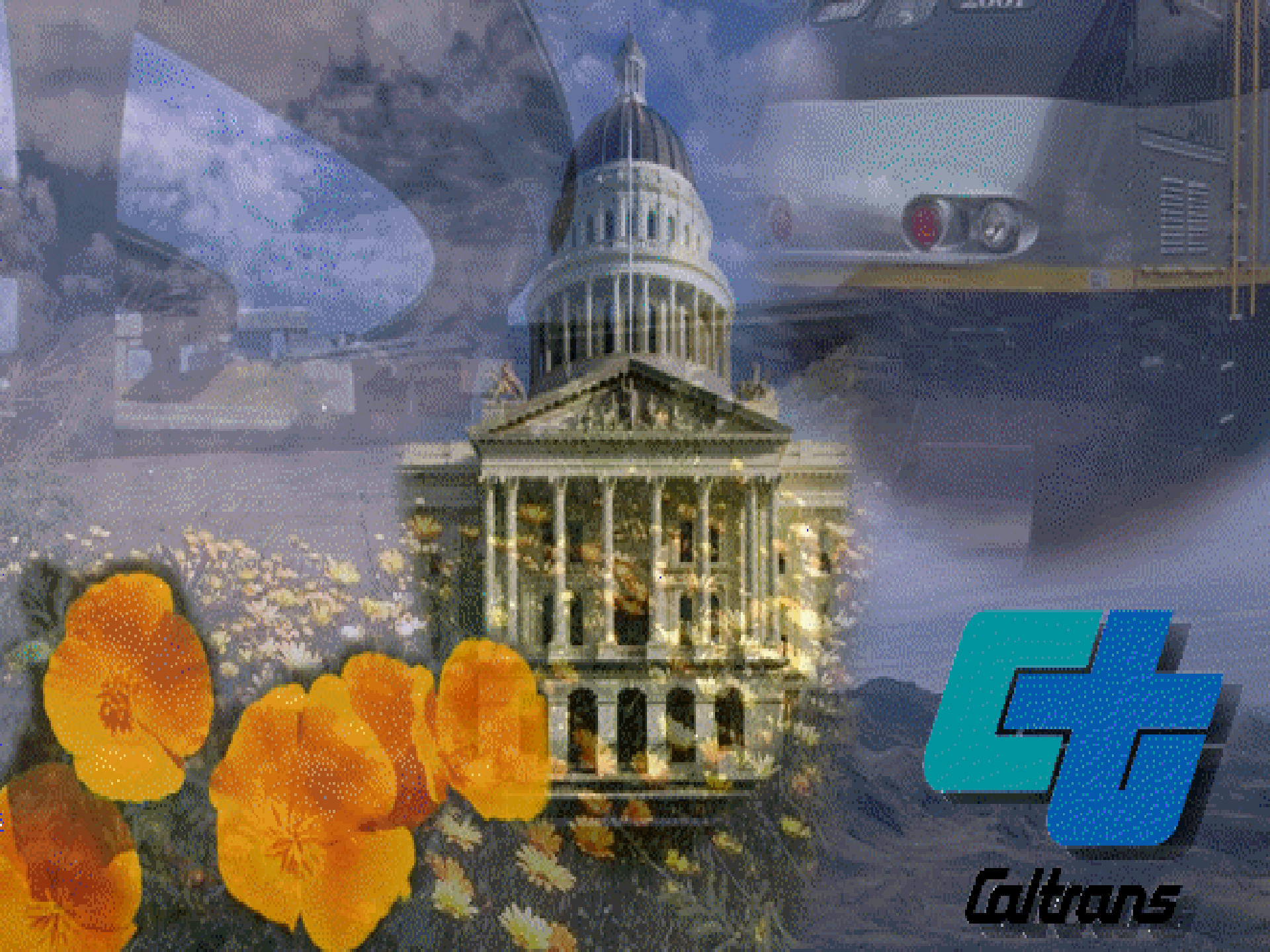

Caltrans

BEFORE WE START

- PLEASE SET YOUR PAGERS AND CELL PHONES ON VIBRATE
  - * # 9 ALL
- CLASS CHARGE CODES
  - AUTHORIZATION
    - 912076
  - SPECIAL DESIGNATION
    - G0C001
  - ACTIVITY
    - 2059

Construction Academy (AKA "Boot Camp")

Caltrans

Construction Academy Curriculum

Introduction Introduction, Vision, Mission, Goals

Implementation Reporting Contractor's Activities

Control of Materials Entering the Work

Interaction Human Relations

Preparation of Pay Documents

Administrative Issues

Investigation

Environmental Issues

Introductions

- Name, work location, and position
- What environmental issue have you been involved with lately?

Environmental Issues

- Objectives
- Water Pollution Control
- Other Environmental Issues
- Archeological Site
- Summary

Objectives

- The participant will learn:
  - How to identify environmental issues
  - Correct and Incorrect BMP Installations
  - Understand the environmental requirements, policies, and laws that pertain to Caltrans Construction activities

Section 1:
Water Pollution Control

Glossary

- **BMP** - Best Management Practice
- **CPD** – Construction Procedure Directive
- **CSWC** – Construction Storm Water Coordinator
- **EPA** - Environmental Protection Agency
- **NPDES** - National Pollutant Discharge Elimination System
- **NRDC** -Natural Resources Defense Council
- **RWQCB** - Regional Water Quality Control Board

Glossary

- **SAP** – Sampling and Analysis Plan
- **WPCP** - Water Pollution Control Program
- **SWMP** - Storm Water Management Plan
- **SWPPP** - Storm Water Pollution Prevention Plan
- **SWRCB** - State Water Resources Control Board
- **SWTF** - Storm Water Task Force

Introduction

- .What are the two primary factors that impact waters adjacent to construction sites?
  - Visible Pollutants: Sediment, PCC, Petroleum
  - Non-Visible Pollutants: Solvents, Acids, Fertilizers

Introduction

Construction Site Pollutants

Erosion and Sedimentation

Construction Wastes

Introduction

- One gallon of oil has the potential to contaminate up to one million gallons of water

StormWater/CleanWater protection program

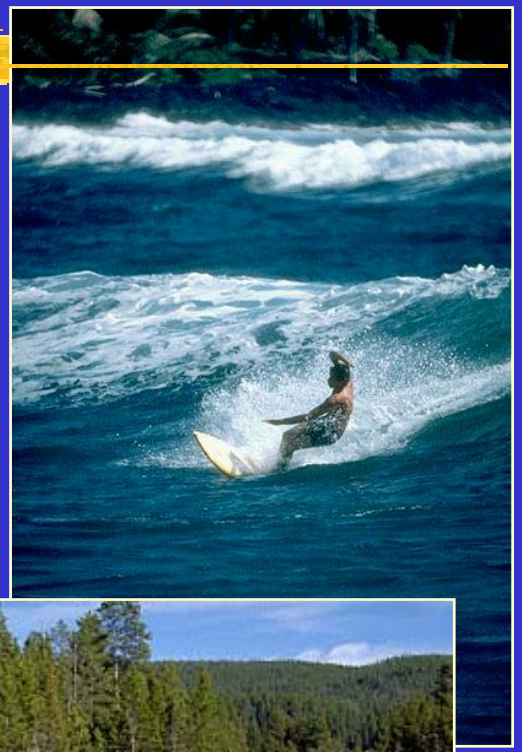
Introduction

- Forty percent of all U.S. waters are not fishable or swimmable, according to the U.S. EPA

- "Even a partial accounting shows that hundreds of millions of dollars are lost each year….due to urban stormwater pollution"

  Natural Resources Defense Council

Introduction



Water Pollution Prevention

- Overall Purpose
  - To Reduce Potential Environmental and Human Health Impacts
  - Comply with State and Federal Laws

Introduction

- Sediment, the most common pollutant washed from construction sites, clogs the gills of fish, blocks light transmission and increases ocean water temperature …..harming aquatic life, and disturbing the food chain

Introduction

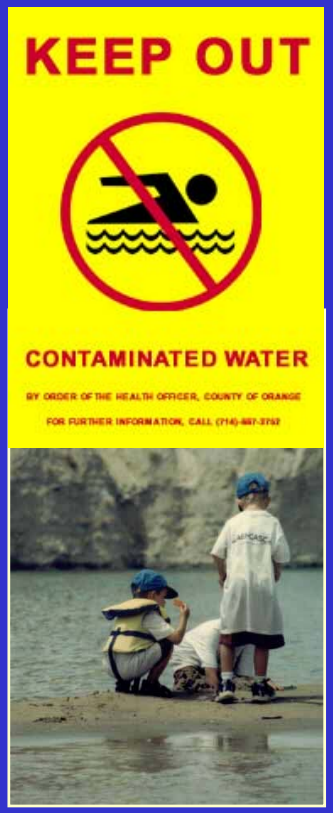
- Construction site erosion can be 10 to 1,000 times greater than nature's erosion process

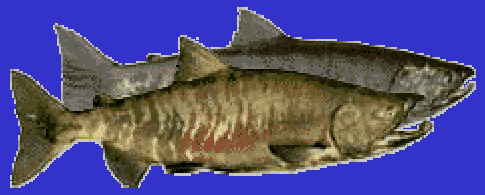
  Ohio Department of Transportation

Introduction

Why should we care

- The effects of water pollution are not only devastating to people but also to animals, fish, and birds
- Polluted water is unsuitable for drinking, recreation, agriculture, and industry. It diminishes the aesthetic quality of lakes and rivers
- Contaminated water destroys aquatic life and reduces its reproductive ability
- Nobody can escape the effects of water pollution





Introduction

Construction Site Water Pollution Prevention helps to

- Minimize the Potential Impact that Construction Activities may have on Water Bodies and Protect their Beneficial Uses for Future Generations

The Laws

- 1972 Federal Clean Water Act (CWA)
  - Amend to Prohibit Any Discharge of Pollutants from a Point Source, NPDES
- 1987 Amendments to the CWA
  - Added Section 402(p) Establishing the Framework for Regulations Regarding Municipal and Industrial Discharges
- 1990 EPA Published Final Regulations
  - Established Permit Requirements for Storm Water Discharges Associated with Industrial (Including Construction) Activities
- 1992 California's General Permit was Adopted
  - Established Requirements for Discharges Associated with Construction Activities
- 1999 Caltrans NPDES Permit was issued –03 Permit
- California's Porter Cologne Water Quality Control Act

The Laws

- General Construction Permit CAS000002 - The ‘02 permit
- Caltrans NPDES Permit CAS000003 - The ‘03 permit

  - The 02 Permit was amended in 2001 to include water quality monitoring
  - The 03 Permit requires that Caltrans’ construction program complies with the General Construction Activity Permit for construction sites that disturb (1) acre or more
  - Both permits can be viewed and downloaded from the State Water Resources Control Board website, www.swrcb.ca.gov

The Law

- Discharge of polluted storm water, into waters of the U.S. is prohibited
- The National Pollutant Discharge Elimination System (NPDES) permit regulate discharges to waters of the U.S.

The Law

- Coverage under General Permit is obtained by filing a Notification of Construction (NOC) with SWRCB
  - NOC must be submitted at least 30 days prior to construction
  - Should be provided in RE pending file
    - If not, RE must submit

Who Enforces These Laws?

- EPA
- SWRCB / RWQCB
- Other Agencies

- **Private Citizens**
  - NRDC
  - Baykeepers
  - Other Watchdog
  - Groups

What If We Don't Comply?

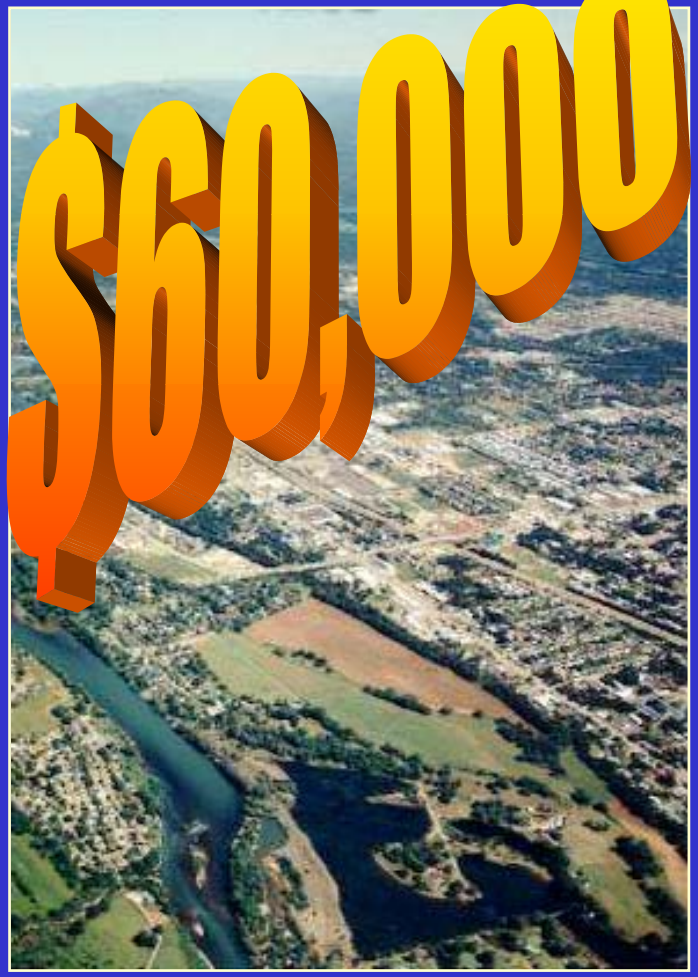
- Fines to $27,500 Per Day – Per CWA
- Fines to $15,000 Per Day and $20 a gallon – Per Porter Cologne Act
- Current Regulatory Atmosphere
  - Violators will be held accountable

Violation and Order for Compliance 1998 District 7

- "…excessive amounts of sediment to the storm drain…"
- "…discharge of false work and miscellaneous construction debris to ...Creek and ... River."
- " A sheen of fuel floating on the storm water ... 40 feet from a drain inlet."

Violation and Order for Compliance 2000 Home Builder…Redding

- "No effective erosion control and minimal sediment control measures…."
- Notes:
  - EPA visited the site in 1998 and 1999
  - RWQCB issued two prior violation notices that went unheeded



Violation and Civil Liability 2002 District 3

- "…one day…discharge of waste material and/or fill material within the 100-year floodplain of a surface water…"
- "…fifteen days of failure to implement soil stabilization measures identified in the SWPPP…"
- "…one day of failure to adequately winterize site prior to…precipitation…"
- "…seven days of …failing to winterize the project area…"
- "…four days of continued earth-disturbing activities beyond the expiration of the grading deadline…"

Violation and Civil Liability 2002 District 3

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- "…four days of continued earth-disturbing activities beyond the expiration of the grading deadline…"

$110,500

Violation and Order for Compliance 2001 Home Builder…Central Valley

- No SWPPP
- Non-compliance for two years
- Discharge to a sensitive habitat

Violation and Order for Compliance 1998 District 11

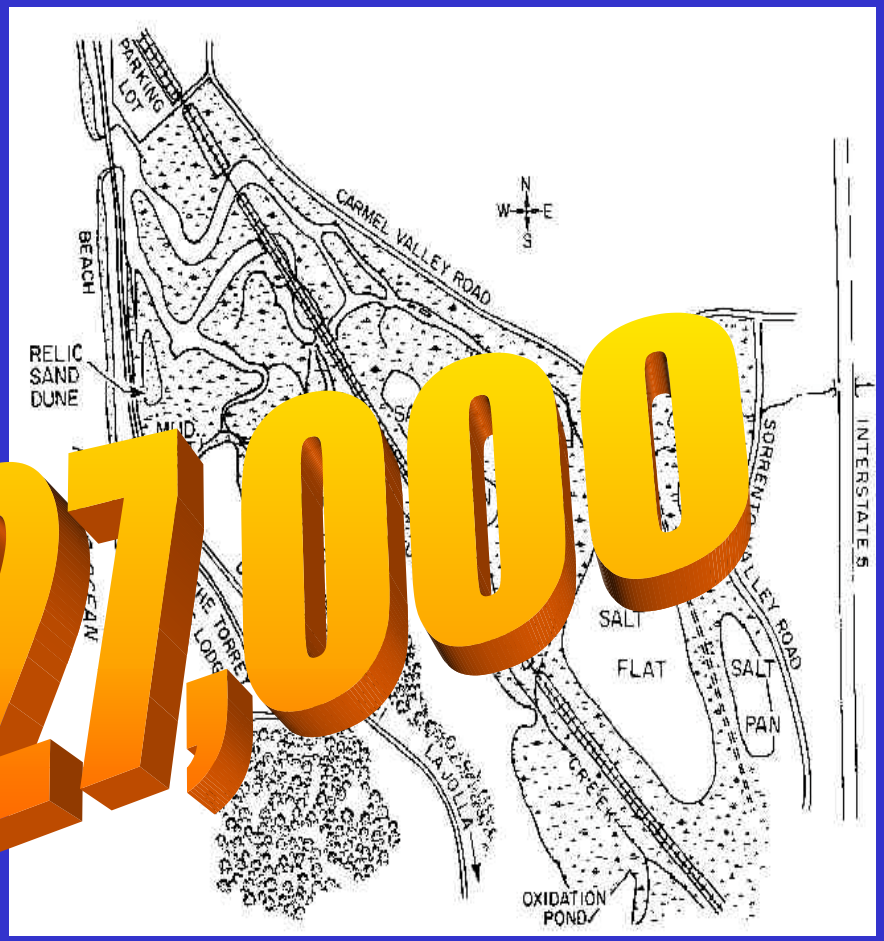
- "..sloppy runoff-control practices at Caltrans construction sites, drainage facilities and maintenance yards"

San Diego Baykeeper

$430,000

Violation and Order for Compliance 2000 City of San Diego

- "Failing to curb erosion along a dirt road above the Los Penasquitos Lagoon"



$527,000

Specifications

- **Caltrans Standard Specifications, Section 7-1.01G**
  - Requires contractors to prepare and implement a program to control water pollution effectively during the construction of **all** projects.
  - SWPPP/WPCP and BMPs must meet requirements of this section
- **Sections 7, 10, 16, 18, 20, and 42**

Background

ENV 1-7 ENV 8 - 15

- Caltrans Water Pollution Control Program is comprised of two separate but equally important programs.
  - WPCP: Water Pollution Control Program
  - SWPPP: Storm Water Pollution Prevention Plans

WPCP

- **W** - Water
- **P** - Pollution
- **C** - Control
- **P** - Program

- Construction sites:

< 1 (0.4 ha)

- Shall conform to the requirements of the Caltrans “SWPPP and WPCP Preparation Manual”

WPCP

Requirements:

- WPCP must:
  - identify pollutant sources that may affect the quality of storm water discharges from the construction site
  - commit to implementing measures to reduce pollutants during and after construction is completed

WPCP

SS 7-1.01G SSP 07-340

Requirements

- Caltrans requires preparation and implementation by the Contractor
- Prior to starting work, Contractor must prepare for construction sites:

  < 1 acres (0.4 ha): WPCP **SSP 07-340**

SWPPP

ENV 1-7 ENV 8 - 15

- **S** - Storm
- **W** - Water
- **P** - Pollution
- **P** - Prevention
- **P** - Plan

- Construction sites: ≥ 1 acre (0.4 ha)
- Required by law and directly regulated by both NPDES permits

SWPPP

Requirements

- SWPPP must:
  - identify pollutant sources that may affect the quality of storm discharges from the construction site
  - commit to implementing measures to reduce pollutants during and after construction is completed

SWPPP

SS 7-1.01G SSP 07-345

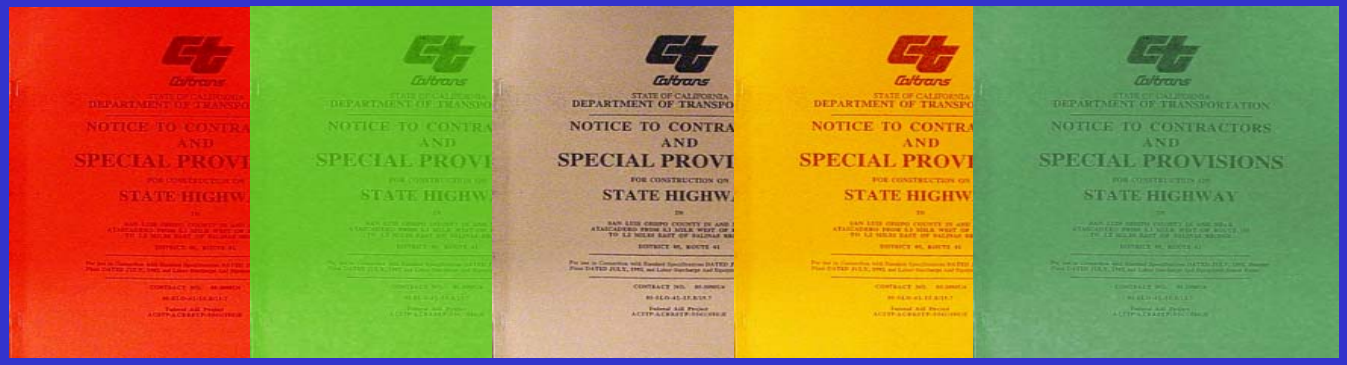
Requirements

- Caltrans requires preparation and implementation by the Contractor
- Prior to starting work, Contractor must prepare for construction sites:

  > 1 acre (0.4 ha): SWPPP **SSP 07-345**

Contract Special Provisions

- **Contract Special Provisions - Section 10**
  - Requires compliance with the NPDES Permit requirements
  - Requires the use of Caltrans Storm Water Quality Handbooks
  - Defines water pollution control requirements



Manuals

- Caltrans Storm Water Quality Handbooks (March ’03)
  - Project Planning and Design Guide
  - SWPPP / WPCP Preparation Manual
  - Construction Site BMPs Manual

  Get Manuals online at http://www.dot.ca.gov/hq/construc/stormwater.html or hard copies are available from Caltrans Publications

- Construction Manual
- New BMP Field Guidance Manual
- New Dewatering Guide

Manuals

- Caltrans Storm Water Quality Handbooks
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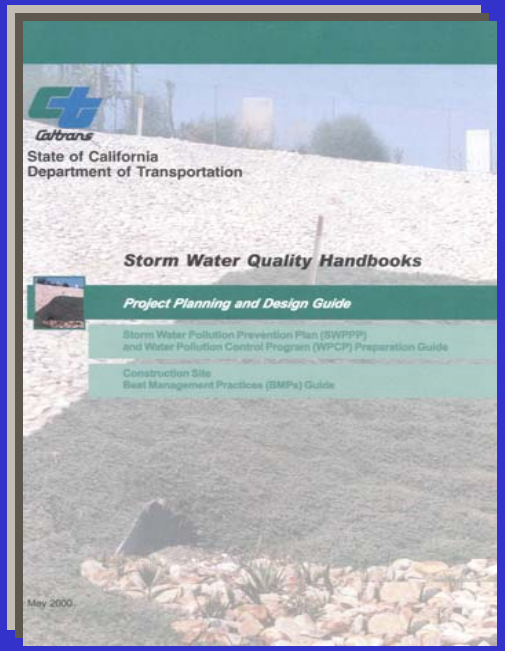

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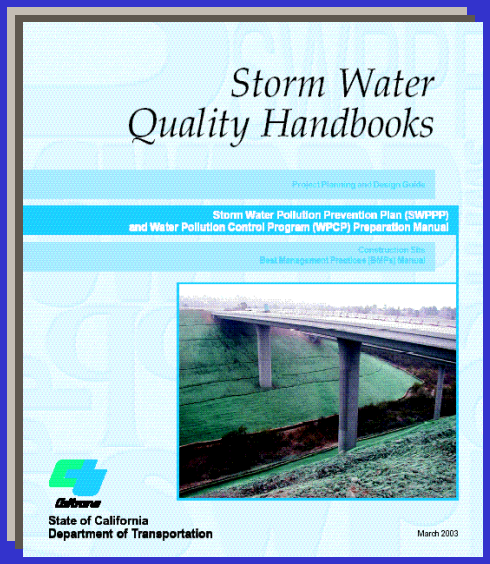

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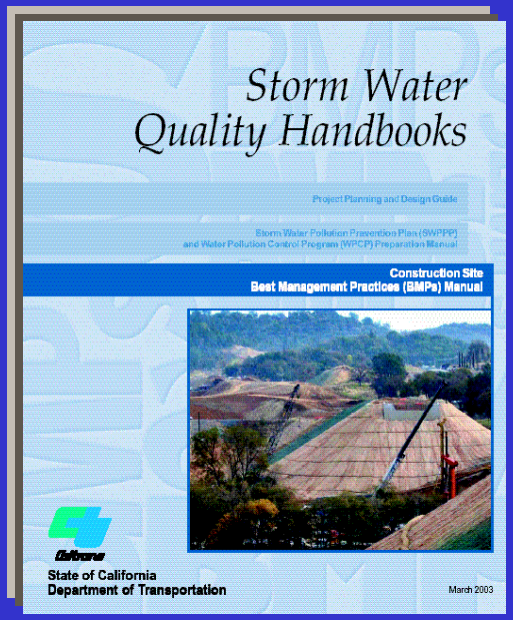

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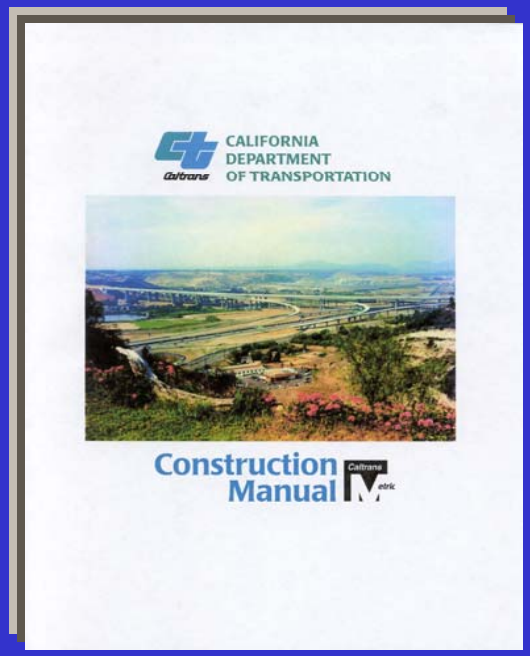

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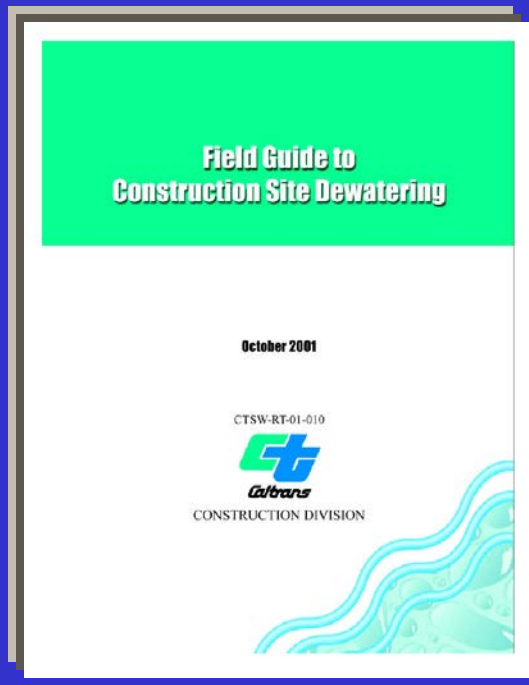
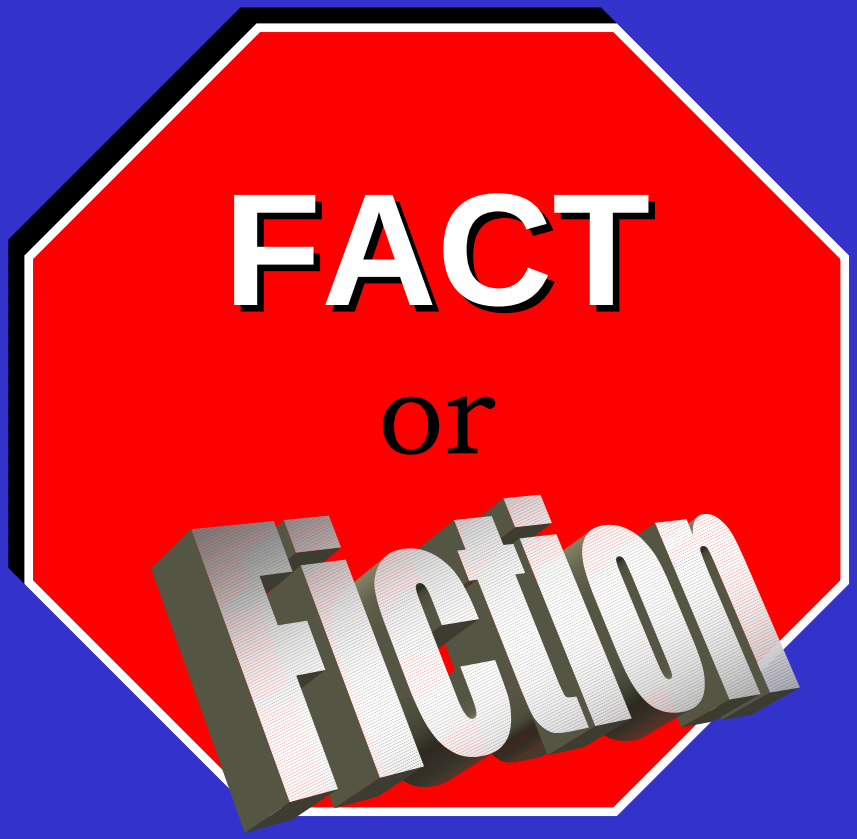


FACT

or

Fiction



The Regional Water Quality Control Boards, the Dept. of Fish and Game, and the EPA all have the authority to enforce the Clean Water Act in California.

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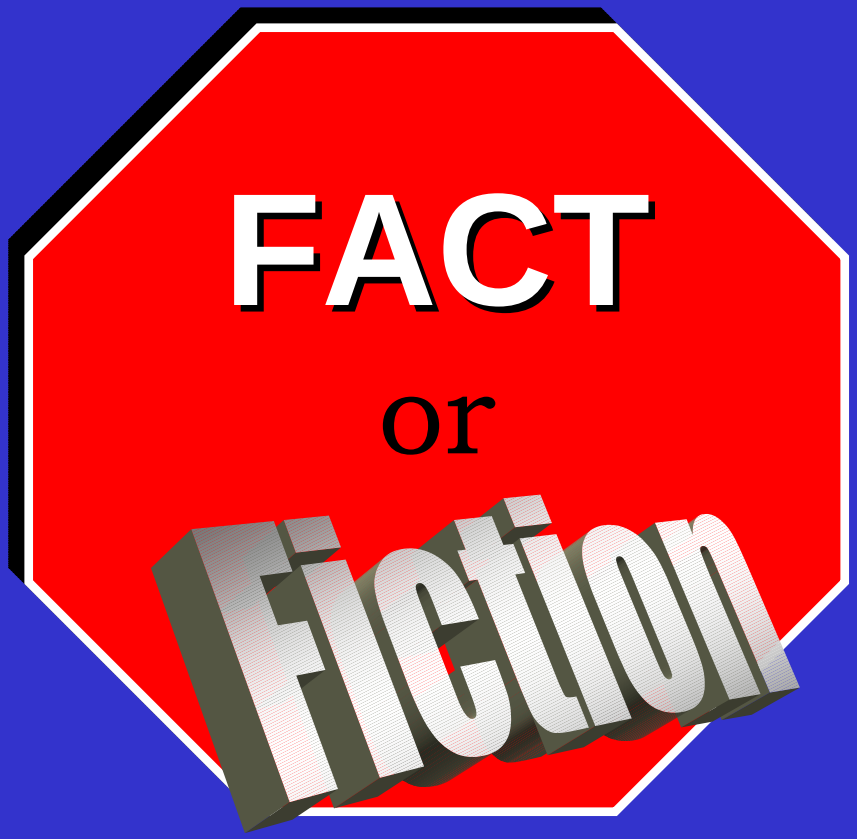
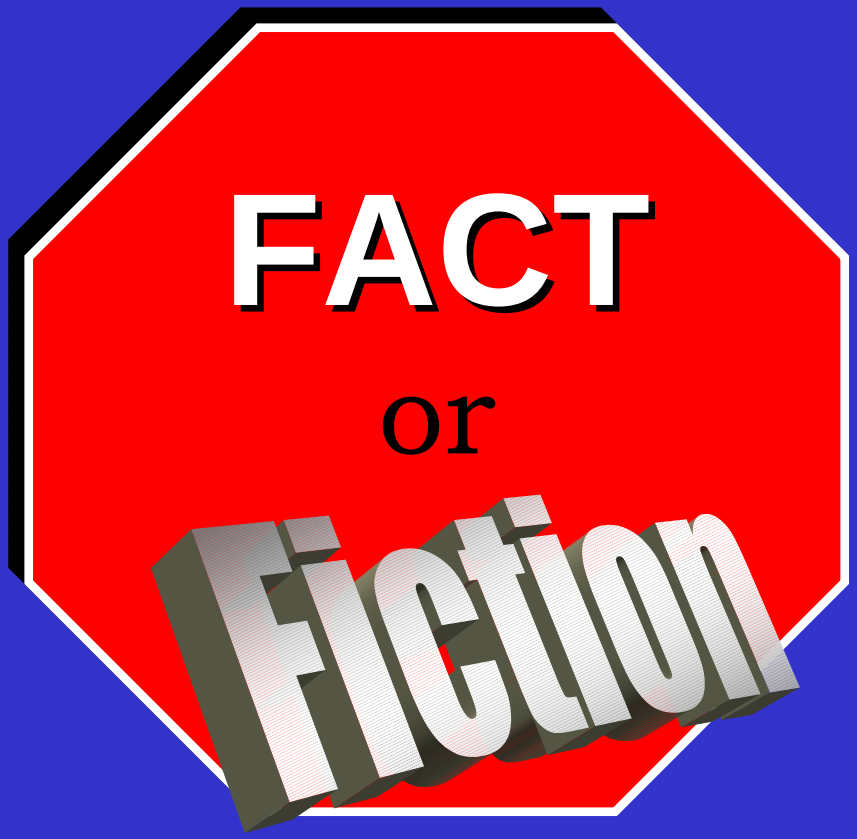


Construction site erosion can be 10 – 100 times greater than nature's erosion process.

Fiction

1,000

Construction site erosion can be 10 – ~~100~~ times greater than nature's erosion process.



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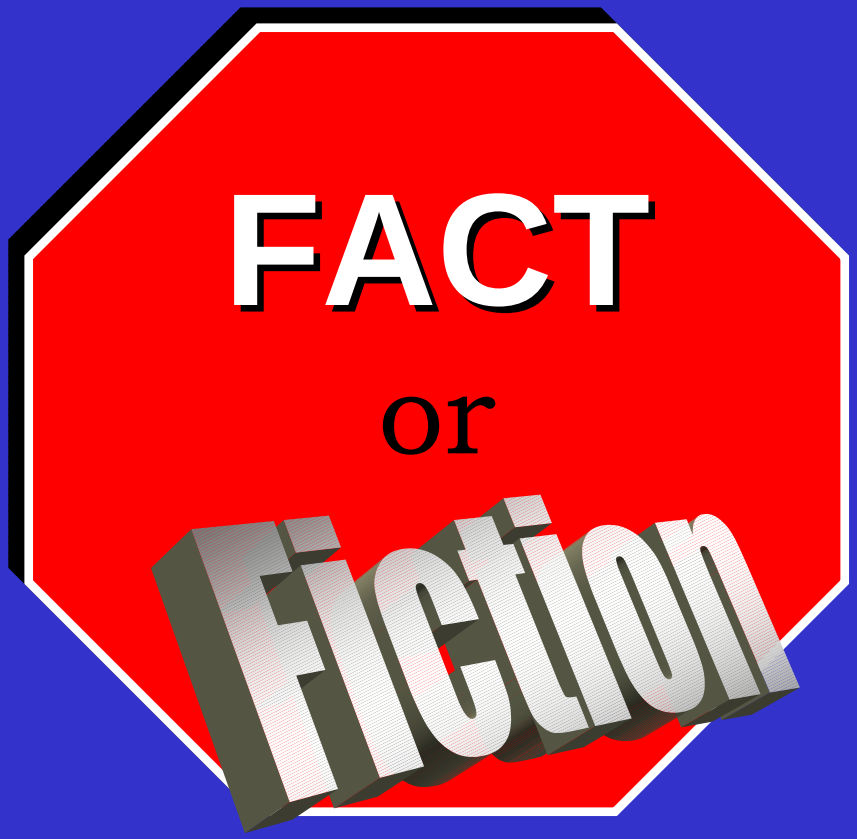


Water pollution control requirements are found in section 16 of the Special Provisions.

Water pollution control requirements are found in section ~~16~~ 10 of the Special Provisions.

Construction Site Best Management Practices - BMPs

Objectives:

- Promote Good Housekeeping
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas

Construction Site Best Management Practices - BMPs

Objectives:

- Protect Slopes and Channels
- Control Site Perimeter
- Control Internal Erosion

Construction Site Best Management Practices - BMPs

- BMP defined – a technique, measure or structural control that is used for a given set of conditions to manage the quantity and improve the quality of storm water runoff in the most cost-effective manner
- Sometimes referred to as temporary control practices

BMP Installation

BMP Categories

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

Temporary Soil Stabilization

ID	BMP Name
SS-1	Scheduling
SS-2	Preservation of Existing Vegetation
SS-3	Hydraulic Mulch
SS-4	Hydroseeding
SS-5	Soil Binders
SS-6	Straw Mulch

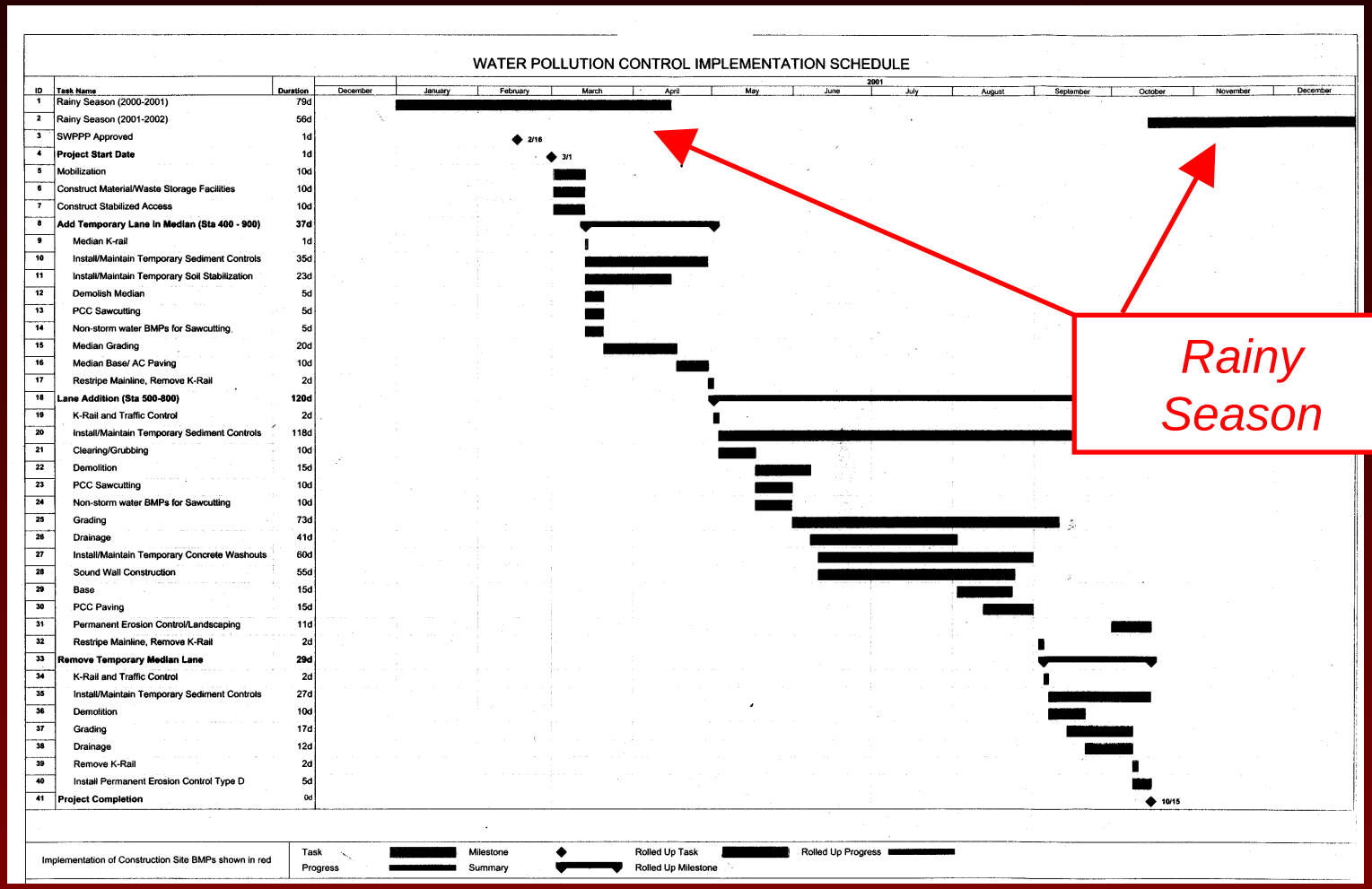
Temporary Soil Stabilization

ID	BMP Name
SS-7	Geotextiles, Plastic Covers, & Erosion Control Blankets/Mats
SS-8	Wood Mulching
SS-9	Earth Dikes/Drainage Swales & Lined Ditches
SS-10	Outlet Protection/Velocity Dissipation Devices
SS-11	Slope Drains
SS-12	Streambank Stabilization

BMP Use - Soil Stabilization

SS-1 Scheduling

Example of Graphical Schedule



BMP Installation - Soil Stabilization

SS-3 Hydraulic Mulch

Hydraulically applied paper mulch

Caltrans Requirements

- Mulch must be approved by RE or CSWC
- Prior to application, roughen embankment and fill areas
- Hydraulic matrices need 24 hours to dry before rainfall occurs to be effective unless approved by the RE
- Application rates per SS3

BMP Installation - Soil Stabilization
SS-4 Hydroseeding

Hydroseeded slopes show vegetation growth

Caltrans Requirements

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

BMP Installation - Soil Stabilization
SS-4 Hydroseeding

Unstabilized slope vs. Stabilized slope

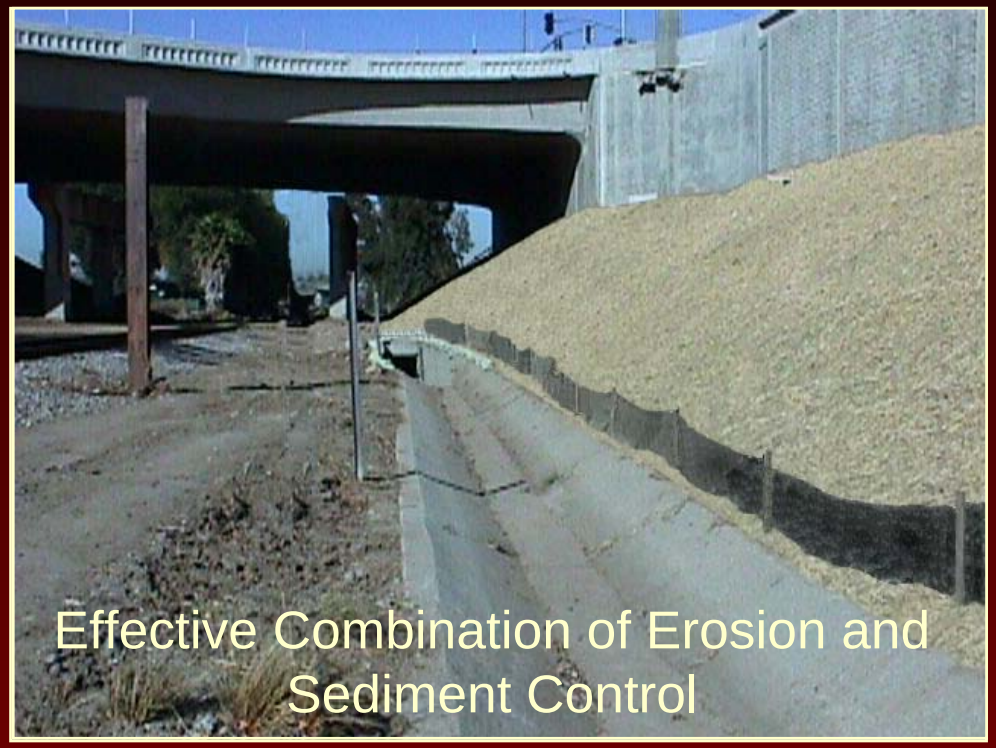
BMP Installation - Soil Stabilization
SS-5 Soil Binders

Application of Soil Binder

Caltrans Requirements

- Are temporary and may require reapplication
- Soil type will dictate which kind of soil binder to use
- Must be environmentally benign, and shall not stain paved or painted surfaces
- Do not apply during or immediately before a rainfall
- Application rates per SS5

BMP Installation - Soil Stabilization
SS-6 Straw Mulch


Effective Combination of Erosion and Sediment Control

Caltrans Requirements

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

BMP Installation – Soil Stabilization

SS-9 Earth Dikes/Drainage Swales/Lined Ditches

Caltrans Requirements

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

Temporary Sediment Control

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

BMP Installation - Sediment Controls

SC-1 Silt Fence

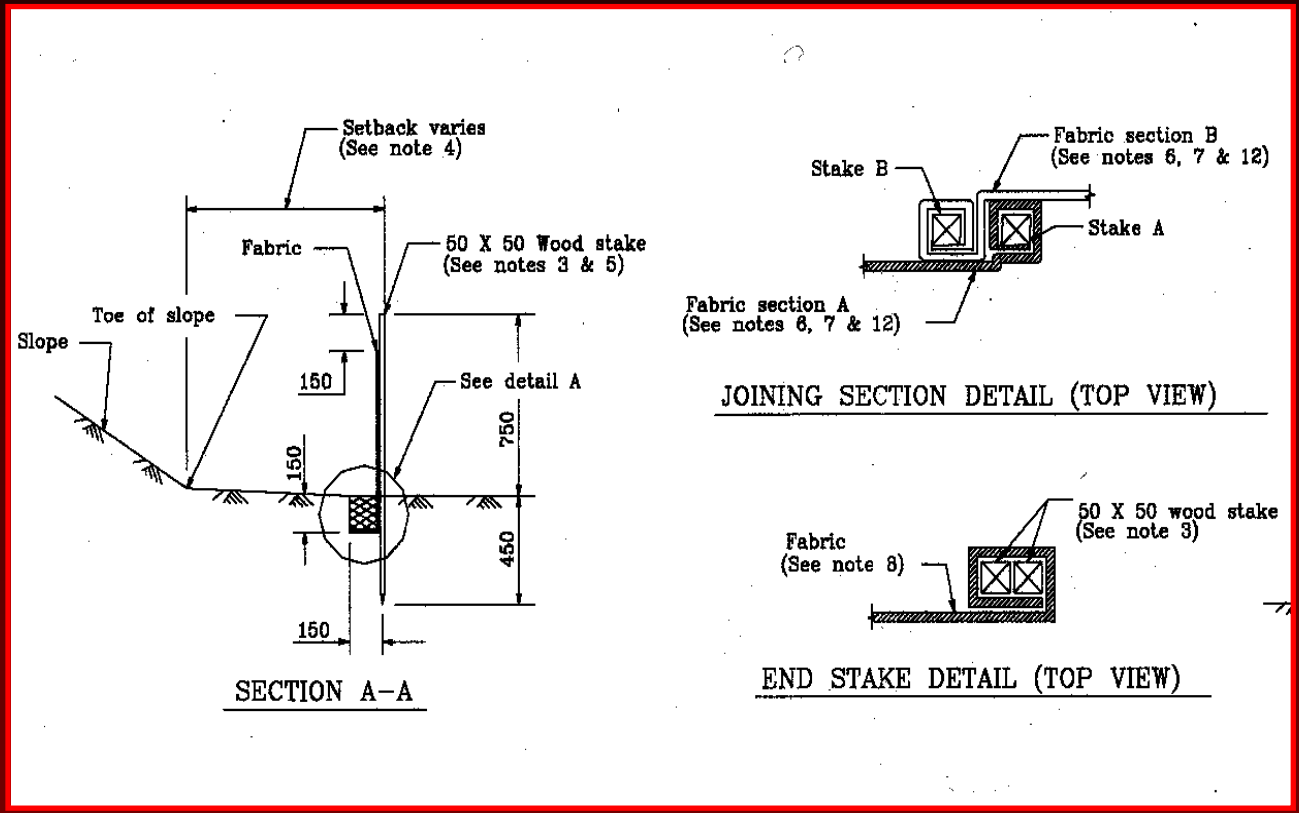
Incorrect installation of silt fence, bottom portion not properly keyed in.

Caltrans Requirements

- Not effective unless keyed in
- Locate on level contours
- Use along the perimeter of a project
- 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

BMP Installation - Sediment Controls

SC-1 Silt Fence



BMP Installation - Sediment Controls

BMP Installation - Sediment Controls

Lack of sediment control

BMP Installation - Sediment Controls

SC-3 Sediment Trap

Sediment Trap without required fencing

Requirements

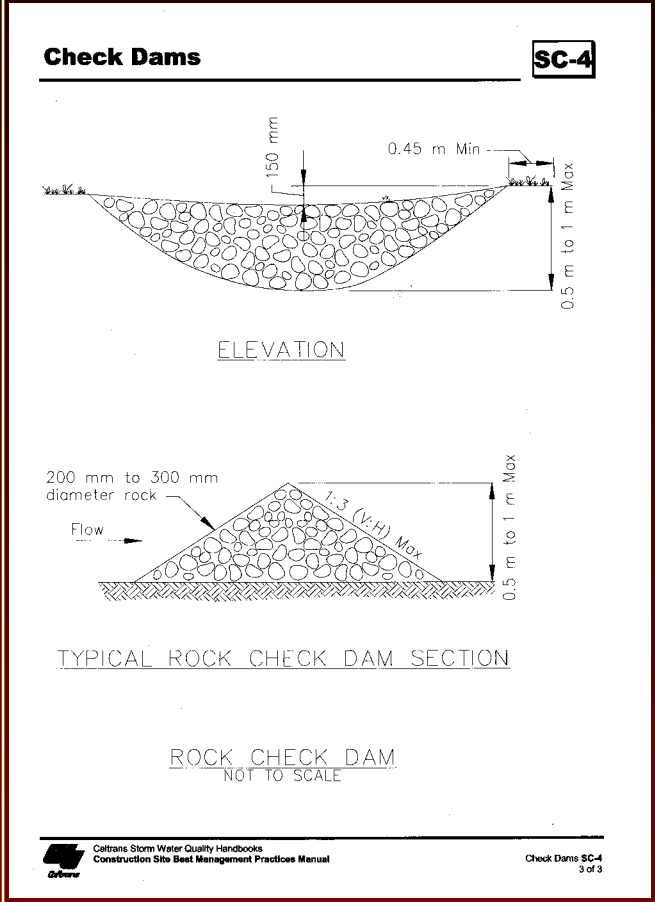
- Size limited by availability of right-of-way
- Not appropriate for drainage areas greater than 5ac
- If captured runoff has not completely infiltrated within 72 hours dewater trap
- Fencing, in accordance with Standard Spec Section 80- ”Fencing”, shall be provided to prevent unauthorized entry

BMP Installation - Sediment Controls

SC-4 Check Dams

Caltrans Requirements

- Don't use in live streams
- Not to be constructed from straw bales or a silt fence
- High flows (typically a 2-year storm or larger) shall safely flow over check dam without upstream flooding or damage to check dam
- Backwater from downstream check dam shall reach toe of upstream dam



BMP Installation - Sediment Controls

SC-5 Fiber Rolls

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

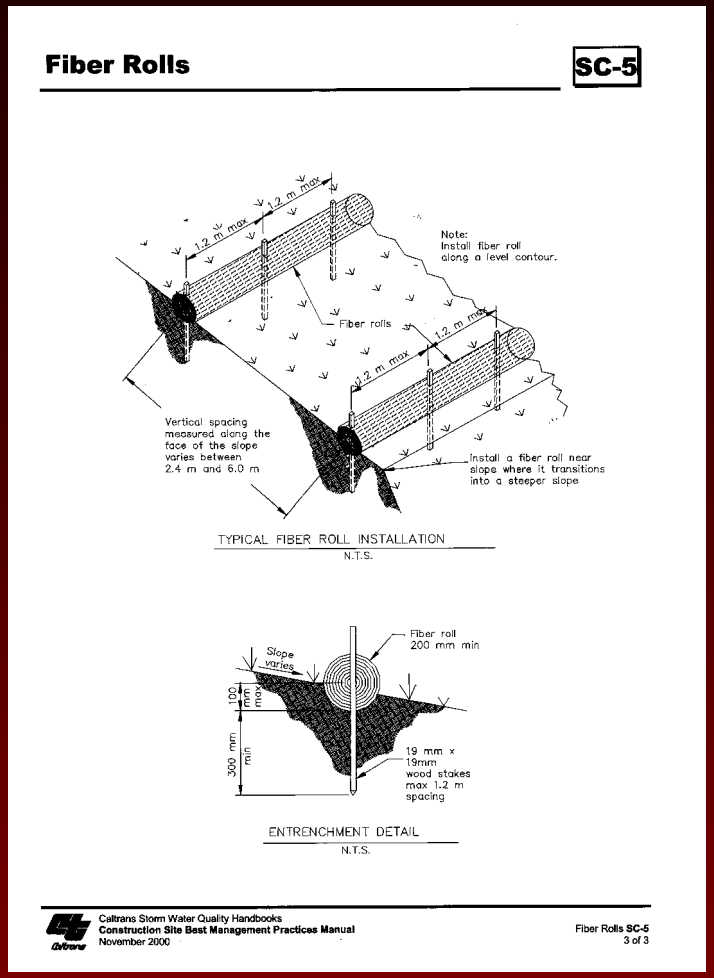
Caltrans Requirements

- Use along the top, face, and at grade breaks of exposed and erodible slopes
- Use along the perimeter of a project
- Locate on level contours
- Use around temporary stockpiles

BMP Installation - SedimentControls

SC-5 Fiber Rolls

Correct installation of fiber rolls



Fiber Rolls SC-5

TYPICAL FIBER ROLL INSTALLATION
N.T.S.

ENTRENCHMENT DETAIL
N.T.S.

Caltrans Storm Water Quality Handbooks
Construction Site Best Management Practices Manual
November 2000

Fiber Rolls SC-5
3 of 3

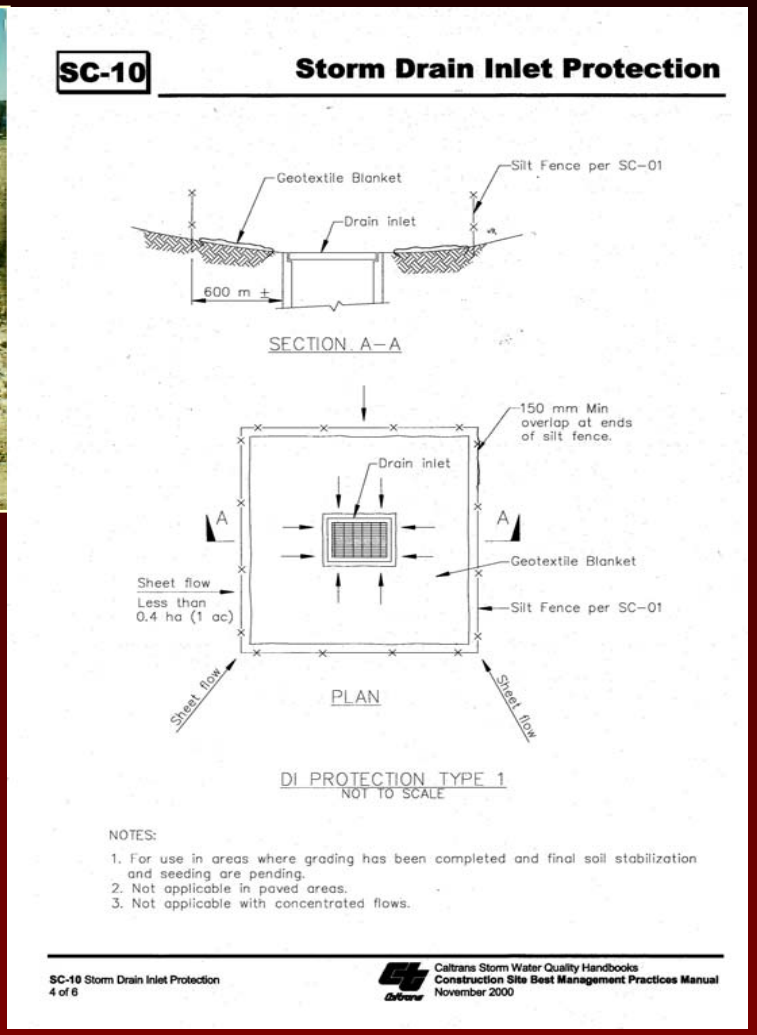
BMP Installation - Sediment Control
SC-7 Street Sweeping and Vacuuming

Street sweeping and vacuuming

Caltrans Requirements

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

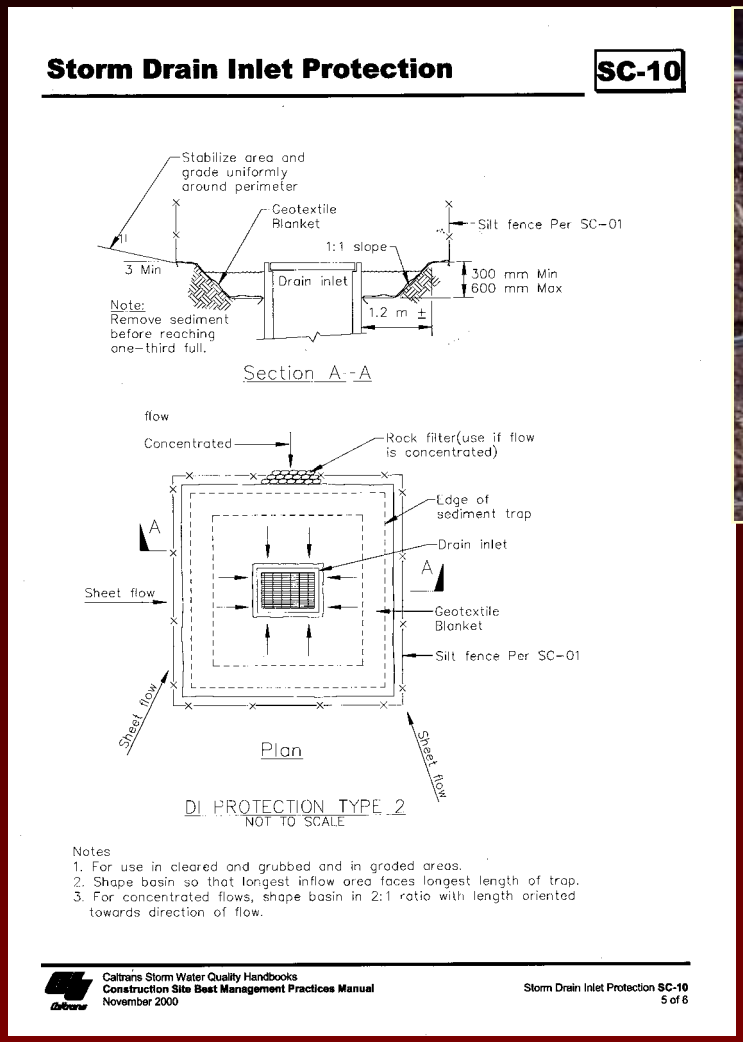
BMP Installation - Sediment Controls
SC-10 Storm Drain Inlet Protection



Caltrans Requirements

- Use where ponding will not encroach into highway traffic
- For use in areas where grading is complete
- Not for concentrated flows

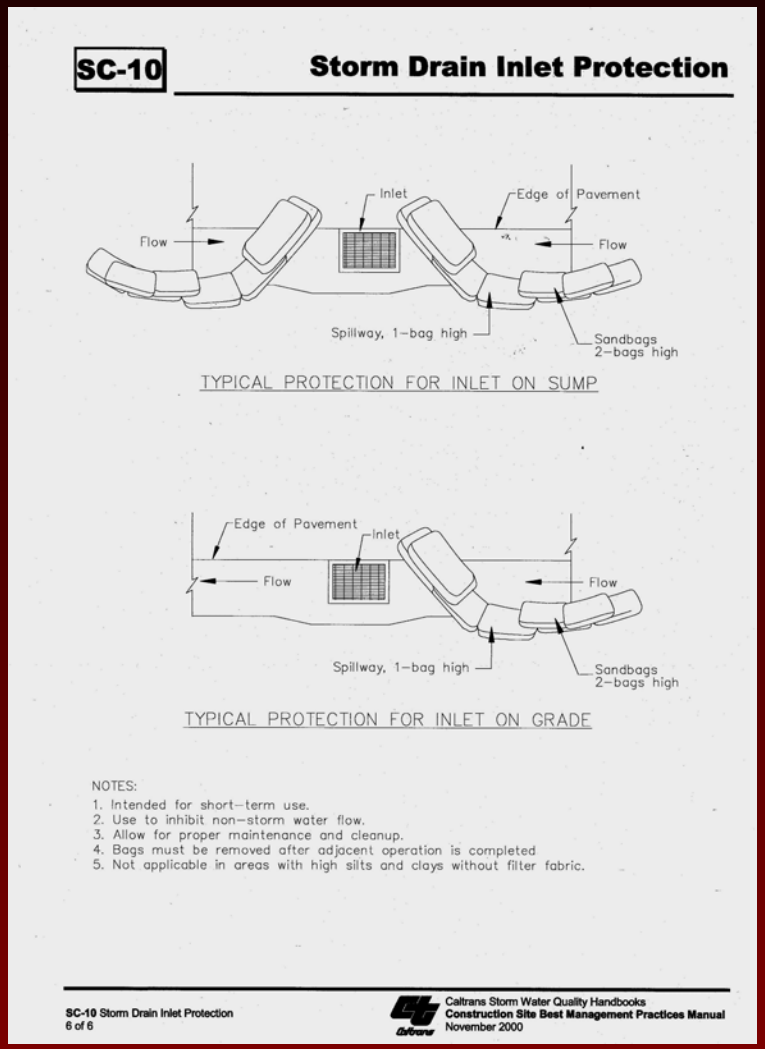
BMP Installation - Sediment Controls
SC-10 Storm Drain Inlet Protection



Caltrans Requirements

- Use where ponding will not encroach into highway traffic
- For use in cleared / grubbed and graded areas
- Frequent maintenance is required

BMP Installation - Sediment Controls
SC-10 Storm Drain Inlet Protection



SC-10 **Storm Drain Inlet Protection**

Inlet
Edge of Pavement
Flow
Flow
Spillway, 1–bag high
Sandbags 2–bags high

TYPICAL PROTECTION FOR INLET ON SUMP

Edge of Pavement
Inlet
Flow
Flow
Spillway, 1–bag high
Sandbags 2–bags high

TYPICAL PROTECTION FOR INLET ON GRADE

NOTES:
1. Intended for short–term use.
2. Use to inhibit non–storm water flow.
3. Allow for proper maintenance and cleanup.
4. Bags must be removed after adjacent operation is completed
5. Not applicable in areas with high silts and clays without filter fabric.

SC-10 Storm Drain Inlet Protection
6 of 6

Caltrans Storm Water Quality Handbooks
Construction Site Best Management Practices Manual
November 2000

Caltrans Requirements

- Use where ponding will not encroach into highway traffic
- Gravel bags shall be used
- Remove when adjacent operation is complete

Wind Erosion Control

ID	BMP Name
WE-1	Wind Erosion Control

BMP Installation - Wind Erosion Control WE-1

Lack of wind erosion controls

BMP Installation - Wind Erosion Control WE-1

Soil binder applied via water truck

Caltrans Requirements

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

Tracking Control

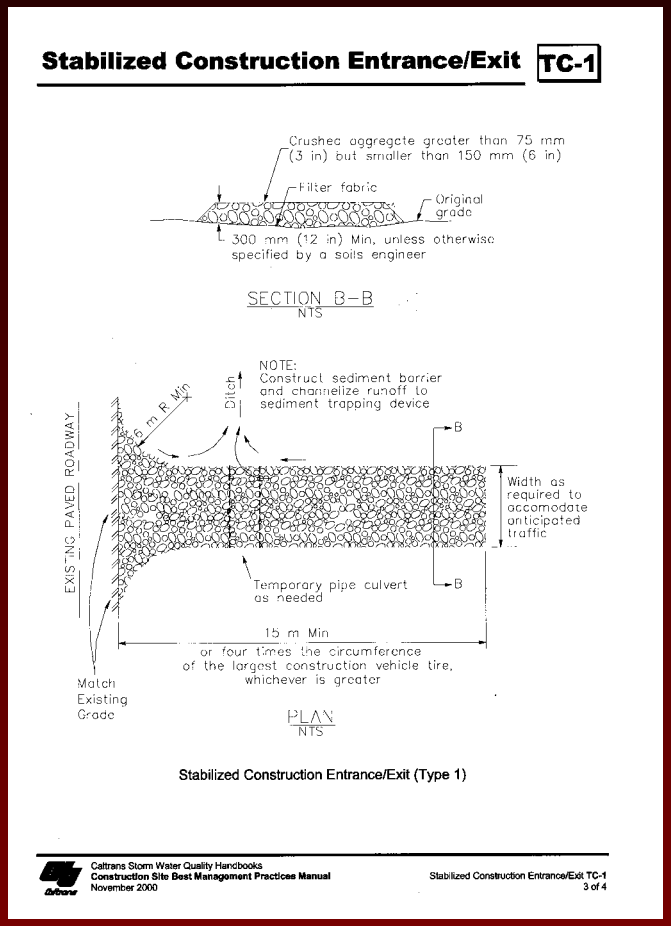
ID	BMP Name
TC-1	Stabilized Construction Entrance/Exit
TC-2	Stabilized Construction Roadway
TC-3	Entrance/Outlet Tire Wash

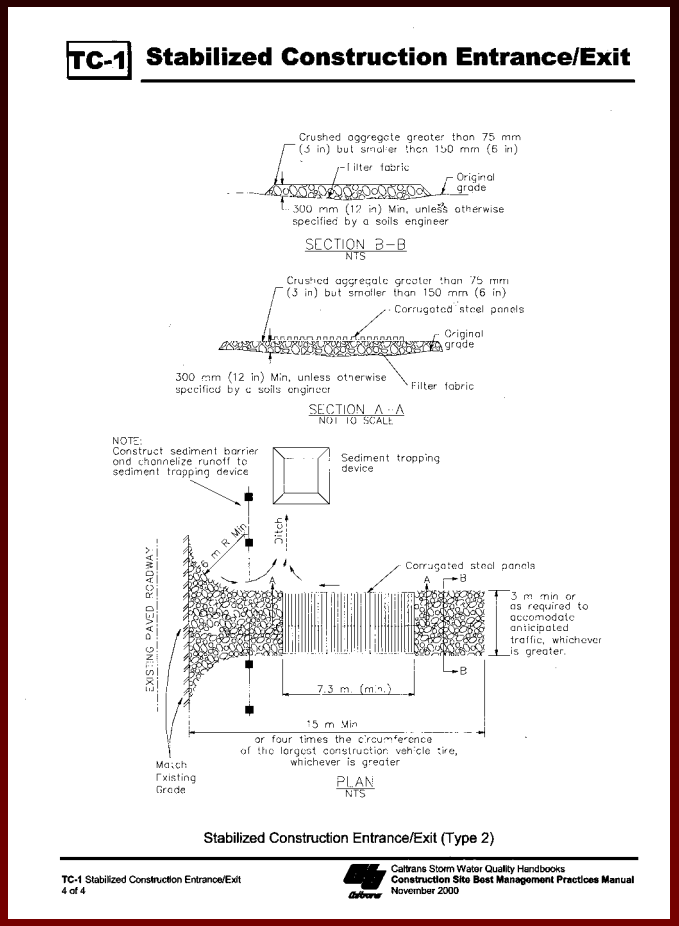
BMP Installation - Tracking Control
TC-1 Stabilized Construction Entrance / Exit

Lack of stabilized entrance / exit

BMP Installation - Tracking Control

TC-1 Stabilized Construction Entrance / Exit





BMP Installation - Tracking Control
TC-1 Stabilized Construction Entrance / Exit

Large diameter rock used as a stabilized entrance / exit.

Caltrans Requirements

- If aggregate is used place over geotextile fabric 12” deep or a depth recommended by the RE
- Use 3”-6” diameter rock
- Minimum of 15 m in length
- Design for heaviest equipment
- Limit number of entrances and exits
- Require their use

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 Detection and Reporting
NS-7	Potable Water / Irrigation

Non-Storm Water Management BMPs

ID	BMP Name
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	Material and Equipment Use Over Water
NS-14	Concrete Finishing
NS-15	Demolition/Removal Over or Adjacent to Water Structure D

BMP Installation - Non-Storm Water
NS-2 Dewatering Operations

Caltrans Requirements

- Notify District Construction Storm Water Coordinator
- Use Caltrans' Field Guide to Construction Site Dewatering
- Use where groundwater or accumulated precipitation will be discharged from site
- Addresses sediment only
- Notify RE if pollutant other than sediment is present
- Must comply with applicable permits

BMP Installation - Non-Storm Water
NS-3 Paving and Grinding Operations

Caltrans Requirements

- Place plastic materials 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

BMP Installation – Non-Storm Water
NS-4 Temporary Stream Crossing

Caltrans Requirements

- Use where construction equipment must frequently cross a waterway
- If improperly designed they may increase pollution load through washouts and scouring
- Appropriate permits are required per NS-4

BMP Installation – Non-Storm Water
NS-5 Clear Water Diversion

Caltrans Requirements

- May require RWQCB, USACE, DFG permits / approval
- If improperly designed they may increase pollution load through flooding and washouts
- If needed follow Caltrans' Field Guide to Construction Site Dewatering
- Construct diversions with material free of potential pollutants

BMP Installation – Non-Storm Water
NS-6 Illicit Connection / Illegal Discharge

Caltrans Requirements

- 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 RE, and CSWC at time of discovery

BMP Installation - Non-Storm Water
NS-9 Vehicle and Equipment Fueling

Caltrans Requirements

- 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

Mobile fueling operations require BMPs

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

BMP Installation - Waste Management
WM-1 Material Delivery and Storage

Well maintained temporary containment facility

Substances that require storage in a containment facility

Caltrans Requirements

- Facility shall provide for a spill containment volume able to contain precipitation from a 24-hour, 25-year storm, plus 10% of the aggregate volume of all containers or 100% of the capacity of the largest container whichever is greater
- Facility shall be impervious to the materials for 72 hours

BMP Installation - Waste Management
WM-1 Material Delivery and Storage

Temporary containment facility for fuel

Caltrans Requirements

- Liquids, petroleum products, and substances listed in 40 CFR Parts 110, 117, and 302 require containment
- During rainy season provide permanent cover and side wind protection

BMP Installation - Waste Management
WM-3 Stockpile Management

Caltrans Requirements

- Year-round requirement
- Locate a minimum of 15m away from concentrated flows of storm water, drainage courses, and inlets
- Protect from run-on with a perimeter sediment barrier

BMP Installation – Waste Management
WM-5 Solid Waste Management

Caltrans Requirements

- 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
- Remove from site on a biweekly basis or as directed by the RE

BMP Installation - Waste Management
WM-8 Concrete Waste Management

Controlled concrete washout

Uncontrolled concrete washouts

BMP Installation - Waste Management
WM-8 Concrete Waste Management

Below Grade concrete washout

Above Grade concrete washout

Caltrans Requirements

- PCC and AC waste shall not be allowed to enter storm drains and watercourses
- Line all washouts with 10-mil polyethylene sheeting
- Install signs designating temporary washout areas
- Locate washout facilities a minimum of 15m(50ft) from storm drains, open drainage facilities, and water courses

BMP Installation - Waste Management
WM-9 Sanitary / Septic Waste Management

Locate temporary sanitary facilities away from drainage facilities

Caltrans Requirements

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

Maintenance of BMPs

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

Maintenance of BMPs

Silt fence maintenance

Water Quality Sampling and Analysis

- First things first
  - Caltrans personnel will not be collecting any samples – this is the responsibility of the contractor or their lab
  - Sampling and Analysis requirements apply only to SWPPP projects

Water Quality Sampling and Analysis

- Resolution 2001-046
  - San Francisco Bay Keepers lawsuit
  - Modification to California's General Construction Permit Monitoring and Reporting Section
  - Requires that permittees implement specific sampling and analytical procedures
  - Determine whether BMPs implemented on construction site are
    - Preventing further impairment of water bodies by sediment
    - Preventing other pollutants from causing or contributing to exceedances of water quality objectives

Water Quality Sampling and Analysis

- What are these new Sampling and Analysis requirements intended to do?
  - The new requirements are intended to determine if BMPs implemented on the construction site are effective for preventing sediment/silt and other non-visible pollutants from impacting water quality objectives

Water Quality Sampling and Analysis

Pollutants Requiring Sampling

Sediment

Non-Visible

Water Quality Sampling and Analysis

- 303(d) listed Water Bodies
  - 99 of the 509 water bodies are listed as impaired for sediment / siltation and turbidity

Water Quality Sampling and Analysis

What is….

- Sediment
  - Soil particles that have been dislodged from their original or placed location and deposited down gradient
- Siltation
  - The deposition of finely divided soil and rock particles upon the bottom of streams and river beds and in reservoirs
- Turbidity
  - Cloudiness of water quantified by the degree to which light traveling through a water column is scattered by the suspended organic and inorganic particles it contains. Measured in Nephelometric Turbidity Units (NTU)

Water Quality Sampling and Analysis

- Sediment / silt in a water body:
  - Decreases water clarity, which causes a decrease in aquatic plant production, obscures sources of food, habitats, refuges, and nesting sites of fish
  - Fills gravel spaces in stream bottoms, smothering fish eggs and juvenile fish
  - Carries nutrients such as nitrogen and phosphorous that may cause algal blooms
  - Pesticides attach to soil particles and enter waters
  - Decreases recreational, commercial, and aesthetic values of water bodies
  - Decreases quality of drinking water

Water Quality Sampling and Analysis

- Turbidity
  - Turbidity in water bodies effects both aquatic and human life by increasing bacteria levels, introducing viruses, and protozoan
  - Blocks light transmission and light penetration
  - Reducing oxygen levels
  - Affecting the food chain

Water Quality Sampling and Analysis

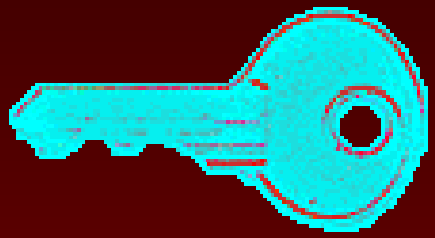
- Non-Visible Pollutants
  - They are not visually detectable in storm water discharges
    - Examples: Acids, Solvents, Lime, Gypsum, Copolymer
      - Toxic properties: Caustic, Carcinogenic, Flammable etc..

Water Quality Sampling and Analysis

- How do Non-Visible Pollutants effect water bodies
  - Toxic to aquatic ecosystems and humans
  - They can dissolve or remain suspended in water or get deposited on the bed
  - Deteriorates water quality
  - Pollutants can also seep down and contaminate groundwater

Water Quality Sampling and Analysis

- **Make sure potential non-visible pollutants are:**
  - **Cleaned-up**
  - **Covered**
  - **Contained**



- **C^3**

Construction Period Responsibilities

- Cover as topic item in pre-Construction meeting
- Review & approve plan
- Inspections - Caltrans self enforcement
- Request, review, & approve amendments for plan deficiencies

Construction Period Responsibilities

- Report illegal dumping
- Complete annual certificates (June 15th)
- Report non-compliance events to RE
- Complete Notice of Completion of Construction (NCC) at end of Construction

Pre- Inspection Preparation Work

- **Review the Plans / Contract Documents**
  - BMP Manual
  - Standard Specifications
  - Project Plans
  - Special Provisions
  - Storm Water Pollution Prevention / WPCP Plans
    - Water Pollution Control Drawings
    - Project Schedule
    - Other NPDES Permits
  - Use SWPPP / WPCP Preparation Manual
  - Project File

Field Inspection Techniques

- **Storm Water Inspection Tips**

- **If possible take copy of approved plan on field inspection**
- **Use an inspection form – Attachment H from the SWPPP Preparation Manual**
- **Contractor should participate in inspection**
- **Inspect the entire site including the perimeter**
- **Start inspection from lowest point or from area where discharge possibility is the highest**

Field Inspection Techniques

Storm Water Inspection Tips

- Walk interior and perimeter of Contractors yard
- Offsite (off the R of W) yards require inspection, however check with RE before entry
- Invite Structures Construction personnel
- Identify existing conditions
- Take photographs
- Identify changes in construction that may require amendments to the SWPPP or WPCP

Inspections

- **Frequency**
  - **Prior to anticipated storm events**
  - **During extended storm events (once each 24-hour period)**
  - **After actual storm events**
  - **As specified in the Special Provisions**

Inspections

- **Prior to an anticipated storm event, confirm:**
  - **Active areas limited as specified (rainy season)**
  - **The protection of active and nonactive DSAs**
  - **The control of off-site storm water run-on**
  - **The condition of drainage systems**
  - **BMPs are properly implemented**

Inspections

- **During a storm event:**
  - **Best time to review BMPs!**
  - **Confirm the proper functioning of BMPs**
  - **Ensure BMPs do not cause flooding or traffic hazard**
  - **Repair or revise BMPs as conditions allow**
  - **Good learning experience**

Inspections

- **After an actual storm event:**
  - **Identify BMPs that failed**
  - **Identify BMPs that need maintenance**
  - **Repair, revise and maintain BMPs as necessary**
  - **Good learning experience**

Notice Of Discharge

- Action required upon discovery of a discharge or if the project receives a written notice or order from any regulatory agency

- Failure to report is subject to $27,500 fine

Notice Of Discharge

- **Applicable Discharges:**
  - **Storm water discharges that contain sediment from DSAs due to the absence of required, failed or damaged BMPs**
  - **Prohibited non-storm water discharges**
  - **Discharges that violate 404 permits or 401 certifications**

Inspection Form

Revised Storm Water Quality Inspection Checklist available on Caltrans website

www.dot.ca.gov/hq/construc/sample_analysis_bulletin.doc

Special Provisions or Conceptual SWPPP may require different form

Documentation

File Organization

- Category 20
- Inspections - Daily Reports
- Correspondence
- Certifications – Annual due June 15
- SWPPP / WPCP
- Amendments
- Photographs
- Notice of Completion
- Retain for Three Years

Quick Check

- Now it’s your turn -
  - pair up with a partner
  - turn to Exercise 1 and GO!

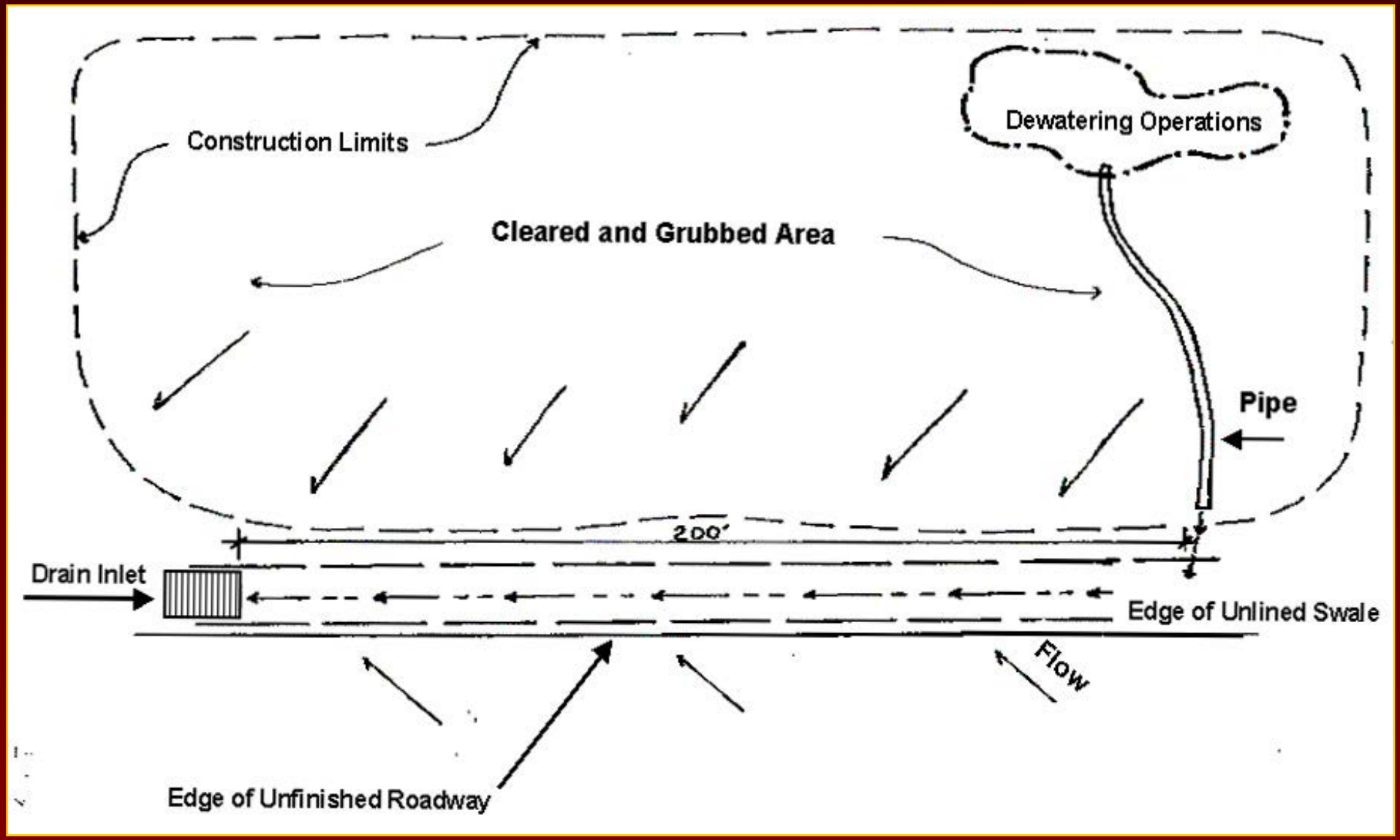
Exercise 1

- The following exercise shows
  - Contractor is dewatering a site
  - Discharge pipe outlet terminates a few feet from an unlined swale
  - Outlet is approximately 200 feet upstream from a drain inlet
  - Water from both the roadway and the construction site flow into the unlined swale before reaching the drain inlet.
  - The drain inlet connects to a storm drain system that flows to a small reservoir a mile away

Exercise 1

- On the Attached Plan
  - Place the appropriate BMPs to slow the velocities and reduce erosion within the unlined swale
  - Control sediment from runoff from the construction site and the roadway
  - Control erosion at the pipe outlet
  - Protect the drain inlet

Exercise 1


Construction Limits
Dewatering Operations
Cleared and Grubbed Area
Pipe
200'
Drain Inlet
Edge of Unlined Swale
Flow
Edge of Unfinished Roadway