

## CHAPTER 5 POLLUTION CONTROL MEASURES AND BMP'S

### 5.1 Management of Other Construction Site Pollutants

There are numerous potential pollutants, other than erosion and sediment, associated with construction activities. Potential pollutants include pollutants associated with the use of concrete and other cement-related mortars and the handling, application, and disposal of construction products and chemicals such as paints, adhesives, and solvents. The improper use and handling of construction materials can result in wash water, spills or wastes being left on the ground. These chemicals can infiltrate into soils causing groundwater contamination or wash-off to surface waters during subsequent storms.

Although this manual is not intended to address all aspects of construction site pollution control, some issues overlap with erosion and sediment control and must be taken into account in the overall planning process.

At a minimum the contractor should provide pollution prevention for:

- 1) Off-site tracking of soils;
- 2) Material management;
- 3) Waste management;
- 4) Vehicle and equipment management;
- 5) Site history.

Each construction project is unique, and understanding the pollution risks for each construction activity is essential to successfully selecting and implementing pollution control BMP's. Defining these risks requires careful review of the site characteristics and the nature of the construction project. Once these risks are defined, BMP objectives can be developed and pollution control BMP's selected. In general the pollution control BMP objectives for construction projects are as follows.

- **Practice Good Housekeeping** – Perform activities in a manner which keeps potential pollutants from either draining or being transported off-site by managing pollutant sources and modifying construction activities.
- **Contain Waste** – Dispose of all construction waste in designated areas and keep storm water from flowing on or off of these areas.

Table 5-1 presents disposal and management alternatives for typical potential pollutants associated with construction activities.

Table 5-1 Quick reference for pollution control

DISCHARGE/ACTIVITY	BMP DETAIL #	BMP/POLLUTION CONTROL
<b>Painting &amp; Paint Removal</b>		
Excess paint	3, 4, 7	<u>Oil Based-</u> 1. Recycle/reuse. 2. Dispose as hazardous waste. <u>Water Based –</u> 1. Recycle/reuse. 2. Dry residue in cans, dispose as trash. 3. If volume is too much to dry, dispose as hazardous waste.
Paint cleanup	3, 8	Wipe paint out of brushes, then: For <u>oil based</u> paints, 1. Filter & reuse thinners, solvents. 2. Dispose as hazardous waste. For <u>water based</u> paints, 1. Rinse to sanitary sewer.
Paint stripping (with solvent)	3	1. Dispose as hazardous waste.
Non-hazardous paint scraping/sand blasting	3	1. Dry sweep, dispose as trash.
<b>HAZARDOUS</b> paint scraping/sand blasting (e.g. marine paints or paints containing lead or tributyl tin)	3, 8	1. Dry sweep, dispose as hazardous waste.

Table 5-1 (cont.) Quick reference for pollution control

DISCHARGE/ACTIVITY	BMP DETAIL #	BMP/POLLUTION CONTROL
<b>General Construction</b>		
Soil from excavations during wet weather periods	9	<ol style="list-style-type: none"> <li>1. Should not be placed in street, on paved areas or near waterways.</li> <li>2. Remove from site or backfill by end of day.</li> <li>3. Cover with tarpaulin or surround with sediment barrier, or use other runoff controls (see chapter 4)</li> <li>4. Place inlet protection over storm drain inlets.</li> </ol> <p>Note: Thoroughly sweep following removal of dirt in all four alternatives.</p>
Soil from excavations placed on paved surfaces during dry season	9	<ol style="list-style-type: none"> <li>1. Keep materials out of storm conveyance systems and thoroughly remove via sweeping.</li> <li>2. Cover to prevent wind erosion.</li> </ol>
Cleaning streets in construction areas	7	<ol style="list-style-type: none"> <li>1. Dry sweep.</li> <li>2. Use silt ponds, inlet protection and/or similar sediment control techniques when flushing pavement.</li> </ol>
Soil erosion, sediments	(see chapter 4)	<ol style="list-style-type: none"> <li>1. Cover disturbed soils, use erosion controls, block entry to storm drain.</li> <li>2. Seed or plant as soon as possible.</li> </ol>
Fresh cement, grout, mortar	10	<ol style="list-style-type: none"> <li>1. Use/reuse excess.</li> <li>2. Dispose to trash.</li> <li>3. Do not allow into surface water and/or collection systems.</li> </ol>
Washwater from concrete/mortar (etc.) cleanup	10	<ol style="list-style-type: none"> <li>1. Wash onto dirt area and spade in.</li> <li>2. Pump and remove to appropriate disposal facility.</li> <li>3. Settle; pump water to vegetated area at least 50 m from surface water.</li> </ol>
Rinsewater from concrete mixing trucks	10	<ol style="list-style-type: none"> <li>1. Return truck to yard for rinsing into settling pond or dirt area.</li> <li>2. At construction site, wash into settling pond or dirt area and spade in, never allow into storm sewer or waterways.</li> </ol>

**Table 5-1 (cont.) Quick reference for pollution control**

<b>DISCHARGE/ACTIVITY</b>	<b>BMP DETAIL #</b>	<b>BMP/POLLUTION CONTROL</b>
<b>General Construction</b>		
Runoff from Foundation Forms & Form Treatment	4, 6	<ol style="list-style-type: none"> <li>1. Store forms on a pervious surface</li> <li>2. Place a tarpaulin over the forms when not in use to prevent contact with precipitation.</li> <li>3. Store form treatment fluids in secondary containment at a designated area.</li> </ol>
Non-hazardous construction and demolition debris	7	<ol style="list-style-type: none"> <li>1. Recycle/reuse (concrete, wood, etc.)</li> <li>2. Dispose as trash.</li> </ol>
Hazardous demolition and construction debris (e.g. asbestos).	8	<ol style="list-style-type: none"> <li>1. Dispose as hazardous waste.</li> </ol>
Concrete saw-cut slurry. (Wet sawing)	10	<ol style="list-style-type: none"> <li>1. Use dry cutting technique and sweep up residue.</li> <li>2. Place a berm on down-slope side of project to collect slurry before it flows off site.</li> <li>3. Vacuum slurry and dispose off-site.</li> <li>4. Shovel out gutters; dispose residue to dirt area, construction yard or landfill.</li> <li>5. Block all storm drains or curb inlets</li> </ol>
Construction dewatering (Nonturbid, uncontaminated groundwater)	1	<ol style="list-style-type: none"> <li>1. Recycle/reuse.</li> <li>1. Discharge to storm drain upon local agency approval.</li> <li>3. Settle, pump water to sanitary sewer or vegetated area at least 50 m from surface water. Discharge to sanitary sewer may require a permit from the POTW.</li> </ol>
Construction dewatering (Other than nonturbid, uncontaminated groundwater)	1	<ol style="list-style-type: none"> <li>1. Recycle/reuse.</li> <li>2. Discharge to sanitary sewer, may need permit from the POTW.</li> <li>3. As appropriate, treat prior to discharge to storm drain, requires NPDES permit.</li> </ol>
Leaks from garbage dumpsters	6	<ol style="list-style-type: none"> <li>1. Collect, contain leaking material. Eliminate leak, keep covered, return to leasing company for immediate repair.</li> <li>2. If dumpster is used for liquid waste, use plastic liner.</li> </ol>

**Table 5-1 (cont.) Quick reference for pollution control**

<b>DISCHARGE/ACTIVITY</b>	<b>BMP DETAIL #</b>	<b>BMP/POLLUTION CONTROL</b>
<b>General Construction (cont.)</b>		
Leaks from construction debris bins	6, 4	<ol style="list-style-type: none"> <li>1. Insure bins are used for dry nonhazardous materials only. (Suggestion: Fencing, covering help prevent misuse).</li> </ol>
Dumpster cleaning water	6	<ol style="list-style-type: none"> <li>1. Clean at dumpster owner's facility and discharge waste through grease interceptor to sanitary sewer.</li> <li>2. Clean on site and discharge through grease interceptor to sanitary sewer.</li> </ol>
Cleaning driveways, paved areas	6	<ol style="list-style-type: none"> <li>1. Sweep and dispose as trash (Dry cleaning only).</li> <li>2. For vehicle leaks, follow this 3-step process:               <ol style="list-style-type: none"> <li>a. Clean up leaks with rags or absorbents.</li> <li>b. Sweep, using granular absorbent material (cat litter).</li> <li>c. Mop and dispose of mop water to sanitary sewer.</li> </ol> </li> </ol>
Paving Operations	2	<ol style="list-style-type: none"> <li>1. Avoid paving during wet weather</li> <li>2. Protect drainage systems by diverting runoff or trap/ filter system.</li> <li>3. Place drip pans or absorbent materials under paving equipment when not in use.</li> </ol>
Steam cleaning of sidewalks, plazas	6	<ol style="list-style-type: none"> <li>4. Collect all water and properly dispose of - do not allow runoff to enter storm sewer.</li> <li>2. Follow this 3-step process:               <ol style="list-style-type: none"> <li>a. Clean oil leaks with rags or absorbents.</li> <li>b. Sweep (Use dry absorbent as needed).</li> </ol> </li> </ol>
Aggregate wash from driveway/patio construction	6	<ol style="list-style-type: none"> <li>1. Wash onto dirt area, spade in.</li> <li>2. Pour driveway approach last.</li> <li>3. Collect and remove to appropriate disposal facility.</li> <li>4. Settle, pump water to vegetated area at least 50 meters from surface water.</li> </ol>

**Table 5-1 (cont.) Quick reference for pollution control**

<b>DISCHARGE/ACTIVITY</b>	<b>BMP DETAIL #</b>	<b>BMP/POLLUTION CONTROL</b>
<b>Landscape/Garden Maintenance</b>		
Pesticides	5, 8, 14	1. Use all material in container. Rinse containers use rinsewater as product. Dispose rinsed containers as trash. 2. Dispose unused pesticide as hazardous waste.
Fertilizer Applications	5, 8, 14	1. Sweep any “over spray” material from streets, sidewalks and driveways.
Yard & Garden clippings	7	1. Compost. 2. Take to landfill.
Tree trimming	7	1. Chip if necessary, before composting or recycling.
<b>Vehicle / Equipment Wastes</b>		
Used motor oil & oil filters	14, 6, 4, 8	1. Use secondary containment while storing, send to recycler.
Antifreeze	14, 6, 4, 8	1. Use secondary containment while storing, send to recycler.
Other vehicle fluids and solvents	14, 6, 4, 8	1. Dispose as hazardous waste.
Automobile batteries	14, 4, 8	1. Use secondary containment while storing. 2. Send to auto battery recycler. 3. Take to Recycling Center.
Vehicle Washing	11, 14	1. Wash on pervious surface and use cold water only. 2. Never allow runoff to directly discharge to storm drainage systems.
Mobile Vehicle Washing	11	1. Collect wash water and discharge to sanitary sewer w/ agency approval; never allow wash water to discharge to storm drainage systems.
Rinsewater from dust removal at new car fleets	11	1. If rinsing dust from exterior surfaces for appearance purposes, do not use soap (cold water only).

**Table 5-1 (cont.) Quick reference for pollution control**

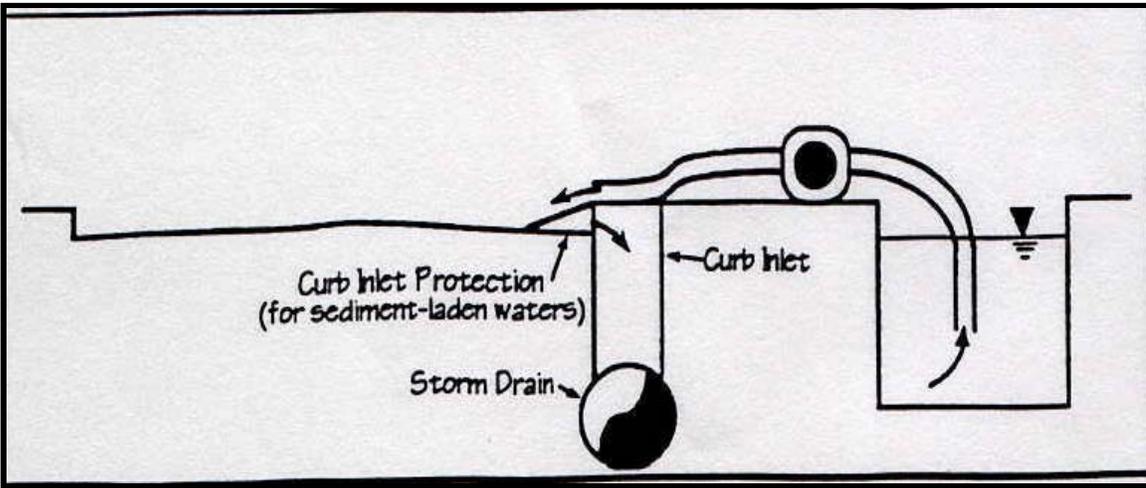
DISCHARGE/ACTIVITY	BMP DETAIL #	BMP/POLLUTION CONTROL
Vehicle leaks & equipment fueling	6, 13, 14	<ol style="list-style-type: none"> <li>1. Clean up leaks with rags or absorbents.</li> <li>2. Sweep, using granular absorbent material (cat litter).</li> <li>3. Fuel only in designated area and place a spill kit in the fueling area.</li> </ol>
<b>Other Wastes</b>		
Roof drains		<ol style="list-style-type: none"> <li>1. If roof is contaminated with industrial waste products, discharge to sanitary sewer with approval from local sanitary authority (may need a discharge permit).</li> <li>2. If no contamination is present, discharge to pervious surface.</li> </ol>
Cooling water Air conditioning condensate		<ol style="list-style-type: none"> <li>1. Recycle/reuse.</li> <li>2. Discharge permit may be required, contact local sanitary authority.</li> </ol>
Pumped groundwater, infiltration/foundation drainage (contaminated)		<ol style="list-style-type: none"> <li>1. Recycle/reuse (landscaping, etc.).</li> <li>2. Discharge permit may be required, contact local sanitary authority</li> </ol>
Fire fighting flows		Under emergency conditions, Fire Department will determine the appropriate procedures to use. If contamination is present, and life and safety are not at issue, Fire Department will attempt to prevent flow to stream or storm drainage system.
Clean-up wastewater from sewer back-up		<ol style="list-style-type: none"> <li>1. Follow this procedure:                         <ol style="list-style-type: none"> <li>a. Block storm drain, contain, collect and return spilled material to the sanitary sewer.</li> <li>b. Block storm drain; rinse remaining material to collection point and pump to sanitary sewer. (No rinsewater may flow to storm drain.)</li> </ol> </li> </ol>

## **5.2 Pollution Control BMP's**

This chapter describes specific BMP's for common construction activities that may pollute storm water. The following fact sheets were adapted from the Construction Methods Handbook developed in 1993 by California's Storm Water Quality Task Force and are suitable for inclusion in many ESCP's or PCP's for typical contractor activities. The BMP's listed are not an exhaustive list, nor will every BMP be appropriate for every situation. Therefore, suggested BMP's that are inappropriate may be deleted and additional BMP's for specific site conditions should be added. In addition, the selection and implementation of BMP's should be reviewed on a regular basis to match the changing conditions at construction sites.

The following fact sheets have been included.

- BMP 1 Dewatering Operations
- BMP 2 Paving Operations
- BMP 3 Structure Construction and Painting
- BMP 4 Material Delivery and Storage
- BMP 5 Material Use
- BMP 6 Spill Prevention and Control
- BMP 7 Solid Waste Management
- BMP 8 Hazardous Waste Management
- BMP 9 Contaminated Soil Management
- BMP 10 Concrete Waste Management
- BMP 11 Vehicle and Equipment Cleaning
- BMP 12 Vehicle and Equipment Fueling
- BMP 13 Vehicle and Equipment Maintenance
- BMP 14 Employee/Subcontractor Training



**BMP 1: DEWATERING OPERATIONS**

**DESCRIPTION**

Prevent or reduce the discharge of pollutants to storm water from dewatering operations by using sediment controls and by testing the groundwater for pollution.

**APPROACH**

There are two general classes of pollutants that may result from dewatering operations: sediment, and toxics and petroleum products. High sediment content in dewatering discharges is common because of the nature of the operation. On the other hand, toxics and petroleum products are not commonly found in dewatering discharges unless the site or surrounding area has been used for light or heavy industrial activities, or the area has a history of groundwater contamination. The following steps will help reduce storm water pollution from dewatering discharges:

Sediment

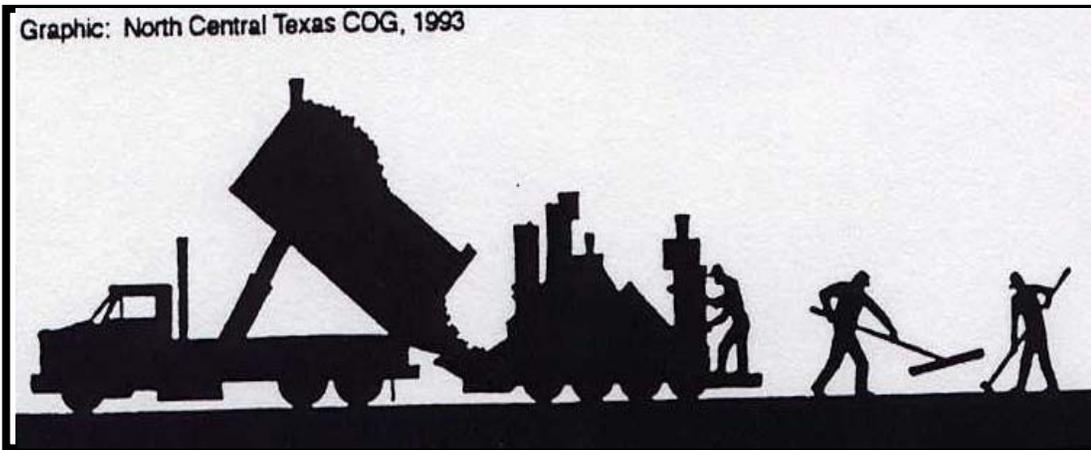
- Use sediment controls to remove sediment from water generated by dewatering.
- Use filtration to remove sediment from a sediment trap or basin. Filtration can be achieved with:
  - Sump pit and a perforated or slit standpipe with holes and wrapped in filter fabric. The standpipe is surrounded by stones, which filter the water as it collects in the pit before being pumped out. Wrapping the standpipe in filter fabric may require an increased suction inlet area to avoid clogging and unacceptable pump operation.
  - Floating suction hose to allow cleaner surface water to be pumped out.

Toxics and Petroleum Products

- In areas suspected of having groundwater pollution, sample the groundwater near the excavation site and have the water tested for known or suspected pollutants at a certified laboratory. Check with the Department of Environmental Quality (DEQ) and the local wastewater treatment plant for their requirements for dewatering, additional water quality tests, and disposal options.
- With a permit, you may be able to recycle/reuse pumped groundwater for landscape irrigation, or discharge to the storm sewer. With a permit from the DEQ or a local agency, you may be able to treat pumped groundwater and discharge it to the municipal wastewater treatment plant via the sanitary sewer.
- For a quick reference on disposal alternatives for specific wastes, see Table 5-1, Quick Reference – Disposal Alternatives.

**TARGET POLLUTANTS**

● Likely to have significant impact		○ Probable Low or Unknown impact	
● Sediment	○ Nutrients	● Toxic Materials	
○ Oil & Grease	○ Floatable Materials	○ Other Construction Waste	



**BMP 2: PAVING OPERATIONS**

**DESCRIPTION**

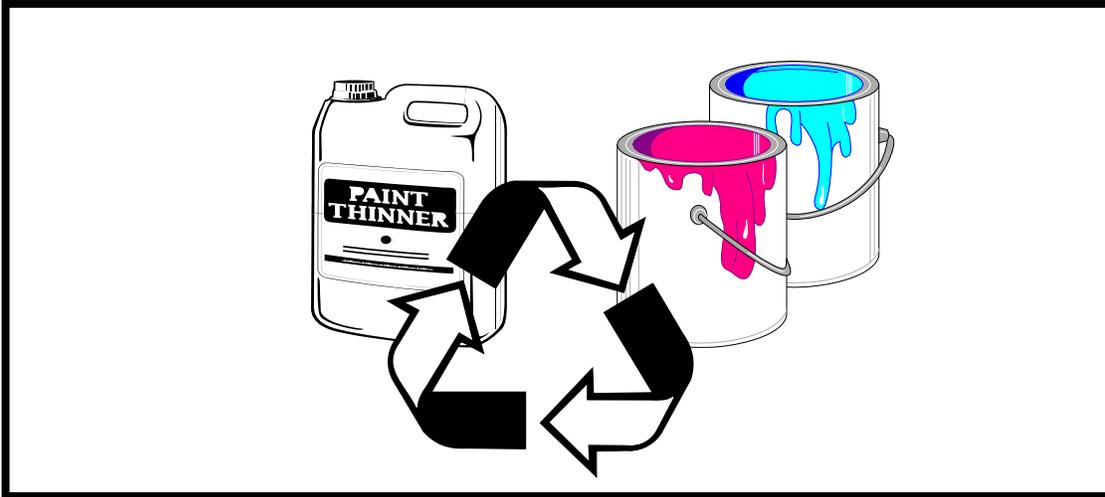
Prevent or reduce the discharge of pollutants from paving operations, using measures to prevent run-on and runoff pollution, properly disposing of wastes, and training employees and subcontractors.

**APPROACH**

- Avoid paving during wet weather.
- Store materials away from drainage courses to prevent storm water run-on (see BMP 4, Material Delivery and Storage).
- Protect drainage courses, particularly in areas with a grade, by employing BMP's to divert runoff or trap/filter sediment.
- Leaks and spills from paving equipment can contain toxic levels of heavy metals and oil and grease. Place drop pans or absorbent materials under paving equipment when not in use. Clean up spills with absorbent materials rather than burying. See BMP 13 (Vehicle and Equipment Maintenance) and BMP 6 (Spill Prevention and Control) in this chapter.
- Cover catch basins and manhole when applying seal coat, track coat, slurry seal, fog seal, etc.
- Shovel or vacuum saw cut slurry and remove from site. Cover or barricade storm drains during saw cutting to contain slurry.
- If paving involves Portland cement concrete, see BMP 10 (Concrete Waste Management).
- If paving involves asphaltic concrete, the following precautions may help prevent pollutant from entering storm water:
  - Do not allow sand or gravel placed over new asphalt to wash into storm drains, streets, or creeks by sweeping. Properly dispose of this waste by referring to BMP 7 (Solid Waste Management) in this chapter.
  - Old asphalt must be disposed of properly. Collect and remove all broken asphalt from the site and recycle whenever possible.
  - If paving involves on-site mixing plant, follow the storm water permitting requirements for industrial activities.
- Train employees and subcontractors.

**TARGET POLLUTANTS**

● Likely to have significant impact		○ Probable Low or Unknown impact	
● Sediment	○ Nutrients	● Toxic Materials	
● Oil & Grease	○ Floatable Materials	○ Other Construction Waste	



**BMP 3: PAINTING**

**DESCRIPTION**

Prevent or reduce the discharge of pollutants to storm water from structure construction and painting by enclosing or covering or berming building material storage areas, using good housekeeping practices, using safer alternative products and training employees and subcontractors.

**APPROACH**

- Keep the work site clean and orderly. Remove debris in a timely fashion. Sweep the area.
- Use soil erosion control techniques if bare ground is exposed.
- Buy recycled or less hazardous products to the maximum extent practicable.
- Conduct painting operations consistent with local air quality and OSHA regulations.
- Properly store paints and solvents. See BMP 4 (Material Delivery and Storage) in this chapter.
- Properly store and dispose waste materials generated from the activity. See the waste management BMPs (BMP 7 to BMP 10) in this chapter.
- Recycle residual paints, solvents, lumber and other materials to the maximum extent practicable.
- Make sure that nearby storm drains are well marked to minimize the chance of inadvertent disposal of residual paints and other liquids.
- Clean the storm drain in the immediate construction area after construction is completed.
- Educate employees who are doing the work.
- Inform subcontractors of company policy on these matters and include appropriate provisions in their contract to make certain proper housekeeping and disposal practices are implemented.
- For a quick reference on disposal alternatives for specific wastes, see Table 5-1.

**TARGET POLLUTANTS**

● Likely to have significant impact	○ Probable Low or Unknown impact	
○ Sediment	○ Nutrients	● Toxic Materials
○ Oil & Grease	● Floatable Materials	● Other Construction Waste



### **BMP 4: MATERIAL DELIVERY AND STORAGE**

#### **DESCRIPTION**

Prevent or reduce the discharge of pollutants to storm water from material delivery and storage by minimizing the storage of hazardous materials on-site, storing materials in a designated area, installing secondary containment, conducting regular inspection, and training employees and subcontractors.

The best management practice covers only material delivery and storage. For other information on materials, see BMP 5 (Material Use), or BMP 6 (Spill Prevention and Control). For information on wastes, see the waste management BMP's in this chapter.

#### **APPROACH**

The following materials are commonly stored on construction sites:

- Soil
- Pesticides and herbicides
- Fertilizers
- Detergents
- Plaster or other products
- Petroleum products such as fuel, oil, and grease, and
- Other hazardous chemicals such as acids, lime, glues, paints, solvents, and curing compounds

Storage of these materials on-site can pose the following risks:

- Storm water pollution
- Injury to workers or visitors
- Groundwater pollution
- Soil contamination

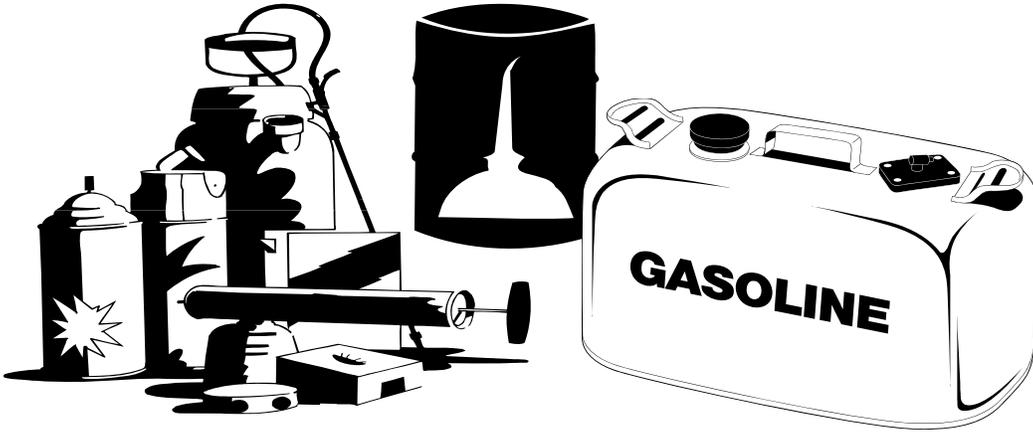
The following steps should be taken to minimize risk of pollution:

- Designate areas of the construction site for material delivery and storage.
  - Place near the construction entrances, away from waterways
  - Avoid transport near drainage paths or waterways
  - Surround with earth berms
  - Place in an area which will be paved
- Storage of reactive, ignitable, or flammable liquids must comply with the fire codes or your area. Contact the local Fire Marshal to review site materials, quantities, and proposed storage area to determine specific requirements.
- For a quick reference on disposal alternatives for specific wastes, see Table 5-1, Quick Reference – Disposal Alternatives.
- Keep an accurate, up-to-date inventory of materials delivered and stored on-site.
- Keep your inventory down.
- Minimize hazardous materials on-site storage.
- Handle hazardous materials as infrequently as possible.

- During the rainy season, consider storing materials in a covered area. Store materials in secondary containment's such as an earthen dike, horse trough, or even a child's wading pool for non-reactive materials such as detergents, oil, grease, and paints. Small amounts of material may be secondarily contained in "bus boy" trays or concrete mixing trays.
- Do not store chemicals, drums, or bagged materials directly on the ground. Place these items on a pallet and, when possible, in secondary containment.
- If drums must be kept uncovered, store them at a slight angle to reduce ponding of rainwater on the lids and to reduce corrosion.
- Try to keep chemicals in their original containers, and keep them well labeled.
- Train employees and subcontractors.
- Employees trained in emergency spill cleanup procedures should be present when dangerous materials or liquid chemicals are unloaded.
- If significant residual materials remain on the ground after construction is complete, properly remove materials and any contaminated soil (See BMP 9). If the area is to be paved, pave as soon as materials are removed to stabilize the soil.

*TARGET POLLUTANTS*

 Likely to have significant impact	 Probable Low or Unknown impact	
 Sediment	 Nutrients	 Toxic Materials
 Oil & Grease	 Floatable Materials	 Other Construction Waste



**BMP 5: MATERIAL USE**

**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.

**APPROACH**

The following materials are commonly used on construction sites:

- Pesticides and herbicides
- Fertilizers
- Detergents
- Plaster or other products
- Petroleum products such as fuel, oil, and grease, and
- Other hazardous chemicals such as acids, lime, glues, paints, solvents, and curing compounds.

Use of these materials on-site can pose the following risks:

- Storm water pollution
- Injury to workers or visitors
- Groundwater pollution
- Soil contamination

The following steps should be taken to minimize the risk:

- Use less hazardous, alternative materials as much as possible.
- Minimize use of hazardous materials on-site.
- Use materials only 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 pesticide. Prepare only the amount needed. Follow the recommended usage instructions. Over-application is expensive and environmentally harmful. Unless on steep slopes, till fertilizers into the soil rather than hydroseeding. 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.
- Train employees and subcontractors in proper material use.

**TARGET POLLUTANTS**

● Likely to have significant impact	○ Probable Low or Unknown impact	
○ Sediment	● Nutrients	● Toxic Materials
● Oil & Grease	● Floatable Materials	○ Other Construction Waste



### **BMP 6: SPILL PREVENTION AND CONTROL**

#### **DESCRIPTION**

Prevent or reduce the discharge of pollutants to storm water from leaks and spills by reducing the chance for spills, stopping the source of spills, containing and cleaning up spills, properly disposing of spill materials, and training employees.

The best management practice covers only spill prevention and control. However, BMP 4 (Material Delivery and Storage) and BMP 5 (Material Use), also contain useful information, particularly on spill prevention. For information on wastes, see the waste management BMP's in this chapter.

#### **APPROACH**

The following steps will help reduce the storm water impacts of leaks and spills:

##### Define "Significant Spill"

- Different materials pollute in different amounts. Make sure that each employee knows what a "significant spill" is for each material they use, and what is the appropriate response for "significant" and "insignificant" spills.

##### General Measures

- Hazardous materials and wastes should be stored in covered containers and protected from vandalism.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- Train employees in spill prevention and cleanup.
- Designate responsible individuals.

##### Cleanup

- Clean up leaks and spills immediately.
- On paved surfaces, clean up spills with as little water as possible. Use a rag for small spills, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to either a certified laundry (rags) or disposed of as hazardous waste.
- Never hose down or bury dry material spills. Clean up as much of the material as possible and dispose of properly. See the waste management BMP's in this chapter for specific information.

##### Reporting

- Report significant spills to local agencies, such as the Fire Department. They can assist in clean up.
- Federal regulations require that any significant oil spill into a water body or onto an adjoining shoreline be reported to the National Response Center (NRC) at 800-424-8802 (24 hour).

Use the following measures related to specific activities:

##### Vehicle and Equipment Maintenance

- If maintenance must occur on-site, use a designated area and /or a secondary containment, located away from drainage courses, to prevent the run-on of storm water and the runoff of spills.
- Regularly inspect on-site vehicles and equipment for leaks, and repair immediately.
- Check incoming vehicles and equipment (including delivery trucks and employee and subcontractor vehicles) for leaking oil and

fluids. Do not allow leaking vehicles or equipment on-site.

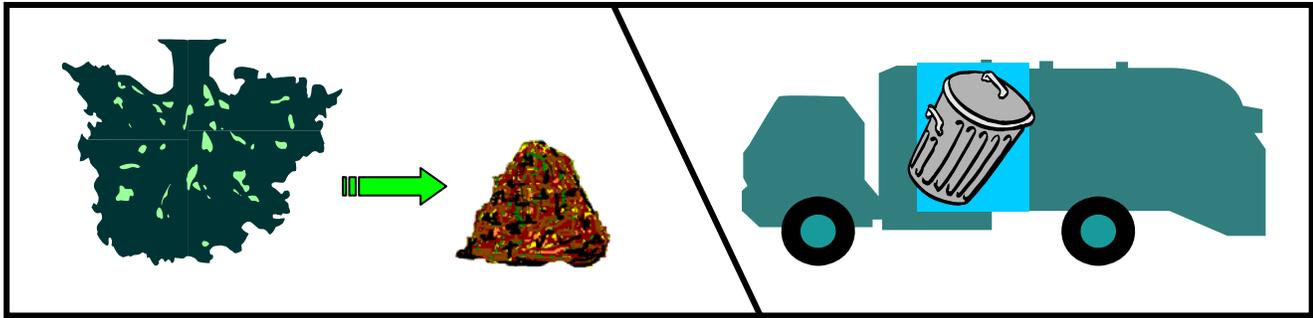
- Always use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.
- Place drip pans or absorbent materials under paving equipment when not in use.
- Use adsorbent materials on small spills rather than hosing down or burying the spill. Remove the adsorbent materials promptly and dispose of properly.
- Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around.
  
- Oil filters disposed of in trashcans or dumpsters can leak oil and pollute storm water. Place the oil filter in a funnel over a waste oil-recycling drum to drain excess oil before disposal. Oil filters can also be recycled. Ask your oil supplier or recycler about recycling oil filters.
- Store cracked batteries in an on-leaking secondary container. Do this with all cracked batteries, even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.

Vehicle and Equipment Fueling

- If fueling must occur on-site, use designated areas, located away from drainage courses, to prevent the run-on of storm water and the runoff of spills.
- Discourage “topping-off” of fuel tanks; an increase in temperature can cause fuel to expand and overflow.
- Always use secondary containment such as a drain pan to catch when fuel spills/leaks.

*TARGET POLLUTANTS*

 Likely to have significant impact	 Probable Low or Unknown impact	
 Sediment	 Nutrients	 Toxic Materials
 Oil & Grease	 Floatable Materials	 Other Construction Waste



**BMP 7: SOLID WASTE MANAGEMENT**

**DESCRIPTION**

Prevent or reduce the discharge or pollutants to storm water from solid or construction waste by providing designated waste collection areas and containers, arranging for regular disposal, and training employees and subcontractors.

**APPROACH**

Solid waste is one of the major pollutants resulting from construction. Construction debris includes:

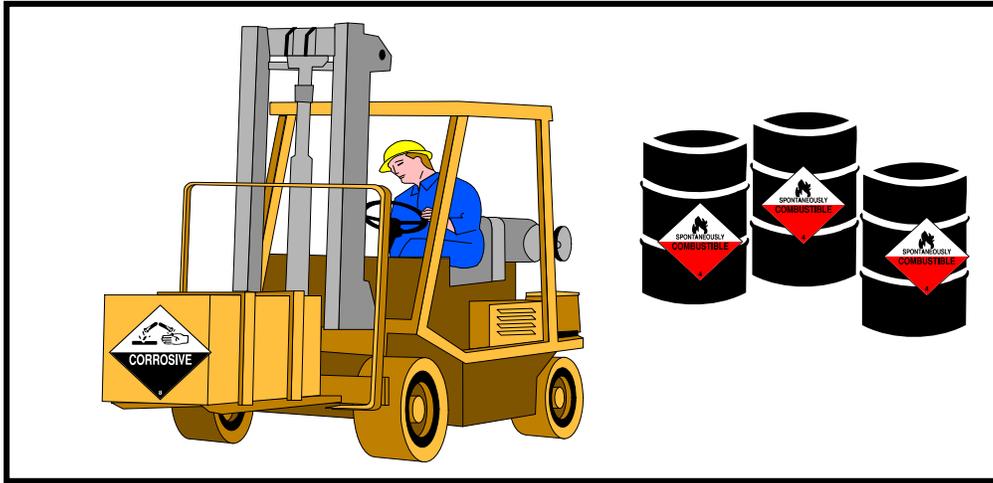
- Solid waste generated from trees and shrubs removed during land clearing, demolition or existing structures (rubble), and building construction;
- Packaging materials including wood, paper and plastic;
- Scrap or surplus building materials including scrap metals, rubber, plastic, glass pieces, and masonry products; and
- Domestic wastes including food containers such as beverage cans, coffee cups, paper bags, plastic wrappers, and cigarettes.

The following steps will help keep a clean site and reduce storm water pollution:

- Select designated waste collection areas on-site.
- Inform trash-hauling contractors that you will accept only watertight dumpsters for on-site use. Inspect dumpsters for leaks and repair any dumpster that is not watertight.
- Locate containers in a covered area and/or in a secondary containment.
- Provide an adequate number of containers with lids or covers that can be placed over the container to keep rain out or to prevent loss of wastes when it's windy.
- Plan for additional containers and more frequent pickup during the demolition phase of construction.
- Collect site trash daily, especially during raining and windy conditions.
- Erosion and sediment control devices tend to collect litter. Remove this solid waste promptly.
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.
- Salvage or recycle any useful material. For example, trees and shrubs from land clearing can be used as a brush barrier, or converted into wood chips, then used as mulch on graded areas.
- Do not hose out dumpsters on the construction site. Leave dumpster cleaning to trash hauling contractor.
- Arrange for regular waste collection before containers overflow.
- If a container does spill, clean up immediately.
- Make sure that construction waste is collected, removed, and disposed of only at authorized disposal areas.
- Train employees and subcontractors in proper solid waste management.
- For a quick reference on disposal alternatives for specific wastes, see Table 5-1.

**TARGET POLLUTANTS**

● Likely to have significant impact	○ Probable Low or Unknown impact	
● Sediment	○ Nutrients	○ Toxic Materials
○ Oil & Grease	● Floatable Materials	● Other Construction Waste



### **BMP 8: HAZARDOUS WASTE MANAGEMENT**

#### **DESCRIPTION**

Prevent or reduce the discharge of pollutants to storm water from hazardous waste through proper material use, waste disposal, and training of employees and subcontractors.

#### **APPROACH**

Many of the chemicals used on-site can be hazardous materials that become hazardous waste upon disposal. These wastes may include:

- Paints and solvents
- Petroleum products such as oils, fuels, and grease
- Herbicides and pesticides
- Acids for cleaning masonry
- Concrete curing compounds

In addition, sites with existing structures may contain wastes that must be disposed of in accordance with Federal, State, and local regulation. These wastes include:

- Sandblasting grit mixed with lead-, cadmium-, or chromium-based paints;
- Asbestos; and
- PCB's (particularly in older transformers).

The following steps will help reduce storm water pollution from hazardous wastes:

#### Material Use

- Use the entire 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 instruction. 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 regulation.
- Do not clean out brushes or rinse paint containers into the dirt, street, gutter, storm drain, or stream. "Paint out" brushes as much as possible. Rinse water-based paints to the sanitary sewer. Filter and re-use thinners and solvents. Dispose of excess oil-based paint and sludge as hazardous waste.

#### Waste Recycling/Disposal

- Select designated hazardous waste collection areas on-site.
- Hazardous materials and wastes should be stored in covered containers and protected from vandalism.
- Place hazardous waste containers in secondary containment.
- Do not mix wastes. This can cause chemical reactions, make recycling impossible, and complicate disposal.
- Recycle material such as used oil or water-based paint.

## CHAPTER 5: POLLUTION CONTROL MEASURES AND BMP'S

---

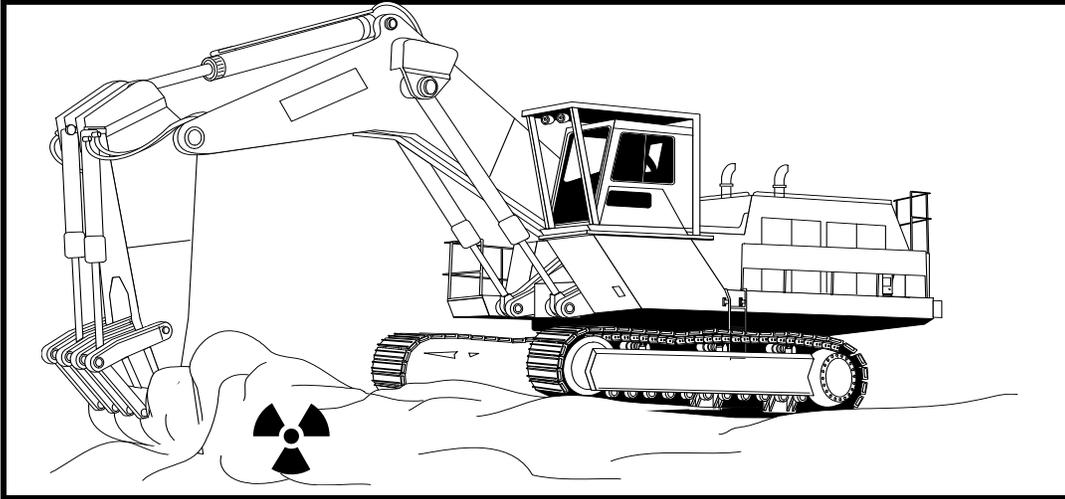
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.
- Arrange for regular waste collection before containers overflow.
- Make sure that hazardous waste (e.g. excess oil-based paint and sludge) is collected, removed, and disposed of only at an authorized disposal area.
- For a quick reference on disposal alternatives for specific wastes, see Table 5-1.

### Training

- Train employees and subcontractors in proper hazardous waste management.
- Warning signs should be placed in areas recently treated with chemical.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- If a container does spill, clean up immediately.

### *TARGET POLLUTANTS*

<input checked="" type="radio"/> Likely to have significant impact	<input type="radio"/> Probable Low or Unknown impact	
<input type="radio"/> Sediment	<input type="radio"/> Nutrients	<input checked="" type="radio"/> Toxic Materials
<input type="radio"/> Oil & Grease	<input type="radio"/> Floatable Materials	<input type="radio"/> Other Construction Waste



**BMP 9: CONTAMINATED SOIL MANAGEMENT**

**DESCRIPTION**

Prevent or reduce the discharge of pollutants to storm water from contaminated soil and highly acidic or alkaline soils by conducting pre-construction surveys, inspecting excavations regularly, and remediating contaminated soil promptly.

**APPROACH**

Contaminated soils may occur on your site for several reasons including:

- Past site uses and activities;
- Detected or undetected spills and leaks; and
- Acid alkaline solutions from exposed soil or rock formations high in acid or alkaline forming elements.

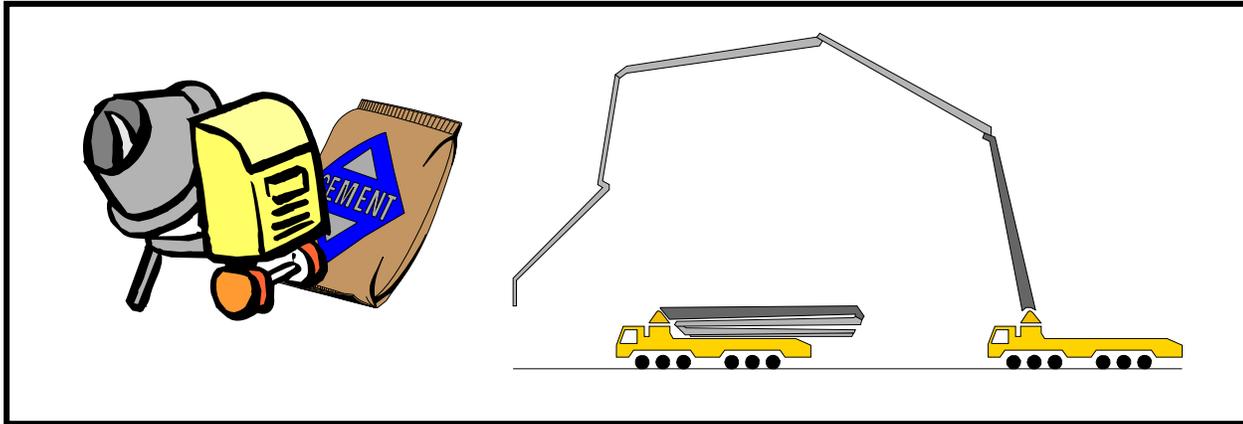
Most developers conduct pre-construction environmental assessments as a matter of routine. Recent court rulings holding contractors liable for cleanup costs when they unknowingly move contaminated soil highlight the need for contractors to confirm that a site assessment is complete before earth moving begins.

The following steps will help reduce storm water pollution for contaminated soil:

- Conduct thorough site planning including pre-construction geologic surveys.
- Look for contaminated soil as evidenced by discoloration, odors, differences in soil properties, abandoned underground tanks or pipes, or buried debris.
- Prevent leaks and spills to the maximum extent practicable. Contaminated soil can be expensive to treat and/or dispose of properly. However, addressing the problem before construction is much less expensive than after the structures are in place.
- Test suspected soils at a certified laboratory.
- If the soil is contaminated, work with the local regulatory agencies to develop options for treatment and/or disposal.
- For a quick reference on disposal alternatives for specific wastes, see Table 5-1.

**TARGET POLLUTANTS**

● Likely to have significant impact			○ Probable Low or Unknown impact
● Sediment	○ Nutrients	● Toxic Materials	
○ Oil & Grease	○ Floatable Materials	○ Other Construction Waste	



**BMP 10: CONCRETE WASTE MANAGEMENT**

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.

APPROACH

The following steps will help reduce storm water pollution from concrete wastes:

- Store dry and wet materials under cover, away from drainage areas.
- Avoid mixing excess amount 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.
- For on-site washout:
  - Locate washout area at least 50 feet from storm drains, open ditches, or water bodies. Do not allow runoff from this area by constructing a temporary pit or bermed area large enough for liquid and solid waste;
  - Wash out wastes into the temporary pit where the concrete can be set, be broken up, and then disposed of properly.
- When washing concrete to remove fine particles and expose the aggregate, avoid creating runoff by draining the water to a bermed or level area.
- Do not wash sweepings from exposed aggregate concrete into the street or storm drain. Collect and return sweepings to aggregate base stockpile, or dispose in the trash.
- Train employees and subcontractors in proper concrete waste management.
- For a quick reference on disposal alternatives for specific wastes, see Table 5-1.

TARGET POLLUTANTS

● Likely to have significant impact	○ Probable Low or Unknown impact	
● Sediment	○ Nutrients	○ Toxic Materials
○ Oil & Grease	○ Floatable Materials	● Other Construction Waste



**BMP 11: VEHICLE AND EQUIPMENT CLEANING**

**DESCRIPTION**

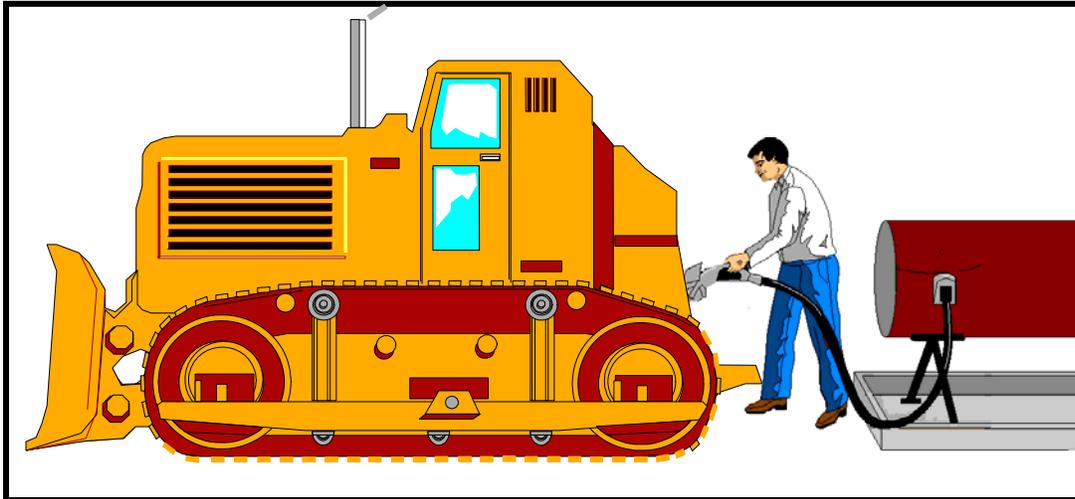
Prevent or reduce the discharge of pollutants to storm water from vehicles and equipment by using off-site facilities, washing in designated, contained areas only, eliminating discharges to the storm drain by infiltrating or recycling the wash water, and/or training employees and subcontractors.

**APPROACH**

- Use off-site commercial washing business 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 storm water. 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 storm water, 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 control 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.
- For a quick reference on disposal alternatives for specific wastes, see Table 5-1.

**TARGET POLLUTANTS**

● Likely to have significant impact		○ Probable Low or Unknown impact	
● Sediment	○ Nutrients	● Toxic Materials	
● Oil & Grease	○ Floatable Materials	○ Other Construction Waste	



**BMP 12: VEHICLE AND EQUIPMENT FUELING**

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.

APPROACH

- 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.
- 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 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.
- 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.
- For a quick reference on disposal alternatives for specific wastes, see Table 5-1.

TARGET POLLUTANTS

● Likely to have significant impact		○ Probable Low or Unknown impact	
○ Sediment	○ Nutrients	● Toxic Materials	
● Oil & Grease	○ Floatable Materials	○ Other Construction Waste	



**BMP 13: VEHICLE AND EQUIPMENT MAINTENANCE**

DESCRIPTION

Prevent or reduce the discharge of pollutants to storm water from vehicle and equipment maintenance by running a “dry site”. This involves using off-site facilities, performing work in designated areas only, providing cover for materials stored outside, checking for leaks and spills, containing and cleaning up spills immediately, and training employees and subcontractors.

APPROACH

- Keep vehicles and equipment clean; don't allow excessive build-up of oil and grease.
- Use off-site repair shops as much as possible. Maintaining vehicles and equipment outdoors or in areas where vehicles or equipment fluids may spill or leak into the ground can pollute storm water. If you maintain a large number of vehicles or pieces of equipment, consider using an off-site repair shop. These businesses are better equipped to handle vehicle fluids and spills properly. Performing this work off-site can also be economical by eliminating the need for a separate maintenance area.
- If maintenance must occur on-site, use designated areas, located away from drainage courses, to prevent the run-on of storm water and the runoff of spills.
- Always use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.
- 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.
- Regularly inspect on-site vehicles and equipment for leaks, and repair immediately.
- Check incoming vehicles and equipment (including delivery trucks and employee and subcontractor vehicles) for leaking oil and fluids. Do not allow leaking vehicles or equipment on-site.
- Segregate and recycle wastes, such as greases, used oil or oil filters, antifreeze, cleaning solutions, automotive batteries, hydraulic, and transmissions fluids.
- Train employees and subcontractors in proper maintenance and spill cleanup procedures.
- For a quick reference on disposal alternatives for specific wastes, see Table 5-1.

TARGET POLLUTANTS

● Likely to have significant impact	○ Probable Low or Unknown impact	
○ Sediment	○ Nutrients	● Toxic Materials
● Oil & Grease	○ Floatable Materials	○ Other Construction Waste



### **BMP 14: EMPLOYEE/SUBCONTRACTOR TRAINING**

#### *DESCRIPTION*

Employee/subcontractor training, like maintenance or a piece of equipment, is not so much a best management practice as it is a method by which to implement BMP's. This fact sheet highlights the importance of training and of integrating the elements of employee/subcontractor training from the individual source controls into a comprehensive training program as part of the Erosion and Sediment Control Plan (ESCP).

The specific employee/subcontractor training aspects of each of the source controls are highlighted in the individual fact sheets. The focus of this fact sheet is more general, and includes the overall objectives and approach for assuring employee/subcontractor training in storm water pollution prevention. Accordingly, the organization of this fact sheet differs from the other fact sheets in the chapter.

#### **OBJECTIVES**

Employee/subcontractor training should be based on four objectives:

- Promote a clear identification and understanding of the problem, including activities with the potential to pollute storm water;
- Identify solutions (BMP's);
- Promote employee/subcontractor ownership of the problems and the solutions; and
- Integrate employee/subcontractor feedback into training and BMP implementation.

#### **APPROACH**

- Integrate training regarding storm water quality management with existing training programs that may be required by other regulations, the Hazardous Waste Operations and Emergency Response standard (29CFR 1910.120), the Spill Prevention Control and Countermeasure Plan (40CFR 112).
- Train employees/subcontractors in standard operating procedures and spill cleanup techniques described in the Pollution Control Plan. Employee/subcontractors trained in spill containment and cleanup should be present during the loading/unloading and handling of materials.
- Personnel who use pesticides should be trained in their use.
- Educating off-site contractors and subcontractors supports the efforts of well-trained employees.
- Consider posting the quick reference table around the job site or in the on-site office trailer to reinforce training.
- Train employees/subcontractors in standard operating procedures and spill cleanup techniques described in the fact sheets. Employees/subcontractors trained in spill containment and cleanup should be present during the loading/unloading and handling of materials.
- Personnel who use pesticides should be trained in their use. The Oregon Department of Pesticide Regulation and county agricultural commissioner's license pesticide dealers, certify pesticide applicators, and conduct on-site inspections.
- Proper education of off-site contractors is often overlooked. The conscientious efforts of well trained employee/subcontractors can be lost by unknowing off-site contractors, so make sure they are well informed about what they are expected to do on-site.

### REFERENCES

Blueprint for a Clean Bay-Construction-Related Industries: Best Management Practices for Storm Water Pollution Prevention; Santa Clara Valley Nonpoint Source Pollution Control Program, 1992

Storm Water management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Hot-mix Asphalt Paving Handbook, U.S. Army Corps of Engineers, Ac 150/5370-14, Appendix July 1991

Best Management Practices and Erosion Control Manual for Construction Sites; Flood Control District of Maricopa County, AZ. September 1992

Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance, Working Group Working Paper; USEPA, April 1992

Processes, Procedures, and Methods to Control Pollution Resulting from all Construction Activity; USEPA, 430/0-73-007,1973.

Swisher, R.D., 1987. Surfactants Biodegradation, Marcel Decker Corporation