

Storm Water Quality Construction Site Compliance / Controls

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Agenda

- Regulatory Responsibilities
- General Construction NPDES Permit & Storm Water Pollution Prevention Plan (SWPPP) Refresher
- Construction Site Inspection & Enforcement
- Construction Site Practices – Good and Bad

What are Municipal Responsibilities for Construction?

- Cities required to inspect construction sites to:
 - Verify that Best Management Practices (BMPs) are in place
 - Enforce City codes and permits
- You are part of the City's Stormwater Construction Inspection Program
- You help the City:
 - Verify that public works and private projects follow stormwater requirements
 - Protect local water quality and the environment
 - Avoid actions/fines by RWQCB

Stormwater Regulations & Construction Activity

- State Water Board requires construction projects to receive coverage under the General Permit
 - i.e, submit Notice of Intent, develop SWPPP, use BMPs to contain pollutants, prevent soil erosion, control sediment, monitor, inspect, and submit Notice of Termination.
- S.F. Bay Regional Water Board also regulates construction activity through the City's Stormwater Permit
 - Permit requires City to monitor construction activity (public & private) and achieve compliance through local policy and enforcement, e.g. requiring Erosion Control Plan (ECP)

Construction Responsibilities

- Property owners:

- Obtain coverage under General Permit, i.e. submit NOI
- Develop *and maintain* SWPPP
- Submit a Notice of Termination to State when project is complete

- The City:

- Enforce Municipal Stormwater Permit
- Accept an approved Erosion Control Plan (ECP)
- Verify that stormwater is managed on site
- Verify that pollutants are contained, sediment is controlled, and any runoff from site is clean
- Enforce City codes and ordinances



Let's quickly review...

...with a Quiz!

Question 1

The City is required to inspect private construction sites for:

- a. Compliance with the Construction General Permit (CGP)
- b. Compliance with the Clean Water Act
- c. Compliance with City codes and ordinances
- d. Compliance with the City municipal NPDES Permit

ANSWER:

c. and d. are correct

Question 2

The RWQCB can fine the City for non-compliance on a private construction site

- a. True
- b. False

ANSWER:

- a. True

Construction NPDES Permit - What is Covered?

- Construction activity that disturbs one (1) or more acres of soil
- Construction activity includes:
 - Clearing and grubbing (land disturbance)
 - Grading / excavation
 - Stockpiling
 - Structure construction
- Sites < 1 acre also included if part of a larger common development (that exceeds one acre total)

General Permit Requirements

- Apply for Coverage Under General Permit
- Develop and Implement a SWPPP
 - Identify pollutant sources
 - Identify / implement BMPs
- Eliminate or Control Non-Storm Water Discharges
 - E.g. pipe flushing, street cleaning, dewatering
- Visual Inspections
- Sampling Strategy
- Initial and Annual certification

What Time of the Year do Permit Requirements Apply?

- SWPPP Must Be Implemented
Year-round at an Appropriate Level
 - Non-storm water discharges controlled
 - BMPs when chance of rain
 - Stockpile materials for sediment and erosion control as well as for spill control

Storm Water Pollution Prevention Plan (SWPPP)

- Purpose:
 - Prevent discharge of potential pollutants during construction
- Potential pollutants include:
 - Sediment (erosion)
 - Litter, trash, and debris
 - Paint, plaster, concrete and stucco
 - Fuel, oil, grease and solvents
 - Pesticides and fertilizers
 - Others

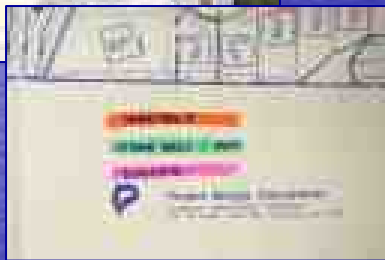
SWPPP Requirements

- SWPPP document must be available at project site
- Must have map showing BMPs
- Required inspections and documentation
 - Before anticipated storm events
 - After storm events
 - Once each 24-hour period during extended storms
- Include name & number of responsible person

SWPPP Contents

- Site / Vicinity Maps
- Pollution Source and BMP Identification
- Erosion Control and Sediment Control BMPs
- Non-Storm Water Management
- Post Construction Controls
- Maintenance, Inspection and Repair
- Sampling Strategy
- Training
- Certification

SWPPP Maps



- SWPPP must have map showing where and what BMPs are being implemented
- Must be updated to reflect changing site conditions
- Must be on-site

Common Construction Site Pollutants

List of Common Potential Non-visible Pollutants at Construction Projects

Category	Potential Pollutant Source	Field Indicator of Pollutant Release	Laboratory Analysis
Line flushing	Chlorinated water	Colorimetric kit	Residual chlorine
Portable toilets	Bacteria, disinfectants	NA	Total/fecal coliform
Concrete & Masonry	Acid wash	pH meter	pH
	Curing compounds	pH meter	pH, alkalinity, volatile organic compounds (VOCs)
	Concrete rinse water	pH meter	pH
Painting	Resins	NA	Semi-volatile organic compounds (SVOCs)
	Thinners	Phenols kit	Phenols, VOCs
	Paint Strippers	NA	VOCs
	Solvents	Phenols kit	Phenols, VOCs
	Adhesives Sealants	Phenols kit N/A	Phenols, SVOCs SVOCs
Cleaning	Detergents	Colorimetric kit	MBAS, phosphates
	Bleaches	Colorimetric kit	Residual chlorine
	Solvents	Phenols kit	VOCs
Landscaping	Pesticides/Herbicides	NA	Check with analytical laboratory
	Fertilizers	NA	NO ₃ /NH ₃ /P
	Lime and gypsum	pH meter	Acidity/alkalinity
	Aluminum sulfate, sulfur	Total dissolved solids (TDS), pH	TDS, alkalinity
Treated wood	Copper, arsenic, selenium	Metals test kits may be available	Metals
Soil amendments & dust control	Lime, gypsum	pH meter	pH
	Plant gums	NA	Biochemical oxygen demand (BOD)
	Magnesium chloride	TDS	Alkalinity, TDS
	Calcium chloride	TDS	Alkalinity, TDS
	Natural brines	TDS	Alkalinity, TDS
	Lignosulfonates	TDS	Alkalinity, TDS



Let's quickly review...

...with another Quiz!

Question 1

The City is required to file an NOI for:

- a. Each construction project, regardless of ownership
- b. Only projects for which the City is the owner
- c. 1 or more acres total size
- d. 1 or more acres disturbed area

ANSWER:

b and d are both correct.

Question 2

True or False?

Some projects sites that disturb less than one acre might need a Construction NPDES Permit?

ANSWER:

True, if they are part of a larger common plan of development that will exceed 1 acre of soil disturbance or the RWQCB requires coverage.

Question 3

The SWPPP must:

- a. Be reviewed and approved by the City.
- b. Be submitted to the SWRCB.
- c. Be kept at the project site.
- d. Contain a sampling strategy

ANSWER:

c. and d. are correct

Question 4

Who is Responsible for
Implementing BMPs?

- a. City staff
- b. Designated Person in SWPPP
- c. Laborer
- d. All site personnel
- e. All of the above

ANSWER:

b. Designated Person



Construction Site Inspection Tips

What to Inspect

- All areas that are not in final stabilized condition
- All erosion and sediment control BMPs
- Material storage areas
- Waste containers and portable toilets
- Entrance and exits
- Purpose: Inspect for evidence of, or potential for pollutants leaving the site

Conducting an Inspection

- Have a copy of the Erosion and Sediment Control Plan
- Need a digital camera
- Inspection form desirable
- Inspect from downstream looking up
- Check all potential sources of pollution
- Erosion controls (85%), sediment controls are backup

Key Inspection Points

- Site perimeter
- Disturbed surfaces
- Storm water conveyances
- Inlets
- Discharge points and outfalls
- Storage and Staging
- Stockpiles
- Washouts



Construction Site BMPs

Construction BMP Categories

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

Function of Temporary Surface Erosion Control

- Protect surface from rain drop impact
- Moderate the surface microclimate
- Help retain moisture in the soil
- Minimize the down-slope transport of soil particles
- Degrade over time

Temporary Erosion Controls

Function by:

- Protecting the surface
- Minimizing flow velocity of water over the soil's surface
- Minimizing runoff over disturbed soil surfaces
- Fostering plant development

EC-5 Soil Binders



- Generally temporary and may require reapplication
- Soil type dictates kind of soil binder to use
- Must be environmentally benign, and should not stain paved or painted surfaces

New Uses for PAM

- Research completed at NC State
- Dramatic reduction in turbidity with PAM application
- No toxicity found at the suggested application rates





EC-3 Hydraulic Mulch



- Most types need 24 hours to dry before rainfall occurs
- Generally good for one wet season (may need re-application)



EC-3 Bonded Fiber Matrix (BFM)



- Last longer than mulch (may get several wet seasons)



EC-6 Straw Mulch



- A tackifier (glue) is the preferred method of anchoring straw
- May not be allowed near structures (Fire Regs)
- Generally short lived (one wet season or less)
- Excellent performance

EC-7 Geotextiles & Mats



- Used when disturbed soil may be difficult to stabilize or drying time an issue
- Blankets and mats may need to be removed and disposed of prior to application of permanent soil stabilization
- Natural & synthetic

EC-4 Hydroseeding



- Seed mix must comply with local standards
- Steep slopes are difficult to protect with temporary seeding
- Must be established to qualify as a BMP



How Hydraulic Soil Stabilizers Rank

Material	Cost/acre	Sediment Reduction (%)
Guar	\$410	80
Psyllium, starch	\$410	60
Acrylic polymers and co- polymers	\$1232	40
polyacrylamide	\$410	55

How Mulches Rank

Mulch	Cost/Acre	Sediment Reduction (%)
Straw	\$2100	90
Cellulose Fiber	\$900	55
Recycled Paper	\$900	50
BFM	\$5400	90

How RECPs Rank

Blanket Type	Cost/Acre	Sediment Reduction (%)
Woven Jute Mesh	\$6,500	70
Excelsior	\$10,600	85
Straw Blanket	\$9,000	87
Coir	\$13,000	80
Plastic Mesh Woven	\$2,000	80

General Comparison of Material Cost and Sediment Reduction Performance

Material ¹	Cost/Ac ²	Cost /SY	Cost/SM	Sediment Reduction ³
Mulches (Biodegradable Materials)				
Straw Mulch (Wheat or Rice)	\$2,136	\$0.44	\$0.53	0.90
Cellulose Fiber Mulch	\$904	\$0.19	\$0.22	0.55
Recycled Paper Mulch	\$863	\$0.18	\$0.21	0.50
Bonded Fiber Matrix	\$5,586	\$1.15	\$1.38	0.90
Rolled Erosion Control Products (RECPs), Biodegradable				
Woven Jute Mesh	\$6,572	\$1.36	\$1.62	0.70
Curled Wood Fiber (Excelsior)	\$10,680	\$2.21	\$2.64	0.85
Straw Blanket	\$9,037	\$1.87	\$2.23	0.87
Coconut Fiber (coir non-woven)	\$13,144	\$2.72	\$3.25	0.87
Coconut Fiber (coir woven)	\$31,628	\$6.53	\$7.82	0.80
Plastic mesh woven (UV degradable)	\$2,054	\$0.42	\$0.51	0.80
Rolled Erosion Control Products (RECPs), Non-biodegradable				
Plastic mesh woven (UV Resistant)	\$2,259	\$0.47	\$0.56	0.80
Plastic Netting, non-woven (UV Resistant)	\$3,286	\$0.68	\$0.81	0.50
Synthetic Matrix with Synthetic Fibers	\$35,325	\$7.30	\$8.73	0.90
Bonded Synthetic Fibers (non-woven)	\$49,702	\$10.27	\$12.28	0.90
Synthetic Matrix with Biodegradable Fibers	\$32,450	\$6.70	\$8.02	0.87
Temporary Seeding				
Non-Competing Natives	\$493	\$0.10	\$0.12	0.65
Adapted Non-Competing	\$452	\$0.09	\$0.11	0.65
Cereal Grains	\$493	\$0.10	\$0.12	0.55
Permanent Seeding (W/O Mulch)				
Prairie Grasses/Bunch Grasses (Native)	\$493	\$0.10	\$0.12	0.65
Commercial Bunch and Forage Grasses	\$452	\$0.09	\$0.11	0.65
Sodding (Turf Species)	\$9,858	\$2.04	\$2.44	0.80
Hydraulic, Non-Vegetative Soil Stabilizers				
Short term organics (Guar)	\$411	\$0.08	\$0.10	0.80
Short term organics (Psyllium, Starch)	\$411	\$0.08	\$0.10	0.60
Long-term organic (Pitch and Rosins)	\$1,232	\$0.25	\$0.30	0.35
Long-term Polymeric Emulsions- Acrylic polymers and copolymers	\$1,232	\$0.25	\$0.30	0.40
Long-term Polymeric Emulsions- Acrylates, polyacrylamides, etc	\$411	\$0.08	\$0.10	0.55
Cementitious Materials (Gypsum)	\$822	\$0.17	\$0.20	0.35
Resin/Petroleum based emulsions	\$1,232	\$0.25	\$0.30	0.75

¹ Materials have been grouped by material types e.g. "curled wood fiber" commonly called excelsior. Within each group there can be significant variations in manufacture such as weight, binder, netting, glue, etc. These differences have not been evaluated or considered in developing categories. The manufacturer's material specifications should always be consulted for specific features, installation and maintenance considerations.

² Costs based on a 1-3 acre installation. Costs will vary by region, amount and proximity to suppliers.

³ Estimates of sediment reduction extrapolated from testing data at the TTI Hydraulics and Erosion Control Laboratory at College Station, Texas, for materials of the same type and class. Actual performance can be expected to vary as much as 20 percent of the values shown and will be effected by installation, soil type, slope and the presence or absence of vegetation.

Temporary Protection Summary

- Most slopes flatter than 15:1 can be protected with hydraulically applied seed and mulch
- Slopes steeper than 15:1 and up to 4:1 will require crimped straw, tacked straw or blankets to achieve greater stability
- Slopes steeper than 4:1 will usually require the use of heavy crimped straw (>2000 lb/ac), blankets or BFMs if the slope length is greater than 30ft horizontal

Use of Sediment Controls

Control	Application	Flow Type	Area	Longevity
Silt Fence	Perimeter Protection	Sheet flow	<0.5 Ac	12-36 mo
Reinf S.F	Sediment Trap	Shallow conc.	0.5 – 1.0ac	12-36 mo
Wattle	Perimeter, inlet	Sheet	<0.5 ac	12-36 mo
Sed. Basin	Online/offline	Concentrated	>10.0 ac	Indefinite
Inlet Filter	Inlet protection	Concentrated	0.5 – 2.0	12-24 mo
Veg. Strip	Perimeter/offsite	Concentrated	0.5 –2.0	Indefinite
Rock Entrance	Tracking prevention	N/a	N/a	1-2 rain events
Rumble Plate Ent.	Tracking Prevention	N/a	N/a	indefinite

SE-1 Silt Fence



- Located level on contours, not perpendicular
- Not for concentrated flow areas
- Must be keyed in

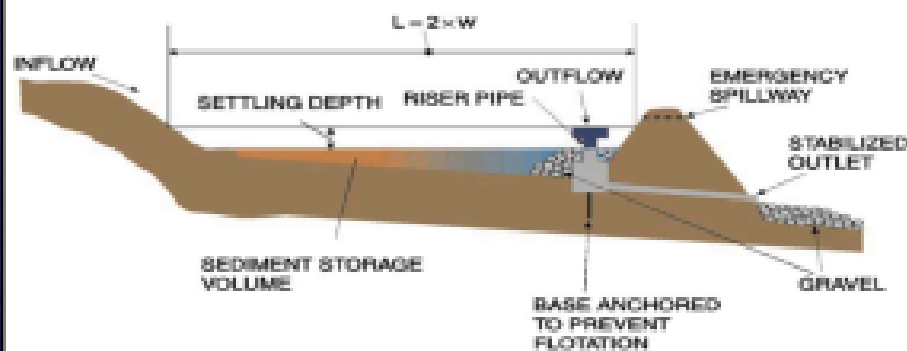
SE-2 Sediment Basin



- Tributary area 5 to 75 acres
- Use with erosion control, not instead of
- **Always** have spillway
- Drain in 7 days max
- Protect outlet from erosion
- Use anti-seep collars
- Size per permit criteria

Sediment Basins

Sediment basins are the last line of defense, and should never be used as a primary sediment control device.



Sediment Basins

- Calculations must be in SWPPP and performed by a registered engineer
- **Always** have spillway
- Use anti-seep collars



SE-5 Fiber Rolls



- Locate on level contours
- Use at top and on face of slopes
- Good for perimeter control
- Space 30 - 60 feet on slopes

SE-6 Gravel Bag Berm



- Use for small check dams
- Use for perimeter control

SE-10 Inlet Protection



- Protect active inlets year-round
- Use where ponding won't encroach into traffic

Track-Out

- Maintain Entrances



TC-1: Temporary Construction Entrance / Exit



- A VERY visible indicator of compliance effort (or lack of)
- Minimize number of access points
- Use coarse aggregate over fabric – can add plates
- Year-round

NS-2 Dewatering

- Likely requires a separate discharge permit from RWQCB
- Addresses sediment and other permit-specified pollutants



Dewatering Discharge Options

- Direct to sanitary sewer (with permission from sewer agency)
- Retain on site (e.g. use for dust control)
- Off-site transport & disposal via licensed contractor)



Dewatering Treatment Options

- Desilting basin or sediment trap
- Weir (Baker) tank
- Dewatering tank
- Gravity (dewatering) bag
- Filtration
- Effectiveness depends on target sediment particle size

WM-1 Material Storage




- Cover and contain
- Keeps site clean
- Avoids potential sampling



WM-8 Concrete Waste

- Provide proper wash-out area
- Locate away from storm drain/street gutter
- Empty or provide new wash out when $\frac{3}{4}$ full





Common Site Implementation Problems

STUCCO, CONCRETE & PAINT MIXING AND STORAGE

Potential Violations



- No protection of soil
- Could get into street

STUCCO, CONCRETE & PAINT MIXING AND STORAGE

Better Practice



- Place mixers on liner with berms
- Cover, berm and contain

WASHOUT PITS

Potential Violation



- Not using washout at all
- Leaking / ineffective washout

REQUIREMENT



- Locate a designated concrete washout
 - Do not overfill

STUCCO/CONCRETE BAGS

Potential Violations



- When exposed to rain, runoff with high pH can enter storm drain

STUCCO/CONCRETE BAGS

Better Practice



- Protect soil
- Prevent contact with rain

MATERIAL BUCKETS

Potential Violations



- No contact with soil
- Use secondary containment or store in a bin, not on soil

MATERIAL BUCKETS

Better Practice



- Prevent contact with rain



LEAKING EQUIPMENT

Potential Violations



Leaks onto ground &
no clean up



Damaged drip pans



Flat oil trays



Plastic does not prevent runoff

LEAKING EQUIPMENT

Better Practice



CONSTRUCTION WASTE

Potential Violations



- Good housekeeping is critical

REQUIREMENT

- Cover trash cans/bins when storm is predicted
- Empty at least every week



DIRT TRACKING

Potential Violations



- Dirt tracked onto streets
- Inadequate/missing stabilized entrances

DIRT TRACKING

Better Practice



- Stabilized lot & site entrances
- Gravel & plates free of excessive dirt
- Do not avoid stabilization measures – use them!

REQUIREMENT

If dirt is tracked out, contractor must clean up immediately



STOCKPILE MANAGEMENT

Potential Violations



- Improper placement
- No measures to prevent material discharges

STOCKPILE MANAGEMENT

Better Practice



- Provide perimeter protection
- Cover for long periods or before rain events



INLET PROTECTION

Potential Violations



- Damaged devices or no protection at all

INLET PROTECTION

Potential Violations



- Damaged devices – lack of maintenance

INLET PROTECTION

Better Practice



- Use products properly
 - Actively maintain
- Prevent damage to devices
- Prevent pollutants from entering inlets

SAWCUTTING

Potential Violation



Discharge to
gutter/storm drain

Better Practice



- Vacuum saw cut slurry
 - Away from concentrated flow paths
- Dispose based on local requirements

SECONDARY CONTAINMENT

Potential Violations



- Storage of fuel/oils
- Improper storage
- No containment

SECONDARY CONTAINMENT

Better Practice



- Do not store fuel on site, OR
- Use proper secondary containment

SITE PERIMETER

Potential Violations



- No protection
- Damaged / ineffective protection

SITE PERIMETER

Better Practice



- Proper controls & placement
- Well-maintained

SLOPES & PADS

Potential Violations



- Inactive/completed areas with no EC applied

SLOPES & PADS

Better Practice



- Completed / inactive areas protected with EC

SILT FENCE

Potential Violations



- Poor installation
- Lack of maintenance

Miss-application of Silt Fence



SILT FENCE

Better Practice



- Proper installation
- Maintained

EQUIPMENT WASHING

Potential Violations



- Not contained
- Non-storm water discharge

EQUIPMENT WASHING

Better Practice



- Use designated washout areas
- Empty washout when 75% full

PORTABLE TOILETS

Potential Violation



- Avoid placement in street gutter / flow areas

PORTABLE TOILETS

Better Practice



- Placed out of gutters and flow paths

STREETS & SIDEWALKS

Potential Violation



- Clean regularly – dry sweep or vacuum
- No water unless runoff directed away from drain inlets to pervious areas

STREETS & SIDEWALKS

Better Practice



- Well maintained



Good or Bad?



Good and Bad...



Good and Bad Examples



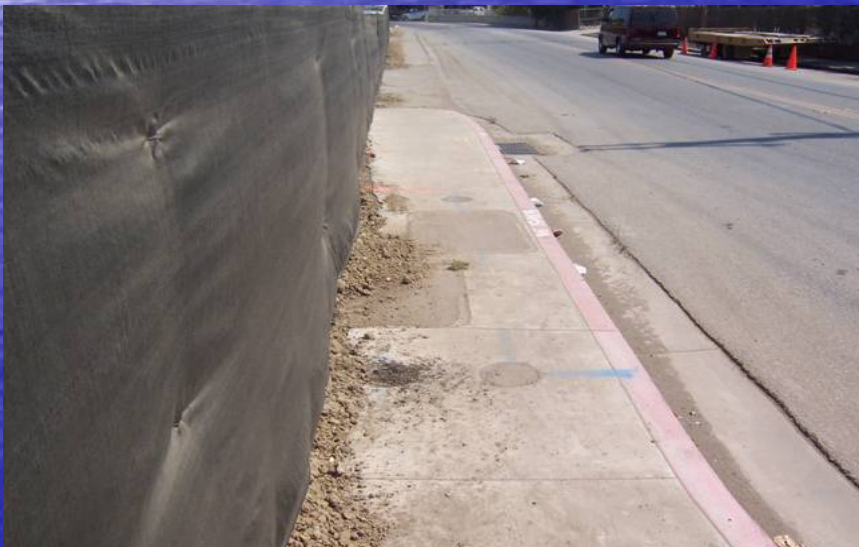
No BMPs



No/Poor BMPs



No BMPs



Spot the Problem



Continued...



What are the consequences of non-compliance?



- State Water Board may fine for Permit violation, incomplete reporting, unpermitted discharge, etc.
 - Up to \$10,000 per day plus \$10 per gallon of discharge
 - Many mandatory minimum penalties are \$3,000 per violation
 - Municipality may be fined up to \$32,500 per violation per day
- 2000: \$532,000 EPA fine to municipality for “failing to curb erosion”
- 2001: \$400,000 EPA fine to homebuilder for “...no SWPPP...and (non-stormwater) discharge to sensitive habitat...”
- 2008: \$4.3 million EPA fine to four homebuilders for “failing to control runoff from construction sites” (four residential projects in San Jose referenced in ruling)

Pop Quiz!

Not following NPDES rules
could cost the Project Owner:

- a. \$5,00 per day, per violation
- b. \$20,500 per day, per violation
- c. \$32,500 per day, per violation
- d. \$50,000 per day, per violation

ANSWER:

- c. \$32,500 per day, per violation

Sites Less Than 1 Acre

Blueprint for a Clean Bay

Best Management Practices to Prevent Stormwater Pollution from Construction-Related Activities



The Bay Area Stormwater Management Agencies Association (BASMAA), a consortium of Bay Area municipalities from Alameda, Contra Costa, Marin, San Mateo, Santa Clara, Solano, and Sonoma Counties, developed this booklet as a resource for all general contractors, home builders, and subcontractors working on construction sites.

Blueprint for a Clean Bay

Erosion Prevention and Sediment Control

- Prevent erosion
- Control sediment

General Site Maintenance

- Prevent spills and leaks
- Clean up spills immediately after they happen
- Store materials under cover
- Cover and maintain dumpsters
- Collect and properly dispose of paint removal wastes
- Clean up paints, solvents, adhesives, and cleaning solutions properly
- Keep fresh concrete and cement mortars out of gutters, storm drains, and creeks
- Service and maintain portable toilets
- Dispose of cleared vegetation properly

Small Urban & Single Family Construction Site BMPs



- Perimeter Controls
- Tracking Controls
- Building Materials Storage
- Liquid Storage
- Dirt & Grading
- Washout Areas
- Equipment
- Concrete Trucks
- Curb Inlet Protection

PERIMETER CONTROLS

- Silt Fence



- Gravel Bags



- Straw Wattles



- Improper placement
- Avoid running over with equipment
- Keep absorbent materials or w/d vacuum for spills

TRACKING CONTROLS

- Tracking Plate & Coarse Gravel



- Keep Equipment Out



- At all entrances/exits
- Gravel 1" to 3" angular material
- Clean up any material tracked off site

BUILDING MATERIALS STORAGE



- Urban Sites: Shipping Containers

- All materials covered or stored in containers
- Stored onsite and within the perimeter
- Adequately covered to prevent wind erosion
- Containers fit within a couple of parallel parking spaces

WASHOUT AREAS

- Onsite materials



- Proprietary Products



- Kiddie Pools



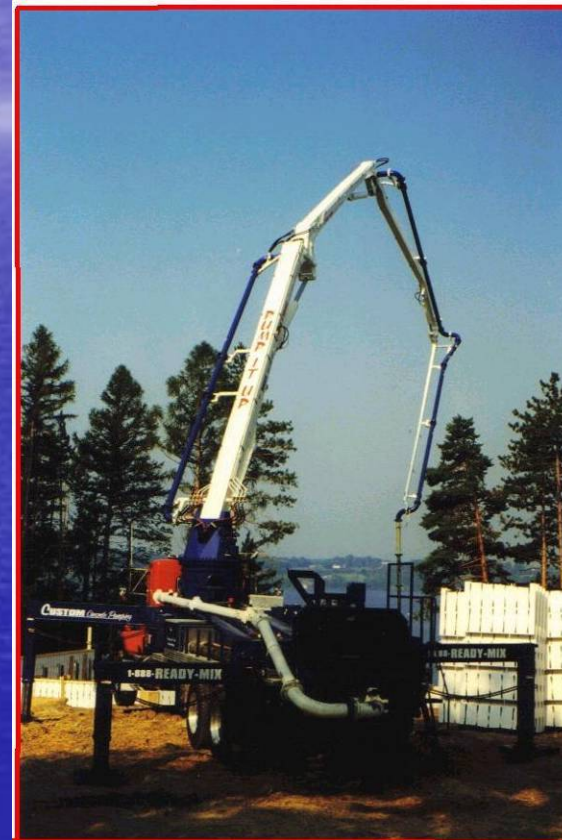
- Wet construction materials should be handled in washout area
- Liquids include paint, stucco, concrete
- Use plastic device to collect and contain liquids
- Inspect washout areas daily
- Pump out or allow to evaporate

EQUIPMENT



- Store equipment with perimeter controls
- Place drip pans under earth moving equipment when not using
- Cover all dumpsters when not using
- All portable toilets must have drip pans
- Urban sites create offsite areas or use perimeters around equipment stored on street

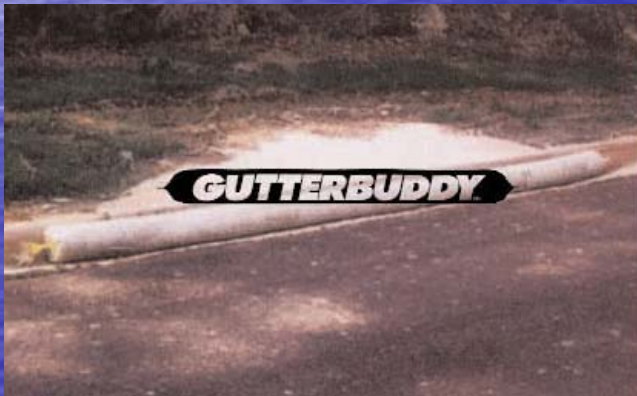
CONCRETE TRUCKS/PUMPEERS



- Must be surrounded by perimeter controls
- Tarps should be placed under pumper during operation
- Residual areas must be cleaned up
- Use washout areas for clean up

Curb Inlet Protection

- Gravel Bags/
Filter Fabric
- Proprietary



Single Family Residence Examples



Single Family Residence Examples



Single Family Residence Examples



Single Family Residence Examples



Single Family Residence Examples



Single Family Residence Examples



Single Family Residence Examples



Single Family Residence Examples



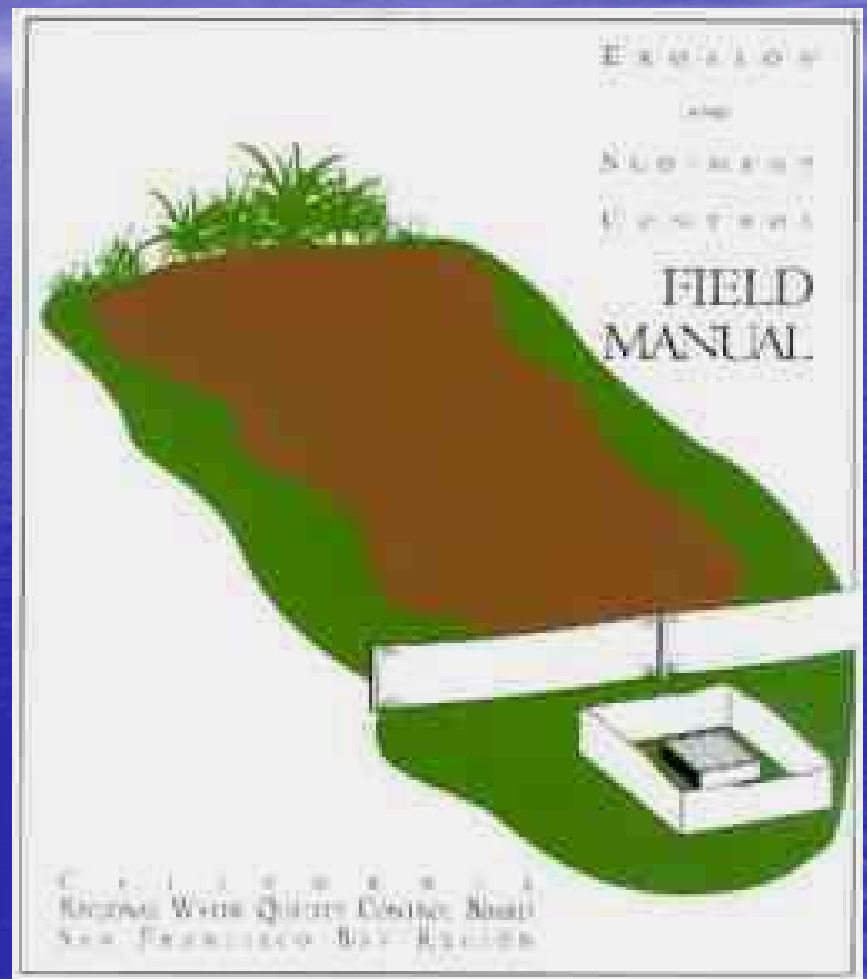
SWPPP References



The cover features three vertical panels of illustrations: a construction site with a building under construction, a construction site with a large excavation and equipment, and a cross-section of a trench with a concrete lining. Below these panels is a small black box with white text. The title 'GUIDELINES FOR CONSTRUCTION PROJECTS' is written vertically on the right side of the cover.

California
Division of Water Quality
San Francisco Bay Area
San Francisco Bay Area
San Francisco Bay Area

GUIDELINES FOR CONSTRUCTION PROJECTS

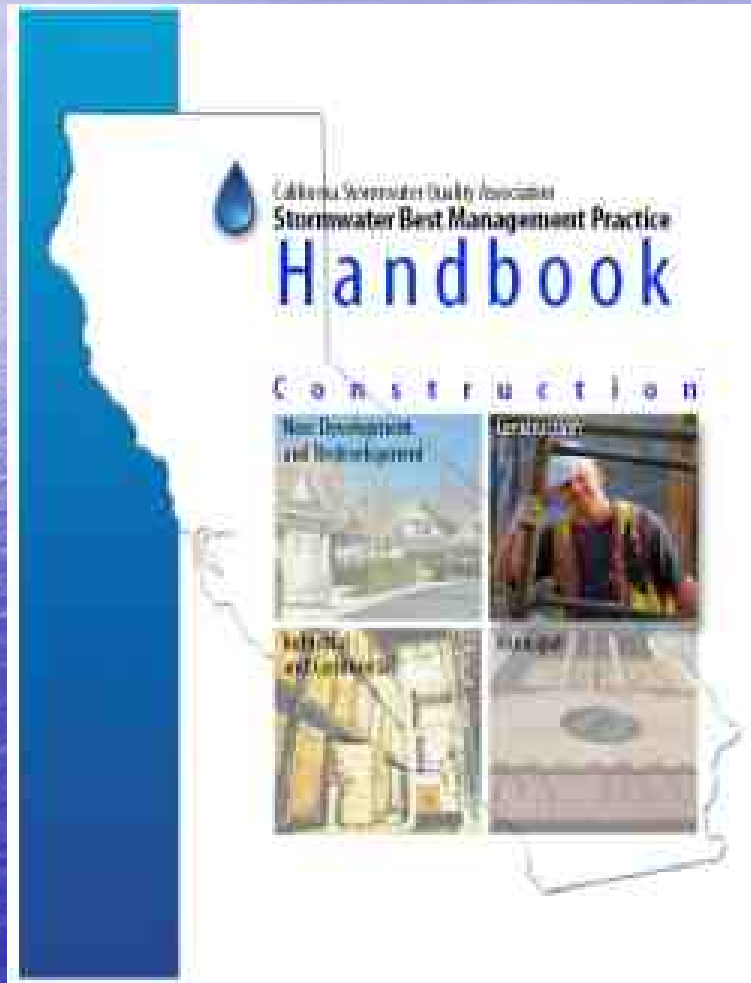


The cover features a large illustration of a cross-section of a hillside with green grass on top and a brown soil layer. A white rectangular box is shown at the base of the hill, with a small square object inside it. The title 'FIELD MANUAL' is written in large letters on the right side of the cover. At the bottom, there is text identifying the publisher as the California Water Quality Control Board, San Francisco Bay Region.

FIELD MANUAL

California Water Quality Control Board
San Francisco Bay Region

Best Management Practices (BMPs) References



Blueprint for a Clean Bay

Best Management Practices to Prevent Stormwater
Pollution from Construction-Related Activities

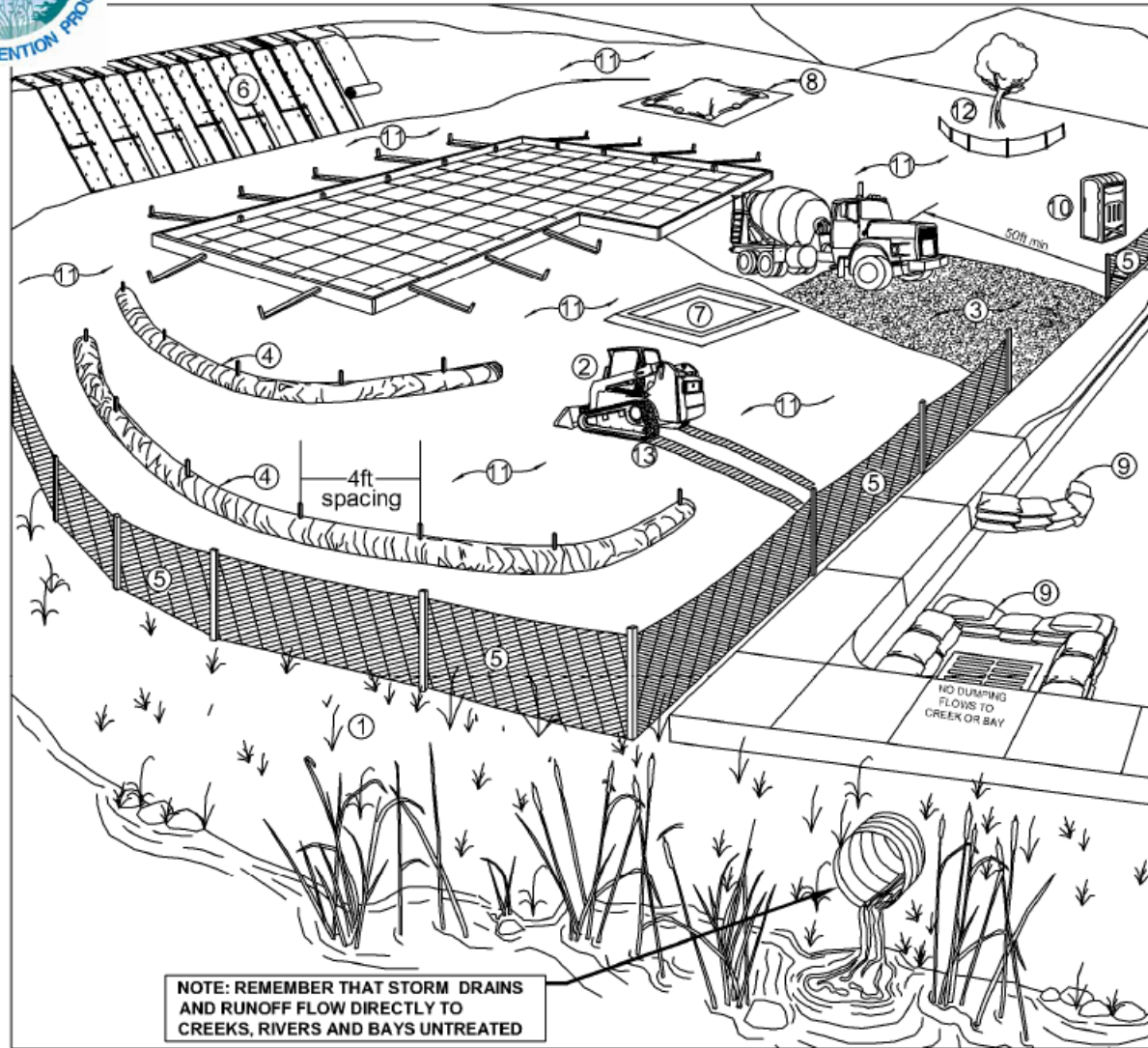


B A S M A A
Bay Area
Stormwater Management
Agencies Association



Marin County Stormwater Pollution Prevention Program

Minimum Erosion/Sediment Control Measures For Small Construction Projects



NOTE: REMEMBER THAT STORM DRAINS AND RUNOFF FLOW DIRECTLY TO CREEKS, RIVERS AND BAYS UNTREATED

Reference Locations

- CA BMP Construction Handbook:
 - www.cabmphandbooks.com
- Blueprint for a Clean Bay:
 - www.sanjoseca.gov/esd/PDFs/CleanBayBlueprint_2006.pdf
- Erosion and Sediment Control Field Manual
 - <http://store.abag.ca.gov/construction.asp#e>
- Guidelines for Construction Projects
 - <http://store.abag.ca.gov>
- Marin County Stormwater Pollution Prevention Program
 - http://www.mcstoppp.org/acrobat/MECM_final_2009.pdf
 - <http://www.mcstoppp.org/aepresources.htm>

The Goal is Clean Water

