriers.
- < Repair or replace damaged areas of the barrier and remove accumulated sediment.
- < Realign bales as necessary to provide continuous barrier and fill gaps.
- < Recomcompact soil around barrier as necessary to prevent piping.

**TARGETED POLLUTANTS**

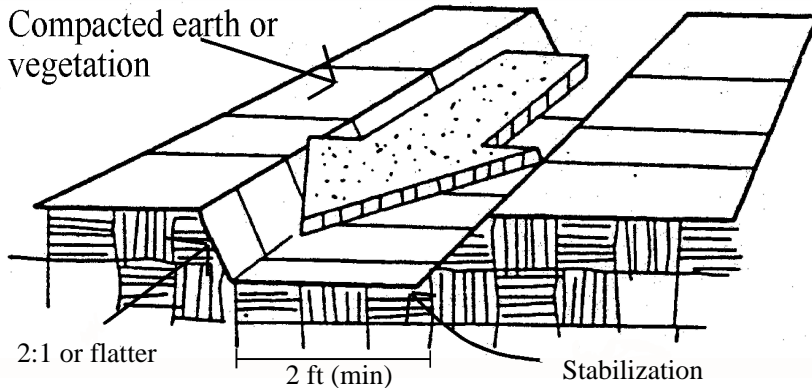
- Sediment
- Nutrients
- Toxic Materials
- Oil & Grease
- Floatable Materials
- Other Waste

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High     Medium     Low



**DESCRIPTION:**

Temporary drains and swales are used to divert off-site runoff around the construction site, divert runoff from stabilized areas around disturbed areas, and direct runoff into sediment.

**APPLICATIONS:**

- < Temporary drains and swales are appropriate for diverting any upslope runoff around unstabilized or disturbed areas of the construction site.
- < Prevent slope failures. Prevent damage to adjacent property. Prevents erosion and transport of sediments into water ways. Increases the potential for infiltration. Diverts sediment-laden runoff into sediment basins or traps.

**INSTALLATION/APPLICATION:**

- < Temporary drainage swales will effectively convey runoff and avoid erosion if built properly:
- < Size temporary drainage swales using local drainage design criteria. A permanent drainage channel must be designed by a professional engineer (see the local drainage design criteria for proper design).
- < At a minimum, the drain/swale should conform to predevelopment drainage patterns and capacities.
- < Construct the drain/swale with an uninterrupted, positive grade to a stabilized outlet. Provide erosion protection or energy dissipation measures if the flow out of the drain or swale can reach an erosive velocity.

**LIMITATIONS:**

- < Temporary drains and swales or any other diversion of runoff should not adversely impact upstream or downstream properties.
- < Temporary drains and swales must conform to local floodplain management requirements.

**MAINTENANCE:**

- < Inspect weekly and after each rain.
- < Repair any erosion immediately.
- < Remove sediment which builds up in the swale and restricts its flow capacity.

**OBJECTIVES**

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

**TARGETED POLLUTANTS**

- Sediment
- Nutrients
- Toxic Materials
- Oil & Grease
- Floatable Materials
- Other Waste

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High     Medium     Low





**DEFINITION:**

Temporary seeding - establishment of short term cover by application of rapidly germinating seed mix (alternatively hydroseeding may be utilized).  
Permanent seeding - establishment of final term cover by application of perennial seed mix (alternatively sod may be utilized).

**APPLICATION:**

Disturbed areas that are at final grade and which will not be disturbed by continuing activities on site. Also areas that are not at final grade but which will be left untouched in excess of one year.

**RECOMMENDED SEED MIX:**

The recommended seed mix will be dependent on site specific information such as elevation, exposure, soils, water available and topography. Check with the County Extension Service for recommended mixes for site specific conditions:

Utah State University Extension Service  
 2001 South State Street #S1200  
 Salt Lake City, Utah 84190  
 phone (801) 468-3170

**LIMITATIONS:**

- < Limited to areas that will not be subject to traffic or high usage.
- < May require irrigation and fertilizer which creates potential for impacting runoff quality.
- < May only be applied during appropriate planting season, temporary cover required until that time.

**INSTALLATION:**

- < Roughen soil to a depth of 2 inches. Add fertilizer, manure, topsoil as necessary.
- < Evenly distribute seed using a commonly accepted method such as; breast seeding, drilling, hydroseeding.
- < Use a seed mix appropriate for soil and location that will provide rapid germination and growth. Check with County for recommended mix and application rate.
- < Cover area with mulch if required due to steep slopes or unsuitable weather conditions.

**MAINTENANCE:**

- < Provide irrigation as required to establish growth and to maintain plant cover through duration of project.
- < Reseed as necessary to provide 75% coverage
- < Remediate any areas damaged by erosion or traffic.
- < When 75% coverage is achieved inspect monthly for damage and remediate as necessary.

**OBJECTIVES**

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

**TARGETED POLLUTANTS**

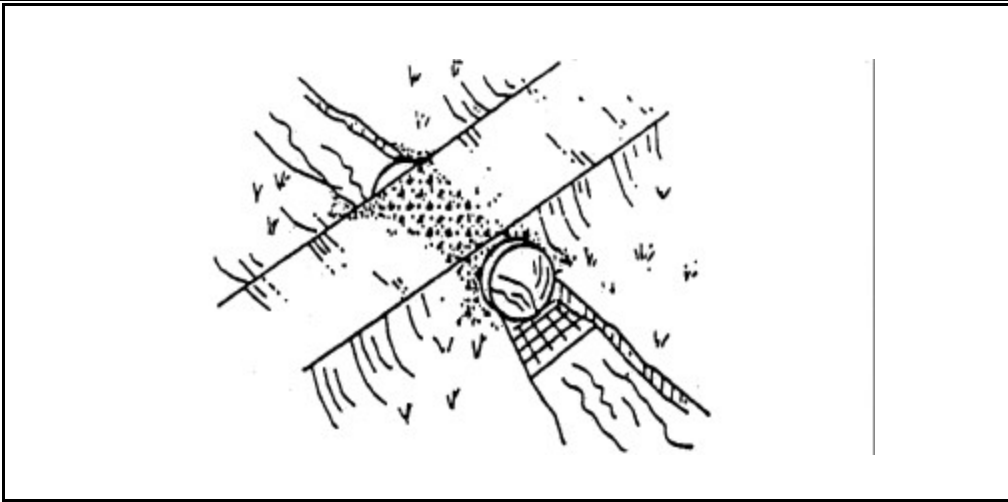
- Sediment
- Nutrients
- Toxic Materials
- Oil & Grease
- Floatable Materials
- Other Waste

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High
- Medium
- Low



**DESCRIPTION:**

A temporary access stream crossing is a temporary culvert, ford or bridge placed across a waterway to provide access for construction purposes for a period of less than one year. Temporary access crossings are not intended to be used to maintain traffic for the general public.

**APPLICATIONS:**

Temporary stream crossings should be installed at all designated crossings of perennial and intermittent streams on the construction site, as well as for dry channels which may be significantly eroded by construction traffic.

**INSTALLATION/APPLICATION:**

Requires knowledge of stream flows and soil strength and should be designed under the direction of a Utah registered engineer with knowledge of both hydraulics and construction loading requirements for structures.

**LIMITATIONS:**

- < May be an expensive for a temporary improvement.
- < Requires other BMP's to minimize soil disturbance during installation and removal.
- < Fords should only be used in dry weather.
- < A Stream Alteration Permit may be required, contact the Utah Division of Water Rights before implementation.

**MAINTENANCE:**

- < Inspect weekly and after each significant rainfall, including assessment of foundations.
- < Periodically remove silt from crossings.
- < Replace lost aggregated from inlets and outlets of culverts.

**OBJECTIVES**

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

**TARGETED POLLUTANTS**

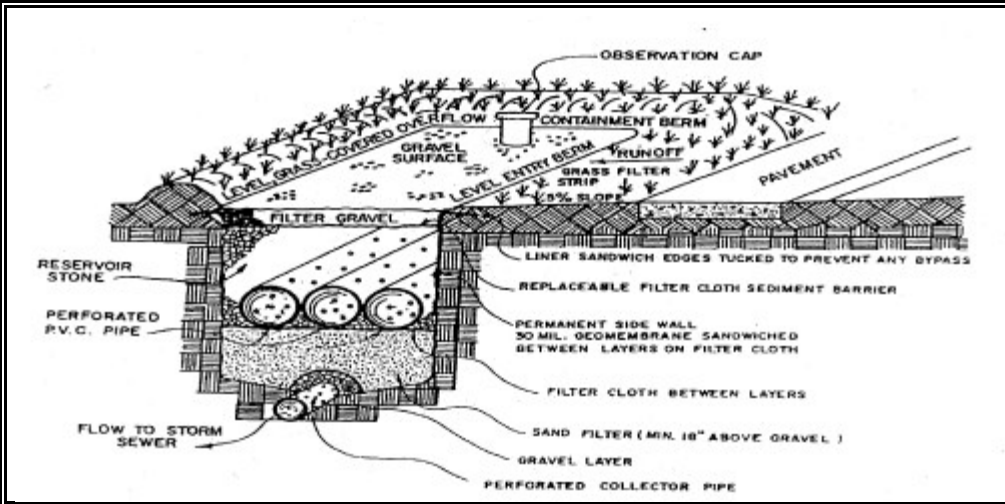
- Sediment
- Nutrients
- Toxic Materials
- Oil & Grease
- Floatable Materials
- Other Waste

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High     Medium     Low



**CONSIDERATIONS**

- Soils
- Area Required
- Slope
- Water Availability
- Aesthetics
- Hydraulic Head
- Environmental Side Effects

**DESCRIPTION:**

An adaptation of the surface sand filter system. The trench sand filter system has two variations. One variation consists of a trench sand filter system with a stone reservoir. The other variation consists of a trench sand filter system with a small sedimentation pond.

**APPLICATION:**

- < Townhouse developments or small commercial redevelopments

**INSTALLATION/APPLICATION CRITERIA:**

- < Topography should offer sufficient relief to allow the system to function by gravity flow.
- < Design for easy maintenance accessibility.
- < Design for safety barriers which prevent children from entering the sedimentation pond.

**LIMITATIONS:**

- < Sites with little or no gradient may prevent sufficient gravity flow through the systems.
- < Not recommended for parking lots.

**MAINTENANCE:**

- < Stone reservoirs will require periodic replacement of the upper filter cloth and gravel layer.
- < Sedimentation ponds will require periodic removal of accumulated sediment.

**TARGETED POLLUTANTS**

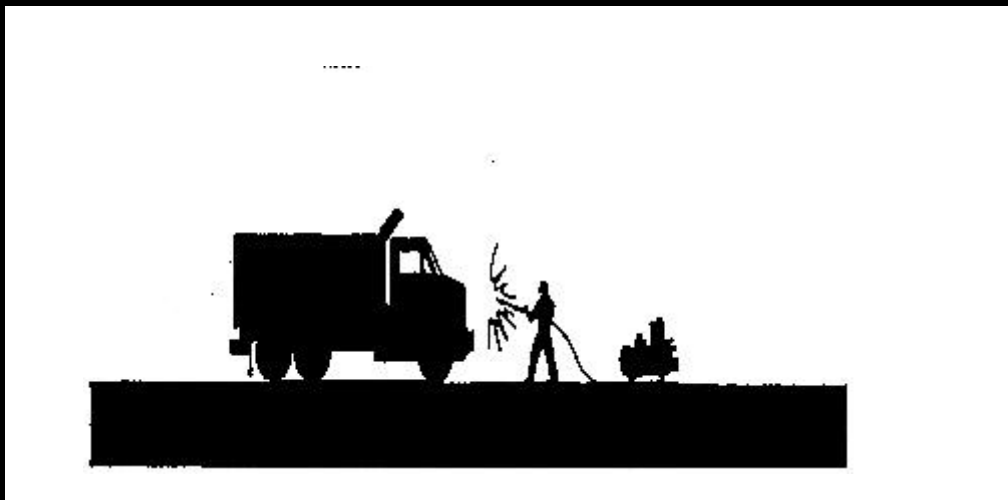
- Sediment
- Nutrients
- Heavy Metals
- Toxic Materials
- Oxygen Demanding Substances
- Oil & Grease
- Floatable Materials
- Bacteria & Viruses

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High
- Medium
- Low



**APPLICATIONS**

- Manufacturing
- Material Handling
- Vehicle Maintenance
- Construction
- Commercial Activities
- Roadways
- Waste Containment
- Housekeeping Practices

**DESCRIPTION:**

Prevent or reduce the discharge of pollutants to stormwater from vehicle and equipment washing and steam cleaning by using off-site facilities, washing in designated, contained areas only, eliminating discharges to the storm drain by infiltrating or recycling the wash water, and training employees and subcontractors.

**APPROACH:**

- < Use off-site commercial washing and steam cleaning businesses as much as possible. Washing vehicles and equipment outdoors or in areas where wash water flows onto paved surfaces or into drainage pathways can pollute stormwater. If you wash a large number of vehicles or pieces of equipment, consider conducting this work at an off-site commercial business. These businesses are better equipped to handle and dispose of the wash waters properly. Performing this work off-site can also be economical by eliminating the need for a separate washing operation at your site.
- < If washing must occur on-site, use designated, bermed wash areas to prevent wash water contact with stormwater, creeks, rivers, and other water bodies. The wash area can be sloped for wash water collection and subsequent infiltration into the ground.
- < Use as little water as possible to avoid having to install erosion and sediment controls for the wash area. Use phosphate-free biodegradable soaps. Educate employees and subcontractors on pollution prevention measures. Do not permit steam cleaning on-site. Steam cleaning can generate significant pollutant concentrations.

**LIMITATIONS:**

- < Even phosphate-free, biodegradable soaps have been shown to be toxic to fish before the soap degrades.
- < Sending vehicles/equipment off-site should be done in conjunction with Stabilized Construction Entrance. (See BMP in the Construction Section).
- < The measures outlined in this fact sheet are insufficient to address all the environmental impacts and compliance issues related to steam cleaning.

**MAINTENANCE:**

- < Minimal, some berm repair may be necessary.

**TARGETED POLLUTANTS**

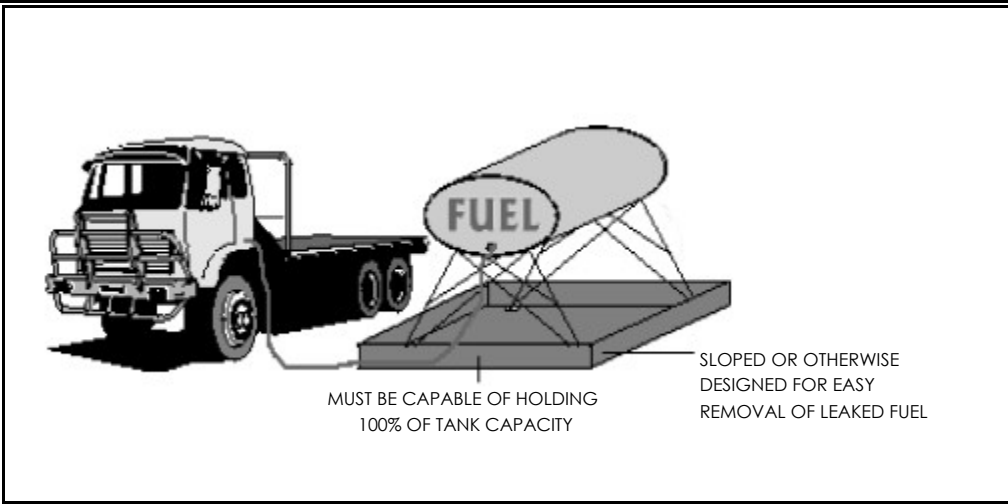
- Sediment
- Nutrients
- Heavy Metals
- Toxic Materials
- Oxygen Demanding Substances
- Oil & Grease
- Floatable Materials
- Bacteria & Viruses

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High     Medium     Low



- OBJECTIVES**
- Housekeeping Practices
  - Contain Waste
  - Minimize Disturbed Areas
  - Stabilize Disturbed Areas
  - Protect Slopes/Channels
  - Control Site Perimeter
  - Control Internal Erosion

**DESCRIPTION:**

Prevent fuel spills and leaks, and reduce their impacts to storm water by using off-site facilities, fueling in designated areas only, enclosing or covering stored fuel, implementing spill controls, and training employees and subcontractors.

**INSTALLATION/APPLICATION:**

- < Use off-site fueling stations as much as possible. Fueling vehicles and equipment outdoors or in areas where fuel may spill/leak onto paved surfaces or into drainage pathways can pollute storm water. If you fuel a large number of vehicles or pieces of equipment, consider using an off-site fueling station. These businesses are better equipped to handle fuel and spills properly. Performing this work off-site can also be economical by eliminating the need for a separate fueling area at your site.
- < If fueling must occur on-site, use designated areas, located away from drainage courses, to prevent the runoff of storm water and the runoff of spills. Discourage "topping-off" of fuel tanks.
- < Always use secondary containment, such as a drain pan or drop cloth, when fueling to catch spills/leaks. Place a stockpile of spill cleanup materials where it will be readily accessible. Use adsorbent materials on small spills rather than hosing down or burying the spill. Remove the adsorbent materials promptly and dispose of properly.
- < Carry out all Federal and State requirements regarding stationary above ground storage tanks. (40 CF Sub. J) Avoid mobile fueling of mobile construction equipment around the site; rather, transport the equipment to designated fueling areas. With the exception of tracked equipment such as bulldozers and perhaps forklifts, most vehicles should be able to travel to a designated area with little lost time. Train employees and subcontractors in proper fueling and cleanup procedures.

**LIMITATIONS:**

Sending vehicles/equipment off-site should be done in conjunction with Stabilized Construction Entrance.

**MAINTENANCE:**

- < Keep ample supplies of spill cleanup materials on-site.
- < Inspect fueling areas and storage tanks on a regular schedule.

**TARGETED POLLUTANTS**

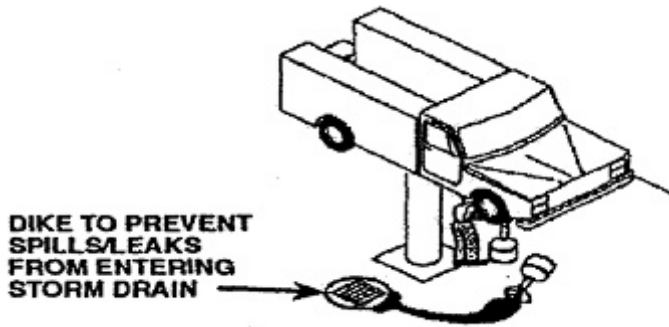
- Sediment
- Nutrients
- Toxic Materials
- Oil & Grease
- Floatable Materials
- Other Waste

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High
- Medium
- Low



(INSIDE MAINTENANCE FACILITY)

**DESCRIPTION:**

Prevent or reduce the discharge of pollutants to stormwater from vehicles and equipment maintenance and repair by running a dry shop.

**APPROACH:**

- < Keep equipment clean, don't allow excessive build-up of oil and grease.
- < Keep drip pans or containers under the areas that might drip.
- < Do not change motor oil or perform equipment maintenance in non-appropriate areas.
- < Inspect equipment for leaks on a regular basis.
- < Segregate wastes.
- < Make sure oil filters are completely drained and crushed before recycling or disposal.
- < Make sure incoming vehicles are checked for leaking oil and fluids.
- < Clean yard storm drain inlets regularly and especially after large storms.
- < Do not pour materials down drains or hose down work areas; use dry seeping.
- < Store idle equipment under cover.
- < Drain all fluids from wrecked vehicles.
- < Recycle greases, used oil or oil filters, antifreeze, cleaning solutions, automotive batteries, hydraulic, and transmission fluids.
- < Switch to non-toxic chemicals for maintenance when possible.
- < Clean small spills with rags, general clean-up with damp mops and larger spills with absorbent material.
- < Paint signs on storm drain inlets to indicate that they are not to receive liquid or solid wastes.
- < Train employees, minimize use of solvents.

**LIMITATIONS:**

- < Space and time limitations may preclude all work being conducted indoors.
- < It may not be possible to contain and clean up spills from vehicles/equipment brought on-site after working hours.
- < Dry pans are generally too small to contain antifreeze, which may gush from some vehicles, so drip pans may have to be purchased or fabricated.
- < Dry floor cleaning methods may not be sufficient for some spills.

**MAINTENANCE:**

Should be low if procedures for the approach are followed.

**APPLICATIONS**

- Manufacturing
- Material Handling
- Vehicle Maintenance
- Construction
- Commercial Activities
- Roadways
- Waste Containment
- Housekeeping Practices

**TARGETED POLLUTANTS**

- Sediment
- Nutrients
- Heavy Metals
- Toxic Materials
- Oxygen Demanding Substances
- Oil & Grease
- Floatable Materials
- Bacteria & Viruses

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High
- Medium
- Low



**PROGRAM ELEMENTS**

- New Development
- Residential
- Commercial Activities
- Industrial Activities
- Municipal Facilities
- Illegal Discharges

**DESCRIPTION:**

Reduce the discharge of pollutants to stormwater from vehicle use by highlighting the stormwater impacts, promoting the benefits to stormwater of alternative transportation, and integrating initiatives with existing or emerging regulations and programs.

**APPROACH:**

- < Integrate this best management practice as much as possible with efforts being developed and implemented by government agencies and businesses to reduce vehicle use and improve air quality. Integration will help avoid redundant and/or conflicting programs and be more effective and efficient.
- < Establish trip reduction programs at major employers (government, large businesses).
- < Reducing vehicle use begins with land use planning. Frequently used public services (post offices, government offices, etc.) and private businesses (banks, restaurants, retail stores, etc.) should be located in "service hubs" near transportation corridors. Multiple, small service hubs should be established as opposed to fewer, large hubs to reduce travel time and thus promote alternative transportation.
- < Municipalities and large businesses with significant numbers of employees working in the same location should be encouraged to establish trip reduction programs. These programs encourage alternative transportation such as carpooling, buses, bicycles, walking, etc. through incentives including monetary compensation, increased parking fees, and subsidized public transit passes.
- < Public education should highlight the benefits to stormwater in public outreach pieces and campaigns. The benefits to water quality of reduced vehicle usage are second only to the benefits to air quality.

**LIMITATIONS:**

The use of alternative transportation is highly dependent on its convenience and relative cost.

**TARGETED POLLUTANTS**

- Sediment
- Nutrients
- Heavy Metals
- Toxic Materials
- Oxygen Demanding Substances
- Oil & Grease
- Floatable Materials
- Bacteria & Viruses

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Regulatory
- Training
- Staffing
- Administrative

- High     Medium     Low



**APPLICATIONS**

- Manufacturing
- Material Handling
- Vehicle Maintenance
- Construction
- Commercial Activities
- Roadways
- Waste Containment
- Housekeeping Practices

**DESCRIPTION:**

Prevent or reduce the discharge of pollutants to stormwater from waste handling and disposal by tracking waste generation, storage, and disposal; reducing waste generation and disposal through source reduction, re-use, and recycling; and preventing runoff and runoff from waste management areas.

**APPROACH:**

- < Maintain usage inventory to limit waste generation.
- < Substitute or eliminate raw materials.
- < Modify process or equipment.
- < SARA Title III, Section 313 requires reporting for over 300 listed chemicals and chemical compounds. This requirement should be used to track these chemicals although this is not as accurate a means of tracking as other approaches.
- < Track waste generated.
- < Use design data and review: process flow diagram, materials and applications diagram, piping and instructions, equipment list, plot plan.
- < Use economic data and review: Waste treatment and disposal cost. Product utility and economic cost. Operation and maintenance labor cost.
- < Recycle materials whenever possible.
- < Maintain list of and the amounts of materials disposed.
- < Segregation and separate waste.
- < Cover, enclose, or berm industrial wastewater management areas whenever possible to prevent contact with runoff or runoff.
- < Equip waste transport vehicles with anti-spill equipment.
- < Minimize spills and fugitive losses such as dust or mist from loading systems.
- < Ensure that sediments or wastes are prevented from being tracked off-site.
- < Training and supervision.
- < Stencil storm drains on the facility's property with prohibitive message regarding waste disposal.

**LIMITATIONS:**

Hazardous waste that cannot be re-used or recycled must be disposed of by a licensed hazardous waste hauler.

**TARGETED POLLUTANTS**

- Sediment
- Nutrients
- Heavy Metals
- Toxic Materials
- Oxygen Demanding Substances
- Oil & Grease
- Floatable Materials
- Bacteria & Viruses

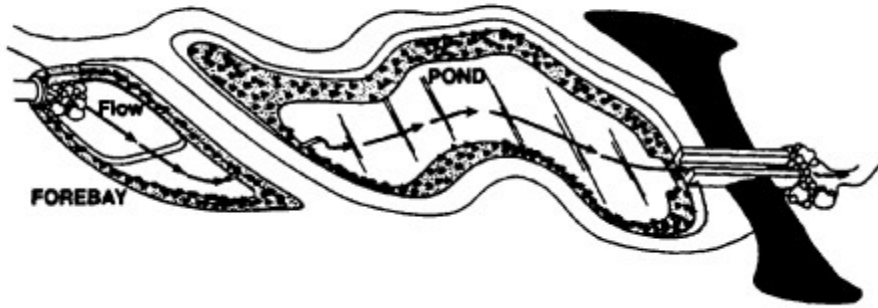
- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High     Medium     Low





CONSIDERATIONS

- Soils
- Area Required
- Slope
- Water Availability
- Aesthetics
- Hydraulic Head
- Environmental Side Effects

DESCRIPTION:

A wet pond has a permanent water pool to treat incoming stormwater. An enhanced wet pond includes a pretreatment sediment forebay.

APPLICATION:

- < Need to achieve high level of particulate and some dissolved contaminant removal.
- < Ideal for large, regional tributary areas.
- < Multiple benefits of passive recreation (e.g. bird watching, wildlife habitat).

INSTALLATION/APPLICATION CRITERIA:

- < Water depth of 3 to 9 feet.
- < Wetland vegetation, occupying 25-50% of water surface area.
- < Design to minimize short-circuiting.
- < Bypass storms greater than two year storm.
- < Establishing wetland vegetation may be difficult.

LIMITATIONS:

- < Concern for mosquitoes and maintaining oxygen in ponds.
- < Cannot be placed on steep unstable slopes.
- < Need base flow or supplemental water if water level is to be maintained.
- < Infeasible in very dense urban areas.
- < May require permits from various regulatory agencies, e.g., Corps of Engineers.

MAINTENANCE:

- < Remove floatables and sediment build-up.
- < Correct erosion spots in banks.
- < Control mosquitoes.

TARGETED POLLUTANTS

- Sediment
- Nutrients
- Heavy Metals
- Toxic Materials
- Oxygen Demanding Substances
- Oil & Grease
- Floatable Materials
- Bacteria & Viruses

- High Impact
- Medium Impact
- Low or Unknown Impact

IMPLEMENTATION REQUIREMENTS

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High     Medium     Low







## Chapter 15.22

# STORMWATER UTILITY

### 15.22.010: FINDINGS:

The city council makes the following findings regarding stormwater runoff and the city's stormwater system:

- A. Facilities: The city's existing stormwater system consists of a network of manmade and natural facilities, structures, and conduits, including groundwater and aquifers that collect and route stormwater runoff.
- B. Endangerment: Uncontrolled or inadequately controlled stormwater runoff endangers the city's groundwater supply.
- C. Erosion: Uncontrolled or inadequately controlled stormwater runoff causes erosion and property damage.
- D. Emergency Services: Uncontrolled or inadequately controlled stormwater runoff hinders the city's ability to provide emergency services to its residents.
- E. Traffic: Uncontrolled or inadequately controlled stormwater runoff impedes the regular flow of traffic in the city and poses a risk to the existing road infrastructure.
- F. Public Health: Uncontrolled or inadequately controlled stormwater runoff poses health hazards to the citizens of the community.
- G. Pollution: Stormwater runoff carries concentrations of oil, grease, nutrients, chemicals, heavy metals, toxic materials and other undesirable materials that may jeopardize the integrity of groundwaters and receiving waters, including the city's culinary water supply.
- H. Impervious Surfaces: All developed properties in the city contribute to the need for the

stormwater system by converting natural ground cover into impervious surfaces.

- I. Maintenance: All developed properties in the city make use of or benefit from the city's operation and maintenance of the stormwater system.
- J. Regulations: The environmental protection agency (EPA) and the Utah department of environmental quality (DEQ) will develop further stormwater permitting regulations that will apply to local government as unfunded mandated and otherwise.
- K. General Operation: Absent effective maintenance, operation, regulation and control of existing stormwater drainage conditions in the city constitute a potential hazard to the health, safety and general welfare of the city, its residents, and its businesses.
- L. Utility Fees: A stormwater utility fee is the most equitable and efficient method of managing stormwater in the city and ensuring that each property in the city pays its fair prorated share of the amount that the property contributes to, benefits from, and otherwise uses the stormwater system. (Ord. 2012-05)

### **15.22.020: PURPOSE:**

The purpose of this chapter and chapters 15.23 through 15.25 of this title is to protect the health, safety and welfare of the city and its inhabitants by improving the city's stormwater system, managing and controlling stormwater runoff, protecting property, preventing polluted waters from entering the city's water supply and other receiving waters, and establishing a viable and fair method of financing the construction, operation and maintenance of the stormwater system. (Ord. 2012-05)

### **15.22.030: DEFINITIONS:**

The words or phrases in this section shall be defined as follows for all chapters in this code relating to stormwater:

**BEST MANAGEMENT PRACTICES (BMPs):** A wide range of management procedures, schedules of activities, prohibitions of practices, maintenance procedures, and other management practices which have been demonstrated to effectively control the quality and/or quantity of stormwater runoff and which are compatible with the planned land use. BMPs also

include treatment requirements, operating procedures, and practices to control site runoff, spillage or leaks, sludge or water disposal, or drainage from raw material storage. A list of sample BMPs and their effectiveness ratings can be found in the most current version of the city's stormwater management plan available at the city office or as otherwise provided.

**CATCH BASIN:** A drain inlet designed to keep out large or obstructive matter.

**CITY:** Includes the geographical boundaries of Farr West City, Utah, and also refers to the classification of the jurisdictional area within a municipal separate storm sewer system (MS4).

**CITY COUNCIL:** Refers to the legislative body of Farr West City, Utah.

**COMMON PLAN OF DEVELOPMENT:** A development that is contiguous to an area where multiple separate distinct construction activities may be taking place at different times or different schedules under one plan. For example, if a developer buys a twenty (20) acre lot and builds roads, installs pipes, and runs electricity with the intention of constructing homes or other structures sometime in the future, this would be considered a common plan of development or sale. If the land is parceled off or sold, and construction occurs on plots that are less than one acre by separate, independent builders, this activity still would be subject to stormwater permitting requirements if the smaller lots were included on the original site plan. The common plan of development or sale also applies to other types of land development such as industrial parks or well fields. A permit is required if one or more acres of land will be disturbed, regardless of the size of any of the individually owned or developed sites.

**DEBRIS:** Any dirt, rock, sand, vegetation, rubbish or litter.

**DETENTION BASIN:** An area designed to detain peak flows from stormwater runoff and to regulate release rates of that water into the city's storm drainage system, also allowing debris to settle out. Detention basin outlets are connected directly to downstream storm drains. All flow entering detention basins is released via outlet piping. "Regional detention basins" are defined as large detention basins owned and maintained by the city. "Local detention basins" are defined as smaller basins typically in subdivisions and constructed by developers. Following acceptance of the construction, the ownership, operation and maintenance may either be conveyed and maintained by the city or owned and maintained by private property owners.

**DEVELOPED PARCEL:** Any parcel that has been altered from its natural condition by grading, filling, or the construction of improvements or other impervious surfaces.

**DEVELOPMENT OR LAND DEVELOPMENT:** Any manmade change to improved or unimproved real estate, including, but not limited to, site preparation, filling, grading, paving, excavation, development of a parcel, lot, subdivision plat or site plan and construction of buildings or other structures.

**DIRECTOR:** The public works director, or other person or agent designated by the city to enforce stormwater regulations adopted by the city.

**DISTURB:** To alter the physical condition, natural terrain or vegetation of land by clearing, grubbing, grading, excavating, filling, building or other construction activity.

**DRAIN INLET:** A point of entry into a sump, detention basin, or storm drain system.

**DRINKING WATER SOURCE PROTECTION ZONE:** Zones determined by geohydrology designed to protect groundwater aquifers of a well in a culinary water system.

**EQUIVALENT RESIDENTIAL UNIT (ERU):** The average amount of impervious surface, expressed in square feet, on developed single-family residential parcels in the city. One ERU equals two thousand eight hundred (2,800) square feet of impervious surface area.

**HAZARDOUS MATERIAL:** Any material, including any substance, waste, or combination thereof, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may cause, or significantly contribute to, a substantial presence or potential hazard to human health, safety, property, or the environment when improperly treated, stored, transported, disposed of, or otherwise managed. Hazardous material includes, but is not limited to, any hazardous substance designated under 40 CFR part 116 pursuant to section 311 of the clean water act.

**ILLICIT CONNECTION:** Either of the following:

- A. Any drain or conveyance, whether on the surface or subsurface, which allows an illicit discharge to enter the storm drain system. Examples include, but are not limited to, any conveyances which allow nonstormwater discharge such as sewage, process wastewater, or wash water to enter the storm drain system, and any connections to the storm drain system from indoor drains or sinks, regardless of whether said drain or connection had been previously allowed, permitted, or approved by a government agency; or
- B. Any drain or conveyance connected to or discharging to the storm drain system, which has not been: 1) documented in plans, maps, or equivalent records submitted to the city, and 2) approved in writing by the city.

**ILLICIT DISCHARGE:** Any nonstormwater discharge to the stormwater system. Illicit discharges include both direct connections (e.g., wastewater piping either mistakenly or deliberately connected to the stormwater system) and indirect connections (e.g., infiltration into the stormwater system or spills collected by drain inlets).

**IMPERVIOUS SURFACE:** Any hard surface, other than the natural surface, that prevents or retards the absorption of water into the soil, or that causes water to run off the surface in greater quantities or at greater rates of flow than the natural surface. Such impervious surfaces include, but are not limited to: roofs, concrete, asphalt, and similar improvements that prevent or impede the natural absorption of water into the soil.

**MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4):** A conveyance or system of conveyances including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains.

**PERCOLATION:** The ability of a soil to absorb water. Typically measured by a standard percolation test in units of minute per inch.

**PERSON:** Any individual, corporation, partnership, association, company or body politic,



including any agency of the state of Utah and the United States government.

**POLLUTANT:** Dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, industrial, municipal and agricultural waste, paints, varnishes, and solvents; oil and other automotive fluids; nonhazardous liquid and solid wastes and yard wastes; refuse, rubbish, garbage, litter, or other discarded or abandoned objects, articles, and accumulations, that may cause or contribute to pollution; floatables; pesticides, herbicides, and fertilizers; hazardous substances and wastes; sewage, fecal coliform and pathogens; dissolved and particulate metals; animal wastes; wastes and residues that result from constructing a building or structure (including, but not limited to, sediments, slurries, and concrete resins); and noxious or offensive matter of any kind.

**REDEVELOPMENT:** Alterations of a property that change the footprint of a site or building in such a way that disturbs one acre of land or more.

**RETENTION BASIN:** An area designed to retain flows from stormwater runoff and to encourage infiltration into surrounding subsurface soils. Retention basins do not have outlet piping connected into a stormwater system. A retention basin allows debris to settle out.

**SANITARY SEWER OVERFLOW (SSO):** A discharge of untreated sanitary wastewater. SSOs are illegal and must be eliminated. All SSOs must be reported to the division of water quality and to the permittee's local wastewater treatment plant.

**STORM DRAIN:** A closed conduit for conducting collected stormwater.

**STORMWATER:** Any flow that occurs during or following any form of natural precipitation. Stormwater includes only the portion of such flow that is composed of precipitation.

**STORMWATER RUNOFF:** Water that is generated by stormwater flows over land.

**STORMWATER SYSTEM:** The system of conveyances (including sidewalks, roads with drainage systems, municipal streets, catch basins, detention basins, curbs, gutters, ditches, manmade channels, sumps, storm drains, and groundwater) owned and operated by the city, which is designed and used for collecting or conveying stormwater. The stormwater system is also referred to as MS4.

**SUMP:** A city approved formalized underground structure that may be used in rare situations to act as a detention basin to allow the slow release of water into the surrounding subsoil. (Ord. 2012-05)

## **15.22.040: STORMWATER UTILITY:**

A. Creation: The city council hereby creates and establishes a stormwater utility as part of the city's overall stormwater system. The stormwater utility shall plan, design, construct, maintain, administer and operate the city's stormwater system.

- B. Funding: The city council hereby establishes a stormwater utility reserve fund to handle all income, expenses and other financial transactions related to the stormwater utility. All stormwater utility service charges shall be deposited in this reserve fund. Money in the stormwater utility shall be accounted separately and held in reserve separate from general funds. The stormwater utility may be used to pay for any services and expenses attributable to stormwater. The city may administer the stormwater utility reserve fund and an enterprise fund.
- C. Facilities: The stormwater utility shall operate independently of the general fund. The stormwater utility shall have the same relationship to the city as other utilities, such as the water and sanitary sewer. Upon creation of this utility, all of the city's stormwater facilities (not including streets and similar facilities as designated by the city council) shall be transferred to the stormwater utility in consideration for the stormwater utility taking primary responsibility for planning, designing, constructing, maintaining, administering and operating the stormwater system and facilities.
- D. Administration: The stormwater utility shall be administered by the director under the oversight of the city management. (Ord. 2012-05)

### **15.22.050: STORMWATER UTILITY FEE:**

- A. Imposed: Each developed parcel of real property in the city shall be charged a stormwater utility fee.
- B. ERU: The fee shall be based on the number of equivalent residential units (ERUs) contained in the parcel. The city council finds that the ERU is the most accurate measurement for determining the amount that each parcel contributes to, benefits from, and otherwise uses the stormwater utility. Based on engineer's research, the city council finds and establishes that one ERU equals two thousand eight hundred (2,800) square feet of impervious surface area.
- C. Calculation: The city council finds that:
1. Each single-family residential parcel contributes approximately the same amount of stormwater runoff. Therefore, each developed single-family residential parcel shall pay a base rate of one ERU.

2. All nonsingle-family residential parcels shall pay a multiple of this base rate, expressed in ERUs, according to the total measured impervious area on the parcel being imposed a fee.
- D. Charge Per ERU: The stormwater utility fee as established by the city council is codified in [title 3, chapter 3.30](#), "Fee Schedule", of this code.
- E. Exemptions And Credits: The city council may establish exemptions and credits to the stormwater utility fee by ordinance or resolution.
- F. Policies: The director may adopt policies and rules, consistent with this chapter to assist in the application, administration, and interpretation of this chapter and any other chapter related to the stormwater.
- G. Appeals: Any person or entity that believes that this chapter, or any stormwater utility rate, was interpreted or applied erroneously may appeal to the city's appeal authority. The appeal shall be in writing, shall state any facts supporting the appeal, and shall be made within ten (10) days of the decision, action, or bill being appealed. All appeals shall be handled in accordance with the procedure in this code for the appeal authority. The decision of the appeal authority shall be final. (Ord. 2014-07: Ord. 2012-05)

## **15.22.060: BILLING:**

The city council finds that the city's stormwater system, sanitary sewer system, culinary water system, and solid waste collection system are interrelated services that are part of a unified city plan to provide for the health, safety and welfare of the city and its residents in an environmentally responsible manner. Billing shall be as follows:

- A. Utilities And Fees: City utility billing is completed in conjunction with the regular monthly billing statement of Bona Vista water district who shall bill on behalf of the city for:
1. Sanitary sewer;
  2. Solid waste collection and disposal;
  3. Enhanced services;
  4. Franchise fees if imposed;

5. Stormwater; and
6. An administrative cost per bill.

B. General Provisions: The following general provisions apply:

1. If there is no regular utility bill for the property, there is no city utility imposed for stormwater.
2. A utility fee is a civil debt owed to the city by the person or entity paying for the city utility services provided to the property.
3. All properties receiving Bona Vista water service shall be charged the applicable city utilities specified in this part, including the stormwater fee, regardless of whether or not the owner or occupant of the property requests the stormwater utility service.
4. Failure to pay any portion of the utility bill may result in termination of water service.

C. Billing Changes: The city council may modify, reduce, impose, or rebate erroneous billing charges not to exceed a period of three (3) months. The mayor may make special exceptions on billing charges for special circumstances as recommended by the director. (Ord. 2012-05)

## **Chapter 15.23**

# **STORM DRAINAGE**

### **15.23.010: PROHIBITED OBSTRUCTIONS:**

A. It is unlawful for any person to:

1. Obstruct the flow of water in the stormwater system.
2. Contribute to the obstruction of the flow of water in the stormwater system.
3. Cover or obstruct any drain inlet.

B. The following obstructions are exempt from the prohibitions of this section:

1. Street and/or stormwater improvement projects authorized by the city.

2. Flood control and prevention activities performed by the city.
3. Obstructions approved by the city as part of a site's stormwater drainage plan.
4. Obstructions occurring during cleanup periods established by the city, provided that the materials are placed according to city directions and do not obstruct drain inlets. (Ord. 2012-05)

### **15.23.020: PROHIBITED DISCHARGES:**

- A. It is unlawful for any person to discharge nonstormwater discharges to the MS4 including spills, illicit connections, illegal dumping, and sanitary sewer overflows ("SSOs") into the storm sewer system. All SSOs must be reported to the division of water quality and to the MS4s local wastewater treatment plant.
- B. The following discharges to the stormwater system are exempt from the prohibitions of this section:
1. Water line flushing.
  2. Landscape irrigation runoff.
  3. Diverted stream flows.
  4. Rising groundwaters.
  5. Uncontaminated groundwater infiltration.
  6. Uncontaminated pumped groundwater.
  7. Discharges from potable water sources.
  8. Foundation drains.
  9. Air conditioning condensate.
  10. Springs.
  11. Water from crawl space pumps.
  12. Footing drains.
  13. Individual residential car washing.
  14. Flows from riparian habitats and wetlands.

15. Dechlorinated swimming/aesthetic pool discharges.
16. Residual wash water.
17. Dechlorinated water reservoir discharges.
18. Discharges or flows from firefighting activity. (Ord. 2012-05)

### **15.23.030: PROHIBITED STORAGE AND DEBRIS:**

It is unlawful for any person to maintain, store, keep, deposit or leave any pollutant or hazardous material, or any item containing a pollutant or hazardous material in a manner that is likely to result in the discharge of the pollutant or hazardous material to the stormwater system. (Ord. 2012-05)

### **15.23.040: BEST MANAGEMENT PRACTICES:**

Any person connecting to the stormwater system or developing a commercial or industrial site shall employ best management practices (BMPs) approved by the city. The city shall adopt a policy establishing a menu of BMPs that may be used to satisfy this requirement. The BMPs may be structural and/or nonstructural depending on the needs of the site. The BMPs shall be designed to ensure that the quality and quantity of stormwater released to the city's stormwater system meets the requirements of federal, state, local law, regulations, and the city's NPDES permit, and will not exceed the designed capacity of the stormwater system or jeopardize the integrity of the stormwater system. (Ord. 2012-05)

### **15.23.050: EASEMENTS:**

The director may enter all private properties through which the city holds an easement for the purposes of inspecting, observing, measuring, sampling, repairing or maintaining any portion of the stormwater facilities lying within the easement, or the performance of any other duties pertinent to the operation of the stormwater system. All entry and subsequent work, if any, on an easement, shall be completed according to any special terms of the easement. (Ord. 2012-05)

### **15.23.060: AUTHORITY TO INSPECT:**

- A. Inspections: Whenever necessary to make an inspection to enforce any provision of this chapter, or whenever the city has cause to believe that there exists, or potentially exists, a condition which constitutes a violation of this chapter, the city may direct its qualified personnel to enter the premises at all reasonable times to inspect, detect, investigate, eliminate, and enforce any suspected nonstormwater discharges, including illegal dumping, into the city's stormwater system. During the same time the city may inspect and copy records related to stormwater compliance. In the event the owner or occupant refuses entry after a request to enter and inspect has been made, the city is hereby empowered to seek assistance from any court of competent jurisdiction in obtaining such entry.
- B. Access: The access for the city to inspect stormwater control measures on private property that is vested subsequent to the effective date of this chapter includes both construction phase and postconstruction access. Upon approval of the director, and in lieu of city employees inspecting and maintaining stormwater controls on private property, the city may allow the owner/operators or a qualified third party to conduct maintenance so long as:
1. At least annual certification, in the form of inspection documentation which has been performed, is provided to the city.
  2. The structural controls are adequately operating and maintained as such were designed to protect water quality as provided in the original maintenance agreement and plans submitted upon vesting and approval of the site.
- C. Agreement: A maintenance agreement is required on private property that is vested subsequent to the effective date of this chapter and includes both construction phase and postconstruction access and where owner/operators or a qualified third party are to conduct maintenance as provided herein. Said maintenance agreement shall be promulgated in the form and manner as determined by the director so long as the agreement at a minimum:
1. Allows the city oversight authority of the stormwater measures.
  2. Includes a provision that the agreement acts as a covenant that runs with the land.
  3. Allows the city to perform necessary maintenance or corrective actions neglected by the owner/operators or the qualified third party.
  4. Allows the city to recoup the costs from the owner/operator as necessary to cover the expenses for necessary actions conducted by the city.
- D. Interpretation: The city interprets this regulation as secondary and subservient to the United States constitution and the Utah state constitution as applied to property rights, land use, development, and similar rights. Specifically, the intent of this regulation is not to be applied to violate vested, property rights nor to be a physical invasion of property rights as determined by the United States supreme court in Loretto v. Teleprompter Manhattan CATV

Corp., 458 U.S. 419 (1982). The city recognizes that the United States supreme court interprets property right in conjunction with the laws and constitutions of each state. Therefore, Utah law also plays an important role in defining property rights. For the purpose of determining when a property right is vested the city shall continue to apply the Utah supreme court ruling in Western Land Equities, Inc. v. City Of Logan, 617 P.2d 388 (1980) that states a property owner is vested to follow the city's regulations in effect at the time a land use application is filed. Furthermore, where there is vagueness in any land use regulation, including the stormwater regulations, it shall be interpreted in favor of the property owner. (Ord. 2012-05)

### **15.23.070: REQUIREMENT TO MONITOR AND ANALYZE:**

If city tests or inspections indicate that a site is causing or contributing to stormwater pollution, illegal discharges, and/or nonstormwater discharges to the stormwater system or waters of the United States, and if the violations continue after notice from the city, the city may require any person engaged in the illicit activity and/or the owner or operator of the site to provide, at their own expense, monitoring and analyses required by the city to determine compliance with this chapter. (Ord. 2012-05)

### **15.23.080: VIOLATIONS AND ENFORCEMENT:**

Whenever the city finds that a person, organization, or institution has violated a prohibition or failed to comply with a requirement of this chapter, the city will order compliance by the following procedure:

- A. Warning: A verbal warning shall be given. The verbal warning shall be documented in the city records by the qualified person (code enforcement officer, city inspector, public works employee) who issued the warning. The city may skip the requirements set forth in this subsection and immediately proceed with other more severe actions against the violator if the following may have occurred:
1. The violator has committed the same violation in the past.
  2. The violation, in the opinion of the city, creates a serious risk to persons, the environment or property.
  3. The city deems the violation to constitute an emergency.
- B. Written Violation: Issue a written notice of violation to the responsible person(s), company or institution. The notice of violation may be documented in the city's stormwater records by



the official who issued the warning. Such notice may require without limitation one or more of the following as may be applicable:

1. The performance of monitoring, analyses, and reporting.
2. The elimination of illicit connections or discharges.
3. That violating discharges, practices, or operations shall cease and desist.
4. The abatement or remediation of stormwater pollution or contamination hazards and the restoration of any affected property.
5. Payment to cover administrative, remediation, monitoring, analyses, and reporting costs.
6. The implementation of source control or treatment BMPs.

C. Prosecution: The city may skip the notice requirements set forth in this section and immediately proceed with criminal and/or civil action against the violator if any of the following may have occurred:

1. The violator has committed the same violation in the past.
2. The violation, in the opinion of the city, creates a serious risk to persons, the environment or property.
3. The city deems the violation to constitute an emergency.

D. Penalty: The following penalties apply for each written violation:

1. Criminal: The violation of any provision of any chapter relating to stormwater is a class B misdemeanor. Each day that a violation continues shall constitute a separate offense.
2. Civil: In addition to other penalties and remedies, any person, firm, corporation, principal, agent, employee, contractor, or other party violating or permitting the violation of any governing stormwater regulation is subject to a civil fine not to exceed one thousand dollars (\$1,000.00), per violation, per day, in addition to reasonable attorney fees and costs incurred by the city for enforcement of stormwater regulations.
3. Damage Recovery: The city is entitled to seek and receive damages equal to the cost to make all repairs and/or replace any materials in addition to any criminal or civil fines and/or penalties imposed.
4. State Penalties: A violation of stormwater regulations may also be subject to any penalties that may be imposed by the state of Utah, under the authority of the Utah water quality act, [title 19, chapter 5](#) of the Utah code.
5. Federal Penalties: A violation of stormwater regulations may also be subject to prosecution, fines, and penalties imposed by the United States Of America.

- E. Permit: The small MS4 general UPDES permit, permit no. UTR090000 defines the maximum penalties for violations of permit conditions as follows:
1. The general UPDES permit provides that any person who violates a permit condition implementing provisions of the act is subject to a civil penalty not to exceed ten thousand dollars (\$10,000.00) per day of such violation. Any person who wilfully or negligently violates permit conditions or the act is subject to a fine not exceeding twenty five thousand dollars (\$25,000.00) per day of violation. Any person convicted under Utah Code Annotated section 19-5-115(2) a second time shall be punished by a fine not exceeding fifty thousand dollars (\$50,000.00) per day.
  2. The general UPDES permit provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction be punished by a fine of not more than ten thousand dollars (\$10,000.00) per violation, or by imprisonment for not more than six (6) months per violation, or by both. Utah Code Annotated section 19-5-115(4).
  3. The general UPDES permit provides that any person who falsifies, tampers with, or knowingly renders inaccurate, any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than ten thousand dollars (\$10,000.00) per violation, or by imprisonment for not more than six (6) months per violation, or by both.
- F. Stop Work Order: In addition to other fines and penalties, a stop work order may be issued upon the discovery of work being conducted without a required permit. The stop work order may be issued by any city inspector. No construction activity may be commenced or continued on any site for which a permit has been revoked or suspended until the permit has been reinstated or reissued.
- G. Injunctive And Corrective Action: The city may seek injunctive relief or take corrective action to install and/or maintain appropriate stormwater control measures on any site required to have such measures in place, and seek reimbursement for the same, including penalties, administrative costs, attorney fees, and court costs. (Ord. 2012-05)

### **15.23.090: DAMAGE TO STORMWATER SYSTEM:**

Any person who damages any portion of the stormwater system shall be responsible for repairing the damages. The damages shall be repaired by a licensed contractor bonded to do work in the city and shall be repaired in accordance with the public works standards and technical specifications adopted by the city. It is unlawful to remove or alter any portion of the stormwater system without permission from the director. (Ord. 2012-05)

**15.23.100: MANHOLE COVERS:**

It shall be unlawful to open any stormwater manhole or other stormwater fixture (such as grates, lids, or inlets) without permission from the director. (Ord. 2012-05)

**15.23.110: COMPLIANCE WITH FEDERAL AND STATE LAW:**

Nothing in this chapter shall be interpreted to relieve any person from an obligation to comply with an applicable federal, state, or local law relating to stormwater discharges or drinking water protection. (Ord. 2012-05)

## **Chapter 15.24 STORMWATER PERMITS**

**15.24.010: PURPOSE AND INTENT:**

The purpose of this chapter is to prevent the discharge of sediment and other construction related pollutants from construction sites. Sediment and debris from construction sites are a major source of pollution to waterways and water systems located within the city and surrounding areas. Each year stormwater runoff carries tons of sediment from construction sites into local drainage systems, irrigation systems, canals, rivers, and lakes. Sediment from stormwater runoff also clogs and obstructs storm drains, culverts, canals, and may cause damage to private property, wildlife habitat, or water quality. (Ord. 2012-05)

**15.24.020: ACTIVITY PERMIT REQUIRED:**

A stormwater construction activity permit is required before any person or entity may excavate, grub and clear, grade, or perform any type of construction activity that will disrupt or cause a change in the natural landscape upon any of the following types of property located within the city:

- A. One Acre Plus: Any parcel, lot, development, or "common plan of development" which is equal to or greater than one acre (43,560 square feet) in size.

- B. Subdivisions: A subdivision development greater than or equal to one acre in size qualifies under this subsection even if each of the individual lots in the subdivision are smaller than one acre.
- C. Special Areas: Any parcel, lot, or development or "common plan of development" the city determines that because of the nature or type of the parcel, lot, or development that there may occur a disturbance of land that may likely result in erosion or the transport of sediment off of the site by stormwater to a degree substantially greater than that which would occur under natural landscape conditions. (Ord. 2012-05)

### **15.24.030: ACTIVITY PERMIT APPLICATION:**

Any person or entity desiring a stormwater construction activity permit must first file an application with the city. The application shall be submitted with, or as part of an application for a site plan or subdivision approval or building permit. Any person or entity desiring a stormwater construction activity permit must also submit a "notice of intent" (NOI) with the state of Utah.

- A. Content: The application shall include a stormwater pollution prevention plan which meets the criteria set forth in section [15.24.040](#) of this chapter.
- B. Timing: The applicant shall file the application on or before the following dates:
1. Subdivision: The date that the applicant submits the preliminary subdivision plat application if the applicant proposes to develop a subdivision.
  2. Site Plan: The date that the applicant submits a site plan application if the applicant proposes to develop a site plan or amended site plan.
  3. Building Permit: The date that the applicant submits a building permit application if the applicant proposes to construct a building on an existing lot or parcel.
  4. Other: At least two (2) weeks before the developer intends to perform any type of work not listed above that would require a stormwater construction activity permit in accordance with this chapter.
- C. Compliance: If an applicant's development comes under more than one of the categories listed above, then the applicant shall submit the stormwater construction activity permit application on the earliest of the listed dates. Failure to comply with the application dates set forth above is not a criminal offense, but will delay the applicant's project. Failure to acquire a required stormwater construction activity permit is grounds for denying a related

subdivision application, site plan application, conditional use permit application, or building permit application. It is unlawful to commence work (move dirt) on a development site before obtaining a required stormwater construction activity permit.

- D. Fee: The applicant for a stormwater construction activity permit shall pay a fee in an amount set by resolution of the city council.
- E. Application Approval: The city administrative staff shall approve the application and grant the permit if the application is complete and meets the criteria set forth in section [15.24.040](#) of this chapter. The city administrative staff shall deny the application or approve the application with conditions if the city administrative staff determines that the measures proposed in the stormwater pollution prevention plan fail to meet the criteria set forth in section [15.24.040](#) of this chapter. Conditions the city administrative staff may impose in connection with the approval of a permit include, but are not limited to, the establishment of specific measures and controls to prevent erosion and the discharge of sediment, debris and other construction related pollutants from the site by stormwater.
- F. Term: Unless otherwise revoked or suspended, a stormwater construction activity permit shall be in effect for the full period of the construction activity. The construction activity will not be considered to be completed until the following events occur:
1. Subdivisions: For permits associated with a subdivision plat approval:
    - a. The permittee must complete all required subdivision improvements.
    - b. One of the following three (3) events must occur:
      - (1) The city issues a final certificate of occupancy for each lot in the subdivision.
      - (2) An individual stormwater construction activity permit is issued for each lot in the subdivision not having a final occupancy permit.
      - (3) The property has been revegetated or landscaped in a manner that eliminates erosion and sediment discharge or that brings the property back to its natural state.
  2. Site Plans: For permits associated with a site plan approval, the date that the permittee has completed all required landscaping and all outside construction work associated with the site plan.
  3. Building Permits: For permits associated with a building permit application, the date that the city issues a final occupancy permit for the structure covered by the building permit.
  4. Other: For permits issued that are not tied to other approvals from the city, the date that the permittee has completed all work associated with the permit and takes steps required by the permit to prevent further erosion and runoff from the site.

- G. Termination: No stormwater construction activity permit shall be considered terminated until the permittee notifies the city of the completion of the project and a final inspection is performed by an authorized city inspector to verify site stabilization. When the city inspector has verified the site is stabilized a "notice of termination" shall be submitted to the state of Utah. The permittee shall keep and maintain all permit required improvements on the site until the city accepts the "notice of termination".
- H. Amendments: In the event that the proposed construction activity for a site to which a permit pertains is materially altered from that described in an original stormwater pollution prevention plan in a way that may have a significant impact upon the effectiveness of the measures and controls described in the original stormwater pollution prevention plan, the permittee shall file an amended stormwater pollution prevention plan which meets the criteria set forth in section [15.24.040](#) of this chapter. (Ord. 2012-05)

## **15.24.040: STORMWATER POLLUTION PREVENTION PLAN:**

- A. Required Information: The stormwater pollution prevention plan (SWPPP) shall be required for all sites disturbing one acre or greater and for sites that are less than one acre that are part of a common plan of development. The SWPPP shall contain the following information. The following is not a comprehensive list of required elements of an SWPPP. For complete requirements see the general permit UTR300000 which can be found at: <http://www.waterquality.utah.gov/>.
1. Site Map: Provide an accurate map of the development area and surrounding property with spot elevations and contour lines.
  2. Site Description: Provide a description of the total area of the development site and acreage to be disturbed. Explain the nature and location of the construction activities, and a description of the intended sequence of major activities which will disturb soils for major portions of the site and include activities such as:
    - a. Grubbing.
    - b. Excavation.
    - c. Grading.
    - d. Utilities.
    - e. Infrastructure.
    - f. Any other activity that may disturb the natural landscape or vegetation.

3. Wetland Area: For sites containing any portion of delineated wetlands the above referenced map and description shall include a USACE certified wetland delineation study and a certified survey marking the boundaries of said wetland area.
  4. Control Description: Provide a description of the proposed measures and controls that will be implemented during construction activity, while the site is not stable, or while the soil is being disturbed or in a state of transition. The SWPPP must clearly describe the times during the construction process that the measures will be implemented for each major activity identified in this section.
  5. Contact Information: The SWPPP shall state the name and phone number of the person or entity responsible for implementation of each control measure.
- B. Goals And Criteria: The proposed measures and controls described in the SWPPP shall be designed to meet the following goals and criteria:
1. Discharges: The proposed measures and controls shall be designed to prevent or minimize, to the maximum extent practicable, the discharge of sediment, debris and other construction related pollutants from the construction site by stormwater runoff into the storm drainage system.
  2. Debris: The proposed measures and controls shall be designed to prevent or minimize, to the maximum extent practicable, the deposit, discharge, tracking by construction vehicles, or dropping of mud, sediment, debris or other potential pollutants onto public streets and rights of way.
    - a. Any such discharge shall be cleaned up and removed immediately upon notification to the permittee, or when it otherwise comes to the attention of the permittee.
    - b. Permittee shall, at a minimum, clean and remove any deposit or discharge by the end of the work shift in which the deposit occurred, or at the end of the workday, whichever comes first.
  3. BMPs: The proposed measures and controls shall consist of best management practices (BMPs) available at the time that the SWPPP is submitted. BMPs may include, but shall not be limited to:
    - a. Temporary silt or sediment fences.
    - b. Sediment traps.
    - c. Detention ponds.
    - d. Gravel construction entrances and wash down pads to reduce or eliminate off site tracking.
    - e. Porous type filter material or authorized sediment barrier.
    - f. Temporary grasses and permanent vegetative cover.

- g. Straw mulch as a temporary ground cover.
  - h. Erosion control blankets.
  - i. Temporary interceptor dikes and swales.
  - j. Storm drain inlet protection.
  - k. Check dams.
  - l. Pipe slope drains.
  - m. Rock outlet protection.
  - n. Reinforced soil retaining systems.
  - o. Gabions.
  - p. Other BMPs that are designed to fulfill the purposes of this chapter.
4. Stabilization: The proposed measures and controls shall be designed to preserve existing vegetation, where possible. Disturbed portions of the site shall be stabilized. Stabilization practices may include:
- a. Temporary seeding.
  - b. Permanent seeding.
  - c. Mulching.
  - d. Geotextiles.
  - e. Sod stabilization.
  - f. Vegetative buffer strips.
  - g. Protection of existing trees.
  - h. Planting of additional trees.
  - i. Preservation of mature vegetation.
  - j. Other appropriate measures.
5. Stabilization Practices: The use of impervious surfaces for stabilization is not an appropriate BMP, and should be avoided. Stabilization measures shall be initiated as soon as practicable in disturbed portions of the site where construction activities have temporarily or permanently ceased, but in no case more than fourteen (14) days after the construction activity in that portion of the site has temporarily or permanently ceased, except under the following circumstances:
- a. If within fourteen (14) days of the initiation of stabilization measures the construction activity temporarily or permanently ceases or is precluded by snow cover or frozen



ground conditions, stabilization measures shall be initiated as soon as practicable; or

b. If construction activity on a portion of the site is temporarily ceased, and earth disturbing will resume within twenty one (21) days, temporary stabilization measures need not be initiated on that portion of the site.

6. Minimizing Risk Materials: The proposed measures and controls shall be installed to minimize at the site the risk of discharge of construction related pollutants such as oil, fuels, paint, thinners, solvents, salts, and other chemicals or pollution material:

a. Implementation of storage practices to minimize exposure of the material to stormwater as well as spill prevention and response.

b. Storage of pollution potential materials under cover and on impervious surfaces.

c. Maintaining permanent vehicle and equipment parking or storage areas on approved impervious surfaces with appropriate catch basins and oil separation devices that are properly maintained. (Ord. 2012-05)

#### **15.24.050: PROPER OPERATION AND MAINTENANCE:**

The permittee of an SWPPP shall install the erosion and sediment control measures required by the approved SWPPP before commencing any construction activity on the site to which the SWPPP applies or at such times indicated in the SWPPP. The erosion and sediment control measures shall be properly installed and maintained in accordance with the permit, the manufacturers' specifications, and good engineering practices. The permittee shall maintain such measures on the site until the city accepts the termination of the permit pursuant to subsection [15.24.030G](#) of this chapter. (Ord. 2012-05)

#### **15.24.060: INSPECTION AND ENTRY:**

The permittee shall allow any authorized employees and representatives of the city, representatives of the Utah division of water quality, and representatives of the EPA, to enter the site to which a permit applies at any time and to inspect the erosion and sediment control measures maintained by the permittee. The permittee shall also allow inspection of any records pertaining to the conditions of the permit. Section 15.23.060 of this title further specifies the authority relating to inspections. (Ord. 2012-05)

#### **15.24.070: REVOCATION OR SUSPENSION OF A PERMIT:**

- A. **Revocation Or Suspension:** A stormwater construction permit issued under this chapter may be revoked or suspended by the city upon the occurrence of any one of the following:
1. Failure of permittee to comply with the SWPPP or any related condition.
  2. Failure of permittee to comply with any provision of this chapter or any other applicable law, ordinance, rule or regulation related to stormwater.
  3. A determination by the city that the erosion and sediment control measures implemented by a permittee pursuant to the SWPPP are inadequate to prevent or minimize, to the maximum extent practicable, the discharge of sediment, debris or other pollutants from the construction site by stormwater.
- B. **Notice:** The city shall provide permittee written notice of noncompliance before revoking or suspending a permit. The notice shall:
1. State the location and nature of the noncompliance, and shall also specify what action is required for the permittee to avoid revocation or suspension of the permit.
  2. Allow the permittee a reasonable time to take the necessary corrective action to avoid revocation or suspension of the permit which time, in the absence of exceptional circumstances, shall not be less than ten (10) nor more than thirty (30) days.
  3. Be delivered or mailed to the address listed for the permittee in the application or the site of the construction activity, or both.
  4. If the permittee fails to correct the problems identified in the notice during the time specified in the notice, the city may suspend or revoke the permit by recording a certificate of noncompliance on the property where the violation occurred.
  5. The permittee may appeal a suspension or revocation determination of any permit as provided in this chapter.
- C. **Exceptional Circumstances:** The city may take any steps necessary to mitigate, remedy, or alleviate any exceptional circumstances and recover the costs for the same from a permittee, owner, developer, or contractor responsible for creating an exceptional circumstance. For purposes of this chapter, exceptional circumstances include, but are not limited to:
1. Situations which involve a risk of injury to persons.
  2. Damage to storm drain facilities.
  3. Damage to other property or the environment.
  4. Discharge of a pollutant into the environment.

D. Stop Work Order: A stop work order may be issued upon the revocation or suspension of a permit, or upon the discovery of work being conducted without a required permit. The stop work order may be issued by the appropriate city inspector. No construction activity may be commenced or continued on any site where a stop work order has been issued, or where a permit has been revoked or suspended until the permit has been reinstated or corrected.

E. Reinstatement: A permit may be reinstated or corrected upon:

1. Compliance with all provisions of this chapter.
2. Correction and compliance with all permit conditions.
3. Correction of substandard performance.
4. Correction of noncompliance issues.
5. Upon the filing of an amended SWPPP which is designed to correct the deficiencies of the original SWPPP. (Ord. 2012-05)

#### **15.24.080: CONNECTION PERMIT:**

A. Permit Required: No person shall:

1. Connect to the city's stormwater system, either directly or indirectly, without first obtaining a stormwater connection permit from the city.
2. Commence new development or redevelopment without first obtaining a stormwater connection permit.

B. Application: The applicant for a stormwater connection permit shall submit the following to the city:

1. Application Form: A completed application form as provided by the city.
2. BMPs: A plan incorporating stormwater BMPs that meet the requirements of the stormwater regulations and section [15.23.040](#) of this title.
3. Maintenance: A maintenance plan and any maintenance agreement outlining how the applicant will maintain the stormwater improvements listed in the application.
4. Fee: A fee in an amount set by resolution of the city council.

- C. Additional Requirements: The application shall be submitted to the city in conjunction with building permit or subdivision approval, whichever is applicable.
- D. Review: The stormwater connection permit application shall be reviewed by the city official designated to issue stormwater permits. Upon review, the permit shall be issued, issued with conditions, or denied.
- E. Appeal: An aggrieved party may appeal as provided in this chapter the issuance or denial of any stormwater permit.
- F. Factors: When deciding whether to issue, issue with conditions, or deny a stormwater permit application, the following factors shall be considered:
1. Whether the application is complete.
  2. Whether all development fees have been paid.
  3. Whether the application complies with all stormwater regulations and policies.
  4. Whether the application conforms to the city's storm drain plan.
  5. Whether the application incorporates effective BMPs.
  6. The potential for the connection to introduce pollutants into the storm drain system.
  7. Whether the proposed connection creates a safety hazard.
  8. Whether the proposed connection affects the integrity of the storm sewer system infrastructure.
  9. Whether the proposed connection endangers any groundwater or drinking water supply.
  10. Whether the applicant has submitted a maintenance plan and any maintenance agreement ensuring the proper maintenance and upkeep of the applicant's connection and on site stormwater improvements.
- G. Failure: Failure to construct or maintain stormwater improvements in accordance with an approved stormwater connection permit shall be a violation of this chapter.
- H. As Built: Any person connecting to the stormwater system shall provide the "as built" drawings showing the details and the location of the connection along with any location device. The plans shall be provided in a format acceptable to the city.

- I. Rate: Connections to the stormwater system shall be designed so that the discharge to the stormwater system does not exceed one-tenth cubic foot per second (0.1 cfs) per acre. (Ord. 2012-05)

### **15.24.090: VIOLATIONS AND ENFORCEMENT:**

Enforcement, violations, and penalties for this chapter are specified in section [15.23.080](#) of this title. Each day that a violation occurs shall constitute a separate offense. (Ord. 2012-05)

### **15.24.100: EXEMPTIONS:**

The following activities are exempt from the requirements of this chapter:

- A. Bona fide municipal activities of the city.
- B. Activities of a public utility, government entity, or similar entity to remove or alleviate an emergency condition, restore utility service, reopen a public thoroughfare to traffic, or otherwise protect public health, safety, and welfare.
- C. Bona fide agricultural and farming operations. (Ord. 2012-05)

### **15.24.110: APPEAL:**

- A. Any aggrieved party may appeal the approval, suspension, revocation, or denial of any stormwater permit issued under this chapter by filing a notice to appeal with the city recorder within ten (10) days of determination being issued by the city. The notice of appeal shall contain the following information:
  - 1. Appellant's name, address, and contact telephone number.
  - 2. A short statement describing the basis for the appeal.

3. The relief sought by the appellant.

B. Upon receipt of the notice of appeal, the city recorder shall schedule an appeal before the city's appeal authority in accordance with the procedures and rules for the same as specified in this code. (Ord. 2012-05)

### **15.24.120: COMPLIANCE WITH FEDERAL AND STATE LAW:**

Nothing in this chapter is intended to relieve any person or entity from any obligation to comply with applicable federal and state regulations. (Ord. 2012-05)

## **Chapter 15.25 STORM DRAIN DESIGN, CONSTRUCTION STANDARDS, AND POLICIES**

### **15.25.010: GENERAL PROVISIONS:**

A. Findings: The city council finds:

1. The city faces unique stormwater challenges as shown on the city's sensitive lands overlay in the city's general plan.
2. The city is impacted by watercourses and multiple drainageways.
3. The city is impacted by stormwater and runoff and nonsource point pollution from parking lots, residential uses, commercial uses, and industrial activity and such pollution presents a hazard for the health, safety, and welfare of the public in this community.
4. There exists in the city a high groundwater table that precludes certain stormwater control measures and necessitates extensive storm drain design, open space preservation, construction standards, and policies as set forth in this chapter.

B. Purpose: This chapter represents the construction standards for private and public construction as it relates to storm drainage within the city.

- C. Conformance: All efforts have been made for this policy to conform with the requirements of phase II of the federal clean water act, and the city's stormwater management plan.
- D. Outline: The following information is organized in such a way to follow the natural flow of stormwater, from the initial rainfall hydrology (section [15.25.020](#) of this chapter), to conveying the rainwater (section [15.25.030](#) of this chapter), to a basin (section [15.25.040](#) of this chapter), then discharging to a natural outlet location (section [15.25.050](#) of this chapter). Permits and practices (section [15.25.060](#) of this chapter), and penalties for violations (section [15.25.070](#) of this chapter) are also discussed.
- E. Definitions: The definitions specified in [chapter 15.22](#) of this title apply to all stormwater regulations in this code. (Ord. 2012-05)

### **15.25.020: RAINFALL HYDROLOGY:**

- A. Policy: All storm drain systems shall be designed to carry the 100-year storm.
- B. Storm Specifications: Local storm drain piping shall be designed for the 10-year storm where the road or other aboveground conveyance will carry the difference to the 100-year storm. All basins regardless of local or regional, or retention or detention, shall be designed to accommodate a 100-year storm event. The storm duration used for the sizing of basins shall be based upon the worst case scenario and not the time of concentration.
- C. Intensity-Duration-Frequency (IDF): For the use of the "rational method", an IDF curve shall be obtained from the city engineer for the project location.
- D. Calculation Basis: For single site plans and small subdivisions, the rational equation may be used. For larger sites a city engineer approved computer model shall be used.
- E. Rainfall Pattern: For the use of computer models, the following rainfall pattern shall be used. This pattern is based upon the "Farmer-Flecher distribution". This pattern is for a one inch (1") unit storm and must be multiplied by rainfall depth for storms of other magnitudes.

F. Rainfall Total: For the use of the following rainfall pattern, a rainfall total from the "NOAA atlas" must be obtained. Such total shall be based upon a 1-hour storm as follows:

1	0	11	0.004	21	0.033	31	0.052	41	0.012	51	0.005
2	0	12	0.005	22	0.034	32	0.045	42	0.011	52	0.005
3	0.002	13	0.008	23	0.035	33	0.04	43	0.01	53	0.004
4	0.002	14	0.009	24	0.038	34	0.035	44	0.009	54	0.004
5	0.002	15	0.009	25	0.039	35	0.03	45	0.009	55	0.004
6	0.002	16	0.013	26	0.045	36	0.022	46	0.008	56	0.003
7	0.002	17	0.017	27	0.052	37	0.02	47	0.006	57	0.003
8	0.002	18	0.02	28	0.054	38	0.018	48	0.006	58	0.002
9	0.003	19	0.024	29	0.054	39	0.016	49	0.005	59	0.002
10	0.003	20	0.029	30	0.054	40	0.014	50	0.005	60	0.001

(Ord. 2012-05)

### 15.25.030: STORM DRAIN SYSTEM:

A. Policy: It is the policy of the city that:

1. Stormwaters not be carried in irrigation ditches, nor that irrigation water be conveyed in storm drain systems.
2. Local pipes shall be sized for the 10-year storm event, however, all basins and other aboveground stormwater facilities shall be designed and constructed to manage the difference for the 100-year storm event.



- B. Piping: Storm drain lines shall be concrete pipe (NRCP or RCP), of appropriate class. Minimum size for storm sewer mains shall be fifteen inch (15") diameter. Pipe specifications are included in the city's public works standard and technical specifications. Where determined by the city engineer, larger drain lines shall be installed to accommodate future development.
  
- C. System Design And Costs: The cost to provide adequate storm drainage to a development shall be paid for by the developer. Structures shall be installed in accordance with the standard drawings.
  
- D. Access: Storm drain lines shall have cleanout boxes, inlets or manholes installed at all changes in grade or alignment, with a maximum distance of four hundred feet (400') between accesses. (Ord. 2012-05)

#### **15.25.040: BASINS:**

- A. Policy: It is the policy of the city to require storm drainage basins for all development.
  
- B. Basin Size And Location: All new development and redevelopment sites are required to have a stormwater detention system designed as provided in this chapter. It is critical for developments that are in close proximity to a stream or river, or within "drinking water source protection zones" 1 or 2 as defined by the "state division of drinking water rules". All detention basin designs and calculations shall be reviewed by the city engineer for approval.
  
- C. Certain Development Requirement: On site detention is required for all commercial, manufacturing, industrial, or similar development in the city.
  
- D. Ownership: The ownership of stormwater basins is specified as follows:
  - 1. Private Basins: Where the development will have a homeowners' association (HOA) or in commercial applications, local detention basins shall be owned and maintained by the owner or HOA.
  - 2. Local Public Or Private Basins: In subdivisions, local detention basins shall be constructed by the developer. Following acceptance of the construction, the ownership,

operation, and maintenance may either be conveyed and maintained by the city or HOA under an appropriate maintenance agreement.

3. Regional Detention Basins: Regional basins shall be owned and maintained by the city and constructed according to the criteria given herein and approved by the city engineer. Actual ownership and responsibility shall be specifically defined in the owner dedication certificates, development agreements, or deed.

E. Basin Access And Setback: Basin access shall be as follows:

1. Public Basins: The developer shall provide the city ingress and egress easements for construction, operation, service, maintenance, and repair for any public basin.
2. Private Basin: The owner or owning association shall be provided ingress and egress easements for construction, operation, service, maintenance, and repair for any private basin. The city shall be provided an emergency easement for emergency access, service, and repair for a private basin.
3. Setback: Each basin shall be constructed with a flat rim circling the basin which shall be set back from a property line, adjoining property, and from any structure an appropriate distance determined by the city engineer to prevent erosion, and to allow for a backhoe and dump truck to circle the rim for maintenance and repair.

F. Percolation: No reduction due to percolation for detention basins volumes shall be permitted in design, due to the nature of basins silting in over time and also possible frost conditions during a storm.

G. Basin Construction: Basins shall be constructed as follows:

1. Policy: Basins must be constructed to enhance safety, health and aesthetics of the area.
2. Engineering: Basins, whether detention or retention, must be designed and stamped by a licensed civil engineer.
3. Location: Detention basins shall be located with convenient access for maintenance and repair by maintenance personnel. This generally means that the basin property has frontage along a public roadway. Volume in ditches or roadside swales shall not be considered in the volume calculation.
4. Fencing: If unfenced and open to general public, the maximum depth of water should not exceed three feet (3'). If a fence is required, six foot (6') chainlink fencing is to be installed in accordance with the city's public works standards and technical specifications, or as may more specifically be stated in any land use regulations.
5. Side Slopes: Side slopes should not exceed 3:1 (horizontal to vertical) (4.5:1 is desirable) for ease of mowing and access.

6. **Bottom Slope:** The basin floor shall be designed so as to prevent the permanent ponding of water. The slope of the floor of the basin shall not be less than one percent (1%) to provide drainage of water to the outlet grate and prevent prolonged wet, soggy or unstable soil conditions. The preferred minimum slope is two percent (2%).
7. **Freeboard:** There should be at least one foot (1') of freeboard (berm above the high water mark).
8. **Spillways:** Spillways must be included and a path with a maintained swale and drainage easement to a safe location. Attention should be given to the design of the spillway to avoid erosion. Overflow spillways are intended to introduce flows back into the main pipe and are typically downstream of the outlet control. Emergency spillways are intended to carry flows beyond the capacity of the overflow spillway to a safe downstream location. All spillways shall be designed to protect adjacent embankments, nearby structures, and surrounding properties.
9. **Outlet Control:** Small, local, private detention basins may be allowed to have calculated fixed orifice plates mounted on the outlet of the basin. Large, regional, public detention basins shall have movable screw type head gates (Waterman C-10 OAE) set at a calculated opening height for the discharge and with a chain to fix the position.
10. **Grates:** All grates on inlets and outlets must be hot dipped galvanized (not painted) with bars at spacing to prohibit feet from falling in and yet avoid clogging with debris. Generally bar spacing should never exceed three inch (3") spacing.
11. **Low Flow Piping:** The inlet and outlet structures may be located in different areas of the basin, requiring a buried pipe to convey any base flows that enter and exit the basin, rather than a cross gutter or surface flow. The minimum pipe size and material for the low flow shall be twelve inch (12") diameter or as approved by the city engineer.
12. **Ground Covers:** The surface area of the basin may either be seeded, sodded, or covered with fabric and cobbles, as specified by the city. If seeded, measures shall be taken to eliminate erosion until grasses are established. A minimum of four inches (4") of topsoil must be installed prior to sod or seed placement. Cobble sizes shall be four inches (4") or greater in size overlying a city approved weed barrier. Cobble rock may be permitted if the basin is fenced and no other alternative purpose is proposed for the land. Grass or hydroseeding on all basins shall be installed in accordance with the city's public work standards and technical specifications. The basin shall be provided with an automated sprinkler system previously approved by the city engineer. Landscaping shall be installed in accordance with the applicable landscaping regulations.
13. **Embankment (Fill) Construction:** If a raised embankment is constructed for a basin (constructed with granular materials), it shall be provided with a minimum of six inches (6") of clay cover on the inside of the berm to prevent water passage through the soil.
14. **Excavation (Cut) Construction:** If the basin is constructed primarily by excavation, then it may be necessary to provide an impermeable liner and land drain system when constructed in the proximity of basements or other below grade structures as determined by a geotechnical evaluation.
15. **Multiuse Basins:** Basins may be designed as multiuse facilities when appropriate

precautions are incorporated into the design. If amenities such as pavilions, playground equipment, volleyball courts, or other amenity are to be constructed within the water detention area of a basin they shall be designed appropriately. Structures shall be designed for saturated soil conditions and bearing capacities are to be reduced accordingly. Restrooms shall not be located in areas of inundation. Inlet and outlet structures should be located as far as possible from all facilities. No woodchips or floatable objects may be used in the area that will be inundated.

H. Detention Volume: Detention basins shall be sized based upon the criteria set forth in section [15.25.020](#) of this chapter. Detention basins are designed to allow a predetermined amount of flow to discharge during and after a storm event as discussed above. Detention basins are preferred over retention basins. No groundwater injection is allowed. Above grade detention basins are preferred over below grade basins, yet both are allowable. Discharge rates shall comply with section [15.25.050](#) of this chapter.

I. Retention Basins: The following applies to retention basins:

1. Policy: Regional retention basins shall not be permitted by the city. It is the policy of the city to prohibit local or private retention basins for developments, unless certain criteria are met.
2. Retention Discouraged: Any retention basin must be specifically approved by the city engineer. Retention basins shall not be permitted within zones 1, 2, or 3 of any "drinking water source protection zone" of any drinking water source. Due to the silting in potential, no percolation rate may be used in the calculation of volume unless an approved oil/sand separator is installed upstream. The volume must be based upon the 100-year, 3-hour storm. Local storm retention basins shall be designed for the 100-year, 3-hour storm, based upon the intensity-duration-frequency (IDF) curve for the area as approved by the city engineer. Local basins are typically private ownership and maintenance, and serve only one or two (2) specified subdivisions or sites as may be approved.
3. Retention Basin Criteria: Retention basins are basins which hold and store water until it is evaporated or percolated, and shall not be permitted for developments unless all the following conditions are met:
  - a. The basin is greater than five hundred feet (500') or fifty feet (50') times the number of lots in the entire development (whichever is greater) from the city storm drain system or waterway, and is topographically capable of draining to the city system.
  - b. The basin is not located within a hazardous area such as a steep slope, floodplain, high groundwater area, "drinking water source protection zone", or some other hazard area.
4. Percolation For Basins: The percolation rate of the ambient soils may be permitted in the calculations only if an oil/sand separator is installed upstream and only ten percent (10%) of the percolation rate may be used due to eventual silting in of the basin.

J. Standing Water: The following regulations apply to standing water:

1. It is the policy of the city to eliminate standing water wherever possible as an effort to minimize a mosquito problem and associated viruses, except where wetland protection is enforced.
2. Basins should completely drain within forty eight (48) hours of the primary storm event.
3. Low flow bypass pipes may be required.

K. Ground Surface Improvements: It is the city policy that the finished surface of the basin shall be improved to eliminate erosion and dust and to enhance the aesthetics of the area by being appropriately landscaped with approved plant material, landscape material, and approved trees. All basins shall be fully landscaped or constructed in accordance with any applicable landscaping regulations. (Ord. 2012-05)

### **15.25.050: DISCHARGE:**

A. Policy: It is the policy of the city to control stormwater at the source and minimize the potential for flooding downstream.

B. Requirements: The following requirements apply:

1. Storm Drainage: Storm drainage leaving a site or subdivision shall not exceed, as much as practicable, the predeveloped quantities and qualities at a maximum rate as follows:
  - a. Allowable Discharge: The allowable discharge rate from any nonregional basin shall:
    - (1) Prehard Surfacing Discharge: Not exceed the prehard surfacing discharge for the entire site for the 100-year storm event.
    - (2) Maximum Discharge Rate: Not exceed the maximum discharge rate set by the city engineer depending on the proposal, the facts and circumstances of the basin, and historical flow, and the drainage within the surrounding area. If no maximum discharge rate is established then the standard discharge rate of 0.1 cubic feet per second per total acre within the development draining to the basin shall be applied.
    - (3) Controlled Discharge: Controlled discharge may be established through an orifice or adjustable gate as approved by the city engineer.
    - (4) Flow Concentration: By nature of development, flows are concentrated to one or more locations where historically sheet flow in lower concentrations may have left the site. Attempts shall be made to minimize the runoff concentrated quantity to the flows

stated above by use of detention basins, downstream piping to safe areas or other methods as deemed necessary by the city engineer.

2. **Water Quality:** Best management practices (BMPs) shall be used to the maximum extent practicable to ensure healthy water quality based upon national standards for the same. BMPs are included in the city's stormwater management plan and must be approved by the city engineer.
3. **Irrigation Facilities:** No stormwater discharge shall be permitted to irrigation ditches and canals, except where such ditch or canal has had historical use only for storm drainage or was an irrigation facility that has been wholly converted to only stormwater use. Irrigation facilities are vested rights under state law and protected against all encroachment, therefore, written permission is required in accordance with Utah Code Annotated section 73-1-15 from the owner or operator of any irrigation ditch or canal before any construction activity that affects an irrigation facility.
4. **Sump Drains And Injection Wells:** Sump drains, injection wells, and underground stormwater basin storage of any kind is not allowed nor is any underground storm drain facility permitted. All storm drain facilities shall be open at the surface for visible inspection, to ensure adequate size, functionality, and proper maintenance.
5. **Parking Lots:** No parking lot, including sidewalks and all other impervious surfaces, shall be used for stormwater storage of any kind, above or below surface.
6. **Basin Overflows:** Attention shall be given to overflow locations and pathways to safe locations downstream as discussed above. Easement shall be obtained and pipes or swales sized to handle the 100-year flow. (Ord. 2012-05)

## **15.25.060: PERMITS AND PRACTICES:**

A. Policy: The following policies apply:

1. It shall be the policy of the city to comply with the requirements of phase II of the federal clean water act, and all other state and federal requirements. This is to include applications, permits, plans, and implementation.
2. It is the policy of the city to require a stormwater permit for all construction sites within the city.

B. Permits: Permitting applies as follows:

1. **Permit Required:** A stormwater activity and/or a stormwater connection permit is required as provided by this code. A permit for all construction activities is required and can be obtained as outlined in sections [15.24.030](#) and [15.24.080](#) of this title.

- a. This permit must be obtained before connecting to any existing stormwater system, drain, pipe, catch basin, stormwater box, manhole, or similar facility.
  - b. As part of this permit all fees must be paid, all detention basins shall be calculated, designed, and stamped by a licensed professional engineer.
2. Utah Pollution Discharge Elimination System (UPDES) Permit: A stormwater general UPDES permit for construction activities is required for all sites or development projects affecting one acre or more, including any area used for staging, stockpiling, or any other temporary construction activity. This permit is filed with the Utah division of water quality, department of environmental quality. The permit can be obtained online as follows:
- a. <http://waterquality.utah.gov/updes/stormwater.htm>.
  - b. Click on "online application process notice of intent".
  - c. The appropriate fee must be paid to the state.
  - d. An SWPPP must be prepared and on site for this application.
3. Stream Alteration Permit: A stream alteration permit is filed with the Utah department of natural resources, division of water rights.
- a. This permit overlaps the 404 wetlands permit, discussed below, because it is applicable to the area equal to the stream plus two (2) times the bank full width (up to 30 feet).
  - b. Any modifications to the stream or banks within this area must comply with the stream alteration permit.
4. EPA 404 Wetlands Permit: This permit is filed with the U.S. army corps of engineers. It is applicable for all wetlands within a development.
- a. This will apply to all wetlands depending upon the presence of water, soil type and vegetation.
  - b. As part of this permit, a wetlands delineation report with USACE acceptance letter is required.
  - c. The scope of this permit applies to all jurisdictional waters of the United States up to and including the normal high water mark.
  - d. No fee is typically required for this permit.
  - e. A letter of nonregulated wetlands may also be applicable.
  - f. Any mitigation that may be required must be done prior to final acceptance of a subdivision.
  - g. Any wetlands identified must be indicated on the final plat with certified survey included.

C. Best Management Practices (BMPs): The city's stormwater management plan contains a listing of BMPs that can be used on a site.

1. Categories: BMPs typically fall into the following categories:

- a. Perimeter control.
- b. Erosion controls.
- c. Sediment control.
- d. Materials handling and spill prevention.
- e. Waste management.
- f. Good housekeeping.

2. Application: The application of some BMPs are discussed below. They include, but are not limited to:

- a. Oil separators.
- b. Inlet protection.
- c. Tracking pads.
- d. Street sweeping.
- e. Concrete washout.
- f. Silt fences.

3. Oil Separators (OWS): Oil separators shall be required on all sites with parking facilities that exceed two (2) acres, automobile salvage or wrecking areas, or smaller sites anticipating oily discharges such as mechanic shops or similar facilities. Oil separators must be capable of removing particulates down to one hundred fifty (150) microns. Possible products include, but are not limited to: BaySaver, Stormceptor, Vortechnic.

- a. Where oil separators are required, sizing and design of OWS must be reviewed by the city engineer prior to installation. Consideration must be given to frequency and ease of maintenance of the structure. Private basins shall have contracts in place with a local sewer company to periodically clean the separator in accordance with the manufacturer's specifications.
- b. Manufacturer's recommendations for sizing must be followed with calculations submitted to the city. The separator may either be installed upstream or downstream of the basin keeping in mind that flows on the outlet of the basin would be smaller.

4. Inlet Protection (IP): The city's stormwater management plan may permit straw bails, silt fences, or curb snakes (after asphalt is placed). Filter fabric under the grate shall not be permitted since drainage is greatly inhibited.

5. Tracking Pads (CR): Sites must have a tracking pad to eliminate mud from being tracked



onto the adjacent street. If mud is tracked, the contractor shall be responsible to sweep the streets as necessary.

6. Street Sweeping (SC): If mud is tracked onto the street, the developer or owner shall be responsible for sweeping the street.
7. Concrete Washout (CWM): A place must be located within the subdivision or on the site for concrete washout. No washout will be permitted on the street which would then continue to the storm drain. The washout area may need to be maintained and temporarily excavated until the building foundations and driveways are constructed, or some other arrangement made.
8. Silt Fences (SF): Silt fences must be installed to prohibit the flow of sediments off of the site in accordance with manufacturer's recommendations and the city's stormwater management plan.

D. Notice Sign: All subdivisions, except minor lot subdivisions, are required to have at least one large notice sign that is clearly visible at the entryway of the subdivision indicating that the SWPPP must be obtained and followed. Said sign shall be maintained by the original subdivision applicant until conditional acceptance of the subdivision. The specific wording on the sign relating to stormwater and other related development requirement may be prescribed and modified by the administration as needed to meet challenges created by development and to give notice to requirements of law. (Ord. 2012-05)

### **15.25.070: VIOLATIONS AND PENALTIES:**

Enforcement, violations, and penalties for this chapter are specified in section [15.23.080](#) of this title. Each day that a violation occurs shall constitute a separate offense. (Ord. 2012-05)

The city also plans to investigate the following for incorporation into the city ordinances:

1. Include the use of low impact development standards with the initial development submittal package. Low impact development standards need to be listed as part of the design requirements for development.
2. Allow for green roofs. Green roofs can be flat or gently sloped. Don't want to allow for flat roofs unless they are landscaped.
3. Limit the amount of hard surfacing on a lot (say 50 percent maximum including impermeable rooftops, and impermeable pavements).
4. Limit the drive approach width, total for a lot.
5. Allow for a storm water impact fee credit at building permit if the homeowner or business uses green roof, rainwater harvesting, permeable pavement, etc on their lot. A maximum credit should be specified.
6. Include a provision in the ordinance that allows the City to penalize or fine a contractor for discharging pollutants, including sediments, into the storm drain system. The maximum amount of fine should also be listed or referenced. Include escalation clause.
7. Include a provision in the ordinance that allows the City to penalize or fine an owner for not maintaining low impact facilities.
8. Require private associations and commercial businesses were required to conduct their own periodic inspections of their storm water facilities and send a report to the City. HOAs and commercial businesses can contract this out to private companies.
9. Require retention (not detention) to be underground as much as possible so that we do not have stagnant surface water issues. Underground retention should be a minimum of 2 feet above the water table depending on the water table.
10. Possibly increase the distance above the groundwater table for basements without footing drains to perhaps 3 feet. Additional water retained on site may raise the water table and get into basements.

FARR WEST CITY  
RESOLUTION NO. 13-01

A RESOLUTION APPROVING AN INTERLOCAL AGREEMENT BETWEEN  
FARR WEST CITY AND WEBER COUNTY RELATING TO OBLIGATIONS  
REQUIRED FOR A GENERAL PERMIT FOR STORM WATER  
MANAGEMENT

WHEREAS, the Utah Interlocal Cooperation Act, Title 11, Chapter 3, Utah Code Annotated, 1953 as amended, permits governmental units to enter into agreements with one another for the purpose of exercising on a joint and cooperative basis powers and privileges that will benefit their citizens and make the most efficient use of their resources; and

WHEREAS, Title 11, Chapter 13, Section 5 of the Utah Code Annotated, 1953 as amended, requires that governing bodies of governmental units adopt resolutions approving an interlocal agreement before such agreements may become effective; and

WHEREAS, Weber County and Farr West City have negotiated an Agreement for the purposes of providing storm water services in accordance with the Federal Water Pollution Control Act, as amended by the Clean Water Act of 1987, and the Utah Water Quality Act, together with federal and state regulation adopted pursuant to such Acts for Farr West City;

WHEREAS, Weber County and Farr West City find that mutual benefit and cost effective government can be achieved through this interlocal agreement for the services entailed herein;

NOW, THEREFOR, BE IT RESOLVED by the Mayor and City Council of Farr West City City that the attached Interlocal Agreement is entered with Weber County for the purposes of storm water as authorized in the Interlocal Agreement, and the Interlocal Agreement is hereby approved and incorporated by this reference. The Council hereby authorizes and directs the Mayor to execute the Interlocal Agreement for and on behalf of Farr West City.

PASSED AND APPROVED by the Farr West City Council this 20 day of February 2003.

  
\_\_\_\_\_  
Mayor, Jimmy Papageorge  
Farr West City

ATTEST:

  
\_\_\_\_\_  
City Recorder

Resolution Number 03-02

**MUNICIPAL WASTEWATER PLANNING PROGRAM RESOLUTION**

RESOLVED that *FARR WEST CITY* informs the Water Quality Board the following actions were taken by the *CITY COUNCIL*

1. Reviewed the Municipal Wastewater Planning Program Report for 2002, which is attached to this resolution.
2. Have taken all appropriate actions necessary to maintain effluent requirements contained in the UPDES Permit (If Applicable)

Passed by a (majority) (unanimous) vote on

4-2-03  
(date)

*Jimmie Patayuzz*  
Mayor/Chairman

*Amy M Roskelley*  
Attest: Recorder/Clerk

**RESOLUTION NO. D2-02****A RESOLUTION OF THE CITY OF FARR WEST,  
ADOPTING THE STORM WATER MANAGEMENT PLAN**

**WHEREAS**, the City of Farr West (herein "City") is a municipal corporation duly organized and existing under the laws of the State of Utah; and

**WHEREAS**, the City Council finds that in conformance with the Clean Water Act, Phase II, the City is mandated to adopt a Storm Water Management Plan; and

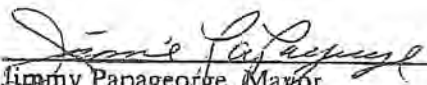
**WHEREAS**, the City Council finds that in conformance with the provisions of the Clean Water Act, Phase II, the City's Storm Water Management Plan identifies the six Minimum Control Measures (MCM's), with their associated Best Management Practices (BMP's), Measurable Goals, Implementation Schedules and Fiscal Sources.

**WHEREAS**, the City seeks to be in compliance with current statutory requirements.

**NOW THEREFORE, BE IT RESOLVED BY THE CITY OF FARR WEST** as follows:

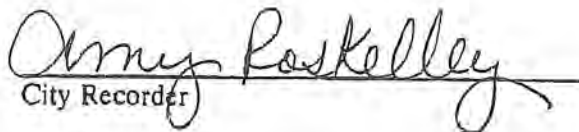
The Farr West City Storm Water Management Plan dated July 2002, and future Mayor-approved updates, attached is hereby adopted and promulgated this 15 day of

August, 2002.

  
Jimmy Papageorge, Mayor

Attest:

(SEAL)

  
Arny Raskelley  
City Recorder

**STATE OF UTAH, DEPARTMENT OF ENVIRONMENTAL QUALITY, DIVISION OF WATER QUALITY**  
 195 North 1950 West, P.O. Box 144870, Salt Lake City, Utah 84114-4870 (801)536-4300

**Notice of Intent (NOI) for Coverage Under the UPDES General Permit for Discharges from Small Municipal Separate Storm Sewer Systems (MS4's), Permit No. UTR090000.**



INSTRUCTIONS ON BACK PAGE

DWQ USE ONLY

Coverage No. \_\_\_\_\_

Submission of this Notice of Intent constitutes notice that the party identified in Section I of this form intends to be authorized by a UPDES permit issued for storm water discharges from Small Municipal Separate Storm Sewers in the State of Utah. Becoming a permittee obligates such discharger to comply with the terms and conditions of the permit. ALL NECESSARY INFORMATION MUST BE PROVIDED ON THIS FORM.

**Part I. General Information**

**Governmental Entity Name:** Farr West City Corporation

**Mailing Address:** Street 1896 North 1800 West

City Farr West City State Utah Zip Code 84404

**Operator Type (Circle One):**  City,  County,  Hospital,  Prison,  Military Base,  Park,  College/University,  UDOT,  Sewer District,  Flood Control District,  Drainage District,  Association,  Other(list) \_\_\_\_\_

**Operator Status (Circle One):** Federal / State /  Local / Other Public Entity(list) \_\_\_\_\_

**Operator Contact Person:** Z. Lee Dickemore

Title: Mayor Telephone Number 801-731-4787

**Latitude/Longitude at Center of land for which you are requesting authorization to discharge:**

Latitude 41° 18' 10" Longitude 112° 01' 46"

**Population served by your MS4:** 4,000 People

**Storm Water Management Program Responsible Person:**

Name: Sean Lambert Title: Public Works Department

Telephone Number: 801-731-4187

**Part II: Outfalls and Receiving Waters**

**Receiving Waters: List all separate storm water outfall receiving waters (all discharges to waters under the definition of waters of the State). If all receiving waters are not known at the time of the NOI submittal, list known outfalls and update the list on annual reports. (ATTACH ADDITIONAL SHEETS AS NEEDED)**

	Outfall	Receiving Water
1.	<u>Fourmile Creek</u>	<u>Weber River</u>
2.	<u>1900 North Drainage</u>	<u>Weber River</u>
3.	<u>3300 North Outfall</u>	<u>Weber River</u>
4.	<u>Warm Springs Channel (4000 N.)</u>	<u>Great Salt Lake</u>
5.		
6.		

**Part III. Initial Identification of Best Management Practices (ATTACH ADDITIONAL SHEETS AS NEEDED)**

**1. Public Education and Outreach on Storm Water Impacts**

**Outreach Techniques**

- Classroom Education/School Programs
- Outreach To Commercial Entities
- Printed Material
- Media Campaign
- Classroom Educational Materials
- Events And Programs
- Displays
- Speakers To Community Groups
- Economic Incentives
- Promotional Giveaways
- Others: [Storm Drain System Signage](#)

**Management Practices to Encourage**

- Proper Lawn And Garden Care (Fertilizer And Pesticide Use, Sweeping, Etc.)
- Low Impact Development
- Pet Waste Management
- Pollution Prevention For Businesses
- Proper Disposal Of Household Hazardous Wastes
- Water Conservation Practices
- Others: \_\_\_\_\_

**2. Public Involvement/Participation**

**Involvement Techniques**

- Advisory/Partner Committees
- Local Storm Water Contact
- Public Access To Documents And Information
- Public Review Of Plans And Annual Reports
- Watershed Organizations
- Attitude Surveys
- Community Hot Lines
- Stakeholder Meetings
- Others: \_\_\_\_\_

**Participation Activities**

- Adopt-A-Stream
- Storm Drain Stenciling
- Stream/Roadway Cleanup
- Volunteer Monitoring
- Wetland Plantings
- Others: \_\_\_\_\_

**3. Illicit Discharge Detection and Elimination**

**Detection and Elimination Activities**

- System Mapping
- Regulatory Control Program
- Identifying And Eliminating Illicit Connection Procedures
- Dye Testing/Tracing Procedures
- System Inspections
- Dry Weather Screening Program/ Field Testing
- Others: \_\_\_\_\_

**Type of Discharges to Target**

- Failing Septic Systems
- Illegal Dumping
- Industrial/Business Connections
- Recreational Sewage
- Sanitary Sewer Overflows
- Wastewater Connections To The Storm Drain System
- Others: \_\_\_\_\_

**4. Construction Site Storm Water Runoff Control**

**Program Activities**

- Regulatory Control Program
- Erosion And Sediment Control Bmp's
- Other Waste Control Program
- Site Plan Review Procedures
- Public Information Handling Procedures
- Site Inspection/Enforcement Procedures
- Other Construction Site Runoff Controls
- Contractor Certification And Inspector Training
- Others: \_\_\_\_\_

**Best Management Practices**

- Construction Entrance/Exit Stabilization
- Perimeter Controls
- Sediment Retention Structure Requirements
- Sediment Filters And Sediment Chambers
- Mulching Requirements
- Temporary/Permanent Stabilization Requirements
- Vehicle Maintenance And Washing Areas
- Cement Truck Washout Area
- Other BMP's: [BRRC](#), [HWM](#), [PTH](#), [TCMC](#), [WD](#)

**5. Post-Construction Storm Water Management in New Development and Redevelopment**

- Community Control Strategy
- Regulatory Control Program
- Long Term O& M Procedures
- Pre-Construction Review Of BMP Designs
- Site Inspections During Construction
- Post Construction Inspections
- Others: \_\_\_\_\_

- Infiltration Trench/Basin
- Infrastructure Planning
- Storm Water Inlet Specifications
- Narrower Residential Streets
- Open Space Design
- Ordinances For Post Construction Runoff
- Storm Water Wetland
- Zoning
- Others: [OWS](#), [SB](#), [SPR](#)

**6. Pollution Prevention/Good Housekeeping for Municipal Operations**

- Employee Training Program
- Inspection and Maintenance Program
- Municipal Operations Storm Water Control
- Others: [BRRC](#), [BGM](#)

- Municipal Operations Waste Disposal
- Flood Management/Assessment Guidelines
- Others: \_\_\_\_\_

**Part IV. Initial Identification of Measurable Goals (Attach additional sheets as needed)**

**1. Public Education and Outreach on Storm Water Impacts**

Measurable goals (with start and end dates): \_\_\_\_\_

Maintain list of dumping sites Jan 2008

Public Education with Weber County Jan 2008

Signage Jan 2008

Milestones: Year 1: W.C. Part, Dump sites, SD sign  
 Year 2: \_\_\_\_\_  
 Year 3: \_\_\_\_\_  
 Year 4: \_\_\_\_\_  
 Year 5: \_\_\_\_\_

**4. Construction Site Storm Water Runoff Control**

Measurable goals (with start and end dates): \_\_\_\_\_

Maintain Inspection Log Jan 2008

Milestones: Year 1: Inspection Log  
 Year 2: \_\_\_\_\_  
 Year 3: \_\_\_\_\_  
 Year 4: \_\_\_\_\_  
 Year 5: \_\_\_\_\_

**2. Public Involvement/Participation**

Measurable goals (with start and end dates): \_\_\_\_\_

Participate with Weber County Jan 2008

Milestones: Year 1: W.C. Participation  
 Year 2: \_\_\_\_\_  
 Year 3: \_\_\_\_\_  
 Year 4: \_\_\_\_\_  
 Year 5: \_\_\_\_\_

**5. Post-Construction Storm Water Management in New Development and Redevelopment**

Measurable goals (with start and end dates): \_\_\_\_\_

Structural Improvements Jan 2008

SD requirements of development Jan 2008

Site Reviews Jan 2008

Milestones: Year 1: SD Required, Site Review, Struct Improvements  
 Year 2: \_\_\_\_\_  
 Year 3: \_\_\_\_\_  
 Year 4: \_\_\_\_\_  
 Year 5: \_\_\_\_\_

**3. Illicit Discharge Detection and Elimination**

Measurable goals (with start and end dates): \_\_\_\_\_

Participate with Weber County Jan 2008

Mapping Jan 2008

Milestones: Year 1: \_\_\_\_\_  
 Year 2: \_\_\_\_\_  
 Year 3: \_\_\_\_\_  
 Year 4: \_\_\_\_\_  
 Year 5: \_\_\_\_\_

**6. Pollution Prevention/Good Housekeeping for Municipal Operations**

Measurable goals (with start and end dates): \_\_\_\_\_

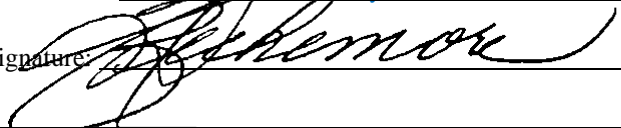
See attached sheet from MCM 6

Milestones: Year 1: See attached  
 Year 2: \_\_\_\_\_  
 Year 3: \_\_\_\_\_  
 Year 4: \_\_\_\_\_  
 Year 5: \_\_\_\_\_

**Part V. Certification**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, I certify that the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Print Name: Z. Lee Dismore, Mayor

Signature: 

Date: 1-29-15



**Part VI: Contract Certification for Co-Permittee SWMP Implementation  
(ATTACH ADDITIONAL SHEETS AS NEEDED)**

**List entity names responsible for implementation of the SWMP**

- |                                      |                        |
|--------------------------------------|------------------------|
| 1. <u>Farr West City Corporation</u> | 2. <u>Weber County</u> |
| 3. _____                             | 4. _____               |
| 5. _____                             | 6. _____               |

The above entities have entered into an agreement or contract to satisfy the implementation requirements of the Storm Water Management Program listed in the NOI. As stated in the existing agreements (MOU's) or contracts, the entities have agreed to the following responsibilities.

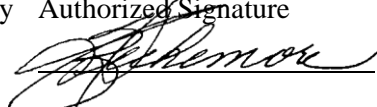
Circle the entity numbers (entity numbers correspond to entity name numbers listed above) corresponding with responsibilities, or portions thereof, of each entity entering into this agreement in the table below:

<u>RESPONSIBILITY</u>	<u>ENTITY</u>					
a. Public Education and Outreach	1.	2.	3.	4.	5.	6.
b. Public Involvement and Participation	1.	2.	3.	4.	5.	6.
c. Illicit Discharge Detection and Elimination	1.	2.	3.	4.	5.	6.
d. Construction Site Run-off Control	1.	2.	3.	4.	5.	6.
e. Post-Construction Storm Water Management in New Development and Redevelopment	1.	2.	3.	4.	5.	6.
f. Pollution Prevention/Good Housekeeping for Municipal Operations	1.	2.	3.	4.	5.	6.

If any entity is agreeing to accomplish only a portion of a responsibility in the table then explain the responsibility portion (e.g. entity 1 is responsible for storm drain stenciling program in the MS4 area, entity 2 is responsible for conducting phone surveys for item (a) in the table etc.) on a separate sheet.

The following statement and the accompanying signatures serve as certification that the agreements (MOU's) or contracts have been developed and agreed upon for the implementation of the Operator's (Identified in Part I of the NOI) SWMP.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, I certify that the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Entity	Authorized Signature	Date	Entity	Authorized Signature	Date
1.		<u>1-29-15</u>	2.	_____	_____
3.	_____	_____	4.	_____	_____
5.	_____	_____	6.	_____	_____

**Instructions for Completing the Notice of Intent for Coverage Under a UPDES General Permit for Storm Water Discharges From SMALL MUNICIPAL SEPARATE STORM SEWER SYSTEMS**  
**Permit No. UTR090000**

**Who Must File a Notice of Intent?**

If you are an operator of a regulated small MS4 designated for permitting, you must apply for coverage under a UPDES permit, or apply for a modification of an existing UPDES permit. If you have questions about whether you need a permit under the UPDES Storm Water Program, contact the Utah Division of Water Quality. The NOI must be submitted in accordance with the deadlines established in Part 2.A. of the UPDES MS4 General Permit.

**When to File the NOI Form**

DO NOT FILE THE NOI UNTIL YOU HAVE READ A COPY OF THE SMALL MUNICIPAL SEPARATE STORM SEWER SYSTEM GENERAL PERMIT. You will need to determine your eligibility, prepare your storm water management plan, and correctly answer all questions on the NOI form, all of which must be done before you can sign the certification statement on the NOI in good faith (and without risk of committing perjury).

**Where to File the NOI Form**

NOIs must be sent to the following address:

Department of Environmental Quality  
Division of Water Quality  
P.O. Box 144870  
Salt Lake City, UT 84114-4870

**Completing the NOI Form**

Please make sure you have addressed all applicable questions and have made a photocopy for your records before sending the completed form to the address above. Attach additional pages as needed for detailed explanations of items on the form.

**Part I. MS4 General Information**

Provide the legal name of the person, partnership, co-partnership, firm, company, corporation, association, joint stock company, trust, estate, governmental entity, or other legal entity that operates the MS4 described in this application. The responsible party is the legal entity that controls the MS4's operation. Provide the telephone number of the MS4 operator. Provide the mailing address of the MS4 operator. Include the street address or P.O. box, city, state, and zip code. All correspondence regarding the permit will be sent to this address, not the MS4 address in Section B.

Enter the official or legal name of the MS4.

Enter the city or cities, county or counties, and state in which the MS4 is located. Enter the latitude and longitude of the approximate center of the MS4 in degrees/minutes/seconds. Latitude and longitude can be obtained from U.S. Geological Survey (USGS) quadrangle or topographic maps or by using a GPS unit, calling 1-(888) ASK-USGS, searching for your Facility's address on several commercial map sites on the Internet, or searching the U.S. Census Bureau database at <http://www.census.gov/cgi-bin/gazetteer>. Additionally, estimate the acreage of land area that drains to the MS4. This estimate can be made using topographic maps or topographic data in a geographic information system.

Indicate the legal status of the MS4 operator as a Federal, State, private, or other public entity (other than Federal or State). This refers only to the operator, not the owner of the land on which the MS4 is located.

Indicate whether the MS4 discharges storm water into one or more receiving water(s). Enter the name(s) of the receiving water(s).

Indicate whether the MS4 discharges storm water into one or more receiving water(s). Enter the name(s) of the receiving water(s).

**Part II. Outfalls and Receiving Waters**

Indicate all major outfalls (by outfall description) and the receiving water body for each outfall. Indicate whether any of the receiving water bodies are included on the 303(d) list for water quality impairments.

**Part III. Initial Identification of Management Practices**

Check the management practices that you have selected to meet each of the minimum measures. If a selected practice is not on the list, check "Other" and write the name of the practice in the space provided.

**Part IV. Identification of Initial Measurable Goals**

List the person(s) responsible for implementing or coordinating the storm water management program. Provide a narrative description of the measurable goals that will be used for each of the storm water minimum control measures. Indicate the month and year in which you will start and fully implement each of the minimum control measures, or indicate the frequency of the action in the description. Attach additional pages as necessary.

**Part V. Certification**

Certification statement and signature. (CAUTION: An unsigned or undated NOI form will prevent the granting of permit coverage.) State statutes provide for severe penalties for submitting false information on this application form. State regulations require this application to be signed by either a principal executive or ranking elected official as described in Part VI.H. of the Small MS4 General Permit.

**Part VI. Contract Certification for Co-Permittee SWMP Implementation**

Contract certification is required when more than one entity will be implementing the SWMP for the operator filing the NOI. The form must be completely filled out to clearly identify all coordinating agencies. Additional pages shall be used as necessary to define the responsibilities for each entity in preparation and implementation of the SWMP. The form must be signed by all coordinating entities, certifying that local agreements and/or contracts have been developed and agreed upon.

**FARR WEST CITY STORM WATER MANAGEMENT PLAN  
MINIMUM CONTROL MEASURES #6 ATTACHMENT  
January 26, 2015**

<b>MCM 6 - POLLUTION PREVENTION / GOOD HOUSE KEEPING</b>				
<b>Name</b>	<b>BMP</b>	<b>Measurable Goal</b>	<b>Implementation Schedule</b>	<b>Fiscal Ability</b>
BRRC	Building Repair, Remodeling, and Construction	Provide 2 hours of annual training to employees	Ongoing	Included below
BGM	Building and Grounds Maintenance	Reduce pesticide use by keeping a log of usage in each location	Ongoing	Included below
CBC	Catch Basin Cleaning	Clean catch basins semi-annually	Ongoing	\$5,000/yr from General Fund (GF)
ET	Employee Training	Training 2 hrs / year	Ongoing	\$1000 per year
IDC	Illegal Dumping Controls	Have stickers on catch basin.	Ongoing	See MCM One
LC	Litter Control	Coordinate annual clean-up program	Ongoing	Coordinated by Volunteers
MU	Material Use	Training 2 hrs/ yr	Ongoing	see ET above
RBM	Roadway/ Bridge Maintenance	Fill Potholes annually	Ongoing	\$800/yr by GF
SC	Street Cleaning	Sweep Streets Semiannually	Ongoing	\$1,600/yr by GF
SCU	Spill Clean-Up	Maintain a list of Emergency Environmental Cleanup Companies	Ongoing	Minimal
VEC	Vehicle and Equipment Cleaning	Use commercial car wash & Maintain a log of washes	Ongoing	\$100/yr
WHD	Waste Handling & Disposal	Continue Newspaper recycle program. Advertise program at City Hall and other locations	Ongoing	Minimal
<b>Estimated Annual Cost for Implementation</b>				<b>\$8,500</b>
<b>Estimate One-Time cost within next 5 years</b>				<b>\$0</b>







## **Low Impact Development (LID) Strategies**

Minimum Control Measure: Long-Term Storm Water Management in New Development and Redevelopment (Post-Construction Storm Water Management)

Subcategory: Innovative BMPs for Site Plans

Urban development significantly alters the natural features and hydrology of a landscape. Development and redevelopment usually creates impervious surfaces like concrete sidewalks and asphalt roadways, commercial and residential buildings, and even earth compacted by construction activities. Prevented from soaking into the ground, rainwater runs across parking lots and streets, collecting used motor oil, pesticides, fertilizers, and other pollutants.

In most cities, a complex system of piping usually feeds contaminated storm water flows directly into streams and coastal waters. More recently, storm water control structures (sometimes called Best Management Practices or BMPs) like dry extended detention ponds or wet retention ponds have been installed, most in new development, to intercept storm water on its way to surface waters.

Historically, the goal of storm water planning has been to prevent localized flooding by moving large amounts of water offsite as quickly as possible. However, experience has shown that traditional storm water management has many limitations.

Expensive, ever-expanding storm sewer systems strain municipal budgets. Fast moving storm water discharges cause downstream flooding, erode stream banks, and contribute to water quality violations. Bacteria and other pathogens carried in storm water contaminate coastal waters, often requiring beach closures. Rainwater diverted or otherwise unable to soak into the soil cannot recharge aquifers. This reduces stream base flows, which can cause streams to dry-up for extended periods of time. Storm water that collects in detention basins or flows over impervious surfaces is often much warmer than the streams into which it flows. This is a problem because a temperature increase of just one or two degrees can stress fish and other aquatic organisms.

### **Mimicking Natural Hydrology**

Efforts to address storm water problems resulting from traditional development methods have produced a number of innovative design alternatives. For example, researchers and developers are experimenting with minimizing the distance between land uses to decrease infrastructure requirements. Another method reduces storm water runoff by conserving forests and green spaces and protecting stream buffers. Yet another technique diminishes impervious surfaces, narrows road and sidewalk widths, reduces parking lot sizes, minimizes or removes cul-de-sacs, and replaces traditional paving materials with pervious concrete.

Such innovative site design grew out of concerns that rapid urban development was not only impairing water quality but eroding quality of life. Concerned by the development of sensitive agricultural and wetlands, and burdened by the rising costs of storm water damage, some

communities are implementing Green Design strategies, such as LID, Conservation Development, Better Site Design, and Smart Growth. The complementary goals of these design schemes lessen the impact of storm water while still providing opportunities for development.

## **LID**

Like other alternative development strategies, LID seeks to control storm water at its source. Rather than moving storm water offsite through a conveyance system, the goal of LID is to restore the natural, pre-developed ability of an urban site to absorb storm water.

LID integrates small-scale measures scattered throughout the development site. Constructed green spaces, native landscaping, and a variety of innovative bioretention and infiltration techniques capture and manage storm water on-site. LID reduces peak runoff by allowing rainwater to soak into the ground, evaporate into the air, or collect in storage receptacles for irrigation and other beneficial uses. In areas with slow drainage or infiltration, LID captures the first flush before excess storm water is diverted into traditional storm conveyance systems. The result is development that more closely maintains pre-development hydrology. Furthermore, LID has been shown to be cost effective, and in some cases, cheaper than using traditional storm water management techniques.

## **LID Techniques**

LID can be simple and effective. Instead of relying solely on complex and costly collection, conveyance, storage and treatment systems, LID employs a range of economical devices that control runoff at the source.

- Bioretention cells, commonly known as rain gardens, are relatively small-scale, landscaped depressions containing plants and a soil mixture that absorbs and filters runoff.
- Cisterns and rain barrels harvest and store rainwater collected from roofs. By storing and diverting runoff, these devices help reduce the flooding and erosion caused by storm water runoff. And because they contain no salts or sediment, they can provide "soft" chemical-free water for garden or lawn irrigation, reducing water bills and conserving municipal water supplies.
- Green roofs are roof-tops partially or completely covered with plants. Used for decades in Europe, green roofs help mitigate the urban "heat island" effect and reduce peak storm water flows. The vegetated cover also protects and insulates the roof, extending its life and reducing energy costs.
- Permeable and porous pavements reduce storm water runoff by allowing water to soak through the paved surface into the ground beneath. Permeable pavement encompasses a variety of mediums, from porous concrete and asphalt, to plastic grid systems and interlocking paving bricks suitable for driveways and pedestrian malls. Permeable pavement helps reduce runoff volumes at a considerably smaller cost than traditional storm drain systems.
- Grass swales are broad, open channels sown with erosion resistant and flood tolerant grasses. Used alongside roadways for years primarily as storm water conveyances, swales



can slow storm water runoff, filter it, and allow it to soak into the ground. Swales and other biofiltration devices like grass filter-strips improve water quality and reduce in-stream erosion by slowing the velocity of storm water runoff before it enters the stream. They also cost less to install than curbs, storm drain inlets, and piping systems.

### **Conservation Development**

Like LID, Conservation Development tries to mitigate the effects of urbanization, but it places additional emphasis on protecting aquatic habitat and other natural resources. Conservation Development subdivisions are characterized by compact clustered lots surrounding a common open space. Conservation Development's goal is to disturb as little land area as possible while simultaneously allowing for the maximum number of residences permitted under zoning laws.

Prior to new construction, conservation developers evaluate natural topography, natural drainage patterns, soils and vegetation. They deploy storm water best management practices to help prevent flooding and protect natural hydrology. By maintaining natural hydrological processes, Conservation Development creates conditions that slow, absorb, and filter storm water runoff onsite.

Because future development threatens valuable natural features, Conservation Development provides specific provisions for long-term and permanent resource protection. Conservation easements, transfer of development rights, and other "in perpetuity" mechanisms ensure that protective measures are more than just temporary.

### **Better Site Design**

The goals of Better Site Design are to reduce impervious cover, preserve natural lands, and capture storm water onsite. To meet these goals, designers employ a variety of methods. To reduce impervious cover, they narrow streets and sidewalks, minimize cul-de-sacs, tighten parking spaces, and reduce the size of driveways and housing lots.

To reduce storm water runoff, designers preserve natural lands, using them as buffer zones along streams, wetlands and steep slopes. They employ landscaping techniques that flatten slopes and preserve native vegetation and clusters of trees. They create bioretention areas - open channels, filter strips and vegetated swales - to increase storm water infiltration, helping to protect streams, lakes, and wetlands.

### **Development Districts**

Development districts are areas zoned specifically for the purpose of permitting property development. Development districts concentrate intense, mixed-use development in an area typically five-acres and larger. Although a development district's percentage of imperviousness may exceed those of surrounding areas, such focused, compact development creates a smaller "footprint" than traditional development patterns.

A well-designed development district can contribute to a number of water quality benefits. Compact development lends itself to more environmentally friendly transportation options, like biking or walking, and shorter and less frequent automobile trips. A development district that redevelops an urban area reuses existing infrastructure, which can reduce the demand for new construction elsewhere in a watershed. Many development districts incorporate tree-lined streets, rain gardens, green roofs and other best management practices into their designs, helping manage storm water onsite.

## **Smart Growth**

Smart Growth is a set of development strategies that seek to balance economic growth, urban renewal, and conservation. In newly developing areas, Smart Growth advocates compact, town-centered communities composed of open green space, businesses, and affordable housing, interconnected by pedestrian walkways and bicycle lanes. Smart Growth's emphasis on walkable communities and alternative forms of transportation can help alleviate the environmental consequences of automobile use. Smart Growth also advocates the revitalization of inner cities and older suburbs. Reusing existing infrastructure often costs less than new construction, and it helps slow the spread of large-scale impervious surfaces.

Ten core principles guide Smart Growth:

- Mix land use.
- Take advantage of compact building design.
- Create a range of housing opportunities and choices.
- Create walkable neighborhoods
- Foster distinctive, attractive communities with a strong sense of place.
- Preserve open space, farmland, natural beauty and critical environmental areas.
- Strengthen and direct development toward existing communities.
- Provide a variety of transportation choices.
- Make development decisions predictable, fair and cost effective.
- Encourage community and stakeholder collaboration in development decisions.

While not explicitly mentioned as a guiding principal, storm water management nevertheless benefits from Smart Growth policies. Compact, high-density development reduces the spread of impervious surfaces on a watershed scale. This helps reduce overall storm water runoff. Infill and redevelopment that reuses existing infrastructure can be cheaper than greenfield development, which requires expensive new infrastructure. The 'Fix it First' management philosophy advocates repairing and upgrading existing, frequently crumbling infrastructure before spending on new infrastructure.

All of these development strategies can contribute to reducing sprawl and slow the rapid spread of impervious surfaces. All of the site design frameworks discussed in this fact sheet can be coupled with the Smart Growth approach so that small-scale reductions in run-off aren't offset by watershed-scale increases in run-off.

## Holistic Planning

The damaging effects of storm water runoff can be mitigated if urban planners use development designs that reduce the "footprint" of impervious structures. Traditional storm water approaches, with their emphasis on collection, conveyance, storage and discharge, cannot adequately address the environmental problems caused by sprawling urbanization. Furthermore, with rapid development occurring beyond the fringe of metropolitan regions, urban storm water is jeopardizing hard fought gains in U.S. water quality.

New land and storm water management strategies take a more holistic approach. Communities employing conservation development techniques have found that natural features like undeveloped landscapes, vegetation, and buffer zones effectively reduce and filter storm water flows. There are also other benefits like recreation, wildlife habitat, and increased property values.

Case studies of green design practices have shown substantial decreases in storm water runoff in pre-existing communities refitted with bioretention basins, permeable pavements, vegetated roof covers, and grass swales.

For example, a study of runoff and pollutant loading conducted in the parking lot of The Florida Aquarium in Tampa revealed an 80 percent decline in runoff volumes when the parking lot was retrofitted with pervious pavement and grass swales. Amounts of copper, manganese, lead, and other metals found in runoff also dropped steeply. [EXIT Disclaimer](#).

Similarly, a study of vegetated roofs in Philadelphia, PA found that an older building retrofitted with a green roof absorbed all but 15 inches of a total 44 inches of rainfall that fell during the nine-month test period. Twenty-five years of German research on green roofs support this finding.

LID integrates ecological considerations into each phase of urban development, from design to construction to post-construction. Pilot programs conducted in the U.S. and around the world show that LID saves money by reducing construction costs for curbing, paving materials, drainage pipes and land clearing. Techniques that manage runoff onsite, such as swales and rain gardens, deliver tangible improvements in water quality and ground water recharge. LID practices also improve air quality, reduce the heat island effect, and enhance community appearance.

Green Design concepts used individually can yield measurable improvements in storm water runoff management. Used in combination, they can help local governments address significant sources of storm water pollution, particularly in older urban and suburban areas.

Because Green Design practices like LID blend multiple technologies, they are more versatile than the more limited drain-and-discharge methods of traditional storm water management. LID can effectively address sources of water pollution in new and existing developments, in brownfields and greenfields, in warm climates and cold, and wet and dry climates. In urban

areas, green roofs used in combination with rain gardens, permeable pavement, bio-retention cells and rain barrels produce results far greater than a single technology used alone.

Sound engineering principals form the basis of Green Design practices. Years of experience derived from storm water management, sanitary engineering, agriculture, and other disciplines, demonstrate soil's ability to effectively absorb and digest many waterborne pollutants. By capturing storm water onsite, Green Design techniques not only reduce pollutants and runoff volume, but they do so cost-effectively.

# Approved Methods/Approaches for Low Impact Development (LID) to Achieve Retention Storage for Residential Development

## Methods/Techniques

- LID street cross sections
  - Grassy swales
- Cluster subdivision with open space
- Rain gardens/bioretention basins
- Soil amendments
- Permeable pavements/pavers
- Below grade retention/detention
- Retention/detention basins
- Other (with pre-approval only)

## Resources

- Low Impact Development Center: <http://www.lowimpactdevelopment.org/index.htm>
- Whole Building Design Guide: <https://www.wbdg.org/resources/lidtech.php#lidt>
- National Asphalt Pavement Association, Porous Asphalt:  
[http://www.asphaltpavement.org/index.php?option=com\\_content&view=article&id=359&Itemid=863](http://www.asphaltpavement.org/index.php?option=com_content&view=article&id=359&Itemid=863)
- National Pervious Concrete Pavement Association: <http://npcpa.org/>
- National Ready Mixed Concrete Association, Pervious Concrete Pavement:  
<http://www.perviouspavement.org/>
-

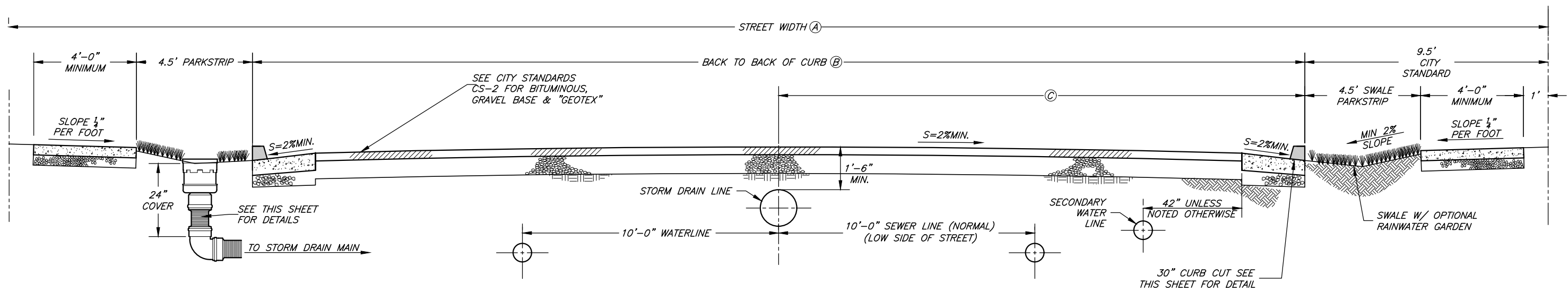
# Approved Methods/Techniques for Low Impact Development (LID) to Achieve Retention Storage for Commercial and Light Industrial Development

## Methods/Techniques

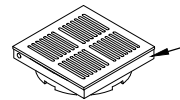
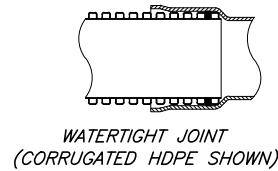
- LID street cross sections
  - Grassy swales
- Permeable pavements/pavers
- Curbless parking lot
- Rain gardens/bioretention basins
- Tree box filters
- Grassed/vegetated buffers
- Vegetated swales/bioswales
- Soil amendments
- Green roofs
- Rain barrels (Utah Code 73-3-1.5)
- Downspout disconnection
- Below grade retention/detention
- Retention/detention basins
- Other (with pre-approval only)

## Resources

- Whole Building Design Guide: <https://www.wbdg.org/resources/lidtech.php#lidt>
- Low Impact Development Center: <http://www.lowimpactdevelopment.org/index.htm>
- National Asphalt Pavement Association, Porous Asphalt:  
[http://www.asphaltpavement.org/index.php?option=com\\_content&view=article&id=359&Itemid=863](http://www.asphaltpavement.org/index.php?option=com_content&view=article&id=359&Itemid=863)
- National Pervious Concrete Pavement Association: <http://npcpa.org/>
- National Ready Mixed Concrete Association, Pervious Concrete Pavement:  
<http://www.perviouspavement.org/>



**STANDARD FARR WEST CITY LID ROADWAY SECTION**  
CITY STANDARD



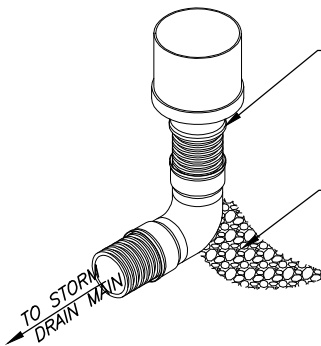
BRONZE GRATE & INTEGRATED  
DUCTILE IRON FRAME TO MATCH BASIN O.D.

VARIOUS TYPES OF INLET & OUTLET ADAPTERS  
AVAILABLE: 4" - 30" FOR CORRUGATED HDPE  
(ADS N-12/HANCOR DUAL WALL, ADS/HANCOR  
SINGLE WALL), N-12 HP, PVC SEWER (EX: SDR 35),  
PVC DWV (EX: SCH 40), PVC C900/C905,  
CORRUGATED & RIBBED PVC

THE BACKFILL MATERIAL SHALL BE CRUSHED STONE OR OTHER  
GRANULAR MATERIAL MEETING THE REQUIREMENTS OF CLASS I,  
CLASS II, OR CLASS III MATERIAL AS DEFINED IN ASTM D2321.  
BEDDING & BACKFILL FOR SURFACE DRAINAGE INLETS SHALL BE  
PLACED & COMPACTED UNIFORMLY IN ACCORDANCE WITH ASTM D2321.

**NOTES:**

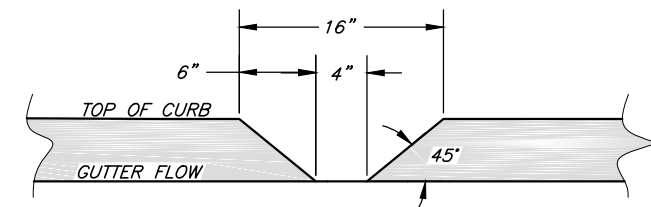
- (A) -8" - 15" GRATES SHALL BE SOLID BRASS METAL.
- (B) -12" - 30" FRAMES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05.  
8" & 10" BRONZE GRATES FIT DIRECTLY ONTO INLINE DRAINS SEE  
DRAWING NO. 7003-110-000 & 7003-110-001.
- (C) -DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO  
ASTM D3212 FOR CORRUGATED HDPE (ADS N-12/HANCOR DUAL WALL),  
N-12 HP, & PVC SEWER.
- (D) -8" - 15" BRONZE GRATES HAVE NO LOAD RATING.



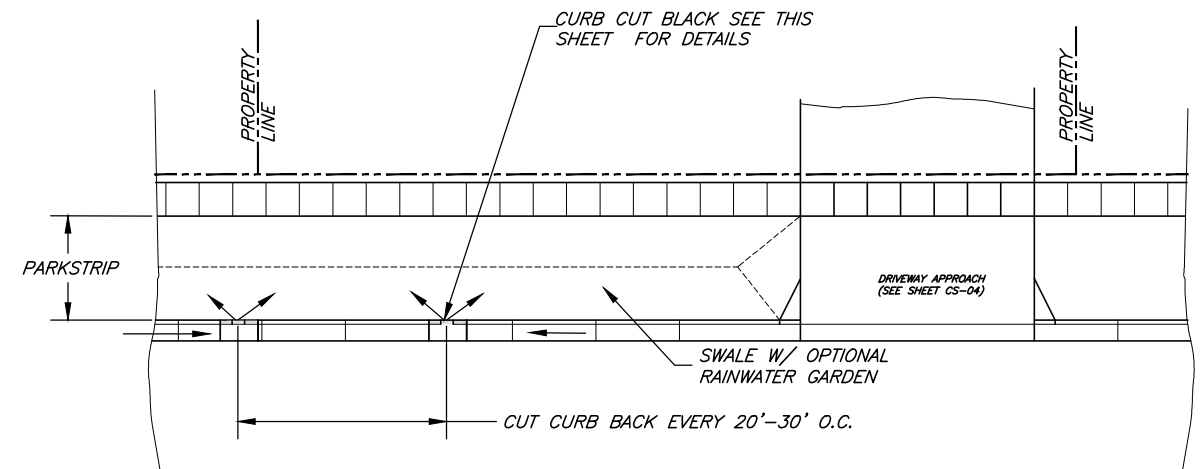
**INLINE DRAIN WITH GRATE DETAIL**

DRAFT

SEE CITY STANDARDS CS-2  
FOR ROADWAY GENERAL NOTES.  
CURBED ROAD TABLE & DETAIL  
NOTES.  
CROWN LOCATION TABLE & DETAIL  
NOTES.



**CURB CUT ELEVATION**  
CITY STANDARD



**GENERAL LOT CURB CUT CONFIGURATION PLAN**

PROJECT ENGINEER			
DATE	REV.	DATE	APPR.

SCALE:

N. T.S.

DESIGNED BEB  
DRAWN BEB  
CHECKED DDA



CONSULTING ENGINEERS

1716 East 5600 South  
Ogden, Utah 84403 (801) 476-9767

FARR WEST CITY CORPORATION  
PUBLIC WORKS STANDARD DRAWINGS

LID ROADWAY IMPROVEMENTS

SHEET:

CS-A2

OF 18 SHEETS

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