Marin County Stormwater Pollution Prevention Program

Construction Stormwater Best Management Practices

San Rafael, California
November 12, 2015

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DISCLAIMER

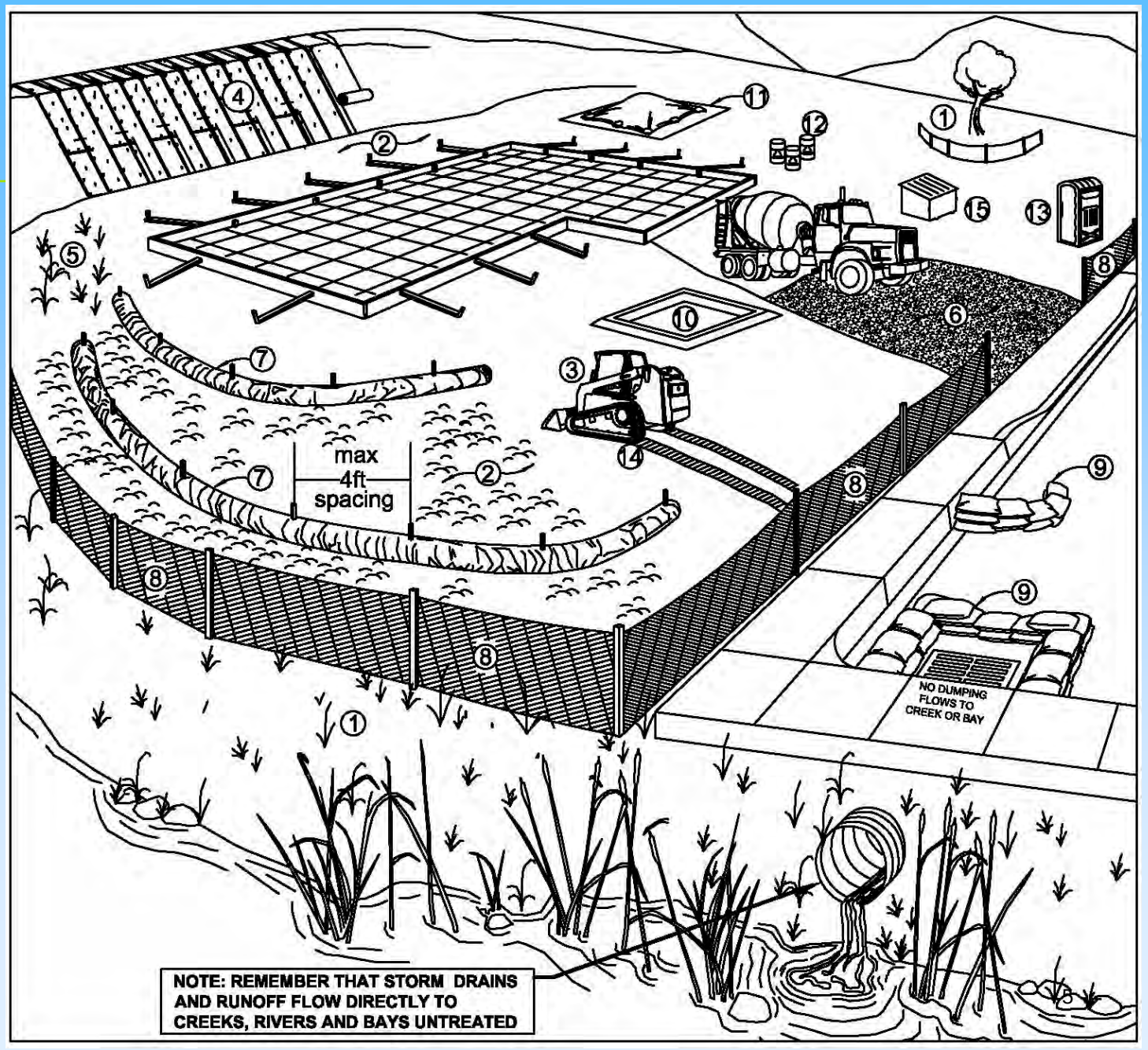
Basic principles of stormwater quality protection

- Minimize pollutant exposure
  - Don’t expose potential pollutants to wind and rain
- Protect exposed pollutants
  - Keep pollutants from being washed or blown away
- Use and maintain Best Management Practices (BMPs)
  - Procedures to minimize exposure or techniques to remove pollutants from runoff
- Use BMPs in layers to protect water quality and plan for accidents

A few common sources of water pollutants on construction sites

Material	Pollutant	Effect on Creeks
Dirt and Dust	Sediment	Fills habitat, clogs gills, impairs ability to hunt
Concrete wastewater	pH	Toxic to aquatic life
Concrete wastewater Vehicle fueling & maintenance	Metals	Toxic to aquatic life
Paints and solvents	Synthetic organic compounds	Toxic to aquatic life
Landscape trimmings and fertilizers	Nutrients	Causes algal blooms, depletes oxygen
Landscape trimmings	Biochemical oxygen demand	Depletes oxygen
Asphalt/Paving Vehicle fueling & maintenance	Oil & grease	Causes sheen, toxic to aquatic life

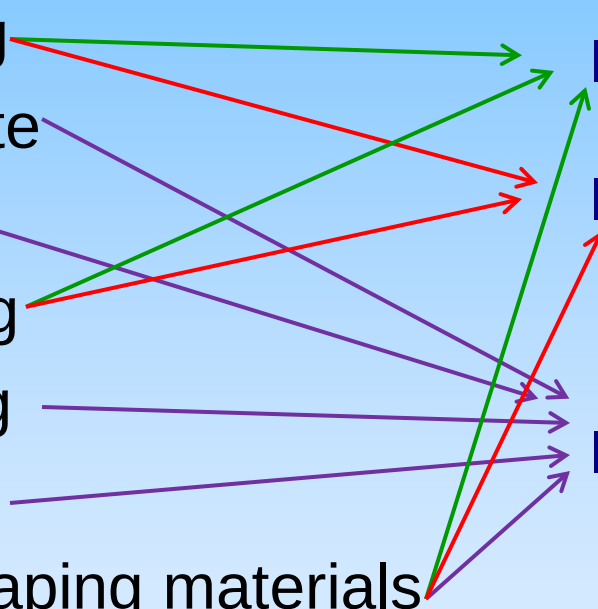
Layers of BMPs



Connecting the dots between BMPs and activities

Construction Activities

- Grading
- Concrete
- Trash
- Clearing
- Painting
- Fueling
- Landscaping materials



BMP Categories

- Erosion Controls
- Sediment Controls
- Good Housekeeping

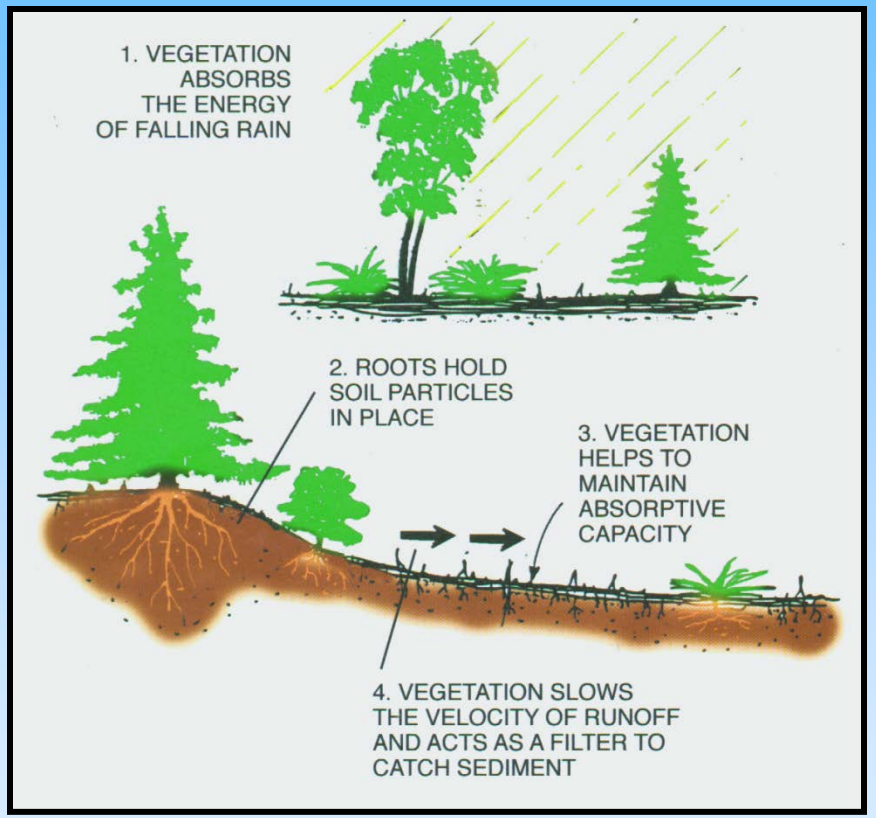
Erosion Control

- Protects soil and prevents soil particles from becoming detached by rainfall, flowing water or wind
- Soil protected as a resource
- Source controls that prevent soil from becoming a pollutant

MCSTOPPP Minimum Control Measures

Erosion Controls
Scheduling
Protect existing vegetation
Creek set backs
Soil cover
Soil preparation/roughening
Erosion control blankets
Revegetation

Benefits of vegetation



Sediment Control

- Practices that trap dirt particles – sediment – once they have been detached by rain, flowing water, or wind
  - Various practices to slow and detain water to allow sediment to settle
  - Treatment controls that remove soil from water or wind

MCSTOPPP Minimum Control Measures

Sediment Controls
Tracking controls
Fiber rolls (wattles)[1]
Silt fence[1]
Drain inlet protection
Trench dewatering
[1]Manufactured linear sediment controls

Good Housekeeping

- Source control practices that minimize exposure of construction materials and waste to rain and wind

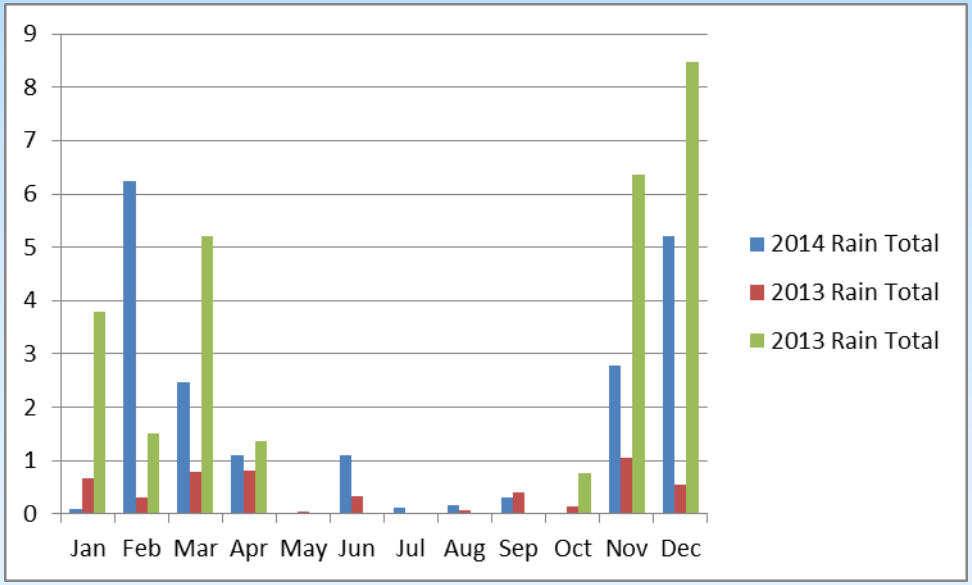
MCSTOPPP Minimum Control Measures

Good Housekeeping Practices
Concrete washout
Stockpile management
Hazardous material management
Sanitary waste management
Equipment and vehicle maintenance
Material storage
Litter and waste management

EROSION CONTROL BMPS

Scheduling

- Integrate BMP implementation with activities
  - Phase grading to limit amount of soil exposed
  - Avoid grading during rainy periods
  - Stabilize graded areas that become inactive
  - Adjust activities based on predicted weather
  - Re-vegetate during the appropriate growing conditions
  - Comply with local winter work prohibitions



Black Point Novato, Data Source UCCE

Preserve vegetation and creek setbacks

- Clear delineation
- Ideally 25+ feet from creek (or as required by local ordinance)
- Preserve existing vegetation in buffer
- Install before construction starts

Preserve vegetation

- Protect trees from construction
- Establish protective zone around drip line of tree

Soil cover

- Generic term for a variety of temporary BMPs that apply an erosion resistant cover to disturbed soil
  - Straw mulch
  - Hydraulic mulch
  - Soil binders
  - Wood mulch
  - Compost blankets
  - Non-vegetative stabilization

Track walked slope treated with hydromulch

Slope treated with hydromulch

Compost blankets

- Pneumatic blower typically used to place compost
- Roughen surface before application
- 1-4-inches thick
- Seed can be incorporated
- Slopes 2:1 or gentler
  - Tackified on steeper slopes

Soil preparation and roughening

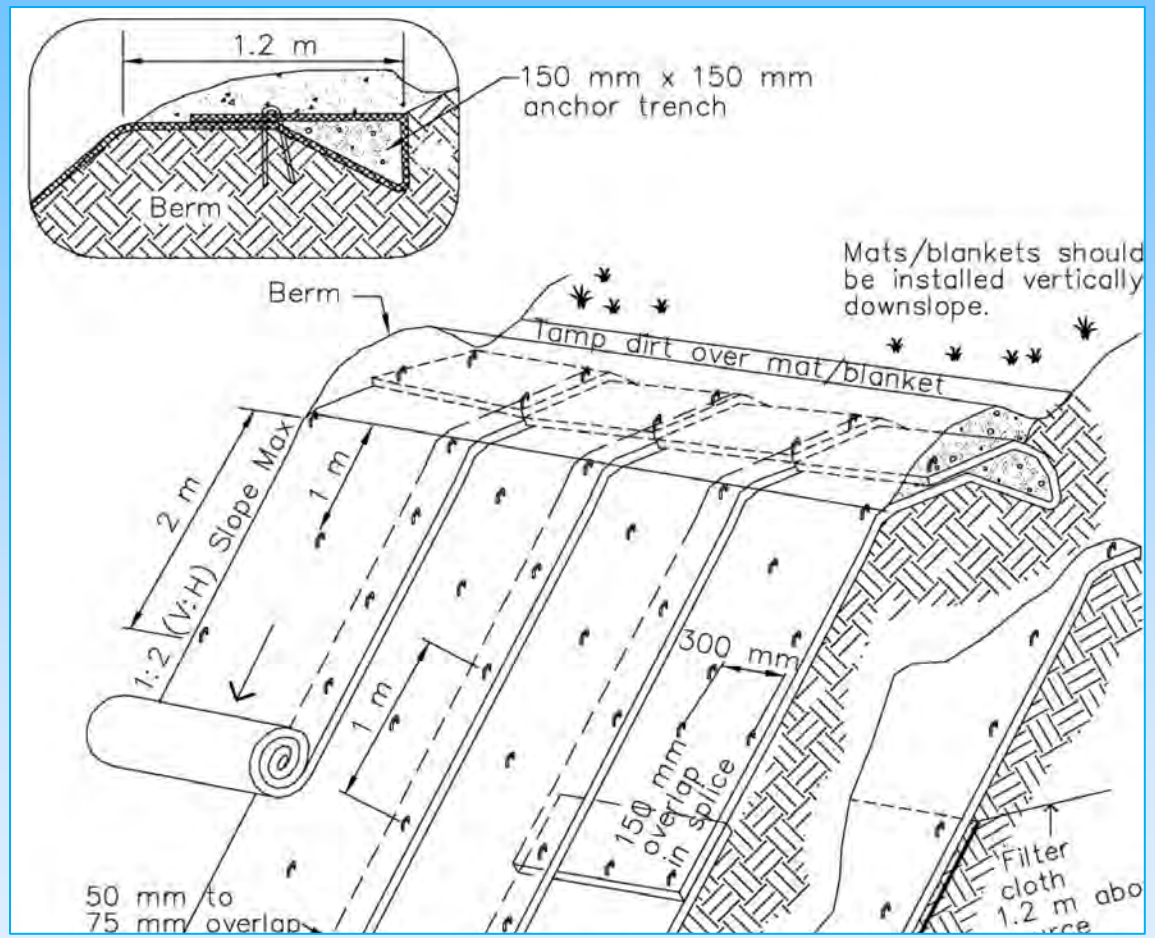
- **Soil Preparation** includes raking, tilling, and incorporation of soil amendments to foster growth
  - Typically part of the establishment of permanent vegetation
- **Soil Roughening** includes track walking, stair stepping, decompacting soil to increase its resistance to erosion
  - Employed for both temporary erosion control and permanent vegetation
  - Used with soil cover and erosion control blankets

Comparison of smooth and track walked slopes

Smooth compacted slope little opportunity for vegetation to take hold

Lots of pockets to catch water, soil, and seed

Erosion control blankets



- Anchor top to secure blanket and prevent undercutting
- Install vertically downslope
- Overlap (shingle) panels
- Staple to secure to soil
- Do not stretch blanket

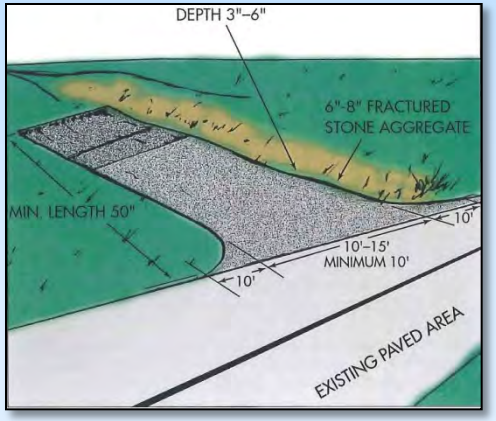
Wildlife friendly products

- Avoid erosion and sediment control products that contain plastic nets (fixed aperture)
  - Never use products that contain plastic nets for any BMP that will be part of the final stabilization
- Use BMPs made of natural material without plastic nets

SEDIMENT CONTROL

Tracking control

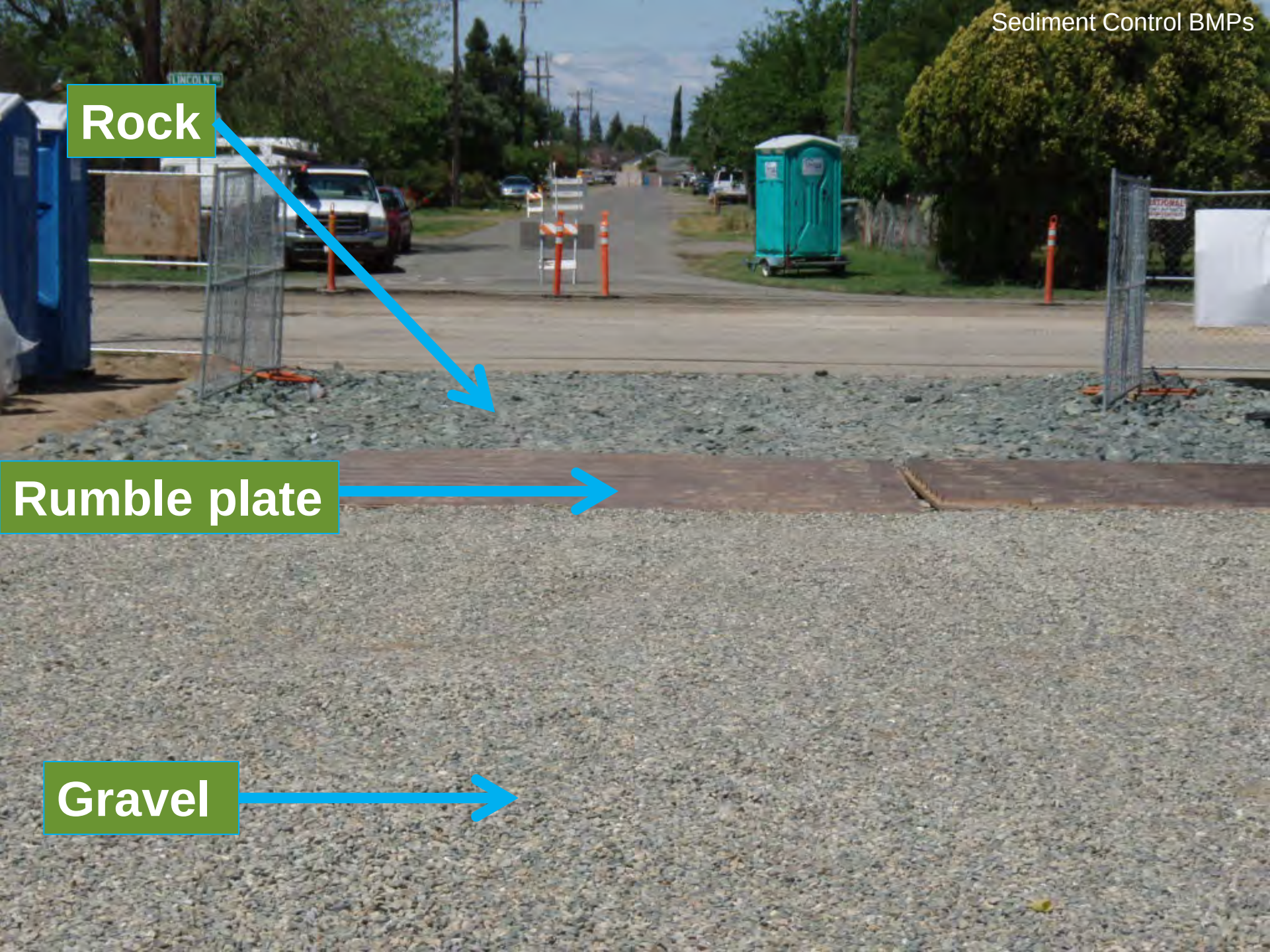
- A system of practices to minimize dirt from the project getting onto the roads and subsequently washed into storm drains
  - Stabilized entrance
  - Sweeping
  - Access restrictions
    - Limit access to stabilized entrance – no short cuts
    - Limit access to necessary vehicles only
  - Tire wash (optional, as needed)



Stabilized entrance/exit

- Size based on size of vehicles that will access site, bigger tires need longer entrances
  - Typical BMP fact sheets are based on large trucks
- Marin BMP adapted for smaller sites assuming light trucks would be the typical vehicle
  - On smaller sites, install maximum length site can accommodate
  - Install to allow two full rotations of tires on the entrance material
  - Augment with rumble pads or racks
  - Consider graveling access area/road


Rumble plate
Rock


Rock
Rumble plate
Gravel

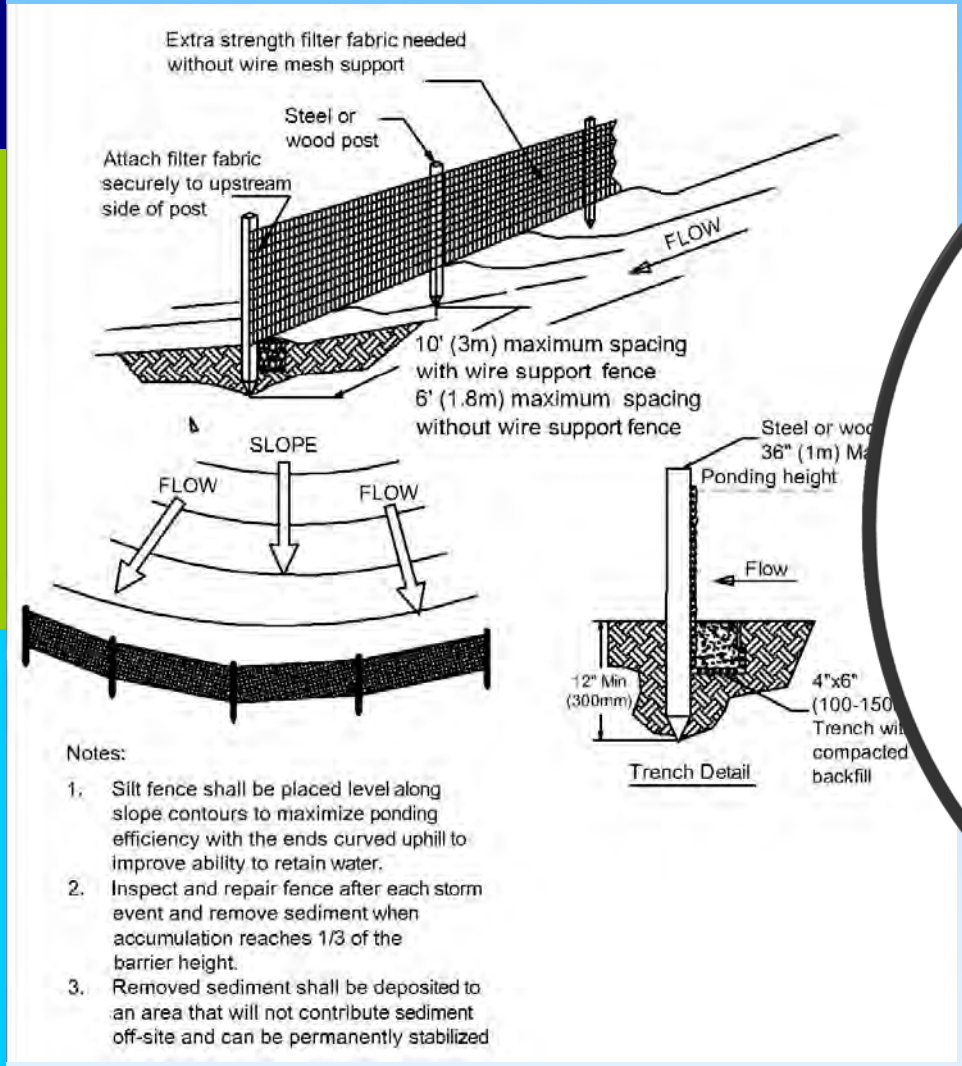
Fiber rolls (wattles) Type 1 installation

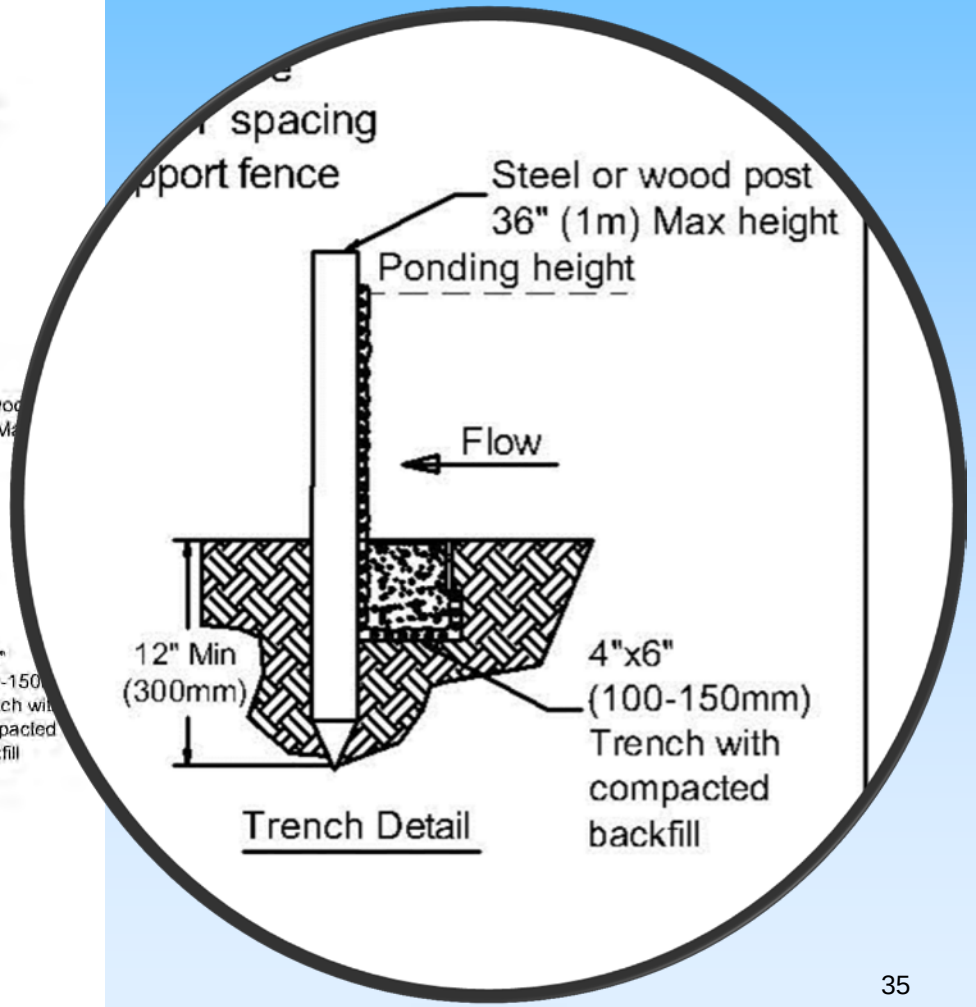
- Wattles with plastic nets must be removed.
- Use for temporary sediment control only!

- Install in shallow trench
- Stakes through wattle hold wattle to the soil

Fiber rolls (wattles)
Type 2 installation

Silt fence – pay attention to the trench





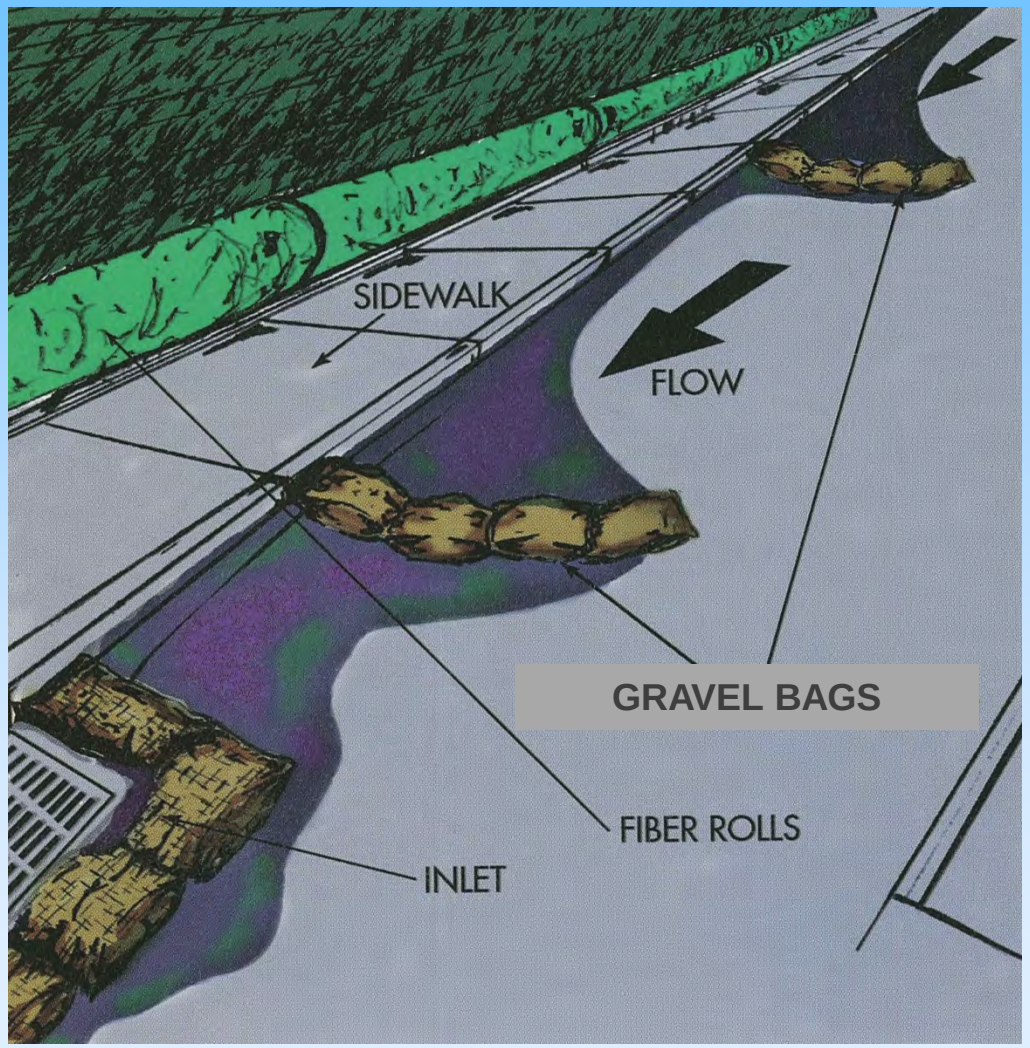
Tug test

Drain inlet protection last line of defense

- Never use silt fence material to cover an inlet

- Protect drains on-site and immediately off-site
- Use woven geotextile bag
  - Resistant to photo degradation
- Fill bags with washed **gravel**
  - **NOT SAND**
  - **NOT DIRT**
  - **NOT ASPHALT**

Setting up a treatment train to the drain



Storm drain inlet protection

J-hook check dam along the flow path

Protection at the drain

GOOD HOUSEKEEPING

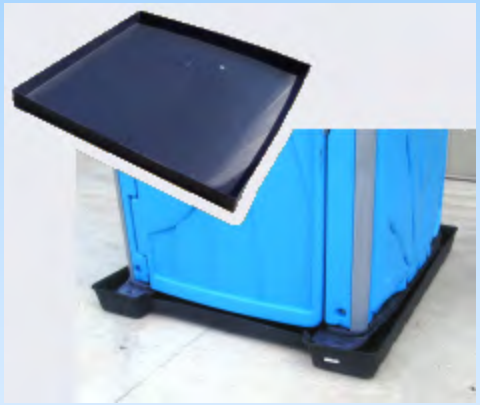
Concrete washout

Stockpile management

Hazardous materials management

Sanitary facilities

- … what is missing?



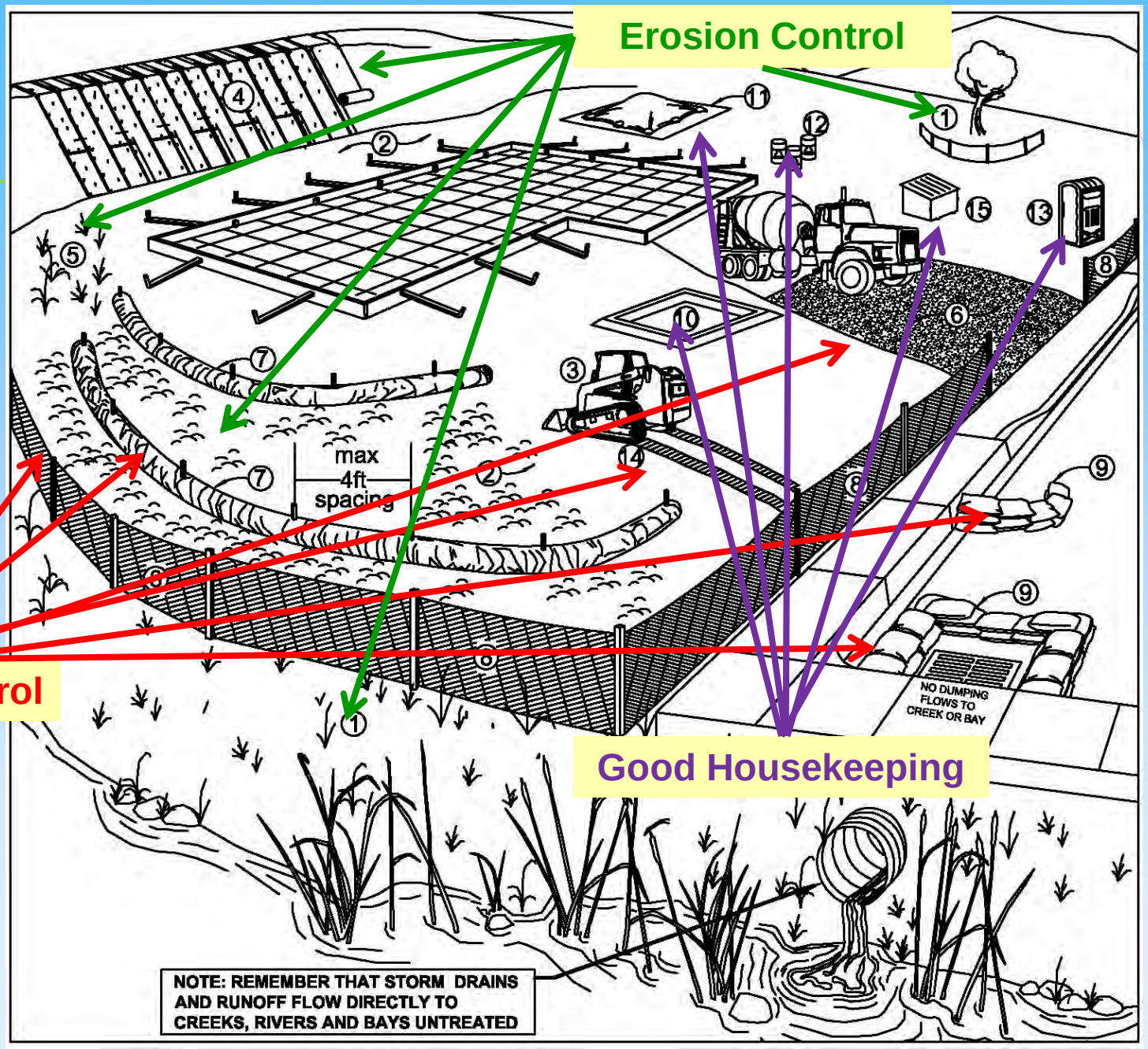
Secondary Containment Pans
Stormwater Pollutant Protection

Equipment and Vehicle Maintenance

- Avoid conducting maintenance at the job site
- Use drip pans, absorbent pads, and tarps to contain drips
- Clean up small spills and drips immediately

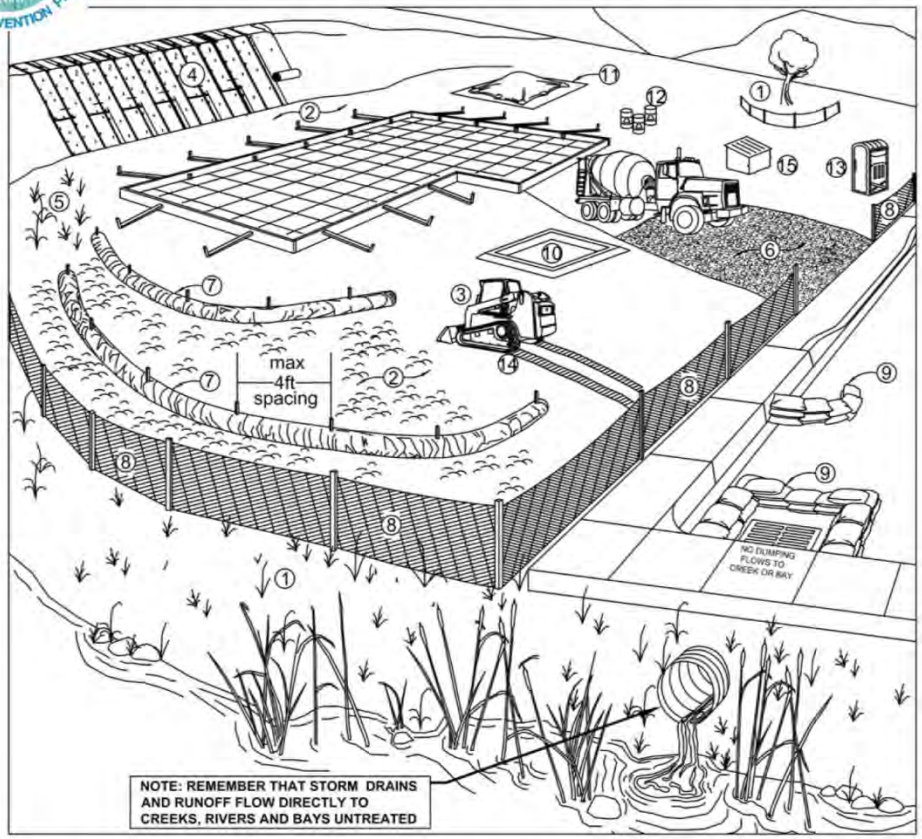
Waste and litter management

Layers of BMPs



Marin County Stormwater Pollution Prevention Program

Minimum Control Measures
For Small Construction Projects



Erosion Controls	Sediment Controls	Good Housekeeping
NS Scheduling	6. Tracking Controls	10. Concrete Washout
1. Preserve Vegetation & Creek Set Backs	7. Fiber Rolls	11. Stockpile Management
2. Soil Cover	8. Silt Fence	12. Hazardous Material Management
3. Soil Preparation/ Roughening	9. Drain Inlet Protection	13. Sanitary Waste Management
4. Erosion Control Blankets	NS Trench Dewatering	14. Equipment and Vehicle Maintenance
5. Revegetation		15. Litter and Waste Management

NS=not shown on graphic

Note: Select an **effective combination of control measures from each category**, Erosion Control, Sediment Control, and Good Housekeeping. Control measures shall be **continually implemented and maintained throughout the project** until activities are complete, disturbed areas are stabilized with permanent erosion controls, and the local agency has signed off on permits that may have been required for the project. **Inspect and maintain the control measures** before and after rain events, and as required by the local agency or state permit.
More detailed information on the BMPs can be found in the related California Stormwater Quality Association (CASQA) and California Department of Transportation (Caltrans) BMP Factsheets. CASQA factsheets are available by subscription in the *California Best Management Practices Handbook Portal: Construction* at http://www.casqa.org. Caltrans factsheets are available in the *Construction Site BMP Manual March 2003* at http://www.dot.ca.gov/hq/construc/stormwater/manuals.htm.
Visit www.mcstoppp.org for more information on construction site management and Erosion and Sediment Control Plans.

If you require materials in alternative formats, please contact:
415-473-4381 voice/TTY or disabilityaccess@co.marin.ca.us

MCSTOPPP Minimum Control Measures

* Appendix in Applicant Package

Protect Creeks and the Bay: Keep Sediments and Contaminated Water out of the Storm Drain System

MARIN COUNTY STORMWATER POLLUTION PREVENTION PROGRAM
Best Management Practices for TRENCH DEWATERING

Requirements for Dewatering Discharges from Minor Street Excavations

- The Federal Clean Water Act, the California Water Code, and local ordinances **prohibit** non-stormwater discharges to the storm drain system.
- Non-stormwater discharges include water that is actually or potentially contaminated with any pollutant, including, but not limited to, sewage, grease, drilling mud and oil.
- Uncontaminated pumped groundwater or accumulated rainwater may be discharged to the storm drain system but must be managed to minimize sediment reaching storm drains and ensure downstream creeks, wetlands, and the Bay are not polluted.
- The storm drain system includes streets, gutters, storm drain inlets, ditches, creeks, and wetlands.

IF YOUR SITE OR PROJECT REQUIRES DEWATERING, CONTACT YOUR LOCAL STORMWATER COORDINATOR BEFORE DISCHARGING WATER TO THE STORM DRAIN SYSTEM. *CONTACT INFORMATION ON THE REVERSE PAGE.*

As necessary, local municipal staff will determine whether flows from dewatering a particular excavation may be discharged to the storm drain system and what measures must be taken to reduce sediment in the discharge.

Depending on circumstances, holders of encroachment or building permits may be directed to use one or more of the following measures:

- Avoid the discharge. Disperse pumped water to a level dirt or landscaped area to allow infiltration or use for dust control. Be sure to prevent damage to landscaping.
- Build a sediment trap (temporary basin formed by excavation or earthen embankment across a low drainage area to detain sediment-laden runoff and allow sediment to settle out before discharging).
- Use a mobile weir tank, dewatering tank, or sand filter (follow vendor instructions).
- At minimum, use a gravity bag filter (dewatering bag) or similar filtration device (follow vendor instructions).

Odors, discoloration, or an oily sheen can indicate contaminants in the water. Dewatering discharges containing contaminants may need to be captured and treated or hauled to a suitable disposal site.

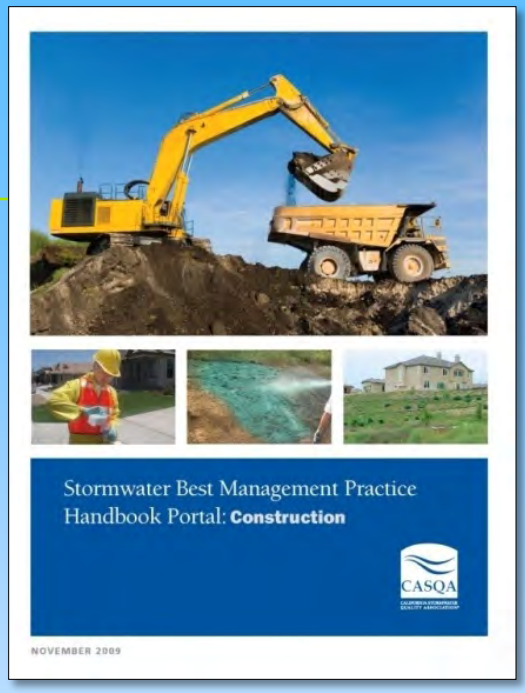
Some dewatering discharges require a National Pollutant Discharge Elimination System (NPDES) permit from the San Francisco Bay Regional Water Quality Control Board (RWQCB). For more information, call the RWQCB or visit their website:
Phone: 510-622-2300
Web: http://www.waterboards.ca.gov/sanfranciscobay/npdes_gen_permit.shtml

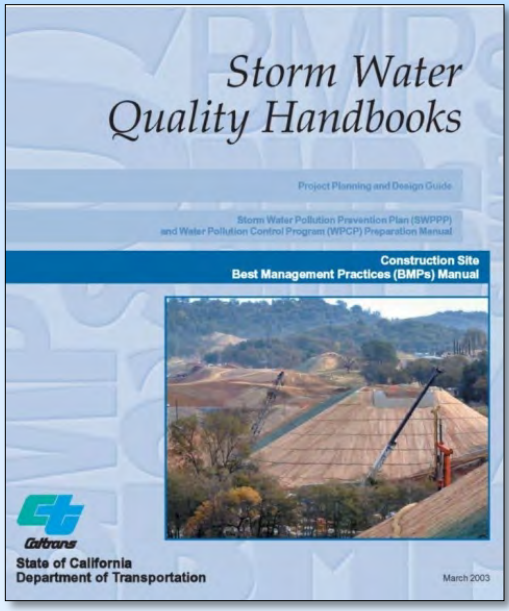
MCSTOPPP Trench Dewatering BMPs

*Appendix in Applicant Package

Where to get more BMP info

- CASQA California BMP Handbook, Construction
  - www.casqa.org
- Caltrans Stormwater Quality Handbook, Construction Site BMP Manual
  - **http://www.dot.ca.gov/hq/construc/stormwater/manuals.htm**
- Erosion and Sediment Control Field Manual
  - San Francisco Bay Regional Water Quality Control Board (2002)
    - Out of print






Questions