

4J BMPs for Municipal Operations

Good Housekeeping Practices for Municipal Operations

Focus of Document

This guidance presents BMPs or good housekeeping practices to address the discharge of pollutants to the storm drain system from municipal facilities. These facilities include:

- ✓ Streets, Roads, and Highways
- ✓ Sidewalks, Plazas, and Municipal Parking Lots
- ✓ Street Medians, Other Landscaped Areas, and Golf Courses
- ✓ Storm Drain Systems Including Open Channels, Inlets, Catchbasins, and Storm Drain Pipelines
- ✓ Corporation Yard and Other Municipal Operations Areas
- ✓ Municipal Swimming Pools, Fountains, Lakes, Lagoons and Other Urban Water Bodies

As discussed in Section 4.4 of the MURP, most municipalities have existing municipal programs that involve cleaning and maintenance of these facilities. The BMPs listed below are recommended improvements to existing activities or functions in order to reduce the potential for urban runoff pollution. Also, see Appendix 3L for additional BMPs for Corporation Yards.

Pollutants of Concern and Their Sources

Some of the pollutants of concern from these areas may be:

- ✓ Metals (from roads, sidewalks, parking lots, corporation yard, and other municipal areas)
- ✓ Oil and Grease (from corporation yard)
- ✓ Organic matter (from streets and landscaped areas)
- ✓ Fertilizers, pesticides, and herbicides (from landscaped areas)
- ✓ Chemical products used for disinfection and algae control (from pools, fountains, and water bodies)
- ✓ Gasoline and radiator fluid (from streets, parking lots, and corporation yard)

- ✓ Sediment; asphalt; concrete; trash and debris; and soil (all urban areas)

Street Sweeping and Cleaning

Sweeping Frequency and Timing

- ✓ Establish street sweeping frequency for your municipality, or portions of it, based on factors such as traffic volume, land use, field observations of sediment and trash accumulation, proximity to water courses, etc. In general, the following frequencies are recommended:
 - Sweep weekly in high traffic downtown areas
 - Sweep twice a month for moderate traffic collector streets, and
 - Sweep monthly in residential, low traffic areas.

One way to determine the areas that should be swept more frequently is to collect data on the total volume or weight of materials collected per mile of road swept. Use this data to prioritize areas to be swept more frequently.

- ✓ Where there is a pronounced dry and wet season, sweep streets just before onset of the wet season.
- ✓ Establish and maintain a consistent sweeping schedule.
- ✓ Avoid wet cleaning or flushing of street, and utilize dry methods where possible.
- ✓ If wet cleaning or flushing is absolutely necessary, sweep and remove debris before flushing; plug storm drain inlet and direct washwater to the sanitary sewer. Alternately, allow washwater to drain to the storm drain and collect it downstream at a manhole or storm drain cleanout.

Maximum Access for Sweepers

- ✓ Institute restrictive parking policy to allow sweepers better access to areas close to the curb and storm drain inlets.
- ✓ Post permanent street sweeping signs. If installation of permanent signs is not possible, use temporary signs.
- ✓ Develop and distribute flyers notifying residents of street sweeping schedules.

Equipment

- ✓ Maintain cleaning equipment in good working condition.

- ✓ Use your most effective sweepers in the high sediment and trash areas (typically industrial/commercial).
- ✓ Replace old sweepers with new technologically advanced sweepers (see Appendix 3K for an evaluation of available sweepers).
- ✓ Clean sweepers at a wash rack that drains to the sanitary sewer.

Residuals Disposal

- ✓ Dispose of street sweeping debris and dirt at a landfill.
- ✓ Do not leave street sweeping debris and dirt in piles along the side of the road or by a riparian area.
- ✓ If dewatering of dirt collected is necessary, the water should be discharged to a sanitary sewer.

Sidewalks, Plazas, Structures, and Parking Lot Cleaning

- ✓ Post “No Littering” signs and enforce anti-litter laws.
- ✓ Provide litter receptacles in busy, high pedestrian traffic areas of the community.
- ✓ Clean out and cover litter receptacles frequently to prevent spillage.
- ✓ Establish frequency of public parking lot sweeping based on usage and field observations of waste accumulation. Sweep all parking lots at least once before the onset of the wet season.
- ✓ Use dry methods of cleaning such as sweeping and vacuuming to clean sidewalks and other paved surfaces rather than hosing, pressure washing or steam cleaning. If water must be used, implement methods specified in Table 1 to minimize illegal discharges.
- ✓ Use instructions in Table 1 for cleaning of structures.
- ✓ Clean up spills using methods listed below.
 - Prepare a spill response plan.
 - Store spill response materials (containment materials such as booms; absorbents, etc) on municipality’s vehicles (as appropriate) or at a central location.

Table 1. Cleaning of Surfaces and Structures

Type of Surface	Characteristics	Cleaning Technique	Discharge to Storm Drain	Disposal Alternatives
Sidewalks, Plazas	No oily deposits	Sweep, collect and dispose of debris and trash; then wash.	Okay to discharge to storm drain.	
Sidewalks, Plazas, Driveways	Light oily deposits	Sweep, collect and dispose of debris and trash. Clean oily spots with absorbent, place oil-absorbent boom around storm drain, or a screen or filter fabric over inlet.	Okay to discharge to storm drain, provided an oil-absorbent boom or filter fabric is used. No oily sheen should be visible in the water draining into the storm drain.	
Parking lots and driveways	Heavy oily deposits	Sweep, collect and dispose of debris and trash. Clean oily spots with absorbent materials. Use a screen or filter fabric over inlet, then wash surfaces.	Seal storm drains. Can not be discharged to the storm drain.	Vacuum/pump wash water to a tank or discharge to sanitary sewer.
Building exteriors and walls	Glass, steel, or painted surfaces (post1978/no lead in paint)	<u>Washing without soap.</u>	Okay to discharge to storm drain provided the drain is sealed first with a fabric filter to capture dirt, paint particles and flakes or oil absorbent boom.	Can alternately be sent to landscape areas.
		<u>Washing with soap.</u>	Can not be discharged to storm drain.	Direct washwater to sanitary sewer or vacuum/pump water to a tank.
Building exteriors	Painted with lead-based or mercury-additive paint	Washing with or without soap.	Seal storm drains. Cannot be discharged to storm drain.	Vacuum/pump to a tank. Check with POTW for discharge to sanitary sewer.
Graffiti Removal	Graffiti	Using wet sand blasting. Minimize use of water; sweep debris and sand.	Can be discharged to storm drain if washwater is filtered through a boom.	Can alternately be directed to landscaped areas.
		Using high pressure washing and cleaning compounds.	Seal storm drains. Cannot be discharged to storm drain.	Vacuum/pump washwater to sanitary sewer. Check with POTW about pre-treatment.
Masonry	Mineral Deposits	<u>Acid Washing.</u>	Seal storm drains. Cannot be discharged to storm drain.	Rinse treated area with alkaline soap and direct washwater to a landscaped or dirt areas. Alternately, washwater may be collected and neutralized to a pH between 6 and 10, then discharged to landscaping or pumped to sanitary sewer.

Source: Santa Clara Valley Urban Runoff Pollution Prevention Program

- Use dry methods of cleaning including vacuuming, scooping, using rags and absorbents. Avoid hosing where possible. If washing is necessary, clean to extent possible before hosing or power-washing.
- Appropriately dispose of spilled materials and absorbents.
- If a spill occurs on dirt, excavate and remove the contaminated (stained) dirt.

Street Medians, Parks, and Other Municipal Landscaped Areas

Erosion Control

- ✓ Maintain vegetative cover on medians and embankments to prevent soil erosion. Apply mulch or leave clippings in place to serve as additional cover.
- ✓ Do not use disking as a means of vegetation management because the practice results in erodable barren soil.
- ✓ Provide energy dissipators (e.g., riprap) below culvert outfalls to minimize potential for erosion.

Vegetation Management/Irrigation

- ✓ When conducting vegetation pruning/removal, remove clipped or pruned vegetation from gutter, paved shoulder and area around storm drain inlet.
- ✓ When conducting mechanical or manual weed control, avoid loosening the soil which could erode into stream or storm drain.
- ✓ Inspect irrigation system periodically to ensure that the right amount of water is being applied and that excessive runoff is not occurring. Minimize excess watering, and repair leaks in the irrigation system as soon as they are observed.
- ✓ When bailing out muddy water, do not put it in the storm drain; pour over landscaped areas.

Pesticides (Diazinon, Chlorpyrifos, and other Similar Products)

- ✓ Follow federal, state, and local laws governing the use, storage, and disposal of pesticides/herbicides.
- ✓ Use pesticides only if there is an actual pest problem (not on a regular preventative schedule).

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- ✓ Avoid use of copper-based pesticides if possible. Use the least toxic pesticide for the job if alternatives are available.

California Department of Pesticide Regulation is conducting a review of pesticidal and non-pesticidal alternatives to diazinon and chlorpyrifos for urban uses (see DPR site on the Internet at www.cdpr.ca.gov).

- ✓ Do not use pesticides if rain is expected.
- ✓ Do not mix or prepare pesticides for application near storm drains.
- ✓ Use the minimum amount needed for the job.
- ✓ Use up pesticides. Rinse containers, and use rinse water as product. Dispose of unused pesticide as hazardous waste.

Herbicides

- ✓ Replace existing vegetation with fire-resistant and native vegetation to reduce the need for herbicides.
- ✓ Do not use herbicides if rain is expected.

Fertilizers

- ✓ Minimize use of chemical fertilizers.
- ✓ Calibrate the distributor to avoid excessive application.
- ✓ Check irrigation system to ensure that over-watering and runoff of fertilizer does not occur. Clean pavement and sidewalk if fertilizer is spilled on these surfaces before applying irrigation water.

Storm Drain System Cleaning

- ✓ Establish a frequency for inspecting all catch basins, inlets, debris basins, and storm drain pipelines, and implement this schedule. Clean facilities where sediment, trash, and other pollutant accumulation is observed. In general, the guidance is as follows:
 - Conduct periodic visual inspections during the dry season to determine if there are problem inlets where sediment/trash accumulate. Clean if necessary. The main objective of the dry season inspections is to identify problem areas.
 - Inspect and clean all inlets and basins before onset of wet season (to ensure drainage capacity and to avoid resuspension of pollutants during a storm event)

- Conduct inspections of storm drain inlets once a month or more frequently during the wet season. The frequency may be as high as once a week for problem areas where sediment or trash accumulates more often. Clean as needed.
- ✓ Inspect and clean storm drain pipelines and inlets in areas affected by pollutant generating incidents immediately or at a minimum before the wet season (incidents include spills, fires, and other events that may have released pollutants to the storm drain system and residues may be present in the system in the vicinity of the event).
- ✓ Store wastes collected from the cleaning in appropriate containers or temporary storage sites in a manner that prevents discharge to the storm drain.
- ✓ Dewater the wastes if necessary with outflow into the sanitary sewer. Do not dewater near a storm drain or stream.
- ✓ Sediment (less the debris) removed from the catchbasin or inlet cleaning should be analyzed for disposal. Pollutants of concern are lead; oil and grease; and hydrocarbons. In general, based on the analysis of sediments from inlet cleaning, it appears that in older cities all these pollutants have been found at elevated levels whereas, in the newer cities, the main pollutants in inlet sediments are hydrocarbons. If concentrations are elevated, the sediment should be disposed of as hazardous waste.

Municipal Swimming Pools, Fountains, Lakes, and Other Water Bodies

Alternate Discharge Options for Chlorinated Water

- ✓ Test water for chlorine level and consider using it for irrigation in landscaped area or for dust suppression at a city construction project site, or
- ✓ If acceptable to the wastewater treatment plant in your community, discharge pool water to the sanitary sewer, or
- ✓ Discontinue use of chlorine before planned discharge to the storm drain and allow the active chlorine to dissipate through aeration. Test water to see if chlorine can be detected. Also test for residual chlorine every half-hour during the discharge event.

Pool maintenance personnel will have a good idea about the length of time it will take before chlorine reaches non-detect levels. Chlorine testing kits are also available with these personnel because they use these to check the water periodically before adding more chlorine.

Note that the main drawback with this option is the potential for bacteria to grow when the water is left in the pool for chlorine dissipation.

- ✓ Alternately, dechlorinate or neutralize the waters before discharge. Add minimum amounts of neutralizing chemicals necessary to produce a zero chlorine reading (see Table 2 for amounts). Test water before discharge to the storm drain. Monitor for residual chlorine at the discharge point every half hour during the discharge event.

Table 2. Amount of Neutralization Chemical Required to Neutralize 100,000 Gallons of Chlorinated Water

Neutralization Chemical	Chlorine Concentration Before Neutralization			
	1.0 mg/l	2.0 mg/l	10.0 mg/l	50.0 mg/l
Sulfur Dioxide (SO ₂)	0.8 lbs	1.7 lbs	8.3 lbs	41.7 lbs
Sodium Bisulfite (NaHSO ₃)	1.2 lbs	2.5 lbs	12.5 lbs	62.6 lbs
Sodium Sulfite (Na ₂ SO ₃)	1.4 lbs	2.9 lbs	14.6 lbs	73.0 lbs
Sodium Thiosulfate (Na ₂ S ₂ O ₃ ·5H ₂ O)	1.2 lbs	2.4 lbs	12.0 lbs	60.0 lbs

Source: Santa Clara Valley Water District. Water Utility O&M Pollution Prevention Plan

Alternative Methods to Control Algae in Lakes and Lagoons

- ✓ Reduce fertilizer use in areas around the water body.
- ✓ Discourage the public from feeding birds and fish.
- ✓ Consider introducing fish species that consume algae. *Silver carp is being studied in UK for algae control in reservoirs and results appear promising. However, use of silver carp is prohibited in California. Other candidate species are grass carp and black fish. Contact the California Department of Fish and Game for more information on this issue.*
- ✓ Mechanically remove pond scum (blue-green algae) using a 60 micron net.
- ✓ Educate the public on algae and that no controls are necessary for certain types of algae that are beneficial to the water body.

Repair and Maintenance of City Surfaces

Asphalt/Concrete Demolition

- ✓ Schedule asphalt and concrete removal activities for dry weather.
- ✓ Take measures to protect any nearby storm drain inlets and adjacent water-courses, prior to breaking up asphalt or concrete (e.g., place sand bags around inlets or work areas).

- ✓ After breaking up old pavement, sweep up materials thoroughly to avoid contact with rainfall and storm water runoff. Recycle as much material as possible, and properly dispose of nonrecyclable materials.
- ✓ During saw-cutting and grading operations, use as little water as possible. Block or place berms around nearby storm drain inlets, in drainage channel (if no inlet is nearby), or around work areas (when bordering watercourse) using sand bags or an equivalent appropriate barrier, or absorbent materials such as pads, pillows and socks to contain slurry. If slurry enters the storm drain system, remove material immediately.
- ✓ Remove saw-cut slurry (e.g., with a shovel or vacuum, or sweep up when dry) as soon as possible.

Concrete Installation and Repair

- ✓ Avoid mixing excess amounts of fresh concrete or cement mortar on-site.
- ✓ Store dry and wet materials under cover, protected from rainfall and runoff.
- ✓ Wash out concrete transit mixers only in designated wash-out areas where the water will flow into drums or settling ponds or onto dirt or stockpiles of aggregate base or sand. Pump water from settling ponds to the sanitary sewer, where allowed. Whenever possible, recycle washout by pumping back into mixers for reuse. Never dispose of washout into the street, storm drains, drainage ditches, or creeks.
- ✓ Whenever possible, return left-over materials in the mixer barrel to the yard for recycling. Dispose of or recycle small amounts of excess concrete, grout, and mortar in the trash. Dispose of excess at landfill site.

Patching, Resurfacing, and Surface Sealing

- ✓ Schedule patching, resurfacing and surface sealing during dry weather.
- ✓ Stockpile materials away from streets, gutter areas, storm drain inlets or watercourses. During wet weather, cover stockpiles with plastic tarps or berm around them if necessary to prevent transport of materials in runoff.
- ✓ Pre-heat, transfer or load hot bituminous material away from drainage systems or watercourses.
- ✓ Cover and seal nearby storm drain inlets and manholes before applying seal coat, slurry seal, etc. Leave covers in place until job is complete and until all water from emulsified oil sealants has drained or evaporated. Clean any collected materials from these covered manholes and drains for proper disposal.

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- ✓ Designate an area for clean up and proper disposal of excess materials.
- ✓ Use only as much water as necessary for dust control, to avoid runoff.
- ✓ Sweep up as much material as possible and dispose of properly. Only wash down streets if runoff is controlled or contained.
- ✓ After the job is complete, remove stockpiles (asphalt materials, sand, etc.) as soon as possible.
- ✓ If it rains unexpectedly, take appropriate action to prevent pollution of storm water runoff (e.g., divert runoff around work areas, cover materials).

Equipment Cleaning, Maintenance and Storage

- ✓ Inspect equipment daily and repair any leaks.
- ✓ Perform major equipment repairs at the corporation yard, when practical.
- ✓ If refueling or repairing vehicles and equipment must be done on-site, use a location away from storm drain inlets and creeks.
- ✓ Recycle used motor oil, diesel oil, and other vehicle fluids and parts whenever possible.
- ✓ Clean equipment including sprayers, sprayer paint supply lines, patch and paving equipment, and mudjacking equipment at the end of each day. Conduct cleaning at a corporation or maintenance yard if possible.

Painting and Paint Removal

- ✓ Do not transfer or load paint near storm drain inlets or watercourses.
- ✓ Where there is significant risk of a spill reaching storm drains, plug nearby storm drain inlets prior to starting painting and remove plugs when job is completed.
- ✓ Clean up spills immediately.
- ✓ Capture all clean-up water, and dispose of properly.
- ✓ If sand blasting is used to remove paint, cover nearby storm drain inlets prior to starting work.
- ✓ If the bridge crosses a watercourse, perform work on a maintenance traveler or platform, or use suspended netting or traps to capture paint, rust, paint

removing agents, or other materials, to prevent discharge of materials to surface waters.

- ✓ Recycle paint when possible. Dispose of paint at an appropriate household hazardous waste facility.

Graffiti Removal

- ✓ When graffiti is removed by painting over, implement the BMPs under Painting and Paint Removal above.
- ✓ Protect nearby storm drain inlets (using tarps in work areas, sand bags, and/or booms or barriers around inlets) prior to removing graffiti from walls, signs, sidewalks, or other structures needing graffiti abatement. Clean up afterwards by sweeping or vacuuming thoroughly, and/or by using absorbent and properly disposing of the absorbent.
- ✓ Direct runoff from sand blasting and high pressure washing (with no cleaning agents) into a landscaped or dirt area. If a landscaped area is not available, filter runoff through an appropriate filtering device (e.g., filter fabric) to keep sand, particles, and debris out of storm drains.
- ✓ If a graffiti abatement method generates washwater containing a cleaning compound (such as high pressure washing with a cleaning compound), plug nearby storm drains and vacuum/pump washwater to the sanitary sewer.
- ✓ Consider using a waterless and non-toxic chemical cleaning method for graffiti removal (e.g., gels or spray compounds).
- ✓ Avoid graffiti abatement activities during a rain storm.

Note: For information on storm drain inlet protection, see BMPs for Construction Sites (Appendix 3P).

Outdoor Storage Materials (Hazardous and Nonhazardous Materials)

- ✓ Store hazardous materials and wastes in secondary containment where they are protected from rain and in a way that prevents spills from reaching the sanitary sewer or storm drain.
- ✓ Keep lids on waste barrels and containers, and store them indoors or under cover to reduce exposure to rain.
- ✓ All hazardous wastes must be labeled according to hazardous waste regulations. Consult the Fire Department or your local hazardous waste agency for details.

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- ✓ Keep wastes separate to increase your waste recycling/ disposal options and to reduce your costs.
- ✓ Never mix waste oil with fuel, antifreeze, or chlorinated solvents. Consult your hazardous waste hauler for details.
- ✓ Double-contain all bulk fluids and wastes to prevent accidental discharges to the sewer and storm drain. Consult the Fire Department for details.
- ✓ Keep storage areas clean and dry. Conduct regular inspections so that leaks and spills are detected as soon as possible.
- ✓ When receiving vehicles to be parted or scavenged, park them on a paved surface and immediately drain and collect gasoline and other fluids properly. Place drip pans
- ✓ Drain all fluids from components, such as engine blocks, which you may store for reuse or reclamation. Keep these components under cover and on a drop pan or sealed floor.
- ✓ Store new batteries securely to avoid breakage and acid spills during earthquakes. Shelving should be secured to the wall. Store used batteries indoors and in plastic trays to contain potential leaks. Recycle old batteries to catch leaking fluids.
- ✓ Wood products treated with chromated copper arsenate, ammonical copper zinc arsenate, creosote, or pentachlorophenol should be covered with tarps (or stored indoors).

Structural Retrofit of Storm Drain Inlets/Catch Basins

Numerous structural “improvements” are available for the removal of pollutants from storm water, either as a modification to existing catch basins, or as a structural addition to the system. Studies have found these structural devices to be only marginally effective for removing pollutants of concern. Municipalities should, before installing, assess the pollutant of concern, validate effectiveness of the device to reduce those pollutants, and provide guarantee of maintenance.

Structural Retrofit of Storm Drains

Given the distinct dry and wet season climatic regime in California, often the runoff from the first storm carries very high pollutant loads. A potential structural control would be to direct the water from the first storm to the sanitary sewer system for treatment at the wastewater treatment plant. This BMP is not recommended for City-wide application, rather for urban runoff from limited areas where

the runoff is known to be highly polluted. Also, this will need to be coordinated with the local/regional wastewater treatment plant. This has been done in some California communities mainly to handle polluted runoff from industrial areas. The following steps will be necessary:

- ✓ Determine areas where the runoff is extremely polluted.
- ✓ Estimate the drainage area and volume of runoff from a design storm. Note that although the first flush runoff from a storm is generally the worst, runoff from the latter part of the first storm is also polluted. Therefore, estimate the runoff from the entire storm (and not just the first portion of it).
- ✓ Contact the local/regional wastewater treatment plant to determine if the facility has capacity to handle these projected flows.
- ✓ If capacity is available, develop appropriate connections (pipe and valve) between the storm drain and sewer system, after obtaining permission from the local wastewater treatment agency.
- ✓ Designate staff in the Public Works Department to handle the valve system to direct flows just before the first major storm.

Sources of Additional Information

The information presented above is based mainly on information from the Santa Clara Valley Urban Runoff Program. Additional information is available in the publications listed below.

Stormwater Quality Task Force. 1993. California Storm Water Best Management Practice Handbook - Municipal.

Stormwater Quality Task Force. 1993. California Storm Water Best Management Practice Handbook - Industrial/Commercial. (for more information on structural controls)

BASMAA 1997. Compilation of New Development in the San Francisco Bay Area Treatment Controls (for more information on structural controls). June.

King County Surface Management Division 1995. Evaluation of Commercially-Available Catch Basin Inserts for the Treatment of Stormwater Runoff from Developed Sites. October. (for more information on structural controls)