<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>Docket Number:</strong></td>
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<tr>
<td><strong>Project Title:</strong></td>
</tr>
<tr>
<td><strong>TN #:</strong></td>
</tr>
<tr>
<td><strong>Document Title:</strong></td>
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<tr>
<td><strong>Submitter Role:</strong></td>
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<tr>
<td><strong>Submission Date:</strong></td>
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<td><strong>Docketed Date:</strong></td>
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</tbody>
</table>
STORMWATER POLLUTION PREVENTION PLAN
APPENDICES VOLUME 2

Inland Empire Energy Center
Decommissioning and Demolition

RISK LEVEL  1

Legally Responsible Person [LRP]:
Frank Escobedo
Inland Empire Energy Center, LLC
26226 Antelope Road, Menifee, CA 92585
951-928-5941

Approved Signatory:
Not Applicable

Prepared for:
Inland Empire Energy Center, LLC
26226 Antelope Road, Menifee, CA 92585

Project Address:
26226 Antelope Road
Menifee, CA 92585

SWPPP Prepared by:
ATC Group Services
25 Cupania Circle
Monterey Park, CA 91755
Jay Schneider

SWPPP Preparation Date
01/09/2020

Estimated Project Dates:

| Start of Construction | February 10, 2020 | Completion of Construction | December 31, 2020 |
DEMOlITION NOTES:

1. REMOVE ALL UNDERGROUND PIPING WITHIN 12' OF GRADE SURFACE WITH THE EXCEPTION OF:
   - POTABLE WATER (PW)
   - FIRE PROTECTION (FP)
   - STORM SEWER

2. IF PIPING IS PRESENT BELOW 13' FROM GRADE SURFACE CUT, PLUG AND CAP AT 12' BGS IN ACCORDANCE WITH REQUIREMENTS DETAILED IN TECHNICAL SPECIFICATIONS.

   [TO BE REMOVED]
DEMOLITION NOTES:

1. REMOVE ALL UNDERGROUND PIPING WITHIN 12' OF GRADE SURFACE WITH THE EXCEPTION OF:
   - POTABLE WATER (PW)
   - FIRE PROTECTION (FP)
   - STORM SEWER

2. IF PIPING IS PRESENT BELOW 12' FROM GRADE SURFACE CUT, PLUG AND CAP AT 12' BGS IN ACCORDANCE WITH REQUIREMENTS DETAILED IN TECHNICAL SPECIFICATIONS.

- TO REMAIN
- TO BE REMOVED
DEMOlITION NOTES:

1. REMOVE ALL UNDERGROUND PIPING WITHIN 12" OF GRADE SURFACE WITH THE EXCEPTION OF:
   - POTABLE WATER (PW)
   - FIRE PROTECTION (FP)
   - STORM SEWER

2. IF PIPING IS PRESENT BELOW 12" FROM GRADE SURFACE CUT, PLUG AND CAP AT 12" BGS IN ACCORDANCE WITH REQUIREMENTS DETAILED IN TECHNICAL SPECIFICATIONS.

- TO REMAIN
- TO BE REMOVED
DEMOLITION NOTES:

1. REMOVE ALL UNDERGROUND PIPING WITHIN 12' OF GRADE SURFACE WITH THE EXCEPTION OF:
   - POTABLE WATER (PW)
   - FIRE PROTECTION (FP)
   - STORM SEWER

2. IF PIPING IS PRESENT BELOW 12' FROM GRADE SURFACE, CUT, Plug and Cap AT 12' BGS IN ACCORDANCE WITH REQUIREMENTS DETAILED IN TECHNICAL SPECIFICATIONS.

NOTE:
EC-16 EXCEPT WHERE INDICATED.

TO REMAIN
TO BE REMOVED
NOTE: ISSUE 11-18 ENTIRE AREA

DEMOLITION NOTES:

1. REMOVE ALL UNDERGROUND PIPING WITHIN 12" OF GRADE SURFACE WITH THE EXCEPTION OF:
   - POTABLE WATER (PW)
   - FIRE PROTECTION (FP)
   - STORM SEWER

2. IF PIPING IS PRESENT BELOW 12" FROM GRADE SURFACE CUT, PLUG AND CAP AT 12" BGS IN ACCORDANCE WITH REQUIREMENTS DETAILED IN TECHNICAL SPECIFICATIONS.

NOTE:

TO REMAIN

TO BE REMOVED
DEMOLITION NOTES:

1. REMOVE ALL UNDERGROUND PIPING WITHIN 12" OF GRADE SURFACE WITH THE EXCEPTION OF:
   - POTABLE WATER (PW)
   - FIRE PROTECTION (FP)
   - STORM SEWER

2. IF PIPING IS PRESENT BELOW 12" FROM GRADE SURFACE CUT, PLUG AND CAP AT 12" BGS IN ACCORDANCE WITH REQUIREMENTS DETAILED IN TECHNICAL SPECIFICATIONS.

   - TO REMAIN
   - TO BE REMOVED

NOTE: PROVIDED FOR REFERENCE ONLY.
DEMOLITION NOTES:

1. REMOVE ALL UNDERGROUND PIPING WITHIN 12' OF GRADE SURFACE WITH THE EXCEPTION OF:
   - POTABLE WATER (PW)
   - FIRE PROTECTION (FP)
   - STORM SEWER

2. IF PIPING IS PRESENT BELOW 12' FROM GRADE SURFACE, CUT PLUG AND CAP AT 12' BGS IN ACCORDANCE WITH REQUIREMENTS DETAILED IN TECHNICAL SPECIFICATIONS.

- TO REMAIN
- TO BE REMOVED
DESTRUCTION NOTES:

1. REMOVE ALL UNDERGROUND PIPING WITHIN 12" OF GRADE SURFACE WITH THE EXCEPTION OF:
   - POTABLE WATER (PW)
   - FIRE PROTECTION (FP)
   - STORM SEWER

2. IF PIPING IS PRESENT BELOW 12" FROM GRADE SURFACE CUT, PLUS AND CAP AT 12" BGS IN
   ACCORDANCE WITH REQUIREMENTS DETAILED IN TECHNICAL SPECIFICATIONS.

- TO REMAIN
- TO BE REMOVED

NOTE: PROVIDED FOR REFERENCE ONLY.

EC-16

EC-16

EC-16

EC-16

EC-16

EC-16

EC-16

EC-16

EC-16

EC-16
DEMOLITION NOTES:

1. REMOVE ALL UNDERGROUND PIPING WITHIN 12' OF GRADE SURFACE WITH THE EXCEPTION OF:
   - POTABLE WATER (PW)
   - FIRE PROTECTION (FP)
   - STORM SEWER

2. IF PIPING IS PRESENT BELOW 12' FROM GRADE SURFACE, CUT, PLUG AND CAP AT 12' BGS IN ACCORDANCE WITH REQUIREMENTS DETAILED IN TECHNICAL SPECIFICATIONS.

   - TO REMAIN
   - TO BE REMOVED

NOTE:

E-16 - ENTIRE SHEET.
DESTRUCTION NOTES:

1. REMOVE ALL UNDERGROUND PIPING WITHIN 12' OF GRADE SURFACE WITH THE EXCEPTION OF:
   - POTABLE WATER (PW)
   - FIRE PROTECTION (FP)
   - STORM SEWER

2. IF PIPING IS PRESENT BELOW 12' FROM GRADE SURFACE CUT, PLUG AND CAP AT 12' BGS IN ACCORDANCE WITH REQUIREMENTS DETAILED IN TECHNICAL SPECIFICATIONS.

- TO REMAIN
- TO BE REMOVED

NOTE: PROVIDED FOR REFERENCE ONLY.
DEMOLITION NOTES:

1. REMOVE ALL UNDERGROUND PIPING WITHIN 12" OF GRADE SURFACE WITH THE EXCEPTION OF:
   - POTABLE WATER (PW)
   - FIRE PROTECTION (FP)
   - STORM SEWER

2. IF PIPING IS PRESENT BELOW 12' FROM GRADE SURFACE CUT, PLUG AND CAP AT 12'
   BGS IN ACCORDANCE WITH REQUIREMENTS DETAILED IN TECHNICAL SPECIFICATIONS.

- TO REMAIN
- TO BE REMOVED
DEMOLITION NOTES:
1. REMOVE ALL UNDERGROUND PIPING WITHIN 12' OF
GRADE SURFACE WITH THE EXCEPTION OF:
• POTABLE WATER (PW)
• FIRE PROTECTION (FP)
• STORM SEWER
2. IF PIPING IS PRESENT BELOW 12' FROM GRADE
SURFACE CUT, PLUG AND CAP AT 12' BOS IN
ACCORDANCE WITH REQUIREMENTS DETAILED IN
TECHNICAL SPECIFICATIONS.
- TO REMAIN
- TO BE REMOVED

NOTE: PROVIDED FOR REFERENCE ONLY.
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MATCH LINE - SEE DRAWING STA}
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DEMOLITION NOTES:

1. REMOVE ALL UNDERGROUND PIPING WITHIN 12' OF GRADE SURFACE WITH THE EXCEPTION OF:
   - POTABLE WATER (PW)
   - FIRE PROTECTION (FP)
   - STORM SEWER

2. IF PIPING IS PRESENT BELOW 12' FROM GRADE SURFACE, CUT, PLUG AND CAP AT 12' BGS IN
   ACCORDANCE WITH REQUIREMENTS DETAILED IN TECHNICAL SPECIFICATIONS.

   - TO REMAIN
   - TO BE REMOVED

CONTRIBUTORS:

- ORIGINATING CONCEPT:
- WRITTEN TERMINAL ISSUER:
- ENGINEERED FOR REVIEW:
- DRAFTED BY:
- REVISED BY:
- TECHNICAL SPECIFICATION DRAWING PACKAGE UNDERGROUND ENLARGED PLAN

SCOTT A. BOLIN

© PARSONS E&C
© COPYRIGHTER: GENERAL ENERGY PERSONAL PATH, DATED 06/17/2019

NOTE: PROVIDED FOR REFERENCE ONLY.
DEMOLITION NOTES:
1. REMOVE ALL UNDERGROUND PIPING WITHIN 12' OF GRADE SURFACE WITH THE EXCEPTION OF:
   - POTABLE WATER (PW)
   - FIRE PROTECTION (FP)
   - STORM SEWER
2. IF PIPING IS PRESENT BELOW 12' FROM GRADE SURFACE CUT, PLUG AND CAP AT 12' BGS IN ACCORDANCE WITH REQUIREMENTS DETAILED IN TECHNICAL SPECIFICATIONS.

- TO REMAIN
- TO BE REMOVED
ADDITIONAL BMPs THROUGHOUT LIFE OF PROJECT:

- SE-10
- SE-5
- WM-3

Robert L. Duree, P.E.
Pradip Khan
DEMONSTRATION NOTES:
1. Final grade on site drainage to be completed by demolition contractors in accordance with surface elevations on drainage structures noted on this drawing.

ADDITIONAL BMPs THROUGHOUT LIFE OF PROJECT:
- EC-1
- WS-1
- NS-3
- NS-6

Robert L. Dune, P.E.
Pradip Khan

DIMENSIONS:
- 3456.0x2592.0
Appendix C: Permit Registration Documents
Permit Registration Documents included in this Appendix

<table>
<thead>
<tr>
<th>Y/N</th>
<th>Permit Registration Document</th>
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</thead>
<tbody>
<tr>
<td>Y</td>
<td>Notice of Intent</td>
</tr>
<tr>
<td>Y</td>
<td>Risk Assessment</td>
</tr>
<tr>
<td>Y</td>
<td>Certification</td>
</tr>
<tr>
<td>N</td>
<td>Post Construction Water Balance</td>
</tr>
<tr>
<td>N</td>
<td>Copy of Annual Fee Receipt</td>
</tr>
<tr>
<td>N</td>
<td>ATS Design Documents</td>
</tr>
<tr>
<td>Y</td>
<td>Site Map, see Appendix B</td>
</tr>
</tbody>
</table>
NOTICE OF INTENT

GENERAL PERMIT TO DISCHARGE STORM WATER
ASSOCIATED WITH CONSTRUCTION Activity
(WQ ORDER No. 2009-0009-DWQ)

WDID: 0.2
Risk Level: Level1

Property Owner Information

Name: Inland Empire Energy Center LLC
Address: 26226 Antelope Road
City/State/Zip: Menifee CA 92585

Type: Private Business

Contact Name: Francisco Escobedo
Title: Director Asset Management
Phone Number: 951-928-5941
Email Address: frank.escobedo@ge.com

Contractor/Developer Information

Name: Silverado Contractors Inc
Address: 13804 Oaks Avenue
City/State/Zip: Chino CA 91710

Contact Name: Jimmy Saldivar
Title: Project Manager
Phone Number: 909-949-6025
Email Address: jimmy@silveradocontractors.com

Construction Site Information

Contact Name: Francisco Escobedo
Title: Director Asset Management
Site Name: Inland Empire Energy Center LLC
Address: 26226 Antelope Road
City/State/Zip: Menifee CA 92585
County: Riverside
Latitude: 33.739305 Longitude: -117.168611

Site Phone #: 951-928-5941
Email Address: frank.escobedo@ge.com
Construction Start: February 10, 2020
Complete Grading: December 31, 2020
Final Stabilization: December 31, 2020

Total Size of Construction Area: 45.8 Acres
Total Area to be Disturbed: 6.45 Acres

Risk Values

R: 21.17 K: 0.2 LS: 1.05
Beneficial Uses/303(d): No

Type of Construction: *Industrial
Receiving Water: Canyon Lake
Qualified SWPPP Developer: Jay Schneider Certification #: 20608

RWQCB Jurisdiction: Region 8 - Santa Ana
Phone: 951-782-4130 Email: r8_stormwater@waterboards.ca.gov

Certification

Name: Francisco Escobedo Date: January 10, 2020
Title: Director Asset Management
State Water Resources Control Board
NOTICE OF INTENT
GENERAL PERMIT TO DISCHARGE STORM WATER
ASSOCIATED WITH CONSTRUCTION ACTIVITY
(WQ ORDER No. 2009-0009-DWQ)

WDID:

Post Construction Information

Is the project located within a permitted Phase I or Phase II Municipal Separate Storm Sewer System?:


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<thead>
<tr>
<th>Attachment ID</th>
<th>File Name</th>
<th>File Description</th>
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</thead>
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<td>MS4 Map of Riverside and San Bernardino counties</td>
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<td>31cd78c1f79444b6ce112a5d471ea136968b1274e4fe8d05bda574e5f19fb58</td>
<td>2571871</td>
<td>2020-01-10 15:57:50.0</td>
<td>Supporting Documentation</td>
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<td>Inland Empire Energy Center SWPPP</td>
<td></td>
<td>bcb915697ba7ca198cbbaeb874c8a085f31764d8b9d2d72c22ae29f073923ebe</td>
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<td>SWPPP</td>
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</tbody>
</table>
State Water Resources Control Board

January 10, 2020

Fee Statement
Application Id # 516233

Facility/Site

Inland Empire Energy Center LL
26226 Antelope Road
Menifee CA 92585

Thank you for submitting the Permit Registration Documents (PRDs) for the facility/site referenced above. The application fee for this submittal is: $652.00

The application is considered incomplete until all PRDs, including the application fee, are received. Only after all PRDs are received, will the WDID Number be assigned. Permit coverage begins once the WDID Number is assigned to the facility/site.

Note: The submitted application will be automatically returned as incomplete if all PRDs, including the application fee and the original signed electronic authorization form, are not received within 60 days from the date of submission.

Please make checks payable to: SWRCB

Mail this Fee Statement and $652.00 to:

Regular Mailing Address:
SWRCB
Storm Water Section
PO Box 1977
Sacramento, CA 95812-1977

Overnight Mailing Address:
SWRCB
Storm Water Section
1001 I Street – 15th Floor
Sacramento, CA 95814

If you have questions or want to check on the status of the application, email us at stormwater@waterboards.ca.gov or call 1-866-563-3107.

Thank You,
Storm Water Help Desk
Rainfall Erosivity Factor Calculator for Small Construction Sites

EPA’s stormwater regulations allow NPDES permitting authorities to waive NPDES permitting requirements for stormwater discharges from small construction sites if:

- the construction site disturbs less than five acres, and
- the rainfall erosivity factor ("R" in the revised universal soil loss equation, or RUSLE) value is less than five during the period of construction activity.

If your small construction project is located in an area where EPA is the permitting authority and your R factor is less than five, you qualify for a low erosivity waiver (LEW) from NPDES stormwater permitting. If your small construction project does not qualify for a waiver, then NPDES stormwater permit coverage is required. Follow the steps below to calculate your R-Factor.

LEW certifications are submitted through the NPDES eReporting Tool or "CGP-NeT". Several states that are authorized to implement the NPDES permitting program also accept LEWs. Check with your state NPDES permitting authority for more information.

- Submit your LEW through EPA's eReporting Tool
- List of states, Indian country, and territories where EPA is the permitting authority
- Construction Rainfall Erosivity Waiver Fact Sheet
- Appendix C of the 2017 CGP - Small Construction Waivers and Instructions

The R-factor calculation can also be integrated directly into custom applications using the R-Factor web service.

For questions or comments, email EPA’s CGP staff at cgp@epa.gov.

1. Select the estimated start and end dates of construction by clicking the boxes and using the dropdown calendar.

   The period of construction activity begins at initial earth disturbance and ends with final stabilization.

   Start Date: 02/10/2020  End Date: 12/31/2020

2. Locate your small construction project using the search box below or by clicking on the map.

   Location: 26226 antelope road, menifee, california

Search
Click the “Calculate R Factor” button below to calculate an R Factor for your small construction project.

**Calculate R Factor**

**Facility Information**

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<th>Start Date: 02/10/2020</th>
<th>Latitude: 33.7415</th>
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<tbody>
<tr>
<td>End Date: 12/31/2020</td>
<td>Longitude: -117.1717</td>
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</table>

**Calculation Results**

Rainfall erosivity factor (R Factor) = **21.17**

A rainfall erosivity factor of 5.0 or greater has been calculated for your site's period of construction.

You do NOT qualify for a waiver from NPDES permitting requirements and must seek Construction General Permit (CGP) coverage. If you are located in an area where EPA is the permitting authority, you must submit a Notice of Intent (NOI) through the NPDES eReporting Tool (NeT). Otherwise, you must seek coverage under your state’s CGP.
K FACTOR DETERMINATION
## Sediment Risk Factor Worksheet

<table>
<thead>
<tr>
<th>Entry</th>
</tr>
</thead>
<tbody>
<tr>
<td>A) R Factor</td>
</tr>
<tr>
<td>Analyses of data indicated that when factors other than rainfall are held constant, soil loss is directly proportional to a rainfall factor composed of total storm kinetic energy (E) times the maximum 30-min intensity (I30) (Wischmeier and Smith, 1958). The numerical value of R is the average annual sum of EI30 for storm events during a rainfall record of at least 22 years. &quot;Isoerodent&quot; maps were developed based on R values calculated for more than 1000 locations in the Western U.S. Refer to the link below to determine the R factor for the project site.</td>
</tr>
<tr>
<td><a href="https://lew.epa.gov/">https://lew.epa.gov/</a></td>
</tr>
<tr>
<td>B) K Factor (weighted average, by area, for all site soils)</td>
</tr>
<tr>
<td>The soil-erodibility factor K represents: (1) susceptibility of soil or surface material to erosion, (2) transportability of the sediment, and (3) the amount and rate of runoff given a particular rainfall input, as measured under a standard condition. Fine-textured soils that are high in clay have low K values (about 0.05 to 0.15) because the particles are resistant to detachment. Coarse-textured soils, such as sandy soils, also have low K values (about 0.05 to 0.2) because of high infiltration resulting in low runoff even though these particles are easily detached. Medium-textured soils, such as a silt loam, have moderate K values (about 0.25 to 0.45) because they are moderately susceptible to particle detachment and they produce runoff at moderate rates. Soils having a high silt content are especially susceptible to erosion and have high K values, which can exceed 0.45 and can be as large as 0.65. Silt-size particles are easily detached and tend to crust, producing high rates and large volumes of runoff. Use Site-specific data must be submitted.</td>
</tr>
<tr>
<td>Site-specific K factor guidance</td>
</tr>
<tr>
<td>C) LS Factor (weighted average, by area, for all slopes)</td>
</tr>
<tr>
<td>The effect of topography on erosion is accounted for by the LS factor, which combines the effects of a hillslope-length factor, L, and a hillslope-gradient factor, S. Generally speaking, as hillslope length and/or hillslope gradient increase, soil loss increases. As hillslope length increases, total soil loss and soil loss per unit area increase due to the progressive accumulation of runoff in the downslope direction. As the hillslope gradient increases, the velocity and erosivity of runoff increases. Use the LS table located in separate tab of this spreadsheet to determine LS factors. Estimate the weighted LS for the site prior to construction.</td>
</tr>
<tr>
<td>LS Table</td>
</tr>
<tr>
<td>Estimated watershed erosion estimate (RxKxLS) in tons/acre:</td>
</tr>
<tr>
<td>Site Sediment Risk Factor:</td>
</tr>
<tr>
<td>Low Sediment Risk: &lt; 15 tons/acre</td>
</tr>
<tr>
<td>Medium Sediment Risk: &gt;=15 and &lt;75 tons/acre</td>
</tr>
<tr>
<td>High Sediment Risk: &gt;= 75 tons/acre</td>
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### Pollutant Assessments

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<tr>
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<th>Listing Decision</th>
<th>Potential Sources</th>
<th>Schedule</th>
<th>Comments</th>
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<td>Fish Kills</td>
<td>Do Not List on 303(d) list (TMDL required list)</td>
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<td>07214</td>
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<td></td>
<td>n/a</td>
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<td></td>
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<tr>
<td>Indicator Bacteria</td>
<td>Delet from 303(d) list (TMDL required list)</td>
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<td></td>
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<tr>
<td></td>
<td>94408</td>
<td></td>
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<td>n/a</td>
<td></td>
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<tr>
<td>Nutrients</td>
<td>List on 303(d) list (being addressed by USEPA approved TMDL)</td>
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<td>USEPA TMDL approval: 2005</td>
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Table 3-1 BENEFICIAL USES - Continued

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<tr>
<th>INLAND SURFACE STREAMS</th>
<th>BENEFICIAL USE</th>
<th>Hydrologic Unit</th>
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<tr>
<td></td>
<td>MUN</td>
<td>AGR</td>
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<tr>
<td>Reach 6 – Elsinore Groundwater Subbasin Boundary to Lake Elsinore Outlet</td>
<td>+</td>
<td>I</td>
</tr>
<tr>
<td>Coldwater Canyon Creek</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Bedford Canyon Creek</td>
<td>+</td>
<td>I</td>
</tr>
<tr>
<td>Dawson Canyon Creek</td>
<td>I</td>
<td>I</td>
</tr>
<tr>
<td>Other Tributaries to these Creeks</td>
<td>I</td>
<td>I</td>
</tr>
<tr>
<td>SAN JACINTO RIVER BASIN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>San Jacinto River</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reach 1 – Lake Elsinore to Canyon Lake</td>
<td>I</td>
<td>I</td>
</tr>
<tr>
<td>Reach 2 – Canyon Lake (see Lakes Pg. 3-45)</td>
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</tr>
<tr>
<td>Reach 3 – Canyon Lake to Nuevo Road</td>
<td>+</td>
<td>I</td>
</tr>
<tr>
<td>Reach 4 – Nuevo Road to North-South Mid-Section Line, T4S/R1W-S8</td>
<td>+</td>
<td>I</td>
</tr>
</tbody>
</table>

- X Existing or Potential Beneficial Use
- I Intermittent Beneficial Use
- + Excepted from MUN (see text)
<table>
<thead>
<tr>
<th>Receiving Water (RW) Risk Factor Worksheet</th>
<th>Entry</th>
<th>Score</th>
</tr>
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<tbody>
<tr>
<td><strong>A. Watershed Characteristics</strong></td>
<td>yes/no</td>
<td></td>
</tr>
<tr>
<td>A.1. Does the disturbed area discharge (either directly or indirectly) to a <strong>303(d)-listed waterbody impaired by sediment</strong> (For help with impaired waterbodies please visit the link below) or has a <strong>USEPA approved TMDL implementation plan for sediment</strong>?:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A.2. Does the disturbed area discharge to a waterbody with designated beneficial uses of SPAWN &amp; COLD &amp; MIGRATORY? (For help please review the appropriate Regional Board Basin Plan)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><a href="http://www.waterboards.ca.gov/waterboards_map.shtml">http://www.waterboards.ca.gov/waterboards_map.shtml</a></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Region 1 Basin Plan
- Region 2 Basin Plan
- Region 3 Basin Plan
- Region 4 Basin Plan
- Region 5 Basin Plan
- Region 6 Basin Plan
- Region 7 Basin Plan
- Region 8 Basin Plan
- Region 9 Basin Plan
Combined Risk Level Matrix

<table>
<thead>
<tr>
<th>Receiving Water Risk</th>
<th>Sediment Risk</th>
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<tbody>
<tr>
<td>Low</td>
<td>Low</td>
<td>Low 1</td>
</tr>
<tr>
<td>High</td>
<td>High</td>
<td>Level 3</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>Level 2</td>
</tr>
</tbody>
</table>

Project Sediment Risk: Low
Project RW Risk: Low
Project Combined Risk: Level 1
Appendix D: SWPPP Amendment Certifications
SWPPP Amendment No.

Project Name: ____________________________________________________________

Project Number: __________________________________________________________

Qualified SWPPP Developer’s Certification of the Stormwater Pollution Prevention Plan Amendment

“This Stormwater Pollution Prevention Plan and attachments were prepared under my direction to meet the requirements of the California Construction General Permit (SWRCB Order No. 2009-009-DWQ as amended by 2010-0014-DWQ and 2012-0006-DWQ). I certify that I am a Qualified SWPPP Developer in good standing as of the date signed below.”

________________________________________  __________________________
QSD’s Signature                              Date

________________________________________  __________________________
QSD Name                                    QSD Certificate Number

________________________________________  __________________________
Title and Affiliation                        Telephone

________________________________________  __________________________
Address                                     Email
Appendix E: Submitted Changes to PRDs
Log of Updated PRDs

The General Permit allows for the reduction or increase of the total acreage covered under the General Permit when a portion of the project is complete and/or conditions for termination of coverage have been met; when ownership of a portion of the project is purchased by a different entity; or when new acreage is added to the project.

Modified PRDs shall be filed electronically within 30 days of a reduction or increase in total disturbed area if a change in permit covered acreage is to be sought. The SWPPP shall be modified appropriately, with revisions and amendments recorded in Appendix C. Updated PRDs submitted electronically via SMARTS can be found in this Appendix.

This appendix includes all of the following updated PRDs (check all that apply):

☐ Revised Notice of Intent (NOI);

☐ Revised Site Map;

☐ Revised Risk Assessment;

☐ New landowner’s information (name, address, phone number, email address); and

☐ New signed certification statement.

________________________________________
Legally Responsible Person [if organization]

________________________________________
Signature of [Authorized Representative of] Legally Responsible Person or Approved Signatory

_______________________________
Date

________________________________________
Name of [Authorized Representative of] Legally Responsible Person or Approved Signatory

_______________________________
Telephone Number
Appendix F: Construction Schedule
Appendix G: Construction Activities, Materials Used, and Associated Pollutants
Table G.1 **Construction Activities and Associated Pollutants**

<table>
<thead>
<tr>
<th>Phase</th>
<th>Activity</th>
<th>Associated Materials or Pollutants</th>
<th>Pollutant Category(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Decommissioning/Trenching</strong></td>
<td>Trenching and backfill</td>
<td>Soil</td>
<td>Sediment</td>
</tr>
<tr>
<td></td>
<td>Equipment</td>
<td>Oil, diesel, grease, anti-freeze, Pb</td>
<td>Oil &amp; Grease, Metals</td>
</tr>
<tr>
<td></td>
<td>Vehicles entering &amp; exiting site</td>
<td>Soil</td>
<td>Sediment</td>
</tr>
<tr>
<td><strong>Demolition</strong></td>
<td>Demolition and stockpiling of ferrous material</td>
<td>Fe</td>
<td>Metals</td>
</tr>
<tr>
<td></td>
<td>Demolition and stockpiling of non-ferrous material</td>
<td>Concrete, gross pollutants</td>
<td>Gross Pollutants</td>
</tr>
<tr>
<td></td>
<td>Equipment</td>
<td>Oil, diesel, grease, anti-freeze, Pb</td>
<td>Oil &amp; Grease, Metals</td>
</tr>
<tr>
<td></td>
<td>Vehicles entering &amp; exiting site</td>
<td>Soil</td>
<td>Sediment</td>
</tr>
<tr>
<td><strong>Cooling Tower Basin Emplacement/Site Stabilization</strong></td>
<td>Concrete backfill</td>
<td>concrete</td>
<td>Gross Pollutants</td>
</tr>
<tr>
<td></td>
<td>Soil backfill</td>
<td>Soil</td>
<td>Sediment</td>
</tr>
<tr>
<td></td>
<td>Equipment</td>
<td>Oil, diesel, grease, anti-freeze, Pb</td>
<td>Oil &amp; Grease, Metals</td>
</tr>
<tr>
<td></td>
<td>Vehicles entering &amp; exiting site</td>
<td>Soil</td>
<td>Sediment</td>
</tr>
</tbody>
</table>

(1) Categories per CASQA BMP Handbook (i.e., Sediment, Nutrients, Bacteria and Viruses, Oil and Grease, Metals, Synthetic Organics, Pesticides, Gross Pollutants, and Vector Production)
Appendix H: BMP Inspection Form
# BMP INSPECTION REPORT

<table>
<thead>
<tr>
<th>Date and Time of Inspection:</th>
<th>Date Report Written:</th>
</tr>
</thead>
</table>

### Inspection Type:
(Circle one)
- **Weekly**
  - Complete Parts I, II, III and VII
- **Pre-Storm**
  - Complete Parts I, II, III, IV and VII
- **During Rain Event**
  - Complete Parts I, II, III, V, and VII
- **Post-Storm**
  - Complete Parts I, II, III, VI and VII

### Part I. General Information

#### Site Information

**Construction Site Name:**

**Construction stage and completed activities:**

**Approximate area of site that is exposed:**

**Photos Taken:**
(Circle one)
- Yes
- No

**Photo Reference IDs:**

#### Weather

**Estimate storm beginning:**
(date and time)

**Estimate storm duration:**
(hours)

**Estimate time since last storm:**
(days or hours)

**Rain gauge reading and location:**
(in)

Is a “Qualifying Event” predicted or did one occur (i.e., 0.5” rain with 48-hrs or greater between events)? (Y/N)

If yes, summarize forecast:

**Exemption Documentation** (explanation required if inspection could not be conducted). Visual inspections are not required outside of business hours or during dangerous weather conditions such as flooding or electrical storms.

### Inspector Information

**Inspector Name:**

**Inspector Title:**

**Signature:**

**Date:**

### Part II. BMP Observations

Describe deficiencies in Part III.
<table>
<thead>
<tr>
<th>Good Housekeeping for Construction Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inventory of products (excluding materials designed to be outdoors)</td>
</tr>
<tr>
<td>Stockpiled construction materials not actively in use are covered and bermed</td>
</tr>
<tr>
<td>All chemicals are stored in watertight containers with appropriate secondary containment, or in a completely enclosed storage shed</td>
</tr>
<tr>
<td>Construction materials are minimally exposed to precipitation</td>
</tr>
<tr>
<td>BMPs preventing the off-site tracking of materials are implemented and properly effective</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Good Housekeeping for Waste Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wash/rinse water and materials are prevented from being disposed into the storm drain system</td>
</tr>
<tr>
<td>Portable toilets are contained to prevent discharges of waste</td>
</tr>
<tr>
<td>Sanitation facilities are clean and with no apparent for leaks and spills</td>
</tr>
<tr>
<td>Equipment is in place to cover waste disposal containers at the end of business day and during rain events</td>
</tr>
<tr>
<td>Discharges from waste disposal containers are prevented from discharging to the storm drain system / receiving water</td>
</tr>
<tr>
<td>Stockpiled waste material is securely protected from wind and rain if not actively in use</td>
</tr>
<tr>
<td>Procedures are in place for addressing hazardous and non-hazardous spills</td>
</tr>
<tr>
<td>Appropriate spill response personnel are assigned and trained</td>
</tr>
<tr>
<td>Equipment and materials for cleanup of spills is available onsite</td>
</tr>
<tr>
<td>Washout areas (e.g., concrete) are contained appropriately to prevent discharge or infiltration into the underlying soil</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Good Housekeeping for Vehicle Storage and Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measures are in place to prevent oil, grease, or fuel from leaking into the ground, storm drains, or surface waters</td>
</tr>
<tr>
<td>All equipment or vehicles are fueled, maintained, and stored in a designated area with appropriate BMPs</td>
</tr>
<tr>
<td>Vehicle and equipment leaks are cleaned immediately and disposed of properly</td>
</tr>
</tbody>
</table>

**Part II. BMP Observations Continued. Describe deficiencies in Part III.**
<table>
<thead>
<tr>
<th>Good Housekeeping for Landscape Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stockpiled landscape materials such as mulches and topsoil are contained and covered when not actively in use</td>
</tr>
<tr>
<td>Erodible landscape material has not been applied 2 days before a forecasted rain event or during an event</td>
</tr>
<tr>
<td>Erodible landscape materials are applied at quantities and rates in accordance with manufacturer recommendations</td>
</tr>
<tr>
<td>Bagged erodible landscape materials are stored on pallets and covered</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Good Housekeeping for Air Deposition of Site Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good housekeeping measures are implemented onsite to control the air deposition of site materials and from site operations</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Non-Stormwater Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Stormwater discharges are properly controlled</td>
</tr>
<tr>
<td>Vehicles are washed in a manner to prevent non-stormwater discharges to surface waters or drainage systems</td>
</tr>
<tr>
<td>Streets are cleaned in a manner to prevent unauthorized non-stormwater discharges to surface waters or drainage systems.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Erosion Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind erosion controls are effectively implemented</td>
</tr>
<tr>
<td>Effective soil cover is provided for disturbed areas inactive (i.e., not scheduled to be disturbed for 14 days) as well as finished slopes, open space, utility backfill, and completed lots</td>
</tr>
<tr>
<td>The use of plastic materials is limited in cases when a more sustainable, environmentally friendly alternative exists</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sediment Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perimeter controls are established and effective at controlling erosion and sediment discharges from the site</td>
</tr>
<tr>
<td>Entrances and exits are stabilized to control erosion and sediment discharges from the site</td>
</tr>
<tr>
<td>Sediment basins are properly maintained</td>
</tr>
<tr>
<td>Linear sediment control along toe of slope, face of slope an at grade breaks (Risk Level 2 &amp; 3 Only)</td>
</tr>
<tr>
<td>Limit construction activity to and from site to entrances and exits that employ effective controls to prevent offsite tracking (Risk Level 2 &amp; 3 Only)</td>
</tr>
<tr>
<td>Ensure all storm, drain inlets and perimeter controls, runoff control BMPs and pollutants controls at entrances and exits are maintained and protected from activities the reduce their effectiveness (Risk Level 2 &amp; 3 Only)</td>
</tr>
<tr>
<td>Inspect all immediate access roads daily (Risk Level 2 &amp; 3 Only)</td>
</tr>
</tbody>
</table>

| Run-On and Run-Off Controls |
Run-on to the site is effectively managed and directed away from all disturbed areas.

**Other**

Are the project SWPPP and BMP plan up to date, available on-site and being properly implemented?

<table>
<thead>
<tr>
<th>Deficiency</th>
<th>Start Date</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
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<tr>
<td>3.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Part III. Descriptions of BMP Deficiencies**

Deficiency

- Repairs Implemented:
  - Note - Repairs must begin within 72 hours of identification and, complete repairs as soon as possible.

<table>
<thead>
<tr>
<th>Start Date</th>
<th>Action</th>
</tr>
</thead>
</table>

**Part IV. Additional Pre-Storm Observations.** Note the presence or absence of floating and suspended materials, sheen, discoloration, turbidity, odors, and source(s) of pollutants(s).

<table>
<thead>
<tr>
<th></th>
<th>Yes, No, N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do stormwater storage and containment areas have adequate freeboard? If no, complete Part III.</td>
<td></td>
</tr>
<tr>
<td>Are drainage areas free of spills, leaks, or uncontrolled pollutant sources? If no, complete Part VII and describe below.</td>
<td></td>
</tr>
<tr>
<td>Notes:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Yes, No, N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are stormwater storage and containment areas free of leaks? If no, complete Parts III and/or VII and describe below.</td>
<td></td>
</tr>
<tr>
<td>Notes:</td>
<td></td>
</tr>
</tbody>
</table>
**Part V. Additional During Storm Observations.** If BMPs cannot be inspected during inclement weather, list the results of visual inspections at all relevant outfalls, discharge points, and downstream locations. Note odors or visible sheen on the surface of discharges. Complete Part VII (Corrective Actions) as needed.

<table>
<thead>
<tr>
<th>Outfall, Discharge Point, or Other Downstream Location</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Description</td>
</tr>
<tr>
<td>Location</td>
<td>Description</td>
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<td>Location</td>
<td>Description</td>
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<tr>
<td>Location</td>
<td>Description</td>
</tr>
<tr>
<td>Location</td>
<td>Description</td>
</tr>
</tbody>
</table>
**Part VI. Additional Post-Storm Observations.** Visually observe (inspect) stormwater discharges at all discharge locations within two business days (48 hours) after each qualifying rain event, and observe (inspect) the discharge of stored or contained stormwater that is derived from and discharged subsequent to a qualifying rain event producing precipitation of ½ inch or more at the time of discharge. Complete Part VII (Corrective Actions) as needed.

<table>
<thead>
<tr>
<th>Discharge Location, Storage or Containment Area</th>
<th>Visual Observation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
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<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Part VII. Additional Corrective Actions Required.** Identify additional corrective actions not included with BMP Deficiencies (Part III) above. Note if SWPPP change is required.

<table>
<thead>
<tr>
<th>Required Actions</th>
<th>Implementation Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---
Appendix I: CASQA Stormwater BMP Handbook Portal:
Construction Fact Sheets
Scheduling

Description and Purpose
Scheduling is the development of a written plan that includes sequencing of construction activities and the implementation of BMPs such as erosion control and sediment control while taking local climate (rainfall, wind, etc.) into consideration. The purpose is to reduce the amount and duration of soil exposed to erosion by wind, rain, runoff, and vehicle tracking, and to perform the construction activities and control practices in accordance with the planned schedule.

Suitable Applications
Proper sequencing of construction activities to reduce erosion potential should be incorporated into the schedule of every construction project especially during rainy season. Use of other, more costly yet less effective, erosion and sediment control BMPs may often be reduced through proper construction sequencing.

Limitations
- Environmental constraints such as nesting season prohibitions reduce the full capabilities of this BMP.

Implementation
- Avoid rainy periods. Schedule major grading operations during dry months when practical. Allow enough time before rainfall begins to stabilize the soil with vegetation or physical means or to install sediment trapping devices.
- Plan the project and develop a schedule showing each phase of construction. Clearly show how the rainy season relates...
Scheduling

Include on the schedule, details on the rainy season implementation and deployment of:

- Erosion control BMPs
- Sediment control BMPs
- Tracking control BMPs
- Wind erosion control BMPs
- Non-stormwater BMPs
- Waste management and materials pollution control BMPs

Include dates for activities that may require non-stormwater discharges such as dewatering, sawcutting, grinding, drilling, boring, crushing, blasting, painting, hydro-demolition, mortar mixing, pavement cleaning, etc.

Work out the sequencing and timetable for the start and completion of each item such as site clearing and grubbing, grading, excavation, paving, foundation pouring utilities installation, etc., to minimize the active construction area during the rainy season.

- Sequence trenching activities so that most open portions are closed before new trenching begins.
- Incorporate staged seeding and re-vegetation of graded slopes as work progresses.
- Schedule establishment of permanent vegetation during appropriate planting time for specified vegetation.

Non-active areas should be stabilized as soon as practical after the cessation of soil disturbing activities or one day prior to the onset of precipitation.

Monitor the weather forecast for rainfall.

When rainfall is predicted, adjust the construction schedule to allow the implementation of soil stabilization and sediment treatment controls on all disturbed areas prior to the onset of rain.

Be prepared year round to deploy erosion control and sediment control BMPs. Erosion may be caused during dry seasons by un-seasonal rainfall, wind, and vehicle tracking. Keep the site stabilized year round, and retain and maintain rainy season sediment trapping devices in operational condition.

Apply permanent erosion control to areas deemed substantially complete during the project’s defined seeding window.

Costs

Construction scheduling to reduce erosion may increase other construction costs due to reduced economies of scale in performing site grading. The cost effectiveness of scheduling techniques should be compared with the other less effective erosion and sedimentation controls to achieve a cost effective balance.
Scheduling

Inspection and Maintenance
- Verify that work is progressing in accordance with the schedule. If progress deviates, take corrective actions.
- Amend the schedule when changes are warranted.
- Amend the schedule prior to the rainy season to show updated information on the deployment and implementation of construction site BMPs.

References

Description and Purpose
Carefully planned preservation of existing vegetation minimizes the potential of removing or injuring existing trees, vines, shrubs, and grasses that protect soil from erosion.

Suitable Applications
Preservation of existing vegetation is suitable for use on most projects. Large project sites often provide the greatest opportunity for use of this BMP. Suitable applications include the following:

- Areas within the site where no construction activity occurs, or occurs at a later date. This BMP is especially suitable to multi year projects where grading can be phased.

- Areas where natural vegetation exists and is designated for preservation. Such areas often include steep slopes, watercourse, and building sites in wooded areas.

- Areas where local, state, and federal government require preservation, such as vernal pools, wetlands, marshes, certain oak trees, etc. These areas are usually designated on the plans, or in the specifications, permits, or environmental documents.

- Where vegetation designated for ultimate removal can be temporarily preserved and be utilized for erosion control and sediment control.
Preservation Of Existing Vegetation  EC-2

Limitations
- Requires forward planning by the owner/developer, contractor, and design staff.
- Limited opportunities for use when project plans do not incorporate existing vegetation into the site design.
- For sites with diverse topography, it is often difficult and expensive to save existing trees while grading the site satisfactory for the planned development.

Implementation
The best way to prevent erosion is to not disturb the land. In order to reduce the impacts of new development and redevelopment, projects may be designed to avoid disturbing land in sensitive areas of the site (e.g., natural watercourses, steep slopes), and to incorporate unique or desirable existing vegetation into the site’s landscaping plan. Clearly marking and leaving a buffer area around these unique areas during construction will help to preserve these areas as well as take advantage of natural erosion prevention and sediment trapping.

Existing vegetation to be preserved on the site must be protected from mechanical and other injury while the land is being developed. The purpose of protecting existing vegetation is to ensure the survival of desirable vegetation for shade, beautification, and erosion control. Mature vegetation has extensive root systems that help to hold soil in place, thus reducing erosion. In addition, vegetation helps keep soil from drying rapidly and becoming susceptible to erosion. To effectively save existing vegetation, no disturbances of any kind should be allowed within a defined area around the vegetation. For trees, no construction activity should occur within the drip line of the tree.

Timing
- Provide for preservation of existing vegetation prior to the commencement of clearing and grubbing operations or other soil disturbing activities in areas where no construction activity is planned or will occur at a later date.

Design and Layout
- Mark areas to be preserved with temporary fencing. Include sufficient setback to protect roots.
  - Orange colored plastic mesh fencing works well.
  - Use appropriate fence posts and adequate post spacing and depth to completely support the fence in an upright position.
- Locate temporary roadways, stockpiles, and layout areas to avoid stands of trees, shrubs, and grass.
- Consider the impact of grade changes to existing vegetation and the root zone.
- Maintain existing irrigation systems where feasible. Temporary irrigation may be required.
- Instruct employees and subcontractors to honor protective devices. Prohibit heavy equipment, vehicular traffic, or storage of construction materials within the protected area.
Preservation Of Existing Vegetation  EC-2

Costs
There is little cost associated with preserving existing vegetation if properly planned during the project design, and these costs may be offset by aesthetic benefits that enhance property values. During construction, the cost for preserving existing vegetation will likely be less than the cost of applying erosion and sediment controls to the disturbed area. Replacing vegetation inadvertently destroyed during construction can be extremely expensive, sometimes in excess of $10,000 per tree.

Inspection and Maintenance
During construction, the limits of disturbance should remain clearly marked at all times. Irrigation or maintenance of existing vegetation should be described in the landscaping plan. If damage to protected trees still occurs, maintenance guidelines described below should be followed:

- Verify that protective measures remain in place. Restore damaged protection measures immediately.
- Serious tree injuries shall be attended to by an arborist.
- Damage to the crown, trunk, or root system of a retained tree shall be repaired immediately.
- Trench as far from tree trunks as possible, usually outside of the tree drip line or canopy. Curve trenches around trees to avoid large roots or root concentrations. If roots are encountered, consider tunneling under them. When trenching or tunneling near or under trees to be retained, place tunnels at least 18 in. below the ground surface, and not below the tree center to minimize impact on the roots.
- Do not leave tree roots exposed to air. Cover exposed roots with soil as soon as possible. If soil covering is not practical, protect exposed roots with wet burlap or peat moss until the tunnel or trench is ready for backfill.
- Cleanly remove the ends of damaged roots with a smooth cut.
- Fill trenches and tunnels as soon as possible. Careful filling and tamping will eliminate air spaces in the soil, which can damage roots.
- If bark damage occurs, cut back all loosened bark into the undamaged area, with the cut tapered at the top and bottom and drainage provided at the base of the wood. Limit cutting the undamaged area as much as possible.
- Aerate soil that has been compacted over a trees root zone by punching holes 12 in. deep with an iron bar, and moving the bar back and forth until the soil is loosened. Place holes 18 in. apart throughout the area of compacted soil under the tree crown.
- Fertilization
  - Fertilize stressed or damaged broadleaf trees to aid recovery.
  - Fertilize trees in the late fall or early spring.
Preservation Of Existing Vegetation  EC-2

- Apply fertilizer to the soil over the feeder roots and in accordance with label instructions, but never closer than 3 ft to the trunk. Increase the fertilized area by one-fourth of the crown area for conifers that have extended root systems.

- Retain protective measures until all other construction activity is complete to avoid damage during site cleanup and stabilization.

References
County of Sacramento Tree Preservation Ordinance, September 1981.


Earth Dikes and Drainage Swales

Description and Purpose

An earth dike is a temporary berm or ridge of compacted soil used to divert runoff or channel water to a desired location. A drainage swale is a shaped and sloped depression in the soil surface used to convey runoff to a desired location. Earth dikes and drainage swales are used to divert off site runoff around the construction site, divert runoff from stabilized areas and disturbed areas, and direct runoff into sediment basins or traps.

Suitable Applications

Earth dikes and drainage swales are suitable for use, individually or together, where runoff needs to be diverted from one area and conveyed to another.

- Earth dikes and drainage swales may be used:
  - To convey surface runoff down sloping land
  - To intercept and divert runoff to avoid sheet flow over sloped surfaces
  - To divert and direct runoff towards a stabilized watercourse, drainage pipe or channel
  - To intercept runoff from paved surfaces
  - Below steep grades where runoff begins to concentrate
  - Along roadways and facility improvements subject to flood drainage

Categories

<table>
<thead>
<tr>
<th>Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC</td>
</tr>
<tr>
<td>SE</td>
</tr>
<tr>
<td>TC</td>
</tr>
<tr>
<td>WE</td>
</tr>
<tr>
<td>NS</td>
</tr>
<tr>
<td>WM</td>
</tr>
</tbody>
</table>

Legend:

- Primary Objective
- Secondary Objective

Targeted Constituents

<table>
<thead>
<tr>
<th>Targeted Constituents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sediment</td>
</tr>
<tr>
<td>Nutrients</td>
</tr>
<tr>
<td>Trash</td>
</tr>
<tr>
<td>Metals</td>
</tr>
<tr>
<td>Bacteria</td>
</tr>
<tr>
<td>Oil and Grease</td>
</tr>
<tr>
<td>Organics</td>
</tr>
</tbody>
</table>

Potential Alternatives

None

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Earth Dikes and Drainage Swales

- At the top of slopes to divert runoff from adjacent or undisturbed slopes
- At bottom and mid slope locations to intercept sheet flow and convey concentrated flows
- Divert sediment laden runoff into sediment basins or traps

Limitations
Dikes should not be used for drainage areas greater than 10 acres or along slopes greater than 10 percent. For larger areas more permanent drainage structures should be built. All drainage structures should be built in compliance with local municipal requirements.

- Earth dikes may create more disturbed area on site and become barriers to construction equipment.
- Earth dikes must be stabilized immediately, which adds cost and maintenance concerns.
- Diverted stormwater may cause downstream flood damage.
- Dikes should not be constructed of soils that may be easily eroded.
- Regrading the site to remove the dike may add additional cost.
- Temporary drains and swales or any other diversion of runoff should not adversely impact upstream or downstream properties.
- Temporary drains and swales must conform to local floodplain management requirements.
- Earth dikes/drainage swales are not suitable as sediment trapping devices.
- It may be necessary to use other soil stabilization and sediment controls such as check dams, plastics, and blankets, to prevent scour and erosion in newly graded dikes, swales, and ditches.
- Sediment accumulation, scour depressions, and/or persistent non-stormwater discharges can result in areas of standing water suitable for mosquito production in drainage swales.

Implementation
The temporary earth dike is a berm or ridge of compacted soil, located in such a manner as to divert stormwater to a sediment trapping device or a stabilized outlet, thereby reducing the potential for erosion and offsite sedimentation. Earth dikes can also be used to divert runoff from off site and from undisturbed areas away from disturbed areas and to divert sheet flows away from unprotected slopes.

An earth dike does not itself control erosion or remove sediment from runoff. A dike prevents erosion by directing runoff to an erosion control device such as a sediment trap or directing runoff away from an erodible area. Temporary diversion dikes should not adversely impact adjacent properties and must conform to local floodplain management regulations, and should not be used in areas with slopes steeper than 10%.

Slopes that are formed during cut and fill operations should be protected from erosion by runoff. A combination of a temporary drainage swale and an earth dike at the top of a slope can divert...
runoff to a location where it can be brought to the bottom of the slope (see EC-11, Slope Drains). A combination dike and swale is easily constructed by a single pass of a bulldozer or grader and compacted by a second pass of the tracks or wheels over the ridge. Diversion structures should be installed when the site is initially graded and remain in place until post construction BMPs are installed and the slopes are stabilized.

Diversion practices concentrate surface runoff, increasing its velocity and erosive force. Thus, the flow out of the drain or swale must be directed onto a stabilized area or into a grade stabilization structure. If significant erosion will occur, a swale should be stabilized using vegetation, chemical treatment, rock rip-rap, matting, or other physical means of stabilization. Any drain or swale that conveys sediment laden runoff must be diverted into a sediment basin or trap before it is discharged from the site.

**General**

- Care must be applied to correctly size and locate earth dikes, drainage swales. Excessively steep, unlined dikes, and swales are subject to erosion and gully formation.
- Conveyances should be stabilized.
- Use a lined ditch for high flow velocities.
- Select flow velocity based on careful evaluation of the risks due to erosion of the measure, soil types, overtopping, flow backups, washout, and drainage flow patterns for each project site.
- Compact any fills to prevent unequal settlement.
- Do not divert runoff onto other property without securing written authorization from the property owner.
- When possible, install and utilize permanent dikes, swales, and ditches early in the construction process.
- Provide stabilized outlets.

**Earth Dikes**

Temporary earth dikes are a practical, inexpensive BMP used to divert stormwater runoff. Temporary diversion dikes should be installed in the following manner:

- All dikes should be compacted by earth moving equipment.
- All dikes should have positive drainage to an outlet.
- All dikes should have 2:1 or flatter side slopes, 18 in. minimum height, and a minimum top width of 24 in. Wide top widths and flat slopes are usually needed at crossings for construction traffic.
- The outlet from the earth dike must function with a minimum of erosion. Runoff should be conveyed to a sediment trapping device such as a Sediment Trap (SE-3) or Sediment Basin.
Earth Dikes and Drainage Swales

(SE-2) when either the dike channel or the drainage area above the dike are not adequately stabilized.

- Temporary stabilization may be achieved using seed and mulching for slopes less than 5% and either rip-rap or sod for slopes in excess of 5%. In either case, stabilization of the earth dike should be completed immediately after construction or prior to the first rain.

- If riprap is used to stabilize the channel formed along the toe of the dike, the following typical specifications apply:

<table>
<thead>
<tr>
<th>Channel Grade</th>
<th>Riprap Stabilization</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5-1.0%</td>
<td>4 in. Rock</td>
</tr>
<tr>
<td>1.1-2.0%</td>
<td>6 in. Rock</td>
</tr>
<tr>
<td>2.1-4.0%</td>
<td>8 in. Rock</td>
</tr>
<tr>
<td>4.1-5.0%</td>
<td>8 in. -12 in. Riprap</td>
</tr>
</tbody>
</table>

- The stone riprap, recycled concrete, etc. used for stabilization should be pressed into the soil with construction equipment.

- Filter cloth may be used to cover dikes in use for long periods.

- Construction activity on the earth dike should be kept to a minimum.

Drainage Swales

Drainage swales are only effective if they are properly installed. Swales are more effective than dikes because they tend to be more stable. The combination of a swale with a dike on the downhill side is the most cost effective diversion.

Standard engineering design criteria for small open channel and closed conveyance systems should be used (see the local drainage design manual). Unless local drainage design criteria state otherwise, drainage swales should be designed as follows:

- No more than 5 acres may drain to a temporary drainage swale.

- Place drainage swales above or below, not on, a cut or fill slope.

- Swale bottom width should be at least 2 ft

- Depth of the swale should be at least 18 in.

- Side slopes should be 2:1 or flatter.

- Drainage or swales should be laid at a grade of at least 1 percent, but not more than 15 percent.

- The swale must not be overtopped by the peak discharge from a 10-year storm, irrespective of the design criteria stated above.
Earth Dikes and Drainage Swales

- Remove all trees, stumps, obstructions, and other objectionable material from the swale when it is built.
- Compact any fill material along the path of the swale.
- Stabilize all swales immediately. Seed and mulch swales at a slope of less than 5 percent, and use rip-rap or sod for swales with a slope between 5 and 15 percent. For temporary swales, geotextiles and mats (EC-7) may provide immediate stabilization.
- Irrigation may be required to establish sufficient vegetation to prevent erosion.
- Do not operate construction vehicles across a swale unless a stabilized crossing is provided.
- Permanent drainage facilities must be designed by a professional engineer (see the local drainage design criteria for proper design).
- At a minimum, the drainage swale should conform to predevelopment drainage patterns and capacities.
- Construct the drainage swale with a positive grade to a stabilized outlet.
- Provide erosion protection or energy dissipation measures if the flow out of the drainage swale can reach an erosive velocity.

Costs
- Cost ranges from $15 to $55 per ft for both earthwork and stabilization and depends on availability of material, site location, and access.
- Small dikes: $2.50 - $6.50/linear ft; Large dikes: $2.50/yd³.
- The cost of a drainage swale increases with drainage area and slope. Typical swales for controlling internal erosion are inexpensive, as they are quickly formed during routine earthwork.

Inspection and Maintenance
- Inspect BMPs prior to forecast rain, daily during extended rain events, after rain events, weekly during the rainy season, and at two-week intervals during the non-rainy season.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Inspect ditches and berms for washouts. Replace lost riprap, damaged linings or soil stabilizers as needed.
- Inspect channel linings, embankments, and beds of ditches and berms for erosion and accumulation of debris and sediment. Remove debris and sediment and repair linings and embankments as needed.
- Temporary conveyances should be completely removed as soon as the surrounding drainage area has been stabilized or at the completion of construction.
References


NOTES:
1. Stabilize inlet, outlets and slopes.
2. Properly compact the subgrade.
Non-Vegetative Stabilization

Description and Purpose
Non-vegetative stabilization methods are used for temporary or permanent stabilization of areas prone to erosion and should be used only where vegetative options are not feasible; examples include:

- Areas of vehicular or pedestrian traffic such as roads or paths;
- Arid environments where vegetation would not provide timely ground coverage, or would require excessive irrigation;
- Rocky substrate, infertile or droughty soils where vegetation would be difficult to establish; and
- Areas where vegetation will not grow adequately within the construction time frame.

There are several non-vegetative stabilization methods and selection should be based on site-specific conditions.

Decomposed Granite (DG) is a permanent erosion protection method that consists of a layer of stabilized decomposed granite placed over an erodible surface.

Degradable Mulches of various types (see EC-3, EC-6, EC-8) can be used for temporary non-vegetative stabilization; examples include straw mulch, compost, wood chips or hydraulic mulch.

Geotextiles and Mats can be used for temporary non-vegetative stabilization (see EC-7). These BMPs are typically manufactured from degradable or synthetic materials and are
Non-Vegetative Stabilization

designed and specified based on their functional longevity, i.e., how long they will persist and provide erosion protection. All geotextiles and mats should be replaced when they exceed their functional longevity or when permanent stabilization methods are instituted.

Gravel Mulch is a non-degradable erosion control product that is composed of washed and screened coarse to very coarse gravel, 16 mm to 64 mm (0.6" - 2.5"), similar to an AASHTO No. 3 coarse aggregate.

Rock Slope Protection consists of utilizing large rock or rip-rap (4" - 24") to stabilize slopes with a high erosion potential and those subject to scour along waterways.

Soil Binders can be used for temporary non-vegetative stabilization (see EC-5). The key to their use is functional longevity. In most cases, the soil binder will need to be routinely monitored and re-applied to maintain an erosion-resistant coverage.

Suitable Applications
Non-vegetated stabilization methods are suitable for use on disturbed soil areas and on material stockpiles that need to be temporarily or permanently protected from erosion by water and wind. Non-vegetated stabilization should only be utilized when vegetation cannot be established in the required timeframe, due to soil or climactic conditions, or where vegetation may be a potential fire hazard.

Decomposed Granite (DG) and Gravel Mulch are suitable for use in areas where vegetation establishment is difficult, on flat surfaces, trails and pathways, and when used in conjunction with a stabilizer or tackifier, on shallow slopes (i.e., 10:1 [H:V]). DG and gravel can also be used on shallow rocky slopes where vegetation cannot be established for permanent erosion control.

Degradable Mulches can be used to cover and protect soil surfaces from erosion both in temporary and permanent applications. In many cases, the use of mulches by themselves requires routine inspection and re-application. See EC-3 Hydraulic Mulch, EC-6 Straw Mulch, EC-8 Wood Mulch, or EC-14 Compost Blankets for more information.

Geotextiles and Mats can be used as a temporary stand-alone soil stabilization method. Depending on material selection, geotextiles and mats can be a short-term (3 mos - 1 year) or long-term (1-2 years) temporary stabilization method. For more information on geotextiles and mats see EC-7 Geotextiles and Mats.

Rock Slope Protection can be used when the slopes are subject to scour or have a high erosion potential, such as slopes adjacent to flowing waterways or slopes subject to overflow from detention facilities (spillways).

Soil Binders can be used for temporary stabilization of stockpiles and disturbed areas not subject to heavy traffic. See EC-5 Soil Binders for more information.

Limitations

General
- Refer to EC-3, EC-6, EC-8, and EC-14 for limitations on use of mulches. Refer to EC-7 for limitations on use of geotextiles and mats. Refer to EC-5 for limitations on use of Soil Binders.
Non-Vegetative Stabilization  EC-16

Decomposed Granite
- Not available in some geographic regions.

- If not tackified, material may be susceptible to erosion even on slight slopes (e.g., 30:1 [H:V]).

- Installed costs may be more expensive than vegetative stabilization methods.

Gravel Mulch
- Availability is limited in some geographic regions.

- If not properly screened and washed, can contain fine material that can erode and/or create dust problems.

- If inadequately sized, material may be susceptible to erosion on sloped areas.

- Pore spaces fill with dirt and debris over time; may provide a growing medium for weeds.

Rock Slope Protection
- Installation is labor intensive.

- Installed costs can be significantly higher than vegetative stabilization methods.

- Rounded stones may not be used on slopes greater than 2:1 [H:V].

Implementation
General
Non-vegetated stabilization should be used in accordance with the following general guidance:

- Should be used in conjunction with other BMPs, including drainage, erosion controls and sediment controls.

- Refer to EC-3, EC-6, EC-8, and EC-14 for implementation details for mulches. Refer to EC-7 for implementation details for geotextiles and mats. Refer to EC-5 for implementation details for soil binders.

- Non-vegetated stabilization measures should be implemented as soon as the disturbance in the areas they are intended to protect has ceased.

- Additional guidance on the comparison and selection of temporary slope stabilization methods is provided in Appendix F of the Handbook.

Decomposed Granite Stabilization
- If used for a road or path should be installed on a prepared base.

- Should be mixed with a stabilizer if used for roads or pathways, or on slope applications.

- Though porous it is recommended to prevent standing water on or next to a decomposed granite road or pathway.
Non-Vegetative Stabilization EC-16

Gravel Mulch
- Should be sized based on slope, rainfall, and upgradient run-on conditions. Stone size should be increased as potential for erosion increases (steeper slopes, high intensity rainfall).
- If permanent, a weed control fabric should be placed prior to installation.
- Should be installed at a minimum 2” depth.
- Should completely cover all exposed surfaces.

Rock Slope Protection
- Rock slope protection installation should follow Caltrans Standard Specification 72-2: Rock Slope Protection. Refer to the specification for rock conformity requirements and installation methods.
- When using rock slope protection, rock size and installation method should be specified by an Engineer.
- A geotextile fabric should be placed prior to installation.

Costs
- Costs are highly variable depending not only on technique chosen, but also on materials chosen within specific techniques. In addition, availability of certain materials will vary by region/location, which will also affect the cost. Costs of mulches, geotextiles and mats, and soil binders are presented in their respective fact sheets. Costs for decomposed granite, gravel mulch stabilization and rock slope protection may be higher depending on location and availability of materials. Caltrans has provided an estimate for gravel mulch of $10 - $15/yd² in flat areas and $11 - $23/yd² on side slopes.

Inspection and Maintenance
General
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- For permanent installation, require inspection periodically and after major storm events to look for signs of erosion or damage to the stabilization.
- All damage should be repaired immediately.
- Refer to EC-3, EC-6, EC-8, and EC-14 for inspection and maintenance requirements for mulches. Refer to EC-7 for inspection and maintenance requirements for geotextiles and mats. Refer to EC-5 for inspection and maintenance requirements for soil binders.

Decomposed Granite and Gravel Mulch Stabilization
- Rake out and add decomposed granite or gravel as needed to areas subject to rill erosion. Inspect upgradient drainage controls and repair/modify as necessary.
Non-Vegetative Stabilization EC-16

- Should remain stable under loose surface material. Any significant problem areas should be repaired to restore uniformity to the installation.

References


Gravel Mulch, Landscape Architecture Non-Standard Specification 10-2, California Department of Transportation (Caltrans), http://www.dot.ca.gov/hq/LandArch/roadside/detail-gm.htm

Maine Erosion and Sediment Control BMPs, DEP Long-Term 588, Maine Department of Environmental Protection: Bureau of Land and Water Quality, 2003.


Water Conservation Practices

Description and Purpose
Water conservation practices are activities that use water during the construction of a project in a manner that avoids causing erosion and the transport of pollutants offsite. These practices can reduce or eliminate non-stormwater discharges.

Suitable Applications
Water conservation practices are suitable for all construction sites where water is used, including piped water, metered water, trucked water, and water from a reservoir.

Limitations
- None identified.

Implementation
- Keep water equipment in good working condition.
- Stabilize water truck filling area.
- Repair water leaks promptly.
- Washing of vehicles and equipment on the construction site is discouraged.
- Avoid using water to clean construction areas. If water must be used for cleaning or surface preparation, surface should be swept and vacuumed first to remove dirt. This will minimize amount of water required.

Categories

| EC  | Erosion Control  |
| SE  | Sediment Control |
| TC  | Tracking Control |
| WE  | Wind Erosion Control |
| NS  | Non-Stormwater Management Control |
| WM  | Waste Management and Materials Pollution Control |

Legend:
- Primary Objective
- Secondary Objective

Targeted Constituents

- Sediment
- Nutrients
- Trash
- Metals
- Bacteria
- Oil and Grease
- Organics

Potential Alternatives
None

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CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

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Construction
www.casqa.org
**Water Conservation Practices**

- Direct construction water runoff to areas where it can soak into the ground or be collected and reused.

- Authorized non-stormwater discharges to the storm drain system, channels, or receiving waters are acceptable with the implementation of appropriate BMPs.

- Lock water tank valves to prevent unauthorized use.

**Costs**
The cost is small to none compared to the benefits of conserving water.

**Inspection and Maintenance**
- Inspect and verify that activity based BMPs are in place prior to the commencement of authorized non-stormwater discharges.

- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges are occurring.

- Repair water equipment as needed to prevent unintended discharges.
  - Water trucks
  - Water reservoirs (water buffalos)
  - Irrigation systems
  - Hydrant connections

**References**
Paving and Grinding Operations

Description and Purpose
Prevent or reduce the discharge of pollutants from paving operations, using measures to prevent runoff and runoff pollution, properly disposing of wastes, and training employees and subcontractors.

The General Permit incorporates Numeric Action Levels (NAL) for pH and turbidity (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Many types of construction materials associated with paving and grinding operations, including mortar, concrete, and cement and their associated wastes have basic chemical properties that can raise pH levels outside of the permitted range. Additional care should be taken when managing these materials to prevent them from coming into contact with stormwater flows, which could lead to exceedances of the General Permit requirements.

Suitable Applications
These procedures are implemented where paving, surfacing, resurfacing, or sawcutting, may pollute stormwater runoff or discharge to the storm drain system or watercourses.

Limitations
- Paving opportunities may be limited during wet weather.

Discharges of freshly paved surfaces may raise pH to environmentally harmful levels and trigger permit violations.
Paving and Grinding Operations

Implementation

General

- Avoid paving during the wet season when feasible.
- Reschedule paving and grinding activities if rain is forecasted.
- Train employees and sub-contractors in pollution prevention and reduction.
- Store materials away from drainage courses to prevent stormwater runoff (see WM-1, Material Delivery and Storage).
- Protect drainage courses, particularly in areas with a grade, by employing BMPs to divert runoff or to trap and filter sediment.
- Stockpile material removed from roadways away from drain inlets, drainage ditches, and watercourses. These materials should be stored consistent with WM-3, Stockpile Management.
- Disposal of PCC (Portland cement concrete) and AC (asphalt concrete) waste should be in conformance with WM-8, Concrete Waste Management.

Saw Cutting, Grinding, and Pavement Removal

- Shovel or vacuum saw-cut slurry and remove from site. Cover or barricade storm drains during saw cutting to contain slurry.
- When paving involves AC, the following steps should be implemented to prevent the discharge of grinding residue, uncompacted or loose AC, tack coats, equipment cleaners, or unrelated paving materials:
  - AC grindings, pieces, or chunks used in embankments or shoulder backing should not be allowed to enter any storm drains or watercourses. Install inlet protection and perimeter controls until area is stabilized (i.e. cutting, grinding or other removal activities are complete and loose material has been properly removed and disposed of) or permanent controls are in place. Examples of temporary perimeter controls can be found in EC-9, Earth Dikes and Drainage Swales; SE-1, Silt Fence; SE-5, Fiber Rolls, or SE-13 Compost Socks and Berms
  - Collect and remove all broken asphalt and recycle when practical. Old or spilled asphalt should be recycled or disposed of properly.
- Do not allow saw-cut slurry to enter storm drains or watercourses. Residue from grinding operations should be picked up by a vacuum attachment to the grinding machine, or by sweeping, should not be allowed to flow across the pavement, and should not be left on the surface of the pavement. See also WM-8, Concrete Waste Management, and WM-10, Liquid Waste Management.
- Pavement removal activities should not be conducted in the rain.
- Collect removed pavement material by mechanical or manual methods. This material may be recycled for use as shoulder backing or base material.
Paving and Grinding Operations

- If removed pavement material cannot be recycled, transport the material back to an approved storage site.

Asphaltic Concrete Paving
- If paving involves asphaltic cement concrete, follow these steps:
  - Do not allow sand or gravel placed over new asphalt to wash into storm drains, streets, or creeks. Vacuum or sweep loose sand and gravel and properly dispose of this waste by referring to WM-5, Solid Waste Management.
  - Old asphalt should be disposed of properly. Collect and remove all broken asphalt from the site and recycle whenever possible.

Portland Cement Concrete Paving
- Do not wash sweepings from exposed aggregate concrete into a storm drain system. Collect waste materials by dry methods, such as sweeping or shoveling, and return to aggregate base stockpile or dispose of properly. Allow aggregate rinse to settle. Then, either allow rinse water to dry in a temporary pit as described in WM-8, Concrete Waste Management, or pump the water to the sanitary sewer if authorized by the local wastewater authority.

Sealing Operations
- During chip seal application and sweeping operations, petroleum or petroleum covered aggregate should not be allowed to enter any storm drain or water courses. Apply temporary perimeter controls until structure is stabilized (i.e. all sealing operations are complete and cured and loose materials have been properly removed and disposed).
  - Inlet protection (SE-10, Storm Drain Inlet Protection) should be used during application of seal coat, tack coat, slurry seal, and fog seal.
  - Seal coat, tack coat, slurry seal, or fog seal should not be applied if rainfall is predicted to occur during the application or curing period.

Paving Equipment
- Leaks and spills from paving equipment can contain toxic levels of heavy metals and oil and grease. Place drip pans or absorbent materials under paving equipment when not in use. Clean up spills with absorbent materials and dispose of in accordance with the applicable regulations. See NS-10, Vehicle and Equipment Maintenance, WM-4, Spill Prevention and Control, and WM-10, Liquid Waste Management.
  - Substances used to coat asphalt transport trucks and asphalt spreading equipment should not contain soap and should be non-foaming and non-toxic.
  - Paving equipment parked onsite should be parked over plastic to prevent soil contamination.
  - Clean asphalt coated equipment offsite whenever possible. When cleaning dry, hardened asphalt from equipment, manage hardened asphalt debris as described in WM-5, Solid Waste Management. Any cleaning onsite should follow NS-8, Vehicle and Equipment Cleaning.
**Thermoplastic Striping**
- Thermoplastic striper and pre-heater equipment shutoff valves should be inspected to ensure that they are working properly to prevent leaking thermoplastic from entering drain inlets, the stormwater drainage system, or watercourses.
- Pre-heaters should be filled carefully to prevent splashing or spilling of hot thermoplastic. Leave six inches of space at the top of the pre-heater container when filling thermoplastic to allow room for material to move.
- Do not pre-heat, transfer, or load thermoplastic near drain inlets or watercourses.
- Clean truck beds daily of loose debris and melted thermoplastic. When possible, recycle thermoplastic material.

**Raised/Recessed Pavement Marker Application and Removal**
- Do not transfer or load bituminous material near drain inlets, the stormwater drainage system, or watercourses.
- Melting tanks should be loaded with care and not filled to beyond six inches from the top to leave room for splashing.
- When servicing or filling melting tanks, ensure all pressure is released before removing lids to avoid spills.
- On large-scale projects, use mechanical or manual methods to collect excess bituminous material from the roadway after removal of markers.

**Costs**
- All of the above are low cost measures.

**Inspection and Maintenance**
- Inspect and verify that activity-based BMPs are in place prior to the commencement of paving and grinding operations.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Sample stormwater runoff required by the General Permit.
- Keep ample supplies of drip pans or absorbent materials onsite.
- Inspect and maintain machinery regularly to minimize leaks and drips.

**References**
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.
Paving and Grinding Operations


Illicit Connection/Discharge

Description and Purpose
Procedures and practices designed for construction contractors to recognize illicit connections or illegally dumped or discharged materials on a construction site and report incidents.

Suitable Applications
This best management practice (BMP) applies to all construction projects. Illicit connection/discharge and reporting is applicable anytime an illicit connection or discharge is discovered or illegally dumped material is found on the construction site.

Limitations
Illicit connections and illegal discharges or dumping, for the purposes of this BMP, refer to discharges and dumping caused by parties other than the contractor. If pre-existing hazardous materials or wastes are known to exist onsite, they should be identified in the SWPPP and handled as set forth in the SWPPP.

Implementation
Planning
- Review the SWPPP. Pre-existing areas of contamination should be identified and documented in the SWPPP.
- Inspect site before beginning the job for evidence of illicit connections, illegal dumping or discharges. Document any pre-existing conditions and notify the owner.
Illicit Connection/Discharge

- Inspect site regularly during project execution for evidence of illicit connections, illegal dumping or discharges.

- Observe site perimeter for evidence for potential of illicitly discharged or illegally dumped material, which may enter the job site.

**Identification of Illicit Connections and Illegal Dumping or Discharges**

- **General** – unlabeled and unidentifiable material should be treated as hazardous.

- **Solids** - Look for debris, or rubbish piles. Solid waste dumping often occurs on roadways with light traffic loads or in areas not easily visible from the traveled way.

- **Liquids** - signs of illegal liquid dumping or discharge can include:
  - Visible signs of staining or unusual colors to the pavement or surrounding adjacent soils
  - Pungent odors coming from the drainage systems
  - Discoloration or oily substances in the water or stains and residues detained within ditches, channels or drain boxes
  - Abnormal water flow during the dry weather season

- **Urban Areas** - Evidence of illicit connections or illegal discharges is typically detected at storm drain outfall locations or at manholes. Signs of an illicit connection or illegal discharge can include:
  - Abnormal water flow during the dry weather season
  - Unusual flows in sub drain systems used for dewatering
  - Pungent odors coming from the drainage systems
  - Discoloration or oily substances in the water or stains and residues detained within ditches, channels or drain boxes
  - Excessive sediment deposits, particularly adjacent to or near active offsite construction projects

- **Rural Areas** - Illicit connections or illegal discharges involving irrigation drainage ditches are detected by visual inspections. Signs of an illicit discharge can include:
  - Abnormal water flow during the non-irrigation season
  - Non-standard junction structures
  - Broken concrete or other disturbances at or near junction structures

**Reporting**

Notify the owner of any illicit connections and illegal dumping or discharge incidents at the time of discovery. For illicit connections or discharges to the storm drain system, notify the local stormwater management agency. For illegal dumping, notify the local law enforcement agency.

**Cleanup and Removal**

The responsibility for cleanup and removal of illicit or illegal dumping or discharges will vary by location. Contact the local stormwater management agency for further information.
Costs
Costs to look for and report illicit connections and illegal discharges and dumping are low. The best way to avoid costs associated with illicit connections and illegal discharges and dumping is to keep the project perimeters secure to prevent access to the site, to observe the site for vehicles that should not be there, and to document any waste or hazardous materials that exist onsite before taking possession of the site.

Inspection and Maintenance
- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect the site regularly to check for any illegal dumping or discharge.
- Prohibit employees and subcontractors from disposing of non-job related debris or materials at the construction site.
- Notify the owner of any illicit connections and illegal dumping or discharge incidents at the time of discovery.

References
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.


Vehicle and Equipment Fueling

Description and Purpose
Vehicle equipment fueling procedures and practices are designed to prevent fuel spills and leaks, and reduce or eliminate contamination of stormwater. This can be accomplished by using offsite facilities, fueling in designated areas only, enclosing or covering stored fuel, implementing spill controls, and training employees and subcontractors in proper fueling procedures.

Suitable Applications
These procedures are suitable on all construction sites where vehicle and equipment fueling takes place.

Limitations
Onsite vehicle and equipment fueling should only be used where it is impractical to send vehicles and equipment offsite for fueling. Sending vehicles and equipment offsite should be done in conjunction with TC-1, Stabilized Construction Entrance/Exit.

Implementation
- Use offsite fueling stations as much as possible. These businesses are better equipped to handle fuel and spills properly. Performing this work offsite can also be economical by eliminating the need for a separate fueling area at a site.
- Discourage “topping-off” of fuel tanks.

Categories
| EC | Erosion Control |
| SE | Sediment Control |
| TC | Tracking Control |
| WE | Wind Erosion Control |
| NS | Non-Stormwater Management Control |
| WM | Waste Management and Materials Pollution Control |

Legend:
- Primary Objective
- Secondary Objective

Targeted Constituents
| Sediment
| Nutrients
| Trash
| Metals
| Bacteria
| Oil and Grease
| Organics

Potential Alternatives
None

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Vehicle and Equipment Fueling

- Absorbent spill cleanup materials and spill kits should be available in fueling areas and on fueling trucks, and should be disposed of properly after use.

- Drip pans or absorbent pads should be used during vehicle and equipment fueling, unless the fueling is performed over an impermeable surface in a dedicated fueling area.

- Use absorbent materials on small spills. Do not hose down or bury the spill. Remove the absorbent materials promptly and dispose of properly.

- Avoid mobile fueling of mobile construction equipment around the site; rather, transport the equipment to designated fueling areas. With the exception of tracked equipment such as bulldozers and large excavators, most vehicles should be able to travel to a designated area with little lost time.

- Train employees and subcontractors in proper fueling and cleanup procedures.

- When fueling must take place onsite, designate an area away from drainage courses to be used. Fueling areas should be identified in the SWPPP.

- Dedicated fueling areas should be protected from stormwater runon and runoff, and should be located at least 50 ft away from downstream drainage facilities and watercourses. Fueling must be performed on level-grade areas.

- Protect fueling areas with berms and dikes to prevent runon, runoff, and to contain spills.

- Nozzles used in vehicle and equipment fueling should be equipped with an automatic shutoff to control drips. Fueling operations should not be left unattended.

- Use vapor recovery nozzles to help control drips as well as air pollution where required by Air Quality Management Districts (AQMD).

- Federal, state, and local requirements should be observed for any stationary above ground storage tanks.

 Costs

- All of the above measures are low cost except for the capital costs of above ground tanks that meet all local environmental, zoning, and fire codes.

 Inspection and Maintenance

- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Vehicles and equipment should be inspected each day of use for leaks. Leaks should be repaired immediately or problem vehicles or equipment should be removed from the project site.

- Keep ample supplies of spill cleanup materials onsite.
Vehicle and Equipment Fueling

- Immediately clean up spills and properly dispose of contaminated soil and cleanup materials.

References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.


Description and Purpose
Prevent or reduce the contamination of stormwater resulting from vehicle and equipment maintenance by running a "dry and clean site". The best option would be to perform maintenance activities at an offsite facility. If this option is not available then work should be performed in designated areas only, while providing cover for materials stored outside, checking for leaks and spills, and containing and cleaning up spills immediately. Employees and subcontractors must be trained in proper procedures.

Suitable Applications
These procedures are suitable on all construction projects where an onsite yard area is necessary for storage and maintenance of heavy equipment and vehicles.

Limitations
Onsite vehicle and equipment maintenance should only be used where it is impractical to send vehicles and equipment offsite for maintenance and repair. Sending vehicles/equipment offsite should be done in conjunction with TC-1, Stabilized Construction Entrance/Exit.

Outdoor vehicle or equipment maintenance is a potentially significant source of stormwater pollution. Activities that can contaminate stormwater include engine repair and service, changing or replacement of fluids, and outdoor equipment storage and parking (engine fluid leaks). For further information on vehicle or equipment servicing, see NS-8,
Vehicle & Equipment Maintenance  NS-10

Vehicle and Equipment Cleaning, and NS-9, Vehicle and Equipment Fueling.

Implementation

- Use offsite repair shops as much as possible. These businesses are better equipped to handle vehicle fluids and spills properly. Performing this work offsite can also be economical by eliminating the need for a separate maintenance area.

- If maintenance must occur onsite, use designated areas, located away from drainage courses. Dedicated maintenance areas should be protected from stormwater runoff and runoff, and should be located at least 50 ft from downstream drainage facilities and watercourses.

- Drip pans or absorbent pads should be used during vehicle and equipment maintenance work that involves fluids, unless the maintenance work is performed over an impermeable surface in a dedicated maintenance area.

- Place a stockpile of spill cleanup materials where it will be readily accessible.

- All fueling trucks and fueling areas are required to have spill kits and/or use other spill protection devices.

- Use adsorbent materials on small spills. Remove the absorbent materials promptly and dispose of properly.

- Inspect onsite vehicles and equipment daily at startup for leaks, and repair immediately.

- Keep vehicles and equipment clean; do not allow excessive build-up of oil and grease.

- Segregate and recycle wastes, such as greases, used oil or oil filters, antifreeze, cleaning solutions, automotive batteries, hydraulic and transmission fluids. Provide secondary containment and covers for these materials if stored onsite.

- Train employees and subcontractors in proper maintenance and spill cleanup procedures.

- Drip pans or plastic sheeting should be placed under all vehicles and equipment placed on docks, barges, or other structures over water bodies when the vehicle or equipment is planned to be idle for more than 1 hour.

- For long-term projects, consider using portable tents or covers over maintenance areas if maintenance cannot be performed offsite.

- Consider use of new, alternative greases and lubricants, such as adhesive greases, for chassis lubrication and fifth-wheel lubrication.

- Properly dispose of used oils, fluids, lubricants, and spill cleanup materials.

- Do not place used oil in a dumpster or pour into a storm drain or watercourse.

- Properly dispose of or recycle used batteries.

- Do not bury used tires.
Vehicle & Equipment Maintenance NS-10

- Repair leaks of fluids and oil immediately.

Listed below is further information if you must perform vehicle or equipment maintenance onsite.

**Safer Alternative Products**
- Consider products that are less toxic or hazardous than regular products. These products are often sold under an “environmentally friendly” label.
- Consider use of grease substitutes for lubrication of truck fifth-wheels. Follow manufacturer's label for details on specific uses.
- Consider use of plastic friction plates on truck fifth-wheels in lieu of grease. Follow manufacturer's label for details on specific uses.

**Waste Reduction**
Parts are often cleaned using solvents such as trichloroethylene, trichloroethane, or methylene chloride. Many of these cleaners are listed in California Toxic Rule as priority pollutants. These materials are harmful and must not contaminate stormwater. They must be disposed of as a hazardous waste. Reducing the number of solvents makes recycling easier and reduces hazardous waste management costs. Often, one solvent can perform a job as well as two different solvents. Also, if possible, eliminate or reduce the amount of hazardous materials and waste by substituting non-hazardous or less hazardous materials. For example, replace chlorinated organic solvents with non-chlorinated solvents. Non-chlorinated solvents like kerosene or mineral spirits are less toxic and less expensive to dispose of properly. Check the list of active ingredients to see whether it contains chlorinated solvents. The “chlor” term indicates that the solvent is chlorinated. Also, try substituting a wire brush for solvents to clean parts.

**Recycling and Disposal**
Separating wastes allows for easier recycling and may reduce disposal costs. Keep hazardous wastes separate, do not mix used oil solvents, and keep chlorinated solvents (like,-trichloroethane) separate from non-chlorinated solvents (like kerosene and mineral spirits). Promptly transfer used fluids to the proper waste or recycling drums. Don’t leave full drip pans or other open containers lying around. Provide cover and secondary containment until these materials can be removed from the site.

Oil filters can be recycled. Ask your oil supplier or recycler about recycling oil filters.

Do not dispose of extra paints and coatings by dumping liquid onto the ground or throwing it into dumpsters. Allow coatings to dry or harden before disposal into covered dumpsters.

Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries, even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.

**Costs**
All of the above are low cost measures. Higher costs are incurred to setup and maintain onsite maintenance areas.
Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.

- Keep ample supplies of spill cleanup materials onsite.

- Maintain waste fluid containers in leak proof condition.

- Vehicles and equipment should be inspected on each day of use. Leaks should be repaired immediately or the problem vehicle(s) or equipment should be removed from the project site.

- Inspect equipment for damaged hoses and leaky gaskets routinely. Repair or replace as needed.

References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.


Description and Purpose
A silt fence is made of a woven geotextile that has been entrenched, attached to supporting poles, and sometimes backed by a plastic or wire mesh for support. The silt fence detains water, promoting sedimentation of coarse sediment behind the fence. Silt fence does not retain soil fine particles like clays or silts.

Suitable Applications
Silt fences are suitable for perimeter control, placed below areas where sheet flows discharge from the site. They could also be used as interior controls below disturbed areas where runoff may occur in the form of sheet and rill erosion and around inlets within disturbed areas (SE-10). Silt fences should not be used in locations where the flow is concentrated. Silt fences should always be used in combination with erosion controls. Suitable applications include:

- At perimeter of a project.
- Below the toe or down slope of exposed and erodible slopes.
- Along streams and channels.
- Around temporary spoil areas and stockpiles.
- Around inlets.
- Below other small cleared areas.

Categories
- EC  Erosion Control
- SE  Sediment Control
- TC  Tracking Control
- WE  Wind Erosion Control
- NS  Non-Stormwater Management Control
- WM  Waste Management and Materials Pollution Control

Legend:
☑ Primary Category
☒ Secondary Category

Targeted Constituents
- Sediment (coarse sediment)
- Nutrients
- Trash
- Metals
- Bacteria
- Oil and Grease
- Organics

Potential Alternatives
- SE-5 Fiber Rolls
- SE-6 Gravel Bag Berm SE-12
- Manufactured Linear Sediment Controls
- SE-13 Compost Socks and Berms
- SE-14 Biofilter Bags

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Limitations

- Do not use in streams, channels, drain inlets, or anywhere flow is concentrated.
- Do not use in locations where ponded water may cause a flooding hazard.
- Do not use silt fence to divert water flows or place across any contour line.
- Improperly installed fences are subject to failure from undercutting, overtopping, or collapsing.
- Must be trenched and keyed in.
- Not intended for use as a substitute for Fiber Rolls (SE-5), when fiber rolls are being used as a slope interruption device.
- Do not use on slopes subject to creeping, slumping, or landslides.

Implementation

General

A silt fence is a temporary sediment barrier consisting of woven geotextile stretched across and attached to supporting posts, trenched-in, and, depending upon the strength of fabric used, supported with plastic or wire mesh fence. Silt fences trap coarse sediment by intercepting and detaining sediment-laden runoff from disturbed areas in order to promote sedimentation behind the fence.

The following layout and installation guidance can improve performance and should be followed:

- Silt fence should be used in combination with erosion controls up-slope in order to provide the most effective sediment control.
- Silt fence alone is not effective at reducing turbidity. (Barrett and Malina, 2004)
- Designers should consider diverting sediment laden water to a temporary sediment basin or trap. (EPA, 2012)
- Use principally in areas where sheet flow occurs.
- Install along a level contour, so water does not pond more than 1.5 ft at any point along the silt fence.
- Provide sufficient room for runoff to pond behind the fence and to allow sediment removal equipment to pass between the silt fence and toes of slopes or other obstructions. About 1200 ft² of ponding area should be provided for every acre draining to the fence.
- Efficiency of silt fences is primarily dependent on the detention time of the runoff behind the control. (Barrett and Malina, 2004)
- The drainage area above any fence should not exceed a quarter of an acre. (Rule of Thumb-100-feet of silt fence per 10,000 square feet of disturbed area.) (EPA 2012)
Silt Fence

- The maximum length of slope draining to any point along the silt fence should be 100 ft per foot of silt fence.

- Turn the ends of the filter fence uphill to prevent stormwater from flowing around the fence.

- Leave an undisturbed or stabilized area immediately down slope from the fence where feasible.

- Silt fences should remain in place until the disturbed area draining to the silt fence is permanently stabilized, after which, the silt fence fabric and posts should be removed and properly disposed.

- J-Hooks, which have ends turning up the slope to break up long runs of fence and provide multiple storage areas that work like mini-retention areas, may be used to increase the effectiveness of silt fence.

- Be aware of local regulations regarding the type and installation requirements of silt fence, which may differ from those presented in this fact sheet.

Design and Layout
In areas where high winds are anticipated the fence should be supported by a plastic or wire mesh. The geotextile fabric of the silt fence should contain ultraviolet inhibitors and stabilizers to provide longevity equivalent to the project life or replacement schedule.

- Layout in accordance with the attached figures.

- For slopes that contain a high number of rocks or large dirt clods that tend to dislodge, it may be necessary to protect silt fence from rocks (e.g., rockfall netting) ensure the integrity of the silt fence installation.

Standard vs. Heavy Duty Silt Fence

Standard Silt Fence
- Generally applicable in cases where the area draining to fence produces moderate sediment loads.

Heavy Duty Silt Fence
- Heavy duty silt fence usually has 1 or more of the following characteristics, not possessed by standard silt fence.
  - Fabric is reinforced with wire backing or additional support.
  - Posts are spaced closer than pre-manufactured, standard silt fence products.
- Use is generally limited to areas affected by high winds.
- Area draining to fence produces moderate sediment loads.

Materials

Standard Silt Fence
- Silt fence material should be woven geotextile with a minimum width of 36 in. The fabric should conform to the requirements in ASTM designation D6461.

- Wooden stakes should be commercial quality lumber of the size and shape shown on the plans. Each stake should be free from decay, splits or cracks longer than the