



## Best Management Practices for Public Streets, Roads and Highway Operation and Maintenance



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## Discussion Topics

- I. Street/Road/Highway Sweeping and Cleaning
- II. Street/Road/Highway Repair and Maintenance
- III. Sidewalk/Plaza Maintenance
- IV. Bridge and Structure Maintenance
- V. Median and Road Embankment Maintenance
- VI. Litter Control
- VII. Spill Control





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## Background

### What is Non-point Source Pollution?

- Storm water runoff from streets, parking lots, parks, building roofs and other impermeable surfaces
- Storm water (or anything else) in drain systems
- Agricultural runoff
- Sediment deposited in creeks, streams and other water bodies




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## Background

### Pollutants in Urban Runoff


- Pesticides and herbicides
- Sediment
- Nutrients
- Bacteria and viruses
- Oxygen-demanding substances
- Petroleum-based products
- Heavy metals
- Other toxic materials


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## Background

### Stormwater Regulations and Agencies

- Federal – Environmental Protection Agency
- California – State and Regional Water Quality Control Boards
- Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP)
- Local Program





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## Background

### Why Care About Runoff?

- Storm water discharges are untreated
- Storm drains discharge to local creeks and the Bay
- Pollutants are harmful to vegetation and aquatic life



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## I. Street/Road/Highway Sweeping and Cleaning



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## A. Sweeping Time and Frequency

- Define program and set priorities for sweeping frequency.
- Establish and maintain a consistent schedule.
- Sweep prior to start of wet season.
- Evaluate sweeping program effectiveness.
- Track miles swept during cleaning.



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## B. Equipment Operation and Selection

- Operate at specified speed and in accordance with manufacturer's recommendations.
- Maintain equipment in good condition.
- Inspect vehicles for worn seals.
- Do not overload vehicles.
- Use most efficient sweepers in high pollutant load areas.

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## C. Other Measures To Improve Efficiency

- Encourage voluntary relocation of parked vehicles.
- Use additional methods in areas with large accumulations of leaves or yard waste.
- Note trees or other obstructions which interfere with cleaning.
  - Notify supervisor
- Do not sweep roads without curbs and gutters.



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## D. Management of Debris

- Store debris **only** in designated temporary storage sites. **No storage on open ground!**
- Cover all debris with tarps.
- Do not store debris within 100 feet of catch basins, creeks or sensitive habitats.
- Protect catch basins adjacent to temporary debris piles.



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## D. Management of Debris (cont'd)

- Keep debris storage to a minimum during the wet season.
- Dispose of debris **only** at approved disposal sites.
- Consider using several temporary storage sites.
- Clean sweepers in approved areas. **Never** rinse or wash sweepers in the field.
- Dewater saturated materials **only** in approved areas.
- Drain liquids to sanitary sewer or allow them to evaporate.

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### E. Street Cleaning and Flushing

**NO FLUSHING!!**



**ONLY USE DRY METHODS!!!**



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### II. Street/Road/Highway Repair and Maintenance



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### A. Asphalt/Concrete Removal




- Conduct major removal work **only** during dry weather.
- Prior to work, protect nearby storm drain inlets and adjacent watercourses.
- Place sand bags, straw wattles or equivalent materials around inlets or work areas.
- Once completed, sweep up area thoroughly and properly manage collected debris.

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### Saw-cutting and Grinding

- Use as little water as possible.
- Block or place berms around nearby storm drain inlets or around work area.
- Confine slurry and sediment to the immediate work area.
- Remove saw-cut slurry. Use shovel, vacuum or sweep (when dry).



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### B. Concrete Installation and Repair

- Conduct major work only during dry weather.
- Avoid mixing excess concrete on-site.
- Store dry and wet materials under cover.




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### B. Concrete Installation and Repair (cont'd)

- Bring back excess concrete to Corp yard and store under cover.
- Wash out concrete transit mixers only in designated wash-out areas.
- Never dispose of washout in street, storm drains, drainage ditches, or creeks.

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### C. Patching, Resurfacing, and Surface Sealing






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### C. Patching, Resurfacing, and Surface Sealing (cont'd)

- Follow spill control and clean-up procedures.
- Schedule activities during dry weather.
- Before working, check all equipment shut-out valves.
- Preheat, transfer or load hot bituminous material away from drainage systems or watercourses.

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### C. Patching, Resurfacing, and Surface Sealing (cont'd)

- Stockpile materials away from streets, gutter areas, storm drain inlets or watercourses.
- During wet weather, cover stockpiles with plastic tarps.
- 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 all water (from emulsified oil sealants) has drained or evaporated.
  - Clean (and properly dispose) any collected materials from covered manholes and drains.

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### C. Patching, Resurfacing, and Surface Sealing (cont'd)

- Prevent excess material from exposed aggregate concrete (or similar treatments) from entering streets or storm drain inlets.
  - Designate an area for clean-up and proper disposal of excess materials.
- Use only as much water as necessary for dust control.

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### C. Patching, Resurfacing, and Surface Sealing (cont'd)

- Sweep up as much excess material as possible and properly dispose.
- **Only** wash down streets if runoff is controlled or contained.
- Catch drips from paving equipment not in use.
  - Dispose of collected material and absorbents properly.
- After completion, remove temporary stockpiles (asphalt materials, sand, etc.) and other materials.

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### C. Patching, Resurfacing, and Surface Sealing (cont'd)

- If it rains unexpectedly, take appropriate action to prevent pollution of stormwater runoff.
  - Suspend all seal coat, tack coat, fog seal, etc. operations for the day.
- In dry weather, be prepared to quickly clean-up runs in coating.

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## D. Chip Seal

- Cover or dike drain inlets.
- Sweep up loose aggregate with sweeper.
- After chip seal, sweep twice.
- Check drain inlets for chip seal debris.
  - Clean if necessary.
- Vactor drain inlets after final sweep.

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## E. Signing (Legends) and Striping



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## E. Signing (Legends) and Striping (cont'd)

- Inspect vehicles and equipment before and after work.
- Keep spill containment, clean-up materials, and spill response plan on vehicles.
- Follow spill control and clean up procedures.
- Contain, clean up and properly dispose wastes in accordance with MSDS.

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## E. Signing (Legends) and Striping (cont'd)

- Handle paint and hot thermoplastic away from drainage systems or watercourses.
  - Load paint products at the Corp yard.
- Wash vehicles, equipment and stencils only at Corp yard.
  - Never rinse or wash in the field.
  - Discharge washwater to sanitary sewer.
- Place thermoplastic grindings into plastic bags.
  - Yellow thermoplastic grindings may be hazardous for lead.
  - Properly dispose in accordance with all applicable regulations

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## F. Traffic Detector Loop Installation and Repair

- Prior to cutting or flushing detector loop slot, protect nearby storm drain inlets.
- Use absorbents to contain slurry.
- Sweep-up residues and dispose of properly.



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## G. Equipment Cleaning, Maintenance and Storage

- Inspect equipment daily and repair any leaks.
- Perform major equipment repairs at Corp yard.
- When refueling or repairing vehicles and equipment on-site, use a location away from storm drain inlets and creeks.
- Try alternative compounds for equipment cleaning, if appropriate.

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## G. Equipment Cleaning, Maintenance and Storage (cont'd)

- Recycle used motor oil, diesel fuel and other vehicle fluids and parts.
- Clean equipment at the end of day.
- Conduct cleaning at a corporation or maintenance yard.
- Collect waste cleaning solutions. Recycle or properly dispose.



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## III. Sidewalk/Plaza Maintenance



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## A. Cleaning

- Use dry methods (e.g., absorbents, sweeping or vacuuming).
- Avoid hosing, pressure washing or steam cleaning.
- If water must be used, avoid using soap or other cleaning chemicals.
- Block nearby storm drain inlets.
- Clean up spills!!!



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## A. Cleaning (cont'd)

- Direct runoff from pressure washing (no cleaning agents) to landscaped areas.
    - If not available, filter runoff through filtering device to prevent discharges to storm drains.
  - If wash water contains cleaning compounds:
    - Plug storm drains
    - Vacuum/pump wastewater to sanitary sewer
- Non-storm water discharges are not permitted to enter the storm drain system!**

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## B. Concrete Installation and Repair

- Conduct major work only during dry weather.
- Avoid mixing excess concrete on-site.
- Store dry and wet materials under cover.



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## B. Concrete Installation and Repair (cont'd)

- Bring back excess concrete to Corp yard and store under cover.
- Wash out concrete transit mixers only in designated wash-out areas.
- Never dispose of washout in street, storm drains, drainage ditches, or creeks.

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## C. Surface Removal and Repair

- Conduct major removal work only during dry weather.
- Prior to work, protect nearby storm drain inlets and adjacent watercourses.
- If it rains unexpectedly, take appropriate action to prevent runoff pollution (e.g. divert runoff around work areas).



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## C. Surface Removal and Repair (cont'd)

- Stockpile materials away from streets, gutter areas, storm drain inlets or creeks.
- Designate an area for clean up and proper disposal of excess materials (exposed aggregate concrete).
- Clean up all spills and leaks using absorbent materials and/or rags.
  - Properly dispose of absorbent materials and rags.

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## C. Surface Removal and Repair (cont'd)

- If spills occur on dirt areas, dig up and remove contaminated soil promptly and properly.
- After completion, remove temporary stockpiles (asphalt materials, sand, etc.) and other materials.
- Once completed, sweep up area thoroughly.



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## IV. Bridge and Structure Maintenance



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## A. Painting and Paint Removal

- **Do not** handle paint near storm drain inlets or watercourses.
- Prior to painting:
  - Test and inspect spray equipment
  - Tighten hoses and connections
  - Do not overfill paint container
- Plug storm drains inlets when necessary.
- Clean up spills immediately!
- Capture all clean-up water and dispose of properly.

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## A. Painting and Paint Removal (cont'd)

- When sand blasting:
  - Cover nearby storm drain inlets.
  - Take measures to contain abrasives and dust.
  - Meter sand to minimize amount needed.
  - Sweep and vacuum sand and blast materials.
  - Recycle or dispose of materials properly.

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## A. Painting and Paint Removal (cont'd)

- If the bridge crosses a watercourse, prevent discharges to surface waters by:
  - Performing work on maintenance traveler or platform or
  - Using suspended netting or traps to capture paint, rust, paint removing agents or other materials.

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## B. Repair Work

- Prevent concrete, steel, wood, metal parts, tools, etc. from entering storm drains or watercourses.
- When completed, thoroughly clean-up work site.
- When repairing paved bridge decks, follow road repair and maintenance BMPs.



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## C. Graffiti Removal

- Consider using recycled paint.
- Consider using a waterless chemical cleaning method (e.g., gels or spray compounds).
- Block nearby storm drain inlets.
- Clean up area by sweeping, vacuuming or using absorbents.
- Properly dispose of absorbents.



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## C. Graffiti Removal (cont'd)

- Direct runoff from sand blasting and pressure washing (no cleaning agents) to landscaped areas.
  - If not available, filter runoff through filtering device to keep sand and debris out of storm drains.
- If wash water contains cleaning compounds:
  - Plug storm drains
  - Vacuum/pump wastewater to sanitary sewer
- Avoid graffiti abatement during rain events. If rain occurs, take appropriate action.

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## V. Median and Road Embankment Maintenance



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## A. Erosion Controls

- Maintain vegetative cover.
- Plant and/or retain native or adaptive vegetation.
- Adjust mowing heights to allow substantial stubble.
- Leave clippings in place or apply mulch.




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### A. Erosion Controls (cont'd)

- Avoid moving large quantities of earth.
- Disking of road embankments is **prohibited**.
- Inspect drainage facilities (including cross drains) and outfalls on a regular basis.
- Report and remediate any observed erosion problems **as soon as possible**.
- Ensure that erosion control is provided for storm drain outfalls.




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### B. Slide and Embankment Repair

- Haul slide debris or removed material to an approved dump site.
- **Dumping of material into storm drain inlets, ditches and watercourses is prohibited.**
- Notify proper regulatory agencies about materials that have fallen into a watercourse.




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### B. Slide and Embankment Repair (cont'd)

- Until repairs are completed, use temporary erosion control measures.
  - Sediment basins, silt fences, straw wattles, sand/gravel bag barriers, mulch, blankets or fiber rolls.
- Re-vegetate denuded slopes to prevent future erosion.

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### C. Irrigation Practices



- Inspect irrigation systems regularly.
- Make any needed repairs promptly.
- Shut off water source until repairs are made.
- To reduce sprinkler runoff, adjust sprinklers to apply the correct amount of water.


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### C. Irrigation Practices (cont'd)

- Prevent eroded soil (as a result of a line break) from entering the drainage system.
- After digging out a line, return all soil to the hole and compact properly.
- When bailing out muddy water, **do not** pour into the storm drain inlet or curb.
- Pour muddy water onto landscaping.

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### D. Vegetation Controls

**General Practices**

- Check equipment for chemical, oil, or fuel leaks.
  - If necessary, make repairs before leaving for the job site.
- Fuel equipment only at Corp yards or service stations.

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## D. Vegetation Controls (cont'd)

### Manual and Mechanical Vegetation Removal

- Keep removed vegetation away from storm drain inlets and watercourses.
- When loading or chipping brush, **do not** leave debris in the gutter or paved shoulder.
- Loosen only the amount of soil needed to remove vegetation. Avoid loosening soil when rain is expected.

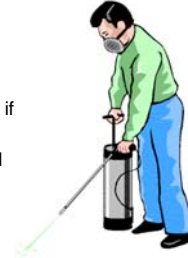
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## D. Vegetation Controls (cont'd)

### Pesticide Usage and Pest Management

- Follow all federal, state, and local laws and regulations.
- Avoid application of pesticides if rain is expected.
- Consider employing integrated pest management methods.



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## D. Vegetation Controls (cont'd)

### Pesticide Usage and Pest Management

- Use the least toxic pesticide and/or herbicide.
- Apply pesticides at the appropriate time.
- Only mix and apply the amount of chemical required for treatment.
- Clean spray equipment at the Corp yard, not in the field.

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## D. Vegetation Controls (cont'd)

### Pesticide Usage and Pest Management

- Do not mix or load pesticides near storm drain inlets, culverts or watercourse.
- Rinse or sweep spilled chemicals (on pavement) to landscaping.
- Avoid using copper-based pesticides.
- Consider alternatives before using diazinon.



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## D. Vegetation Controls (cont'd)

### Fertilizer Usage

- Avoid application of fertilizer if rain is expected.
- Consider applying municipally-generated compost in lieu of chemical fertilizers.
- Confine fertilizer to the targeted area.
- Remove fertilizer accidentally applied to paved surfaces.

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## VI. Litter Control

- Post "**No Littering**" signs where needed.
- Enforce anti-littering laws.
- Provide adequate number of litter receptacles
  - Commercial and other litter source areas.
- Empty litter receptacles on a frequent basis.



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## VII. Spill Control

- Keep spill containment, clean-up materials, and spill response plan on trucks and equipment.
- Follow spill response plan.
- Contain all spills with "dry" methods.



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## VII. Spill Control (cont'd)

- Do not hose down or bury spilled materials.
- Collect spilled (non-hazardous) materials for reuse or recycling.
- Properly dispose of non-recyclable wastes and spent absorbents.
- If spills occur on dirt areas, dig up and remove contaminated soil promptly and properly.

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## Conclusion

- **Nothing but storm water is discharged to the storm drain system!**
- Protect storm drain inlets, creeks and the Bay.
- Clean-up spills promptly!
  - Ask for assistance!
  - Record spills and report the big ones.
- If materials enter catch basin, **clean it out!**
- Cover and contain debris.



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