

EXHIBIT B-8.II
CONSTRUCTION
INSPECTING CONSTRUCTION SITE BMPS

**INSPECTING
CONSTRUCTION SITE BMPs**

Module B.8-II

**Audience: Construction
Inspectors**

Time: 3-4 Hours





**Inspecting
Construction Site
Best Management Practices
(BMPs)**

Name
Affiliation
Location
Date



Introduction



Introduction

**Water Resources are
Crucial to Orange County**

Water provides recreation for Orange County residents.



It attracts tourists, boosting the local economy.

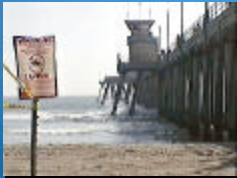


It is home to many types of wildlife.

Introduction

Potential Impacts

- Urban runoff and stormwater pollution can impact the ocean, beaches and creeks, harming wildlife and impairing peoples' ability to enjoy the water.



Introduction

Sources of Pollution


- Homes
- Businesses
- Construction sites
- Municipal facilities



introduction

Path of Pollutants


- Potential pollutants may run off driveways, streets and gutters into stormdrains.
- The stormdrains lead to creeks and rivers, where pollutants can flow untreated into the ocean.



introduction

It's Everyone's Responsibility

- Urban runoff and stormwater pollution is not just a coastal issue-it starts in all regions of the community and affects water quality from the mountains to the ocean.



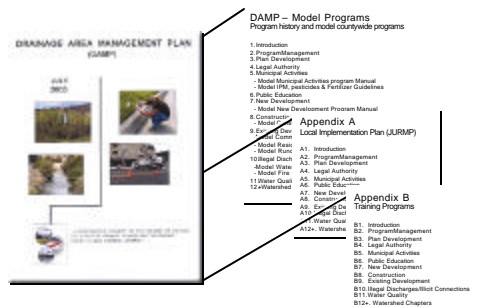
introduction

It's Your Responsibility

- Everyone must help to reduce urban runoff and stormwater pollution.
- This training will help explain what you can do while conducting construction activities to help implement the Orange County Stormwater Program.

introduction

OC Stormwater Program



DAMP - Model Programs
Program history and model countywide programs


1. Introduction
2. Program Management
3. Plan Development
4. Legal Authority
5. Municipal Activities
6. Public Education
7. New Development
8. Construction
9. Existing Development
10. Illegal Discharges/Illicit Connections
11. Water Quality
12. Watershed Chapters

Appendix A
Local Implementation Plan (LIRMP)

Appendix B
Training Programs

introduction

Program Elements



DAMP - Model Programs
Program history and model countywide programs

1. Introduction
2. Program Management
3. Plan Development
4. Legal Authority
5. Municipal Activities
6. Public Education
7. New Development
8. Construction
9. Existing Development
10. Illegal Discharges/Illicit Connections
11. Water Quality Monitoring - SDR/SAR
12. Watershed Chapters

introduction

Training Outline

- Definitions
- Inspection Responsibilities, Frequency & Documentation
- Inspection of Private and Public Works Construction Sites
- Enforcement Actions
- Non Compliance Reporting
- Break -
- What to look for when inspecting BMPs (examples)
 - Installation
 - Maintenance of BMPs

Introduction

Training Goal

Increase your knowledge of the construction program and what to look for when inspecting construction BMPs

1.3

Definitions





1.4

Definitions

Definitions

- Best Management Practice (BMP)
- Construction Project
- General Permit
- Storm Water Pollution Prevention Plan (SWPPP)

1.5

Definitions

Best Management Practice (BMP)

Any program, technology, process, siting criteria, operating method, measure, or device that controls, prevents, removes, or reduces pollution

1.6

Definitions

Construction Project

Any site for which grading or building permits are issued and where an activity results in the disturbance of soil such as soil movement, grading, excavation, clearing, road construction, structure construction, or structure demolition; and sites where uncovered storage of materials and wastes such as dirt, sand or fertilizer occurs; or exterior mixing of cementaceous products such as concrete, mortar or stucco will occur

1.7

Definitions

General Permit

- State Water Resources Control Board (SWRCB) Order No. 99-08-DWQ, National Pollutant Discharge Elimination System (NPDES) General Permit No. CAS000002, Waste Discharge Requirements (WDRs) for Discharges of Stormwater Runoff Associated with Construction Activity
- Applies to stormwater discharges associated with construction activity on site with one or more disturbed acres

1.8

Definitions

Storm Water Pollution Prevention Plan (SWPPP)

Document required to be developed and implemented by the General Permit. The SWPPP emphasizes the use of appropriately selected, correctly installed and maintained pollution reduction BMPs. This approach provides the flexibility necessary to establish BMPs that can effectively address source control of pollutants during changing construction activities

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Inspections





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Inspections

Inspection Responsibilities

- Inspectors not responsible for reviewing or approving SWPPP for private projects
- Review and approve SWPPP for Public Works projects (for contract compliance)
- Inspect for compliance with
 - Local permits
 - Ordinances
 - General Permit (public works projects only)
- RWQCB is responsible for inspecting projects for compliance with General Permit

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Inspections

Inspection Frequency

Inspection Frequency of Construction Projects			
Construction Site Priority	Wet Season (October 1 - April 30)		Dry Season (May 1 - September 30)
	Projects within the jurisdiction of the Santa Ana RWQCB	Projects within the jurisdiction of the San Diego RWQCB	
HIGH	Once per month	Once per week *	As needed
MEDIUM	Twice during the season		As needed
LOW	Once during the season	Twice during the season	As needed
OR			
<small>monthly, if County/City has submitted a written statement to the San Diego Regional Board</small>			

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Inspections

Inspection Documentation

- Construction Inspection Checklist (Exhibit A-8.V)
- Enforcement/Non-compliance reporting (Exhibit A-8.VI)
- Retain for three years

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Inspections

Municipal Inspections of Private Construction Projects

- Ensure that the owner/developer/contractor is meeting the requirements of grading/building permit & local ordinances;
- Ensure that there is an effective combination of erosion, sediment and non-stormwater BMPs being implemented and maintained in order to prevent the discharge of pollutants into stormwater conveyances and receiving waters;
- Ensure that the owner/developer/contractor implements and maintains BMPs on a year-round basis; and
- Ensure that, if issues are noted during the inspections, appropriate corrective actions are taken

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Inspections

Municipal Inspections of Public Works Construction Projects

- Ensure that the contractor is meeting the requirements of the plans, specs & local ordinances;
- Ensure that there is an effective combination of erosion, sediment and non-stormwater BMPs being implemented and maintained in order to prevent the discharge of pollutants into stormwater conveyances and receiving waters;
- Ensure that the contractor implements and maintains BMPs on a year round basis; and
- Ensure that, if issues are noted during the inspections, appropriate corrective actions are taken

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Enforcement




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Enforcement

Enforcement Actions

- Verbal Warning
- Written Actions under the Water Quality Ordinance
 - Notice of Non-Compliance
 - Administrative Compliance Order
 - Administrative Citations or Fines
 - Cease and Desist Order
 - Civil and Criminal Actions
- Written Actions under Building/Grading Ordinances
 - Corrective Action Notice
 - Stop Work Order
 - Revocation of Permit(s) and/or Denial of Future Permits
 - Civil and Criminal Actions

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Inspections

Non-Compliance Reporting

- Private construction project
 - Is non-compliant with local permit and ordinances and is determined to pose a threat to public or environmental health
 - Report to RWQCB verbally within 24-hrs of discovery and in writing within 5 days (Criteria in Exhibit A-8.VII form)
- Public Works construction project
 - Compliance with General Permit provisions can't be certified
 - Is determined to pose a threat to public or environmental health
 - Report to RWQCB verbally within 24-hrs of discovery and in writing within 5 days (Criteria in Exhibit A-8.VII form)
- Who reports? – Confer with NPDES Manager/Coordinator

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Requirements




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Requirements

Minimum Requirements – All Projects

- Erosion and Sediment Control
 - Sediments from areas disturbed by construction shall be retained on site using an effective combination of erosion and sediment controls to the maximum extent practicable, and stockpiles of soil shall be properly contained to minimize sediment transport from the site to streets, drainage facilities or adjacent properties via runoff, vehicle tracking, or wind.
- Waste and Materials Management Control
 - Construction-related materials, wastes, spills or residues shall be retained on site to minimize transport from the site to streets, drainage facilities, or adjoining property by wind or runoff.

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Requirements

Site Management Requirements

- For all Medium and High Priority projects
- Dry Season Requirements
 - May 1 to September 30
- Wet Season Requirements
 - October 1 to April 30

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Requirements

Site Management Requirements Dry Season (May 1 through Sept 30)

- Wind erosion BMPs (dust control)
- Sediment control BMPs at operational SD inlets
- BMPs to control off-site sediment tracking
- Appropriate waste management and materials pollution control BMPs
- Appropriate non-storm water BMPs
- Weather triggered action plan to deploy sediment control BMPs to completely protect the exposed portions of the site within 48 hours of a predicted storm event (a predicted storm event is defined as a forecasted, 50% chance of rain)

Continued... 32

Requirements

Site Management Requirements Dry Season (May 1 through Sept 30) (Continued)

- Store on site sufficient materials needed to install standby sediment control BMPs
- Start deployment of permanent erosion control BMPs (physical or vegetation) as soon as practical on slopes that are completed for any portion of the site.
- The area that can be cleared or graded and left exposed at one time should be limited to the amount of acreage that can be adequately protected by deployment of sediment controls prior to a predicted rainstorm.

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Requirements

Site Management Requirements Wet Season (Oct 1 through Apr 30)

- In addition to the Dry Season Requirements
- Implement sediment control BMPs at the site perimeter, at all operational storm drain inlets and at all non-active slopes
- Install (and establish) adequate physical or vegetation erosion control BMPs for all completed slopes prior to the start of the rainy season
- The amount of exposed soil allowed at one time shall not exceed that which can be adequately protected by deploying standby erosion control and sediment control BMPs prior to a predicted rainstorm

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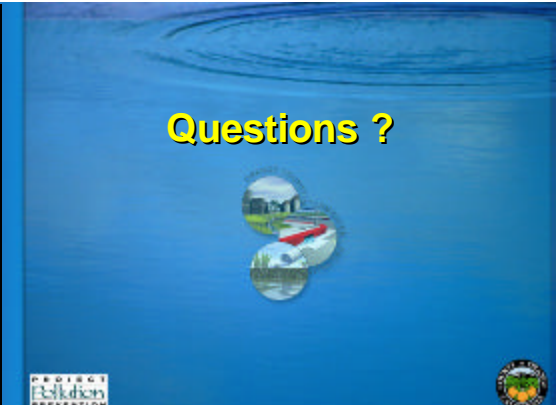
Requirements

Site Management Requirements Wet Season (Oct 1 through Apr 30) (Continued)

- A disturbed area that is not completed, but that is not being actively graded (non-active area), shall be fully protected from erosion. This includes all building pads, unfinished roads and slopes
- Sufficient materials needed to install standby erosion and sediment control BMPs necessary to completely protect the exposed portions of the site from erosion and to prevent sediment discharges shall be stored on site

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Questions ?



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Inspecting Construction Site BMPs





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BMP Categories

- Temporary Erosion Control (Soil Stabilization)
- Temporary Sediment Control
- Wind Erosion Control
- Tracking Control
- Non-Storm Water Management
- Waste Management and Materials Pollution Control

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Sediment laden streets are a water quality problem



Sediment free streets are possible, but require significant effort

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Temporary Erosion Control (Soil Stabilization)

ID	BMP Name
• ES-1	Scheduling
• ES-2	Preservation of Existing Vegetation
• ES-3	Hydraulic Mulch
• ES-4	Hydroseeding
• ES-5	Soil Binders
• ES-6	Straw Mulch
• ES-7	Geotextiles & Mats
• ES-8	Wood Mulching
• ES-9	Earth Dikes and Drainage Swales
• ES-10	Velocity Dissipation Devices
• ES-11	Slope Drains
• ES-12	Streambank Stabilization
• ES-13	Polyacrylamide

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BMP Use – Erosion Control ES-1 Scheduling

Example of Graphical Schedule



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ES-3 Hydraulic Mulch



Hydraulically applied paper mulch

- Mulch must be approved by Engineer
- Prior to application, roughen embankment and fill areas
- Most types need 24 hours to dry before rainfall occurs
- Application rates per SS3 or manufacturers recommendation

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ES-4 Hydroseeding



Hydroseeded slopes show vegetation growth

- Seed mix must comply with local standards
- Hydroseeding mixture requires approval by the Landscape Architect
- Prior to application, roughen embankment and fill areas
- Steep slopes are difficult to protect with temporary seeding

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ES-4 Hydroseeding



Unstabilized slope vs. Stabilized slope

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ES-5 Soil Binders



Application of Soil Binder

- Are temporary and may require reapplication
- Soil type will dictate which kind of soil binder to use
- Must be environmentally benign, and should not stain paved or painted surfaces
- Do not apply during or immediately before a rainfall

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ES-6 Straw Mulch



Effective Combination of Erosion and Sediment Control

- Apply straw at a minimum of 2 tons per acre or as local standards
- A tackifier (glue) is the preferred method of anchoring straw
- Straw needs to last long enough to achieve erosion control objective

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BMP Installation – Erosion Control



Lack of soil stabilization

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ES-7 Geotextiles & Mats



Erosion Control Blankets

- Used when disturbed soil may be difficult to stabilize
- Materials selected by the contractor must be approved by the Engineer
- Blankets and mats must be removed and disposed of prior to application of permanent soil stabilization

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ES-9 Earth Dikes and Drainage Swales



- Conveyances must be stabilized
- Not suitable for trapping sediment
- Do not divert runoff onto other property

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ES-9 Earth Dikes and Drainage Swales

- Collect runoff from deck cure



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Temporary Sediment Controls

- | ID | BMP Name |
|---------|-------------------------------|
| • SE-1 | Silt Fence |
| • SE-2 | Sediment Basin |
| • SE-3 | Sediment Trap |
| • SE-4 | Check Dam |
| • SE-5 | Fiber Rolls |
| • SE-6 | Gravel Bag Berm |
| • SE-7 | Street Sweeping and Vacuuming |
| • SE-8 | Sandbag Barrier |
| • SE-9 | Straw Bale Barrier |
| • SE-10 | Storm Drain Inlet Protection |

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SE-1 Silt Fence

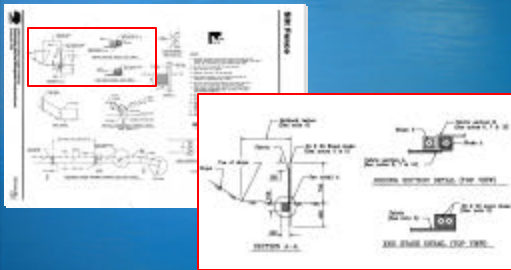


Incorrect installation of silt fence, bottom portion not properly keyed-in, improper overlap

- Not effective unless keyed in
- Locate on level contours
- Don't use in streams, channels or anywhere flow is concentrated
- Locate in areas suitable for ponding and sediment deposition
- Maintain to provide an adequate sediment holding capacity

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SE-1 Silt Fence



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SE-1 Silt Fence, ES-6 Straw Mulch



Correct installation of silt fence on a slope stabilized with Straw Mulch



Straw Mulch application

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BMP Installation - Sediment Controls



Sediment Controls plus Soil Stabilization = An effective combination

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Lack of Sediment Controls



Lack of sediment control

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SE-3 Sediment Trap



Sediment Trap

- Size limited by space availability
- Not appropriate for drainage areas greater than 5ac
- Length of basin must be three times the width
- Safety fencing may be required

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SE-4 Check Dams



- Don't use in live streams or channels
- Not to be constructed from straw bales or a silt fence
- High flows should safely flow over check dam without upstream flooding or damage to check dam
- Backwater from downstream check dam shall reach toe of upstream dam

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SE-5 Fiber Rolls



Incorrect installation of fiber rolls; too far apart, not trenched in

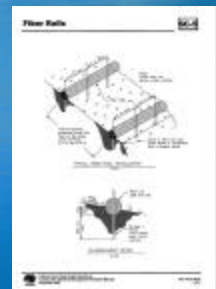
- Use along the top, face, and at grade breaks of exposed and erodible slopes
- Locate on level contours
- Do not use in place of a sediment barrier
- Must be trenched in

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SE-5 Fiber Rolls



Correct installation of fiber rolls



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SE-7 Street Sweeping and Vacuuming



Street sweeping and vacuuming

- Do not use kick brooms or sweeper attachments
- Visible sediment tracking should be swept and vacuumed daily
- Dispose of sweeper waste at an approved dumpsite

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SE-10 Storm Drain Inlet Protection



- Use where ponding will not encroach into traffic
- For use in areas where sediment laden runoff may enter an inlet
- Not for concentrated flows

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Wind Erosion Control

ID	BMP Name
WE-1	Wind Erosion Control



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Lack of Wind Erosion Control



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WE-1 Wind Erosion Control



Soil binder applied via water truck

- Effectiveness depends on soil, temperature, humidity and wind velocity
- Temporary soil stabilizers and soil binders will also provide wind erosion control benefits

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Tracking Controls

- | ID | BMP Name |
|------|---------------------------------------|
| TC-1 | Stabilized Construction Entrance/Exit |
| TC-2 | Stabilized Construction Roadway |
| TC-3 | Entrance/Outlet Tire Wash |

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TC-1 Stabilized Construction Entrance / Exit



Lack of stabilized entrance / exit

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TC-1 Stabilized Construction Entrance / Exit



Lack of stabilized entrance / exit

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TC-1 Stabilized Construction Entrance / Exit



Large diameter rock used as a stabilized entrance / exit.

- If aggregate is used place over Geotextile fabric - 12" deep
- Use 3" - 6" diameter rock
- Minimum of 15 m in length
- Design for heaviest equipment
- Limit number of entrances and exits
- Require their use

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TC-1 Stabilized Construction Entrance / Exit



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TC-1 Stabilized Construction Entrance / Exit



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TC-1 Stabilized Construction Entrance / Exit



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TC-3 Entrance/Exit Tire Wash



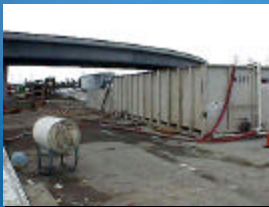
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Non-Storm Water Management BMPs

ID	BMP Name
• NS-1	Water Conservation Practices
• NS-2	Dewatering Operations
• NS-3	Paving and Grinding Operations
• NS-4	Temporary Stream Crossing
• NS-5	Clear Water Diversion
• NS-6	Illicit Connection / Illegal Discharge
• NS-7	Potable Water / Irrigation
• NS-8	Vehicle and Equipment Cleaning
• NS-9	Vehicle and Equipment Fueling
• NS-10	Vehicle and Equipment Maintenance
• NS-11	Pile Driving Operations
• NS-12	Concrete Curing
• NS-13	Concrete Finishing
• NS-14	Material and Equipment Over Water
• NS-15	Demolition Adjacent to Water
• NS-16	Temporary Batch Plants

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NS-2 Dewatering Operations



- Use where groundwater or accumulated precipitation will be discharged from site
- Addresses sediment only
- Notify Engineer if pollutant other than sediment is present
- Must comply with applicable permits

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NS-3 Paving and Grinding Operations



- Place drip pans under paving equipment when not in use
- Substances used to coat asphalt equipment shall not contain soap, will be non-foaming and non-toxic
- Clean equipment off-site whenever possible

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NS-4 Temporary Stream Crossing



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NS-5 Clear Water Diversion



- May require RWQCB, USACE, DFG permits / approval
- If improperly designed they may increase pollution load through washouts and scouring
- Construct diversions with material free of potential pollutants

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NS-6 Illicit Connection- Illegal Discharge

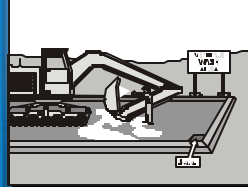
- Can be in liquid or solid form
- Refers to discharges and dumping caused by parties other than contractor
- Inspect site before beginning of job
- Proceed with caution – notify Engineer at time of discovery



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NS-8 Vehicle and Equipment Cleaning

- On-site vehicle and equipment washing is discouraged
- Cleaning of vehicles and equipment with soap, solvents or steam must not occur on the project site
- If permitted on site, use a designated area



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NS-9 Vehicle and Equipment Fueling



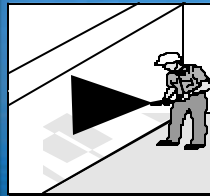
Mobile fueling operations require BMPs

- Fuel on site only when impractical to go off site
- Use a designated area
- Clean up materials and spill kits available
- Protect fueling area from run-on and run-off

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NS-12 Concrete Curing

- Avoid over-spray of curing compounds. Minimize the drift of chemical cure as much as possible by applying the curing compound close to the concrete surface.
- Apply an amount of compound that covers the surface, but does not allow any runoff of the compound.
- Use proper storage and handling techniques for concrete curing compounds.
- Protect drain inlets prior to the application of curing compounds.



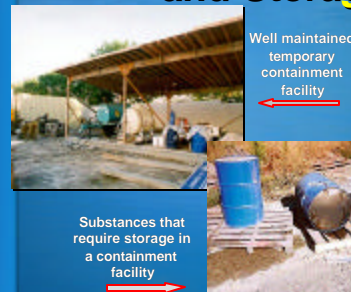
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Waste Management and Material Pollution Control BMPs

ID	BMP Name
WM-1	Material Delivery and Storage
WM-2	Material Use
WM-3	Stockpile Management
WM-4	Spill Prevention and Control
WM-5	Solid Waste Management
WM-6	Hazardous Waste Management
WM-7	Contaminated Soil Management
WM-8	Concrete Waste Management
WM-9	Sanitary / Septic Waste Management
WM-10	Liquid Waste Management

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WM-1 Material Delivery and Storage



- Spill containment volume should be equal to 1.5 times volume of all containers and be impervious to the materials for 72 hours
- Substances listed in 40 CFR Parts 110, 117, and 302 require containment
- Provide cover during non-working days and prior to rain events

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WM-1 Material Delivery and Storage



Temporary containment facility for fuel

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WM-1 Material Delivery and Storage

- Cure requires proper storage



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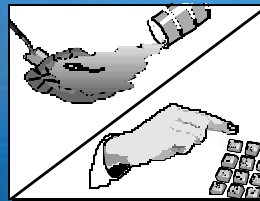
WM-3 Stockpile Management



- Year-round requirement
- Locate away from concentrated flows of storm water
- Protect from run-on

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WM- 4 Spill Prevention and Control



- Applies to all construction projects
- Prevent and control spills to minimize or prevent discharge of spilled material(s) to the drainage system or watercourses

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WM-4 Spill Prevention and Control



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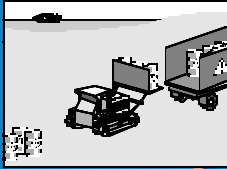
WM-5 Solid Waste Management

- Solid waste includes litter generated by the public
- Dumpsters of sufficient size and number shall be provided
- Segregate potentially hazardous waste from non-hazardous waste



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WM-6 Hazardous Waste Management



- Procedures and practices to minimize or eliminate the discharge of pollutants from construction site hazardous waste to the storm drain system or to watercourses



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WM-7 Contaminated Soil Management



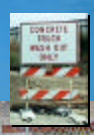
- Implemented on construction projects in highly urbanized or industrial areas where soil contamination may have occurred due to spills, illicit discharges, and leaks from underground storage tanks

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WM-8 Concrete Waste Management



Below Grade concrete washout



- PCC and AC waste should not be allowed to enter storm drains and watercourses
- Install signs designating temporary washout areas
- Locate washout facilities a minimum of 50ft from storm drains, water courses



Uncontrolled concrete washouts

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WM-8 Concrete Waste Management



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WM-8 Concrete Waste Management



Concrete washout



Uncontrolled concrete washouts

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WM-9 Sanitary / Septic Waste Management



- Locate sanitary facilities away from storm drains, water courses
- Secure if subject to high wind
- Contractor should monitor weekly

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WM-10 Liquid Waste Management

- Liquid waste cannot enter storm drain, receiving water or waterway
- Disposal of certain liquid waste may be subject to specific laws or regulations

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Maintenance of BMPs



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Maintenance of BMPs



Maintenance of BMPs is a critical requirement for an effective water pollution control program

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Maintenance of BMPs



Silt fence maintenance

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Improperly Implemented BMPs



Silt fence installed incorrectly in a concentrated flow area

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Improperly Implemented BMPs



Silt fence installed incorrectly in a un-stabilized concentrated flow area

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Improperly Implemented BMPs



Sandbags blocking an inlet and causing a safety hazard

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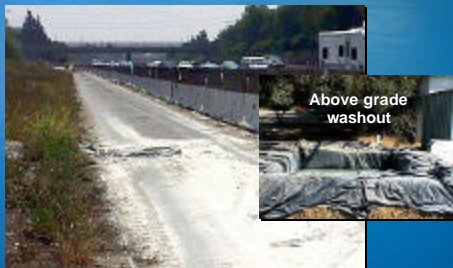
Improperly Implemented BMPs



Sandbags blocking inlet and causing a safety hazard

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Improperly Implemented BMPs



Uncontrolled concrete washout near an active DI

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Improperly Implemented BMPs



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Improperly Implemented BMPs



Possible solution: Block other entrance / exit

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Improperly Implemented BMPs



Incorrect use of silt fence

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Improperly Implemented BMPs



Lack of soil stabilization has led to failure of silt fence

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Improperly Implemented BMPs



Stockpile should be relocated, covered and protected from run-on

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Photo Credits

- Caltrans
- Ventura County Flood Control District
- CDM

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Questions?



PROJECT
Eradication
PREVENTION



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Conclusion



PROJECT
Eradication
PREVENTION



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Conclusion

- Everyone must help to reduce urban runoff and stormwater pollution
- Sites that properly implement and maintain BMPs during construction help prevent or reduce stormwater pollution

Conclusion

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Conclusion

Remember

- Everyone benefits from clean water, and everyone has a responsibility to protect it by reducing urban runoff and stormwater pollution.



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Conclusion

Resources

For more information:
Visit www.ocwatersheds.com
or
Call the Orange County Stormwater Program at 714-567-6363.



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Conclusion

Other Resources

- California BMP Handbooks
<http://www.cabmphandbooks.com>
- Caltrans
 - Construction Site BMP Field Manual and Troubleshooting Guide (Jan. 2003)
 - Guidance for Temporary Soil Stabilization (Jul. 2003)<http://www.dot.ca.gov/hq/construc/stormwater/manuals.htm>
- Field Manual on Sediment and Erosion Control BMPs for Contractors and Inspectors – Jerald S. Fifield, Ph.D., CPESC
<http://www.forester.net>

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Conclusion

Thank You!

Thank you for attending and learning how you can help!



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