

# **Temporary Erosion and Sediment Control During Road Construction Projects in the Lake Tahoe Basin**



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# TRPA Code of Ordinances

## 33.3.2.A

### Discharge Prohibition

Discharges to the waters of the region of solid or liquid waste materials, including soil, silt, clay, sand, or other organic or earthen materials, are prohibited...



## CODE OF ORDINANCES

TAHOE REGIONAL PLANNING AGENCY || *lake tahoe*





# TRPA Code of Ordinances

## 33.3.2.C

### Discharge Control Devices

Approved erosion and siltation control devices and measures shall be required for all grading...

## TRPA Stormwater Management Program


Working with property owners, private businesses, and government agencies to advance effective BMP design and implementation on developed properties at Lake Tahoe



- Home
- BMPs
- Fertilizer
- News
- Who Are You?
- Contact

### BMPs

- What is the Problem?
- What are BMPs?
- BMP Handbook
- BMP Resources
- Maintenance Program




#### TRPA BMP Handbook

The Handbook of Best Management Practices (BMP Handbook) is Volume II of the Tahoe Regional Planning Agency's Water Quality Management Plan for the Lake Tahoe Region (208 Plan). Last updated in 1988, this BMP Handbook assists in the implementation of federal Clean Water Act (CWA) mandates by providing technical and planning guidance to landowners, private businesses, agencies, and jurisdictions for water quality improvement projects. [Click here](#) for the 1988 BMP Handbook.


**Final Draft Revised BMP Handbook** (60.81 mb)

#### Final Draft BMP Handbook


- Preface**
- Introduction**
- Chapter 1 Urban Hydrology**
- Chapter 2 Site Analysis**
- Chapter 3 BMP Planning and Selection**
- Chapter 4 BMP Toolkit**
- Chapter 5 Soil and Vegetation Management**
  - Revegetation Plan Template
  - Revegetation Plan Example
  - Fertilizer Management Plan Template
  - Fertilizer Management Plan Example
  - Description of Revegetation Site Types
  - Site Type Recommended Species List
  - Site Type Recommended Seed Mixes
  - TRPA Approved Plant Species Attributes Table
- Chapter 6 Inspection, Maintenance, and Monitoring**




PROPERTY BMP STATUS SEARCH



LIVING WITH FIRE



BMP HANDBOOK



BMP RESOURCES

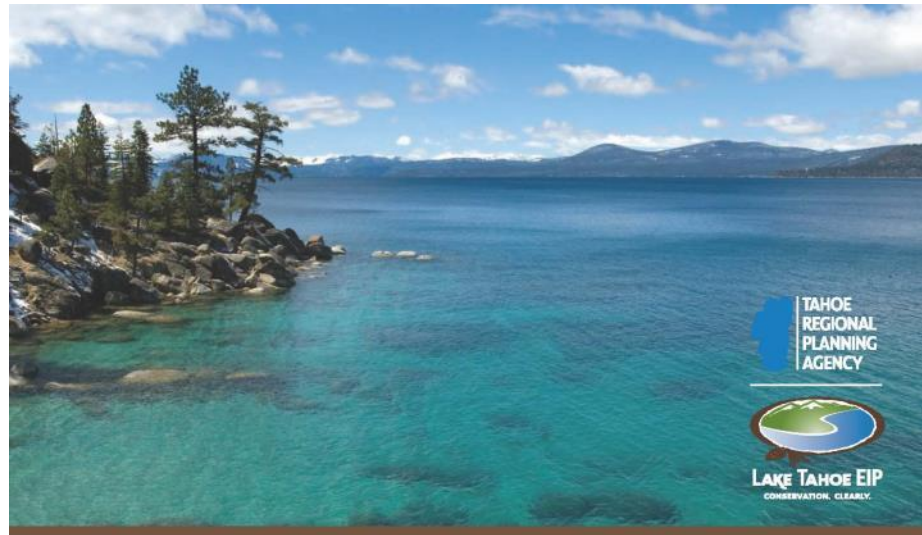


# TRPA Code of Ordinances

## 60.4.3.A

### Temporary BMPs

Temporary BMPs in accordance with the Handbook of Best Management Practices... shall be implemented on construction sites and maintained throughout the construction period...



## BEST MANAGEMENT PRACTICES HANDBOOK

2012

TAHOE REGIONAL PLANNING AGENCY

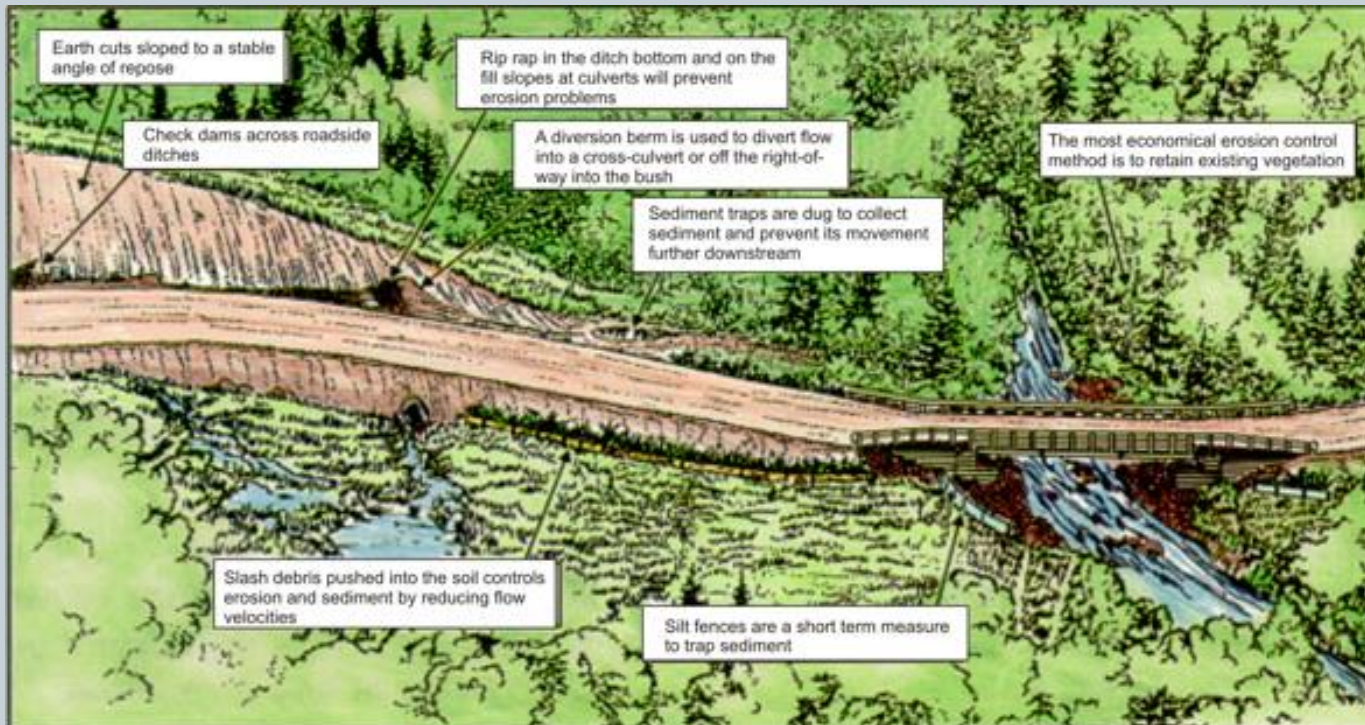
*lake tahoe*



# Hydrologic Connectivity



- Is the project “connected” to Lake Tahoe?
- Where does the water flow?



# Temporary Erosion and Sediment Control



- **Filter Fence/Silt Fence**
- **Fiber Rolls or Wattles**
- **Organic Mulch**
- **Sediment Catch Basins**
- **Dust Control**
- **Sweeping Paved Surfaces**
- **Construction Staging**
- **Limit Construction to the Dry Season**
- **Minimize the Area of Disturbance**
- **Implement Progressive Permanent Erosion Control**

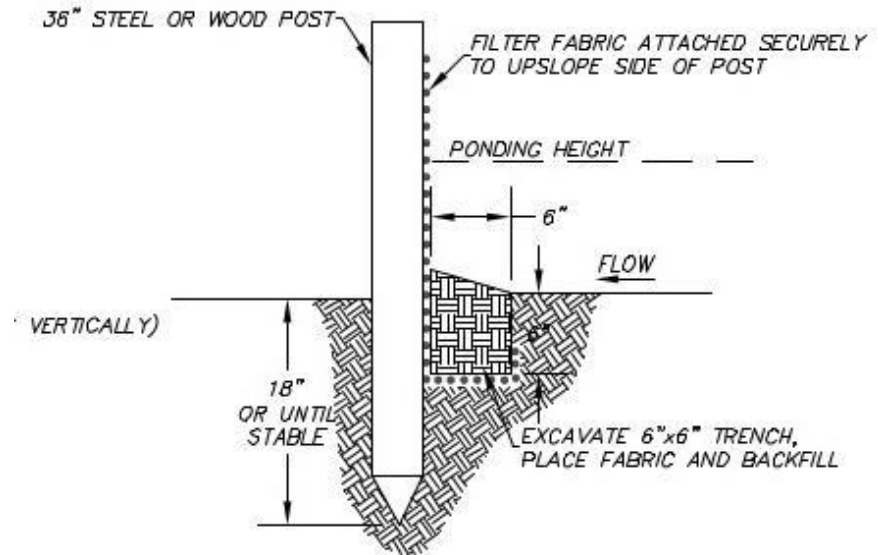
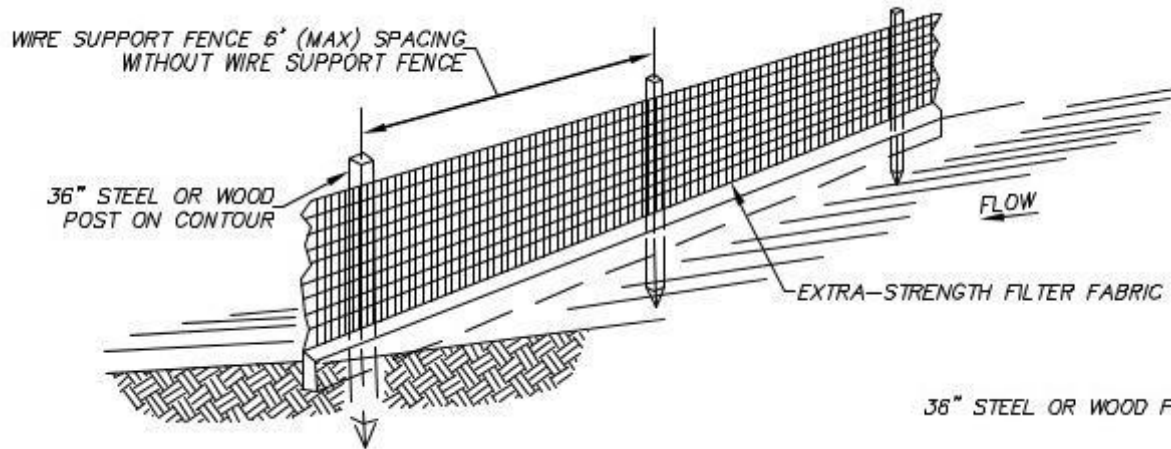


- A temporary barrier designed to capture sediment at the bottom of fill or cut slopes.
- Made out of porous geotextile.
- Generally is not biodegradable.
- Needs to be removed at the end of a project.
- Used where erosion control is needed for several months.



## **Filter Fabric Fence Silt Fence**

# Silt Fence Installation



# Silt Fence Installation



- Install down slope of all soil disturbance.
- Used to prevent sheet flow from leaving a site. Do not use in channels or areas of concentrated flow.
- Install along a level contour. Turn ends upward to create a J shape to prevent flow from going around the ends.
- Should be firmly keyed into the soil at least 6-inches.
- Use wire backed silt fence in high wind areas or for winter or long term use.

# Filter Fabric Fence or Silt Fence

It worked!



- Silt fence combined with construction limit fence.
- Large volume of sediment was captured by the silt fence.

Double silt fence with fiber rolls.



- Used to provide high level of protection.

# Good Silt Fence



A properly installed and well maintained silt fence.



Double temporary erosion barrier.

# Bad Silt Fence



Fence is falling down and allowing water to flow over the top.



This silt fence is not correctly installed. The gap in the fence makes it completely ineffective.

# Bad Silt Fence



# Failed Silt Fence

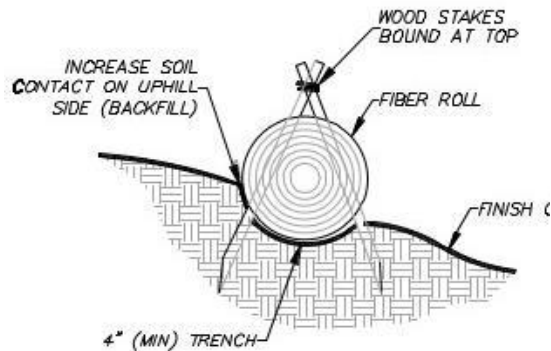


- Water flow around side of silt fence.



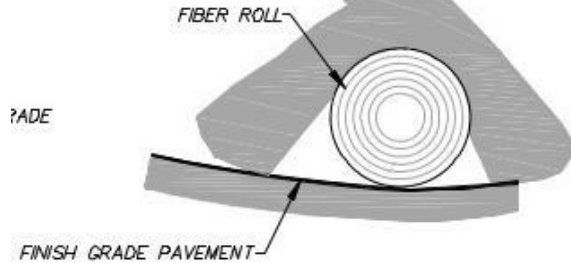
- Water flow under silt fence.

# Wattle or Fiber Rolls

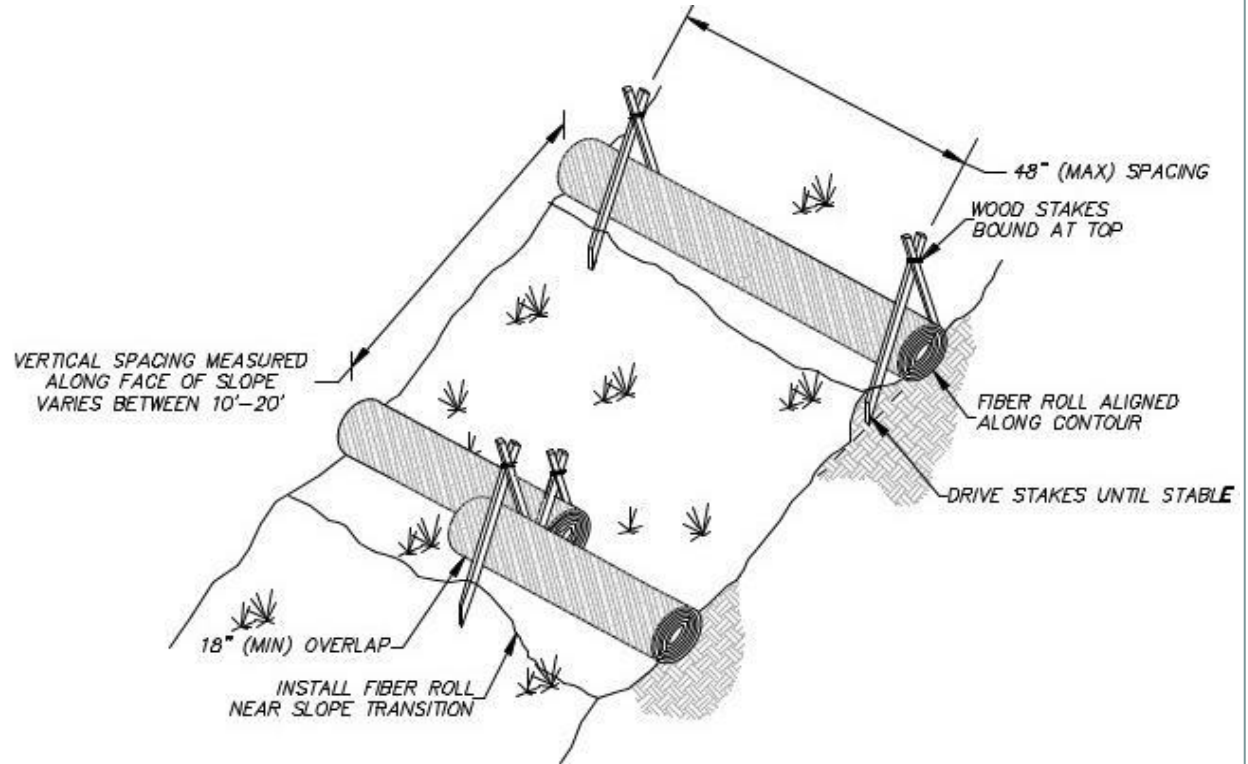


OFF PAVEMENT

GRAVEL BAG WEIGHTS ON UNWEIGHTED FIBER ROLL (PLACE AT ENDS AND 36" ON-CENTER)



ON PAVEMENT



FIBER ROLL - ON SLOPE

# Incorrect Wattle Installation



Gaps between the wattles allow water and sediment to leave the site.



Gravel filled wattles are effective only if maintained and properly positioned.

# Mulching Bare Soil



- Hydro mulch used to stabilize soil pile during summer thunderstorms.



- Wood chips can be tilled-in to restore soil and promote revegetation.

# Mulching Bare Soil



- Excellent erosion control and rapidly introduces nutrients to the soil.
- Should not be used adjacent to residences.



- Tree branches and tree trunks spread over bare soil on road-to-trail project.

# Hydro-mulch or Hydro-seed



# Sediment Basins and Infiltration Ponds



- Typically used for permanent storm water control.
- Require regular maintenance.



- Fine particles float in the water and never settle out.
- Use wood chips or gravel.
- Use a water truck or fire hose.

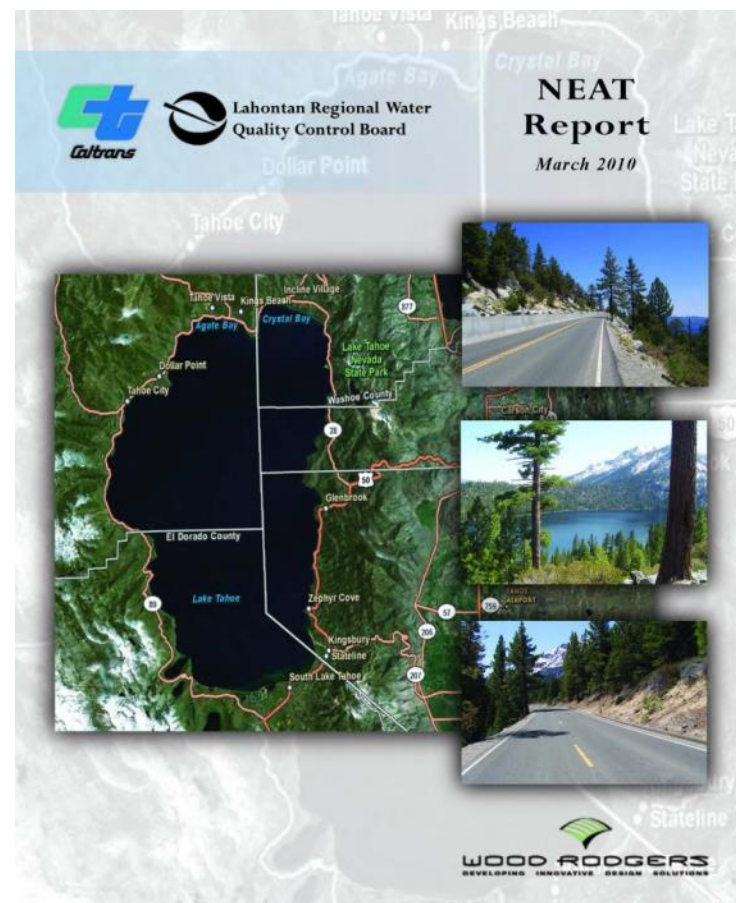


## **Dust Control**

# Sweeping Paved Surfaces



- Consensus based approach for the prioritization and selection of water quality improvements.
- Categorizes roadways into three specific designations:
  1. Natural Environment as Treatment (NEAT),
  2. Modified Natural Environment as Treatment (MEAT),
  3. Treatment (TREAT).
- Could be applied to rural roads when designing temporary erosion control.



## Caltrans NEAT Report Natural Environment as Treatment

# Construction Staging and Job Site Management



- **Staging Areas**
- **Repair and Maintenance of Machines**
- **Chemicals, Fuel and Oil**
- **Elimination of Construction Waste**
- **Avoiding Residential Areas**

# Staging Areas



- Staging areas must be pre-approved.
- Should be on previously disturbed areas, if not a restoration plan should be prepared.
- Staging areas need temporary erosion control and vegetation protection.
- Establish a boundary for staging areas.
- Restore the staging area to a condition better than when the project started.

# Repair and Maintenance of Machines



- Maintain heavy equipment away from streams.
- Maintain a regular maintenance schedule.
- Clean the air filter on a regular basis!
- Repair leaky hydraulic hoses immediately.



# Chemicals, Fuel and Oil



- Use secondary containment system to avoid spills.
- Cover tanks with a plastic tarp.
- Remove used oil from the site.
- Store buckets inside of a metal box or other structure.
- Maintain a large quantity of absorbent pads on site.

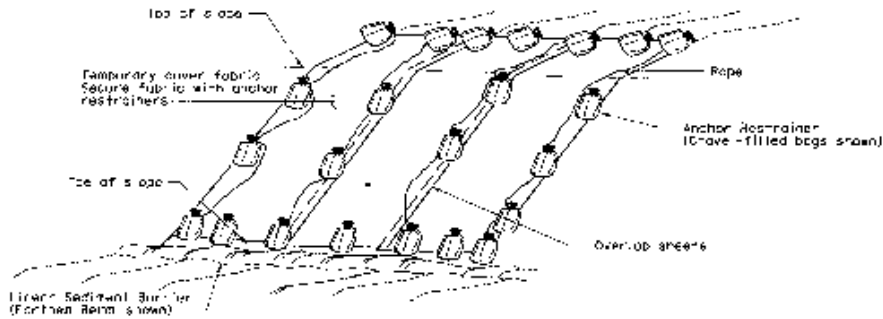
# Bad Staging Area



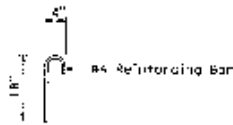
- Materials should not be placed on existing.
- Needs boundary and tree protection fencing.
- Needs temporary erosion control.
- Cover soil piles when not in use.

# Materials Stockpiling

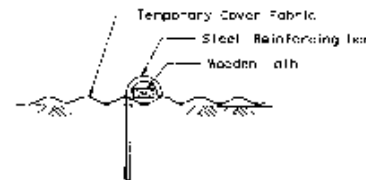
DATE	COUNTY	ROUTE	POST MILE	SHEET NO.
			OF 21 SHEETS	
<i>Robert B. Muth</i> LICENSED PROFESSIONAL ENGINEER				
May 11, 2006 PLATE APPROVAL DATE				
For State of California use only. Engineer or party shall not be responsible for the accuracy or completeness of electronic data of this plan sheet.				
Project No. Caltrans and State Highways Department				



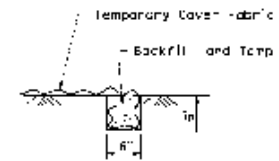
PERSPECTIVE  
TEMPORARY COVER ON SLOPE



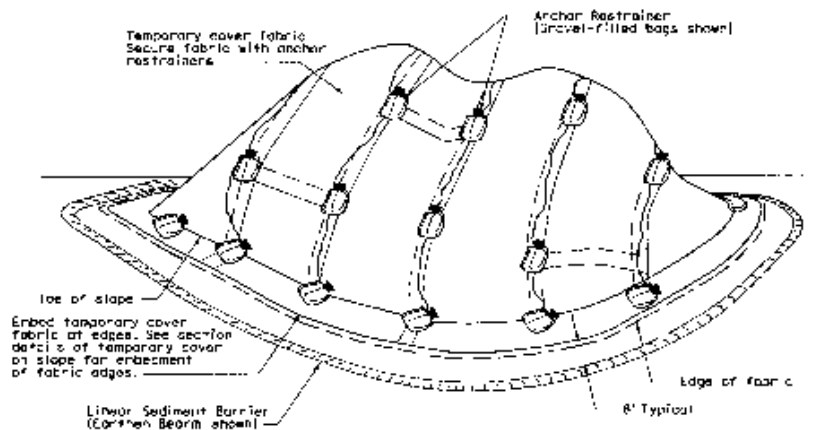
STEEL REINFORCING BAR DETAIL



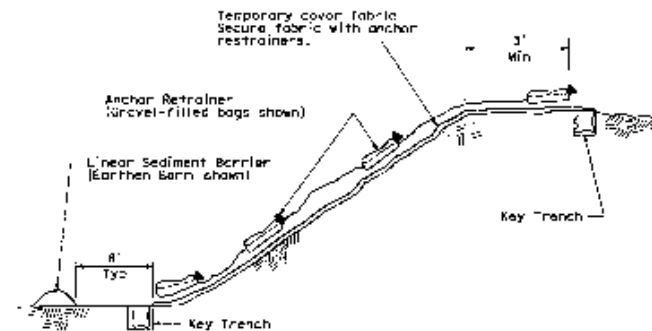
SECTION  
ANCHOR RESTRAINER  
(Steel bar and wooden trench)



SECTION  
KEY TRENCH DETAIL



PERSPECTIVE  
TEMPORARY COVER ON STOCKPILE

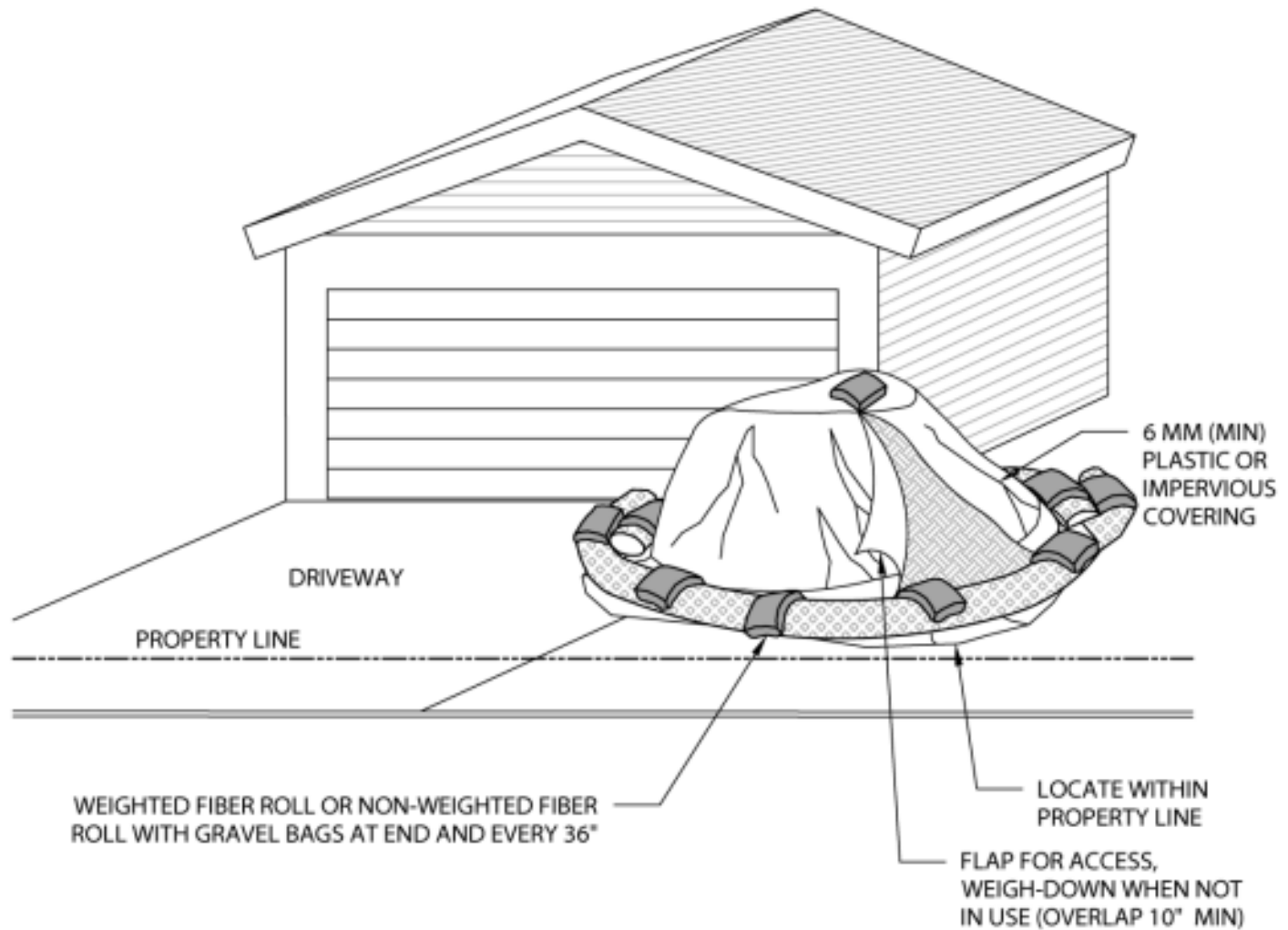


SECTION  
TEMPORARY COVER ON SLOPE

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**TEMPORARY WATER POLLUTION  
CONTROL DETAILS  
(TEMPORARY COVER)**

NO SCALE

## Stockpile Management Figure



# Covering Soil Piles

Without proper covers, soil piles are prone to erosion.



Good cover on soil pile eliminates erosion threat.



# Inadequate Pile Covers



- Inadequate weights to hold plastic in place.
- Plastic not covering entire pile.
- No wattle surrounding bare soil.

# Hazardous Materials Storage



- Improper storage resulting in a Cease & Desist Order and notification sent to County Public Health.

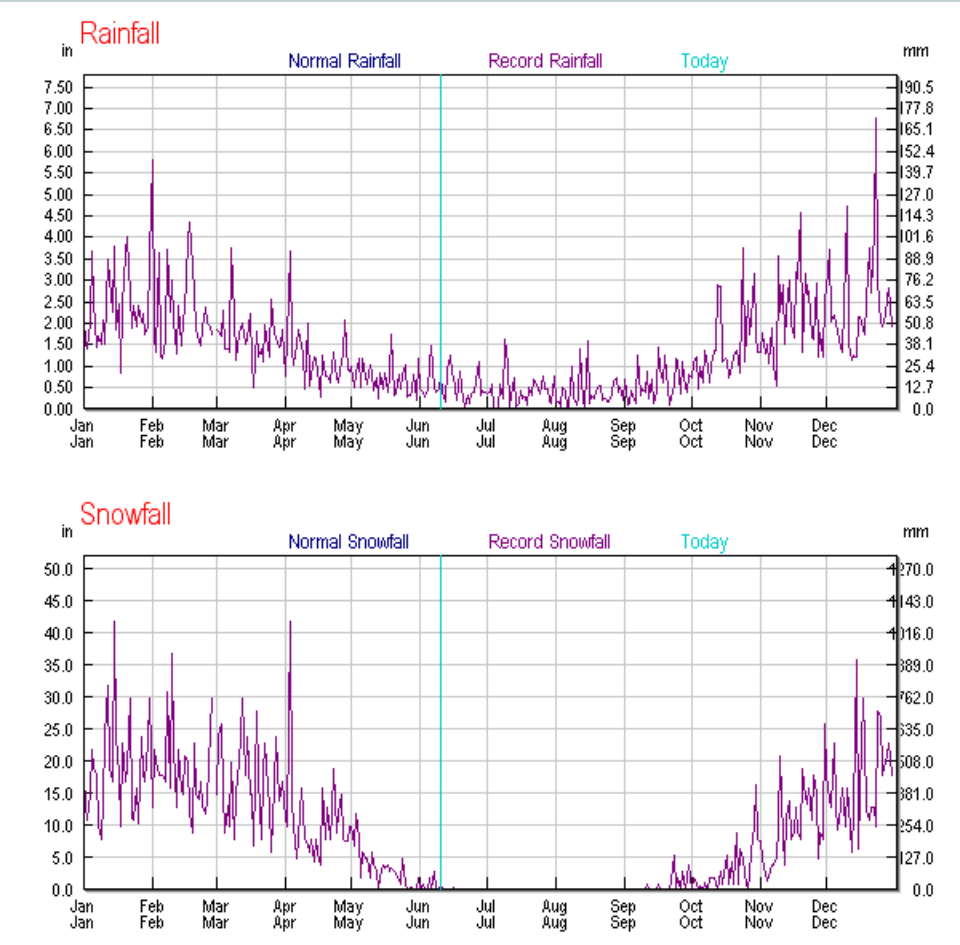


- Excellent control of materials

# Other Construction Site Management Issues



# Limit Construction to the Dry Season



# Limit the Area of Disturbance



- Identify the physical limits of the area to be disturbed.
- During construction, confine soil disturbance to areas previously identified.
- Keep the area of disturbance to a minimum size.
- Protect natural vegetation and avoid compaction of soil outside the construction limits.

# Progressive Permanent Erosion Control



- Implementing permanent erosion control measure throughout the entire project.
- Divide a project into several phases, and complete permanent erosion control during each phase.
- A small amount of erosion control work every day is better than doing all erosion control at the end of a project.

# Dewatering Plan



- Should be prepared prior to construction.
- Important on projects with deep excavation, especially in areas known to have high groundwater.
- Water should be disposed of by:
  1. Removal from the basin,
  2. Infiltrated into areas of high land capability or in existing infiltration basins, OR
  3. Discharged to surface waters after filtering or treatment to a higher quality than the receiving waters (may require additional permits).

# Portable Toilet Management



- Must be located where no hydrologic connectivity exists.
- Secure the toilet to prevent wind from knocking it over.

# Concrete Management



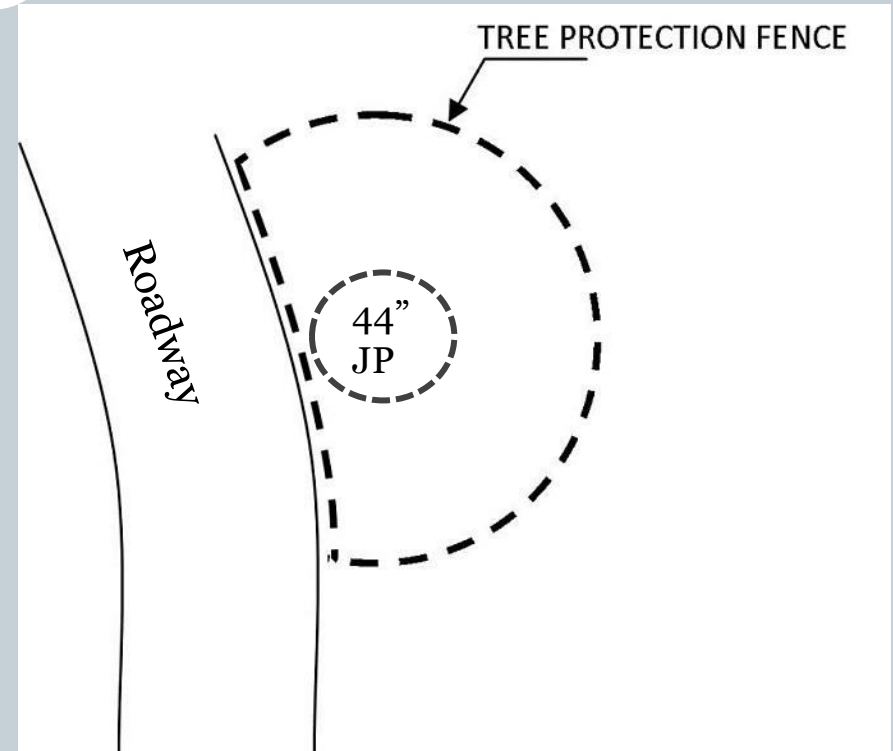
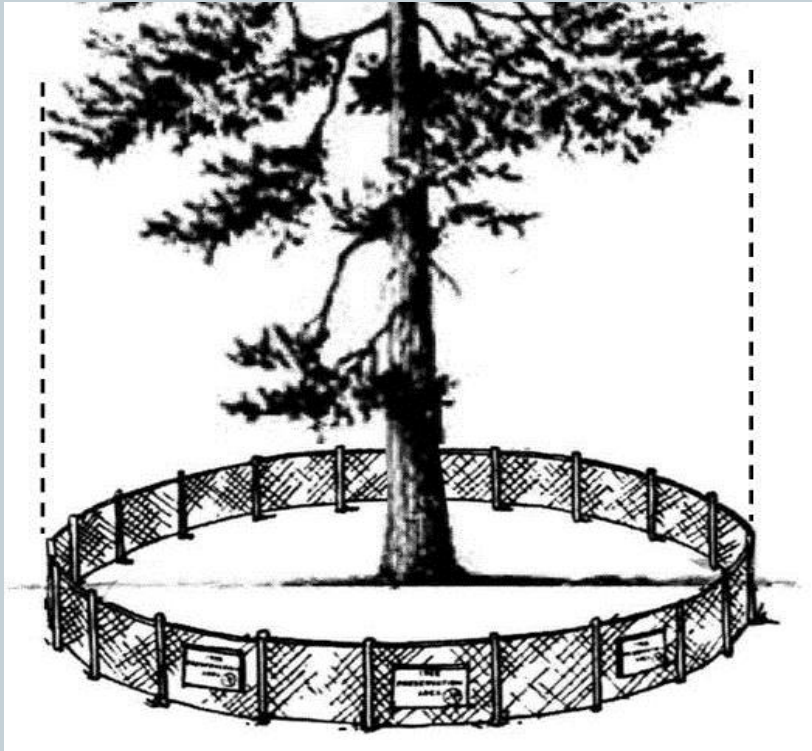
- Used during any concrete work.
- Washout facilities must be sized adequately to contain all waste materials.
- Locate washouts away from storm drains and water bodies.
- Must be water-tight.
- Dispose of all waste materials properly.
- Cement trucks and large equipment should be washed off-site.

# Concrete Management



- Always use a bin or tub specifically designated for concrete waste.

# Tree Protection Fencing



- Fencing must be extended to the drip line of all tree.
- Fencing should be at least 4-ft tall.
- If trees are close to road, fencing can be adjusted as needed.

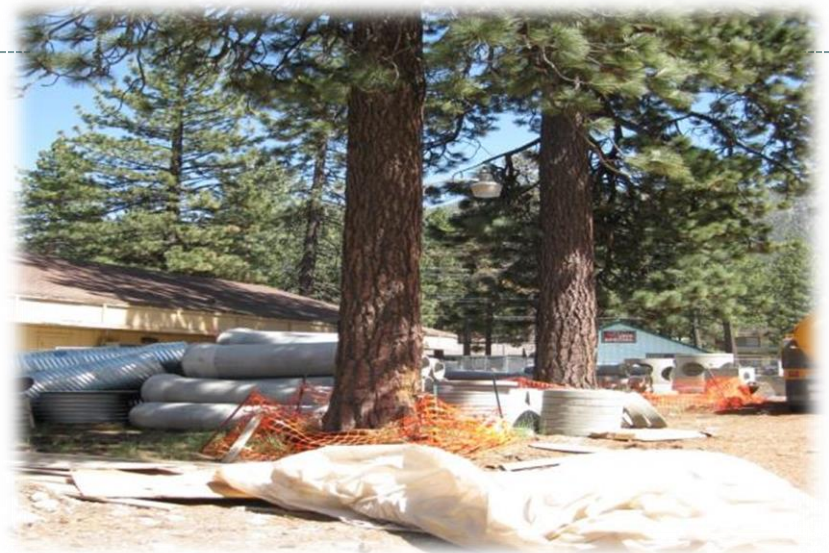
# Good Tree Protection



# OK Tree Protection



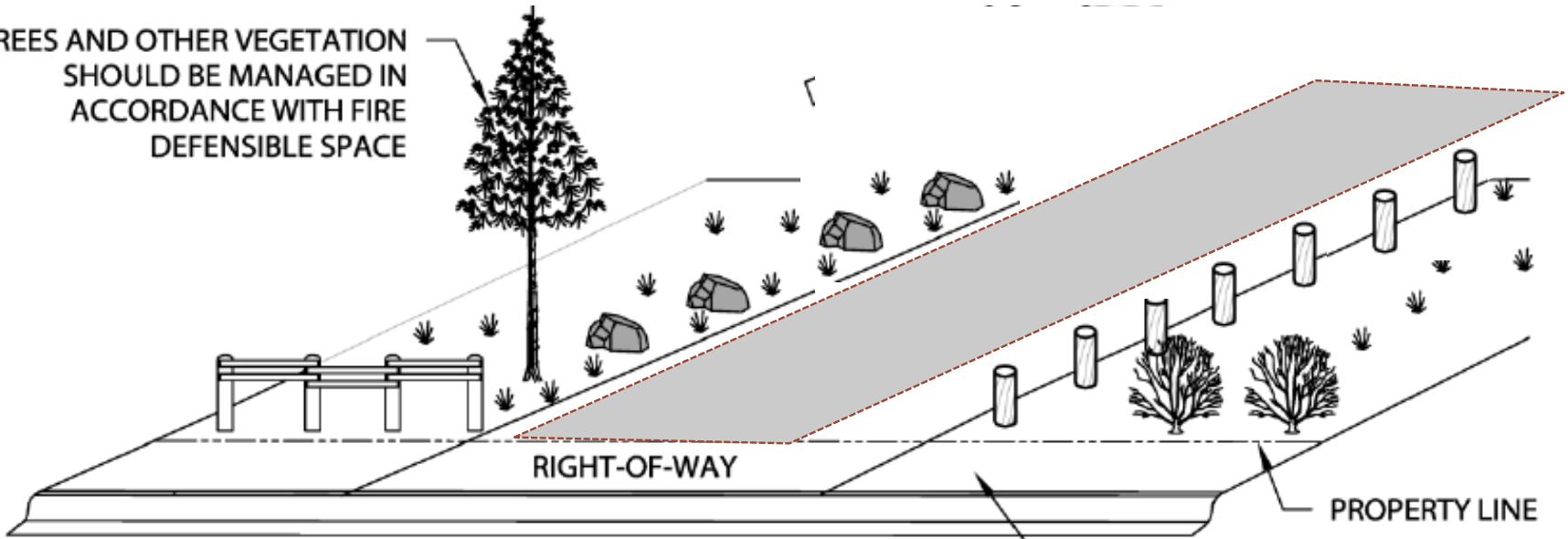
# Bad Tree Protection



# Parking Barriers



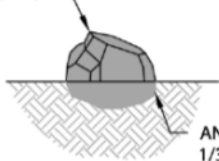
TREES AND OTHER VEGETATION SHOULD BE MANAGED IN ACCORDANCE WITH FIRE DEFENSIBLE SPACE



PARKING BARRIER PLACEMENT

DO NOT INSTALL PARKING BARRIERS WITHIN THE RIGHT-OF-WAY

3" DIA. (MIN)

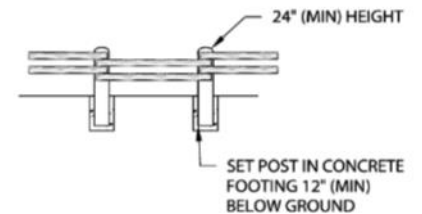
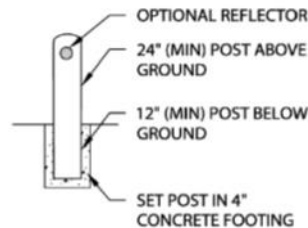


BOULDER SECTION

ANCHOR BOULDER BY PLACING 1/3 TO 1/2 OF DIAMETER BELOW FINISHED GRADE



ESTABLISHED VEGETATION

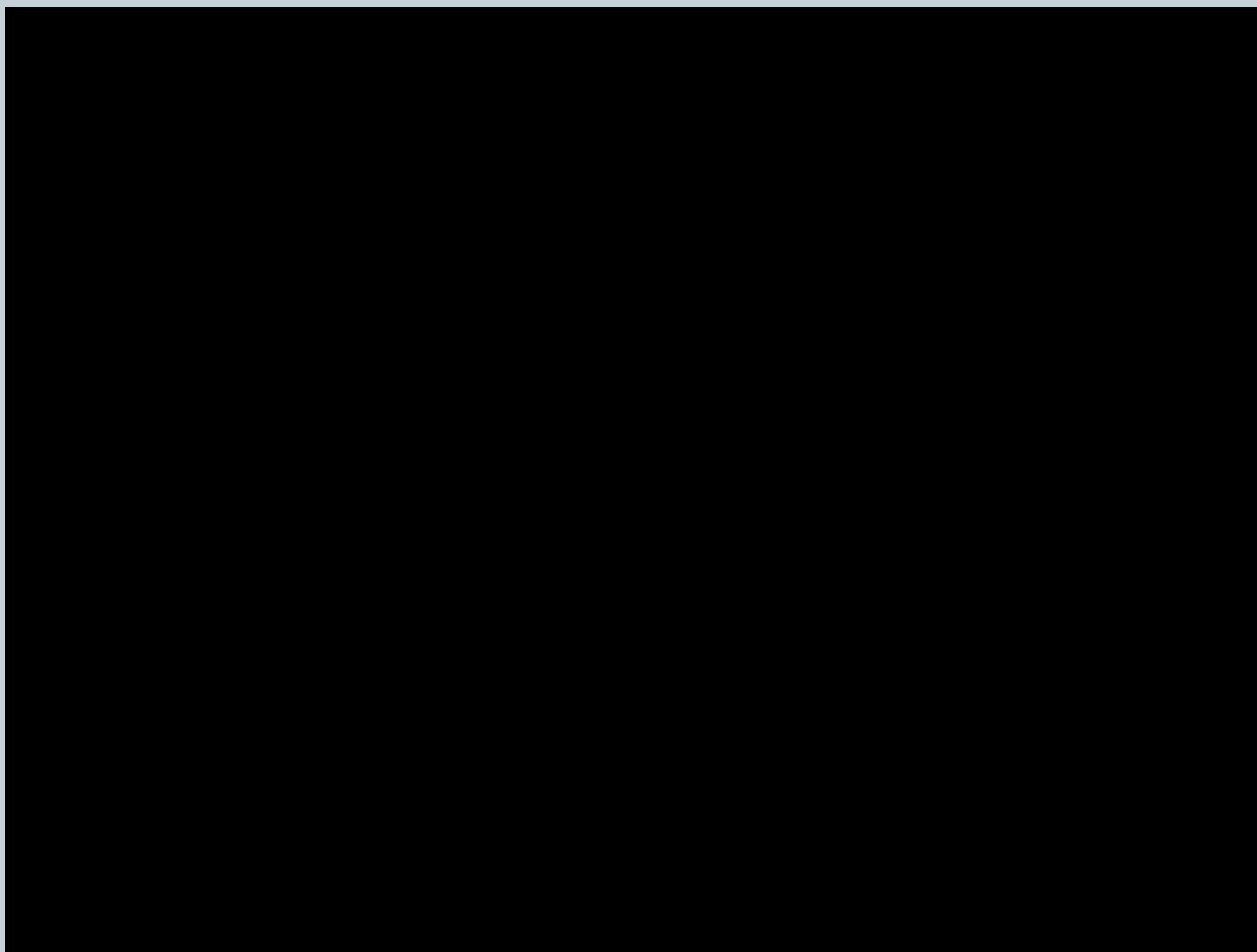


# Parking Barriers



- Break away bollards, boulders, fence, trees or large shrubs.
- Barriers should be set back from the edge of pavement
- $\frac{1}{2}$  of boulder should be below soil.

# Road Removal



# Conclusion



10 29 2007