

APPENDIX D.

DRAINAGE AND EROSION CONTROL

ON-SITE DRAINAGE RETENTION STRATEGIES

For years the prevailing way of handling drainage on a property was to direct it downhill and off-site through a variety of methods. As the number of buildings and the amount of impervious surfaces grew, so did the problem with the stormwater runoff. The runoff from the built environment caused a dramatic increase in the amount of water flowing into the drainages, thus accelerating erosion and scouring in the creek channels. The quality of the stormwater was also a problem, as runoff from storm events carried with it everything from car oil, to septic wastes.

In 2001, the Los Angeles Regional Water Quality Control Board ruled that retaining the runoff from the first 3/4-inch rainstorm on-site would substantially reduce non-point source pollution in our waters. This reflects a general trend in recognizing that management of drainage from the built environment could provide numerous benefits when integrated with a thoughtful site design. The Permaculture movement, as well as many sustainable design processes has numerous plans to draw from. This document is merely meant to get you started in thinking about how to capture and use the stormwater runoff from your property more productively.

INTEGRATED SITE DESIGN

Fire Protection

In Topanga, fire protection is a real concern. Collecting rainwater and storing it on site in cisterns, old septic tanks, water features like ponds and pools, provides a ready source of water to fight a fire. The addition of a small generator, pump or even one of the foam or gel systems can significantly increase the protection of a property.

Irrigation

Depending on the size of the collection and storage areas, it could be possible to provide supplemental landscape irrigation from rainwater.

Landscaping

The use of ponds and pools in the landscape can add tremendously to the aesthetics of a property. In addition to providing visual benefits, these resources could also be used during a fire. The use of infiltration basins and green berms to capture driveway or road runoff is another great idea that enhances groundwater recharge.

Storage Ideas:

- Cisterns – both above and below ground
- Septic tanks – old systems no longer in active use
- Plastic inflatable bladders used for pickup trucks
- Rain barrels or trash cans

Remember that ponded water can attract nuisance insects like mosquitoes if not covered!

PLANTS THAT HOLD UP SLOPES

Presented by Rosi Dagit, Senior Conservation Biologist, RCDSMM
4 March 2000, Streambank and Slope Stabilization Workshop, Topanga, CA

Background Thoughts:

Use of plant materials to stabilize slopes is as old as agriculture. Historically, civilizations have prospered or failed along with their natural resources, specifically their watersheds. At the dawn of the 21st century, we should think carefully about how best to repair the damage done to our watersheds to ensure that we, along with the landscape, prosper in the years ahead.

First it is necessary to define the role of plants in a streambank or slope stabilization project.

- Is this project solely designed to be functionally stable?
- Are there opportunities to enhance or restore degraded habitat?
- Is the goal to create a managed garden or a functional habitat?
- How do plants fit into the context of the whole stream/slope?

Important to evaluate every project within the context of the whole.

Piecemeal efforts at streambank or slope protection often fail if they do not clearly identify the underlying problems and seek to solve them within the context of up and down stream/slope constraints.

Streambank and slope repairs provide numerous opportunities for restoring some of the habitat lost to development. Providing a variety of features (sun/shade, vegetation height, substrates from sand to boulder, runs, riffles and pools, etc.) will support more critters!

Think big! Look at the problem not only from the specific site scale, but also include adjoining property or the whole stream reach if necessary. Most project failures are due to incomplete problem analysis, followed by faulty installation!

Streamside Plants:

Along streambanks, vegetation is critical. Preserving existing trees and understory plants will enhance stream complexity and prevents further downcutting or bank failures downstream if done properly.

Narrow channels can pose special problems that especially need to be integrated into a comprehensive hydrologic picture. It is sometimes possible or necessary to use rocks to stabilize the toe of a slope/bank, and then utilize vegetation to stabilize the upper areas.

Shade is often a problem in establishing willows, since they require sun to get going. Need to be cautious about removing large trees, since they provide important structural stability. Careful pruning may allow adequate light.

Be aware of roots during the construction phase. It is best to be flexible to work with them, rather than cut or remove them.

Trees with exposed roots can be shored up using a number of different strategies. Pick the plan that fits into an integrated stream context, not just because it is a quick fix.

Remember that trees stabilize the banks for free, and add tremendous habitat value, moderate stream temperatures and soften impacts of stormwater runoff. It costs hundreds to thousands of dollars to replace their benefits.

*****Important to install a project so that it is able to withstand a design storm immediately, with long term benefits of plantings filling in over time.**

Be sure to use appropriate native species for maximum habitat value.

Non-native invasive species like Giant Bamboo (*Arundo donax*), German Ivy and Vinca deplete the water table and out compete the native species. The ivy and vinca root to approximately 12 inches and smother the roots of oaks, bays and sycamores nearby. *Arundo* spreads by rhizomes or rooting of small fingernail size pieces. Once established, it is extremely difficult to remove. *Arundo* does not bend like native willows, and has been known to cause severe erosion problems during flooding. Get rid of these pests!

Slope Planting:

Critical to carefully understand the site conditions including:

- drainage, soil type, water table depth and fluctuation, exposure, orientation

Roots cannot grow in soils compacted to more than 85%.

Subsoils on cut slopes pose even greater problems since all organic matter is gone. May be necessary to do stratified planting starting with pioneer species, using mycorrhizal inoculants or replacing lost topsoils, followed by more permanent planting after soil is rejuvenated.

Irrigation often needed in order to get drought tolerant plants established but needs to be used with great care since saturated slopes will fail.

Be sure to integrate the planting plan with fuel modification for firesafety needs.

Mosaics of plants that have different rooting depths is more effective at holding a slope than use of a single ground cover. Native shrubs are particularly deep rooted, fire adapted and have dense canopies that are good for dispersing rain and reducing runoff.

Planting is best done in fall to take advantage of winter rainy season.

Drainage swales on long steep slopes can be planted to reduce runoff problems.

Usually need to install some type of mechanical slope protection (jute netting, rice straw or other mulch, geotextile fabrics) first, so that slope holds until plants generate sufficient cover.

A mix of locally collected seeds, and appropriate small container plants is a good way to start.

Be sure to group plantings according to irrigation needs! Trees like a long slow soaking with intermediate drier periods. Grasses and low shrubs need more frequent watering.

Don't underestimate the magic of mulch! A layer 2-6 inches deep can suppress weeds, modify soil temperatures, conserve water, and provide a wonderful habitat for beneficial soil organisms. Plants grow better in mulch!

See attached specifications for more details about particular techniques.

Stream specialist Ann Riley proposed some questions to ask when thinking about these kinds of projects:

1. Whose land or what structures are being protected by the project, and who is paying for the project?
2. Can the structures in danger be moved or relocated to at a lower cost than that for stabilizing the stream bank?
3. What is the cause of the "destabilization"? Is there a bridge abutment, existing bank protection or other feature that might be modified to prevent the problem?
4. Will the stabilization works cause bank erosion on the opposite downstream bank? Will it potentially cause erosion upstream or downstream of the bank protection?
5. Will the project require removal of the native vegetation and ongoing maintenance to keep the vegetation from returning? What are the typical long-term maintenance costs for similar projects?
6. Will the project require the use of herbicides?
7. Will the stabilization project reduce aquatic habitat and riparian wildlife habitat, or will it enhance those habitats?
8. Have the dynamics of the stream been studied so that potential reactions of the stream to the project have been considered? Do potential reactions include the stream forming unwanted cutoffs through meanders or change of gradient?
9. Are the project and the costs being compared with potentially less costly stabilization methods?
10. Have soil bioengineering techniques (using live or dead plant materials) been evaluated as a project alternative?
11. How have similar projects on this stream or in the region performed on a long-term basis?
12. What social, historical, environmental, and economic impacts could result from this project? Will we be gaining or losing opportunities for enhancing the community's identity, aesthetics, and economic welfare as a result of this project?

BIOENGINEERING METHODS FOR SLOPE STABILIZATION

By Robbin Sotir, Soil Bioengineering Consultant

1. SOIL BIOENGINEERING

Soil bioengineering is an integrated technology that uses sound engineering practices in conjunction with integrated ecological principles to assess, design, construct and maintain living vegetation systems to repair damage caused by erosion and failures in the land and to protect and enhance healthy functioning systems (Sotir 2001). This is achieved frequently in association with inert materials such as rock, wood, geosynthetics and geocomposites.

Appropriately applied, soil bioengineering offers a cost-effective and attractive approach for stabilizing stream banks and slopes against surface erosion, seepage conditions and shallow mass movement, capitalizing on the benefits and advantages that vegetation offers. Woody vegetation improves the hydrology and mechanical stability of slopes through root reinforcement and surface protection. The biological and mechanical elements must be analyzed and designed to work together in an integrated and complementary manner to achieve the required project goals. In addition to using engineering principles to analyze and design the slope stabilization systems, plant science and horticulture are needed to select and establish the appropriate vegetation for root reinforcement, erosion control, aesthetics and the environment. Numerous areas of expertise integrate to provide the knowledge required for success.

2. WHEN TO USE SOIL BIOENGINEERING

It is important to understand what soil bioengineering can offer over conventional methods alone, and if this offering is the required and an appropriate choice for the project. Soil bioengineering methods may have numerous advantages over conventional engineering methods for a particular project. Typically, we look at a number of multi-objective goals and requirements such as ecological, aesthetic, economic and educational. Essentially, if any of these goals cannot be fully met using conventional methods alone then soil bioengineering is justified.

Soil bioengineering performs far more than erosion control, re-vegetation and rehabilitation. Once soil bioengineering is designated as the required appropriate approach. The next step is to choose the correct measure(s) to eliminate the damage.

Table 1 illustrates the use of soil bioengineering methods to satisfy different soil and site conditions on stream corridors and upland slopes. It indicates the suitability of a system design to control particular factors or failure processes as well as the intensity or types of condition. In the case of stream systems, toe areas may also require additional protection against scour. Typically, several factors, failure processes and conditions may be found on a particular site, requiring stabilization and restoration.

In addition to reducing surface erosion, functioning as drainage features and improving streambank slope stability, woody plants also provide a host of environmental benefits for aquatic, riparian and upland wildlife. Soil bioengineering methods that use woody vegetation to restore upland and stream areas offer many advantages (see Tables 2 & 3). These tables offer guidance in meeting environmental and recreational goals. Beginning with site assessment and a clear understanding of the problem and future needs, it is important to select the appropriate soil bioengineering foundation system in the initial installation to ensure that it becomes part of the complex relationships that will serve to not only connect land, water, plant and animal life, but to integrate their function. When this occurs, other plants typically invade, creating a rich, diverse community that offers long-term site protection and enhancement.

TABLE 1
Suitability of Different Soil Bioengineering Methods
For Stream Corridors & Upland Slopes
Based on Soil & Site Conditions

Factor or Failure Process	Intensity or Type of Condition	Soil Bioengineering Methods						
		Live Staking	Live Fascine	Brush-layering	Branch-packing	Live Cribwall	Live Siltation Construction	VRSS
Slope Gradient	Steep		✘	✓	n/a	✓	✘	✓
	Moderate		✓	✓	n/a	✓	✓	✓
	Gentle	✓	✓	n/a	n/a	✓	✓	
Slope Height	High	✓	✓	✓	n/a		✓	✓
	Low	✓	✓	✓	n/a	✓	✓	✓
Soil Depth	Deep	✓	✓	✓	✓	n/a	✓	✓
	Shallow		✓			n/a		
Soil Erodibility	High		✘	✓		n/a	✘	✓
	Moderate		✓	✓	✓	n/a	✓	✓
	Low	✓	✓		✓	n/a	✓	✓
Soil Strength	Moderate	✓	✓	✓	n/a	n/a	✓	n/a
	Low	n/a	✓	✓	n/a	n/a	✓	n/a
Slope Type	Cut	✓	✓	✓	✓		✓	
	Fill	✓	✓	✓	✓	✓		✓
Surficial Erosion		✓	✓		✓		✘	
Mass Movement	Shallow	✓		✓	✓	✓		
	Moderate			✓				✓

Revised Sotir 2002;
Adapted from Gray & Sotir 1996

TABLE 2
Environmental Enhancement For Upland Slopes

Method	Enhancements			
	Surface Cover/ Canopy	Natural Invasion	Upland Habitat	Litter Layer Development
Live Staking	fair - v. good ¹	fair	fair - good	fair
Live Fascines	fair - v. good	good - excellent	good	good
Brushlayer (cut)	good - excellent	good - excellent	good - excellent	good - excellent
Brushlayer (fill)	good - excellent	v. good - excellent	good - excellent	v. good - excellent
Brushpacking	negligible	fair	negligible - fair	negligible
VRSS ²	good - excellent	good - v. good	good - v. good	fair - good
Live Cribwall	negligible	fair	fair	fair
Conventional Vegetation	fair - v. good ¹	negligible - fair	fair	fair

Sotr 2002

¹Takes years to develop

²Vegetated Reinforced Soil Slope

TABLE 3
Soil Bioengineering Relative
Environmental Benefits For
Stream Restoration

Methods	Create or Preserve Scour Holes	Shade & Overhang Cover	Riparian Habitat
VRSS¹	good	excellent	low - good
Live Cribwall	fair ²	excellent	low - fair
Live Siltation Construction	n/a	fair - good	fair - good
Brushmattress	n/a	fair - good	low - v. good
Live Fascine	low - fair ²	good - v. good	low - v. good
Joint Planting	n/a	good - v. good	low - good
Live Stake	n/a	fair - good	good - v. good

Softr 2002

¹Vegetated Reinforced Soil Slope

²Varies with materials & geometry of toe stabilization

3. STREAM & RIVER SYSTEMS

Slopes along streams and rivers have special problems due to erosion and scour by flowing water. Geotechnical failures associated with surface and groundwater seepage often add complexity to the problem. As velocities increase so do the erosive powers of the flowing water. Vegetation is able to reduce erosion via the branches that bend over and protect the bank face during floods and reduce the velocities along the near bank. The roots physically hold the soil particles together and increase the bank strength.

4. BENEFITS OF WOODY VEGETATION

Vegetation can be an excellent choice in reducing surface erosion. However, the main benefits of woody vegetation on the mass stability of slopes and streambanks are root reinforcement, soil moisture depletion, buttressing and arching and surcharge. While there can be adverse effects, most of these such as windthrow and surcharge can largely be eliminated through the appropriate vegetation selection; slope design and selective pruning.

The use of woody plant materials, purposely arranged and imbedded during construction offers:

- Immediate erosion control for slopes; streambanks and shorelines;
- Improved face stability through mechanical reinforcement by roots;
- Reduced maintenance costs;
- Modification of soil moisture regimes through improved drainage and depletion of soil moisture and increase of soil suction by root uptake and transpiration;
- Enhanced wildlife habitat and ecological diversity;
- Improved aesthetic quality and naturalization; and
- Additional environmental benefits including air and water quality improvements via:
 - Cleansing, filters out pollutants
 - temperature modification
 - noise absorption due to the soil mass
 - *reduction in quantity and time of runoff improving stormwater management*

5. VEGETATION

5.1 Selection

The vegetation used in the soil bioengineering system is typically in the form of live woody branch cuttings from species that root adventitiously, bare root, tublings and/or container plants. Plant materials may be selected for a variety of tolerances including drought, salt, flooding, fire, deposition, and shade. They may be chosen for their environmental wildlife value, water cleansing capabilities, flowers, branches and leaf color or fruits. Other interests for selection may include size, form, and rooting rate of growth characteristics and ease of propagation. The decision to use natives, naturalized or ornamental species is also an important consideration. Time of year for construction of a soil bioengineering system also plays a critical role in plant selection.

5.2 Placement

The plant materials are placed on terraces, in trenches or directly installed via tamping. The process of plant installation is best and least expensive when it occurs simultaneously with the conventional construction activities, but may be incorporated later.

5.3 Development

Typically, soil bioengineering systems offer immediate results from the surface erosion control structural/mechanical and hydraulic perspectives. Over time, (generally within the first year) they develop substantial top and root growth further enhancing those benefits, and providing aesthetic, recreational and environmental values (See Figures 1, 2 and 3).

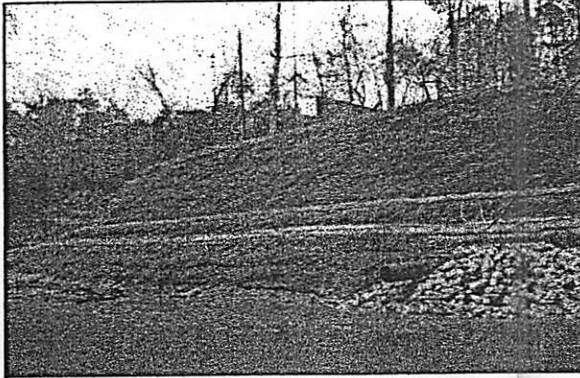


Figure 1. Soil bioengineering streambank immediately after construction

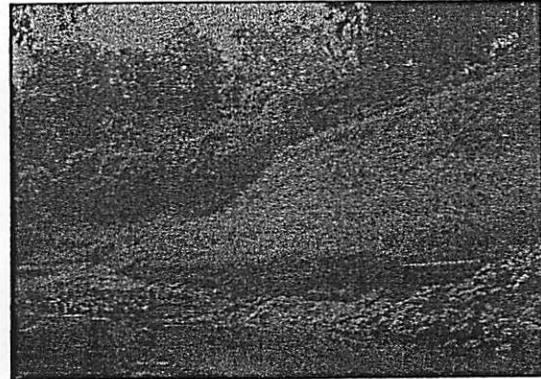


Figure 2. Early in the first growing season

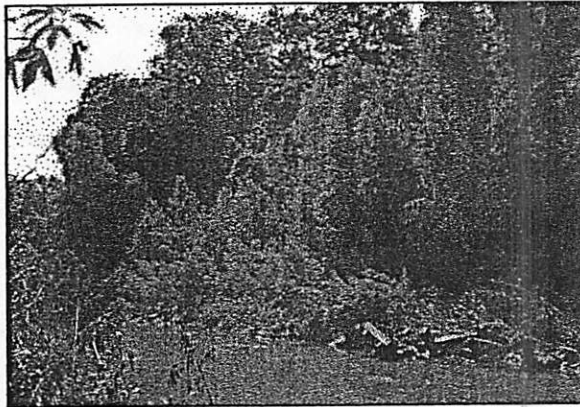


Figure 3. The streambank 5 years after construction

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE SPECIFICATION

484 – MULCHING

I. SCOPE

The work shall consist of furnishing all materials and placing them on all exposed, disturbed, or barren areas within the field or project area to the limits as shown on the drawings, or as staked in the field.

II. MATERIALS

Straw

Straw shall be new straw derived from rice, wheat, oats, or barley. Clearance shall be obtained from the County Agricultural Commissioner, as required by law, before straw obtained outside the county in which it is to be used is delivered to the site.

Wood Fiber

Wood fiber shall be a wood cellulose fiber that contains no germination nor growth inhibiting factors. The wood fiber shall be produced from nonrecycled wood such as wood chips or similar wood materials and shall have the property to be evenly dispersed and suspended when agitated in water. It shall be colored with a nontoxic water-soluble green dye to provide a proper gauge for metering of material over ground surfaces.

The wood fiber mulch may also be produced from the following materials:

- a. recycled wood fiber, such as wood chips or similar wood materials
- b. a combination of recycled newsprint and cardboard materials that contain at least 50 percent cardboard, or
- c. a combination of recycled newsprint and non-recycled wood fiber or recycled wood fiber materials that does not contain more than 50 percent newsprint

Tackifier

Tackifier material shall be one of the following or other material specified on the Practice Requirements sheet and shall have the property to be evenly dispersed and suspended in water when agitated: M-Binder, Sentinel, Ecotak-SAT, Fish-STIK, and Soil Master WR.

Other Materials

Other mulch materials shall be used when specified on the Practice Requirements sheet.

III. MULCHING DATE

Mulching shall be performed prior to November 15th unless otherwise specified on the Practice Requirements sheet.

IV. SITE PREPARATION

The area to be mulched shall be weed free and have a uniform surface. No implement shall be used that will create an excessive amount of downward movement of clods on sloping areas.

Rocks larger than 6 inches in diameter, trash, weeds and other debris that will interfere with mulching or maintenance shall be removed.

Site preparation shall be suspended when soil moisture conditions are not suitable for obtaining a satisfactory surface.

V. APPLYING THE MULCH

Use one of the following methods of application as specified on the Practice Requirements sheet.

Mulching with Straw

A straw covering shall be distributed uniformly over the area at the rate of 2 tons per acre unless a different amount is specified on the Practice Requirements sheet. The straw shall be applied by hand, blower, or other suitable equipment. If straw is applied by blower, it shall not be chopped in lengths less than 6 inches.

Mulching with Wood Fiber

A wood fiber covering shall be distributed uniformly over the area in a water slurry by hydroseeder.

The slurry shall contain wood fiber at the rate of 2,000 pounds per acre with a tackifier unless a different amount is specified on the Practice Requirements sheet.

Application rates for wood fiber mulch products that have moisture contents greater than 15 percent shall be increased by the following factor, c:

$$c: = \frac{85 \text{ percent}}{\text{percent fiber (solids) in product}}$$

The application rate of the tackifier shall be:

Tackifier	Rate	Wood Fiber Mulch
M-Binder	100lbs	1,500 to 2,000lbs
Sentinel	100lbs	1,500 to 2,000lbs
Ecotak-SAT	100lbs	1,500 to 2,000lbs
Fish-STIK	100lbs	1,500 to 2,000lbs
Soil Master WR	100gal	2,000 to 2,500lbs

The hydroseeder shall be equipped with a built-in continuous agitation system of sufficient operating capacity to produce a homogenous slurry and a discharge system that will apply the slurry to the slopes at a continuous and uniform rate.

The materials shall not remain in the slurry longer than two (2) hours. Water used shall be potable water or Class 1 or 2 agricultural irrigation water.

Mulching with Gravel

A gravel covering or covering of other inorganic material specified on the Practice Requirements sheet shall be distributed uniformly over the area at the rate specified on the Practice Requirements sheet to provide 100 percent ground cover.

Mulching with Other Materials

The material(s) specified on the Practice Requirements sheet shall be distributed uniformly over the area at the rate specified on the Practice Requirements sheet to provide at least 80 percent ground cover unless otherwise specified on the Practice Requirements sheet.

Anchoring the Mulch

When specified on the Practice Requirements sheet, the straw mulch shall be anchored in place. Anchoring process may include hand tools, mulching rollers, disks, or similar types of suitable equipment alone or in combination with a hydro-mulch material and shall be performed in a satisfactory manner. When specified on the Practice Requirements sheet, hydro-mulch material alone may be used.

The hydro-mulch material shall be applied uniformly over the straw in a water slurry by hydroseeder within 48 hours following mulching. Unless otherwise specified on the Practice Requirements sheet, the hydro-mulch shall be wood fiber mulch, a tackifier, and water in the following portions per acre:

Tackifier	Rate	Wood Fiber	
		Mulch	Water
M-Binder	100 lbs	150 lbs	700 gal
Ecotak-SAT	100 lbs	150 lbs	700 gal
Sentinel	100 lbs	500 lbs	2,000 gal
Fish-STIK	60 lbs	500 lbs	3,000 gal
Soil Master WR	100 gal	250 lbs	1,000 gal

Application rates for wood fiber mulch products that have moisture contents greater than 15 percent shall be increased by the following factor, c:

$$c: = \frac{85 \text{ percent}}{\text{percent fiber (solids) in product}}$$

The hydroseeder shall be equipped with a built-in continuous agitation system of sufficient operating capacity to produce a homogenous slurry and a discharge system that will apply the slurry to the slopes at a continuous and uniform rate.

The materials shall not remain in the slurry longer than two (2) hours. Water used shall be potable water or Class 1 or 2 agricultural irrigation water.

The slurry shall be continuously mixed and shall be mixed for at least five (5) minutes after the last addition before application starts.

The slurry shall be applied uniformly over the site at a rate that is nonerosive and minimizes runoff.

VI. OTHER REQUIREMENTS

Operations shall be done in such a manner that soil erosion and air and water pollution are minimized and held within legal limits.

The owner, operator, contractor, and other persons shall conduct all work and operations in accordance with proper safety codes for the type of equipment and operations being performed with due regards to the safety of all persons and property.

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE SPECIFICATION

342B - CRITICAL PLANTING AREA - HYDRO MULCH

I. SCOPE

The work shall consist of furnishing all materials and placing them on all exposed, disturbed, or barren areas within the project area or site to the limits as show on the drawings or as staked in the field.

II. MATERIALS

Seed

All seed shall be delivered to the site tagged and labeled in accordance with the California Agricultural Code, and shall be acceptable to the County Agricultural Commissioner.

Bag tag figures will be evidence of purity and germination. Time since date of seed test shall not exceed 9 months.

Seed shall be of a quality that weed seed shall not exceed 0.5 percent of the aggregate of pure live seed (PLS) (percent germination x percent purity) and other material.

Fertilizer

Unless otherwise specified on the Practice Requirements sheet, all fertilizer shall be Ammonium Phosphate Sulfate containing a minimum of 16 percent Nitrogen, 20 percent available phosphoric acid and 0 percent water soluble potash and be uniform in composition, dry and free flowing, pelleted or granular.

All fertilizer shall be labeled in accordance with applicable state regulations and bear the warranty of the producer for the grade furnished.

Inoculants

The inoculant for treating legume seeds shall be a pure culture of Nitrogen fixing bacteria prepared specifically for the plant species and shall not be used later than the date indicated on the container. A mixing medium, as recommended by the manufacturer or approved substitute, shall be used to bond the inoculant to the seed. For nonpellet inoculated seed, two times the amount of the inoculant recommended by the manufacturer shall be used and seed shall be sown with 24 hours.

For pellet inoculated seed, at least 30 pounds of inoculant shall be used per 1,000 pounds of raw seed and the seed shall be labeled to show the Lot Number, Expiration Date, and Percent Coat of the finished product. Pellet inoculated seed shall be kept cool and sown within 180 days.

Wood Fiber

Wood fiber shall be a wood cellulose fiber that contains no germination nor growth inhibiting factors. The wood fiber shall be produced from nonrecycled wood such as wood chips or similar wood materials and shall have the property to be evenly dispersed and suspended when agitated in water. It shall be colored with a nontoxic water soluble green dye to provide a proper gauge for metering of material over ground surfaces.

The wood fiber mulch may also be produced from the following materials:

- a. recycled wood fiber, such as wood chips or similar wood materials
- b. a combination of recycled newsprint and cardboard materials that contain at least 50 percent cardboard, or
- c. a combination of recycled newsprint and non-recycled wood fiber or recycled wood fiber materials that does not contain more than 50 percent newsprint

Tackifier

Tackifier material shall be one of the following or other material specified on the Practice Requirements sheet and shall have the property to be evenly dispersed and suspended in water when agitated: M-Binder, Sentinel, Ecotak-SAT, Fish-STIK, and Soil Master WR.

III. SEEDING MIXTURE AND PLANTING DATE

The seed(s) and rate(s) specified on the Practice Requirements sheet shall be used. The seeding rate(s) shall be the weight exclusive of any coating material. Any legume seed used shall be inoculated. Based on bag tags, seeding rates shall be adjusted to insure the required amounts of pure live seed.

Planting shall be performed after final grading is completed unless otherwise specified on the Practice Requirements sheet.

IV. SEEDBED PREPARATION

The area to be planted shall be weed free and have a firm seedbed which has previously been roughened by scarifying, disking, harrowing, chiseling, or otherwise worked to a depth of 2 to 4 inches. No implement shall be used that will create an excessive amount of downward movement of clods on sloping areas. Seedbed may be prepared at time of completion of earth moving work.

Rocks larger than 6 inches in diameter, trash, weeds, and other debris that will interfere with seeding or maintenance shall be removed.

Seedbed preparation shall be suspended when soil moisture conditions are not suitable for obtaining a satisfactory seedbed.

V. FERTILIZING, SEEDING, MULCHING

Fertilizing

Fertilizer shall be distributed uniformly over the seedbed at the rate of 500 pounds per acre unless a different amount is specified on the Practice Requirements sheet.

Fertilizer shall be applied hydraulically by hydroseeder in the form of a slurry that also contains the required seed. Fertilizer shall not remain in the slurry longer than two (2) hours.

Seeding and Mulching

Seed shall be distributed uniformly in a water slurry by hydroseeder.

The hydroseeder shall be equipped with a built-in continuous agitation system of sufficient operating capacity to produce a homogeneous slurry and a discharge system which will apply the slurry to the slopes at a continuous and uniform rate.

Seed shall not remain in the slurry longer than thirty (30) minutes. The slurry shall also contain wood fiber at the rate of 1500 pounds per acre, tackifier, and the required fertilizer unless otherwise specified on the Practice Requirements sheet. The wood fiber shall not remain in the slurry longer than two (2) hours. Water used shall be potable water or Class 1 or 2 agricultural irrigation water.

Application rates for wood fiber mulch products that have moisture contents greater than 15 percent shall be increased by the following factor, c:

$$c: = \frac{85 \text{ percent}}{\text{percent fiber (solids) in product}}$$

The application rate of the tackifier shall be:

Tackifier	Rate	Wood Fiber Mulch
M-Binder	100lbs	1,500 to 2,000lbs
Sentinel	100lbs	1,500 to 2,000lbs
Ecotak-SAT	100lbs	1,500 to 2,000lbs
Fish-STIK	100lbs	1,500 to 2,000lbs
Soil Master WR	100gal	2,000 to 2,500lbs

The slurry shall be continuously mixed and shall be mixed for at least five (5) minutes after the last addition before application starts. The slurry shall be applied uniformly over the site at a rate that is nonerosive and minimizes runoff.

VI. IRRIGATION

When specified, irrigation water shall be applied at the times and rates as listed on the Practice Requirements sheet.

VII. SPECIAL MEASURES

Measures and methods that enhance fish and wildlife values, protect visual resources, and maintain key shade, food, and den trees shall be performed when specified on the Practice Requirements sheet.

VIII. OTHER REQUIREMENTS

Other details for the establishment and maintenance of the plants including, but not limited to, the need for livestock and traffic control shall be applied when specified on the Practice Requirements sheet.

Operations shall be done in such a manner that erosion and air and water pollution are minimized and held with legal limits.

The owner, operator, contractor, or other persons shall conduct all work and operations in accordance with proper safety codes for the type of equipment and operations being performed with due regards to the safety of all persons and property.

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE SPECIFICATION

342C - CRITICAL AREA PLANTING - SPLIT HYDRO MULCH

I. SCOPE

The work shall consist of furnishing all materials and placing them on all exposed, disturbed, or barren areas within the project area or site to the limits as shown on the drawings, or as staked in the field.

II. MATERIALS

Seed

All seed shall be delivered to the site tagged and labeled in accordance with the California Agricultural Code, and shall be acceptable to the Country Agricultural Commissioner.

Bag tag figures will be evidence of purity and germination. Time since date of seed test shall not exceed 9 months.

Seed shall be of a quality that weed seed shall not exceed 0.5 percent of the aggregate of pure live seed (PLS) (percent germination x percent purity) and other material.

Fertilizer

Unless otherwise specified on the Practice Requirements sheet, all fertilizer shall be Ammonium Phosphate Sulfate containing a minimum of 16 percent Nitrogen, 20 percent available phosphoric acid and 0 percent water soluble potash and be uniform in composition, dry and free flowing, pelleted or granular.

All fertilizer shall be labeled in accordance with applicable state regulations and bear the warranty of the producer for the grade furnished.

Inoculants

The inoculant for treating legume seeds shall be a pure culture of Nitrogen fixing bacteria prepared specifically for the plant species and shall not be used later than the date indicated on the container. A mixing medium, as recommended by the manufacturer or approved substitute, shall be used to bond the inoculant to the seed. For nonpellet inoculated seed, two times the amount of the inoculant recommended by the manufacturer shall be used and seed shall be sown within 24 hours.

For pellet inoculated seed, at least 30 pounds of inoculant shall be used per 1,000 pounds of raw seed and the seed shall be labeled to show the Lot Number, Expiration Date, and Percent Coat of the finished product. Pellet inoculated seed shall be kept cool and sown within 180 days.

Wood Fiber

Wood fiber shall be a wood cellulose fiber that contains neither germination nor growth inhibiting factors. The wood fiber shall be produced from nonrecycled wood such as wood chips or similar wood materials and shall have the property to be evenly dispersed and suspended when agitated in water. It shall be colored with a nontoxic water-soluble green dye to provide a proper gauge for metering of material over ground surfaces.

The wood fiber mulch may also be produced from the following materials:

- a. recycled wood fiber, such as wood chips or similar wood materials
- b. a combination of recycled newsprint and cardboard materials that contain at least 50 percent cardboard, or
- c. a combination of recycled newsprint and non-recycled wood fiber or recycled wood fiber materials that does not contain more than 50 percent newsprint

Tackifier

Tackifier material shall be one of the following or other material specified on the Practice Requirements sheet and shall have the property to be evenly dispersed and suspended in water when agitated: M-Binder, Sentinel, Ecotak-SAT, Fish-STIK, and Soil Master WR.

III. SEEDING MIXTURE AND PLANTING DATE

The seed(s) and rate(s) specified on the Practice Requirements sheet shall be used.

The seeding rate(s) shall be the weight exclusive of any coating material. Any legume seed used shall be inoculated. Based on bag tags, seeding rates shall be adjusted to insure the required amounts of pure live seed.

Planting shall be performed after final grading is completed unless otherwise specified on the Practice Requirements sheet.

IV. SEEDBED PREPARATION

The area to be planted shall be weed free and have a firm seedbed which has previously been roughened by scarifying, disking, harrowing, chiseling, or otherwise worked to a depth of 2 to 4 inches. No implement shall be used that will create an excessive amount of downward movement of clods on sloping areas. Seedbed may be prepared at time of completion of earth moving work.

Rocks larger than 6 inches in diameter, trash, weeds, and other debris that will interfere with seeding or maintenance shall be removed.

Seedbed preparation shall be suspended when soil moisture conditions are not suitable for obtaining a satisfactory seedbed.

V. FERTILIZING, SEEDING, MULCHING

Fertilizing

Fertilizer shall be distributed uniformly over the seedbed at the rate of 500 pounds per acre unless a different amount is specified on the Practice Requirements sheet.

Fertilizer shall be applied hydraulically by hydroseeder in the form of a slurry that also contains the required seed. Fertilizer shall not remain in the slurry longer than two (2) hours.

Seeding

Seed shall be distributed uniformly in a water slurry by hydroseeder.

The hydroseeder shall be equipped with a built-in continuous agitation system of sufficient operating capacity to produce a homogeneous slurry and a discharge system that will apply the slurry to the slopes at a continuous and uniform rate.

Seed shall not remain in the slurry longer than thirty (30) minutes. The slurry shall also contain wood fiber at the rate of 500 pounds per acre and the required fertilizer. The wood fiber shall not remain in the slurry longer than two (2) hours. Water used shall be potable water or Class I or 2 agricultural irrigation water.

Application rates for wood fiber mulch products that have moisture contents greater than 15 percent shall be increased by the following factor, c:

$$c: = \frac{85 \text{ percent}}{\text{percent fiber (solids) in product}}$$

The slurry shall be continuously mixed and shall be mixed for at least five (5) minutes after the last addition before application starts. The slurry shall be applied uniformly over the site at a rate that is nonerosive and minimizes runoff.

Mulching

Wood fiber with tackifier shall be distributed uniformly over the seeded area in a water slurry by hydroseeder. Application shall be made within 48 hours following seeding.

The hydroseeder shall be equipped with a built-in continuous agitation system of sufficient operating capacity to produce a homogeneous slurry and a discharge system that will apply the slurry to the slopes at a continuous and uniform rate.

The slurry shall contain wood fiber at the rate of 1500 pounds per acre and tackifier unless otherwise specified on the Practice Requirement sheet. The wood fiber shall not remain in the slurry longer than two (2) hours. Water used shall be potable water or Class 1 or 2 agricultural irrigation water.

Application rates for wood fiber mulch products that have moisture contents greater than 15 percent shall be increased by the following factor, c:

$$c: = \frac{85 \text{ percent}}{\text{percent fiber (solids) in product}}$$

The application rate for the tackifier shall be:

Tackifier	Rate	Wood Fiber Mulch
M-Binder	100lbs	1,500 to 2,000lbs
Sentinel	100lbs	1,500 to 2,000lbs
Ecotak-SAT	100lbs	1,500 to 2,000lbs
Fish-STIK	100lbs	1,500 to 2,000lbs
Soil Master WR	100gal	2,000 to 2,500lbs

The slurry shall be continuously mixed and shall be mixed for at least five (5) minutes after the last addition before application starts. The slurry shall be applied uniformly over the site at a rate that is nonerosive and minimizes runoff.

VI. IRRIGATION

When specified, irrigation water shall be applied at the times and rates as listed on the Practice Requirements sheet.

VII. SPECIAL MEASURES

Measures and methods that enhance fish and wildlife values, protect visual resources, and maintain key shade, food, and den trees shall be performed when specified on the Practice Requirements sheet.

VIII. OTHER REQUIREMENTS

Other details for the establishment and maintenance of the plants including, but not limited to, the need for livestock and traffic control shall be applied when specified on the practice Requirements sheet.

Operations shall be done in such a manner that erosion and air and water pollution are minimized and held within legal limits.

The owner, operator, contractor, or other persons shall conduct all work and operations in accordance with proper safety codes for the type of equipment and operations being performed with due regards to the safety of all persons and property.

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE SPECIFICATION

342E - CRITICAL AREA PLANTING - EROSION CONTROL BLANKET

I. SCOPE

The work shall consist of furnishing all materials and placing them on all exposed, disturbed, or barren areas within the project area or site to the limits as shown on the drawings, or as staked in the field.

II. MATERIALS

Seed

All seed shall be delivered to the site tagged and labeled in accordance with the California Agricultural Code, and shall be acceptable to the County Agricultural Commissioner.

Bag tag figures will be evidence of purity and germination. Time since date of seed test shall not exceed 9 months.

Seed shall be of a quality that weed seed shall not exceed 0.5 percent of the aggregate of pure live seed (PLS) (percent germination x percent purity) and other material.

Fertilizer

Unless otherwise specified on the Practice Requirements sheet, all fertilizer shall be Ammonium Phosphate Sulfate containing a minimum of 16 percent Nitrogen, 20 percent available phosphoric acid and 0 percent water soluble potash and be uniform in composition, dry and free flowing, pelleted or granular.

All fertilizer shall be labeled in accordance with applicable state regulations and bear the warranty of the producer for the grade furnished.

Inoculants

The inoculant for treating legume seeds shall be a pure culture of Nitrogen fixing bacteria prepared specifically for the plant species and shall not be used later than the date indicated on the container. A mixing medium, as recommended by the manufacturer or approved substitute, shall be used to bond the inoculant to the seed. For nonpellet inoculated seed, two times the amount of the inoculant recommended by the manufacturer shall be used and seed shall be sown within 24 hours.

For pellet inoculated seed, at least 30 pounds of inoculant shall be used per 1,000 pounds of raw seed and the seed shall be labeled to show the Lot Number, Expiration Date, and Percent Coat of the finished product. Pellet inoculated seed shall be kept cool and sown within 180 days.

Wood Fiber

Wood fiber shall be a wood cellulose fiber that contains neither germination nor growth inhibiting factors. The wood fiber shall be produced from nonrecycled wood such as wood chips or similar wood materials and shall have the property to be evenly dispersed and suspended when agitated in water. It shall be colored with a nontoxic water-soluble green dye to provide a proper gauge for metering of material over ground surfaces.

The wood fiber mulch may also be produced from the following materials:

- a. recycled wood fiber, such as wood chips or similar wood materials
- b. a combination of recycled newsprint and cardboard materials that contain at least 50 percent cardboard, or

-
- c. a combination of recycled newsprint and non-recycled wood fiber or recycled wood fiber materials that does not contain more than 50 percent newsprint

Erosion Control Blanket

The erosion control blanket shall consist of a machine-produced mat of wood excelsior fiber with consistent thickness and fiber evenly distributed over the entire area of the blanket. At least 70-percent of the fibers shall be six (6) inches or longer in length. The topside of each blanket shall be covered with biodegradable extruded plastic mesh with openings not exceeding two inches by two inches.

Erosion control blankets may also be machine produced mats of 70 percent wheat straw and 30 percent coconut fiber or 100 percent coconut fiber with consistent thickness and fiber evenly distributed over the entire area of the blanket. These blankets shall have a minimum density of 0.5 pounds per square yard and be enclosed in netting material.

Staples

Staples shall be "U" shaped with legs at least ten (10) inches in length and have a two (2) inch crown and shall be made of eleven (11) gauge or heavier wire.

III. SEEDING MIXTURE AND PLANTING DATE

The seed(s) and rate(s) specified on the Practice Requirements sheet shall be used. The seeding rate(s) shall be the weight exclusive of any coating material. Any legume seed used shall be inoculated. Based on bag tags, the seeding rates shall be adjusted to insure the required amounts of pure live seed.

Planting shall be performed after final grading is completed unless otherwise specified on the Practice Requirements sheet.

IV. SEEDBED PREPARATION

The area to be planted shall be weed free and have a firm seedbed which has previously been roughened by scarifying, disking, harrowing, chiseling, or otherwise worked to a depth of 2 to 4 inches. No implement shall be used that will create an excessive amount of downward movement of clods on sloping areas. Seedbed may be prepared at time of completion of earth moving work.

Rocks larger than 6 inches in diameter, trash, weeds, and other debris that will interfere with seeding or maintenance shall be removed.

Seedbed preparation shall be suspended when soil moisture conditions are not suitable for obtaining a satisfactory seedbed.

V. FERTILIZING, SEEDING, MULCHING

Fertilizing

Fertilizer shall be distributed uniformly over the seedbed at the rate of 500 pounds per acre unless a different amount is specified on the Practice Requirements sheet.

Fertilizer shall be applied in any way that will result in uniform distribution. When specified on the Practice Requirements sheet, fertilizer shall be incorporated into the soil as part of the seedbed preparation or as part of the seeding operation.

Fertilizer shall be applied hydraulically by hydroseeder in the form of a slurry that also contains the required seed. Fertilizer shall not remain in the slurry longer than two (2) hours.

Seeding

Seed shall be drilled, broadcast, or distributed uniformly in a water slurry by hydroseeder. When specified on the Practice Requirements sheet, seed shall be incorporated into the soil but not more than the specified depth.

The hydroseeder shall be equipped with a built-in continuous agitation system of sufficient operating capacity to produce a homogeneous slurry and a discharge system that will apply the slurry to the slopes at a continuous and uniform rate.

Seed shall not remain in the slurry longer than thirty (30) minutes. The slurry shall also contain wood fiber at the rate of 500 pounds per acre and the required fertilizer. The wood fiber shall not remain in the slurry longer than two (2) hours. Water used shall be potable water or Class 1 or 2 agricultural irrigation water.

Application rates for wood fiber mulch products that have moisture contents greater than 15 percent shall be increased by the following factor, c:

$$c: = \frac{85 \text{ percent}}{\text{percent fiber (solids) in product}}$$

The slurry shall be continuously mixed and shall be mixed for at least five (5) minutes after the last addition before application starts. The slurry shall be applied uniformly over the site at a rate that is nonerosive and minimizes runoff.

Mulching

Erosion control blankets shall be distributed uniformly over the surface of the seeded area within 48 hours following seeding. The blankets shall be started on the backside three (3) feet below the crest of the treated slope and installed vertically down the treated slope. The netting shall be on top and the fibers in contact with the soil. The edges shall overlap at least four (4) inches onto adjoining blankets.

Anchoring the Mulch

Staples shall be driven vertically into the ground with reference to the slope. Four (4) staples shall be uniformly spaced across the start and end of each roll and placed four (4) inches from the starting edge at the crest of the slope and two (2) inches from the end of each roll.

Staples shall also be uniformly spaced down both sides of each roll at six (6) foot intervals and two (2) inches from the edge. Staples shall also be spaced down the center of each roll at six (6) foot intervals and alternately spaced with respect to the staples on each side.

VI. IRRIGATION

When specified, irrigation water shall be applied at the times and rates as listed on the Practice Requirements sheet.

VII. SPECIAL MEASURES

Measures and methods that enhance fish and wildlife values, protect visual resources, and maintain key shade, food, and den trees shall be performed when specified on the Practice Requirements sheet.

VIII. OTHER REQUIREMENTS

Other details for the establishment and maintenance of the plants including, but not limited to, the need for livestock and traffic control shall be applied when specified on the Practice Requirements sheet.

Operations shall be done in such a manner that erosion and air and water pollution are minimized and held with legal limits.

The owner, operator, contractor, and other persons shall conduct all work and operations in accordance with proper safety codes for the type of equipment and operations being performed with due regards to the safety of all persons and property.

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE SPECIFICATION

342G - CRITICAL AREA PLANTING - WOODY CUTTINGS

I. SCOPE

The work shall consist of furnishing all materials and placing them within the project area or site to the limits as shown on the drawings, or as staked in the field.

II. MATERIALS

Woody cuttings shall be made from healthy green plants during the dormant season. No more than 2/3ds of each plant will be removed. Select cuttings with leaf buds near the top of each cut.

Stem or branch cuttings of soft wood, hard wood or firm wood should be taken whenever possible from plants that are native to the locality or grown on similar sites.

Cuts shall be made clean with sharp tools. The butt end of the stem shall be a slant cut and the tip end shall be cut square across the stem.

Size:

Slips: The diameter of the cutting shall not be more than 1-1/2 inches at the butt end nor smaller than 1/4 inch at the tip. Cuttings shall have a minimum length of 2 feet and a maximum length of 4 feet unless otherwise specified on the Practice Requirements Sheet.

Poles: The diameter of the cutting shall not be more than 4 inches nor smaller than 1 inch at the butt end and 1/2 inch at the tip. Cuttings shall have a minimum length of the depth to the water table plus 3 feet unless otherwise specified on the Practice Requirements Sheet.

Cuttings shall not be allowed to dry and shall not be more than 7 days old when planted unless otherwise specified on the Practice Requirements sheet.

III. PLANT MATERIALS AND PLANTING DATE

The kinds of cuttings specified on the Practice Requirement sheet shall be used.

Planting shall be performed after final grading is completed unless otherwise specified on the Practice Requirements sheet.

IV. SITE PREPARATION

The area to be planted shall be weed free and have a uniform surface. No implement shall be used that will create an excessive amount of downward movement of clods on sloping areas. The site may be prepared at time of completion of earth moving work.

Trash, weeds, and other debris that will interfere with planting or maintenance shall be removed.

V. PLANTING REQUIREMENTS

Cuttings shall be planted in one or more rows as shown on the drawing(s) as vertical as possible. Cuttings shall be spaced 3 feet apart in the row and in multiple row plantings, spacing between rows shall be 3 feet. Cuttings shall be staggered with respect to those in adjacent rows unless otherwise specified on the Practice Requirement sheet.

Cuttings shall be planted in prepared holes or "V" furrows to avoid stripping the bark, especially in rocky or hard soils. Cuttings may be pushed into soil if the soil is saturated with moisture. Cuttings shall be placed in the soil with the butt end in a downward position

All cuttings shall have 6 inches to a maximum of 1-foot including at least two nodes above the ground level.

Cuttings shall be placed into the soil to a depth specified on the Practice Requirements sheet. If however, due to some physical condition in the soil this planting depth cannot be attained, the cuttings shall be set with 3/4 of its length in the soil upon approval of the NRCS technician. At a minimum they must be placed into the soil 18 inches.

Poles: Plant in adequately sized, sod-free holes. Auger a hole to the water table. Place materials in the augured hole one-half foot above the growing season water table.

After planting, pack the soil firmly around each pole to eliminate air pockets. "Mudding" by filling the hole with water and then adding more soil to make a slurry can remove air pockets.

VI. IRRIGATION

When specified, irrigation water shall be applied at the times and rates as listed on the Practice Requirements sheet to keep the soil in the lower two feet of the planted cutting moist.

VII. SPECIAL MEASURES

Measures and methods that enhance fish and wildlife values, protect visual resources, and maintain key shade, food, and den trees shall be performed when specified on the Practice Requirements sheet.

VIII. OTHER REQUIREMENTS

Other details for the establishment and maintenance of the plants including, but not limited to, the need for livestock and traffic control shall be applied when specified on the Practice Requirements sheet.

Operations shall be done in such a manner that erosion and air and water pollution are minimized and held within legal limits.

The owner, operator, contractor, and other persons shall conduct all work and operations in accordance with proper safety codes for the type of equipment and operations being performed with due regards to the safety of all persons and property.

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE SPECIFICATION

342H - CRITICAL AREA PLANTING - CONTAINER PLANTS

I. SCOPE

The work shall consist of furnishing all materials and placing them on areas within the project area or site to the limits as shown on the drawings, or as staked in the field.

II. MATERIALS

Plants

Plants shall be healthy, shapely, and well rooted, with roots showing no evidence of having been damaged, restricted, or deformed. Plants found to be root or pot bound will not be acceptable. Plants shall be vigorous and free of disease, insect pests, eggs or larvae and shall be subject to inspection and approval at the place of growth or upon delivery. Plants shall not be allowed to freeze or dry.

Unless otherwise noted, all plant material shall be grown in nurseries which have been inspected by the State Department of Food and Agriculture and have complied with the regulations thereof. Clearance shall be obtained from the County Agricultural Commissioner, as required by law, before planting plants delivered from outside the county in which they are to be planted.

All specified one-quart and one-gallon plant stock shall be of the standard one-quart and one-gallon size and shall be delivered to the site in one-quart and one-gallon containers or equivalent. All specified five-gallon plant stock shall be of the standard five-gallon size and shall be delivered to the site in five-gallon containers. All specified 15-gallon plant stock shall be of the standard 15-gallon size and shall be delivered to the site in 15-gallon containers.

Manure

Manure shall be well composted, weed free, pulverized, sterilized, and may be furnished in bulk.

Commercial Fertilizer

Commercial fertilizer for trees and shrubs shall be a compressed long lasting slow release tablet form containing a minimum of 20 percent nitrogen, 10 percent available phosphoric acid, and 5 percent water soluble potash with each tablet approximately 21 grams in weight unless otherwise specified on the Practice Requirements sheet.

Commercial fertilizer for flat size plants shall contain a minimum of 10 percent nitrogen, 8 percent available phosphoric acid and 4 percent water soluble potash unless otherwise specified on the Practice Requirements sheet.

All fertilizer shall be delivered in original, unopened factory packaging, shall be free of lumps or other moisture damage, and shall be labeled in accordance with applicable state regulations and bear the warranty of the producer for the grade furnished.

Sand

Sand shall be clean, sharp, silica sand, uniform in size and irregular in shape.

Stakes

Stakes shall be straight and sound heart grade redwood, and shall be two inches by two inches and length as shown on the plans.

Flexible Rods

Flexible rods shall be 1/4-inch diameter steel for five-gallon plants and 3/8-inch diameter for 15-gallon plants and length as shown in plans.

Ties

Ties shall be heavy-duty vinyl, minimum .010 inches thick, or approved flexible rubberized cloth webbing, 1-inch width.

Steel Straps

Straps shall be 1/16-inch by 1-inch mild steel nailed to stakes with 8d box nails.

Mulch

Mulch shall consist of medium ground redwood, fir, cedar, or pine bark chips, 3/8-inch to 1-1/4 inch in size.

III. PLANT MATERIALS AND PLANTING DATE

The plant varieties shown on the drawings and specified on the Practice Requirements sheet shall be used.

Planting shall be performed after final grading is completed and during the period specified on the Practice Requirements sheet.

IV. SITE PREPARATION

All planting areas shall be cultivated and raked to remove any and all weeds or weed clumps and stones or other foreign material exceeding 2-inch diameter to a depth of 8 inches. No planting will be allowed in soil that, in the opinion of the NRCS technician is too wet, too dry, or otherwise improperly conditioned.

Plants shall be the varieties and arranged as shown on the plans. The locations of plants shall be marked for approval by the NRCS technician prior to excavating the plant holes. The locations shall be marked by flags or other approved means. Two days notice shall be given prior to the date desired for inspection by the NRCS technician.

Holes for trees and shrubs shall be excavated to minimum diameters and depths as follows:

Container Size	Hole Diameter	Hole Depth
One quart	12"	12"
One gallon	12"	12"
Five gallon	20"	20"
Fifteen gallon	32"	24"

The sides of the hole shall be vertical, lightly scarified and the bottom of the hole shall be loosened to a minimum additional depth of six inches.

V. PLANTING, FERTILIZING, MULCHING

Planting Trees and Shrubs

Partially backfill planting hole with planting mixture consisting of 50 percent native soil, 25 percent sand, and 25 percent manure by volume, unless otherwise specified on the Practice Requirements sheet, that has been uniformly mixed and is free of clods or lumps and blend planting mix into top two inches of soil in bottom of hole.

Plants shall be removed from the containers in such a manner that the ball of earth surrounding the roots is not broken, except for root bound plants that need their roots pruned, and shall be planted immediately. Cans shall be cut on at least two sides.

Set plants in center of pits, adjusting so that after settlement the crown of the plant will stand one or two inches above finish grade as shown on the plans.

Backfill with planting mixture to one-half root ball height, place one fertilizer tablet per foot of plant height two inches out from root ball and water thoroughly. Backfill rest of hole with

planting mixture. Firm down, eliminating all air pockets, do not pack. Build a four-inch high berm around edge of root ball to form a basin for holding water. The bottom of the basin shall be at surrounding finish grade.

Fill basin with water immediately after planting, being careful not to break down the berm, gouge out holes in the backfill, or expose plant roots with hose stream. Settled plants shall be reset to proper grade position and planting basin restored.

No more plants shall be distributed or cans cut than can be planted and watered on that day.

Planting - Flat Size Plants

The 10-8-4 fertilizer shall be distributed uniformly over the areas to be planted to flat size plants at the rate of 20 pounds per 1000 square feet. Fertilizer may be applied in any way that will result in uniform distribution. The fertilizer shall be incorporated into the soil prior to planting. If fertilizing is performed as part of Section IV, Site Preparation, it shall not be accomplished more than (15) days prior to planting.

Prior to planting flat size plants, the areas shall also be watered thoroughly to insure optimum soil moisture to a minimum depth of 8 inches.

Flat size plants shall be planted at spacing specified on plans. Cultivate immediately after completion of planting and water lightly, but thoroughly, taking care to avoid erosion.

Planting -Tree Seedlings

Planting holes shall be made using the Western planting tool, mattock, or other suitable tool. The hole shall have one flat vertical side and be deeper than the plant container.

A single plant shall be immediately placed against the flat vertical side of the hole with roots straight and vertical and the hole carefully backfilled with excavated soil without damaging the roots. Plants in biodegradable containers shall be planted in their container. Plants in nonbiodegradable containers shall be removed from their container at time of planting. The soil around the plant shall be firmed by tamping to eliminate all air pockets, without packing the soil, and the ground line on the plant shall correspond to the adjacent ground line.

A 15 foot radius around each plant shall be cleared of any living grasses, legumes, and forbs.

Planting operations shall not create an excessive amount of downward movement of soil or clods on sloping areas and shall not damage newly placed plants, existing trees or tree seedlings. All plants that show damage or improper planting as determined by the NRCS Technician shall be replaced.

Mulching

Mulch shall be applied around each tree and shrub covering the bottom of the basin to a depth of two inches.

Pruning

Plants shall not be pruned prior to planting and after planting only at the direction of the NRCS Technician.

Staking

All 5-gallon and 15-gallon size trees installed shall be supported by three stakes plus ties as shown on the drawings within 48 hours after planting. Spindly trees shall also be supported by a flexible rod plus ties and the three stakes shall be held by a steel strap as shown on the plans. The type of support used for each tree shall be subject to the approval of the NRCS Technician.

VI. IRRIGATION

All trees, shrubs, and flat size plants shall be watered immediately after planting and thereafter as necessary to keep the soil reasonably moist throughout the root system during the first and second growing seasons unless otherwise specified on the Practice Requirements sheet.

Water shall be intermittently applied in a moderate stream that does not displace the mulch or soil around the plant until the surrounding soil is thoroughly saturated. Damage, erosion or slippage of the soil caused by watering shall be repaired by the Contractor at his expense

When specified, irrigation water shall be applied at the times and rates as listed on the Practice Requirements sheet.

VII. SPECIAL MEASURES

Measures and methods that enhance fish and wildlife values, protect visual resources, and maintain key shade, food, and den trees shall be performed when specified on the Practice Requirements sheet.

VIII. OTHER REQUIREMENTS

For the first two growing seasons all plants and planting areas shall be maintained weed and pest free and shall be protected against animal depredation and other hazards that will adversely affect the plants. All plants that show damage or indicate failure to grow will be replaced. Papers, trash, debris, and surplus earth which accumulate in the planted areas shall be removed and disposed of away from the site and the planted areas shall be cared for as to present a neat and clean condition at all times. Basins, basin walls and other earth areas shall be kept well formed or graded.

Weeding shall be by hand or with a herbicide. When pulled by hand they shall be pulled before they exceed four inches in height or with a herbicide before they exceed two inches in height, unless otherwise specified on the Practice Requirements sheet. When any insecticide or herbicide is used, all manufacturer's label directions and State and Federal regulations shall be followed.

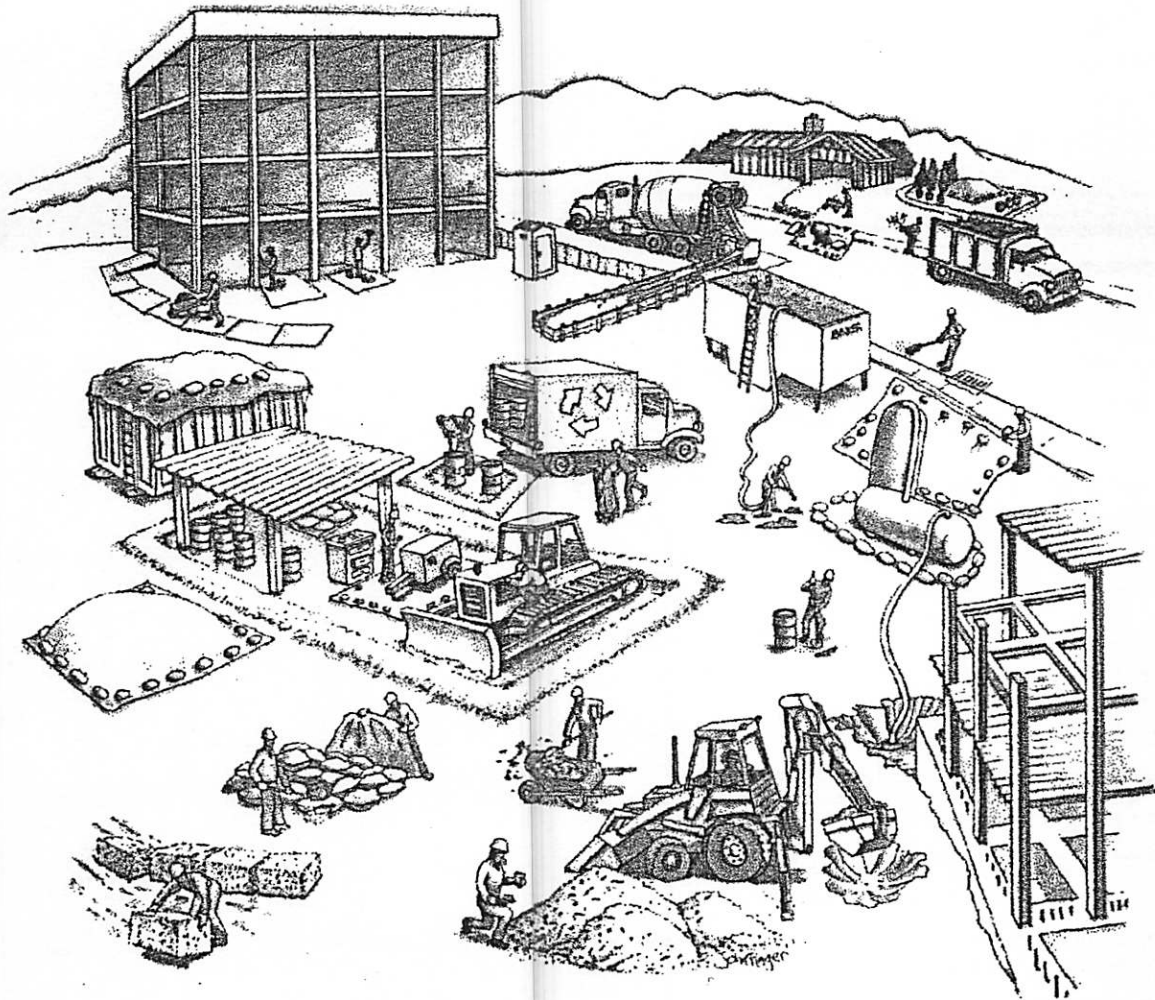
No herbicide may be used within 30 days of planting and shall be applied with a photosensitive dye, unless otherwise specified on the Practice Requirements sheet, which will produce a color when sprayed upon the ground. The color shall disappear within two or three days after being applied and shall not stain concrete, nor be injurious to plant or animal life when applied at the manufacturers recommended application rate.

Other details for the establishment and maintenance of the plants including, but not limited to rodent protection and livestock and traffic control shall be applied when specified on the Practice Requirements sheet.

Operations shall be done in such a manner that erosion and air and water pollution are minimized and held within legal limits. All work and operations shall be conducted in accordance with proper safety codes for the type of equipment and operations being performed with due regards to the safety of all persons and property.

Blueprint For A Clean Ocean

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



This booklet has been developed as a resource for all general contractors,
home builders, and subcontractors working on construction sites.

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INTRODUCTION

Stormwater pollution is rapidly growing in importance as a national environmental issue. In California, stormwater pollution is a major source of water pollution. To help combat the problems of stormwater pollution, federal and state governments have developed a program for monitoring and permitting discharges to municipal storm drain systems, creeks, and water bodies such as the Pacific Ocean.

Municipalities in the Los Angeles Area are required by the Clean Water Act to develop stormwater management programs that include requirements for construction activities. Your construction project will need to comply with local municipal requirements. If your construction activity will disturb five acres or more, you must also obtain coverage under the General Construction Activity Permit (see Requirements for Dischargers).

Blueprint for a Clean Ocean is an introductory guide to stormwater quality control on construction sites. It contains several principles and techniques that you can use to help prevent stormwater pollution. This booklet has been developed as a resource for all general contractors, home builders, and subcontractors working on construction sites.

Blueprint for a Clean Ocean is not a design manual or a Stormwater Pollution Prevention Plan (SWPPP) (see Requirements for Dischargers). For more information on the General Permit, designing stormwater quality controls, or producing a Stormwater Pollution Prevention Plan, please refer to the California Storm Water Best Management Practice Handbook for Construction Activity, or consult your local program or the SWRCB (see below). Please note that this booklet is concerned only with the management of construction sites and activities during construction.

STORMWATER POLLUTION

Storm Drain System

Stormwater or runoff from sources like sprinklers and hoses flows over the ground into the storm drain system. In the Los Angeles Area, storm drain systems consist of gutters, storm drains, underground pipes, open channels, culverts, and creeks. Storm drain systems are designed to drain directly to the Pacific Ocean with no treatment.

Pollution From Construction Sites

Stormwater runoff is part of a natural hydrologic process. However, land development and construction activities can significantly alter natural drainage patterns and pollute stormwater runoff. Runoff picks up pollutants as it flows over the ground or paved areas and carries these pollutants into the storm drain system. Common sources of pollutants from construction sites include: sediments from soil erosion; construction materials and waste (e.g., paint, solvents, concrete, drywall); landscaping runoff containing fertilizers and pesticides; and spilled oil, fuel, and other fluids from construction vehicles and heavy equipment.

Adverse Effects from Stormwater Pollution

Stormwater pollution is a major source of water pollution in California. It can cause declines in fisheries, disrupt habitats, and limit water recreation activities. Even more importantly, stormwater pollution poses a serious threat to the overall health of the ecosystem.

For more information on stormwater requirements, call the State Water Resources Control Board's Stormwater Information Line at (916) 657-1146 or your local program.

REQUIREMENTS FOR DISCHARGERS

Municipal Stormwater Program

Municipalities in the Los Angeles Area are required by federal regulations to develop programs to control the discharge of pollutants to the storm drain system, including the discharge of pollutants from construction sites and areas of new development or significant redevelopment. As a result, your development and construction projects may be subject to new requirements designed to improve stormwater quality such as, expanded plan check and review, new contract specifications, and increased site inspection. For more information on municipal requirements, please contact the municipal representative listed on the back cover of this booklet.

Projects Equal To Or Greater Than 5 Acres

If your construction activity will disturb five acres or more, you must obtain coverage under the General Construction Activity Storm Water Permit (General Construction Permit) issued by the State Water Resources Control Board (SWRCB) for stormwater discharges associated with construction activity. To obtain coverage under the General Permit, a Notice of Intent (NOI) must be filed with the SWRCB. The General Construction Permit requires you to prepare and carry out a "Stormwater Pollution Prevention Plan" or SWPPP. Your SWPPP must identify appropriate stormwater pollution prevention measures or best management practices (BMPs), like the ones described in this booklet, to reduce pollutants in stormwater discharges from the construction site both during and after construction is completed. A best management practice or BMP is defined as any program, technology, process, practice, operating method, measure, or device which controls, prevents, removes, or reduces pollution.

Projects Less Than 5 Acres

If your project is less than five acres, you may still need to use BMPs to comply with local municipal requirements. Check with the local planning or engineering department for details.

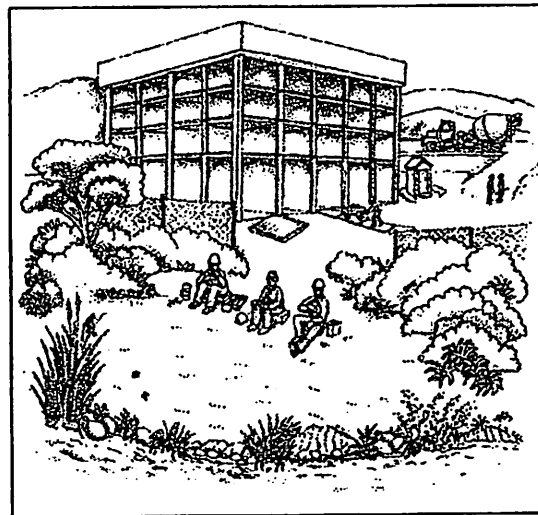
GENERAL BEST MANAGEMENT PRACTICES

The following are some general principles that can significantly reduce pollution from construction activity and help make compliance with stormwater regulations easy:

- Identify all storm drains, drainage swales and creeks located near the construction site and make sure all subcontractors are aware of their locations to prevent pollutants from entering them.
- Clean up leaks, drips, and other spills immediately so they do not contact stormwater.
- Refuel vehicles and heavy equipment in one designated location on the site and take care to clean up spills immediately.
- Wash vehicles at an appropriate off-site facility. If equipment must be washed on-site, do not use soaps, solvents, degreasers, or steam cleaning equipment, and prevent wash water from entering the storm drain. If possible, direct wash water to a low point where it can evaporate and/or infiltrate.
- Never wash down pavement or surfaces where materials have spilled. Use dry cleanup methods whenever possible.

For more information on stormwater requirements, call the State Water Resources Control Board's Stormwater Information Line at (916) 657-1146 or your local program.

- Avoid contaminating clean runoff from areas adjacent to your site by using berms and/or temporary or permanent drainage ditches to divert water flow around the site. Reduce stormwater runoff velocities by constructing temporary check dams and/or berms where appropriate.
- Protect all storm drain inlets using filter fabric cloth or other best management practices to prevent sediments from entering the storm drainage system during construction activities.
- Keep materials out of the rain — prevent runoff pollution at the source. Schedule clearing or heavy earth moving activities for periods of dry weather. Cover exposed piles of soil, construction materials and wastes with plastic sheeting or temporary roofs. Before it rains, sweep and remove materials from surfaces that drain to storm drains, creeks, or channels.
- Keep pollutants off exposed surfaces. Place trash cans around the site to reduce litter. Dispose of non-hazardous construction wastes in covered dumpsters or recycling receptacles.
- Practice source reduction — reduce waste by ordering only the amount you need to finish the job.
- Do not over-apply pesticides or fertilizers and follow manufacturers instructions for mixing and applying materials.
- Recycle leftover materials whenever possible. Materials such as concrete, asphalt, scrap metal, solvents, degreasers, cleared vegetation, paper, rock, and vehicle maintenance materials such as used oil, antifreeze, batteries, and tires are recyclable.
- Dispose of all wastes properly. Materials that cannot be reused or recycled must be taken to an appropriate landfill or disposed of as hazardous waste. Never throw debris into channels, creeks or into wetland areas. Never store or leave debris in the street or near a creek where it may contact runoff.
- Illegal dumping is a violation subject to a fine and/or time in jail. Be sure that trailers carrying your materials are covered during transit. If not, the hauler may be cited and fined.
- Train your employees and inform subcontractors about the stormwater requirements and their own responsibilities.



SPECIFIC BEST MANAGEMENT PRACTICES

Following is a summary of specific best management practices for erosion and sediment control and contractor activities. For more information on erosion and sediment control BMPs and their design, please refer to the California Storm Water Best Management Practice Handbook for Construction Activity (March 1993).

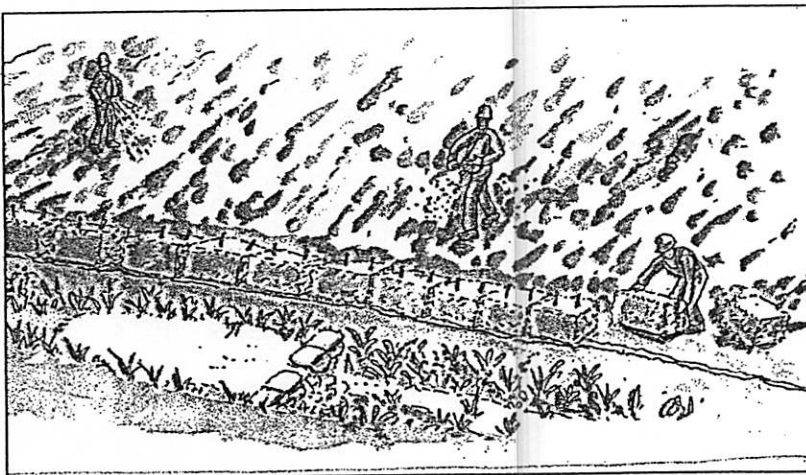
Erosion Prevention and Sediment Control

Prevent erosion

Soil erosion is the process by which soil particles are removed from the land surface, by wind, water and/or gravity. Soil particles removed by stormwater runoff are pollutants that when deposited in local creeks, lakes, and the Pacific Ocean, can have negative impacts on aquatic habitat. Exposed soil after clearing, grading, or excavation is easily eroded by wind or water. The following practices will help prevent erosion from occurring on the construction site:

- Plan the development to fit the topography, soils, drainage pattern and natural vegetation of the site.
- Delineate clearing limits, easements, setbacks, sensitive or critical areas, trees, drainage courses, and buffer zones to prevent excessive or unnecessary disturbances and exposure.
- Phase grading operations to reduce disturbed areas and time of exposure.
- Avoid excavation and grading during wet weather.
- Limit on-site construction routes and stabilize construction entrance(s).
- Remove existing vegetation only when absolutely necessary.
- Construct diversion dikes and drainage swales to channel runoff around the site.
- Use berms and drainage ditches to divert runoff around exposed areas. Place diversion ditches across the top of cut slopes.

The California Storm Water Best Management Practices Handbook for Construction Activity provides specific details and design criteria for erosion and sediment control plans.



Drainage swales channel runoff around a construction site. Planting temporary vegetation on freshly graded areas, and trenching and staking straw bales and/or silt fences downslope are common techniques for preventing erosion and controlling sediment.

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- Plant vegetation on exposed slopes. Where replanting is not feasible, use erosion control blankets (e.g., jute or straw matting, glass fiber or excelsior matting, mulch netting).
 - Consider slope terracing with cross drains to increase soil stability.
 - Cover stockpiled soil and landscaping materials with secured plastic sheeting and divert runoff around them.
 - As a back-up measure, protect drainage courses, creeks, or catch basins with straw bales, silt fences and/or temporary drainage swales.
 - Once grading is completed, stabilize the disturbed areas using permanent vegetation as soon as possible.
 - Conduct routine inspections of erosion control measures especially before and immediately after rainstorms, and repair if necessary.

Control sediment

Sedimentation is defined as the process of depositing sediments picked up by runoff. Sediments consist of soil particles, clays, sands, and other minerals. The purpose of sediment control practices is to remove sediments from stormwater before they are transported off-site or reach a storm drain inlet or nearby creek. The most effective sediment control practices reduce runoff velocity and trap or detain runoff allowing sediments to settle out.

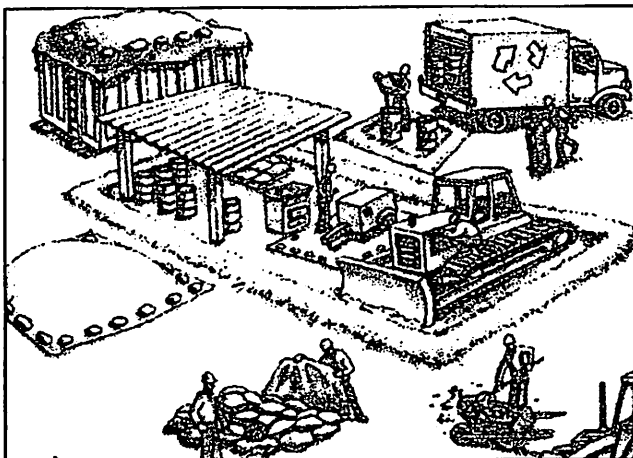
- Use terracing, rip rap, sand bags, rocks, straw bales, and/or temporary vegetation on slopes to reduce runoff velocity and trap sediments. Do not use asphalt rubble or other demolition debris for this purpose.
- Use check dams in temporary drains and swales to reduce runoff velocity and promote sedimentation.
- Protect storm drain inlets from sediment-laden runoff. Storm drain inlet protection devices include sand bag barriers, filter fabric fences, block and gravel filters, and excavated drop inlet sediment traps.
- Collect and detain sediment-laden runoff in sediment traps (an excavated or bermed area or constructed device) to allow sediments to settle out prior to discharge.
- Use sediment controls and filtration to remove sediments from water generated by dewatering.
- Prevent construction vehicle tires from tracking soil onto adjacent streets by constructing a temporary stone pad with a filter fabric underliner near the site exit where dirt and mud can be removed.
- When cleaning sediments from streets, driveways and paved areas on construction sites, use dry sweeping methods where possible. If water must be used to flush pavement, collect runoff to settle out sediments and protect storm drain inlets.

NOTE: Performance of erosion and sediment controls is dependent on proper installation, routine inspections and maintenance of the controls. Most of the BMPs described above are temporary and if left alone can quickly fall into disrepair and/or become ineffective. Routine inspections and maintenance, particularly before and after a storm event, must be part of any erosion and sediment control plan.

General Site Maintenance

Prevent spills and leaks

Poorly maintained vehicles and heavy equipment leaking fuel, oil, antifreeze, or other fluids on the construction site are common sources of stormwater pollution and soil contamination. Construction material spills can also cause serious problems. Careful site planning, preventive maintenance, and good materials handling practices can eliminate most spills and leaks.



Store building materials under cover. Make sure dumpsters are properly covered to keep out rain.

- Maintain all vehicles and heavy equipment. Inspect frequently for and repair leaks.
- Designate specific areas of the construction site, well away from creeks or storm drain inlets, for auto and equipment parking and routine vehicle and equipment maintenance.
- Perform major maintenance, repair jobs and vehicle and equipment washing off-site when feasible, or in designated and controlled areas on-site.
- If you must drain and replace motor oil, radiator coolant, or other fluids on-site, use drip pans or drop cloths to catch drips and spills. Collect all spent fluids, store in labeled separate containers, and recycle whenever possible. Note that in order to be recyclable, such liquids must not be mixed with other fluids. Non-recycled fluids generally must be disposed of as hazardous wastes.

Clean up spills immediately after they happen

When vehicle fluids or materials such as paints or solvents are spilled, cleanup should be immediate, automatic, and routine.

- Sweep up spilled dry materials (e.g., cement, mortar, or fertilizer) immediately. Never attempt to “wash them away” with water, or bury them. Use only minimal water for dust control.
- Clean up liquid spills on paved or impermeable surfaces using “dry” cleanup methods (e.g., absorbent materials like cat litter, sand or rags).
- Clean up spills on dirt areas by digging up and properly disposing of the contaminated soil.
- Report significant spills to the appropriate spill response agencies immediately (See reference list on the back cover of this booklet for more information).

NOTE: Used cleanup rags that have absorbed hazardous materials must either be sent to a certified industrial laundry or dry cleaner, or disposed of through a licensed hazardous waste disposal company.

Store materials under cover

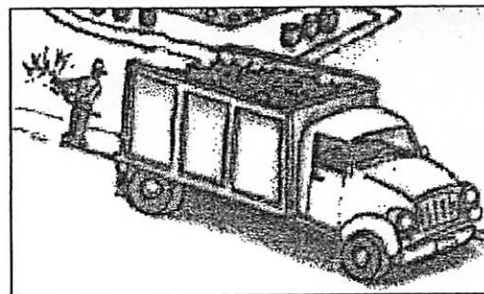
Wet and dry building materials with the potential to pollute runoff should be stored under cover and/or surrounded by berms when rain is forecast or during wet weather.

- Store stockpiled materials and wastes under a temporary roof or secured plastic sheeting or tarp.
- Berm around storage areas to prevent contact with runoff.
- Plaster or other powders can create large quantities of suspended solids in runoff, which may be toxic to aquatic life and cause serious environmental harm even if the materials are inert. Store all such potentially polluting dry materials—especially open bags—under a temporary roof or inside a building, or cover securely with an impermeable tarp. By storing dry materials under a roof, you may also help protect air quality, as well as water quality.
- Store containers of paints, chemicals, solvents, and other hazardous materials in accordance with secondary containment regulations and under cover during rainy periods.

Cover and maintain dumpsters

Open or leaking dumpsters can be a source of stormwater pollution.

- Cover open dumpsters with plastic sheeting or a tarp during rainy weather. Secure the sheeting or tarp around the outside of the dumpster. If your dumpster has a cover, close it.
- If a dumpster is leaking, contain and collect leaking material. Return the dumpster to the leasing company for repair/exchange.
- Do not clean dumpsters on-site. Return to leasing company for periodic cleaning, if necessary.



Recycle yard waste and tree prunings at a landfill that chips and composts plant material.

Collect and properly dispose of paint removal wastes

Paint removal wastes include chemical paint stripping residues, paint chips and dust, sand blasting material and wash water. These wastes contain chemicals that are harmful to the wildlife in our creeks and the water bodies they flow to. Keep all paint wastes away from the gutter, street, and storm drains.

- Non-hazardous paint chips and dust from dry stripping and sand blasting may be swept up or collected in plastic drop cloths and disposed of as trash. Chemical paint stripping residue and chips and dust from marine paints or paints containing lead or tributyl tin must be disposed of as a hazardous waste.
- When stripping or cleaning building exteriors with high-pressure water, cover or berm storm drain inlets. If possible (and allowed by your local wastewater treatment plant), collect (mop or vacuum) building cleaning water and discharge to the sanitary sewer. Alternatively, discharge non-contaminated wash water onto a dirt area and spade into the soil. Be sure to shovel or sweep up any debris that remains in the gutter and dispose of as garbage.

Clean up paints, solvents, adhesives, and cleaning solutions properly

Although many paint materials can and should be recycled, liquid residues from paints, thinners, solvents, glues, and cleaning fluids are hazardous wastes. When they are thoroughly dry, empty paint cans, used brushes, rags, absorbent materials, and drop cloths are no longer hazardous and may be disposed of as garbage.

- Never clean brushes or rinse paint containers into a street, gutter, storm drain, or creek.
- For water-based paints, paint out brushes to the extent possible and rinse to a drain leading to the sanitary sewer (i.e., indoor plumbing).
- For oil-based paints, paint out brushes to the extent possible, and filter and reuse thinners and solvents. Dispose of unusable thinners and residue as hazardous waste.
- Recycle, return to supplier or donate unwanted water-based (latex) paint. You may be able to recycle clean empty dry paint cans as metal.
- Dried latex paint may be disposed of in the garbage.
- Unwanted paint (that is not recycled), thinners, and sludges must be disposed of as hazardous waste.
- More and more paint companies are recycling excess latex paint (See separate list of "Recyclers and Disposal Services" for more information).

DEMOLITION WASTE MANAGEMENT

Keep fresh concrete and cement mortars out of gutters, storm drains, and creeks

Concrete and cement-related mortars that wash into gutters and storm drains are toxic to fish and the aquatic environment.

- Avoid mixing excess amounts of fresh concrete or cement mortar on-site.
- Store dry and wet materials under cover, protected from rainfall and runoff.
- Wash out concrete transit mixers only in designated wash-out areas where the water will flow into settling ponds or onto dirt or stockpiles of aggregate base or sand. Pump water from settling ponds to the sanitary sewer, where allowed. Whenever possible, recycle washout by pumping back into mixers for reuse. Never dispose of washout into the street, storm drains, drainage ditches, or creeks.
- Whenever possible, return contents of mixer barrel to the yard for recycling. Dispose of small amounts of excess concrete, grout, and mortar in the trash.

Service and maintain portable toilets

Leaking portable toilets are a potential health and environmental hazard.

- Inspect portable toilets for leaks.
- Be sure the leasing company adequately maintains, promptly repairs, and replaces units as needed.
- The leasing company must have a permit to dispose of waste to the sanitary sewer.

Dispose of cleared vegetation properly

Cleared vegetation, tree trimmings, and other plant material can cause environmental damage if it gets into creeks. Such "organic" material requires large quantities of oxygen to decompose, which reduces the oxygen available to fishes and other aquatic life.

- Do not dispose of plant material in a creek or drainage facility or leave it in a roadway where it can clog storm drain inlets.
- Avoid disposal of plant material in trash dumpsters or mixing it with other wastes. Compost plant material or take it to a landfill or other facility that composts yard waste.

Make sure all demolition waste is properly disposed of

Demolition debris that is left in the street or pushed over a bank into a creek bed or drainage facility causes serious problems for flood control, storm drain maintenance, and the health of our environment. Different types of materials have different disposal requirements or recycling options.

- Materials that can be recycled from demolition projects include: metal framing, wood, concrete, asphalt, and plate glass.
- Materials that can be salvaged for reuse from old structures include: doors, banisters, floorboards, windows, 2x4s, and other old, dense lumber.
- Unusable, unrecycleable debris should be confined to dumpsters, covered at night and during wet weather, and taken to a landfill for disposal.
- Hazardous debris such as asbestos must be handled in accordance with specific laws and regulations and disposed of as a hazardous waste. For more information of asbestos handling and disposal regulations, contact the South Coast Air Quality Management District.
- Arrange for an adequate debris disposal schedule to insure that dumpsters do not overflow.

ROADWORK AND PAVEMENT CONSTRUCTION

Plan roadwork and pavement construction to avoid stormwater pollution

Road paving, surfacing, and asphalt removal happen right in the street, with numerous opportunities for stormwater pollution from the asphalt mix, saw-cut slurry, or excavated material. Properly proportioned asphalt mix and well-compacted pavement avoid a host of water pollution problems.

- Apply concrete, asphalt, and seal coat during dry weather to prevent contaminants from contacting stormwater runoff.
- Cover storm drain inlets and manholes when paving or applying seal coat, slurry seal, fog seal, etc.
- Always park paving machines over drip pans or absorbent materials, since they tend to drip continuously.
- When making saw-cuts in pavement, use as little water as possible. Cover each catch basin completely with filter fabric during the sawing operation and contain the slurry by placing straw bales, sand bags, or gravel dams around the catch basin. After the liquid drains or evaporates, shovel or vacuum the slurry residue from the pavement or gutter and remove from site.

- Wash down exposed aggregate concrete only when the wash water can: (1) flow onto a dirt area; (2) drain onto a bermed surface from which it can be pumped and disposed of properly; or (3) be vacuumed from a catchment created by blocking a storm drain inlet. If necessary, place straw bales downslope, or divert runoff with temporary berms. Make sure runoff does not reach gutters or storm drains.
- Allow aggregate rinse to settle, and pump the water to the sanitary sewer if allowed by your local wastewater authority.
- Never wash sweepings from exposed aggregate concrete into a street or storm drain. Collect and return to aggregate base stockpile, or dispose with trash.
- Recycle broken concrete and asphalt.

CONTAMINATED PONDED STORMWATER, GROUNDWATER, AND SOIL GUIDANCE

Look for ponded stormwater, groundwater, and/or soil contamination

Ponded stormwater, groundwater and soil may become contaminated if exposed to hazardous materials. If any of the following conditions apply, contaminated ponded stormwater, groundwater, and/or soil may be present and pose a potential health and environmental hazard:

- The project site is in an area of previous commercial/industrial activity;
- There is a history of illegal dumping on the site or adjacent properties;
- The construction site is subject to a Superfund, state, or local cleanup order;
- Ponded stormwater, groundwater and/or water generated by dewatering exhibits an oily-sheen and/or smells of petroleum;
- Soil appears discolored, smells of petroleum and/or exhibits other unusual properties;
- Abandoned underground storage tanks, drums, or other buried debris are encountered during construction activities; or
- Spills have occurred on the site or adjacent properties involving pesticides and herbicides; fertilizers; detergents; plaster and other products; petroleum products such as fuel, oil, and grease; or other hazardous chemicals such as acids, lime, glues, paints, solvents, and curing compounds.

Take appropriate action

Ponded stormwater, groundwater, or water generated by dewatering that is contaminated cannot be discharged to a street, gutter, or storm drain. If contamination is suspected, the water should be contained and held for testing. Call the appropriate local agency and/or the Regional Water Quality Control Board for further guidance (See reference list on the back cover of this booklet for more information).

Remember: The property owner and the contractor share ultimate responsibility for the activities that occur on a construction site. You may be held responsible for any environmental damage caused by your subcontractor or employees.

POLLUTION CONTROL AGENCIES AND SOURCES OF INFORMATION

Storm water quality management program

County of Los Angeles (800) 303-0003

Agencies to call for local construction site requirements

In county unincorporated areas and in the cities of:

Artesia	Lakewood
Bellflower	La Mirada
Bradbury	La Puente
Carson	Lawndale
Cerritos	Lomita
Commerce	Rolling Hills
Duarte	Santa Fe Springs
Industry	Temple City
Irwindale	Westlake Village

La Cañada/Flintridge

(818) 458-3187

Agencies to call in the event of a spill

You are required by law to report all significant releases or suspected significant releases of hazardous materials, including oil.

To report a spill, call the following agencies:

1. Dial (800) 303-0003 or your local emergency response number.
2. Call the Governor's Office of Emergency Services Warning Center, (800) 852-7550 (24 hours).

For spills of "Federal Reportable Quantities" of oil, chemicals, or other hazardous materials to land, air, or water, notify the National Response Center (800-424-8802). If you are not sure whether the spill is of a "reportable quantity," call the federal Environmental Protection Agency (800) 424-9346 for clarification.

For further information, see *California Hazardous Material Spill/ Release Notification Guidance* (State Office of Emergency Services, Hazardous Materials Division).

Agencies to call if you find or suspect contaminated soil or groundwater

Regional Water Quality Control Board:

Los Angeles Basin (213) 266-7500

California Environmental Protection Agency (Cal EPA), Department of Toxic Substances Control (DTSC) (510) 540-3732

Documents and available resources

From State Water Resources Control Board (SWRCB) (916) 657-1146:

General Construction Activity Storm Water Permit

California Storm Water Best Management Practice Handbook – Construction Activity

From Cal EPA, DTSC (916) 322-3670:

Waste Minimization for the Building Construction Industry – Fact Sheet