

[Version 11/17/2003]

# **Erosion Prevention and Sediment Control (EPSC) Plan Technical Guidance Handbook**

---

**(Best Management Practices)**

**City of Salem, Oregon**

# Table of Contents

	Page
1.0 Introduction .....	1
2.0 Erosion Prevention and Sediment Control Permit and Plan Submittal Requirements .....	2
2.1 Permit Application Requirements: Single Family Homes and Duplexes on Existing Lots of Record and Manufactured Home Placement .....	2
2.2 Other Construction and Ground Disturbing Activities .....	3
2.3 Construction in Public Rights-of-way .....	4
3.0 Recommended Erosion Prevention and Sediment Control Measures .....	5
3.1 Erosion Control Matrices .....	5
3.2 Recommended Design Criteria .....	10
3.2.1 Gravel Construction Entrances .....	10
3.2.2 Temporary Sediment Fences .....	13
3.2.3 Straw Bale Sediment Barrier/Bio-Filter Bags .....	16
3.2.4 Sidewalk Subgrade Crushed Rock Barrier .....	22
3.2.5 Undisturbed Vegetative Buffers .....	23
3.2.6 Temporary Grasses and Permanent Vegetative Cover .....	23
3.2.7 Straw Mulch .....	25
3.2.8 Erosion and Matting Blankets .....	26
3.2.9 Plastic Sheet Covering .....	28
3.2.10 Sediment Traps and Ponds .....	29
3.2.11 Temporary Interceptor Dikes and Swales .....	35
3.2.12 Storm Drain Inlet Protection .....	38
3.2.13 Check Dams .....	43
Appendix A - References .....	46
Appendix B - Erosion Control Permit Application Form .....	48
Appendix C - Recommended Standard Notes for Erosion Control Plans .....	50

## List of Tables

	<b>Page</b>
Table 3-1	
Erosion Control Matrix Single Family/Duplex Residential/Manufactured Homes . . . . .	7
Table 3-2	
Erosion Control Matrix Commercial, Subdivision, and Large Site Construction . . . . .	8
Table 3-3	
Erosion Control Matrix Utilities Construction and Stock Piles/Ditches/Swales Protection . .	9

## List of Drawings

	<b>Page</b>
Gravel Construction Entrance	
Detail Drawing 3-1A . . . . .	11
Wheel Wash	
Detail Drawing 3-1B . . . . .	12
Sediment Fence	
Detail Drawing 3-2 . . . . .	15
Straw Bale Overland Flow	
Detail Drawing 3-3A . . . . .	18
Biofilter Bag Overland Flow	
Detail Drawing 3-3B . . . . .	19
Biofilter Bag Overland Flow	
Detail Drawing 3-3C . . . . .	20
Biofilter Bag Ditches and Swales	
Detail Drawing 3-3D . . . . .	21
Sediment Trap	
Detail Drawing 3-5 . . . . .	33
Sediment Pond	
Detail Drawing 3-6 . . . . .	34
Interceptor Swales & Dikes	
Detail Drawing 3-7 . . . . .	36
Filter Fabric Inlet Barrier	
Detail Drawing 3-8A . . . . .	39
Block & Gravel Inlet Barrier	
Detail Drawing 3-8B . . . . .	40
Gravel & Wire Mesh Inlet Barrier	
Detail Drawing 3-8C . . . . .	41
Biofilter Bags Temporary	
Detail Drawing 3-8D . . . . .	42
Check Dams	
Detail Drawing 3-9 . . . . .	45

# UNIFORM EROSION CONTROL SYMBOLS

UNIFORM CODING SYSTEM FOR EROSION AND SEDIMENTATION CONTROL BMPs AND THEIR APPLICABILITY TO CONTROL VARIOUS PROBLEM AREAS.

BMPs	Code	Symbols
<b>I. TOPO SYMBOLS</b>		
PONDS		
CREEK/STREAM		
ORIGINAL GROUND LINE (CROSS SECTION)		
SLOPE		
<b>II. COVER PRACTICES</b>		
TEMPORARY SEEDING	(TS)	
MULCHING & MATTING	(MU)	
CLEAR PLASTIC COVERING	(CPC)	
BUFFER ZONES	(BZ)	
PERMANENT SEEDING & PLANTING	(PS)	
<b>III. EROSION CONTROL</b>		
TIRE WASH	(TW)	
STABILIZED CONSTRUCTION ENTRANCE	(CE)	
DUST CONTROL	(DC)	
PIPE SLOPE DRAINS	(PSD)	
GRADIENT TERRACES	(GT)	
INTERCEPTOR DIKE & SWALE	(IDS)	
CHECK DAMS	(CD)	

# UNIFORM EROSION CONTROL SYMBOLS

BMPs	Code	Symbols
<b>III. EROSION CONTROL (CONT.)</b>		
OUTLET PROTECTION	OP	
RIPRAP	RR	
VEGETATIVE STREAMBANK STABILIZATION	YSS	
BIOENGINEERING METHODS OF STREAMBANK STABILIZATION	BSS	
STRUCTURAL STREAMBANK PROTECTION	SSS	
<b>IV. SEDIMENT DETENTION</b>		
FILTER FENCE	FF	
STRAW BALE BARRIER (BIOFILTER)	STB	
BIO-FILTER BAGS	BFB	
GRAVEL FILTER BERM	GFB	
SEDIMENT TRAP (OR SUMP)	ST	
SEDIMENT POND OR BASIN	SB	

# Erosion Prevention And Sediment Control Plan

## Technical Guidance Handbook

GOAL STATEMENT: This Handbook contains erosion prevention techniques and sediment control measures (Best Management Practices). In order to meet the high water quality requirements of Salem's urban watersheds and the Willamette River, the use of erosion prevention techniques shall be the primary focus, rather than relying on sediment control measures. This shall be especially important on larger construction sites immediately before and during the rainy portion of the year. Erosion prevention techniques are designed to protect soil particles from the force of rain and wind so that they will not erode. These techniques include such things as ground cover and matting. Sediment control measures are designed to capture soil particles after they have been dislodged and attempt to retain the soil particles on-site. These measures include such things as silt fences and settling basins. Both erosion prevention techniques and sediment control measures have appropriate uses. However, numerous case studies have shown that sediment control measures are less effective in preventing soil movement than erosion prevention techniques.

### 1.0 Introduction

Each year tons of sediment are washed and blown from construction sites into municipal storm drainage systems and local streams, rivers, wetlands, and lakes. It is a major source of pollution to these water bodies. Eroded materials also clog streets, storm drains, culverts, and stream channels and cause private property damage. The degradation of fish and wildlife habitat and water quality, plus the burden placed on ratepayers for cleanup, could be largely avoided through implementation of adequate erosion prevention and sediment control practices.

This Handbook introduces plan submittal requirements and recommended measures for construction site erosion prevention and sediment control. All ground-disturbing and construction activities, public and private, which involve disturbance of the land surface are covered by the requirements in this handbook. The handbook was developed to address state-mandated erosion control requirements for Salem's urban watersheds and the Willamette River. Details of the geographical areas in which the information in this handbook is enforced, plus permit application, reviews, and enforcement information are available from the City of Salem Public Works Department (City).

Erosion prevention and sediment control measures are required for any activities where the ground surface will be disturbed with clearing, grading, fills, excavations, and other ground-disturbing and construction activities.

An important concept to keep in mind when developing construction and erosion control plans is: **practices which minimize the amount of disturbed land area and avoid or minimize work on steep slopes are encouraged.** Such practices can provide the following positive results:

- A. Less chance of soil washing off the site and clogging streets, drainage systems, and neighboring properties.
- B. The number and size of required erosion control measures will be minimized.

- C. The costs of maintaining erosion control facilities are minimized.
- D. As much topsoil as possible is retained on the site, making revegetation and landscaping easier to establish.

## **2.0 Erosion Prevention and Sediment Control Permit and Plan Submittal Requirements**

Planning considerations and submittal requirements for erosion control permits and plans for various types of construction projects are presented below. Full details of construction project erosion control requirements, submittal requirements, and review/enforcement procedures are available from the City.

*Approval of an erosion prevention and sediment control plan and permit issuance by the City does not relieve the applicant's responsibility to ensure that erosion control measures are implemented and maintained to contain sediment on the construction site.*

### **2.1 Permit Application Requirements: Single Family Homes and Duplexes on Existing Lots of Record and Manufactured Home Placement**

Individual single family home and duplex construction on existing lots of record, manufactured home placement on individual lots or in manufactured home parks, and other ground-disturbing activities, unless exempted by Salem Revised Code (SRC) 75.050(b) or approved otherwise by the Director, have the following requirements for construction period erosion control.

[Erosion control methods are as designated in Table 3-1 in Chapter 3.]

Submit the following information with the application for permit:

- A. Erosion Control Permit Application form from Appendix B.
- B. Construction schedule information, including:
  - 1. Construction start and completion dates.
  - 2. Dates when erosion control measures will be in place.
  - 3. Timing of site clearing and grading, placement of fills, and excavations.
  - 4. Projected date of removal of erosion control measures (after landscaping is established or after establishment of a healthy grass stand or other approved vegetation).

## 2.2 Other Construction and Ground Disturbing Activities

Construction, other than those sites covered in Section 2.1 above or exempted under SRC 75.050(b) and SRC 75.060(a)(1) or otherwise approved by the Director, which will cause ground surface disturbance, have the following requirements for erosion control.

[Erosion control measures are as designated in Tables 3-2 and 3-3 in Chapter 3 or approved alternatives.]

Submit with construction plans for subdivision approval, grading, building, or erosion control permit the following information:

- A. Completed Erosion Control Permit Application form from Appendix B
- B. Construction schedule with the following information:
  - 1. Construction start and completion dates.
  - 2. Dates when erosion control measures will be in place.
  - 3. Timing of site clearing and grading, placement of fills, and excavations.
  - 4. Projected date of removal of erosion control measures (after landscaping is established or after establishment of a healthy grass stand or other approved vegetation).

Submit also with construction plans three (3) sets of erosion control site plan drawings showing:

- A. Vicinity map, property address, and property owner's name and address.
- B. Locations, types, and applicable dimensions of erosion control measures.
- C. Applicable details of erosion control measures showing full dimensions and construction information.
- D. Existing and proposed ground contours, including a minimum of the first 50 feet of abutting property.
- E. Locations and sizes of existing and proposed channels and drainage pipes (labeled as such and with arrows indicating flow direction) on and immediately upstream and downstream of the site.
- F. Site entrances/exits (as approved by the City).
- G. Applicable standard erosion control notes from Appendix C, with additions or changes as required.



- H. Other notes including references to timing of placement and removal of erosion control measures, and erosion measure specifications such that types and quantities of materials necessary for the installation of the erosion control measures are fully detailed.
- I. Stamped or signed by a Certified Professional for projects that disturb 10,000 square feet or more of land surface [See SRC 75.020(d) and 75.060(c)].

If the site erosion control plan includes sediment traps or ponds, the applicant shall also submit calculations used for determining trap or pond sizing and pipe orifice sizing.

Because of particular site conditions or preferences, the applicant may desire in certain cases to use different erosion control measures than those recommended in Tables 3-2 or 3-3. In such cases, the applicant must submit calculations or other supporting information used to determine the sizing and layout of the measures shown on the submitted erosion control plan.

Construction activity within the City, subject to the 1200-C or 1200-CA General Permit issued by the Oregon Department of Environmental Quality (DEQ) must be obtained directly from DEQ with evidence of such permit provided to the Director. However, the performance standards set forth by SRC Chapter 75 must still be met, as well as any or more restrictive requirements in the 1200-C or 1200-CA permit.

If the facilities and techniques approved in an EPSC Plan are not effective or sufficient, the applicant shall:

- Take immediate action to stop sediment from leaving the site.
- Immediately implement additional facilities and techniques as approved by the City Inspector.
- Prepare and submit a revised EPSC Plan for City approval as directed by the Director.

### **2.3 Construction in Public Rights-of-way**

Private construction in public rights-of-way has the same erosion control plan submittal requirements as noted in Section 2.2 above.

An exception is construction of private utilities and similar localized construction or maintenance activities. Such construction must meet noted erosion control measures in Table 3-3 for utilities construction and stock piles as applicable. For such construction, the applicant need only submit the completed Erosion Control Permit Application form in Appendix B as required; unless different erosion measures than those indicated in Table 3-3 are desired, in which case an erosion control site plan drawing must be submitted as required in Section 2.2 above.

An annual blanket permit may be issued for franchised utilities and City construction activities.

Construction activity within the City, subject to the 1200-C or 1200-CA General Permit issued by the Oregon DEQ must be obtained directly from DEQ with evidence of such permit provided to the Director. However, the performance standards set forth by SRC Chapter 75 must still be met, as well as any or more restrictive requirements in the 1200-C or 1200-CA permit.

### **3.0 Recommended Erosion Prevention and Sediment Control Measures**

Recommended construction period erosion control measures are detailed in this chapter. The methods and measures outlined in this handbook are recommended for use in the development of appropriate erosion control plan permit submittals as outlined in Chapter 2 above.

Erosion control measures are required during all permitted construction and site disturbance activities and until permanent site ground covers are in place and accepted by the City. As further detailed in Sections 3.1 and 3.2, certain base erosion control measures are required for construction sites at all times of the year. Also, additional ground cover and/or filtration measures are required during the wet weather season (October 15 through April 30). **All seed applications shall be established prior to October 15.**

The designer should keep in mind when laying out an erosion control plan that the purpose of the plan is to maximize erosion prevention and minimize sediment transport from disturbed ground surfaces. Minimizing the area of clearing and grading, phasing of construction, and use of other methods to reduce the amount of land area disturbed will provide the greatest erosion control benefits.

The site owner/developer is responsible for seeing that erosion control measures are properly installed, satisfactorily maintained, and working as designed. An approved erosion control plan does not waive the owner/developer's responsibility for ensuring that erosion control is achieved. If an installed erosion control system does not adequately contain sediment on site, then the erosion measures must be field adjusted as necessary by the applicant to the satisfaction of the Director.

#### **3.1 Erosion Control Matrices**

Tables 3-1 through 3-3 are matrices presenting recommended minimum erosion control measures for various site and construction types. Additional measures may be required based on specific site conditions.

Table 3-1 is a matrix summarizing recommended erosion controls for single family residential and duplex construction activities on single lots of record. Table 3-2 summarizes recommended erosion control measures for larger construction sites including commercial, industrial, and subdivision development and construction. Table 3-3 is a matrix presenting recommended erosion controls for small, linear utilities construction and ditches/swales.

Erosion control measures are divided into two categories:

- Base measures which are required for construction sites at all times while there is disturbed or unstabilized ground surface on the site, and
- Supplementary wet weather measures which are required between October 15 and April 30 in addition to the base measures.

Base measures are indicated on Tables 3-1 through 3-3 with an “X” indicating primary recommended base measures and “A” indicating alternate measures. Wet weather measures are indicated on Tables 3-1 through 3-3 with an “\*” for primary recommended measures and with an “O” for alternate measures. In the event of unusual weather patterns, the use of wet weather measures may be required at other times of the year. This is particularly true for the use of plastic sheet coverings.

Each erosion control measure presented in the matrices is presented in further detail with design, construction, and maintenance criteria in Section 3.2. Applicable subsections of Section 3.2 are referenced in parenthesis after each erosion control measure presented in the matrices.

Alternative erosion prevention and sediment control measures may be submitted by a Certified Professional, as defined in SRC 75.020(d).

**Table 3-1  
Erosion Control Matrix  
Single Family/Duplex Residential/Manufactured Homes**

	Construction Site		Stock Piles
	slope <2%	slope>2 %	
<b>Base Measures</b>			
1. Gravel Construction Entrance (Sec. 3.2.1)	X	X	
2. Sediment Fence/Barrier at toe of disturbed area of stockpile (Sec. 3.2.2 & 3.2.3)	X	X	X
3. Sidewalk Subgrade Gravel Barrier (site slopes to street at <5% grade) (alternate to #2.) (Sec. 3.2.4)	A(2.)	A(2.)	
4. Undisturbed Buffer at toe of disturbed areas (alternate to #2.) (site slopes < 10%) (Sec. 3.2.5)		A(2.)	
5. Storm Drain Inlet Protection Barrier (3.2.12)	X	X	X
<b>Wet Weather Measures</b>			
6. 6-mil plastic sheet cover (Sec. 3.2.9)			*
7. 2"-min. straw mulch cover (Sec. 3.2.7)			O
<b>Post Construction</b>			
8. Reestablish permanent ground cover or landscape prior to removing erosion measures (Sec. 3.2.6)	X	X	

**Key:**

X = Base Measure

A = Alternate to Base Measure Indicated in Parenthesis

\* = Supplemental Wet Weather Measure (October 15–April 30)

O = Alternate Wet Weather Measure to \*

**Table 3-2  
Erosion Control Matrix  
Commercial, Subdivision, and Large Site Construction**

	Site Slope							Stock Piles
	<2%	<10%	<15%	<20%	<30%	<50%	>50%	
<b>Base Measures</b>								
1. Gravel Construction Entrance (Sec. 3.2.1)	X	X	X	X	X	X	X	
2. Sediment fence or barrier at toe of disturbed area (Sec. 3.2.2 and 3.2.3)		X	X	X	X	X	X	X
3. Undisturbed buffer at toe of disturbed area (Sec. 3.2.5)		A(2.)						
4. Sediment fence installed on contours (spacing) (Sec. 3.2.2)		X (300')	X (150')	X (100')	X (50')	X (25')	X (25')	
5. Temp. interceptor dikes/swales around active work areas (Sec. 3.2.11)	#	#	#	#	#	#	#	
6. Storm Drain Inlet Protection Barrier (Sec. 3.2.12)	X	X	X	X	X	X	X	X
<b>Wet Weather Measures</b>								
7. Established grass (Sec. 3.2.6)		*	*	*	*	*		
8. 2"-min. straw mulch cover (Sec. 3.2.7)		O	O	O	O	O		O
9. Erosion Blankets with anchors (Sec. 3.2.8)		O	O	O	O	O	O	
10. 6-mil plastic sheet cover (Sec. 3.2.9)		O	O	O	O	O	*	*
11. Sediment traps or ponds (Sec. 3.2.10)		O	O	O	O	O		
<b>Post Construction</b>								
12. Reestablish permanent ground cover or landscape prior to removing erosion measures (Sec. 3.2.6)	X	X	X	X	X	X	X	

**Key:**

X = Base Measure

A = Alternate to Base Measure Indicated in Parenthesis

# = Optional Base Measure, Can Use as Applicable

\* = Supplemental Wet Weather Measure (October 15–April 30) (Seeding prior to September 1)

O = Alternate Wet Weather Measure to \*

NOTE: If different areas of the site have considerably different slopes, the site may be divided up and erosion measures selected for each area from the appropriate column in the matrix.

**Table 3-3  
Erosion Control Matrix  
Utilities Construction and Stock Piles/Ditches/Swales Protection**

	<u>Utilities Construction</u>		<u>Stock Piles</u>	<u>Ditches/Swales (Const. protection)</u>
	<u>Catch Basin Drainage</u>	<u>Ditch Drainage</u>		
<b>Base Measures</b>				
1. Sediment fence or barrier at toe (Sec. 3.2.2 and 3.2.3)				X
2. Check Dams (Sec. 3.2.13 and 3.2.3)		X		X
3. Storm Drain Inlet Protection Barrier (Sec. 3.2.12)	X		X	
<b>Wet Weather Measures</b>				
4. Established grass (Sec. 3.2.6)				*
5. 6-mil plastic sheet cover (Sec. 3.2.9)			*	
6. 2"-min. straw mulch cover (Sec. 3.2.7)			O	O
7. Erosion Blanket with anchors (Sec. 3.2.8)				O
<b>Post Construction</b>				
8. Reestablish permanent ground cover or landscape prior to removing erosion measures (Sec. 3.2.6)	X	X		X

**Key:**

X = Base Measure

\* = Supplemental Wet Weather Measure (October 15–April 30) (Seeding prior to September 1)

O = Alternate Wet Weather Measure to \*

## 3.2 Recommended Design Criteria

The following sections provide design, construction, and maintenance criteria and recommendations for the erosion control measures listed in the matrices in Section 3.1.

### 3.2.1 Gravel Construction Entrances

#### Purpose

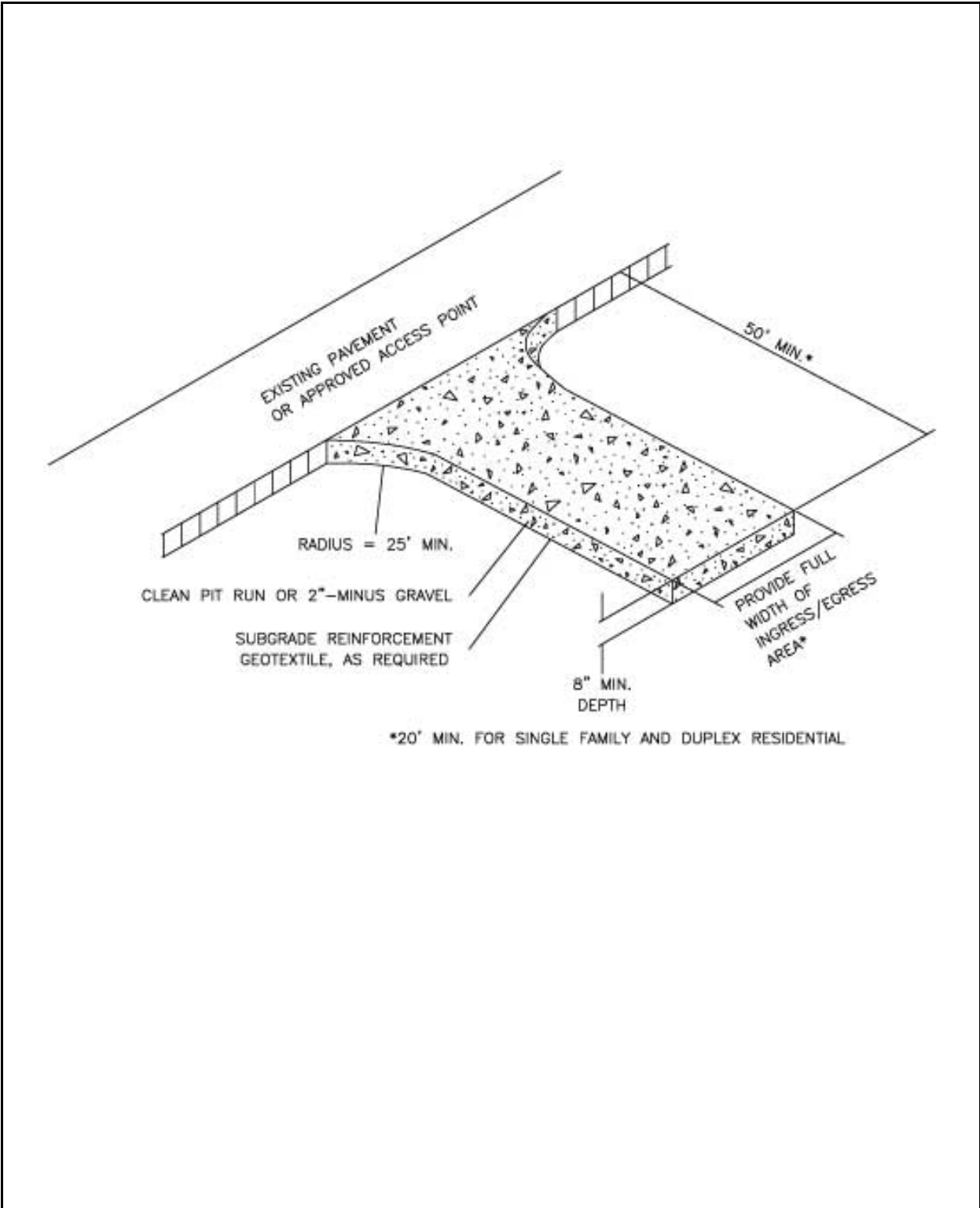
To reduce the amount of mud, dirt, rock, etc., transported onto roads by motor vehicles or stormwater runoff by constructing a stabilized pad of gravel at approved entrances/exits to construction sites.

#### Conditions Where Practice Applies

At any construction site where traffic will be leaving the site and moving directly onto public roads, other paved areas, or other approved access points.

#### Design Criteria/Specifications

- A. See Figure 3-1A for details.
- B. Material should be clean pit run or crushed rock (1"-minus for all single family, duplex, and manufactured home sites and 2-6" for all other construction sites).
- C. The gravel pad shall be at least 8 inches thick and 50 feet in length. Width shall be the full width of the vehicle ingress and egress area. (A 20-foot minimum pad length may be acceptable as approved for single family, duplex, and manufactured home sites.)
- D. Use subgrade reinforcement geotextile under gravel pads for all but construction of a single family/duplex residence and manufactured home placement.
- E. Additional gravel may have to be added periodically to maintain proper function of the pad.
- F. Additional Measures: If the gravel pad does not adequately remove dirt and mud from vehicle wheels such that mud and dirt tracking is evident off site, additional measures must be taken. Such measures may include washing off wheels before vehicles leave the site (see Detail Drawing 3-1B) or other construction techniques/work operations modifications.
- G. Do not install aggregate on paved surfaces. Use curb wood ramps.
- H. Install construction entrance prior to any site work.



TECHNICAL GUIDANCE HANDBOOK

Gravel Construction Entrance  
Detail Drawing 3-1A





- I. Whenever possible, construct the aggregate pad on a firm compacted subgrade. Install geotextile under aggregate when subgrade is not stable or is “pumping” up into the pad.

Wheel washing should be done on the gravel pad or in an approved wheel wash structure located onsite, adjacent to and on the site interior side of the gravel pad. Wash water shall be properly drained through a silt-trapping structure prior to leaving the construction site. See Detail Drawing 3-1B for details of a typical wheel wash structure.

Another additional measure is to construct gravel filter berms across on-site traffic wheel paths to capture and retain sediment. Berms shall be 1 foot high with 3:1 side slopes, constructed of  $\frac{3}{4}$ - to 3-inch well-graded or crushed rock with less than 5 percent fines. Berms must be inspected regularly and accumulated sediment removed and rock added or replaced as needed. Berms should be spaced as follows:

- Every 300 feet on slopes less than 5 percent.
- Every 200 feet on slopes between 5 and 10 percent.
- Every 100 feet on slopes greater than 10 percent.

### **3.2.2 Temporary Sediment Fences**

#### Purpose

To reduce the transport of sediment from a construction site by providing a temporary physical barrier to sediment and reducing runoff velocities.

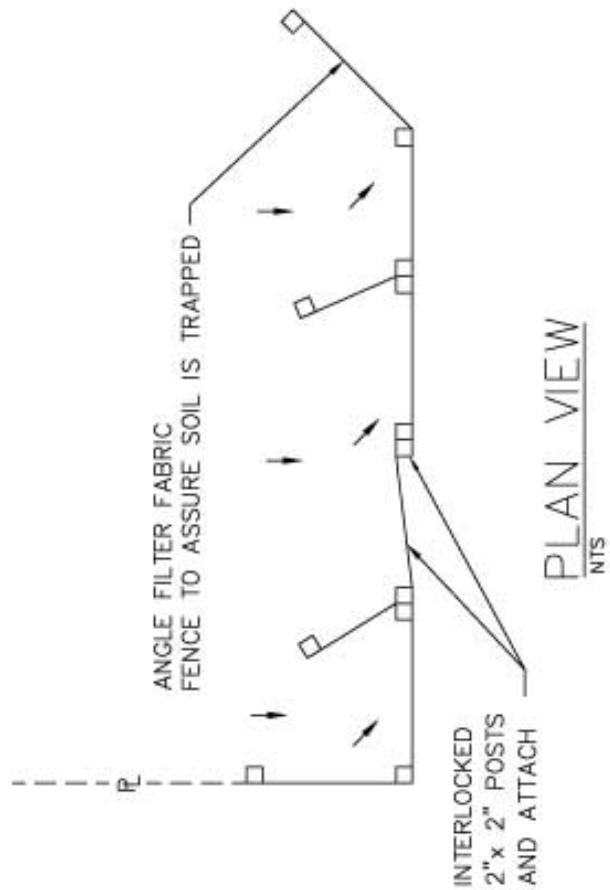
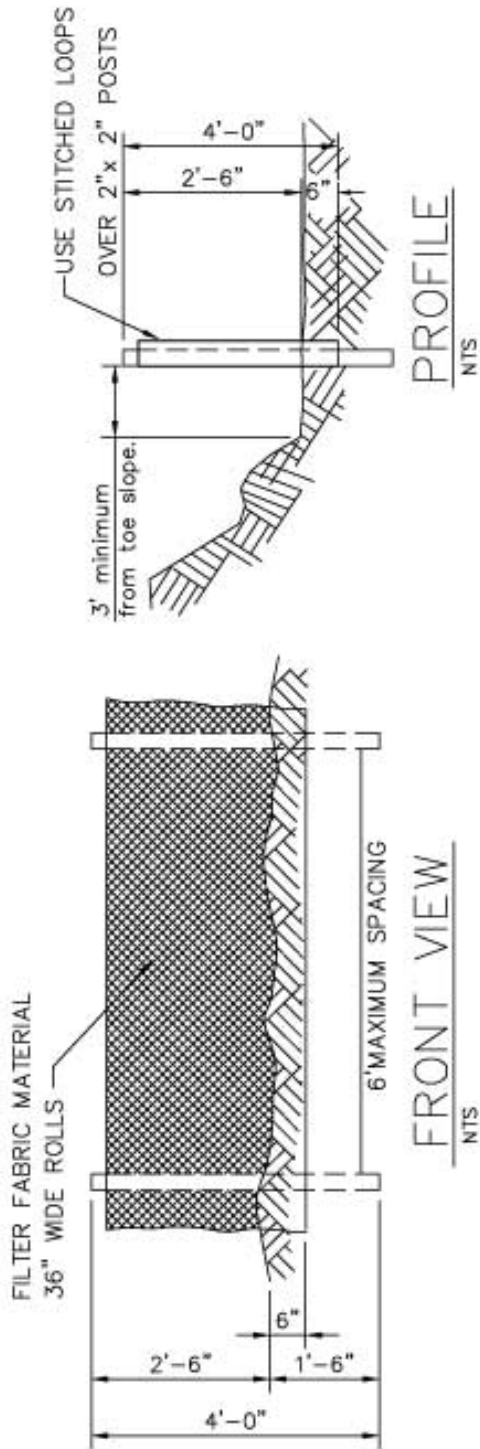
#### Conditions Where Practice Applies

- A. Down slope of disturbed areas where runoff occurs as sheet runoff.
- B. At the toe of soil or material stock piles.
- C. At intervals as indicated on Table 3-2 along the contours of large disturbed areas.
- D. At grade breaks exceeding 20 percent.
- E. Following discharge from a sediment trap or pond
- F. Sediment fences shall not be installed across streams.

#### Design Criteria/Specifications

- A. See Detail Drawing 3-2 for details.

- B. Maximum sheet or overland flow path length to sediment fence as shown in Table 3-2.
- C. Selection of filter fabric tensile and bursting strength depends on the slope characteristics. The use of standard or heavy duty filter fabric (woven polypropylene sediment fence fabric) shall meet manufacturer's design standards. Synthetic filter fabric shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of 6 months of expected usable construction life at a temperature range of 0 degrees to 120 degrees Fahrenheit. Selection shall be based on standard engineering principles for design.
- D. Standard or heavy duty filter fabric fence shall have manufactured stitched loops for 2"x 2" post installation. Stitched loops shall be installed on the up-hill side of the sloped area, with posts spaced a maximum of 6 feet apart.
- E. Filter fabric fence shall have a minimum vertical burial of 6 inches. All excavated material from filter fabric fence installation shall be firmly redeposited along the entire trenched area on the uphill side of the fence.
- F. The physical integrity of all materials shall be sufficient to meet the requirements of their intended use and withstand normal wear and tear.
- G. Where practical, the filter fabric shall be purchased in a continuous roll to the length of the barrier to avoid use of joints. When joints are necessary, 2"x 2" posts shall be interlocked with each other and be attached securely.
- H. Sediment fences shall be inspected by applicant/contractor immediately after each rainfall and at least daily during prolonged rainfall. Any required repairs, relocations, or additions shall be made immediately.
- I. At no time shall more than one foot depth of sediment be allowed to accumulate behind a sediment fence. Sediment should be removed or regraded into the uphill slopes, and the sediment fences repaired and reestablished as needed.
- J. Sediment fencing should be installed a minimum of 3 feet from toe of slope to maximize storage.
- K. When sediment fence approaches its termination point, turn fence uphill and extend one full panel (6 feet).



NOTES:

1. BURY BOTTOM OF FILTER FABRIC 6" VERTICALLY BELOW FINISHED GRADE.
2. 2" x 2" FIR, PINE OR STEEL FENCE POSTS.
3. POSTS TO BE INSTALLED ON UPHILL SIDE OF SLOPE.
4. COMPACT BOTH SIDES OF FILTER FABRIC TRENCH.

### 3.2.3 Straw Bale Sediment Barrier/Bio-Filter Bags

#### Purpose

To reduce the transport of sediment from a construction site by providing a temporary physical barrier to sediment and reducing runoff velocities. They may also may be used to divert runoff around active work areas or into sediment filtration/sedimentation areas. **Straw bales shall not be considered a means of filtering sediment.**

#### Conditions Where Practice Applies

- A. May be used for slope protection on single family residential or duplex construction and manufactured home placement activities as approved, or as prescribed in the Erosion Control Matrix.
- B. At toe of soils or material stock piles.
- C. Bio-Filter bags can be used in all newly constructed or existing drainage ditches and/or swales.
- D. Note: see Section 3.2.11 “Temporary Interceptor Dikes and Swales” for use of straw bales as flow interceptor dikes.
- E. Note: see Section 3.2.13 “Check Dams” for use of straw bales.
- F. See Detail Drawing 3-8D for temporary Bio-Filter Bag catch basin protection.

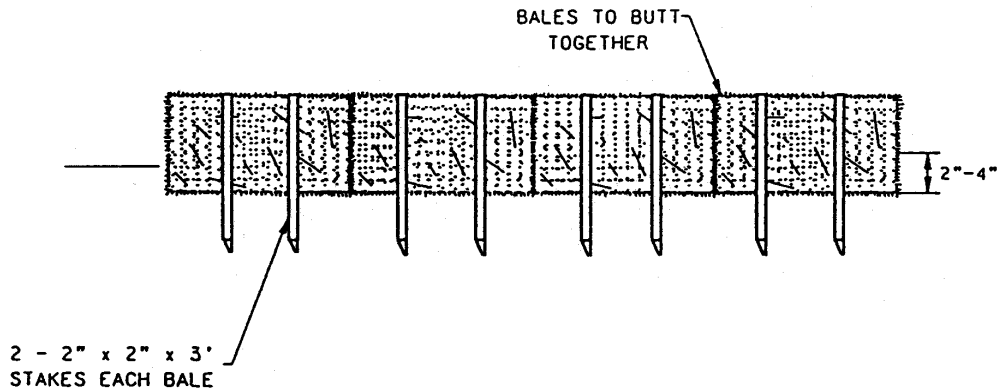
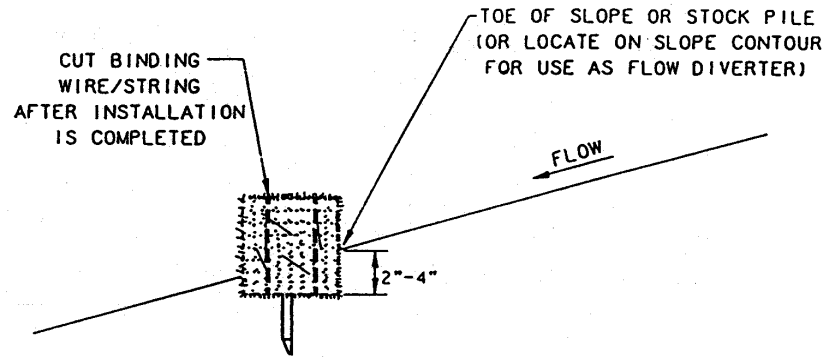
#### Conditions Where Practice Does Not Apply

- A. Straw bales shall not be used in newly constructed or existing ditches, swales, streams, or creeks, nor for catch basin protection.

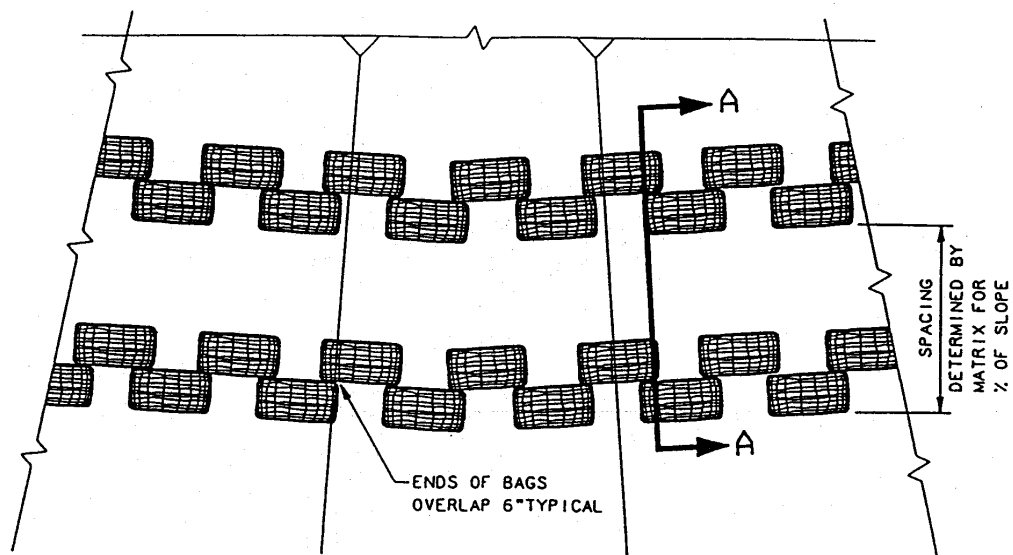
#### Design Criteria/Specifications

- A. See Detail Drawings 3-3A through 3-3D for details of straw bale sediment barriers and Bio-Filter Bags.
- B. Straw bales shall be standard 40 to 60 pound rectangular bales of cereal grain or seed straw, free of known harmful substances.
- C. Bio-filter bags shall be clean 100 percent recycled wood product waste, free of known harmful substances. Size of bag shall be 18x8x30 inches and weigh approximately 45 pounds, and made of ½ inch plastic mesh.
- D. Stakes shall be wood of size as shown on Detail Drawing 3-3A and driven through bales and into ground to a minimum depth of 12 inches.

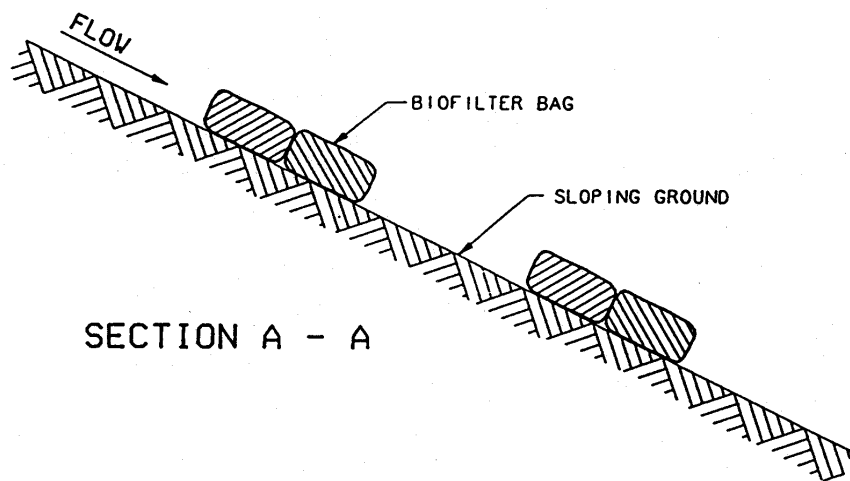
- E. Stakes for Bio-Filter bags shall be installed as shown in the Notes on Detail Drawings 3-3B through 3-3D.
- F. Straw bales shall be keyed into existing ground 2 to 4 inches.
- G. Straw bale sediment barriers and Bio-Filter bags may be left in place or used as mulch after completion of site work. They must be removed once the project has been completed and any post-construction control measures have been installed and approved by the City.
- H. At no time shall more than one foot depth of sediment be allowed to accumulate behind straw bale sediment barriers and/or Bio-Filter bags. Sediment should be removed or regraded into the uphill slope, or new lines of barriers installed uphill of sediment-laden barriers.
- I. Ends of straw bales or bio-filter bags must be overlapped 6 inches to prevent piping between joints.



- NOTES:
- \* EMBED BALES 2 TO 4 INCHES
  - \* DRIVE STAKES MINIMUM 12" INTO GROUND SURFACE
  - \* DRIVE STAKES FLUSH TO TOP OF BALES



PLAN VIEW

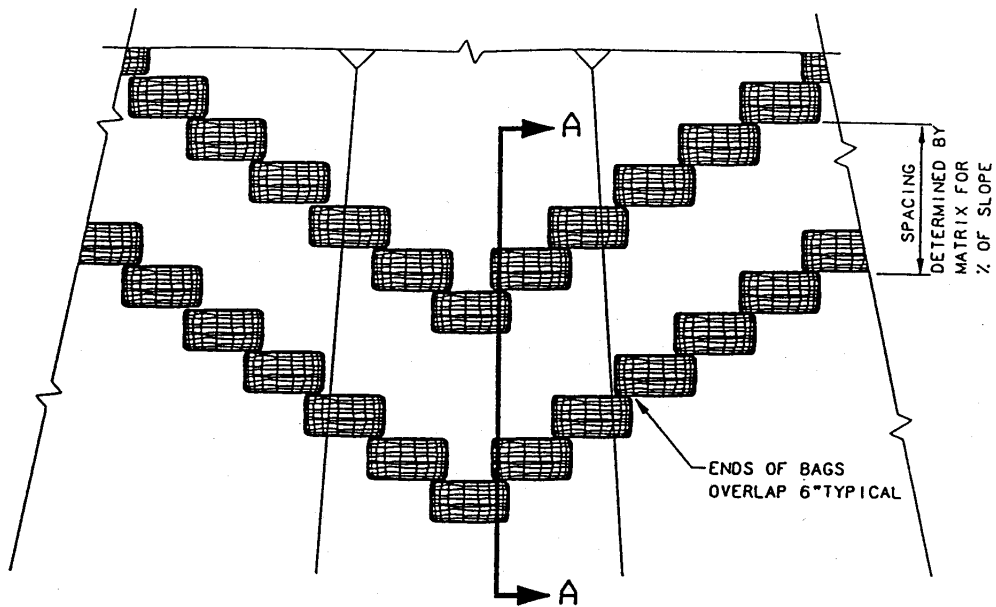


SECTION A - A

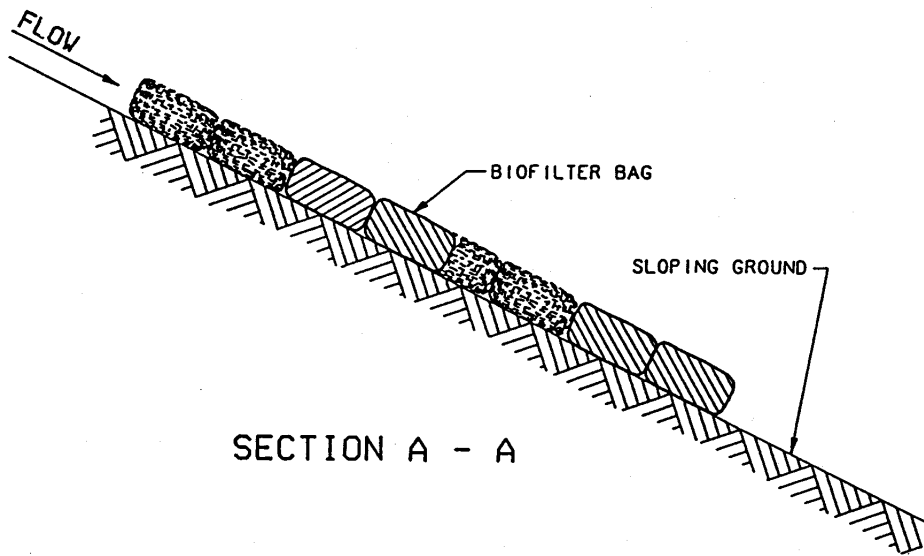
ALTERNATE #1  
NTS

**NOTE:**  
STAKING OF BAGS MAY BE REQUIRED WITH EITHER METHOD. USING (2) 1" x 2" WOOD STAKES OR APPROVED EQUAL PER BAG.





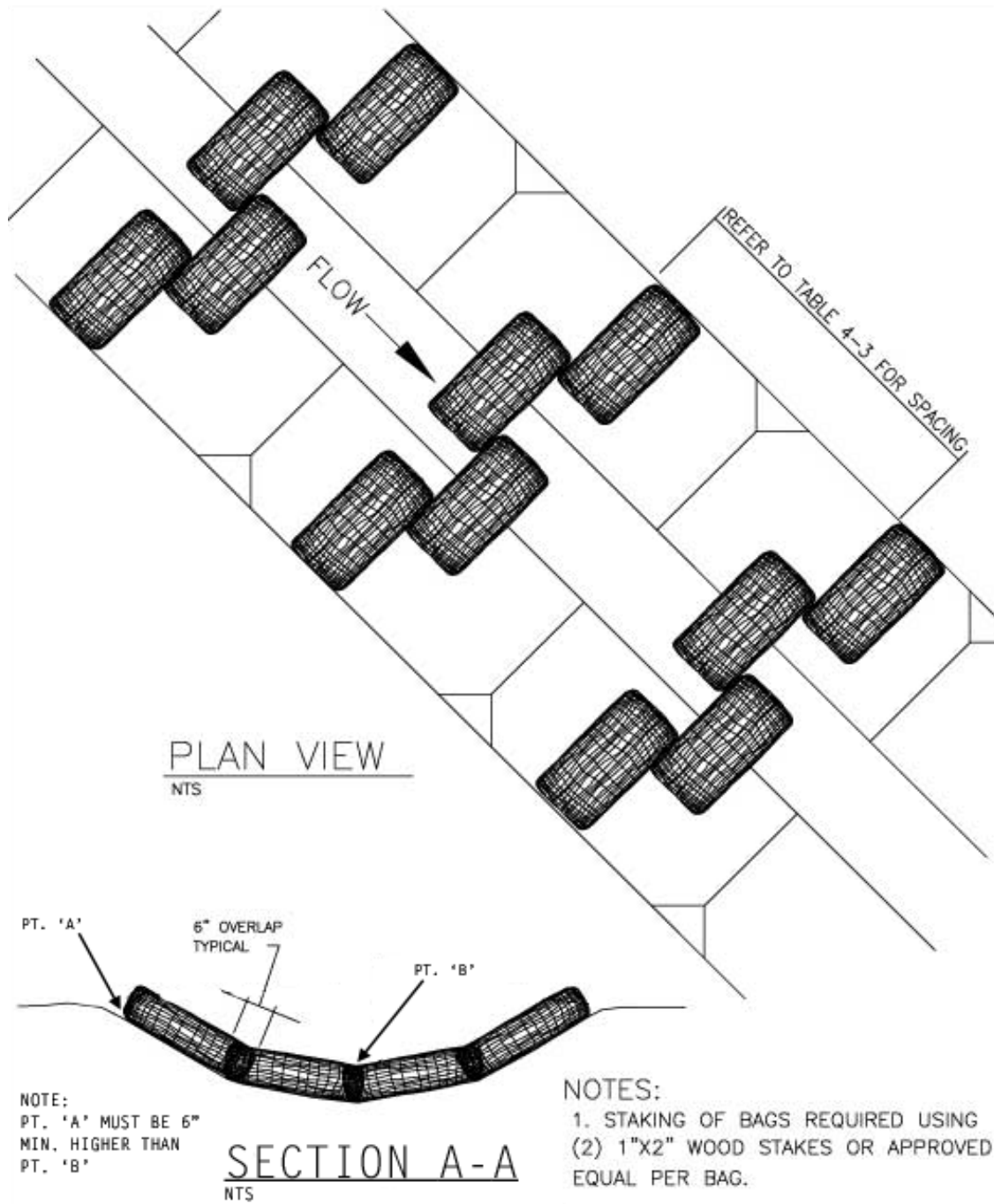
PLAN VIEW



SECTION A - A

ALTERNATE #2  
NTS

**NOTE:**  
STAKING OF BAGS MAY BE REQUIRED  
WITH EITHER METHOD. USING (2)  
1" x 2" WOOD STAKES OR APPROVED  
EQUAL PER BAG.



TECHNICAL GUIDANCE HANDBOOK

Biofilter Bag Ditches and Swales  
Detail Drawing 3-3D

### 3.2.4 Sidewalk Subgrade Crushed Rock Barrier

#### Purpose

To reduce the transport of sediment from a construction site by using the sidewalk subgrade gravel as a temporary filter and storage area for sediment-laden runoff.

#### Conditions Where Practice Applies

Single family/duplex residential construction and manufactured home placement sites, where the site slopes to a street with planned but unconstructed sidewalks and site slopes are less than 5 percent.

#### Design Criteria/Specifications

- A. See Detail Drawing 3-4 for details.
- B. Install where the site slopes to a street with curbs and slopes are 5 percent or less.
- C. Sidewalk subgrade gravel or other suitable controls must be in place during the entire construction period, from the time of initial site clearing/grading through establishment of permanent site cover.
- D. Sidewalk subgrade must have a minimum 4-inch depth and a 4-foot width, with at least a 2-inch layer of approved sub-base material installed..
- E. If the sidewalk subgrade gravel does not provide an effective filter such that sediment is leaving the construction site, additional measures must be applied. These may include replacement of gravel or installation of sediment barriers.
- F. Subgrade gravel may not meet specifications for sidewalk concrete placement if too much sediment has infiltrated the rock. The permittee should weigh the benefits of eliminating sediment barriers versus the possibility that the subgrade gravel may be rejected. To mitigate against this possibility and maintain performance, remove and replace gravel when filtering capacity is reduced by half.
- G. Plug all weep holes in curb.
- H. When sidewalk concrete is to be poured prior to establishment of permanent site cover, other suitable controls may be needed to retain sediment-laden runoff on site.
- I. Install as part of the footing/foundation dig out.
- J. Install sediment barrier on the downhill corner of the property to intercept sediment-laden runoff.

- K. A gravel filter berm may be installed along the inside edge or toe of slope to increase filtration.

### **3.2.5 Undisturbed Vegetative Buffers**

#### Purpose

To provide a natural vegetated buffer area for filtering erosion from construction areas, as an alternate in certain cases or a supplemental measure to sediment barriers.

#### Conditions Where Practice Applies

An undisturbed vegetated buffer may be used as approved as an alternate to a sediment barrier at the toe of the site slopes if the buffer meets the following criteria:

- A. The buffer is an undisturbed grassed area or covered with other approved dense vegetation.
- B. The buffer is downhill and in the drainage path from the construction/disturbed area.
- C. There are no concentrated or channeled flows from the disturbed site entering the buffer.
- D. The buffer area is owned by the applicant or approved for such use in writing by the owner.
- E. Slopes in the buffer and its drainage area are less than 10 percent.
- F. The grassed buffer area impacted by the potential disturbed area runoff is at least equal in dimensions to the uphill construction/disturbed area draining to it.
- G. Clearly establish construction limits with orange construction safety fence and signs spaced 100 feet apart.

### **3.2.6 Temporary Grasses and Permanent Vegetative Cover**

#### Purpose

To reduce erosion and sedimentation by stabilizing exposed soils with vegetation and mulching.

#### Conditions Where Practice Applies

- A. Ground surfaces exposed during the wet season (October 15 through April 30).

- B. Areas which will not be subjected to heavy wear by on-going construction traffic.
- C. Exposed ground surfaces at end of construction period (permanent cover must be established prior to removal of any erosion control measures).
- D. Temporary or permanent stabilization of new or disturbed ditches or swales.

Design Criteria/Specifications: Temporary Erosion Control Grasses

- A. Temporary grass cover measures must be fully established by October 15 or other cover measures will have to implemented until adequate grass coverage is achieved.
- B. Hydromulch shall be applied with grass seed at a rate of 2000 pound/acre. On slopes steeper than 10 percent, hydroseed and mulch shall be applied with a bonding agent (tackifier). Application rate and methodology to be in accordance with seed supplier recommendations.
- C. Dry, loose, weed-free straw used as mulch shall be applied at double the hydromulch application requirement (4000 pound/acre). Anchor straw by working in by hand or with equipment (rollers, cleat tracks, etc.).
- D. Mulch shall be spread uniformly immediately following seeding.
- E. Soil Preparation: Top soil should be prepared according to landscape plans, if available, or recommendations of grass seed supplier. It is recommended that slopes be roughened before seeding by “track-walking” (driving a crawling tractor up and down slopes to leave a pattern of cleat imprints parallel to slope contours) or other method to provide more stable sites for seeds to rest.
- F. Seeding: Recommended erosion control grass seed mixes are as follows: (Similar mixes designed to achieve erosion control may be substituted if approved.)
  - 1. Dwarf Grass Mix (low height, low maintenance): Dwarf Perennial Ryegrass, 80 percent by weight; Creeping Red Fescue, 20 percent by weight. Application rate: 100 pounds minimum per acre.
  - 2. Standard Height Grass Mix: Annual Ryegrass, 40 percent by weight; Turf-type Fescue, 60 percent by weight. Application rate: 100 pounds minimum per acre.
- G. Fertilization for grass seed shall be in accordance with supplier’s recommendations. Development areas within 50 feet of water bodies and wetlands must use a non-phosphorus fertilizer. Slow release fertilizers are more efficient and have fewer environmental impacts.

- H. Netting and Anchors, as needed: For disturbed areas on slopes and in ditches/swales, biodegradable netting or jute is desirable and may be used instead of bonding agents to provide a stable area for seeding. Netting should be anchored in accordance with manufacturer's recommendations.
- I. Watering and sustaining: Seeding shall be supplied with adequate moisture to establish grass. Supply water as needed, especially in abnormally hot or dry weather or on adverse sites. Water application rates should be controlled to provide adequate moisture without causing runoff.
- J. Reseeding: Areas which fail to establish grass cover adequate to prevent erosion shall be reseeded as soon as such areas are identified, and all appropriate measures shall be taken to establish adequate cover.

Design Criteria/Specifications: Permanent Vegetative Groundcover

- A. At the end of site construction or paving, approved permanent site landscaping or establishment of a healthy stand of grass (or alternative vegetation as approved) must occur prior to removal of site erosion control measures and as set forth in the approved EPSC plan.

**3.2.7 Straw Mulch**

Purpose

To reduce erosion by providing a protective cover over disturbed bare or reseeded soils. Also can be used to enhance success of seeding/revegetation.

Conditions Where Practice Applies

- A. As a cover on ground surfaces and stock piles exposed during the wet season (October 15 through April 30). Adjacent and downstream catch basins must be protected.
- B. As a mulch to enhance vegetation establishment in areas that have been seeded.

Design Criteria/Specifications

- A. Loose, weed-free straw mulch, free of known harmful substances, shall be applied at a rate of no less than 4000 pounds (2 tons) per acre, and shall have a minimum depth in-place of 2 inches. It shall be spread uniformly throughout the entire area and integrated into the top layer of soil.
- B. Mulch must be stabilized in place by hand or machine punching the straw into the soil, spraying it with a tacking agent, or covering it with an erosion blanket. See Section 3.2.8 "Erosion Blankets" for appropriate design criteria for such coverings.

C. Straw mulch may be required during the dry season if:

- Grass growth is expected to be slow;
- The soils are highly erodible;
- There is a water body close to the disturbed area; or
- Significant precipitation is anticipated before the grass will provide effective cover.

### **3.2.8 Erosion and Matting Blankets**

#### Purpose

To provide immediate protection and physical stabilization of disturbed soils. Typically used when vegetative cover cannot be achieved due to soils, slopes, or time of year. Can be used to enhance success of seeding, planting, and/or sodding.

#### Conditions Where Practice Applies

- A. On areas of steep slopes (greater than 50 percent) and areas of moderate slopes that are prone to erosion.
- B. As a cover on ground surfaces exposed during the wet season (October 15 through April 30).
- C. As a supplemental aid to seed and/or mulch treatment on slopes or in ditches or swales.

#### Design Criteria/Specifications

- A. Erosion blankets may be used on level areas and on slopes up to 1:1. Where soil is highly erodible, netting shall only be used in conjunction with an organic mulch such as straw or wood fiber. The blanket must be applied so that it is in complete contact with the soil; if it is not, erosion will occur beneath it. Erosion blankets shall be securely anchored to the slope in accordance with manufacturer's recommendations. Surface must be graded smooth before blankets are installed. Remove all debris and undulations larger than 2 inches in any dimension.
- B. Deformed plastic filament matting may be used for stream velocity protection and other special applications when approved by the City.
- C. Organic matting materials (excelsior, jute, or coir) biodegrade and are useful for applications requiring stabilization for up to three months. Use organic blankets, which retain moisture and provide organic matter to the soil, for slope protection and short-term waterway protection and to improve the speed and success of revegetation.

- Excelsior brand (aspen wood fiber), woven straw, and coir (coconut fiber) blankets may be installed without mulch because they provide complete surface protection.
- D. Synthetic mats are made from non-biodegradable material and will remain in place for years (some photodegradation does occur). Use purely synthetic blankets for long-term stabilization of waterways.
- Turf Reinforcement Mats (TRM) are made from polymer netting or monofilaments formed into a synthetic 3-D mat. TRMs protect seed and increase germination and also act as part of the root structure; giving the turf higher strength.
  - Erosion Control and Revegetation Mats (ECRM), composed of heat-fused monofilaments or monofilaments stitched between netting, act as permanent mulch. ECRM allow growth through the mat.
- E. Channel or swale applications:
- Lengthwise overlap: Minimum 12 inches
  - Crosswise overlap: Minimum 6 inches
  - Avoid joining material in center of ditch or swale
- F. Slope application:
- Lengthwise overlap: Minimum 6 inches
  - Crosswise overlap: Minimum 6 inches
  - At top of slope, entrench material in a 6" x 6" trench and staple at 12-inch intervals
  - At bottom of slope, extend mat 2 feet beyond the toe of the slope, turn material under 4 inches, and staple at 12-inch intervals
  - On slopes of 4:1 or flatter, rolls can be placed in horizontal strips
  - Mats must be stapled in place as they are installed down the slope face every 4 feet until you reach the bottom. This keeps the blanket in a relaxed position eliminating the potential for under-rilling.

### **3.2.9 Plastic Sheet Covering**

#### Purpose

To provide immediate erosion protection to slopes and disturbed areas when vegetative cover cannot be achieved due to soils, slopes, or time of year. To provide erosion protection on soils, spoils, and other erodible stock piles, including temporary stockpiles of construction materials as authorized by 75.090(b).

#### Conditions Where Practice Applies

- A. Disturbed areas which require immediate erosion protection.



- B. On areas of steep slopes (greater than 50 percent) and areas of moderate slopes that are prone to erosion.
- C. On ground surfaces and stock piles exposed during wet weather season (October 15 through April 30).
- D. As a temporary measure to provide erosion protection and assist in germination on areas seeded between October 15 through April 30.
- E. On temporary stockpiles of construction materials as authorized under 75.090(b), such use is mandatory during the wet weather season (October 15 through April 30), and as necessary during other periods so as to meet the performance standards in SRC 75.

#### Design Criteria/Specifications

- A. Plastic sheeting shall be polyethylene and have a minimum thickness of 6 mil.
- B. Covering shall be installed and maintained tightly in place by using sandbags or tires on ropes with a maximum 10-foot grid spacing in all directions. All seams shall be taped or weighted down the full length and there shall be at least a 12-inch overlap of all seams. For seams parallel to the slope contour, the uphill sheet shall overlap the downhill sheet. No runoff shall be allowed to run under the plastic covering. Toe-in the top of the plastic in a 6" x 6" trench backfilled with compacted native material. Install a gravel berm, riprap, or other approved protection at the toe of the slope in order to dissipate runoff velocity.
- C. Drainage from areas covered by plastic sheeting shall be controlled such that no discharge occurs directly onto uncontrolled disturbed areas of the construction site. Adjacent and downstream catch basins shall also be adequately protected.
- D. Clear plastic sheeting may be installed on areas seeded between October 15 to March 31 to provide a greenhouse-type environment, and remain until vegetation is firmly established.
- E. When possible on sloped applications, construct an interceptor dike or trench at the top of the plastic to divert upland flows away from the plastic.

### **3.2.10 Sediment Traps and Ponds**

#### Purpose

To collect and temporarily store sediment eroded from exposed ground surfaces, disturbed during the construction period, prior to establishment of permanent vegetation and drainage facilities.

### Conditions Where Practice Applies

- A. Downhill of areas with exposed soils during the wet season (October 15 through April 30).
- B. Sediment Traps: where the tributary drainage area is 3 acres or less (but not including individual single family and duplex residence construction or manufactured home placement), and slopes are less than 50 percent.
- C. Sediment Ponds: where the tributary drainage area is 10 acres or less and slopes are less than 50 percent.

### Design Criteria/Specifications

Temporary interceptor dikes or swales may be constructed to divert runoff to sediment traps or ponds.

### Sediment Traps

The sediment trap may be formed completely by excavation or by construction of a compacted embankment. It shall have a sediment storage depth not to exceed 1.5 feet, topped by a 2-foot-deep settlement zone. Sediment trap side slopes shall be 3:1 or flatter. The outlet of the trap shall be a weir/spillway, providing a minimum 1 foot overflow depth between the spillway and embankment.

A filter fabric fence or similar filter must be constructed to filter runoff from the trap prior to discharge from the construction site.

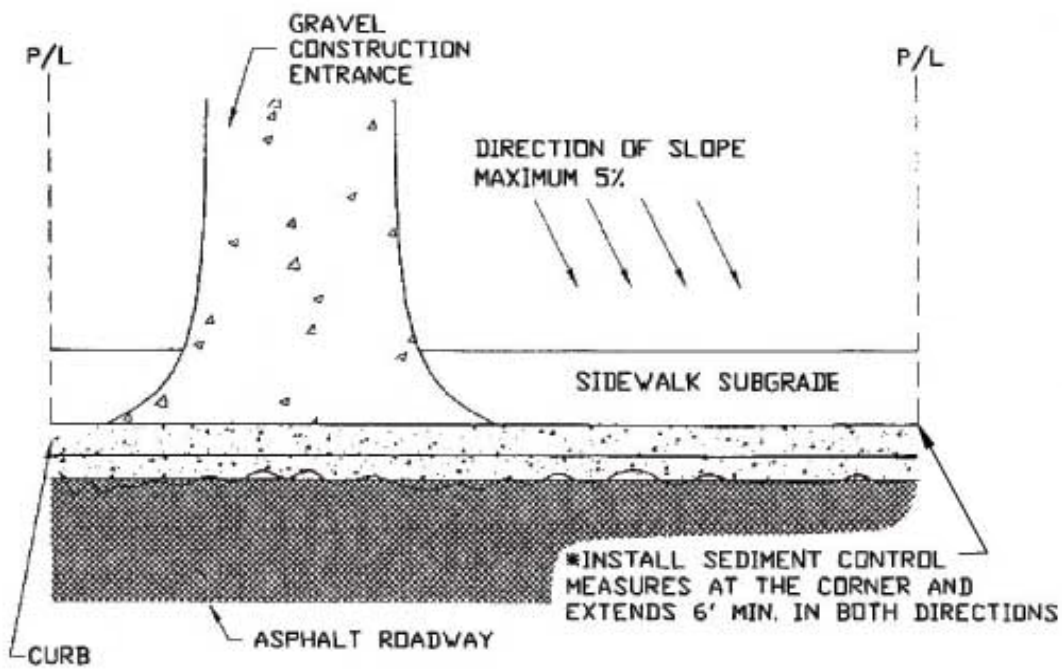
- A. See Detail Drawing 3-5 for details.
- B. Determine the bottom surface area of the sediment trap using the calculated sediment volume and the maximum 1.5 foot sediment depth and 3:1 side slope requirements.
- C. Determine the total trap dimensions by adding an additional 2 feet of depth for settling volume (before overtopping of spillway) above the sediment storage volume, while not exceeding 3:1 side slopes.
- D. A 3:1 ratio of trap length to width is desirable. Length is defined as the average distance from the inlet to the outlet of the trap.

### Sediment Ponds

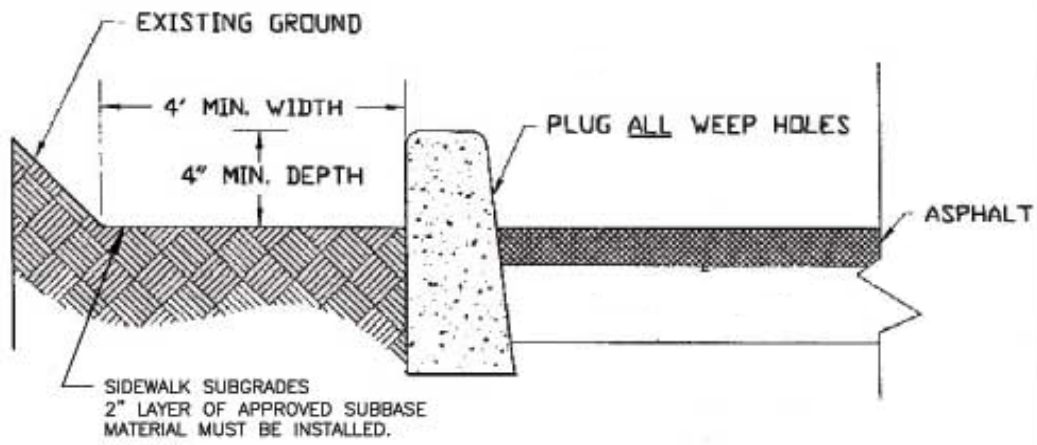
A sediment pond may be formed by partial excavation and/or by construction of a compacted embankment. It may have one or more inflow points carrying polluted runoff. Baffles to spread the flow throughout the pond should be included. A securely anchored riser pipe is the recommended principal discharge mechanism, with an emergency overflow spillway. The riser pipe should be perforated and

covered with filter fabric and gravel “cone” for filtration or solid with a 1” diameter dewatering hole and perforated drain pipe. Outlet protection shall be provided to reduce erosion at the pipe outlet. A filter fabric fence or similar filter must be constructed to filter runoff from the pond prior to discharge from the construction site.

- A. See Detail Drawing 3-6 for details.
- B. The sediment pond shall have a sediment storage depth no greater than 2 feet, topped by a 2-foot-deep settlement zone and an additional 1 foot of freeboard. The pond side slopes shall be 3:1 or flatter.
- C. The sediment storage volume is determined in the same manner as mentioned above for sediment traps.
- D. The pond riser pipe and outlet pipe shall be sized to carry the 10-year design storm.
- E. A 3:1 ratio between the pond length and width is desirable. Length is defined as the average distance from the inlet to the outlet of the pond. Use baffles in the pond to help prevent short-circuiting and to increase the effective pond length where site conditions prohibit constructing a pond with a direct 3:1 length to width ratio.
- F. The pond bottom shall be sufficiently compacted to the Director’s satisfaction so as to prevent seepage of contaminated runoff entering into the groundwater or the City’s stormwater drainage or surface water system.
- G. Do not drain basins directly into a stream, lake, wetland, or other waterway. Water temperatures in the pond may be too high for direct release. Always moderate the water temperature before it drains into a stream, lake, wetland, or other waterway. Whenever possible, release the pond discharge on-site onto a relatively level, grassed area at least 50 feet from a waterway or wetland.
- H. Remove sediment when the storage zone is half full. This sediment shall be placed in such a manner that it will not erode from the site. The sediment shall not be deposited downstream from the embankment or in or adjacent to a stream, wetland, or floodplain.

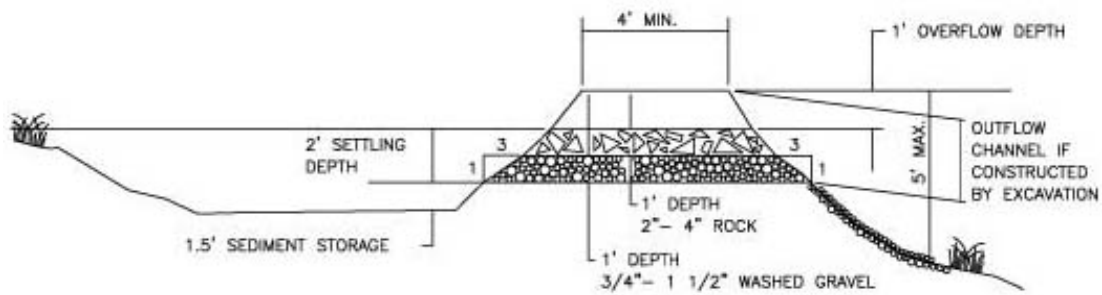


PLAN VIEW



PROFILE

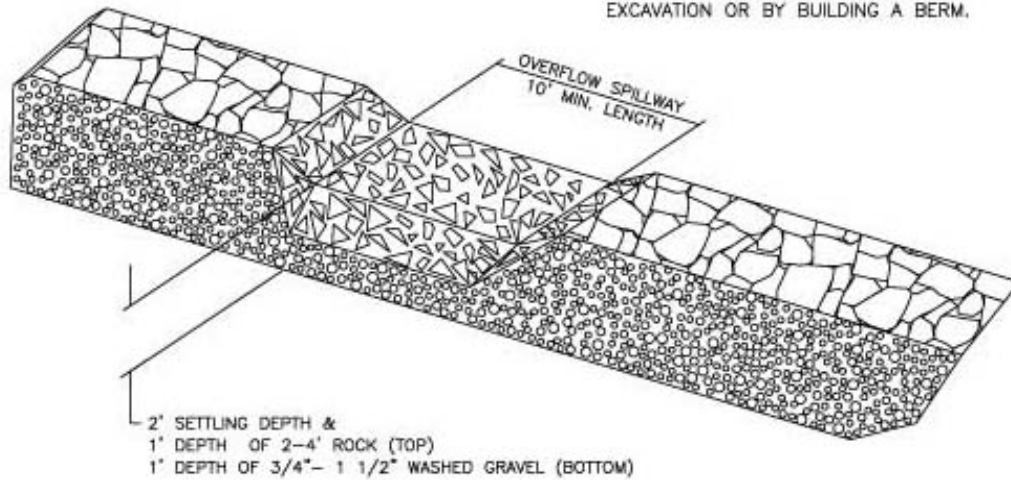
NOTE: SIDEWALK SUBGRADE CAN BE USED FOR ALL CONSTRUCTION ACTIVITIES.



**CROSS SECTION**

NTS

NOTE: MAY BE CONSTRUCTED BY EXCAVATION OR BY BUILDING A BERM.

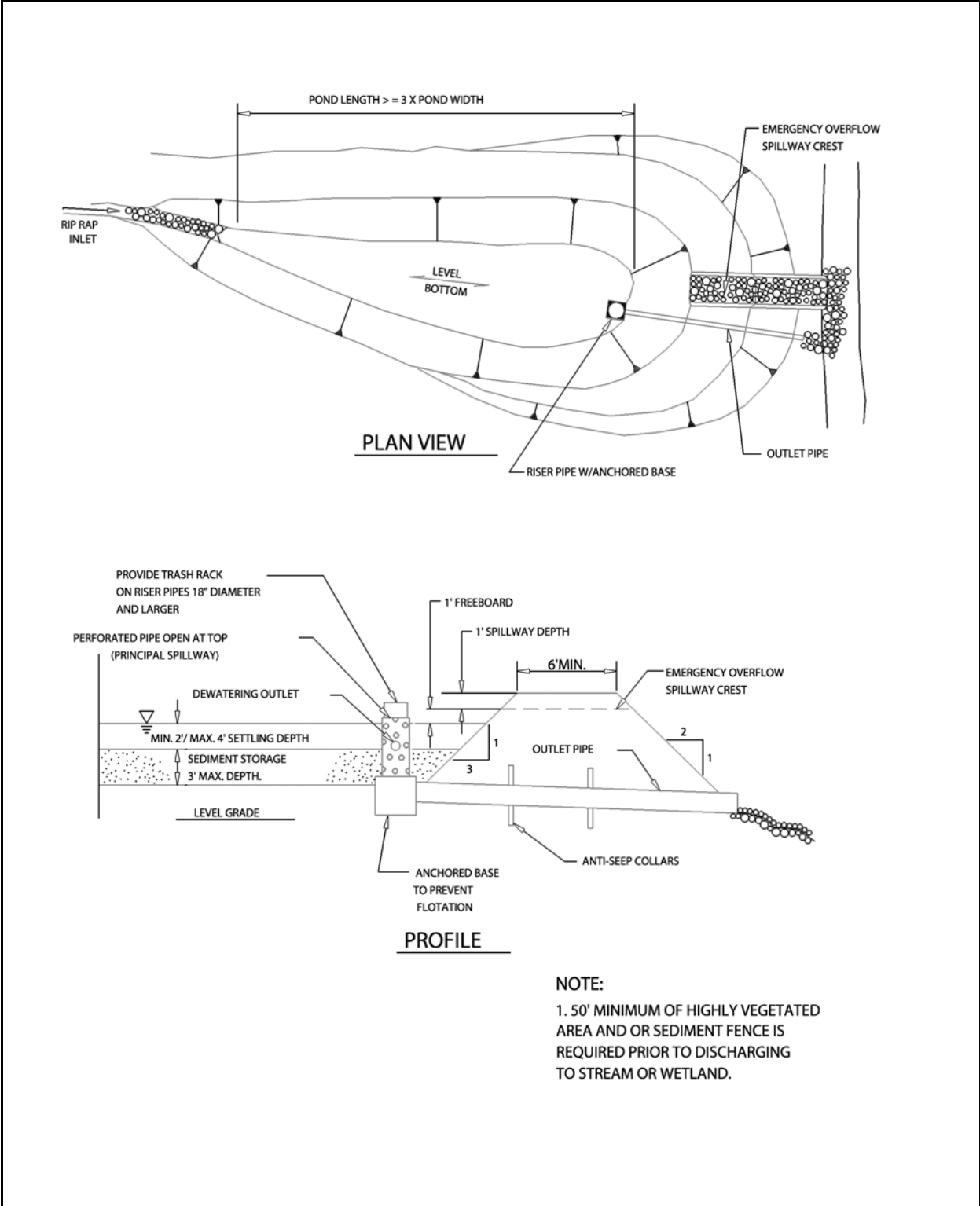


2' SETTLING DEPTH &  
1' DEPTH OF 2-4" ROCK (TOP)  
1' DEPTH OF 3/4" - 1 1/2" WASHED GRAVEL (BOTTOM)

**SEDIMENT TRAP OUTLET**

NTS

NOTE:  
A FILTER FABRIC FENCE OR SIMILAR FILTER MUST BE CONSTRUCTED TO FILTER RUNOFF FROM THE SEDIMENT TRAP PRIOR TO DISCHARGE FROM THE CONSTRUCTION SITE.



### 3.2.11 Temporary Interceptor Dikes and Swales

#### Purpose

To intercept stormwater runoff from drainage areas above unprotected slopes and direct it to a stabilized outlet. To intercept stormwater runoff from a disturbed site and direct it to a sediment trap or pond.

#### Conditions Where Practice Applies

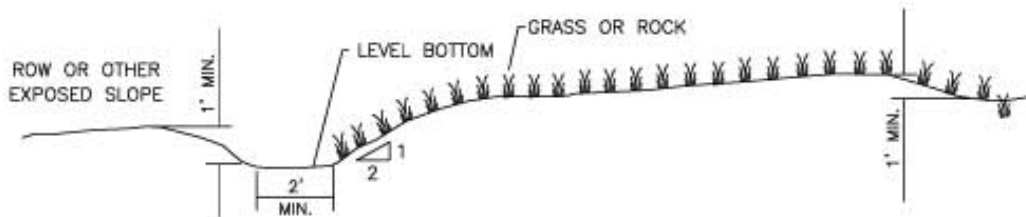
- A. Where the volume and velocity of runoff from disturbed slopes must be reduced. When an interceptor dike or swale is placed above a disturbed slope, it reduces the volume of water reaching the disturbed area by intercepting runoff from above.
- B. Where sediment traps or ponds are to be used, interceptor dikes and swales can be used to direct site runoff to a sediment trap or pond.

#### Design Criteria/Specifications

- A. Intercepted runoff must be directed to a stabilized area (such that no erosion occurs due to the additional water and velocity) or to a sediment pond or trap.
- B. See Detail Drawing 3-7 for details. Straw Bales may also be used to intercept runoff. See Section 3.2.3 “Straw Bale Sediment Barrier” for installation criteria and specifications.
- C. Interceptor dikes and swales shall be stabilized with approved cover before being put into use. Such cover may include grass, rock, or erosion blankets.
- D. Spacing between interceptor dikes and swales along slope contours shall be as follows:

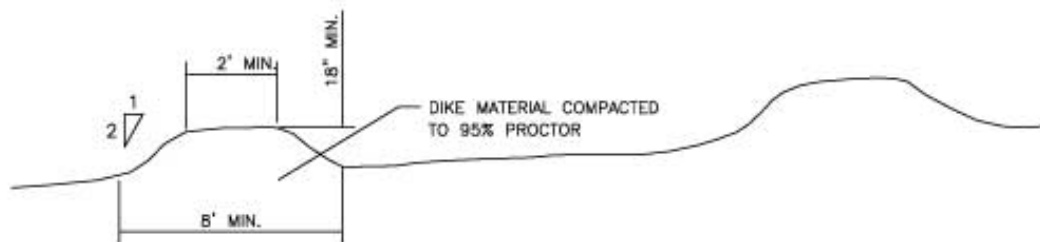
<u>Slope</u>	<u>Spacing</u>
< 5%	300 feet
5-10%	200 feet
10-25%	100 feet
> 25%	50 feet minimum or as approved by the City

- E. Minimize construction traffic over dikes and swales.
- F. The upslope side of interceptor dikes shall provide positive drainage to the dike outlet. Provide energy dissipation measures as necessary to minimize erosion at dike outlet.
- G. Grades for drainage parallel to interceptor dikes shall be between 0.5 and 1.0 percent.



BOTTOM WIDTH	2 FEET MINIMUM; THE BOTTOM WIDTH SHALL BE LEVEL
DEPTH	1 FOOT MINIMUM
SIDE SLOPE	2H:1V OR FLATTER
GRADE	MAXIMUM 5 PERCENT, WITH POSITIVE DRAINAGE TO A SUITABLE OUTLET (SUCH AS SEDIMENTATION POND)

DIVERSION SWALE



TEMPORARY DIVERSION DIKE

Slope	Spacing
<5%	300 feet
5-10%	200 feet
10-40%	100 feet

NOTE:  
IMMEDIATELY UPON CONSTRUCTION,  
ESTABLISHED VEGETATION OR EROSION  
CONTROL BLANKETS ARE REQUIRED.



- H. Maximum grade of interceptor swales shall be 5 percent and provide positive drainage to outlet.
- I. Outlets shall lead to an approved sediment trap/pond when runoff from disturbed areas is intercepted by dikes/swales. Outlets shall be stabilized to prevent erosion.
- J. Unless approved as a permanent post-construction erosion control measure, temporary dikes and swales shall be graded out at the completion of construction when permanent vegetation has been established.

### **3.2.12 Storm Drain Inlet Protection**

#### Purpose

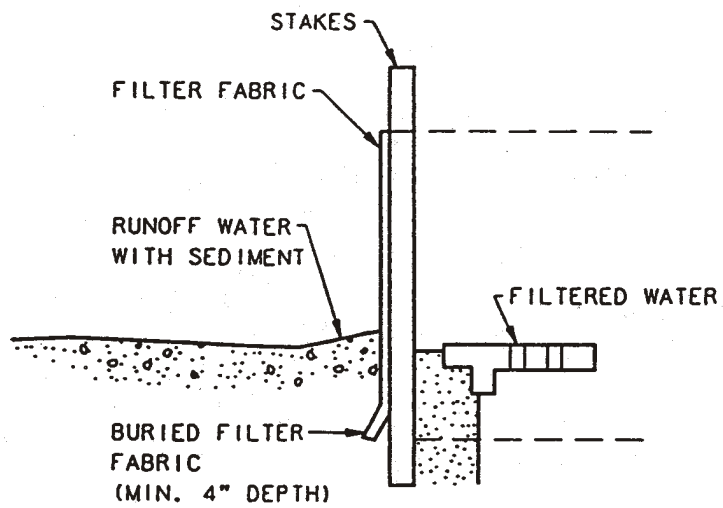
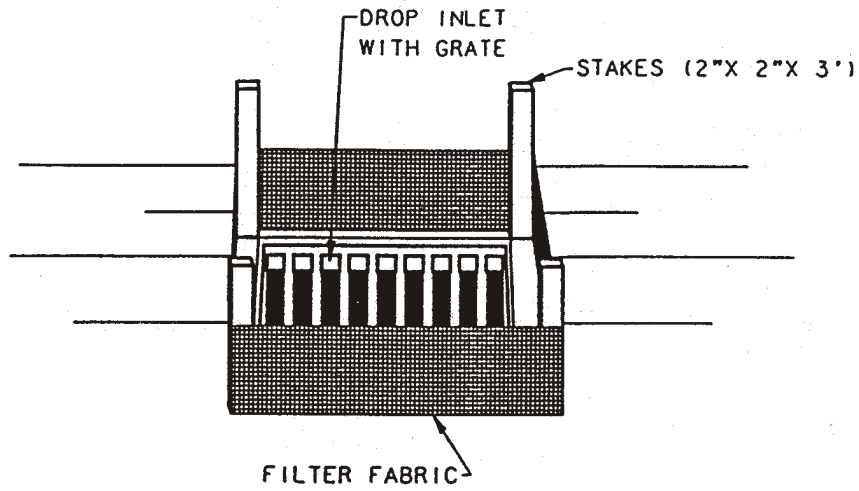
To prevent sediment from entering storm drain systems prior to permanent stabilization of disturbed areas.

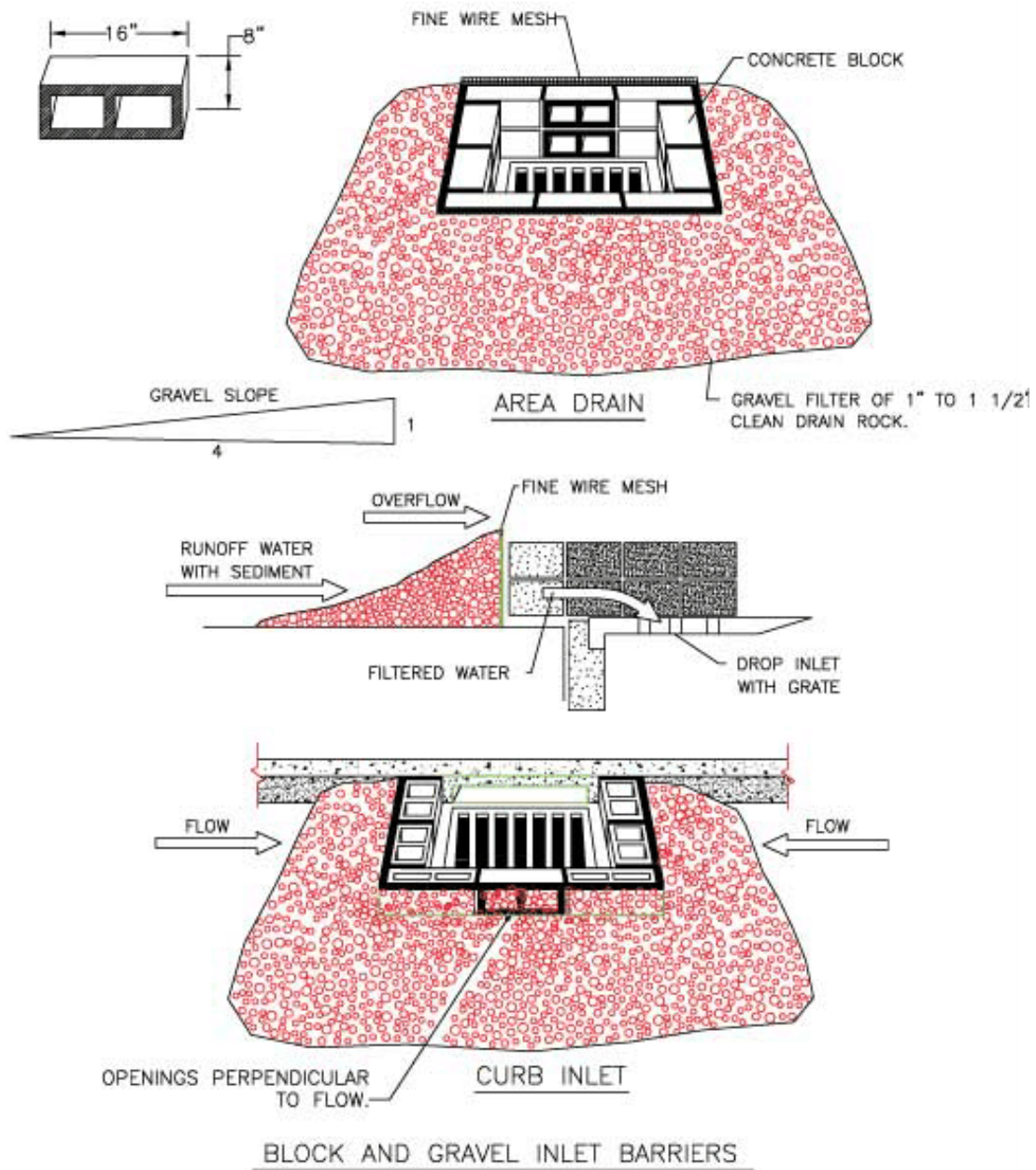
#### Conditions Where Practice Applies

- A. Where interior site storm drain inlets are operational before permanent stabilization of the disturbed drainage area, as approved by the Director.
- B. Adjacent to and immediately downhill of utility type construction in existing paved areas with catch basin drainage.
- C. In public right-of-way areas for use during approved flushing operations.
- D. Adjacent to and downstream from any temporary stockpiles of construction materials [75.090(b)], used in conjunction with plastic sheet covering.

#### Design Criteria/Specifications

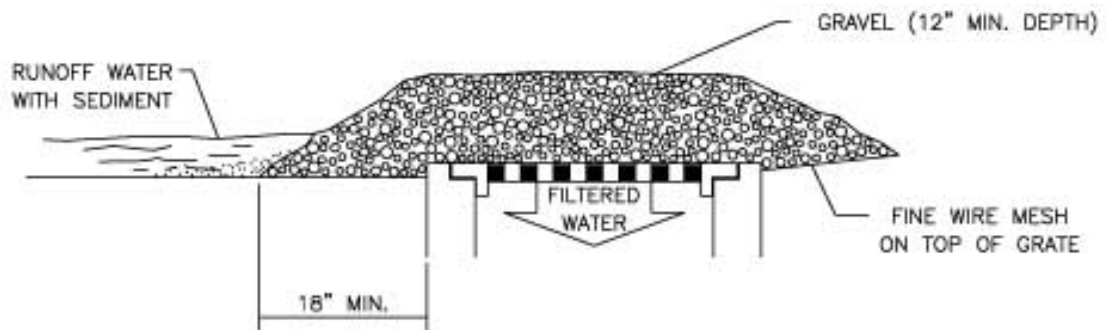
- A. Design criteria and specifications for four recommended alternative methods of storm drain inlet protection are presented on Detail Drawings 3-8 A, B, C, and D.
- B. Berms may be required to direct drainage to flow through the filters and prevent bypassing of the inlets.
- C. At no time shall more than one foot depth of sediment be allowed to accumulate against storm drain inlet protection measures. Sediment must be removed and inlet protection measures restored as needed to maintain their sediment trapping and filtering capability.
- D. Place inlet protection in areas where water can pond and where ponding will not have adverse impacts. Allow for an approved overflow in a severe storm event.



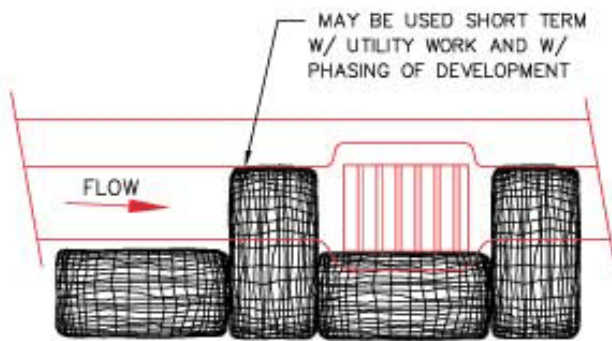


**NOTE:**

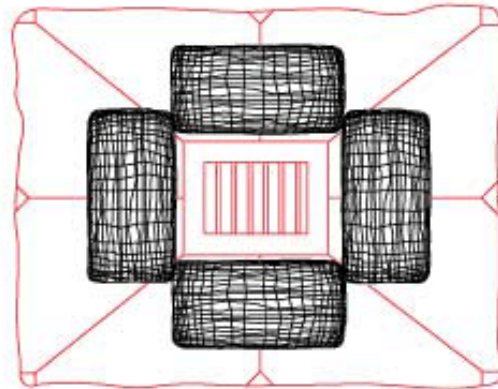
1. BLOCKS SHALL BE STACKED WITH THE OPENINGS ON THE TOP AND BOTTOM EXCEPT FOR THE CENTER BLOCKS. CENTER BLOCKS WILL HAVE OPENINGS PERPENDICULAR TO FLOW.



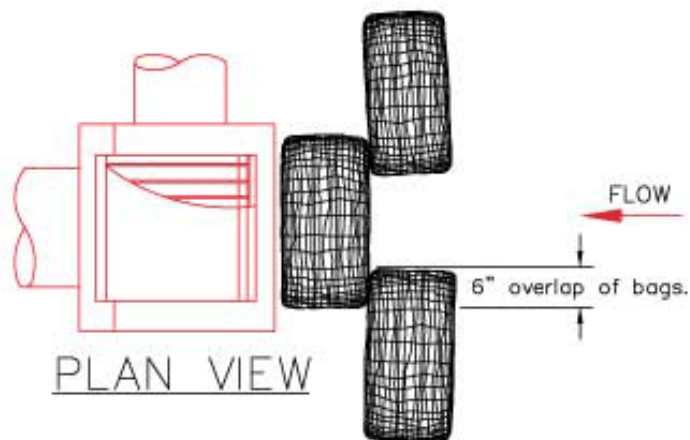
GRAVEL & WIRE MESH



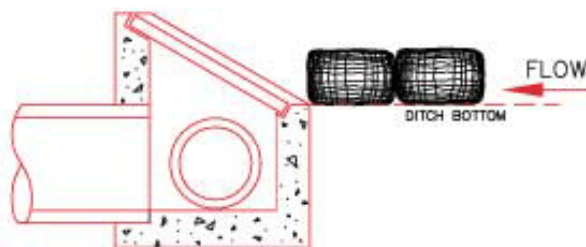
CATCH BASIN



AREA DRAIN



PLAN VIEW



DITCH INLET

**NOTES:**

1. ADDITIONAL MEASURES MUST BE CONSIDERED DEPENDING ON SOIL TYPES.
2. BIOFILTER BAGS SHOULD BE STAKED WHERE APPLICABLE USING (2) 1"x2" WOODEN STAKES OR APPROVED EQUAL PER BAG.

### 3.2.13 Check Dams

#### Purpose

To reduce the velocity of concentrated flows, reduce erosion of swales or ditches, and provide for sedimentation of suspended soil particles.

#### Conditions Where Practice Applies

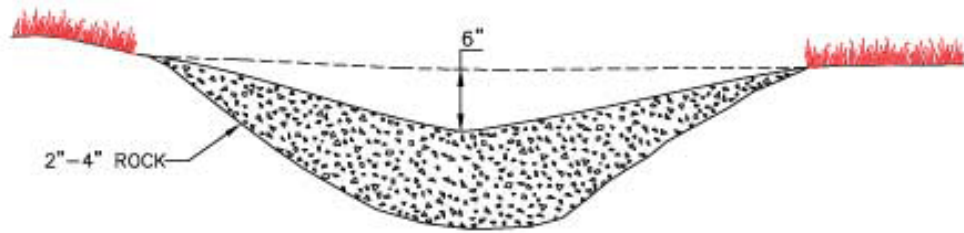
- A. In new or disturbed ditches and swales to reduce velocities and erosion.
- B. In interior site ditches or swales conveying runoff from disturbed areas (other base and cover measures are still required in addition to the check dams for disturbed drainage areas).
- C. No check dams may be placed in streams without appropriate City, State, and/or Federal permits.

#### Design Criteria/Specifications

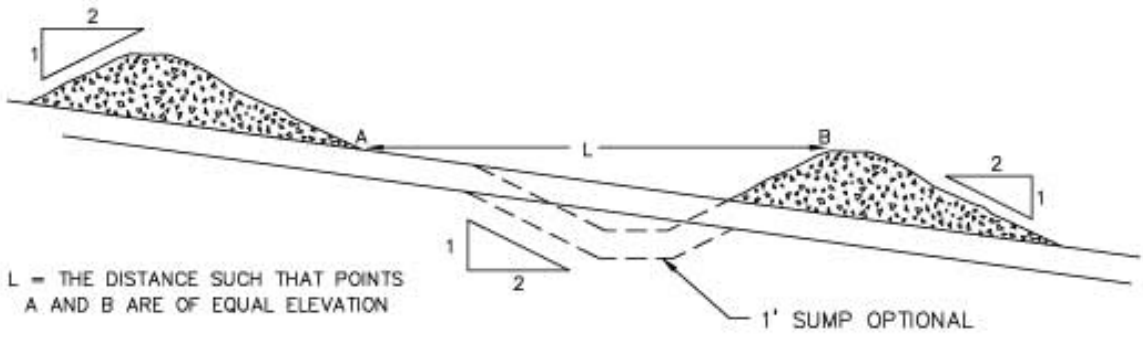
- A. See Detail Drawing 3-9 for details.
- B. Check dams shall be constructed of either rock or logs. Check dams may also be constructed of straw bales, bio-filter bags, sand bags, or other materials as approved by the Director. (See Section 3.2.3 for approved temporary uses and design criteria for straw bales.)
- C. Construct a 1-foot-deep sump immediately upstream of check dams for storage of settled sediment.
- D. Check dams shall be spaced such that the toe of the upstream dam is at the same elevation as the top of the next downstream dam .
- E. Rock check dams shall be constructed of rock spalls, 6"-Minus. The rock must be placed by hand or mechanical placement (no dumping of rock to form dam) to achieve complete coverage of the ditch or swale and to ensure that the center of the dam is lower than the edges.
- F. Log check dams shall be constructed of 4- to 6-inch diameter untreated logs. The logs shall be embedded into the soil at least 18 inches.
- G. Check dams shall be inspected for sediment accumulation after each significant rainfall. Sediment shall be removed before filling sump.
- H. Check dams will not be used in streams or other waterways where their use would present a barrier to fish passage or where, in the opinion of the Director, their use poses a threat to flooding, people, or property..

- I. Remove check dams from grass lined ditches and swales once permanent grass is established. Seed, mulch, or mat the area where the check dams were immediately following removal.





ROCK CHECK DAM



L = THE DISTANCE SUCH THAT POINTS A AND B ARE OF EQUAL ELEVATION

SPACING BETWEEN CHECK DAMS

## **Appendix A - References**

---

Note: This Handbook was modeled after a 1994 version adopted by CleanWater Services (formerly Unified Sewerage Agency) of Washington County, Oregon (revised effective December 2000); Water Environment Services of Clackamas County, Oregon (revised effective December 2000); and the City of Portland, Oregon. The references below were contained in that 1994 handbook. Supplemental reference information may be attained from the City's Permit Application Center (PAC).

## References

Aldrich, Bob; Kramer, Chin & Mayo, Inc., Seattle, WA, personal communication.

Hopkins, Keith; Hobbs and Hopkins, Ltd., Portland, OR, personal communication.

King County, Washington, Surface Water Management Division, Department of Public Works. January 1990. "Surface Water Design Manual."

Oregon Administrative Rules. 1989. OAR 340-41-455.

Oregon Department of Transportation, State Highway Division. 1984. "Standard Specifications for Highway Construction."

Oregon Department of Transportation, State Highway Division. "Hydraulics Manual."

U.S. Department of Agriculture, Science & Education Administration. December 1978. Predicting Rainfall Erosion Losses, A Guide to Conservation Planning. Agriculture Handbook No. 537.

USDA Soil Conservation Service and Washington County Soil and Water Conservation District. April 1981. "Urban Conservation Guide for Washington County, Oregon," parts A and B.

**Appendix B - Erosion Control Permit Application Form**

---

---

## GRADING/EROSION CONTROL INFORMATION

GENERAL CONTRACTOR NAME: _____ ADDRESS: _____ _____ _____ PHONE: _____	BUILDING PERMIT APPLICATION# _____ PARCEL I.D. # _____ SUBDIVISION NAME: _____
EXCAVATION CONTRACTOR: NAME: _____ ADD ADDRESS: _____ _____ _____ PHONE: _____	SITE ADDRESS: _____ LOCATION FROM NEAREST INTERSECTION: _____ FT. JOB SITE: (circle one) PRIVATE PUBLIC
OWNER/APPLICANT: NAME: _____ ADD ADDRESS: _____ _____ _____ PHONE: _____	AMOUNT OF WORK AREA TO BE EXCAVATED: _____ SQ. FT. EXISTING & PROPOSED SITE RUNOFF DRAINS: (circle one) DITCH PIPE CREEK CATCH BASIN OTHER: _____
24-HOUR EMERGENCY CONTACT: NAME: _____ ADD ADDRESS: _____ _____ _____ PHONE: _____	SOIL DISPOSAL: _____ DISPOSAL LOCATION ADDRESS: _____ ESTIMATED AMOUNT: _____ CU. FT.

I agree to comply with the "Erosion Prevention and Sedimentation Control Plan Technical Guidance Handbook" and will construct and maintain ESC measures to contain sediment on the construction site.

\_\_\_\_\_  
 Owner/Applicant Signature

\_\_\_\_\_  
 Date

## **Appendix C - Recommended Standard Notes for Erosion Control Plans**

---

---

## **Recommended Standard Notes for Erosion Control Plans**

- A. Approval of this erosion prevention and sedimentation control (EPSC) plan does not constitute an approval of permanent road or drainage design (e.g., size and location of roads, pipes, restrictors, channels, detention facilities, utilities, etc.).
- B. The implementation of these EPSC plans and the construction, maintenance, replacement, and upgrading of these EPSC facilities is the responsibility of the applicant/owner and their contractor/subcontractors until all construction is completed, and approved and permanent vegetation/landscaping and approved post construction measures are established.
- C. The boundaries of the clearing limits shown on this plan shall be clearly flagged in the field prior to construction. During the construction period, no disturbance beyond the flagged clearing limits shall be permitted. The flagging shall be maintained by the applicant/owner and their contractor/subcontractors for the duration of construction.
- D. The EPSC facilities shown on this plan must be constructed in conjunction with all clearing and grading activities, and in such a manner as to ensure that sediment and sediment laden water do not enter the drainage system or roadways, or violate applicable water quality standards.
- E. The EPSC facilities shown on this plan are the minimum requirements for anticipated site conditions. During the construction period, these EPSC facilities shall be upgraded as needed for unexpected storm events or site conditions, and to ensure that sediment and sediment-laden water do not leave the site.
- F. The EPSC facilities shall be inspected daily by the applicant/owner and their contractor/subcontractors and maintained as necessary to ensure their continued satisfactory performance.
- G. The EPSC facilities on inactive sites shall be inspected and maintained a minimum of once a month and within the 24 hours following a storm event.
- H. At no time shall more than one foot depth of sediment be allowed to accumulate within a trapped catch basin. All catch basins and conveyance systems shall be cleaned prior to paving. The cleaning operation shall not flush sediment laden water into the downstream system.
- I. Stabilized construction entrances shall be installed prior to the beginning of construction and maintained for the duration of the project. Additional measures may be required to ensure that all paved areas are kept clean for the duration of the project.

### **Standard Notes for Sediment Fences:**

- 1. The filter fabric shall be purchased in a continuous roll cut to the length of the barrier to avoid use of joints. When joints are necessary, filter cloth shall be spliced together only at a support post, with a minimum 6-inch overlap. Both ends shall be securely fastened to the post or overlap 2" x 2" posts and attach as shown on Detail Drawing 3-2.

2. The filter fabric fence shall be installed to follow the contours where feasible. The fence posts shall be spaced a maximum of 6 feet apart and driven securely into the ground a minimum of 18 inches.
3. The filter fabric shall have a minimum vertical burial of 6 inches. All excavated material from filter fabric fence installation shall be backfilled and compacted along the entire uphill side of the disturbed area.
4. Standard or heavy duty filter fabric fence shall have manufactured stitched loops for 2" x 2" post installation. Stitched loops shall be installed on the up-hill side of the sloped area.
5. Filter fabric fences shall be removed when they have served their useful purpose, but not before the upslope area has been permanently protected, stabilized, and approved by the City.
6. Filter fabric fences shall be inspected by the applicant/owner and their contractor/subcontractors immediately after each rainfall and at least daily during prolonged rainfall. Any required repairs shall be made immediately.