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MS4: PROGRAM OVERVIEW*

STORMWATER MANAGEMENT

Southwestern Pennsylvania Commission

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What is the MS4 Program?

Certain stormwater regulations associated with the Federal Clean Water Act are administered under the Municipal Separate Storm Sewer System (MS4) Program. In Pennsylvania, the MS4 program is managed by the Pennsylvania Department of Protection.

What is an MS4?

The Environmental Protection Agency defines an MS4 as "a conveyance or system of conveyances that is:

- Not part of a Publicly Owned Treatment Works (sewage treatment plant);
- Owned by a state, city, town, village, or other public entity that discharges to waters of the U.S.;
- Designed or used to collect or convey stormwater (including storm drains, pipes, ditches, etc.); and

  Not a combined sewer."

Who is an MS4?

MS4 regulations were rolled out in two phases:

- Phase I, issued in 1990, requires *medium* and *large* cities or certain counties with populations of 100,000 or more to obtain National Pollutant Discharge Elimination System (NPDES) permit coverage for their stormwater discharges.
- Phase II, issued in 1999, requires regulated small MS4s in urbanized areas, as well as some small MS4s outside the urbanized areas, to obtain NPDES permit coverage for their stormwater discharges.

What is required under the MS4 Program?

Operators of a small MS4 must obtain a NPDES permit and develop and implement a Stormwater Management Plan (SWMP) according to the details of their specific permit. Mandatory elements of the SWMP include six (6) Minimum Control Measures (MCMs). Each MCM has a number of associated Best Management Practices (BMPs) that explain in more detail how the MCM can be carried out.

The MCMs are:

1. Public Education and Outreach on Stormwater Impacts
2. Public Involvement / Participation
3. Illicit Discharge Detection and Elimination
4. Construction Site Stormwater Runoff Control
5. Post-Construction Stormwater Management in New and Re-Development Activities
6. Pollution Prevention / Good Housekeeping for Municipal Operations

MS4s in the SPC Region

As of December 2014, there were 207 municipalities within the 10-county SPC Region that hold an MS4 permit.

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PUBLIC EDUCATION & OUTREACH

Small MS4 Program: Minimum Control Measure #1

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Public Education and Outreach is one of the six (6) Minimum Control Measures (MCMs) required of small MS4s under the MS4 program*. The goal of the Public Education and Outreach MCM is to build greater support for the stormwater management program (SWMP), increase compliance, and ultimately increase environmental awareness amongst members of the community.

Federal EPA Regulations specifically require the following under this MCM:
"Implement a public education program to distribute educational materials to the community or conduct equivalent outreach activities about the impacts of stormwater discharges on water bodies and the steps that the public can take to reduce pollutants in stormwater runoff."

There are four (4) Best Management Practices (BMPs) required under this MCM. Keep reading to learn more about their requirements, resources to help meet these requirements, and more.

BMP #1 – Develop, implement, and maintain a Public Education and Outreach program. The plan should include goals, strategies, a timeline, and provisions for reviewing and updating annually. This plan can be relatively simple and is an easy way to ensure that you are meeting all the requirements of the Public Education and Outreach MCM. EPA's "Getting in Step, A Guide for Conducting Watershed Outreach Campaigns" (EPA 841-B-03-002, December 2003) is an exceptionally helpful resource for meeting this BMP requirement.

One of the goals of the Public Education and Outreach MCM is to protect our waterways by increasing environmental awareness amongst the community. *Photo: planning.co.wayne.pa.us*

Many sources, such as the EPA and PA DEP have a variety of materials and templates available on their websites for use in MCM #1. This pamphlet is available under "MS4 Resources" at www.portal.state.pa.us.

(OVER)

BMP #2 – Develop and maintain lists of target audience groups that are present within the areas served by your small Ms4. Target audiences typically include residents, businesses, developers, schools, and municipal employees. Remember to modify this list based on the characteristics of your municipality. For example, be sure to include agricultural entities if these exist within your municipality.

BMP #3 – Annually publish at least one issue of a newsletter, a pamphlet, a flyer, or a website that includes general stormwater educational information, a general description of your SWMP, and/or information about your stormwater management activities. One of the following must be done: 1) Publish and distribute in printed form a newsletter, pamphlet, or flyer containing information consistent with this BMP; or 2) Publish educational and informational items including links to DEP's and EPA's stormwater websites on your municipal website.

BMP #4 – Distribute educational materials and/or information to the target audiences (identified in BMP #2) using a variety of distribution methods, including but not limited to: displays, posters, signs, pamphlets, booklets, brochures, radio, local cable TV, newspaper articles, posters, bill stuffers, presentations, conferences, meetings, fact sheets, giveaways, or storm drain stenciling. All permittees shall utilize at least two (2) of these methods to conduct outreach a year.

Many people don't realize that stormwater isn't treated before it ends up in our local waterways. Storm drain stenciling (above) is a great way to raise awareness that storm drains are connected to waterways. It is also a one of the ways to meet BMP #4 required under the Public Education and Outreach MCM. *Photo: gannett-cdn.com*

Outreach efforts, such as the poster to the right, can help your target audiences understand their role in stormwater management, pollution prevention, and keeping our waterways clean. These efforts can help you meet requirements under BMP #4.
Photo: upperdublin.net

Developers are often on the list of target audience groups that is required under BMP #2. Educating developers and their contractors on the importance of and regulatory requirements associated with stormwater management can have a big impact.
Photo: bluewaterbaltimore.org

For more information, please visit:

- www.spcwater.org
- http://www.portal.state.pa.us/portal/server.pt/community/municipal_stormwater/21380/ms4_resources/1489647
- http://cfpub.epa.gov/npstbx/index.html
- http://water.epa.gov/polwaste/npdes/stormwater/Municipal-Separate-Storm-Sewer-System-MS4-Main-Page.cfmPAG

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PUBLIC PARTICIPATION / INVOLVEMENT

Small MS4 Program: Minimum Control Measure #2

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Public Participation/Involvement is one of the six (6) Minimum Control Measures (MCMs) required under the MS4 program*. The goal of the Public Participation/Involvement MCM is to facilitate successful implementation of your Stormwater Management Program (SWMP) through a number of means, including: garnering broad public support; utilizing expertise and local knowledge; shortening implementation schedules; and building partnerships with other community and government programs.

There are three (3) Best Management Practices (BMPs) required under this MCM.

BMP #1 – Develop, implement, and maintain a Public Involvement and Participation Program (PIPP) which describes various types of possible participation activities and describes methods of encouraging the public's involvement and soliciting of public's input. The PIPP should be developed the first year of permit coverage and re-evaluated annually. PIPP should include, but not be limited to: 1) opportunities for the public to participate in your SWMP; 2) regular communication methods to organizations such as watershed groups, environmental advisory committees, etc.; and 3) making MS4 reports available to the public.

BMP #2 – Prior to the adoption of any ordinance required by the permit, provide adequate public notice and opportunities for public review, input, and feedback. Public comments that are received should be documented and responded to.

Getting the public involved through river and stream cleanups (above and below) is a great way to achieve multiple water quality goals, including: educating and engaging the public, removing trash from local waterways, and meeting some requirements of the Public Participation/Involvement MCM.

Photos: popcitymedia.com & wvwa.org

BMP #3 – Regularly solicit public involvement and participation from the target audience groups. This should include an effort to solicit public reporting of suspected illicit discharges. Assist the public in their efforts to help implement your SWMP. Conduct public meetings to discuss the ongoing implementation of your SWMP.

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ILLICIT DISCHARGE DETECTION AND ELIMINATION

Small MS4 Program: Minimum Control Measure #3

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Illicit Discharge Detection and Elimination is one of the six (6) Minimum Control Measures (MCMs) required under the small MS4 program*. The goal of the Illicit Discharge Detection and Elimination (IDD&E) is to reduce pollution to our waterways through the removal of non-stormwater contributions to the storm sewer system. Common sources of illicit discharges include sanitary wastewater, improper disposal of auto and household toxins, and car wash wastewaters.

There are six (6) Best Management Practices (BMPs) required under this MCM.

BMP #1 – Develop and implement a written program for the detection, elimination, and prevention of illicit discharges into your regulated small MS4. Your program should include dry weather field screening of outfalls for non-stormwater flows, and sampling of dry weather discharges for selected chemical and biological parameters. Test results should be used as indicators of possible discharge sources. The program must include the following:

- Procedures for identifying priority areas
- Procedures for screening outfalls in priority areas during varying seasonal and meteorological conditions
- Procedures for identifying the source of an illicit discharge when a contaminated flow is detected
- Procedures of eliminating an illicit discharge
- Procedures for assessing the potential for illicit discharges caused by the interaction of sewage disposal systems
- Mechanisms for gaining access to private property to inspect outfalls
- Procedures for evaluation, program documentation, and assessment

Why are illicit (illegal) discharges important?

Illicit discharges make their way to our waterways untreated. Illicit discharges such as paint or oil dumped into storm drains, septic effluent, car wash wastewater, and wastewater piping connected illegally can cause serious pollution issues. These illicit discharges can carry a variety of pollutants, such as:

- Heavy metals
- Bacteria
- Viruses
- Nutrients
- Oil and grease
- Solvents
- Toxins

MCM #3 under the MS4 program requires regular screening of stormwater outfalls to detect any illicit discharges. *Photo: water.epa.gov*

(OVER)

BMP #2 – Develop and maintain a map of your regulated small MS4. The map must also show the location of all outfalls and the locations and names of all surface waters of the Commonwealth that receive discharges from those outfalls. Surface waters that should be included are creeks, streams, ponds, lakes, basins, swales, and channels that receive stormwater discharges. Outfalls should have unique names to assist in record-keeping.

BMP #3 – In conjunction with the map created under BMP #2, new permittees should map the entire storm sewer collection system including roads, inlets, piping, swales, catch basins, channels, basin, and any other features of the permittees storm sewer system including municipal boundaries and watershed boundaries. New permittees should develop this map by the completion of the fourth year of the permit. Renewal permittees should update and maintain the map annually.

BMP #4 – Following the IDD&E program created under BMP #1, the permittee shall conduct outfall field screening, identify the source of any illicit discharges, and remove or correct any illicit discharges using the procedures outlined under BMP #1.

BMP #5 – Enact a stormwater ordinance to implement and enforce a stormwater management program that includes the prohibition of non-stormwater discharged to the regulated MS4. Ordinances associated with an Act 167 Stormwater Management Plan that was approved by PA DEP in 2005 or later meet the requirements of BMP #5. You can also meet the ordinance requirement by utilizing PA DEP's model MS4 Stormwater Management Ordinance or by developing an ordinance that meets all applicable requirements outlined in the MS4 Stormwater Management Ordinance Checklist.

BMP #6 – Provide educational outreach to public employees, business owners and employees, property owners, the general public, and elected officials about the program to detect and eliminate illicit discharges. Educational outreach should be conducted to the target audiences by the methods outlined in MCM #1, Public Education/Outreach. Programs should be developed to encourage and facilitate public reporting of illicit discharges, illegal dumping, or outfall pollution.

Some common sources of illicit discharges include fryer oil from restaurants (above), carwash wastewater (below), and septic tank effluent. *Photos: clemson.edu & keepitcleanpartnership.org*

Unusual colors, odors, or flow volumes may be indicators of illicit discharges.
Photos: facilities.vt.edu & pwcgov.org

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CONSTRUCTION SITE RUNOFF CONTROL

Small MS4 Program: Minimum Control Measure #4

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Construction Site Runoff Control is one of the 6 minimum control measures (MCMs) required under the small MS4 program*. The goal of the Construction Site Runoff Control MCM is to protect our waterways from stormwater-related pollution that can result from construction activities. Four (4) best management practices (BMPs) are required under this MCM.

Under Chapter 102, Erosion and Sediment (E&S) Control, County Conservation Districts and/or DEP must issue a permit for earth disturbance activities greater than or equal to 1 acre. If the permittee chooses to rely on DEP's statewide program for issuing NPDES permits for stormwater discharges associated with construction activities, they satisfy all requirements under this MCM. It is a good practice for the permittee to have a written agreement, such as a Memorandum of Understanding (MOU), with their County Conservation District which clearly defines roles in the permitting, inspection, and enforcement of land development activities.

BMP #1 – Develop your program consisting of all procedures necessary to comply with the requirements of this MCM. The program must include:

- Construction stormwater permitting
- Construction inspection
- Enforcement of installation and maintenance of E&S controls

The program should be developed within the first year of permit coverage and reviewed/updated annually. A simple tracking system for active construction sites, inspections, enforcement actions, and other activities related to this MCM can simplify the reporting process while ensuring that all applicable activities are being managed.

Pollutants Commonly Associated with Construction Sites

- Sediment
- Trash
- Sanitary Waste
- Phosphorus
- Nitrogen
- Pesticides
- Oil and Grease
- Concrete Truck Washout
- Construction Chemicals

Sediment is the primary pollutant of concern associated with construction site stormwater runoff. Sediment-polluted stormwater can cause physical, chemical, and biological damage to waterways. Proper installation and maintenance of erosion and sediment control best management practices is essential to protect our waterways.

Photos: catawbariverkeeper.org

(OVER)

BMP #2 – Enact, implement, and enforce an ordinance to require the implementation of erosion and sediment control BMPs, as well as sanctions to ensure compliance. Permittees should adopt the ordinance within the first year of permit coverage.

BMP #3 – Develop and implement requirements for construction site operators to control waste at the construction site that may cause adverse impacts to water quality. Sediment is the primary pollutant of concern for MCM #4; however, other pollutants associated with construction are also important and should be addressed under this BMP. Pollutants may include but are not limited to: discarded building materials, washout from concrete trucks, chemicals, litter, and sanitary waste. Permittees should establish requirements within the first year. The goal of these requirements should be communicated to construction site operators during pre-construction meetings. Permittees must keep detailed records of site inspections, findings, and any resulting actions.

BMP #4 – Develop and implement procedures for the receipt and consideration of public inquiries, concerns, and information submitted by the public regarding local construction activities. The permittee should demonstrate acknowledgement and consideration of the information submitted. Permittees should establish and implement a tracking system to keep a record of any submitted public information as well as responses, actions, and results. This BMP should be implemented during each year of permit coverage. This BMP closely aligns with and supports requirements associated with MCM #2, Public Involvement and Participation.

Sediment Pollution in Our Waterways

Sediment pollution is, by volume, the greatest contributor to pollution in Pennsylvania waterways. Nationally, it is the second leading cause of pollution in impaired waterways (second only to bacteria). Sediment can cause physical, biological, and chemical harm to streams, lakes, wetlands, and rivers. According to the EPA, sediment runoff from construction sites can be 1,000 to 2,000 times greater than that of forested land, and 10 to 20 times greater than that of agricultural land. The installation and maintenance of construction site erosion and sediment controls is critical for the protection of our waterways.

Polluted runoff from construction sites eventually makes its way to our waterways untreated (left). Sediment is the most common pollutant associated with construction sites. Impacts of uncontrolled sediment runoff include but are not limited to: ecosystem damage, storm system infrastructure damage, and increased costs of producing drinking water.
Photo: blog.epa.gov

Elements of An Effective Stormwater Site Plan

A stormwater site plan is one of many essential elements necessary to minimize stormwater pollution from construction sites. Ten (10) key elements of an effective stormwater site plan include:

1. Minimize clearing and grading
2. Protect waterways
3. Phase construction to limit soil exposure
4. Immediately stabilize exposed soils
5. Protect steep slopes and cuts
6. Install perimeter controls to filter sediments
7. Employ advanced sediment settling controls
8. Certify and train contractors on stormwater site plan implementation
9. Control waste at the construction site
10. Inspect and maintain BMPs

Source: http://water.epa.gov/polwaste/npdes/swbmp/Construction-Phase-Plan-Review.cfm

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POST-CONSTRUCTION RUNOFF CONTROL

Small MS4 Program: Minimum Control Measure #5

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Post-Construction Runoff Control is one of the six (6) Minimum Control Measures (MCM) required under the Small MS4 program*. The goal of the Post-Construction Runoff Control MCM is to avoid increased stormwater runoff problems and increased non-point source pollution that often accompanies the development of land and associated increase in impervious surfaces. Six (6) best management practices (BMPs) are required under this MCM.

Under Chapter 102, Erosion and Sediment (E&S) Control, County Conservation Districts and/or the Pennsylvania Department of Environmental Protection (DEP) must issue a permit for earth disturbance activities greater than or equal to 1 acre. If the permittee chooses to rely on DEP's statewide program for issuing NPDES permits for stormwater discharges associated with construction activities, they satisfy all requirements under BMPs 1-3 of this MCM. It is a good practice for permittees to have a written agreement, such as a Memorandum of Understanding (MOU), with their County Conservation District which clearly defines roles in the permitting, inspection, and enforcement of land development activities.

BMP #1 – Develop a written procedure that describes how the permittee will address all required components of this plan. Guidance can be found in the Pennsylvania Stormwater Best Management Practices Manual, which can be accessed at www.elibrary.dep.state.pa.us/dsweb/View/Collection-8305. The plan should be developed within the first year of permit coverage and be annually reviewed and updated where necessary. Minimum requirements of the plan include:

- Minimum requirements for use of structural and/or non-structural BMPs in plans for development and redevelopment
- Criteria for selecting and standards for sizing stormwater BMPs
- Implementation of an inspection program to ensure that BMPs are properly installed

BMP #2 – Require the implementation of a combination of structural and/or non-structural BMPs that are appropriate to the local community, that minimize water quality impacts, and that are designed to maintain pre-development runoff conditions. The ordinance requirements under BMP #4 of this MCM (see next page) will satisfy this requirement. All qualifying development or redevelopment projects should be reviewed to ensure that their post-construction stormwater management plans and selected BMPs conform to the applicable requirements. A tracking system should be used to record qualifying projects and their BMPs.

Preserving and restoring riparian buffers (right) are best management practices that can effectively manage stormwater in post-construction situations.

(OVER)

BMP #3 – Ensure that controls are installed that will prevent or minimize water quality impacts. Qualifying development or redevelopment projects should be inspected during construction to ensure proper installation of the approved post-construction stormwater management (PCSM) BMPs. A tracking system should be used to track inspections and results. Permittees that do not rely on Chapter 102 as a QLP to fulfill these requirements must summarize construction inspections and results in periodic reports.

BMP #4 – The permittee should enact, implement, and enforce an ordinance or other regulatory mechanism to address post-construction stormwater runoff from new development and redevelopment projects, as well as sanctions and penalties associated with non-compliance, to the extent allowable under state law. An ordinance must be adopted within the first year.

BMP #5 – Develop and implement measures to encourage and expand the use of Low Impact Development (LID) in new and redevelopment. Measures also should be included to encourage retrofitting LID into existing development. DEP's Pennsylvania Stormwater Best Management Practices Manual provides guidance on implementing LID practices. An inventory of development and redevelopment projects that discharge stormwater to your regulated MS4 must be kept. In this inventory, note which projects that have been authorized for construction since 3/10/2003 that incorporated LID practices (and specifics on what LID practices were used). Additionally, ordinances should be enacted that are consistent with LID practices. Sections of existing ordinances that conflict with LID practices should be repealed.

BMP #6 – Ensure adequate operation and maintenance of all post-construction stormwater management BMPs installed at all qualifying development or redevelopment projects (including those owned or operated by the permittee). Within the first year of permit coverage, permittees should develop and implement a written inspection program to ensure that BMPs are properly operated and maintained. This program should be reviewed annually and updated accordingly. An inventory of PCSM BMPs should be developed and updated regularly. The inventory should include all PCSM BMPs installed since 3/10/2003 that discharge to your regulated MS4. Information required in inventory includes but is not limited to: owner, location, type of BMP, installation date, required maintenance, inspection activities, and an assessment by the permittee to determine if proper inspection and maintenance of BMP has been taking place.

Bioswales (above) are a structural BMP that can help mitigate the effects of stormwater once a site has been developed.

What is a Post Construction Stormwater BMP (PCSM BMP)?

PCSM BMPs are practices that are put in place to prevent and mitigate stormwater runoff after the site is developed. PCM BMPs include non-structural and structural BMPs. Non-structural BMPs include practices that aim to avoid and/or minimize damages associated with stormwater volumes and runoff from development. Structural BMPs are engineered systems that are designed to mitigate the impacts of stormwater.

Examples of Non-Structural BMPs

- Minimize Impervious Area
- Protect Special Value Features (e.g., Floodplains, Wetlands, Riparian areas, etc.)
- Re-vegetate Disturbed Areas with Native Vegetation

Examples of Structural BMPs

- Rain Gardens
- Constructed Wetlands
- Riparian Buffer Restoration

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POLLUTION PREVENTION / GOOD HOUSEKEEPING

Small MS4 Program: Minimum Control Measure #6

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Pollution Prevention/Good Housekeeping is one of the six (6) Minimum Control Measures (MCMs) required under the small MS4 program*. The goal of the Pollution Prevention/Good Housekeeping MCM is to help ensure a reduction in the amount and type of pollution that is generated from municipally-owned and maintained facilities (e.g., streets, parking lots, and vehicle maintenance areas) and eventually discharged into local waterways. An additional goal of MCM #6 is to reduce the amount of pollution that is discharged to waterways from poor maintenance of storm sewer systems.

There are three (3) best management practices (BMPs) required under this MCM.

BMP #1 – Identify and document all facilities and activities that are owned or operated by the permittee and have the potential for generating stormwater runoff to the small regulated MS4. This includes activities conducted by contractors for the permittee.

Municipal Activities may include the following:

- Street sweeping
- Snow removal/deicing
- Inlet/outlet cleaning
- Lawn/grounds care
- Storm system maintenance, inspection and repair
- Park and open space maintenance
- Municipal building maintenance
- New construction and land disturbances
- Right of Way maintenance
- Vehicle maintenance, operation, fueling and washing
- Material transfer operations, including leaf/yard debris pickup and disposal procedures

Municipal Facilities may include the following:

- Streets, roads, highways and parking lots
- Maintenance and storage yards
- Waste transfer stations
- Parks
- Fleet or maintenance shops
- Wastewater treatment plants
- Stormwater conveyances (open and closed)
- Riparian buffers
- Stormwater storage or treatment units (e.g., basins, constructed wetlands, etc.)

Potential Pollutants Associated with Municipal Facilities and Municipal Activities

Pollutants from municipal facilities and activities can eventually make their way to our local waterways through the stormwater conveyance and collection system. These pollutants can cause physical, chemical, and biological harm to our lakes, streams, rivers, and wetlands. Pollutants associated with municipal facilities and activities may include but are not limited to:

- Sediment
- Nutrients
- Trash
- Metals
- Bacteria
- Oil
- Toxic Materials
- Organic Materials
- Pesticides
- Grease

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BMP #2 – Develop, implement, and maintain a written operation and maintenance (O&M) program for all municipal operations and facilities that could contribute to the discharge of pollutants from the regulated small MS4s, as identified under BMP #1. This program should address municipally-owned stormwater collection or conveyance systems, but could include other areas (as identified in BMP #1). The O&M plan should stress pollution prevention and good housekeeping measures, contain site-specific information, and address the following areas:

- Management practices, policies, and procedures to reduce or prevent the discharge of pollutants to your small regulated MS4. Consider eliminating maintenance-area floor drains.
- Maintenance activities, schedules, and inspection procedures to reduce the potential for pollutants to reach your small regulated MS4.
- Controls for reducing or eliminating the discharge of pollutants from streets, roads, highways, municipal parking lots, maintenance and storage yards, waste transfer stations, fleet or maintenance shops with outdoor storage areas, and salt/sand (anti-skid) storage locations and snow disposal areas.
- Procedures for the proper disposal of waste removed from your regulated smalls MS4s and your municipal operations, including dredge spoil, accumulated sediments, trash, household hazardous waste, used motor oil, and other debris.

Many municipal facilities and activities have the potential to negatively impact water quality. Some examples include improper storage of chemicals (above); allowing vehicle washing effluent to enter storm sewer system (below); improper disposal of hazardous waste; and, improper disposal of debris collected during street sweeping.
Photos: waterresources.saccounty.net & arlnow.com

BMP #3 – Develop and implement an employee training program that addresses appropriate topics to further the goal of preventing or reducing the discharge of pollutants from municipal operations to your regulated small MS4s. The program may be developed and implemented using any guidance and training materials that are available from federal, state, or local agencies, or other organizations. Any municipal employee or contractor shall receive training; this may include:

- Public Works Staff
- Building/Zoning/Code Enforcement Staff
- Engineering Staff (On-Site and Contracted)
- Administrative Staff
- Elected Officials
- Police and Fire Responders
- Volunteers
- Contracted Personnel

Training should cover all relevant parts of the stormwater management program that could affect municipal operations, such as illicit discharge detection and elimination, construction sites, and ordinance requirements.

Application and storage protocols for commonly-used materials such as road salt (above), herbicides (below), pesticides and fertilizers can help protect water quality while also reducing costs. *Photos: 27east.com & npic.orst.edu*

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