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DEPARTMENT OF THE AIR FORCE

27th CIVIL ENGINEER SQUADRON (ACC)
CANNON AIR FORCE BASE NEW MEXICO

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Lt Col Nicholas L. Desport
Commander
506 N DL Ingram Blvd
Cannon AFB NM 88103-5323

Mr. James Bearzi, Chief
Hazardous and Radioactive Materials Bureau
New Mexico Environment Department
2044 Galisteo Street
PO Box 26110
Santa Fe, NM 87502

Dear Mr. Bearzi,

Enclosed for your information, review , and records is a Remedial Action Work Plan for SWMU 97, Landfill No. 25 Cannon Air Force Base, New Mexico. This project is a surface cleanup only to dispose of asbestos containing materials and clean up concrete rubble on the surface of the site. Drainage will be improved to minimize pooling and infiltration of rain water at the site.

If you have any questions, please contact Mr. Sanford Hutsell of my environmental staff at (505)784-6378.

Sincerely,

NICHOLAS L. DESPORT, Lt Col, USAF
Commander

Encl:
Remedial Action Work Plan for SWMU 97
Landfill No. 25 Cannon Air Force Base, New Mexico

cc:
NMED w/o encl (G. VonGonten)
NMED GW Bureau (J. Jacobs)
EPA Region VI w/o encl (D. Neleigh)
EPA Region VI (B. Sturdivant)

HWB CAFB-00-006

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Remedial Action Work Plan for SWMU 97—Landfill No. 25 /SWMU 97 Cannon Air Force Base, New Mexico Volume 1

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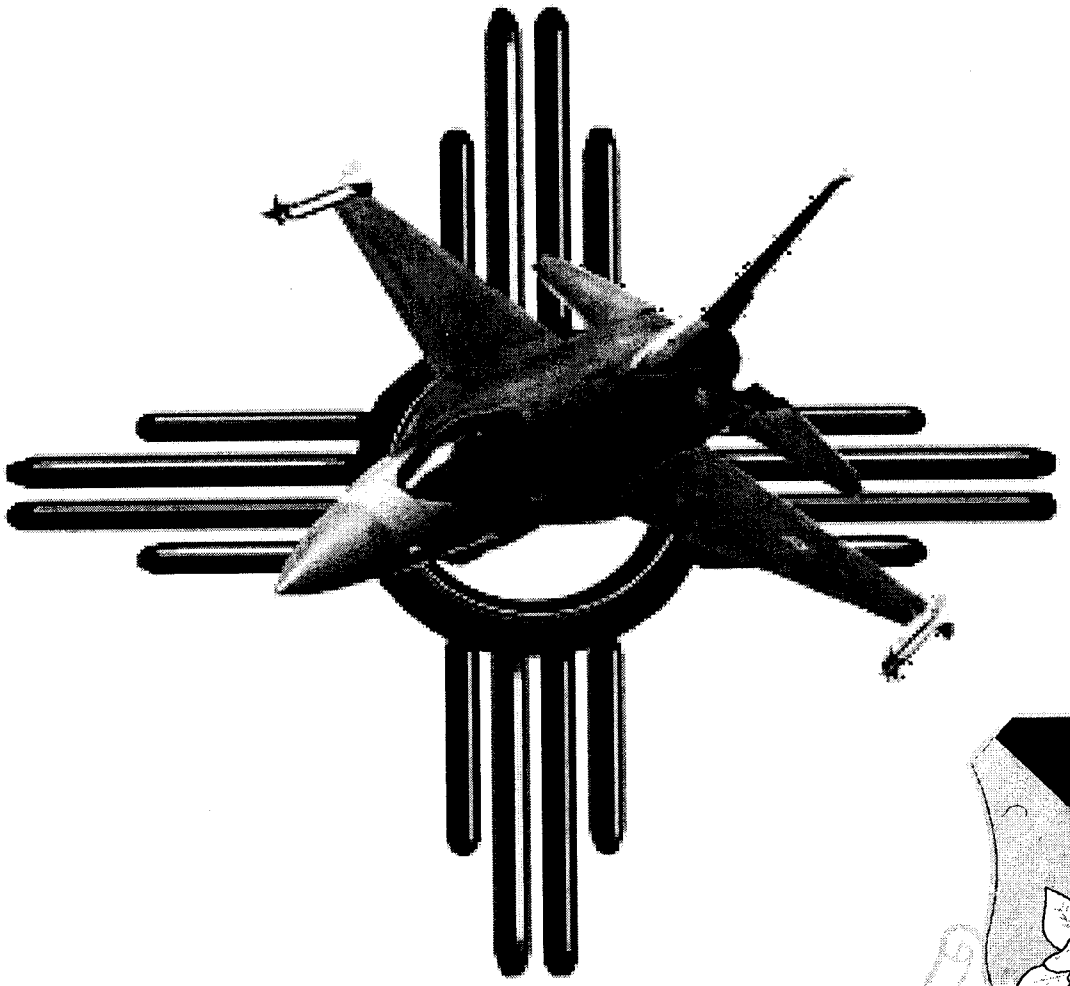

27TH FIGHTER WING

Project Number: CZQZ20007025

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Remedial Action Work Plan for SWMU 97—Landfill No. 25 /SWMU 97 Cannon Air Force Base, New Mexico Volume 2

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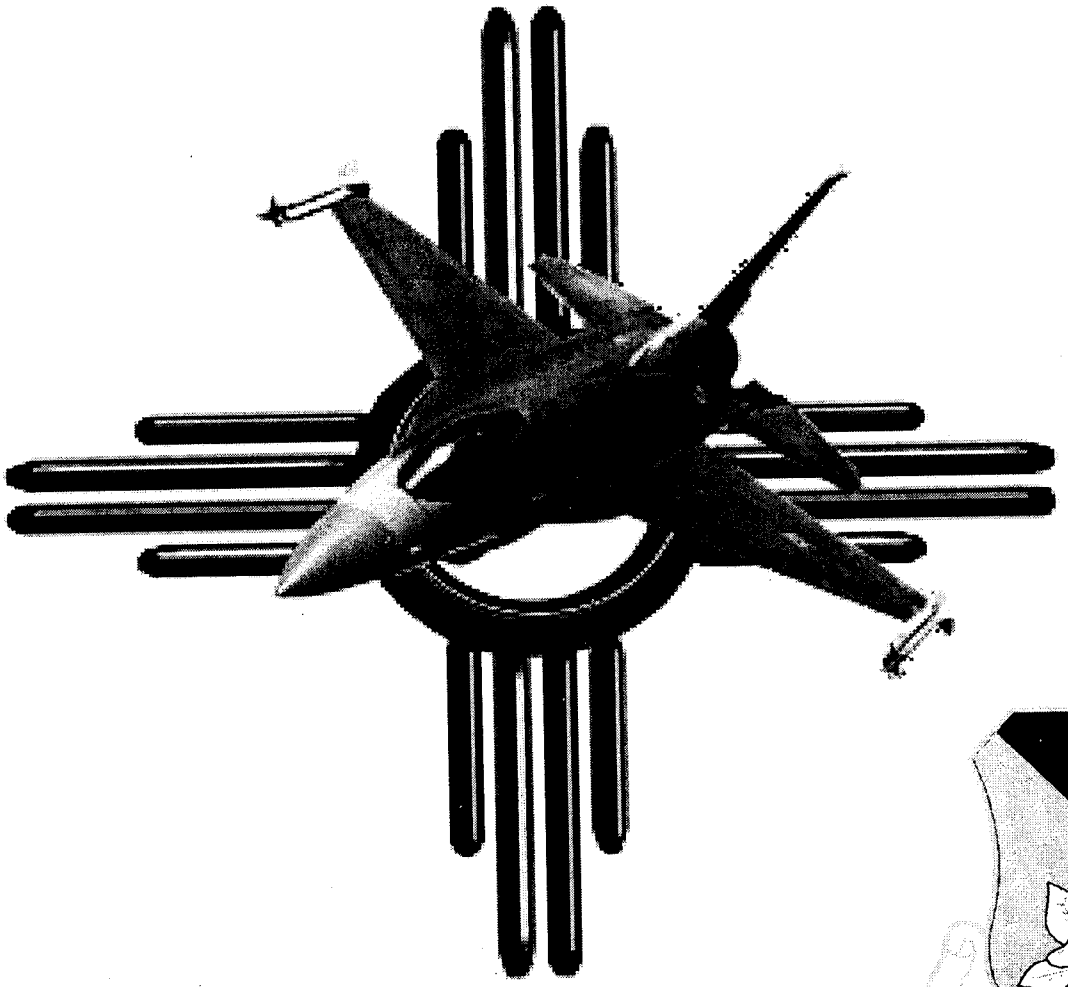

27TH FIGHTER WING

Project Number: CZQZ20007025

REMEDIAL ACTION WORK PLAN
SWMU 97—LANDFILL NO. 25
CANNON AIR FORCE BASE, NEW MEXICO

Prepared for:

27 CE/CEV
Cannon Air Force Base, NM
and
HQ ACC/CEV
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6605 Uptown Boulevard, Suite 220
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Under Contract No. DACW45-94-D-0003
Delivery Order No. 28, Work Authorization Directive 3
Project Number: CZQZ20007025

U.S. Army Corps of Engineers
Omaha District
Omaha, Nebraska

July 2000

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LIST OF ACRONYMS

ACM	asbestos-containing material
AFB	Air Force Base
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
C-O-C	chain-of-custody
cu yd	cubic yard
DO	Delivery Order
DOT	U.S. Department of Transportation
DQCR	daily quality control report
DQO	data quality objective
EPA	U.S. Environmental Protection Agency
ESS	Environmental Safety Supervisor
ft	foot/feet
Foster Wheeler Environmental	Foster Wheeler Environmental Corporation
HASP	Health and Safety Plan
HWMR	Hazardous Waste Management Regulations
IRP	Installation Restoration Program
LDR	Land Disposal Restriction
LF-25	Landfill No. 25
LIMS	Laboratory Information Management System
MDL	method detection limit
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
PCS	petroleum-contaminated soil
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
RA	remedial action
RCP	Regulatory Compliance Plan
RCRA	Resource Conservation and Recovery Act

LIST OF ACRONYMS (Concluded)

SPCC	Spill Prevention Control and Countermeasures Plan
SSHP	Site-Specific Safety and Health Plan
SVOC	semivolatile organic compound
SWMR	Solid Waste Management Regulations
SWMU	Solid Waste Management Unit
SWPP	Stormwater Pollution Prevention Plan
TCLP	toxicity characteristic leaching procedure
TRPH	total recoverable petroleum hydrocarbon
TSDF	treatment, storage, and disposal facility
USACE	U.S. Army Corps of Engineers
USAF	United States Air Force
VOC	volatile organic compound

1.0 INTRODUCTION

This document describes the remedial action (RA) to be conducted for Solid Waste Management Unit (SWMU) 97, Landfill No. 25 (LF-25), at Cannon Air Force Base (AFB), New Mexico. Foster Wheeler Environmental Corporation (Foster Wheeler Environmental), at the direction of the U.S. Army Corps of Engineers (USACE) Omaha District and Cannon AFB, will remove and dispose of exposed asbestos-containing material (ACM), crush and remove visible concrete, construct drainage channels/outlets, and revegetate the site.

This RA Work Plan meets the requirements stipulated within the Total Environmental Restoration Contract No. DACW45-94-D-0003, Delivery Order 28, Work Authorization Directive 3; Resource Conservation and Recovery Act (RCRA) Corrective Action Plan Guidance (EPA, 1994a); and USACE and Base requirements.

The RA Work Plan provides project objectives, descriptions, field procedures, and related plans that address all aspects of the proposed construction activities at LF-25. A detailed grading and drainage plan, based on current survey data, is provided under separate cover. Additionally, a Site-Specific Safety and Health Plan (SSHP) addendum to the Cannon AFB Base-Wide Health and Safety Plan (HASP) (Foster Wheeler Environmental, 2000) has been prepared for the RA and is included as Appendix C to this document. All field activities will be performed in accordance with the Base-Wide HASP, the SSHP addendum, and USACE health and safety requirements.

1.1 PROJECT OBJECTIVES

This RA is designed to minimize the threat to human health and the environment by accomplishing the following activities:

- Site Survey. To plan access routes and staging areas, a site topographic and content survey will be performed to identify the general location, approximate volume, and types of exposed debris. The topographic information will be used to develop a grading and drainage plan.
- Tree Removal and Trimming. To construct access roads and retrieve exposed debris, trees and limbs will be trimmed and/or removed and then disposed by burial on site.
- ACM Separation, Transportation and Disposal. All exposed ACM will be addressed in this activity. The ACM will be separated, transported, and disposed at a permitted disposal facility, prior to all other field activities.
- Separate and Haul Concrete. Clean, salvageable, exposed concrete will be separated and identified during the site survey and then moved to the concrete crushing plant. No excavation of material will be performed. The "clean" determination will be made by visual inspection. No analytical laboratory testing is anticipated.

- Concrete Crushing. A concrete crushing plant will be operated and maintained to produce 4-inch diameter, or smaller, concrete material that will be stockpiled on site for future use.
- Native Soil Cover/Debris Consolidation. The remaining exposed debris will be consolidated, to the extent possible, and a native soil cover of 4 to 6 inches of clean imported soil will be placed. The area is estimated to be 10 acres.
- Grading and Drainage Construction. The construction of runon/runoff control ditches around the site perimeter will be completed in this activity. Outlet drainage will be directed to the southeast corner of the landfill. Additionally, temporary soil erosion and sediment control will be required to prevent the sedimentation of off-site areas from stormwater runoff.
- Site Revegetation. The entire site will be revegetated and mulched with native grasses. Compost from Cannon AFB will be used as mulch.
- Final Survey. A topographic survey of the final site contours and features will be performed to develop record drawings to be provided with the RA Completion Report.

1.2 DOCUMENT ORGANIZATION

This RA Work Plan describes the methods that will be used to remove and dispose of exposed ACM, remove and crush exposed concrete debris, construct drainage channels, and revegetate the site. Foster Wheeler Environmental personnel, including subcontractors, will follow the procedures outlined in this Work Plan.

The Work Plan is divided into six sections, plus references and related appendices:

- Section 1 – Introduction
- Section 2 – Site Description and History
- Section 3 – Project Implementation Plan/Scope of Work
- Section 4 – Regulatory Compliance Plan
- Section 5 – Quality Assurance Project Plan
- Section 6 – Project Management

2.0 SITE DESCRIPTION AND HISTORY

A description of Cannon AFB and brief discussion of LF-25, including site description, history, and results of previous investigations, are provided below. The USACE and previous reports provided the site history and detailed descriptions of previous site activities.

2.1 CANNON AFB DESCRIPTION AND HISTORY

Cannon AFB occupies approximately 4,000 acres south of U.S. Highway 60/84 in Curry County, New Mexico. The Base is 6 miles west of the city of Clovis, near the New Mexico-Texas border (Figure 2-1). The area surrounding Cannon AFB is used mainly for farming and ranching. Cannon AFB also maintains several satellite facilities.

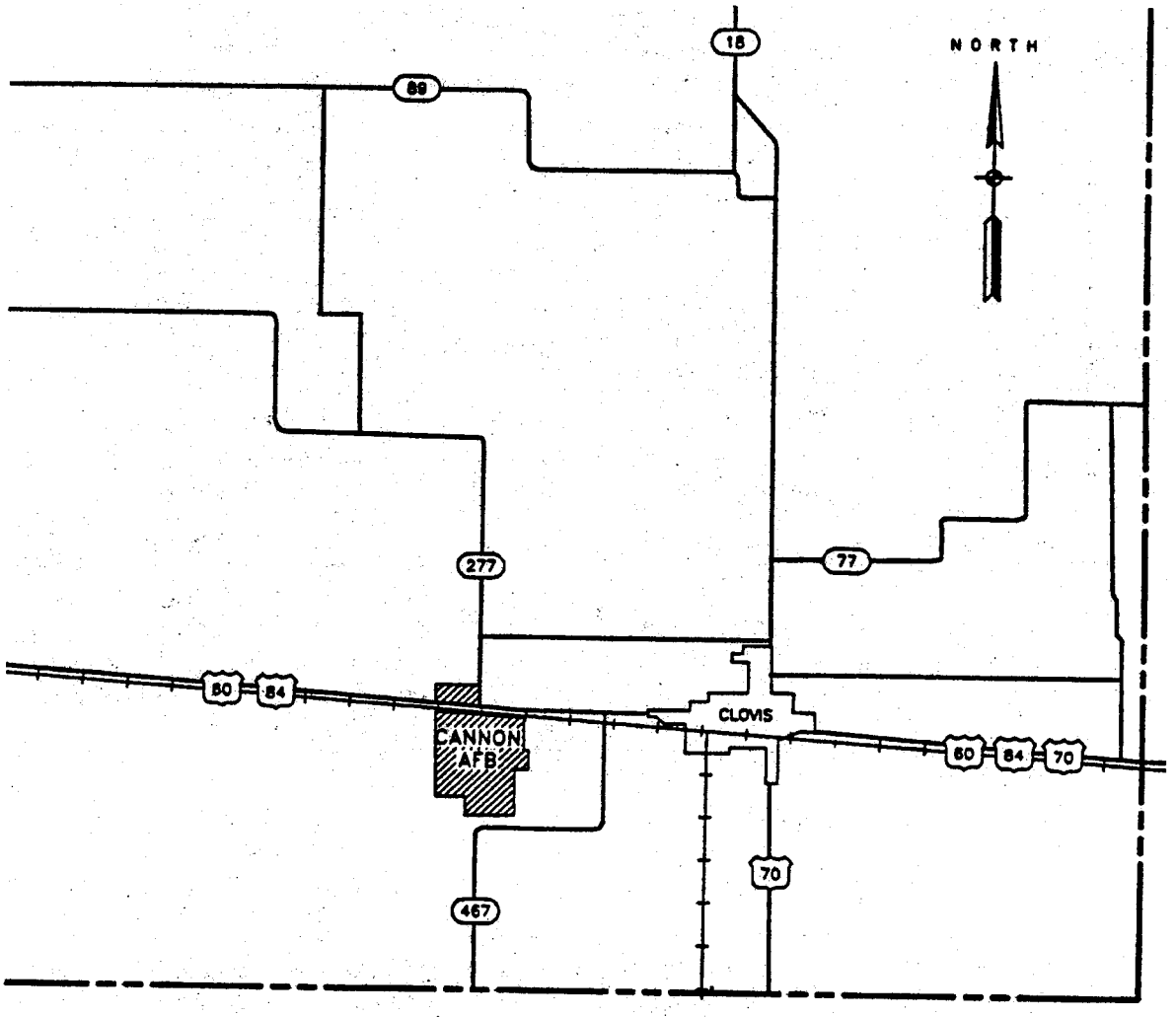
In 1942, the Department of Defense established the Clovis Army Air Base, a training facility for B-17, B-24, and B-29 aircrews. In 1945, the base was renamed Clovis Army Airfield; it was closed in 1947. In 1951, the facility was reactivated and reassigned to the Tactical Air Command; in 1957 it was renamed Cannon Air Force Base. In 1975, the 27th Tactical Fighter Wing became the principal Air Force unit at Cannon AFB. In 1992, the Base was reassigned to the Air Combat Command and currently maintains a combat-ready force and provides replacement training of combat aircrews for worldwide tactical organizations.

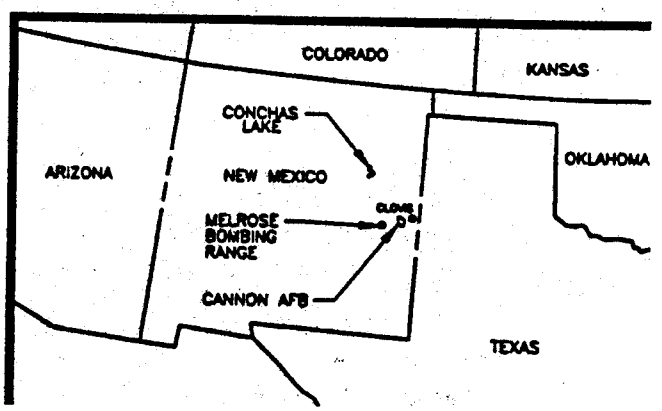
2.2 LF-25 DESCRIPTION AND HISTORY

LF-25 is located in the east-central portion of Cannon AFB, bounded by a road leading to the ordnance area to the north, a road leading to the north side of Playa Lake to the south, the ordnance area to the east, and a perimeter road to the west. The landfill is nearly rectangular in shape, measuring approximately 29 acres, with dimensions approximately 650 feet (ft) by 1,950 ft (Figure 2-2).

From about 1945 through the 1980s, LF-25 was used as a waste disposal site; it is unknown when disposal activities ceased. After World War II, construction demolition debris was disposed of in the landfill. The debris consists of concrete, wood, asbestos tiles, metal, asbestos/cement pipe, and asphalt mixed with soil. Concrete pieces of various sizes and shapes are from demolition of buildings and pavement (runways) at Cannon AFB. Debris extends approximately 3 to 4 ft above natural grade over most of the site, reaching a maximum of approximately 15 ft above natural grade at the north end of the site.

LF-25 was investigated during the Phase IV investigation of an adjacent SWMU. Information from the investigation involved minimal landfill sampling. Two soil borings were sampled, and low levels of





Scale Is Approximate

0 5
Miles

REMEDIAL ACTION WORK PLAN
SWMU 97--LANDFILL-25

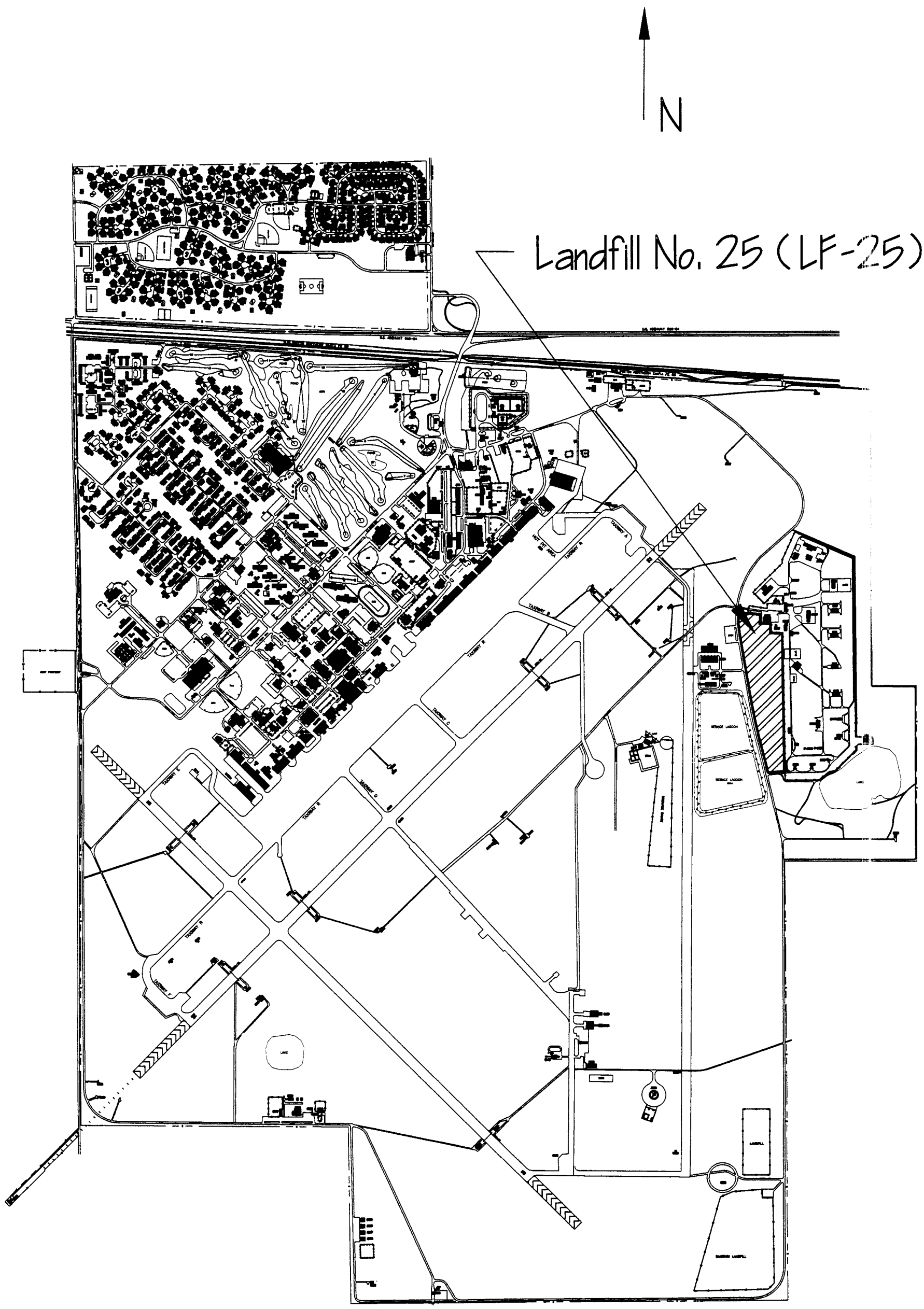
Cannon Air Force Base, New Mexico

U.S. Army Corps of Engineers, Omaha District

Figure 2-1

Base Location Map
Cannon Air Force Base, New Mexico

Foster Wheeler Environmental Corporation



REMEDIAL ACTION WORKPLAN
SWMU 97 – LANDFILL NO. 25

Cannon Air Force Base, New Mexico

U.S. Army Corps of Engineers, Omaha District

Figure 2–2
Location of Landfill No. 25

Foster Wheeler Environmental Corporation
July 5, 2000

pesticides were detected at shallow depths. In 1992, metals concentrations below maximum contaminant levels were detected in a monitoring well sample (Woodward Clyde, 1992).

In December 1990, the USACE performed a site environmental assessment. Trenches were excavated at nine locations and waste and native soil samples were collected for laboratory analysis. Excavation revealed the majority of the material in the rubble pile was airfield paving and subgrade material. The second most prevalent waste was building demolition rubble. The third type of waste encountered was glass, metal, cinders, ash, and other burned material in what appeared to be burn trenches (USACE, 1991). Low level of metals (barium, mercury, and cadmium) and one semivolatile organic compound (SVOC) (benzidine) were detected in the trench samples (USACE, 1991).

In 1992, an additional site characterization was performed; 139 field samples were collected. One surface sample exceeded the soil action level for lead and one sample exceeded regulatory carcinogenic action levels for benzo(a)pyrene and benzo(b)fluoranthene. All organic results were below regulatory noncarcinogenic soil action levels.

3.0 PROJECT IMPLEMENTATION PLAN/SCOPE OF WORK

This section provides the details for supporting on-site and off-site activities including Base access and site security, mobilization, construction activities, and demobilization.

3.1 BASE ACCESS AND SECURITY

Contractor and subcontractor vehicles will access the site via the Base main gate. Vehicles will only use improved roads and will not enter secure areas without receiving prior clearance. Vehicle passes valid for the project duration will be issued to Foster Wheeler Environmental personnel, subcontractors, and vendors. A valid driver's license, proof of vehicle insurance, and valid vehicle registration will be required to obtain a pass. The site security consists of procedures, structures, and personnel provided by Cannon AFB at the Base perimeter.

3.2 ON-SITE SUPPORT ACTIVITIES

On-site activities will include the following:

- Project kickoff meeting
- Preconstruction site survey
- Mobilization
- Tree trimming and removal
- ACM removal and construction of access roads
- Grading and drainage construction
- Separation and crushing of exposed concrete
- Site restoration and revegetation
- Demobilization
- Field engineering
- Health and safety monitoring

3.2.1 Project Kickoff Meeting

Foster Wheeler Environmental will conduct a project kickoff meeting at the Base prior to initiation of construction with participation from Foster Wheeler Environmental, USACE, Cannon AFB, and key subcontractor personnel. The conference agenda includes:

- Introductions, roles, and responsibilities
- Project scope
- Construction schedule
- Mobilization logistics
- Schedule coordination

- Quality assurance/quality control (QA/QC) requirements
- Review of the Base-Wide HASP and project-specific health and safety requirements
- Potential changes and substitutions based on site conditions at the time of the field program
- Other business related to field activities

The agenda will be formalized prior to the project kickoff meeting.

3.2.2 Preconstruction Site Survey

A preconstruction site survey will be performed to identify general locations of concrete debris, plan access routes and staging areas, and for engineering purposes related to additional design efforts (i.e., grading, drainage, etc.).

3.2.3 Mobilization

Mobilization will consist of logistical planning and a personnel orientation meeting prior to startup of field activities. This meeting will include a site-specific health and safety briefing that covers planned operations, site hazards and procedures, a review of the SSHP (Appendix C), and training in pollution prevention and waste minimization procedures.

Utility Clearance

Cannon AFB will provide utility clearance for the construction sites. Foster Wheeler Environmental will notify Cannon AFB a minimum of 7 days prior to mobilization.

Staging and Storage Areas

Staging and storage areas will be determined at the project kickoff meeting. These areas will be used for storage of equipment and supplies, maintenance operations, and general construction administration.

Miscellaneous Site Preparation

Construction and health and safety personnel will establish work zones for the project in accordance with the SSHP.

3.2.4 Construction Activities

The following subsections describe the construction activities that will be performed at the landfill.

Tree Trimming and Removal

Heavy equipment will be used to construct access roads into the landfill to allow removal and transport of exposed concrete debris and rubble. Trees and limbs will be trimmed and/or removed and subsequently disposed of by burial on site. The removal and trimming of trees will be minimized to the extent possible.

Figure 3-1 presents a preliminary schematic diagram of the access roads planned for construction during the RA field program.

ACM Removal Activities

Subcontractor asbestos removal personnel will conduct a field reconnaissance to visually identify ACM. The exposed ACM will be removed by hand or light equipment and placed in appropriate containers. The ACM will be bagged and transported to a certified landfill for disposal.

Grading and Drainage Construction

Heavy equipment will be used to construct drainage control channels to direct stormwater to the southeast corner of the landfill. Additionally, temporary soil erosion and sediment control measures will be installed (i.e., straw bales and silt fences) to prevent the sedimentation of off-site areas from stormwater runoff.

Separate and Haul Concrete

Heavy equipment will be used to separate clean, salvageable, exposed concrete, which will then be moved to access points for transportation (via wheel loaders) to the crusher. Pieces that cannot be easily transported will be buried in the landfill. No excavation of material will be performed. The concrete will be stockpiled at the crusher.

Concrete Crushing

The stockpiled concrete will be "sized" with an excavator and a pulverizer attachment, which will also aid in removing any rebar. Rebar will be stockpiled for transport and disposal at an off-site location. The sized concrete will be loaded into the screening/crushing unit, and the finish material (4 inches or smaller) will be stockpiled on site for future use at another location.

Native Soil Cover/Debris Consolidation

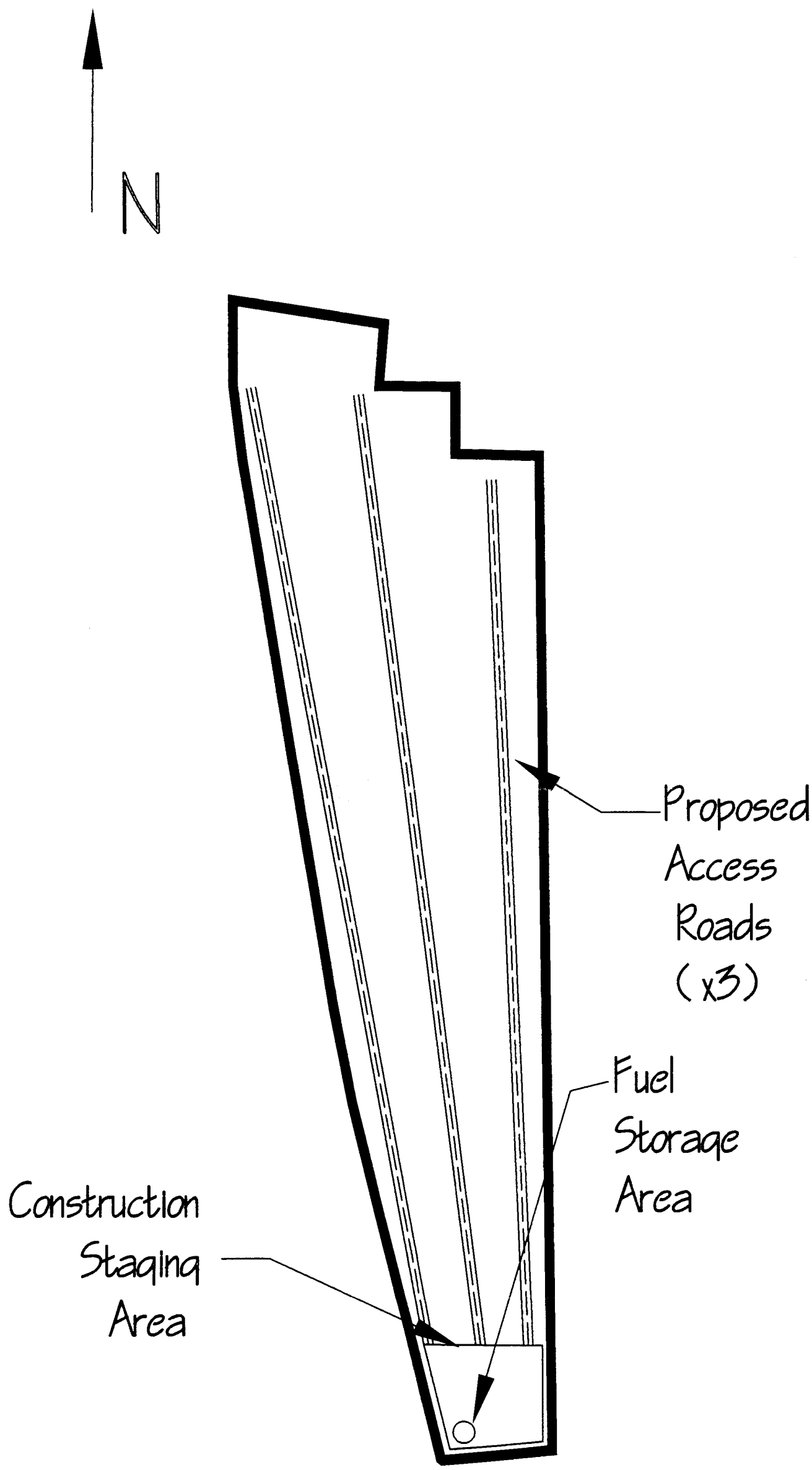
The remaining concrete and debris will be consolidated to the extent practical by heavy equipment. A 6inch minimum soil cover will be placed on top of the debris. The area is estimated to be 10 acres.

Fill Material

Upon approval from USACE and Cannon AFB, available on-site soil material or clean material from an off-site supply will be placed and compacted atop the concrete rubble using existing equipment.

Site Revegetation

The entire site will be revegetated (seeded) and mulched with native grasses using an approved seed mix. Compost from Cannon AFB will be used as mulch.



REMEDIAL ACTION WORKPLAN
SWMU 97 – LANDFILL NO. 25

Cannon Air Force Base, New Mexico

U.S. Army Corps of Engineers, Omaha District

Figure 3–1 Site Plan Map

Foster Wheeler Environmental Corporation
July 5, 2000

0 250 ft. 500 ft.

Scale: 1 inch = 250 ft.

Site Restoration Activities

The landfill access roads will remain in-place after the RA field program.

3.2.5 Demobilization

Demobilization activities will include site cleanup, trash disposal, personnel and equipment demobilization, and field records organization. USACE and Cannon AFB will be briefed on the anticipated completion of field activities prior to the demobilization of the site and the departure of field personnel.

3.2.6 Field Engineering and Quality Control

Field engineering will be performed under the direction of the Site Construction Manager. QC inspections will be conducted, and field change requests, design change notices, and nonconformance notices will be used to document discrepancies between constructed elements and associated drawings or specifications. In addition, daily quality control reports (DQCRs) documenting construction activities will be completed and maintained and the approximate locations of the construction area incorporated into the as-constructed drawings.

3.2.7 Health and Safety

Health and safety activities will be conducted in accordance with the SSHP (Appendix C); Cannon AFB Base-Wide HASP (Foster Wheeler Environmental, 2000); Foster Wheeler Corporate Health and Safety Program; and USACE Safety and Health Requirements Manual (EM 385-1-1) (1996). All site workers, including subcontractors, will review and comply with the project health and safety requirements and procedures.

3.3 OFF-SITE SUPPORT ACTIVITIES

The Delivery Order (DO) Manager will oversee the entire project from the Albuquerque, New Mexico, office. The Site Construction Manager will serve as the point of contact for all inquiries from the project engineering staff regarding field design and construction efforts. All personnel will comply with Foster Wheeler Environmental corporate procedures and applicable professional standards.

Additional project staff will provide the following administrative support functions:

- Procurement Specialist—Procures subcontractors, equipment, and material
- Contract Compliance Administrator—Assists project management with all issues pertaining to contract compliance
- Regulatory Compliance Specialist—Oversees permits and regulatory requirements as described in the Regulatory Compliance Plan (RCP), Section 4 of this Work Plan

- Project Environmental Safety Manager—Monitors the project-specific health and safety program
- Foster Wheeler Environmental Corporate Environmental Safety Supervisor (ESS)—Evaluates all issues regarding corporate, regulatory, health and safety, and project compliance

During the project, Foster Wheeler Environmental personnel from the Denver and Albuquerque offices may be required to visit the site to provide routine inspection and technical assistance. Visits and inspections will be coordinated through the DO Manager according to project needs.

3.4 FIELD SAMPLING ACTIVITIES

Soil samples will be collected for the verification of uncontaminated clean borrow material in accordance with the standard operating procedures presented in Appendix A. If a certification of analysis is provided by the borrow source, only one composite soil sample will be analyzed for verification.

3.4.1 Soil Sampling

Eight composite soil samples, one per 1,000 cubic yard (cu yd) of borrow material, will be collected from the borrow source. One duplicate sample will be collected and analyzed for the same parameters as the composite soil sample. Soil samples will be collected from the borrow source stockpile at the start of field activities and will be submitted to the subcontractor laboratory for the following chemical analyses:

- TCLP RCRA Metals (toxicity characteristic leaching procedure [TCLP] extraction, Method 1311):
  - Barium, cadmium, chromium, silver, arsenic, lead, and selenium (Method 6010B)
  - Mercury (Method 7470A)
- Volatile Organic Compounds (VOCs) (Methods 5035/8260B)
- SVOCs (Methods 3545/8270C)
- Pesticides (Methods 3550/8081A)
- Herbicides (Methods 3550/8151A)
- Total Recoverable Petroleum Hydrocarbons (TRPH) (Methods 9071/418.1)

3.4.2 Sample Identification Numbers

Each soil sample will be uniquely identified by both a field and laboratory sample identification number. The field leader will assign a sample number using a 10-character alphanumeric string. The sample-numbering scheme to be used will contain a sample location reference, matrix identifier, and a flag identifying the sample as a representative or QA/QC sample. An example of a field sample identification number is presented below:

Sample Identification Number: C097CS0101

C097 Cannon AFB SWMU 97

CS01 Composite sample 01

Representative environmental samples will be identified using the following codes:

01 Chemical soil sample

02 Field duplicate sample

3.4.3 Documentation

Documentation of the verification of clean borrow material will be submitted to USACE and Cannon AFB prior to stockpiling borrow material on site.

4.0 REGULATORY COMPLIANCE PLAN

The RCP was developed specifically to identify the regulatory requirements applicable to the asbestos removal and concrete crushing activities for LF-25 at Cannon AFB.

4.1 REGULATORY FRAMEWORK

Cannon AFB is conducting an Installation Restoration Program (IRP) at the Base, which was initially managed under the United States Air Force (USAF) IRP. The IRP was subsequently integrated with the U.S. Environmental Protection Agency (EPA) Resource Conservation and Recovery Act (RCRA) corrective action program. This site has been included under the Base's IRP as IRP Site LF-25 and is designated SWMU 97. IRP activities are implemented in accordance with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and response procedures consistent with the National Contingency Plan. Under CERCLA, Executive Order 12580, and the Defense Restoration Program (10 United States Code Section 2701, *et seq.*), the Department of Defense has delegated USAF "lead agency" in responding to hazardous substance and other pollutant and contaminant releases. Because this project is under the IRP, there is certain flexibility regarding permitting and waste management. Specifically, no federal, state, or local permits are required for on-site response actions conducted pursuant to CERCLA. The term "on-site" means the real extent of contamination and all suitable areas in very close proximity to the contamination necessary for implementation of the response action. The planned construction activities involve removing exposed ACM and surficial construction debris and covering exposed areas of the landfill with clean fill, but no movement or disturbance of subsurface refuse material is anticipated.

4.1.1 Permit Requirements

Surface Disturbance/Demolition Permit—20 New Mexico Administrative Code (NMAC) 11 Part 20, Subpart II addresses airborne particulate matter and, specifically in this case, surface disturbance. The regulation as applied to soil indicates that, except for an area zoned for agriculture that grows a crop, no responsible party shall engage in an activity disturbing 0.75 acres (32,670 square feet) or more of surface area if the activity may result in transported material or particulate matter becoming airborne without having a valid New Mexico Environment Department (NMED) Surface Disturbance/Demolition permit. If the applicant and NMED agree, the permit application and any resulting programmatic permit may include multiple locations if the surface disturbance activities are similar. An application for a permit shall be made on forms provided by NMED and shall include a particulate matter control plan. Within 10 days of receiving the completed permit application, NMED shall grant or deny the permit. Because

LF 25 is an IRP-designated site, a permit equivalency will be required for a Surface Disturbance/Demolition Permit. Cannon AFB will be listed on the application as the applicant.

National Pollutant Discharge Elimination System Stormwater Construction Permit—Title 40 of the Code of Federal Regulations (CFR) 122.26 requires a National Pollutant Discharge Elimination System (NPDES) permit for construction activity, including clearing, grading, and excavation activities, except for operations that result in the disturbance of less than 5 acres of total land area and are not part of a larger common plan of development or sale. The actual construction area for this project is greater than 5 acres; consequently, an NPDES construction permit or a Notice of Intent (NOI) to discharge is required. At this time, Cannon AFB is preparing an NOI. The Stormwater Pollution Prevention Plan (SWPPP) has been prepared and is provided as Appendix E to the RA Work Plan. The SWPPP addresses surface water discharges and runon and runoff control resulting from project construction activities. The waste management practices described herein are based on data generated during previous site assessments of this unit.

Bulk Storage User Permit—Section 7-16, A-8 of the New Mexico Special Fuels Supplier Tax Act requires a Special Bulk Storage User Permit in order to avoid excise tax. Fuel must be used for nonhighway purposes only.

4.1.2 Regulated Site Activities

The following actions are addressed in this RA Work Plan and are applicable to the planned construction activities:

- Constructing stormwater controls
- Constructing temporary facilities
- Applying water for dust control on crushing/screening equipment
- Maintaining spill control materials
- Placing and compacting clean soil on top of the processed materials to create a final soil cover of a minimum of 4 to 6 inches
- Revegetating the final cover
- Removing ACM

4.1.3 Regulatory Requirements

Project activities are expected to generate nonhazardous solid waste (trash, grubbing and cleaning waste, and excess construction materials, such as reinforcement steel from concrete rubble processing). New Mexico-regulated special waste in the form of ACM and possibly petroleum-contaminated soil (PCS),

resulting from equipment leaks, will be generated during site activities. As such, the following federal and state regulations are applicable and must be complied with during implementation of planned project activities:

- 40 CFR Part 61, Subpart M, Regulations for Asbestos Containing Material
- 40 CFR Parts 190–259, *EPA Regulations for Solid Waste*
- 40 CFR Parts 260–299, *EPA Regulations for Identification and Management of Hazardous Waste*
- 40 CFR 122, *National Pollution Discharge Elimination System SWPPP Requirements* (Appendix E)
- 49 CFR Parts 100–178, *Department of Transportation (DOT) Rules For Hazardous Materials Transport*
- New Mexico Solid Waste Management Regulations (SWMR)
- New Mexico Hazardous Waste Management Regulations (HWMR)
- New Mexico Air Quality Control Regulations
- New Mexico Water Quality Control Commission Regulations

4.2 PROJECT WASTE DESCRIPTIONS

This section identifies the types of waste streams that are anticipated during remedial activities and describes how the waste is to be managed. Potential waste streams associated with the construction activities can be categorized as follows:

- ACM debris
- Concrete debris (curbing, runway pavement, etc.)
- Demolition debris
- Personal protective equipment

These waste streams and their ultimate disposal are described in the following subsections.

4.2.1 Asbestos-Containing Material Debris

ACM will be handled in accordance with state and federal regulations. During handling operations, care will be taken to minimize dust generation. ACM will be wetted to minimize dust generation during handling and bagging operations, prior to disposal at a permitted disposal facility.

4.2.2 Concrete Debris

Concrete curbs, pavement, and foundations will be stockpiled and crushed to 4 inches or smaller. This material will be stockpiled on site for future use at another site.

4.2.3 Demobilization Debris

Any materials remaining from demobilization activities will be disposed of as general trash in a commercial dumpster.

4.2.4 Personal Protective Equipment

Protective clothing and sampling equipment will be disposed of as general trash. Trash will be collected on a daily basis in plastic garbage bags and disposed of in a designated dumpster on Base.

4.3 WASTE MANAGEMENT ACTIVITIES

Waste streams are characterized either by sampling and analysis or by using process knowledge in accordance with the New Mexico SWMR 20 NMAC 9.1, and HWMR 20 NMAC 4.1. These regulations require the generator to determine if a solid waste is a New Mexico special waste or a listed or characteristic hazardous waste. Identification of ACM will be based on generator knowledge of materials placed in the landfill and visual inspection of the exposed material.

4.3.1 Waste Minimization

To minimize the volume of waste generated and to ensure that no materials are brought on site that would result in the generation of hazardous waste, the following techniques will be used during field activities:

- Do not contaminate materials unnecessarily
  - Plan work in advanced and on the base procedure to be used.
  - Take only the material (i.e., chemicals) needed to perform the activity. Additional material can be brought to the work location if necessary.
  - Transport materials in the smallest reasonable container. Materials can be stored in larger containers until transport.
  - Maintain or construct prefabricated materials, barriers, support equipment, etc., outside potentially contaminated areas.
  - Separate hazardous waste by waste type; do not mix.
  - Use drop cloths or other absorbent material to contain small spills or leaks.
  - Avoid a bellows effect when double-bagging contaminated materials.
  - Use containers to minimize contamination.
  - Do not place contaminated materials with clean materials.
- Use volume reduction techniques when practicable.
  - Verify that waste containers are solidly packed to minimize the number of containers.
  - Use only the size of container to meet needs (i.e., do not use a drum or garbage can when a small polyethylene bag will do).

4.3.2 Waste Containerization and Storage

Containers for the temporary storage and disposal of ACM will meet the requirements specified in 49 CFR Part 173.216.

Prior to ACM field activities, the Construction Site Manager, in conjunction with Cannon AFB personnel, will select areas for the temporary staging and storage of nonregulated debris.

4.4 REPORTING SPILLS AND RELEASES

Precautions will be taken to prevent oil and fuel spills, including daily inspection of equipment, structure(s), and containers by site personnel. In the event of a spill or release, the procedures specified in the Spill Prevention Control and Countermeasures Plan (SPCC), Appendix D, will be followed.

4.5 TRAINING/CERTIFICATION REQUIREMENTS

Employees will be trained in the applicable Foster Wheeler Environmental Compliance Policies and Procedures. The Occupational Safety and Health Administration training and certification requirements are contained in the SSHP (Appendix C) and in the Base-Wide HASP.

4.6 DOCUMENTATION AND RECORDS RETENTION

This section presents project requirements relating to documentation and records.

4.6.1 Documentation

The information contained in this section applies to all waste managed during project activities. Field records will be kept in a bound, numbered field notebook. Information to be recorded includes, but is not limited to, the following:

- Description of waste-generating activities
- Location of waste generation (including depth, if applicable)
- Type of waste
- Date and time of generation
- Name of person recording information
- Name of field manager at time of generation and at time of disposal
- Test results
- Inspection logs, if applicable
- Waste documentation, including:
  - Waste profile sheets
  - Land Disposal Restriction (LDR) certification
  - Hazardous waste manifest
  - Trip tickets or bills of lading
  - Copies of any state or local permits or approvals

4.6.1.1 Transportation

Foster Wheeler Environmental personnel will prepare all transportation documents for ACM, which will be reviewed and signed by Cannon AFB officials. Transportation documentation will comply with DOT regulations 49 CFR 100–178 and 40 CFR Part 61, Subpart M. Prior to off-site transport, containers will be marked, labeled, and/or placarded. Other documentation includes treatment, storage, and disposal facility (TSDF) waste profile sheets, LDR notifications, waste manifests, and shipping documents.

Waste transporters will be registered with NMED and approved by the Base and in accordance with Foster Wheeler Environmental procedures for TSDF and transporter approvals.

4.6.1.2 Hazardous and Special Waste Manifests and LDR Certification

All transported hazardous waste will be accompanied by a Hazardous Waste Manifest. Since New Mexico does not provide a standard state manifest, the manifest of the receiving state must be used. If the receiving state does not have a manifest, a Uniform Hazardous Waste Manifest may be used. Cannon AFB personnel will be responsible for reviewing and signing all waste documentation, including waste profiles, manifests, and LDR notifications (manifest packages). Prior to signing the manifest, the designated Cannon AFB official will ensure that pretransport requirements of packaging, labeling, marking, and placarding are met according to 40 CFR 262.30–262.33 and 49 CFR 100–178.

For special waste, a manifest containing the following information will accompany each load originating from or to be disposed of in New Mexico, as specified in 20 NMAC 9.1, Subpart VII 702.C:

- Name, address, and telephone number of the generator
- Name, address, and telephone number of any and all transporters in the order each will be transporting the waste
- Name, site address, telephone number, and identification number of the solid waste facility to which the waste is to be delivered
- Type and proper name of waste being shipped
- Total weight or volume of waste prior to shipment from generator
- Total weight or volume of waste received at solid waste facility
- Type and number of containers in shipment
- Any special handling instructions
- Date and location the waste was delivered
- Date of receipt from the generator and total weight or volume of the special waste, to be provided by the transporter

If more than one transporter is used, each transporter will provide the date of receipt and total weight or volume of waste received from the previous transporter.

The manifest will be signed by the Cannon AFB personnel, each transporter of the special waste, and the solid waste facility operator. All signatories will be duly authorized agents of their organizations. Significant discrepancies will be reported to the NMED Solid Waste Bureau within 24 hours of discovery.

One manifest copy will be retained at Cannon AFB; the remaining copies are for the transporter. The manifest will be returned to the Cannon AFB signatory official for record retention.

Copies of all waste manifests will be kept in a central project file. Cannon AFB will forward a copy to NMED.

An LDR form will accompany the shipment of hazardous waste to the TSDF. The TSDF must be notified before waste is transported. All waste shipments must include a LDR form and the following:

- EPA and New Mexico Hazardous Waste Generator ID number (provided by Cannon AFB)
- Manifest number, including state disposal application number
- Waste analysis data
- If the waste is also restricted, corresponding concentration-based or technology-based treatment standards or prohibition

4.7 UPDATING THE REGULATORY COMPLIANCE PLAN

The RCP will be updated if changes in site activities or changes in applicable regulations occur.

5.0 QUALITY ASSURANCE PROJECT PLAN

This Quality Assurance Project Plan (QAPP) was prepared to follow the format provided in the General Chemistry Supplement to the Scope of Services for Studies (USACE, 1997). The designations in parentheses following the section titles correspond to the designation found in the above-referenced document

5.1 TABLE OF CONTENTS (A2)

The Table of Contents for the QAPP is contained within the Table of Contents for this RA Work Plan.

5.2 DISTRIBUTION LIST (A3)

The distribution list is indicated on the transmittal letter for the submittal of this RA Work Plan.

5.3 PROJECT ORGANIZATION AND RESPONSIBILITIES (A4)

The Foster Wheeler Environmental Project Chemist is responsible for oversight of laboratory performance and for validation of the analytical data. The analytical laboratory will provide chemical analytical services and will be responsible for the overall laboratory performance and the implementation of the project analytical requirements.

The DO Manager and the ESS will ensure that sampling is conducted in accordance with prescribed procedures. All changes and variances to the Work Plan will be documented and provided to the Foster Wheeler Environmental Project QA Manager and the DO Manager for concurrence.

5.4 PROBLEM BACKGROUND/DEFINITION (A5)

To assure clean backfill is being placed in the landfill, all imported borrow material will be tested for chemical contamination. One composite sample will be taken per 1,000 cu yd of the borrow source.

5.5 PROJECT DESCRIPTION (A6)

This QAPP has been prepared to address the specific chemical QA requirements for sampling and analysis conducted during the RA at LF-25. A description of the scope of work is contained in Section 3.

5.6 QUALITY OBJECTIVES (A7)

5.6.1 Data Quality Objectives

The data quality objectives (DQOs) for this project are described in the USACE Scope of Services, January 26, 2000, and include the following:

- Collecting one composite soil sample per 1,000 cu yd of borrow source material. The sample will be collected from representative stockpile locations.
- Collecting one duplicate soil sample.

5.6.2 Analytical Support Levels

The analytical support levels include screening and definitive data levels as determined by the project DQOs. Definitive data will be generated by the off-site analytical laboratory for the chemical analyses of the soil samples. Screening-level data will be generated during sampling activities in accordance with the SSHP.

5.6.3 Data Quality Indicators

Analytical methods will be performed in accordance with EPA SW-846, Test Methods for Evaluating Solid Waste (EPA, 1986 and Updates) and EPA Methods for Chemical Analysis of Water and Waste (EPA, 1979).

5.6.4 Level of Field Quality Control Effort

One field duplicate soil sample will be collected and sent to the analytical laboratory for VOCs, SVOCs, pesticides, herbicides, TRPH, and TCLP RCRA metals.

5.7 PROJECT NARRATIVE (A8)

Information required for the project narrative is contained throughout this RA Work Plan.

5.8 SPECIAL VALIDATION (A9)

The analytical laboratory chosen will be validated by the USACE Chemistry Quality Assurance Branch Laboratory of the Waterways Experimentation Station to perform the analytical methods required for this project.

5.9 DOCUMENTATION AND RECORDS (A10)

Documentation and records generated during this project and the associated submittal schedule will consist of the following:

- Health and Safety Records and Field Logbooks—Maintained in the Foster Wheeler Environmental project files.
- Daily Quality Control Reports—Submitted daily to USACE Project Manager and weekly to the Cannon AFB point of contact.
- Definitive Level Analytical Data Packages—Submitted by the analytical laboratory to the Foster Wheeler Environmental Project Chemist within 28 working days of sample receipt; data summary forms will be submitted to USACE with the RA Completion Report.
- If there are any problems encountered during the field investigation, the DQCRs should be transmitted to the USACE Project Manager on a daily basis.

Additional documentation consisting of the field sampling logbooks will be maintained in the project files.

5.10 SAMPLING DESIGN PROCESS (B1)

The design of data collection operations is presented in the USACE Scope of Services, January 26, 2000.

5.11 SAMPLING METHOD REQUIREMENTS (B2)

Sampling procedures for collection of soil samples are provided in Appendix A of this plan.

5.12 SAMPLE HANDLING AND CUSTODY REQUIREMENTS (B3)

Sample handling and custody requirements are contained in corporate procedure SCI-004, Sample Preservation, Chain of Custody, Packaging and Shipping. This procedure provides detailed information for sample labeling, preservation, handling and shipping, documentation and tracking, and the chain-of-custody (C-O-C) form. Examples of the sample tag and custody seal, and C-O-C form are illustrated in Figures 5-1 and 5-2, respectively. Sample containers, preservation requirements, and holding times are presented in Table 5-1.

Soil samples received at the analytical laboratory will be documented and logged into its Laboratory Information Management System (LIMS). Each sample will be assigned a work order sample number, and a label with this information will be attached to each sample container.

Table 5-1. Sample Container, Preservation, and Holding Time Requirements for Soil Samples

Parameter	Container[1]	Preservation[2]	Maximum Holding Times[3] Extraction	Analysis
Metals/mercury	1 8-oz glass jar	Ice to 4°C	--	180/28 day
Pesticides	1 8-oz glass jar	Ice to 4°C	14 days	40 days
Herbicides	1 8-oz glass jar	Ice to 4°C	14 days	40 days
VOCs	EnCore™ sampler [4] 4-oz glass jar	Ice to 4°C	--	14 days
SVOCs	1 8-oz glass jar	Ice to 4°C	14 days	40 days
TRPH	1 8-oz glass jar	Ice to 4°C	--	28 days

1 All containers must have Teflon®-lined lids.
2 Sample preservation will be performed in the field immediately upon sample collection.
3 When only one holding time is given, it implies total holding time from sampling until analysis.
4 Alternative VOC sample collection procedure will be Method 5030, field preservation with methanol.

°C degrees Celsius
oz ounce
SVOC semivolatile organic compound
TRPH total recoverable petroleum hydrocarbons
VOC volatile organic compound

Figure 5-1

FOSTER WHEELER ENVIRONMENTAL CORPORATION
SAMPLE LABEL (TYPICAL)

SAMPLE NO.:_____
PROJECT:_____
DATE:____/____/____ **TIME:**_____**HRS**_____
MEDIUM: **WATER**_____ **SOIL**_____ **SEDIMENT**_____
OTHER_____**(Specify)**
TYPE: **GRAB**_____ **COMPOSITE**_____ **OTHER**_____
PRESERVATION:_____**pH:**_____
ANALYSIS:_____
SAMPLED BY:_____
LAB NO.:_____
REMARKS:_____
_____

CUSTODY SEAL (TYPICAL)

CUSTODY SEAL
Person Collecting Sample:_____ Sample No.:_____
(Signature)
Date Collected:_____ Time_____
Collected:_____

Figure 5-2

FOSTER WHEELER ENVIRONMENTAL CORPORATION
CHAIN OF CUSTODY RECORD

PROJECT

SAMPLERS: (Signature)

SAMPLE NUMBER	DATE	TIME	COMP.	GRAB	NO. CONTAINERS											REMARKS OR SAMPLE LOCATION	PRESERVATION: ICED	PRESERVATION: SPECIFY CHEMICALS ADDED AND FINAL pH IF KNOWN

Relinquished by: (Signature) 1	Date / Time	Received by: (Signature)	Relinquished by: (Signature) 4	Date / Time	Shipped via:
Relinquished by: (Signature) 2	Date / Time	Received by: (Signature)	Received for Laboratory by: (Signature)	Date / Time	Shipping Ticket No.
Relinquished by: (Signature) 3	Date / Time	Received by: (Signature)	Remarks		

The date and time of sample receipt, as well as comment on the sample and container disposition, are recorded on the sample receipt forms. Sample custody is tracked from the point of entry into the laboratory system until time of disposal and time the samples are checked into and out of secure storage areas by authorized personnel.

5.13 ANALYTICAL METHODS REQUIREMENTS (B4)

The methods and procedures that will be used to prepare and analyze samples are summarized in Table 5-2. Chemical analyses will be performed according to EPA SW-846, Test Methods for Evaluating Solid Waste (1986), and EPA Methods for Chemical Analysis of Water and Waste (1979).

The laboratory will perform instrument-specific demonstration of capability and method detection limit (MDL) studies to verify that project-specific practical quantitation limits can be met. Analyses will be performed only on instruments with valid and current MDL studies.

5.14 QUALITY CONTROL REQUIREMENTS (B5)

One field duplicate sample will be collected during the course of the RA backfill and grading effort and will be analyzed for the same parameters as the associated field samples. In addition to the field duplicate sample, the analytical laboratory will analyze method-specific quality control samples (i.e., duplicates and spike samples).

The Laboratory QA Manager will be responsible for identifying nonconforming conditions in the laboratory. All nonconforming conditions and recommended corrective actions will immediately be reported to the Project Chemist and the Project QA Manager.

Table 5-2. Analytical Procedures for the Remedial Action at LF-25

Parameter	Technique	Extraction/Analysis Method
VOCs	GC/MS	5035/8260B
Pesticides	GC/ECD	3550/8081A
Herbicides	GC/ECD	3550/8151A
SVOCs	GC/MS	3545/8270C
TRPH	IR	9071/418.1
TCLP– Metals	ICPES/CVAA	1311/6010B/7470A

CVAA cold vapor atomic absorption
GC/MS gas chromatography mass spectrometry
GC/ECD gas chromatography/electron capture detector
ICPES inductively coupled plasma emission spectroscopy
IR infrared spectroscopy
Method EPA SW-846, Test Methods for Evaluating Solid Waste, Third Edition (1986); EPA Methods for Chemical Analysis of Water and Waste (1979); American Society for Testing and Materials (1997, 1998)
SVOC semivolatile organic compound
TCLP toxicity characteristic leaching procedure
TRPH total recoverable petroleum hydrocarbon
VOC volatile organic compound

The analytical laboratory will perform sample analysis in accordance with its internal QA program, including periodic review and inspection of laboratory procedures, followed by reports to management. The Laboratory QA Manager performs these reviews. The audits are used to ensure proper use of measurement systems, evaluate accuracy of analytical procedures, and assure the laboratory is adhering to policies and procedures.

5.15 INSTRUMENT/EQUIPMENT TESTING AND MAINTENANCE REQUIREMENTS (B6)

Prior to sampling and analysis, all field and laboratory instruments will be tested to ensure proper functioning. The laboratory will perform maintenance on all instruments according to an established schedule or based on the manufacturers' recommendations.

5.16 INSTRUMENT CALIBRATION (B7)

Instrument calibration for health and safety monitoring is discussed in the SSHP (Appendix C).

5.17 INSPECTION/ACCEPTANCE REQUIREMENTS FOR SUPPLIES (B8)

Level I certified sample containers will be used for collection of field samples for chemical analysis. The off-site laboratory will provide these containers.

The analytical laboratory will obtain all standard solutions for analytical testing from reliable sources and prepare these standards with calibrated glassware. Where possible, standards are used that are traceable to the National Institute of Standards and Technology through the stock standard supplier and the laboratory's internal system of standards tracking.

5.18 DATA ACQUISITION REQUIREMENTS (B9)

Data collection requirements were specified by the USACE Scope of Services, January 26, 2000.

5.19 DATA MANAGEMENT (B10)

Definitive data deliverables are required for this project for the off-site laboratory analysis. Hard copies of the data deliverables will be provided to Foster Wheeler Environmental within 28 days of receipt of samples at the laboratory. The following information is to be included in the hardcopy data deliverables:

- Case narrative—associated analytical problems or deviations
- C-O-C documentation and sample receipt forms
- Sample results
- Holding time information
- Initial and continuing calibration information
- Method blank summary
- Laboratory control sample summary
- Matrix spike/matrix spike duplicate summary
- Laboratory duplicate sample summary
- Surrogate percent recovery data
- Inductively coupled plasma interference check sample results
- Second column confirmation data (organochlorine pesticides and polychlorinated biphenols)
- Raw instrument data

5.20 ASSESSMENT/OVERSIGHT (C)

The Laboratory QA Manager will conduct laboratory oversight as described in the QA Plan. Any deficiencies noted during inspection that require corrective action will be documented in a nonconformance report generated by the laboratory and provided to the Foster Wheeler Environmental Project Chemist. Foster Wheeler Environmental will not perform an audit of the analytical laboratory in

support of the RA at LF-25 sampling event. Foster Wheeler Environmental will perform oversight of field activities, including an audit and inspection of site activities during the field program.

5.21 DATA VALIDATION AND USABILITY (D)

The Foster Wheeler Environmental Project Chemist or designee will validate analytical data generated by the analytical laboratory. This validation will be in accordance with the EPA Contract Laboratory Program National Functional Guidelines for Inorganic and Organic Data Review (1994b, 1994c) and will include a review of the following criteria:

- Data and deliverable completeness
- Extraction and analysis holding times
- Blank data (method, equipment)
- System monitoring compound data
- Laboratory control sample recoveries
- Matrix spike/matrix spike duplicate recoveries
- Laboratory duplicate sample data
- Field duplicate sample relative percent difference

A brief summary of data usability will be included with the RA Completion Report.

Section 5.0 (A1) - Quality Assurance Project Plan

Title and Approval Sheet

for

Remedial Action at LF-25
Quality Assurance Project Plan
Cannon AFB, NM

Prepared by:

Foster Wheeler Environmental Corporation
6605 Uptown Blvd NE, Ste 220
Albuquerque, NM 87110

Foster Wheeler Environmental Corporation Approval:

_____ _____
Carol Bieniulis Date
Delivery Order Manager

_____ _____
Deborah Wilson Date
Project Quality Assurance Manager

_____ _____
Pam Moss Date
Project Chemist

6.0 PROJECT MANAGEMENT

6.1 PROJECT TEAM

Figure 6-1 depicts the proposed project team for the RA for LF-25. The key parties for this project are the Cannon AFB, USACE Omaha District, and Foster Wheeler Environmental. The DO Manager, Carol Bieniulis, is responsible for the project direction. The Task Manager, Walt Migdal, is responsible for the execution of RA activities and preparation of the RA Completion Report. The Project Engineer is Derek Johnson.

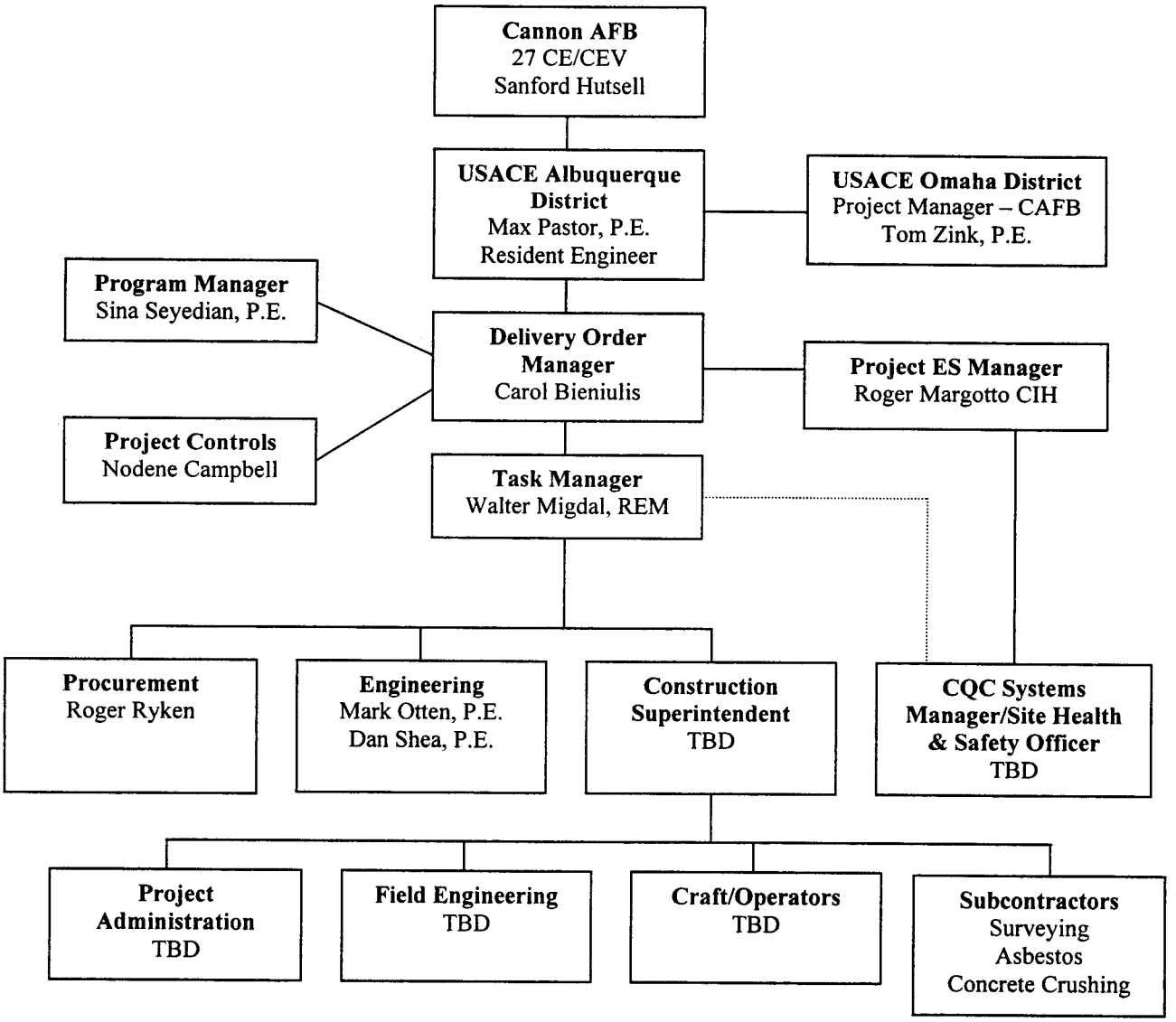
The Task Manager is the primary author of the RA Completion Report, with assistance from the Project Engineer and a multidisciplinary team comprising personnel from civil engineering, hydrogeology, chemistry, regulatory compliance, QA, and technical editing.

6.2 PROJECT SCHEDULE

A summary of the anticipated schedule to provide the RA Work Plan, draft report, and final report is presented below.

Submittal of Final RA Work Plan	July 2000
RA Field Activities	September 2000
Complete Revegetation	January 2001
Development of Draft RA Completion Report	March 2001
Submittal of Final RA Completion Report	May 2001

Figure 6-1. Project Organization Chart



7.0 REFERENCES

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1979. Methods for Chemical Analysis of Water and Waste. EPA Manual 600/4-79-020.

Foster Wheeler Environmental (Foster Wheeler Environmental Corporation)

2000. Basewide Health and Safety Plan for Cannon Air Force Base.

USACE (U.S. Army Corps of Engineers)

1997. General Chemistry Supplement to the Scope of Services for Studies. December.

1996. USACE Safety and Health Requirements Manual (EM 385-1-1).

1991. To be provided in final RA Work Plan.

Woodward Clyde

1992. Remedial Investigation Report for 18 Solid Waste Management Units. Cannon Air Force Base, Clovis, New Mexico. October.

Appendix A

Standard Operating Procedures

This appendix includes the standard operating procedures for certifying the clean soil fill material to be used during the remedial action at Solid Waste Management Unit 97, Landfill 25, at Cannon Air Force Base.

LIST OF STANDARD OPERATING PROCEDURES

SOP A-1 Composite Soil Sampling

SOP A-2 Equipment Decontamination

SOP A-3 Sample Handling and Documentation

SOP A-4 Field Preservation for Volatile Organic Compounds Using Methanol

LIST OF ACRONYMS AND ABBREVIATIONS

C-O-C	chain-of-custody
cu yd	cubic yards
DQCR	Daily Quality Control Report
FCR	Field Change Request
SOP	standard operating procedure

Standard Operating Procedure A-1
Composite Soil Sampling

PURPOSE

The following procedures apply to the collection of soil samples from the excavation area and from stockpiled soil at a facility contracted to provide clean fill material for use during remedial activities at Cannon Air Force Base. The sample jar quantities and sizes depend on the analyses being run and are detailed in Section 5.0 of the Work Plan, Tables 5-1 and 5-2.

PROCEDURE

Composite soil sampling will be accomplished as follows:

- Wear appropriate personal protective equipment as outlined in the Site-Specific Safety and Health Plan (Appendix C). In addition, samplers will don new sampling gloves at each location.
- Use decontaminated stainless steel sampling equipment for each sample collected for chemical analysis.
- Sampling equipment at each location will consist of the following:
  - Stainless steel pan (or bowl) or disposable aluminum pans (disposable aluminum pans can be used since soil samples are being analyzed for toxicity characteristic leaching procedure metals)
  - Stainless steel spoon or trowel
- For stockpiles present at the site of the source material: Composite samples will be collected at a frequency of 1 sample per 1,000 cubic yards (cu yd) of stockpiled soil. For one composite sample, collect a 4-ounce grab sample (approximately one large spoonful) from eight separate locations within each 1,000 cu yd of stockpiled soil.
- For the soil fill excavation area (if this area will be used as a source for imported fill material): One composite sample will be collected for each sidewall of the excavation area. For one composite sample, collect a 4-ounce grab sample (approximately one large spoonful) from eight separate locations within each sidewall of the excavation area.
- Empty soil into a decontaminated stainless steel or aluminum pan.
- Before soil homogenization, measure two 5-gram sample aliquots. Each aliquot will be emptied into a 40-milliliter vial containing methanol for volatile organic compound analysis.
- Homogenize sludge samples as follows: Remove any debris not considered part of the sample and thoroughly mix the remaining sample using a stainless steel spoon. The soil in the pan is scraped from the sides and bottom of the pan or bowl, rolled to the middle of the pan or bowl, and mixed. The sample is then to be quartered. Each quarter of the sample should be mixed individually, rolled to the center of the container, and the entire sample mixed again before placing into sample containers.
- Fill remaining sample container jars with soil for remaining analyses using stainless steel spatulas or spoons after homogenization of the soil, as presented above.

- Decontaminate sampling equipment according to the procedures outlined in SOP A-2. Containerize disposable sampling equipment in plastic trash bags for disposal in a designated dumpster on Base.
- Place analytical samples in sample cooler, chill to 4 degrees Celsius, and ship samples to the laboratory within 24 hours.
- Fill out field notebook, sample labels, custody seals, and chain-of-custody (C-O-C) forms for analytical samples according to the procedures outlined in SOP A-3.

Standard Operating Procedure A-2
Equipment Decontamination

PROCEDURE

Decontaminating Large Equipment

The following procedure will be used to decontaminate large pieces of equipment, such as drilling casings, auger flights, drilling pipe and rods, and portions of the drill rig that may stand directly over a boring or well location or that come into contact with casing, auger flights, pipe, or rods:

- Wash the external surfaces of equipment with high-pressure hot water and a detergent solution consisting of 4 ounces of Liquinox (or equivalent no-phosphate, laboratory-grade detergent) mixed in 10 gallons of potable water. If necessary, scrub until all visible dirt, grease, oil, loose paint, rust flakes, etc., have been removed. Also wash the inside surfaces of the casing and auger flights as described above.
- Rinse with potable water.
- Perform this decontamination procedure before equipment is used and between each sampling location.

Decontaminating Sampling Equipment

The following procedure will be used to decontaminate devices such as split-spoons, spoons, spatulas, and stainless steel bowls that come in direct contact with the samples:

- Wash and scrub with detergent solution formulated as described above.
- Rinse with potable water.
- Triple rinse with deionized, analyte-free water.
- Air dry.
- Wrap in aluminum foil.

Decontamination of sampling equipment will be kept to a minimum in the field; whenever possible, dedicated or disposable sampling equipment will be used. All large equipment will be decontaminated prior to leaving the site. Mobile or temporary decontamination stations will be constructed, as appropriate, to adequately capture and contain decontamination fluids. Decontamination fluids will be disposed as discussed in the Regulatory Compliance Plan, Section 4.0 of the RA Work Plan. If the Cannon Air Force Base decontamination pad or wash rack are available, all decontamination fluids will be disposed in this facility. Personnel directly involved in equipment decontamination will wear appropriate personal protective equipment, including nitrile gloves and safety glasses or face shield.

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Standard Operating Procedure A-3
Sample Handling and Documentation

PURPOSE

Field sample coordination activities will be in accordance with the Quality Assurance Project Plan, Section 5.0 of the Work Plan.

PROCEDURE

Labeling

All sample containers will be labeled. Labels may be partially completed prior to sample collection. The date, time, and sampler's name should **NOT** be completed until the time of sample collection. Self-adhesive sample labels containing all appropriate sample information, including sample identification, field sample number, sample type, and analyses requested, will be generated by the field sampling team. Sample labels will be completed with waterproof ink. Soil samples collected in stainless steel liners will be capped and sealed immediately following collection and a completed label attached. Sample labels should be completed and attached prior to sample collection for soil samples collected in jars.

At a minimum, each numbered label shall contain the following information:

- Project and facility
- Date and time of sample collection
- Analyses required
- Preservation used
- Sampler's initials
- Sample identification number

Sampling Containers

Certified, commercially clean sample containers will be obtained from the contract analytical laboratory. If appropriate, the bottles will be labeled by the laboratory to indicate the type of sample to be collected. Soil samples will typically be collected in glass vials, wide-mouth sample jars, or in stainless steel liners. For samples collected in stainless steel liners, the liners will be sealed by covering each end with a square of Teflon® tape and a plastic cap. Caps will be secured with electrical tape prior to affixing the sample label.

Sample Preservation

All samples will be stored on ice in an insulated cooler immediately following sample collection. Soil and sludge samples do not require additional preservation. Table 5-1 in Section 5.0 of the Work Plan lists appropriate sample containers for the specific matrix and analyses required for this project.

Sample Handling and Shipping

Sample containers will be placed in recloseable plastic storage bags and wrapped in protective packing material (if appropriate). Ice will be placed on top of the samples in a cooler for shipment to the laboratory. The drain on the cooler will be taped shut. Samples collected in glass containers will be packed in bubble packing or Styrofoam peanuts to ensure that no breakage occurs during shipment. Samples will be shipped by overnight express carrier for delivery to the analytical laboratory.

A completed chain-of-custody (C-O-C) form for each cooler will be placed in a resealable plastic bag and taped to the inside of the cooler lid. Coolers will be wrapped with strapping tape at two locations to secure lids. Dated and signed custody seals will be placed on the outside of each cooler. Note that each cooler cannot exceed the weight limit set by the shipper.

Holding Times and Analyses

The holding time is specified as the maximum allowable time between sample collection and analysis and/or extraction, Based on the analyte of interest, stability factors, and preservation methods. Allowable holding times are listed in the Work Plan (Section 5.0, Table 5-1). Samples should be sent by overnight courier service to the laboratory daily after collection.

Chemical constituents that will be analyzed during the field investigation have been identified in the Work Plan.

Sample Documentation and Tracking

This section describes documentation required in the field notes, Daily Quality Control Reports (DQCR), and sample C-O-C requirements.

Field Notes

Documentation of observations and data acquired in the field will provide information on the acquisition of samples and also provide a permanent record of field activities. The observations and data will be recorded with waterproof ink in a permanently bound weatherproof field book with consecutively numbered pages and, if applicable, on field sampling data sheets.

The information in the field book will include the following, as a minimum. Additional information is included in the specific standard operating procedures (SOPs) regarding the appropriate data sheets:

- Project name
- Location of sample and time collected
- Description of samples (matrix sampled)
- Number and volume of samples
- Sample methods or reference to the appropriate SOP
- Sample handling, including preservation, as appropriate for samples
- Field observations
- Personnel present
- Weather conditions

Changes or deletions in the field book should be lined out with a single strike mark, initialed and dated by person making the change, and remain legible. Sufficient information should be recorded to allow the sampling event to be reconstructed without relying on the collector's memory.

The person making the entry will sign each page of the field book. Anyone making entries in another person's field book will initial and date those entries.

Daily Quality Control Report

To supplement the information recorded in the field book, DQCRs will also be maintained to document daily field activities and will note any nonconformances and corrective actions taken at every sampling location. Details on the completion and submittal of DQCRs are provided in Appendix B of the Work Plan.

Sample Chain-of-Custody

During field sampling activities, traceability of the sample must be maintained from the time the samples are collected until laboratory data are issued. Information on the custody, transfer, handling, and shipping of samples will be recorded on a C-O-C form. An example C-O-C form is presented in Section 5.0, Figure 5-2, of the Work Plan. C-O-C forms will be generated in the field by the field sampling team and will include site identification, field sample number, sample type, and analysis requested.

The sampler will sign the C-O-C when the sampler relinquishes the samples to anyone else. It is not necessary for Federal Express to sign C-O-Cs; however, the airbill will be retained by the sample handler for tracking purposes. A C-O-C form will be completed for each set of samples collected daily and will contain the following information:

- Sampler's signature
- Project name
- Date and time of sample collection
- Sample identification number
- Sample type/matrix
- Sample depth intervals (if applicable)
- Preservative used
- Analyses requested
- Number of containers
- Signature of persons relinquishing custody, dates, and times
- Signature of persons accepting custody, dates, and times (laboratory)
- Method of shipment (i.e., Federal Express)

The person responsible for delivery of the samples to the air carrier will sign the C-O-C form, retain the last copy of the C-O-C form, document the method shipment, and send the original and the second copy of the C-O-C form with the sample (taped in a resealable plastic bag to inner cooler lid). Upon receipt by the laboratory, the person receiving the samples will sign the C-O-C form and return the second copy to the project manager. Copies of the C-O-C forms and all custody documentation will be received and kept in the central files. The original C-O-C forms will remain with the samples until final disposition of the samples by the laboratory. The analytical laboratory will dispose of the samples in an appropriate manner 60 to 90 days after data reporting.

Field Change Requests

Field Change Requests (FCR) will be submitted to U.S. Army Corps of Engineers for approval if any deviation from the procedures or specifications contained in the RA Work Plan occurs. Details on the completion and submittal of FCRs are provided in Appendix B of the Work Plan.

Standard Operating Procedure A-4
Field Preservation for Volatile Organic Compounds Using Methanol

NOTE: General laboratory-provided procedures are presented here for this standard operating procedure. Project-specific procedures for the collection of soil samples requiring field preservation using methanol and requiring analysis for volatile organic compounds will be presented in the Final RA Work Plan.

1.9 This method is restricted to use by or under the supervision of trained analysts. Each analyst must demonstrate the ability to generate acceptable results with this method.

2.0 SUMMARY OF METHOD

2.1 Low concentration soil method - generally applicable to and soils and other solid samples with VOC concentrations in the range of 0.5 to 200 µg/kg.

Volatile organic compounds (VOCs) are determined by collecting an approximately 5-g sample, weighed in the field at the time of collection, and placing it in a pre-weighed vial with a septum-sealed screw-cap (see Sec. 4) that already contains a stirring bar and a sodium bisulfate preservative solution. The vial is sealed and shipped to a laboratory or appropriate analysis site. The entire vial is then placed, unopened, into the instrument carousel. Immediately before analysis, organic-free reagent water, surrogates, and internal standards (if applicable) are automatically added without opening the sample vial. The vial containing the sample is heated to 40°C and the volatiles purged into an appropriate trap using an inert gas combined with agitation of the sample. Purged components travel via a transfer line to a trap. When purging is complete, the trap is heated and backflushed with helium to desorb the trapped sample components into a gas chromatograph for analysis by an appropriate determinative method.

2.2 High concentration soil method - generally applicable to soils and other solid samples with VOC concentrations greater than 200 µg/kg.

The sample introduction technique in Sec. 2.1 is not applicable to all samples, particularly those containing high concentrations (generally greater than 200 µg/kg) of VOCs which may overload either the volatile trapping material or exceed the working range of the determinative instrument system (e.g., GC/MS, GC/FID, GC/EC, etc.). In such instances, this method describes two sample collection options and the corresponding sample purging procedures.

2.2.1 The first option is to collect a bulk sample in a vial or other suitable container without the use of the preservative solution described in Sec. 2.1. A portion of that sample is removed from the container in the laboratory and is dispersed in a water-miscible solvent to dissolve the volatile organic constituents. An aliquot of the solution is added to 5 mL of reagent water in a purge tube. Surrogates and internal standards (if applicable) are added to the solution, then purged using Method 5030, and analyzed by an appropriate determinative method. Because the procedure involves opening the vial and removing a portion of the soil, some volatile constituents may be lost during handling.

2.2.2 The second option is to collect an approximately 5-g sample in a pre-weighed vial with a septum-sealed screw-cap (see Sec 4) that contains 5 mL of a water-miscible organic solvent (e.g., methanol). At the time of analysis, surrogates are added to the vial, then an aliquot of the solvent is removed from the vial, purged using Method 5030 and analyzed by an appropriate determinative method.

2.3 High concentration oily waste method - generally applicable to oily samples with VOC concentrations greater than 200 µg/kg that can be diluted in a water-miscible solvent.

Samples that are comprised of oils or samples that contain significant amounts of oil present additional analytical challenges. This procedure is generally appropriate for such samples when they are soluble in a water-miscible solvent.

6.0 SAMPLE COLLECTION, PRESERVATION, AND HANDLING

Refer to the introductory material in this chapter, Organic Analytes, Sec. 4.1, for general sample collection information. The low concentration portion of this method employs sample vials that are filled and weighed in the field and never opened during the analytical process. As a result, sampling personnel should be equipped with a portable balance capable of weighing to 0.01 g.

6.1 Preparation of sample vials

The specific preparation procedures for sample vials depend on the expected concentration range of the sample, with separate preparation procedures for low concentration soil samples and high concentration soil and solid waste samples. Sample vials should be prepared in a fixed laboratory or other controlled environment, sealed, and shipped to the field location. Gloves should be worn during the preparation steps.

6.1.1 Low concentration soil samples

The following steps apply to the preparation of vials used in the collection of low concentration soil samples to be analyzed by the closed-system purge-and-trap equipment described in Method 5035.

6.1.1.1 Add a clean magnetic stirring bar to each clean vial. If the purge-and-trap device (Sec. 4.2) employs a means of stirring the sample other than a magnetic stirrer (e.g., sonication or other mechanical means), then the stir bar is omitted.

6.1.1.2 Add preservative to each vial. The preservative is added to each vial prior to shipping the vial to the field. Add approximately 1 g of sodium bisulfate to each vial. If samples markedly smaller or larger than 5 g are to be collected, adjust the amount of preservative added to correspond to approximately 0.2 g of preservative for each 1 g of sample. Enough sodium bisulfate should be present to ensure a sample pH of ≤2.

6.1.1.3 Add 5 mL of organic-free reagent water to each vial. The water and the preservative will form an acid solution that will reduce or eliminate the majority of the biological activity in the sample, thereby preventing biodegradation of the volatile target analytes.

6.1.1.4 Seal the vial with the screw-cap and septum seal. If the double-ended, fritted, vials are used, seal both ends as recommended by the manufacturer.

6.1.1.5 Affix a label to each vial. This eliminates the need to label the vials in the field and assures that the tare weight of the vial includes the label. (The weight of any markings added to the label in the field is negligible).

6.1.1.6 Weigh the prepared vial to the nearest 0.01 g, record the tare weight, and write it on the label.

6.1.1.7 Because volatile organics will partition into the headspace of the vial from the aqueous solution and will be lost when the vial is opened, surrogates, matrix spikes, and internal standards (if applicable) should only be added to the vials after the sample has been added to the vial. These standards should be introduced back in the

laboratory, either manually by puncturing the septum with a small-gauge needle or automatically by the sample introduction system, just prior to analysis.

6.1.2 High concentration soil samples collected without a preservative

When high concentration samples are collected without a preservative, a variety of sample containers may be employed, including 60-mL glass vials with septum seals (see Sec. 4.4).

6.1.3 High concentration soil samples collected and preserved in the field

The following steps apply to the preparation of vials used in the collection of high concentration soil samples to be preserved in the field with methanol and analyzed by the aqueous purge-and-trap equipment described in Method 5030.

6.1.3.1 Add 10 mL of methanol to each vial.

6.1.3.2 Seal the vial with the screw-cap and septum seal.

6.1.3.3 Affix a label to each vial. This eliminates the need to label the vials in the field and assures that the tare weight of the vial includes the label. (The weight of any markings added to the label in the field is negligible).

6.1.3.4 Weigh the prepared vial to the nearest 0.01 g, record the tare weight, and write it on the label.

NOTE: Vials containing methanol should be weighed a second time on the day that they are to be used. Vials found to have lost methanol (reduction in weight of >0.01 g) should not be used for sample collection.

6.1.3.5 Surrogates, internal standards and matrix spikes (if applicable) should be added to the sample after it is returned to the laboratory and prior to analysis.

6.1.4 Oily waste samples

When oily waste samples are known to be soluble in methanol or PEG, sample vials may be prepared as described in Sec. 6.1.3, using the appropriate solvent. However, when the solubility of the waste is unknown, the sample should be collected without the use of a preservative, in a vial such as that described in Sec. 6.1.2.

6.2 Sample collection

Collect the sample according to the procedures outlined in the sampling plan. As with any sampling procedure for volatiles, care must be taken to minimize the disturbance of the sample in order to minimize the loss of the volatile components. Several techniques may be used to transfer a sample to the relatively narrow opening of the low concentration soil vial. These include devices such as the EnCore™ sampler, the Purge-and-Trap Soil Sampler ™, and a cut plastic syringe. Always wear gloves whenever handling the tared sample vials.

6.2.1 Low concentration soil samples

6.2.1.1 Using an appropriate sample collection device, collect approximately 5 g of sample as soon as possible after the surface of the soil or other solid material has been exposed to the atmosphere: generally within a few minutes at most. Carefully wipe the exterior of the sample collection device with a clean cloth or towel.

6.2.1.2 Using the sample collection device, add about 5 g (2 - 3 cm) of soil to the sample vial containing the preservative solution. Quickly brush any soil off the vial threads and immediately seal the vial with the septum and screw-cap. Store samples on ice at 4°C.

NOTE: Soil samples that contain carbonate minerals (either from natural sources or applied as an amendment) may effervesce upon contact with the acidic preservative solution in the low concentration sample vial. If the amount of gas generated is very small (i.e., several mL), any loss of volatiles as a result of such effervescence may be minimal if the vial is sealed quickly. However, if larger amounts of gas are generated, not only may the sample lose a significant amount of analyte, but the gas pressure may shatter the vial if the sample vial is sealed. Therefore, when samples are known or suspected to contain high levels of carbonates, a test sample should be collected, added to a vial, and checked for effervescence. If a rapid or vigorous reaction occurs, discard the sample and collect low concentration samples in vials that do not contain the preservative solution.

6.2.1.3 When practical, use a portable balance to weigh the sealed vial containing the sample to ensure that 5.0 ± 0.5 g of sample were added. The balance should be calibrated in the field using an appropriate weight for the sample containers employed (Sec. 4.5.5). Record the weight of the sealed vial containing the sample to the nearest 0.01 g.

6.2.1.4 Alternatively, collect several trial samples with plastic syringes. Weigh each trial sample and note the length of the soil column in the syringe. Use these data to determine the length of soil in the syringe that corresponds to 5.0 ± 0.5 g. Discard each trial sample.

6.2.1.5 As with the collection of aqueous samples for volatiles, collect <u>at least</u> two replicate samples. This will allow the laboratory an additional sample for reanalysis. The second sample should be taken from the same soil stratum or the same section of the solid waste being sampled, and within close proximity to the location from which the original sample was collected.

6.2.1.6 In addition, since the soil vial cannot be opened without compromising the integrity of the sample, at least one additional aliquot of sample must be collected for screening, dry weight determination, and high concentration analysis (if necessary). This third aliquot may be collected in a 60-mL glass vial or a third 40-mL soil sample vial. However, this third vial must *not* contain the sample preservative solution, as an aliquot will be used to determine dry weight. If high concentration samples are collected in vials containing methanol, then two additional aliquots should be collected, one for high concentration analysis collected in a vial containing methanol, and another for the dry weight determination in a vial without either methanol or the low concentration aqueous preservative solution.

6.2.1.7 If samples are known or expected to contain target analytes over a wide range of concentrations, thereby requiring the analyses of multiple sample aliquots, it may be advisable and practical to take an additional sample aliquot in a low concentration soil vial containing the preservative, but collecting only 1-2 g instead of the 5 g collected in Sec. 6.2.1.1. This aliquot may be used for those analytes that exceed the instrument calibration range in the 5-g analysis.

6.2.1.8 The EnCore™ sampler has not been thoroughly evaluated by EPA as a sample storage device. While preliminary results indicate that storage in the EnCore™ device may be appropriate for up to 48 hours, samples collected in this device should be transferred to the soil sample vials as soon as possible, or analyzed within 48 hours.

6.2.1.9 The collection of low concentration soil samples in vials that contain methanol is <u>not</u> appropriate for samples analyzed with the closed-system purge-and-trap equipment described in this method (see Sec. 6.2.2).

6.2.2 High concentration soil samples preserved in the field

The collection of soil samples in vials that contain methanol has been suggested by some as a combined preservation and extraction procedure. However, this procedure is <u>not</u> appropriate for use with the low concentration soil procedure described in this method.

<u>NOTE</u>: The use of methanol preservation has not been formally evaluated by EPA and analysts must be aware of two potential problems. First, the use of methanol as a preservative and extraction solvent introduces a significant dilution factor that will raise the method quantitation limit beyond the operating range of the low concentration direct purge-and-trap procedure (0.5-200 µg/kg). The exact dilution factor will depend on the masses of solvent and sample, but generally exceeds 1000, and may make it difficult to demonstrate compliance with regulatory limits or action levels for some analytes. Because the analytes of interest are volatile, the methanol extract cannot be concentrated to overcome the dilution problem. Thus, for samples of unknown composition, it may still be necessary to collect an aliquot for analysis by this closed-system procedure and another aliquot preserved in methanol and analyzed by other procedures. The second problem is that the addition of methanol to the sample is likely to cause the sample to fail the ignitability characteristic, thereby making the unused sample volume a hazardous waste.

6.2.2.1 When samples are <u>known</u> to contain volatiles at concentrations high enough that the dilution factor will not preclude obtaining results within the calibration range of the appropriate determinative method, a sample may be collected and immediately placed in a sample vial containing purge-and-trap grade methanol.

6.2.2.2 Using an appropriate sample collection device, collect approximately 5 g of sample as soon as possible after the surface of the soil or other solid material has been exposed to the atmosphere; generally within a few minutes at most. Carefully wipe the exterior of the sample collection device with a clean cloth or towel.

6.2.2.3 Using the sample collection device, add about 5 g (2 - 3 cm) of soil to the vial containing 10 mL of methanol. Quickly brush any soil off the vial threads and immediately seal the vial with the septum and screw-cap. Store samples on ice at 4°C.

Appendix B

Construction Quality Control Plan

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LIST OF ACRONYMS

ACM	asbestos-containing material
AFB	Air Force Base
AHA	activity hazard analysis
CQC	Contractor Quality Control
CR	Construction Representative
DO	Delivery Order
DQCR	Daily Quality Control Report
FCR	Field Change Request
Foster Wheeler Environmental	Foster Wheeler Environmental Corporation
LF-25	Landfill No. 25
QA/QC	quality assurance/quality control
RA	remedial action
SHSO	Site Health and Safety Officer
SSHP	Site-Specific Safety and Health Plan
TERC	Total Environmental Restoration Contract
USACE	U.S. Army Corps of Engineers

1.0 CONTRACTOR QUALITY CONTROL PLAN

This Contractor Quality Control (CQC) Plan establishes the procedures and methods to be implemented during remedial action at Landfill No. 25 (LF-25) on Cannon Air Force Base (AFB), New Mexico. This CQC Plan combines the quality assurance/quality control (QA/QC) requirements from the U.S. Army Corps of Engineers (USACE) Omaha District and QC requirements from Foster Wheeler Environmental Corporation (Foster Wheeler Environmental) to form a set of common requirements commensurate with the scope and nature of services planned under the Southwest Total Environmental Restoration Contract (TERC) Program.

1.1 PURPOSE

This CQC Plan provides an effective QC system to ensure the quality of all work complies with the contract requirements. To achieve quality, this document describes the specific organization, personnel, procedures, controls, instructions, tests, records, submittals, and forms to be used.

1.2 SCOPE

The CQC Plan is applicable to all on-site construction operations, including any inspection and testing activities performed for this project. All work activities will be conducted in accordance with this RA Work Plan and its respective appendices. This CQC Plan will be implemented for the following activities:

- Required project meetings/teleconferences
- Mobilization
- Removal of asbestos-containing material (ACM)
- Grading and drainage construction
- Separation and crushing of exposed concrete
- Site restoration and revegetation
- Inspection and testing
- Waste disposal
- Site surveys
- Demobilization

2.0 ORGANIZATION AND RESPONSIBILITIES

2.1 QUALITY CONTROL ORGANIZATION

This section describes the responsibilities for project personnel performing QC of the on-site construction operations. The project organization chart is provided in the RA Work Plan.

2.2 DELIVERY ORDER MANAGER

The Delivery Order (DO) Manager, Ms. Carol Bieniulus, will oversee the entire project and is responsible for the direction, execution, and successful completion of project tasks. The DO Manager will also perform the following activities related to the specific task order:

- Prepare and approve all proposed task-specific work orders.
- Coordinate work activities of subcontractors and Foster Wheeler Environmental personnel and ensure that all personnel adhere to the administrative and technical requirements of the project.
- Monitor and report the progress of work and ensure that project deliverables are completed on time and within budget.
- Ensure performance of project management activities including procurement/purchase order preparation, monthly exposure reporting, invoicing, scheduling, and other TERC requirements.
- Ensure adherence to the quality requirements of the contract, specifications of the delivery order, and the CQC Plan.
- Direct the Construction Site Manager to undertake and accomplish the required construction.
- Ensure that all task activities are conducted in a safe manner in accordance with the Site-Specific Safety and Health Plan (SSHP), Appendix C of this Work Plan.
- Communicate as the primary contact between USACE Construction Representative (CR) and Foster Wheeler Environmental for actions and information related to the delivery order.
- Communicate and interface with the CQC Systems Manager/Site Health and Safety Officer (SHSO).

2.3 TASK MANAGER

Mr. Walter Migdal, REM, is the project Task Manager. His primary responsibility is the completion of all field activities, including field engineering, survey control, and inspection and testing, on schedule and as directed by the DO Manager. He will be referred to as the "Engineer" in any construction specifications. The duties of the Task Manager, as they apply to the project, include the following:

- Establish a field base for operations and mobilize subcontractors and Foster Wheeler Environmental personnel.
- Coordinate work activities of subcontractors and Foster Wheeler Environmental personnel and ensure that all personnel adhere to the administrative and technical requirements of the project, including corporate procedures and applicable professional standards and construction activities.
- Serve as the point of contact for all field-engineering inquiries regarding engineering and construction activities.
- Procure equipment for work crews and health and safety personnel.
- Coordinate all personnel involved in task activities, including obtaining support services.
- Ensure adherence to site access requirements.
- Coordinate and maintain logistics of all components of on-site tasks, including all personnel and equipment.

- Evaluate relevant documents and permits for validity and current status.
- Acquire necessary permits, licenses, and rights-of-way.
- Schedule and manage all submittals, including those of subcontractors, and providing monthly updates.

2.4 CONTRACTOR QUALITY CONTROL SYSTEMS MANAGER/SITE HEALTH AND SAFETY OFFICER

The CQC Systems Manager/SHSO is responsible for overall management of contractor quality control and health and safety and reports to the Site Construction Manager. The CQC Systems Manager/SHSO will be onsite at all times during construction.

The duties of the CQC Systems Manager/SHSO, as they apply to this project, include the following:

- Provide and maintain an effective QC system for all construction activities.
- Monitor QC activities to ensure conformance with authorized policies, procedures, contract specifications, and sound practices.
- Maintain sufficient staff to perform all QC activities appropriate to all work phases, work shifts, and work crews.
- Inspect the work performed each day for compliance with the plans and specifications and prepare the Daily Quality Control Report (DQCR).
- Ensure that required phases of inspection (preparatory, initial, and follow-up) are implemented for all definable phases of construction.
- Schedule and manage all submittals, as identified in the Submittal Register, including those of subcontractors providing monthly updates.
- Ensure that all required tests and inspections are performed and the results reported.
- Attend required meetings, including submittal review meetings and field review meetings.
- Review all submittals in detail and verify that they are correct and in strict compliance with contract drawings and specifications.
- Stop work that is not in compliance with the contract.
- Perform the duties of the SHSO as stated in the Base-Wide Health and Safety Plan.

2.5 FIELD ENGINEER

The Field Engineer (to be determined) reports to the Site Construction Manager and is responsible for implementing, directing, and supervising engineering activities on site. Field engineering includes survey control, inspection and testing, and implementation of any project technical specifications and the contract drawings. The duties of the Field Engineer include the following:

- Ensure all engineering work activities are performed in accordance with the Foster Wheeler Environmental corporate engineering procedures, any technical specifications and contract drawings, Remedial Action (RA) Work Plan, and applicable professional standards.

- Provide oversight of engineering work activities performed by subcontractors.
- Implement engineering design requirements at the direction of the Project Engineer.
- Conduct field engineering inspections and tests required by any project technical specifications and contract drawings.
- Ensure the quality of survey control data.
- Implement the Spill Prevention Control and Countermeasures Plan (Appendix D).
- Implement the Stormwater Pollution Prevention Plan (Appendix E).
- Inspect the work performed each day for compliance with the RA Work Plan and any technical specifications.
- Prepare the DQCR.
- Review all submittals in detail for engineering technical quality and verify they are correct and in strict compliance with any technical specifications and the contract drawings.
- Issue and maintain Field Change Requests (FCRs), Design Change Notices, and Nonconformance Reports.

2.6 SITE CONSTRUCTION MANAGER

The Site Construction Manager will ensure the timely completion of all field activities as directed by the DO Manager. The Site Construction Manager project tasks include:

- Establish a field base for operations and mobilize subcontractors and Foster Wheeler Environmental personnel.
- Procure equipment for work crews and health and safety personnel.
- Coordinate all personnel involved in task activities, including obtaining support services.
- Direct field leaders, support personnel, and subcontractors.
- Administer site access.
- Maintain work site, vehicles, and equipment.
- Coordinate and maintain logistics of all components of onsite tasks, including all personnel and equipment.
- Prepare weekly status reports and estimate future scheduling needs.
- Coordinate, prepare, and complete all required field reports.
- Evaluate relevant documents and permits for validity and current status.
- Acquire necessary permits, licenses, and rights-of-way.

2.7 SUBCONTRACTORS AND VENDORS

Subcontractors and vendors will be required to conform to the Foster Wheeler Environmental CQC Plan and any other approved procedures, technical specifications, or contract provisions.

The subcontractor's QC inspectors are responsible for field inspection of their construction and operating activities. Foster Wheeler Environmental will monitor, oversee, and make on-site observations and inspections of work in progress to ensure the subcontractor's work complies with the CQC Plan.

Subcontractor personnel are responsible for maintaining a daily log of the project activities they perform and for providing information needed to complete the DQCR. All inspection records, including inspection and deficiency reports and reinspections of corrective actions, will be documented.

3.0 CONSTRUCTION INSPECTION PLAN

Contractor QC is the means by which Foster Wheeler Environmental ensures that all construction complies with the contract requirements. The Construction Inspection Plan ensures quality of work and compliance with specified requirements, including the inspection of materials and workmanship before, during, and after each definable feature of work. Contractor QC includes implementation of the following control phases for all aspects of the specified work:

- Preparatory phase
- Initial phase
- Additional inspections
- Completion inspections

Inspection requirements specific to this project are discussed throughout this section.

3.1 PREPARATORY-PHASE INSPECTIONS

Preparatory-phase inspections will be conducted by the CQC Systems Manager/SHSO prior to initiation of work described in the RA Work Plan. At a minimum, these inspections will include the following:

- A review of each paragraph of applicable specifications.
- A review of the contract plans.
- A check to ensure that all materials and/or equipment have been tested, submitted, and approved.
- An examination of the work area to ensure that all required preliminary work has been completed and is in compliance with the contract.
- A physical examination of required materials, equipment, and sample work to ensure that they are on hand, conform to approved shop drawings or submitted data, and are properly stored.
- A review of the project activity hazard analysis (AHA) to ensure that safety requirements are met.
- A discussion of procedures for construction, including repetitive deficiencies.
- Documentation of construction tolerances and workmanship standards for that phase of work.
- A check that the CQC Plan for the work has been accepted by the USACE or designee.

The Base Project Manager and USACE Resident Engineer/CR will be notified at least 48 hours in advance of any preparatory phase activity. This phase will include a meeting conducted by the CQC Systems Manager/SHSO that will be attended by other responsible construction personnel as applicable (e.g., the project superintendent, the construction foreman).

The preparatory phase meetings will be documented by item on the Inspection Checklist, as shown on Figure B-1. Preparatory inspections will be reported on the DQCR, with the checklist included as an attachment. An example of the DQCR is included as Figure B-2. The CQC Systems Manager/SHSO will direct personnel in the acceptable level of workmanship for the particular work feature covered by the inspection.

3.2 INITIAL-PHASE INSPECTIONS

An initial-inspection will be performed at the beginning of each task and will include the following:

- Review of preliminary work to ensure it is in compliance with contract requirements.
- Review of the Inspection Checklist documenting results of the preparatory meeting.
- Verify contract compliance, including control inspection and testing.
- Establish required level of workmanship and verify it meets minimum acceptable standard.
- Resolve all differences.
- Review safety requirements to include compliance with and upgrading of the safety plan and AHA.
- Review AHA with project personnel.

The Base Project Manager and the USACE Resident Engineer/CR will be notified at least 48 hours in advance of any initial-phase activity. During the initial inspection, the CQC Systems Manager/SHSO will document each item on the Inspection Checklist (Figure B-1); the documentation will be attached to the DQCR. The exact location of the initial phase inspection will be indicated for future reference and to allow for comparison with follow-up inspections.

An initial-phase inspection will be conducted each time a new crew arrives onsite or any time specified quality standards are not being met.

Figure B-1. Inspection Checklist

ITEM:				DATE:
CONTRACT SPEDIFICATIONS:				
MATERIAL	QTY.	CONDITION	TESTING	COMMENTS
STORAGE CONDITIONS:				
SUBMITTALS:				

Figure B-1. Inspection Checklist

MATERIAL/EQUIPMENT CERTIFICATIONS:	
PREPARATORY SITE CONDITIONS:	
CONTRACT VARIANCE:	
COMMENTS:	
ATTENDEES:	
	QC REPRESENTATIVE: DATE:
	QCSM: DATE:

Figure B-2. Daily Quality Control Report

Daily Report No.: _____ Date: _____

Contract No.: _____

Project Title & Location: _____

Weather: _____ Precipitation: _____ In.: ___ Temp.: _____ Min.: _____ Max.: _____

1. Contract/Subcontractors and Area of Responsibility:

NUMBER	TRADE	HOURS	EMPLOYER	LOCATION/ DESCRIPTION OF WORK

2. Operating Plant or Equipment (not hand tools):

PLANT/ EQUIPMENT	DATE OF ARRIVAL/ DEPARTURE	DATE OF SAFETY CHECK	HOURS USED	HOURS IDLE	HOURS REPAIR

Figure B-2. Daily Quality Control Report

3. Work Performed Today: (Indicate location and description of work performed by prime and/or subcontractors. When network analysis is used, identify work by appropriate activity number.)

4. Control Activities Performed:

- Preparatory Inspections: Identify features of work and attach minutes.
- Initial Inspections: Identify features of work and attach minutes.
- Follow-up Inspections: List inspections performed, results of inspections compared to specification requirements, and corrective actions taken when deficiencies are noted.

5. Tests Performed and Test Results: Identify test requirement by paragraph number in specifications and/or sheet number in plans.

6. Material Received: Note inspection results and storage provided.

Figure B-2. Daily Quality Control Report

7. Submittals Reviewed:

(A) SUBMITTAL NO.	(B) SPEC/PLAN REFERENCE	(C) BY WHOM	(D) ACTION

8. Offsite Surveillance Activities, Including Action Taken:

_____
_____
_____
_____
_____

9. Job Safety: List items checked, results, instructions, and corrective actions taken.

_____
_____
_____
_____

10. Remarks: Instructions received or given. Conflict(s) in plans and/or specifications. Delays encountered.

_____
_____
_____
_____
_____
_____

Contractor's Verification: On behalf of the Contractor, I certify this report is complete and correct and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as may be noted above.

_____ CQC SYSTEMS MANAGER

_____ DATE

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3.3 ADDITIONAL INSPECTIONS

The CQC Systems Manager/SHSO will conduct additional preparatory and initial inspections on the same task under several circumstances, including when:

- The quality of ongoing work is unacceptable as determined by the Base Project Manager or the USACE Resident Engineer/CR.
- Staff on-site supervision or work crews change.
- Work on a definable feature is resumed after a substantial period of inactivity.
- Other problems develop.

3.4 COMPLETION INSPECTIONS

Completion inspections will be performed as summarized in this section.

3.4.1 Contractor's Quality Control Completion Inspection

The CQC Systems Manager/SHSO or designated Foster Wheeler Environmental QC inspection personnel will conduct a detailed inspection when all or an increment of the work is substantially complete. This inspection will be conducted prior to the prefinal inspection. The Base Project Manager and the USACE Resident Engineer/CR may also participate and will be notified in advance of the inspection date. The inspection will focus on conformance to plans, specifications, quality, workmanship, and completeness. The CQC Systems Manager/SHSO will prepare an itemized list of work not properly completed, inferior workmanship, or work that does not conform to plans and specifications. The list will also include outstanding administrative items such as record (as-built) drawings, operations and maintenance manuals, and spare parts. The list will be included in the QC documentation and submitted to the Base Project Manager or designee and the USACE Resident Engineer/CR with an estimated date for correction of each deficiency scheduled within 5 working days after the inspection. The completion inspection will be documented on the Inspection Checklist, shown in Figure B-1, and attached to the DQCR.

3.4.2 Prefinal Inspection

The Base Project Manager will schedule and conduct the prefinal inspection. The USACE Resident Engineer/CR, Foster Wheeler Environmental QC inspection personnel, CQC Systems Manager/SHSO, or other primary management representative, as applicable, will attend. The inspection will be conducted in response to notification from the CQC Systems Manager/SHSO. The CQC Systems Manager/SHSO is required to verify at this time that all specific items previously identified to Foster Wheeler Environmental as being unacceptable, along with all remaining project work, will be complete and acceptable by the date scheduled for the prefinal inspection. At this inspection, the Base Project Manager or designee will develop a specific list of incomplete and/or unacceptable work performed under the contract and will provide this list to Foster Wheeler Environmental

3.4.3 Final Acceptance Inspection

The Base Project Manager will schedule the final acceptance inspection after notification from the CQC Systems Manager/SHSO of readiness. All personnel listed above will be invited to this inspection. This notification will be provided prior to the planned final acceptance inspection date and must include verification that all specific items previously identified as being unacceptable, along with all remaining work performed under the contract, will be complete and acceptable by the date scheduled for the final acceptance inspection.

3.4.4 Management Inspections

In addition to the required QC field inspections, one internal management inspection will be performed to ensure:

- Possession and use of approved procedures, standards, and technical specifications
- Conformance with appropriate procedures, standards, and instructions
- Thoroughness of performance
- Identification and completeness of documentation generated during performance

3.4.5 Inspection Documentation

The CQC Systems Manager/SHSO will maintain the inspection records. Inspection records will be legible and will provide all necessary information clearly to verify that the items or activities inspected conform to the specified requirements or, in the case of nonconforming conditions, provide evidence that the conditions were brought into conformance or otherwise accepted by Foster Wheeler Environmental

All inspection records will be made available to Cannon AFB and USACE through the Foster Wheeler Environmental DO Manager.

4.0 PROJECT DOCUMENTS

Preparation, review, approval, and issuance of documents affecting quality will be controlled to the extent necessary to determine that the documents meet specified requirements. Project documents to be controlled include the following:

- Submittal register
- Inspection documentation
- DQCR
- Test and control activity results
- Nonconformance reports

- Project reports
- Project drawings

Discussions of the required DQCR and records to be provided at document meetings are included in this section.

4.1 DAILY QUALITY CONTROL REPORT

The CQC Systems Manager/SHSO will maintain current records of QC operations, activities, and tests, including the work of subcontractors and suppliers. The records will include factual evidence that QC activities and tests were performed. A DQCR will be completed to document construction activities covered by the CQC Plan and will include the following information:

- Contractor/subcontractor(s) and their area of responsibility
- Operating equipment with hours worked, idle, or in maintenance
- Work performed that day, location, description, and by whom
- Test and/or control activities performed with results and references to specifications/plan requirements, including the control phase (preparatory, initial, follow-up) and deficiencies (along with corrective action)
- Material received with statement as to its acceptability and storage
- Submittals reviewed, with contract reference, by whom, and action taken
- Off-site surveillance activities, including actions taken
- Job safety evaluations stating what was checked, results, and instructions or corrective actions
- A list of instructions and conflicts in plans and/or specifications
- Contractor's verification statement
- Site visitors and purpose, deviations from plans, difficulties/resolution

The records will indicate a description of trades working on the project, the number of personnel working, weather conditions encountered, and any delays encountered. Both conforming and nonconforming features will be discussed with a statement that equipment and materials used during the work and workmanship comply with the contract. The original of this report shall be furnished to the USACE Resident Engineer/CR on the first work day following the date covered by the report, although reports need not be submitted for days on which no work is performed. At a minimum, one report shall be prepared and submitted for every 7 days of no-work and on the last day of a no-work period. All calendar days shall be accounted for throughout the life of the contract. The first report following a day of no work will summarize work for that day only. Reports will be signed and dated by the CQC Systems Manager/SHSO and other appropriate personnel, including subcontractors responsible for completion of

activities. The report from the CQC Systems Manager/SHSO will include copies of test reports and copies of reports prepared by all subordinate QC personnel.

4.2 MEETING NOTES AND CONFIRMATION NOTICES

In addition to other required documentation, the DO Manager is responsible for taking notes and preparing reports for all meetings and teleconferences. Notes will be typed and the original report furnished to the USACE within 7 working days after the meeting/biweekly teleconference for concurrence and distribution. At a minimum, this report will include the following items:

- Air Force Project Number, date and time the meeting/teleconference was held, and agenda
- Attendees, including name, organization, email address, and telephone number (for meetings)
- Written comments presented by attendees attached to each report with the conference action noted: "A" for an approved comment, "D" for a disapproved comment, "W" for a comment that has been withdrawn, and "E" for a comment that has an exception noted
- Comments made during the meeting/teleconference and decisions affecting criteria changes
- Conference notes that augment the written comments
- Documentation of any augmentation of written comments

Project meetings include the scope development meeting held at Cannon AFB, biweekly teleconferences to discuss work progress and project status, one site visit, and project kickoff meeting. The DO Manager will also provide a weekly record of all discussions, verbal directions, telephone conversations, etc., in which Foster Wheeler Environmental personnel participated. These records, "Confirmation Notices," will be numbered sequentially and will identify participating personnel, subject discussed, and any conclusions reached. The DO Manager will forward a copy of the Confirmation Notice within 7 working days to the Base Project Manager or designee and the USACE Resident Engineer/CR.

4.3 RECORD DRAWINGS

In addition to the basic requirements for record drawings, all drawings will be developed or modified using Auto-CAD for required submittals. All drawings will be compatible with the system used at Cannon AFB. After construction, Foster Wheeler Environmental will provide the Base Project Manager with electronic and hard copies of the drawings, which will include the as-constructed site conditions.

4.4 FINAL SUBMITTALS

Final submittals will be reproduced and distributed by mail to all reviewers via an overnight carrier service. All reports will be printed on recyclable paper to the maximum extent possible.

Partial submittals will not be accepted unless prior approval is given in writing. A cover letter addressed to the Resident Engineer will accompany each final document and will indicate the following information: project, project number, project phase, date comments are due, to whom comments are to be submitted, and the date and location of the review conference, as appropriate. Depending on the recipient, all letters shall be coordinated with the USACE Resident Engineer/CR prior to the submittal date. The cover letter will not be bound into the document.

One unbound copy of each submittal will be provided to USACE and to Cannon AFB when the project is completed. This copy will be in addition to the quantities listed in the submittal register. All final submittals will be error free.

4.5 SUPPORTING DATA AND CALCULATIONS

The tabulation of criteria, data, calculations, cost estimates, etc., that are performed but not included in detail in the report will be assembled as appendices. Criteria provided by the USACE Omaha District will be referenced as appropriate. Persons performing and checking calculations will place their full names on the first page of all supporting calculations, estimates, etc., and initial the following sheets. The originator of the calculations may not be the checker. Each sheet will be dated and numbered in sequence.

4.6 REMEDIAL ACTION COMPLETION REPORT

All work performed under this delivery order shall be documented in a final completion report. This report shall include a description of tasks performed, supporting analytical data, DQCRs, and site maps showing the location of any excavated areas and sampling schematic. A draft completion report will first be provided to USACE and Cannon AFB for review; the final report shall incorporate all comments received on the draft report.

5.0 NONCONFORMANCES

5.1 NONCONFORMANCE REPORT

Any work or materials not conforming to the contract requirements or any technical specifications will be identified and documented on a Nonconformance Report, as indicated in Figure B-3. The Nonconformance Report will detail the nonconforming condition, recommended corrective action(s), and disposition of the corrective action(s). The Nonconformance Report will remain open until the condition has been satisfactorily resolved and verified by QC inspection staff. Upon receipt of notification of detected nonconformances from the USACE Base Project Manager, Nonconformance Reports for each item will be completed.

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Figure B-3. Nonconformance Report

FOSTER WHEELER ENVIRONMENTAL CORPORATION QUALITY ASSURANCE
REPORT NO. (1) _____

NONCONFORMANCE REPORT

CLIENT OR PROJECT (2)		DRAWING NO./SPEC NO. (3)
SUPPLIER, CONSTRUCTION QC, OR CONTRACTOR (4)	P. O. NO. (5)	
DESCRIPTION OF COMPONENT, PART, OR SYSTEM (6)		

I. DESCRIPTION OF NONCONFORMANCE (7) *(Items Involved, Specifications, Code or Standard to Which Items Do Not Comply, Submit Sketch, If Applicable)*			
NAME AND SIGNATURE OF PERSON REPORTING NONCONFORMANCE (8)		TITLE/COMPANY	DATE (9)
II. RECOMMENDED DISPOSITION (10) *(Submit Sketch, If Applicable)*			
NAME AND SIGNATURE OF PERSON RECOMMENDING DISPOSITION (11)		TITLE/COMPANY	DATE (12)
III. EVALUATION OF DISPOSITION BY FOSTER WHEELER ENVIRONMENTAL. REASON FOR DISPOSITION (13)			
IV. CORRECTIVE ACTION (14) ☐ Required ☐ Not Required			

Figure B-3. Nonconformance Report

FOSTER WHEELER ENVIRONMENTAL CORPORATION QUALITY ASSURANCE
REPORT NO. (1) _____

NONCONFORMANCE REPORT

V. ☐ ENGINEERING	☐ QUALITY ASSURANCE	☐ CONSTRUCTION	☐ OTHER
NAME (SIGNATURE)	NAME (SIGNATURE)	NAME (SIGNATURE)	NAME (SIGNATURE)
DATE	DATE	DATE	DATE
☐ ACCEPTED ☐ REJECTED ☐ ACCEPTED WITH COMMENTS	☐ ACCEPTED ☐ REJECTED ☐ ACCEPTED WITH COMMENTS	☐ ACCEPTED ☐ REJECTED ☐ ACCEPTED WITH COMMENTS	☐ACCEPTED ☐REJECTED ☐ACCEPTED WITH COMMENTS

VI. VERIFICATION OF DISPOSITION ☐ REQUIRED ☐ NOT REQUIRED (16)

(17) BY _____ SIGNATURE _____
TITLE _____ DATE _____

5.2 IDENTIFICATION OF NONCONFORMING ITEMS

Items identified as nonconforming will be documented on a Nonconformance Report that will include the following information:

- Description of nonconforming item or activity
- Detailed description of nonconformance
- Referenced criteria
- Recommended disposition and corrective action to prevent recurrence (as applicable)
- Affected organization

5.3 CONTROL AND SEGREGATION

The nonconforming items will be controlled to prevent inadvertent use. All items identified as nonconforming will be clearly identified and segregated from acceptable items when practical.

5.4 DISPOSITION

The disposition of Nonconformance Reports will include the necessary actions required to transform the nonconforming condition into an acceptable condition and may include reworking, replacing, retesting, or reinspecting. Implementation of the disposition may be done in accordance with the original procedural requirements, a specific instruction, or an FCR (Figure B-4).

5.5 CORRECTIVE ACTIONS

When a nonconforming condition is detected, the CQC Systems Manager/SHSO will immediately take corrective action. Corrective action records will also address the initial cause of adverse conditions and establish methods to prevent recurrence of the same or similar types of nonconformances. The CQC Systems Manager/SHSO will monitor the corrective actions to verify that they were properly implemented and accepted and that the Nonconformance Report was resolved.

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Figure B-4. Field Change Request

FOSTER WHEELER ENVIRONMENTAL CORPORATION
ENGINEERING PROCEDURES
DEVELOPING AND ISSUING ENGINEERING DOCUMENTS

PROJECT	PROJ. NO.	FIELD CHANGE NO.

TO _____ DEPT. _____ LOCATION _____ DATE _____

RE: ☐
DRAWING NO. _____ TITLE _____
☐ SPEC. NO. _____ TITLE _____
☐ OTHER _____

1. DESCRIPTION (Items involved, submit sketch if applicable.): _____

2. REASONS FOR CHANGE (If from disposition of nonconformance report, list report number.): _____

3. RECOMMENDED DISPOSITION ☐ MINOR CHANGE ☐ MAJOR CHANGE

Figure B-4. Field Change Request (Concluded)

4. RESIDENT ENGINEER (Signature)	DATE	PROJECT SUPT. CONCURRENCE (Signature)	DATE

5. DISPOSITION

☐ NOT APPROVED (Give Reason)

☐ CONSIDERED MINOR CHANGE – Approval per Recommended Disposition - Design documents will not be normally revised; field to maintain as-built records

☐ CONSIDERED MAJOR CHANGE – Action will be taken as prescribed on Design Change Notice -

LEAD DISCIPLINE ENGINEER OR DESIGNEE (Signature)	DATE	PROJECT ENGR. OR DESIGNEE (Signature)	DATE

Project Engineer signs and returns to LDE for transmittal to Resident Engineer with copies to:

Project Manager _____ *Others as Required* _____

_____ _____

Project Supt. _____ _____

_____

Project Files _____

_____

Appendix C

Site-Specific Health and Safety Plan

SITE-SPECIFIC SAFETY AND HEALTH PLAN APPROVAL

This Site-Specific Safety and Health Plan Addendum provides the health and safety guidelines and procedures for the LF-25 Remedial Action Project at Cannon Air Force Base, New Mexico. The signatures below indicate concurrence with the procedures specified in the plan and a commitment to the philosophy of quality made by all project personnel.

James Morning
Environmental Safety Specialist/Construction Manager, Foster Wheeler Environmental Corporation

Signature _____ Date _____

Carol Bieniulis
Delivery Order Manager, Foster Wheeler Environmental Corporation

Signature _____ Date _____

Roger Margotto, CIH
Project Environmental Safety Manager, Foster Wheeler Environmental Corporation

Signature _____ Date _____

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LIST OF ACRONYMS

ACM	asbestos-containing material
AFB	Air Force Base
AHA	Activity Hazard Analysis
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
CPR	cardiopulmonary resuscitation
DO	Delivery Order
EHS	Environmental Health and Safety
Foster Wheeler Environmental	Foster Wheeler Environmental Corporation
ft	feet
GFCI	ground-fault circuit interrupter
HASP	Health and Safety Plan
LF-25	Landfill No. 25
OHST	Occupational Health and Safety Technician
OSHA	Occupational Safety and Health Administration
PESM	Project Environmental Safety Manager
POC	Point of Contact
PPE	personal protective equipment
RA	Remedial Action
SHSO	Site Health and Safety Officer
SSHP	Site-Specific Safety and Health Plan
USACE	U.S. Army Corps of Engineers

1.0 INTRODUCTION

This Site-Specific Safety and Health Plan (SSHP), which is an addendum to the Base-Wide Health and Safety Plan (HASP) for Cannon Air Force Base (AFB) (Foster Wheeler Environmental, 2000), identifies the health and safety requirements and procedures for the remedial action (RA) to be conducted for Landfill No. 25 (LF-25), Solid Waste Management Unit 97, at Cannon AFB, New Mexico. The RA is part of the environmental services Foster Wheeler Environmental Corporation (Foster Wheeler Environmental) is providing to the U.S. Army Corps of Engineers (USACE) Omaha District, under the Total Environmental Restoration Contract, DACW45-94-D-0003. This SSHP has been prepared in accordance with Occupational Safety and Health Administration (OSHA) 29 Code of Federal Regulations (CFR) Section 1910.120 and 29 CFR Part 1926; the USACE Safety and Health Requirements Manual EM 385-1-1 (USACE, 1996); and Base and contract requirements.

This SSHP provides Foster Wheeler Environmental field personnel, subcontractors, and site visitors with an understanding of the potential chemical and physical hazards that exist or may arise while performing tasks associated with the RA. Documents and procedures to ensure protection of on-site personnel performing field activities are also provided. The general procedures and guidance presented in Sections 2.0 through 10.0 of this SSHP are based on the current understanding of site conditions and required scope of field activities and apply to all personnel working at the RA site. This SSHP supplements information contained in the Base-Wide HASP (Foster Wheeler Environmental, 2000) and the Foster Wheeler Environmental Project Rules Handbook (1999).

All personnel participating in the field investigation must sign a statement acknowledging they have read this plan, understand its provisions, and will adhere to the requirements contained herein.

1.1 SCOPE OF WORK

A description of the scope of work is outlined in the RA Work Plan and includes the following activities:

- Mobilization
- Tree trimming and removal
- Asbestos-containing material (ACM) removal
- Construction of access roads
- Grading and drainage construction
- Separation and crushing of exposed concrete
- Site restoration and revegetation

- Waste disposal
- Site surveys
- Demobilization

1.2 SITE LOCATION

Cannon AFB is located in northeastern New Mexico in Curry County, south of Highway 60/84. The Base property includes approximately 4,000 acres. The nearest population center is the city of Clovis, New Mexico, which is located approximately 6 miles east of the Base.

LF-25 received waste beginning in about 1945 and waste was placed through the 1980s. The exact date disposal activities were ceased is unknown. After World War II, construction demolition debris consisting of concrete, wood, asbestos tiles, metal, asbestos/cement pipe, and asphalt mixed with soil were disposed of in the landfill. Concrete pieces of various sizes and shapes are from demolition of buildings and pavement (runways) at Cannon AFB. Debris extends approximately 3 to 4 feet (ft) above natural grade over most of the site, reaching a maximum of approximately 15 ft above natural grade at the north end.

2.0 ORGANIZATION/KEY PERSONNEL AND RESPONSIBILITIES

2.1 PROJECT TEAM

The on-site project personnel include the following:

Team	Project Title/Assigned Role	Phone Numbers
James Morning, Occupational Health and Safety Technician (OHST)	Construction Manager/Site Health and Safety Officer (SHSO)	(505) 479-2668 (505) 430-2307 (*mobile*)

Other project personnel include the following:

Name	Project Title/Assigned Role	Phone Numbers
Sina Seyedian, P.E.	Program Manager	(303) 980-3573
Roger Margotto, Certified Industrial Hygienist (CIH)	Project Environmental Safety Manager (PESM)	(619) 234-8696 (714) 810-3742 (*pager*)

Name	Project Title/Assigned Role	Phone Numbers
Carol Bieniulis	Delivery Order (DO) Manager	(505) 878-8924 (505) 934-0879 (mobile)
Walter Migdal	Task Order Manager	(505) 878-8901

2.2 ROLES AND RESPONSIBILITIES

The roles and responsibilities of key project personnel are addressed in the Base-Wide HASP (Foster Wheeler Environmental, 2000).

3.0 HAZARD ANALYSIS

3.1 HAZARD IDENTIFICATION

The activity hazard analysis (AHA), presented in Table C-1, identifies the potential hazards associated with the RA tasks; additional task elements may be added to the AHA in the future to address any unanticipated hazards. The Base-Wide HASP (Foster Wheeler Environmental, 2000) also details several of the hazards identified in the site-specific AHA.

The SHSO will inspect the site to ensure that all project tasks are performed according to the AHA. The minimum personal protective equipment (PPE) required for the field activities is Level D (work clothes with hard hat, steel-toed boots, and safety glasses). The SHSO shall periodically review the SSHP to determine whether changes to the SSHP are needed. Any revisions resulting from changes in the project scope of work and/or site conditions shall be approved by the CIH and documented using the Field Change Request form, provided in the Contractor Quality Control Plan, Appendix B to the RA Work Plan.

3.2 HAZARD ASSESSMENT

The following hazard assessment applies only to the activities within the specified scope of this SSHP.

3.3 CHEMICAL HAZARDS

Subcontractor personnel will remove ACM and provide a separate health and safety plan. Once ACM is removed, the threat of chemical exposure to site workers is greatly reduced. To ensure exposure is minimized, the asbestos subcontractor will train Foster Wheeler Environmental personnel in the identification of ACM, and trained personnel will check for ACM during crushing operations.

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Table C-1. Activity Hazard Analysis

Activity	Cause: Hazard	Controls
Heavy Equipment/Field Activities (excavation, crushing, backfill placement)	Disturbance of soils: Personnel overexposure to dust	Awareness of dust levels by visual monitoring. Dust suppression provided by water and PPE.
	Heavy equipment operation: noise overexposure	Monitoring with sound meters as necessary, PPE, use of hearing conservation techniques.
	Uneven or slippery terrain: Slips/trips/falls	Ensure that work area is kept cleared of debris and unnecessary equipment, identify depressions or mounds on work surfaces, daily inspection of work area for hazard identification.
	Underground utilities: Striking underground utilities and service lines	Obtain underground utility clearance, demarcate and barricade areas identified with high visibility fence, monitor work activities adjacent to areas with underground utilities.
	Unauthorized site visitors: Unauthorized vehicle traffic	Identification of work area by signs and/or barriers, prevention of unauthorized vehicles from entering work site.
	Outdoor temperature extremes: heat or cold Stress	Implement heat/cold stress procedures as outlined in EHS Procedure 4-6.
ACM Removal, Separation, and Disposal	Disturbance and handling of ACM: overexposure to asbestos-containing dust	Awareness of dust levels by visual monitoring, dust suppression provided by water and PPE.
	Crushing concrete: potential overexposure to asbestos containing dust	Trained personnel on site to identify ACM and prevent placement in crushing unit.
Silt Fence Installation and Maintenance	Disturbance of soils: personnel overexposure to dust	Monitoring for dust levels, awareness of dust levels by monitoring, dust suppressing provided by water trucks, PPE.
	Heavy equipment operation: noise overexposure, rotation of excavator boom, etc.	Monitoring with sound meters as necessary, PPE, and using hearing conservation techniques.
	Uneven or slippery terrain: slips/trips/falls	Ensuring that work area is kept cleared of debris and unnecessary equipment, identifying depressions or mounds on work surfaces, and daily inspecting work area for hazard identification.

Table C-1. Activity Hazard Analysis (Continued)

Activity	Cause: Hazard	Controls
Silt Fence Installation and Maintenance (continued)	Manual lifting of heavy items: personal injury or strain	Providing instruction on lifting procedures and precautions.
	Elevated outdoor temperatures: heat stress, or cold outdoor temperatures: cold stress	Implementing heat stress protocols, or cold stress protocols.
	Snakes, insects, or other inhabitants on site: snake or insect bite	Making site workers aware of hazard, using caution when working in areas of thick ground cover, and wearing appropriate clothing to minimize skin exposure.
Earthworks/Grade Control/Drainage Structure Construction and Maintenance	Disturbance of soils: personnel overexposure to dust	Monitoring for dust levels, awareness of dust levels by monitoring, dust suppressing provided by water trucks, PPE.
	Heavy equipment operation: noise overexposure	Monitoring with sound meters as necessary, PPE, and using hearing conservation techniques.
	Uneven or slippery terrain and walking on or around gabion mattresses: slips/trips/falls	Ensuring that work area is kept cleared of debris and unnecessary equipment, identifying depressions or mounds on work surfaces, and daily inspecting work area for hazard identification.
	Manual lifting of heavy items including hand placement of rock in mattresses: personal injury or strain	Providing instruction on lifting procedures and precautions.
	Elevated outdoor temperatures: heat stress, or cold outdoor temperatures: cold stress	Implementing heat stress protocols or cold stress protocols.
	Snakes, insects or other inhabitants on site: snake or insect bite	Making site workers aware of hazards, using caution when working in areas of thick ground cover, and wearing appropriate clothing to minimize skin exposure.
	Heavy equipment operation: noise overexposure	Monitoring with sound meters as necessary, PPE, and using hearing conservation techniques.

Table C-1. Activity Hazard Analysis (Concluded)

Activity	Cause: Hazard	Controls
Earthworks/Grade Control/Drainage Structure Construction and Maintenance (continued)	Uneven or slippery terrain: slips/trips/falls	Ensuring that work area is kept cleared of debris and unnecessary equipment, identifying depressions or mounds on work surfaces, and daily inspecting work area for hazard identification.
	Handling of wire, wire cutting: personal injury (pinch, puncture)	Making site workers aware of hazards and using leather gloves, safety glasses, proper tools, and proper tool maintenance.
Work on Slopes	Steep terrain, loose soils, uneven terrain: slips/trips/falls, Equipment instability	Making site workers aware of hazards; using experienced equipment operators with knowledge of surroundings; using spotters when necessary; and using personal fall protection, spiked shoes, etc. when necessary.
Equipment Cleaning and Decontamination	Cleaning of equipment: Personnel overexposure to cleaning fluids	Direct personnel on proper cleaning procedures, wear appropriate PPE to avoid exposure to cleaning fluids.
	Uneven or slippery terrain: Slips/trips/falls	Ensure that work area is kept cleared of debris and unnecessary equipment, identify depressions or mounds on work surfaces, daily inspection of work area for hazard identification.
	Manual lifting of heavy items: personal injury or strain	Provide instruction on lifting procedures.
	Outdoor temperature extremes: heat or cold stress	Implement heat/cold stress procedures as outlined in EHS Procedure 4-6.
	Heavy equipment use for cleaning purposes: injury or strain from improper use	Instruct site workers on proper equipment use, maintain equipment in good working order, and inspect equipment prior to use.

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3.4 PHYSICAL HAZARDS

The SHSO must perform frequent and regular inspections of the site, materials, and equipment to identify site hazards in accordance with 29 CFR 1926.20. All on-site personnel will be provided with the information and training necessary to avoid accidental injury, including literature on maintaining the site in such a way that slip, trip, and fall hazards are recognized and eliminated or controlled. Basic PPE (steel-toe boots, hard hats, and safety glasses) must be available and site management will enforce its use.

3.4.1 Slips, Trips, and Falls

Field personnel will become familiar with the specific hazards associated with each work area. Hazards causing slips, trips, and falls may be a result of debris, uneven terrain, or poor lighting. Field personnel will remain alert to the surrounding conditions. After arriving at the site, personnel will inspect the areas for hazards, which will either be removed from the immediate area or marked to prevent injury.

3.4.2 Electrically Powered Equipment

OSHA regulations require that employees who may be exposed to electrical equipment be trained to recognize the potential hazards and identify the appropriate control methods. All extension cords used for portable tools or other equipment must be designed for hard or extra-hard usage and must be three-wire grounded. In addition, all 120-volt, single-phase, 15- and 20-ampere receptacle outlets on construction sites and other locations where moisture/water contact may occur must be equipped with ground-fault circuit interrupter (GFCI) units. GFCI units must be attached directly to or as close as possible to the receptacle to increase effectiveness.

Whenever conducting maintenance on electrical equipment, lockout/tagout procedures to isolate the unit and all associated equipment must be used. Lockout/tagout procedures are presented in the Base-Wide HASP (Foster Wheeler Environmental, 2000) and in Foster Wheeler Environmental Health and Safety (EHS) Program procedure EHS 6-4, Lockout/Tagout.

All electrical equipment (tools, lights, extension cords) must be visually inspected prior to use. Equipment that could expose personnel to electric shock must be removed from service.

If overhead utilities are present in the work area, all equipment that may come in contact with the utilities must maintain adequate clearance. Clearance requirements are addressed in the Base-Wide HASP (Foster Wheeler Environmental, 2000) and USACE EM 385-1-1.

3.4.3 Heat and Cold Stress

Overexposure to temperature extremes can present significant risks to personnel if simple precautions are not observed. Typical control measures designed to prevent heat stress include dressing properly, drinking plenty of fluids, and establishing an appropriate work/break regimen. Typical control measures designed to prevent cold stress include dressing properly and establishing an appropriate work/break regimen. The SHSO must ensure that the appropriate measures are observed. Additional guidance concerning heat and cold stress is provided in the Base-Wide HASP (Foster Wheeler Environmental, 2000).

3.4.4 Driver Safety

All project staff operating a vehicle on site must follow all Base traffic regulations. The use of seat belts is required when vehicles are in motion.

3.4.5 Noise

Mechanical equipment (generators and heavy equipment) used for the RA is a potential source of noise exposure. To reduce noise exposure, personnel working in the presence of such equipment should use appropriate hearing protection (ear plugs or ear muffs). All employees are required to wear hearing protection when the OSHA action level of 85 decibels is exceeded for an 8-hour time-weighted average. The SHSO will make this determination and document in the logbook when hearing protection is required. Additional guidance on hearing conservation and noise monitoring is provided in Foster Wheeler Environmental procedure EHS 4-4, Hearing Conservation, and EHS Guideline EFG1-5, Noise Monitoring, respectively.

3.4.6 Manual Lifting and Material Handling

Manual lifting and material handling procedures include the following:

- Always bend at the knees when lifting heavy objects.
- Keep the weight close to your body. Do not twist or turn your body while lifting.
- Get help or use a mechanical lifting device for awkwardly shaped objects or objects that are too heavy for one person to lift.

3.4.7 Heavy Equipment Safety

Heavy equipment shall be operated by qualified operators in accordance with Foster Wheeler Environmental Construction procedure CP-7, Construction Tools and Equipment. All heavy equipment shall be inspected prior to initial acceptance on site, and thereafter, before, during, and after daily use.

3.4.8 Hand Protection

Heavy leather gloves will be worn when handling materials or performing other work that could result in hand injuries.

3.4.9 Inclement Weather

Natural phenomena, including excessive heat or cold, rain, snow, ice, and lightning, can affect work activities and increase risk. At the daily health and safety meetings, the SHSO will discuss potential weather issues that could affect workers. It is the SSHO's responsibility to recognize weather conditions and adjust site activities accordingly.

3.4.10 Bloodborne Pathogen Exposure

Bloodborne pathogen exposure risks are associated with medical emergencies requiring cardiopulmonary resuscitation (CPR); stabilization of a bleeding victim or one with an open wound; or cleanup of blood, body fluids or tissues, or broken or sharp objects that might be contaminated with blood. At least two on-site personnel will be trained in CPR and first aid. Personnel trained in CPR and first aid will also be trained in the Bloodborne Pathogens Program.

3.4.11 Buried Utility Lines

A review will be made of any available property maps, redline, or as-built drawings to identify potential buried utilities before commencing work activities. Cannon AFB uses utilities-locating personnel to identify, mark, and de-energize buried utilities prior to starting work. If additional concerns remain regarding the location of buried utilities, the SHSO will be contacted for guidance.

3.4.12 Lockout/Tagout

As necessary throughout the project, lockout/tagout procedures, in accordance with 29 CFR 1910.147 and Foster Wheeler Environmental procedure EHS 6-4, Lockout/Tagout, will be used to control employee exposure to hazardous energy sources and, in particular, to control access to below- and aboveground utilities and services. Subcontractors will present their lockout/tagout procedures to the SHSO for approval.

3.4.13 Excavation Safety

All excavation work will be performed in accordance with the guidelines specified by OSHA in 29 CFR 1926 Subpart P, 29 CFR 1926.651, 29 CFR 1926.652, and Foster Wheeler Environmental procedure EHS 6-3, Excavation and Trenching.

Special precautions will be taken when work activity is occurring on slopes. Personnel will maintain good footing at all times. If slope gradient is excessive (steeper than 45°), fall protection guidelines will be implemented. All surface hazards shall be removed from surfaces surrounding open trenches and excavations. Employees shall not be permitted under loads being lifted or under loads being unloaded from vehicles.

Employees shall not work in excavations in which water has accumulated or is accumulating. The Competent Person and the PESM will plan future work tasks in wet excavations. These tests may include the use of additional protection, such as special support systems or water removal. Barriers, such as ditches and dikes, shall be used to divert runoff from excavations and trenches. Trenches shall be reinspected prior to reentry after water accumulation from heavy rainfall or seepage.

When vehicles and machinery are operating adjacent to excavations, warning systems, such as stop logs or barricades, shall be used to prevent vehicles from entering the excavation or trench.

3.4.14 Work on Slopes

Because this project requires work on slopes, the Site Construction Manager and the SHSO will assess the work as it is performed to ensure safe footing for equipment and personnel is implemented. Heavy-equipment operators will use techniques to prevent placing their equipment in unsafe positions. Slopes will be considered when selecting the types of equipment to be used. Personnel may be required to wear shoes with extra traction (i.e., spikes). Other techniques may be employed to protect the site workers while working on slopes.

3.4.15 Hot Work

Work involving the use of cutting or welding equipment will be conducted using a hot-work procedure. The SHSO will coordinate the initiation of permits with Cannon AFB Fire Department. In addition, the following site-specific practices will be observed:

- Foster Wheeler Environmental procedure EHS 6-5, Welding and Hot Work, will be followed.
- Hot work will be contingent upon acceptable entry conditions to confined spaces and excavations.
- All lines will be cleaned of contaminants prior to hot work being performed, as applicable.
- Coatings of piping and vessels containing lead will be chemically stripped a minimum of 6 inches on either side of the work, as applicable.

- The inside of the piping or vessel will be monitored to ensure a hazardous or flammable atmosphere does not exist.
- If a flammable or hazardous atmosphere does exist, it will be inerted or vented prior to working.

3.4.16 Fueling and Maintenance of Equipment

All equipment will be fueled only in a designated area. This area will have signs indicating that smoking is prohibited. All equipment will be turned off while being fueled. Employees will ensure that all connections from tank to the vehicle are grounded whenever a flammable fuel is transferred. Spill control and containment supplies will be readily available to clean up any spills. A designated maintenance area will be set up in a manner to prevent release of maintenance fluids to the ground. All fluids and batteries will be stored to prevent release of liquids to the ground. Supplies will be stored neatly and good housekeeping is required. The SHSO will inspect these areas at the end of each day.

The aboveground storage tank will be labeled with the name of the contents and signage indicating either the combustibility or flammability of the liquid, including use of the National Fire Protection Association (triangle) hazard identification system. The tank will have secondary containment. The area will be demarcated by fence or barrier tape and signs will be posted to indicate that smoking is prohibited.

3.4.17 Confined Spaces

Employees will not enter any confined space whether existing or created. There are no confined spaces on the site except for tanks. No tanks will be entered at any time. It is possible that trenches or holes will be dug during excavation. Employees will not enter any excavation or trench. Excavations that are greater than 15 ft wide may be entered after the area is inspected by the SHSO and it is determined that the excavation conforms with the requirements of EM 385-1-1 and Foster Wheeler Environmental procedures.

3.4.18 Spills

All spills, leaks, and fires involving oil or hazardous substances must be reported in accordance with the procedures specified in the Spill Prevention Control and Countermeasures Plan, Appendix D.

3.5 BIOLOGICAL HAZARDS

3.5.1 Insects

Stinging insects, primarily spiders, scorpions, bees, and wasps, are prevalent at the site during the warmer months. Field personnel should exercise caution and avoid contact with these insects by always looking ahead to where they will be walking, standing, sitting, or leaning. Personnel who have experienced

serious reactions to previous insect bites are urged to secure possible immunization or have an antidote readily available to prevent future reactions.

3.5.2 Rattlesnakes

Field personnel performing site activities could encounter rattlesnakes. Employees are advised to be alert to this danger. Snakebites can be painful and lead to serious illness if not treated immediately. If bitten, personnel must seek medical attention immediately. The best thing to do, however, is to avoid contact as follows:

- Wear sturdy leather boots.
- Avoid walking in areas where snakes may hide.
- Use extreme caution when moving or lifting objects that could be used by snakes as cover.
- Never reach under or behind such objects or into other areas where snakes may hide.

3.5.3 Mosquitoes

Mosquitoes could be prevalent at the site during certain times of the year. The risk of disease transmission via the mosquito vector is considered to be very low. Use of PPE will provide some protection from mosquitoes during normal site operations, and insect repellent should be used when mosquitoes cannot be avoided. Creation of mosquito breeding habitat (areas of standing water) will be avoided whenever possible.

4.0 AIR MONITORING

All on-site monitoring will be performed in accordance with the Base-Wide HASP. The following sections provide the practices to be implemented for direct reading instrumentation, integrated air sampling, and the calibration and maintenance of instrumentation.

4.1 ON-SITE MONITORING

Wind-blown dust from the clean construction activities will be monitored to ensure and document that no site worker experiences adverse exposure. To document and control the level of exposure to site workers, the SHSO will use miniRAM personal dust monitors to measure real-time respirable dust levels and ensure workers are not exposed to levels exceeding the permissible dust level. Monitoring with the miniRAMs will be conducted daily for the first 2 weeks of the project or until site conditions are characterized. Following this initial monitoring, periodic monitoring as determined by the SHSO will be conducted to ensure conditions have not changed.

Respirable dust level monitoring will allow for the estimation of dust volume in the air at the work site (see Table C-2). Dust suppression methods, such as spraying water, controlling speed of travel, etc., will be used to control the amount of dust site activities generate when visible dust is sustained for 5 minutes. The SHSO and the Site Construction Manager, with input from the PESM, will determine the need and applicability of the measures.

Table C-2. Occupational Exposure to Dust

Particulate	TLV	Action Level	Action
Respirable particulate	3 mg/m^3	1.5 mg/m^3	Full-face air-purifying respirator with HEPA cartridge. Implement dust control.

(Particulates Not Otherwise Classified)
Reference: American Conference of Governmental Industrial Hygienists TLVs and BEIs, 1998
HEPA High-Efficiency Particulate Air
mg/m^3 milligrams per cubic motor
TLV Threshold Limit Value

5.0 TRAINING AND COMMUNICATION

5.1 GENERAL TRAINING REQUIREMENTS

Personnel covered by this SSHP must be active participants in the Foster Wheeler Environmental Hazardous Waste Operation and Health and Safety Training Program, which complies with OSHA 29 CFR 1910.120(e), OSHA 29 CFR 1926.20, and the USACE Safety and Health Requirements Manual EM 385-1-1 (Section 28.D).

5.1.1 First-Aid Training

Individuals assigned to perform first aid and CPR must hold current American Red Cross or equivalent training certification. At least two site workers will be currently certified in first aid and CPR during all phases of field work.

5.2 ON-SITE COMMUNICATIONS

Verbal communication at the sites may be impeded by on-site background noise, ongoing activities, or the use of PPE. Hand signals may be used between personnel and will be reviewed during daily/preshift safety meetings. The use of the buddy system will ensure that any information is communicated between all workers on site.

External communications between on-site personnel will be conducted using cellular telephones. Exact locations of site facility telephones and emergency telephone numbers will be determined before site activities begin and communicated to all site personnel.

5.3 NOTIFICATION OF ACTIVITIES

The SHSO will contact the Cannon AFB Fire Department and hospital prior to starting work to discuss project scope and potential hazards at the site and to confirm emergency response capabilities.

5.4 SAFETY ORIENTATION/TAILGATE MEETINGS

The SHSO will conduct a daily (or preshift) tailgate safety meeting to review the physical hazards that may be present at the site. Proper and safe work practices will be reviewed. This meeting will also address contingency plans for potential emergency situations and location(s) of available safety equipment. The SHSO will inspect the site to ensure that the SSHP is being properly implemented and shall also periodically review the SSHP to ensure that all physical and chemical hazards encountered during field activities are recognized and addressed therein.

6.0 FIRST-AID PLAN

The following general guidelines apply to first-aid services for the RA:

1. Survey the situation. Do not endanger your own life. Do not enter a confined space to rescue someone who has been overcome unless properly equipped and with a standby person present.
2. Call the fire department immediately. Explain the physical injury, chemical exposure, fire, or release.
3. Decontaminate the victim without delaying life-saving procedures.
4. If the victim's condition appears noncritical but seems to be more severe than minor cuts, trained emergency medical services personnel should transport him/her to the nearest hospital. The attending physician has the responsibility for determining the severity of the injury.
5. When transporting an injured person to a hospital, bring this SSHP to assist medical personnel with diagnosis and treatment. In all cases of chemical overexposure, follow standard procedures as outlined for poison management, first aid, and, if applicable, CPR.
6. Notify the DO Manager and the SHSO. Follow Foster Wheeler Environmental incident reporting procedures and also complete the Incident/Near Miss Report Form EHS 1-7 within 24 hours.

First-aid equipment and supplies will be kept in a project vehicle or at a location that is near the work areas at LF-25. Table C-3 details the first-aid equipment that will be present on site during RA field activities.

Table C-3. First-Aid Equipment and Supplies

Equipment	Size	Location
First-aid kits with bloodborne pathogen kit	10-person capacity for every 5 workers	In each project vehicle
Emergency eye wash	One portable unit with 15-minute flush capacity	On site or in project vehicle
Spill control	Absorbent pads, drum, and Shovels	On site or in project vehicle
Fire extinguishers	10-pound ABC— at least two units	On site or in project vehicle

7.0 GENERAL SAFETY RULES

1. All site personnel must attend the daily or preshift tailgate safety meeting.

2. Any individual taking prescribed drugs shall inform the SHSO of the type of medication. The SHSO will review the matter with the PESM and the corporate medical consultant, who will decide whether the employee can safely work on site while taking the medication.

3. The PPE specified by the SHSO and the SSHP shall be worn by all site personnel. This includes hard hats, steel-toed boots, and safety glasses, which must be worn at all times in active work areas.

4. Facial hair (long sideburns or mustaches) that may interfere with a satisfactory fit of a respiratory mask is not allowed on any person who may be required to wear a respirator.

5. Smoking is permitted only in designated areas.

6. All signs and demarcations shall be followed. Such signs and demarcations shall not be removed except as authorized by the SHSO.

7. No one shall enter a permit-required confined space without a permit. Confined space entry permits must be followed. No confined space entry is permitted on this project without specific authorization of the PESM.

8. All personnel must use the buddy system.

9. All personnel must follow the work-rest regimens and other practices required by the heat stress program.

10. All personnel must follow lockout/tagout procedures when working on equipment involving moving parts or hazardous energy sources.

11. No person shall operate equipment unless trained and authorized.

12. Ladders and scaffolds shall be solidly constructed, in good working condition, and inspected prior to use. No one may use defective ladders or scaffolds.

13. Fall protection or fall arrest systems must be in place when working at elevations greater than 6 ft for temporary working surfaces or 4 ft for fixed platforms. Ladders cannot be wood or metal.

14. Safety harnesses and lanyards must be selected by the SHSO. Safety belts for fall protection are not authorized. The user must inspect the equipment prior to use. No defective personal fall-protection equipment shall be used. Personal fall protection that has been shock loaded must be discarded.

15. Hand and portable power tools must be inspected prior to use. Defective tools and equipment shall not be used. All power tools must have a grounding plug or be double insulated.

16. GFCI units shall be used for cord and plug equipment used outdoors or in damp locations. Electrical cords shall be kept out of walkways and puddles unless protected and rated for such service. Vehicles and equipment will not drive over any electrical cords.

17. Improper use, mishandling, or tampering with health and safety equipment and/or samples is prohibited.

18. Horseplay of any kind is prohibited.

19. Possession or use of alcoholic beverages, controlled substances, or firearms on any site is forbidden.

20. All incidents, no matter how minor, must be reported immediately to the DO Manager and the SHSO.

21. All personnel shall be familiar with the Site Emergency Action Plan, Section 9.0 of this SSHP.

Additional guidelines for safe work practices and health and safety work rules are presented in the Foster Wheeler Environmental Project Rules Handbook (1999).

8.0 VISITOR REQUIREMENTS

Visitors to the site will be required to participate in a site-specific safety orientation briefing. In accordance with the contract requirements, four sets of PPE (excluding prescription glasses and safety shoes) will be maintained in storage for government representatives. Visitors will sign in and sign out.

9.0 EMERGENCY RESPONSE PLAN

9.1 GENERAL REQUIREMENTS

Prior to working on the site, all personnel will be familiar with the emergency response plan requirements of this SSHP and the Base-Wide HASP (Foster Wheeler Environmental, 2000). Copies of the SSHP and Base-Wide HASP will be kept in Foster Wheeler Environmental site vehicles and in the USACE field office, since an office trailer will not be located at the site.

9.2 EMERGENCY TELEPHONE NUMBERS

Ambulance (Base)		(505) 784-4033 or 911
Fire Department (Base)		(505) 784-2578 or 911
Base Hospital		(505) 784-4033 or 911
Poison Control		(800) 432-6866
EPA (Info line)		(800) 424-9346
National Response Center		(800) 424-8802
Chemtrec		(800) 424-9300
Plains Regional Medical Center—Civilian Hospital		(505) 769-2141
Sina Seyedian	Program Manager	(303) 988-2202
James Morning, OHST	Construction Manager/SHSO	(505) 430-2307
Roger Margotto, CIH	PESM	(619) 234-8696
		(714) 810-3742 (*pager*)
Carol Bieniulis	DO Manager	(505) 878-8924
		(505) 934-0879 (*mobile*)
Tom Zink	USACE Technical Manager (Omaha)	(402) 221-7711
Max Pastor	USACE Resident Engineer	(505) 784-2861
John Pike/Sanford Hutsell	Base Point of Contact (POC)	(505) 784-6378
Jayne Fitzgerald	Regional Compliance Manager	(714) 444-5534

9.3 INCIDENT REPORTING PROCEDURES

In the event of an accident or incident, a Foster Wheeler Environmental Accident/Incident Report Form and USACE Accident Report ENG Form 3394 (Attachment 1) must be completed within 24 hours. Depending upon the nature of the incident, additional agencies or individuals may need to be notified, including the New Mexico Environment Department, OSHA, and Base POC. Unless otherwise mandated by law, no outside agency may be contacted without explicit approval by Cannon AFB.

All incidents resulting in injury, illness, or property damage require completion of an accident investigation and report. The investigation should be initiated as soon as emergency conditions are under control. The purpose of this investigation is not to attribute blame but to determine the pertinent facts so that repeat or similar occurrences can be avoided.

The investigation should begin while details are still fresh in the minds of the personnel involved. The person administering first aid may be able to start the fact-gathering process if the injured are able to speak. Pertinent facts must be determined. Questions beginning with who, what, when, where, and how are usually most effective in discovering ways to improve job performance in terms of efficiency and quality of work as well as safety and health concerns.

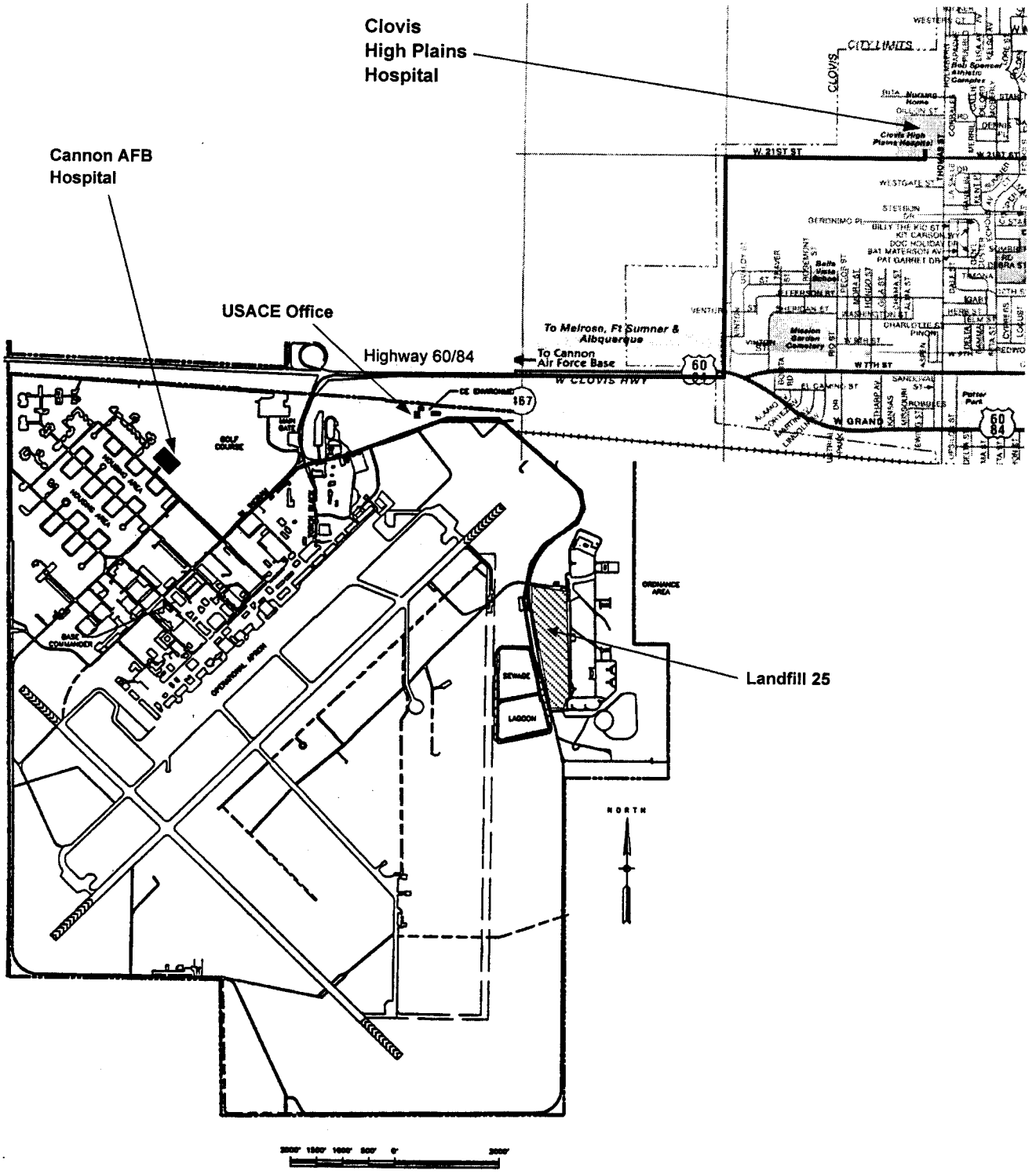
9.4 MEDICAL TREATMENT FACILITIES

The routes to the Cannon AFB Hospital and to Plains Regional Medical Center Hospital in Clovis, New Mexico, are shown on Figure C-1. The use of the Cannon AFB hospital is restricted to life and death situations.

10.0 DANGEROUS WEATHER RESPONSE PLAN

Work will not be permitted during severe weather conditions that could endanger the health and safety of onsite workers or when there is an imminent threat of severe weather. Additionally, site workers are advised to do the following:

1. Stop work during electrical storms and other extreme weather conditions such as extreme hot or cold temperatures.
2. Take cover in vehicles or at a designated building provided for field operations by Cannon AFB.
3. Listen to local forecasts for warnings about specific weather hazards such as tornadoes, flash floods, or electrical storms.
4. Take frequent work breaks during extreme heat or cold conditions.



Scale in Feet is Approximate

SITE HEALTH AND SAFETY PLAN

Cannon Air Force Base, New Mexico

U.S. Army Corps of Engineers, Omaha District

Figure 9-1

Hospital Route Map

Foster Wheeler Environmental Corporation

11.0 REFERENCES

Foster Wheeler Environmental (Foster Wheeler Environmental Corporation)
2000. Base-Wide Health and Safety Plan, Cannon AFB, October.

1999b. Foster Wheeler Environmental Corporation Environmental Health and Safety Program Manual and Project Rules Handbook.

USACE (U.S. Army Corps of Engineers)
1996. USACE Safety and Health Requirements Manual (EM 385-1-1).

Attachment 1

Health and Safety Forms

Health and Safety Plan Acknowledgment

This form serves as documentation that field personnel have read, been informed, and understand the provisions of the Cannon Air Force Base Base-Wide Health and Safety Plan (HASP) and the project-specific addendum to the HASP for the remedial action of Landfill 25 (Solid Waste Management Unit 97).

Each field team member, including subcontractors, will read the Base-Wide HASP and the project-specific addendum. Once the plans have been read, each person will sign this form after the site-specific training is complete before being permitted to work on site. In signing this form, each person will understand the following statement:

I have read, or have been informed of, the Cannon AFB Base-Wide HASP and the project-specific addendum for the remedial action at Landfill 25. I understand the information presented and will comply with the provisions contained therein.

Name	Signature	Date

EHS 3-3 ATTACHMENT B

FOSTER WHEELER ENVIRONMENTAL CORPORATION

EHS WEEKLY/MONTHLY CHECKLIST AND ACTION ITEM REPORT

Project: _____ **Area of Inspection:** _____

Inspection Type: ☐ **Weekly** ☐ **Monthly**

Inspector: _____ **Date:** _____

Signature: _____ **Time:** _____

REQUIREMENTS	OBSERVATIONS (N/A if not applicable)	FINDING YES/NO
Work Conditions		
1 Walking /Working Surfaces		
2 Aisles and Passageways		
3 Platforms/ Scaffolding		
4 Ladders		
5 Stairs		
6 Exits/Egress		
7 Roadways		
8 Ventilation		
9 Lighting		
10 Noise Exposure		
11 Ergonomics		
Materials		
1 Stacking and Storage		
2 Chemicals and Fuel		
3 Compressed Gases		
Equipment		
1 Hand / Portable Tools		
2 Machine, Tools, Guarding		
3 Mobile/ Heavy Equipment		
4 Lifting Gear Equipment		
5 Materials Handling Equipment		
6 Mechanical Power Systems		
7 Hydraulic Power Systems		

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EHS 3-3 ATTACHMENT B

EHS WEEKLY/MONTHLY CHECKLIST AND ACTION ITEM REPORT

REQUIREMENTS	OBSERVATIONS (N/A if not applicable)	FINDING YES/NO
8 Pneumatic Power Systems		
9 Electrical Power Systems		
10 Valves and Controls		
Hazard Controls		
1 Other Heavy Equipment		
2 Lock-Out Systems		
3 Signs and Tags		
4 Color Coding		
5 Materials Labeling		
6 Warning Systems		
Emergency Systems		
1 Emergency Instructions		
2 Fire Protection		
3 Eye Wash and Showers		
4 First Aid Kits/ Stations		
5 Emergency Rescue Equipment		
Protective Equipment		
1 Eye Protection		
2 Ear Protection		
3 Respiratory Protection		
4 Head Protection		
5 Hand Protection		
6 Foot Protection		
7 Body Protection		
8 Fall Protection		
Hazardous Waste Storage Area(s)/Satellite Accumulation Areas[1] [2]		
1 Designated, secured area with "Hazardous Waste" signage. For SAA area is marked "SAA". (SAA)		
2 Containers:		
a. DOT-spec. containers (for wastes to go off-site only)		

[1] For sites with multiple storage areas or Satellite Accumulation Areas (SAAs), indicate location where deficiencies are noted.
[2] For SAAs, evaluate only rows marked with (SAA).

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EHS 3-3 ATTACHMENT B

EHS WEEKLY/MONTHLY CHECKLIST AND ACTION ITEM REPORT

REQUIREMENTS	OBSERVATIONS (N/A if not applicable)	FINDING YES/NO
b. Intact/in good condition (SAA)		
c. Waste compatible with containers (e.g., no evidence of corrosion, softening, bulging) (SAA)		
d. Marked "Hazardous Waste"/ visible Accumulation Date. *For SAA, marked "Hazardous Waste" or identify container contents and Accumulation date (SAA)*		
e. Securely closed and stored to prevent rupture/leaking, except when add/remove waste. (SAA)		
f. Labeled with EPA Id. No.		
g. For SAA only, Stored "at the point of generation" and meets quantity limits.		
3 Reactive/ignitable wastes stored at least fifty (50) feet from property.		
4 Liquid wastes within secondary containment.		
5 Incompatible wastes separated by a dike, wall, berm or other device.		
6 Stored for less than 90 days. *(CERCLA projects may have storage variance).*[3]		
7 Container tracking log accurately reflects containers stored. (SAA)		
8 Area maintained in an orderly fashion and complies with state/EHS plan requirements. (SAA)		
Hazardous Waste Tank Storage Area *(Daily inspection is being conducted and maintained on-site)*		
Waste/Stockpiles - State Regulated Non-Hazardous Wastes ***(Refer to PESM Checklists, if applicable)***		
TSCA PCB Wastes – must be inspected at least every 30 days (GMP - weekly) *(Refer to PESM TSCA Checklist for inspection items)*		

[3] If stored on-site 75 or more days, TSDF/transporter has been selected (EHS 1-4), pick-up date scheduled and PM/PESM are aware of 90-day limit.

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EHS 3-3 ATTACHMENT B

EHS WEEKLY/MONTHLY CHECKLIST AND ACTION ITEM REPORT

REQUIREMENTS	OBSERVATIONS (N/A if not applicable)	FINDING YES/NO
Point Source Discharges/ Air Emissions		
1 Permit conditions are being met.		
2 Monitoring equipment is fully operational.		
3 Equipment calibrations and maintenance is up-to-date.		
4 Discharge sampling performed at required intervals.		
5 Review monitoring results *(Report permit exceedences per EHS 1-7)*		
6 DMR and Plant Logs properly completed, signed, and submitted (if required).		
7 Fugitive Dust – Appropriate BMPs are instituted for fugutive dust emissions.		
Stormwater Discharge Activities		
1 SWPPP /Soil Plan reflects current activities.		
2 Monitoring/sampling performed at required intervals.		
3 Review monitoring results *(Report permit exceedences per EHS 1-7)*		
4 BMPs in SWPPP/Soil Plan implemented.		
5 Visual observations indicate stormwater meets water quality criteria.		
6 Inspections conducted as required and documented. Corrective actions are implemented and documented.		
Other Conditions or Work Practices		
1		
2		
3		
4		

- End of Checklist-

Monthly Inspections must be sent to PESM and Project Manager.

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EHS 3-3 ATTACHMENT B

EHS WEEKLY/MONTHLY CHECKLIST AND ACTION ITEM REPORT

Review previous week's/month's Action Item Report. Carry forward action items that have not been implemented. Note outstanding action items with an (F) in the "Action Item" column on this report. Note an (F) in the "Date Completed" column on previous week's/month's Action Item Report.

Project:

Area of Inspection:

Inspection Type: ☐ **Weekly** ☐ **Monthly**

Date of Inspection:

ACTION ITEM	RESPONSIBLE PARTY	SCHEDULE	DATE COMPLETED
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			
16.			

Reviewed by: _____ _____

Site Superintendent/ Site Manager Date

cc: Project Manager (monthly only)
PESM (monthly only)

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REMEDIAL ACTION WORK PLAN
SWMU 97—LANDFILL NO. 25
CANNON AIR FORCE BASE, NEW MEXICO

Prepared for:

27 CE/CEV
Cannon Air Force Base, NM
and
HQ ACC/CEV
Langley Air Force Base, VA

Prepared by:

Foster Wheeler Environmental Corporation
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Under Contract No. DACW45-94-D-0003
Delivery Order No. 28, Work Authorization Directive 3
Project Number: CZQZ20007025

U.S. Army Corps of Engineers
Omaha District
Omaha, Nebraska

July 2000

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Spill Prevention Control and Countermeasures Plan

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LIST OF ACRONYMS

ACM	asbestos-containing material
AFB	Air Force Base
CFR	Code of Federal Regulations
RA	Corrective Measure
CP	Command Post
DO	Delivery Order
EHS	Environmental Health and Safety Officer
ESQ	Environmental, Safety, and Quality
Foster Wheeler Environmental	Foster Wheeler Environmental Corporation
ft	feet
HDPE	high-density polyethylene
LF-25	Landfill 25
POL	petroleum, oil, and lubricants
RA	Remedial Action
RQ	reportable quantity
RS	Regulatory Specialist
SHSO	Site Health and Safety Officer
SPCCP	Spill Prevention Control and Countermeasures Plan
USACE	U.S. Army Corps of Engineers

1.0 INTRODUCTION

This Spill Prevention Control and Countermeasures Plan (SPCCP) was prepared in accordance with U.S. Environmental Protection Agency Oil Pollution Prevention Regulations (Title 40 of the Code of Federal Regulations [CFR] Part 112) to address the potential for spills from an aboveground 2,000-gallon diesel fuel storage tank located at Cannon Air Force Base (AFB) Landfill 25 (LF-25) project site. This plan also addresses prevention of spills and releases from a 200-gallon diesel fuel tank on a concrete crusher and several 55-gallon storage drums for petroleum, oil, and lubricants (POL) and antifreeze also located at the site construction staging area. The SPCCP is required because the amount of diesel stored at this location exceeds the 660-gallon capacity threshold for an individual container [as specified in 40 CFR 112.1(d)(2)(ii)]. Project activities will require the use of heavy earth-moving and material-handling equipment, such as excavators, bulldozers, front-end loaders, and compactors. Operation of this equipment requires the use of a temporary storage tank to store diesel fuel.

Fuel storage, equipment fueling, and maintenance are activities identified as having the greatest potential for spills and releases. To minimize this risk, the SPCCP will be implemented in conjunction with the Remedial Action (RA) Work Plan and the Site-Specific Safety and Health Plan. The SPCCP addresses the potential for spills and releases from the temporary diesel storage tank and equipment fueling and maintenance areas and emphasizes spill prevention through the use of Best Management Practices consisting of the following:

- Good housekeeping and on-site management practices and implementation of preventative maintenance procedures
- Use of secondary containment and liners for selected areas such as fuel storage
- Inspections

Training

The SPCCP complies with existing laws and regulations pertaining to safety standards, fire prevention, and pollution prevention and provides an explicit, comprehensive, balanced spill prevention plan. The Task Manager has full approval of the Base and Foster Wheeler Environmental Corporation (Foster Wheeler Environmental) management to commit the resources necessary to implement the SPCCP. The SPCCP describes the actions Foster Wheeler Environmental personnel will take in response to leaks, spills, or discharges of fuel, lubricants, or antifreeze. The plan also describes:

- Types of materials typically managed at the site
- Spill prevention measures
- Emergency response procedures
- Designated on-site emergency coordinator and spill/release coordinator and their responsibilities

- Evacuation plans
- Spill incident reporting procedures

Foster Wheeler Environmental will determine the potential risk of harm to the environment for facilities described in this plan and for which this plan is to be implemented. A copy of this SPCCP will be maintained in the Foster Wheeler Environmental Site Construction Manager's vehicle or U.S. Army Corps of Engineers (USACE) field office and made available to site and project personnel.

2.0 FACILITY INFORMATION

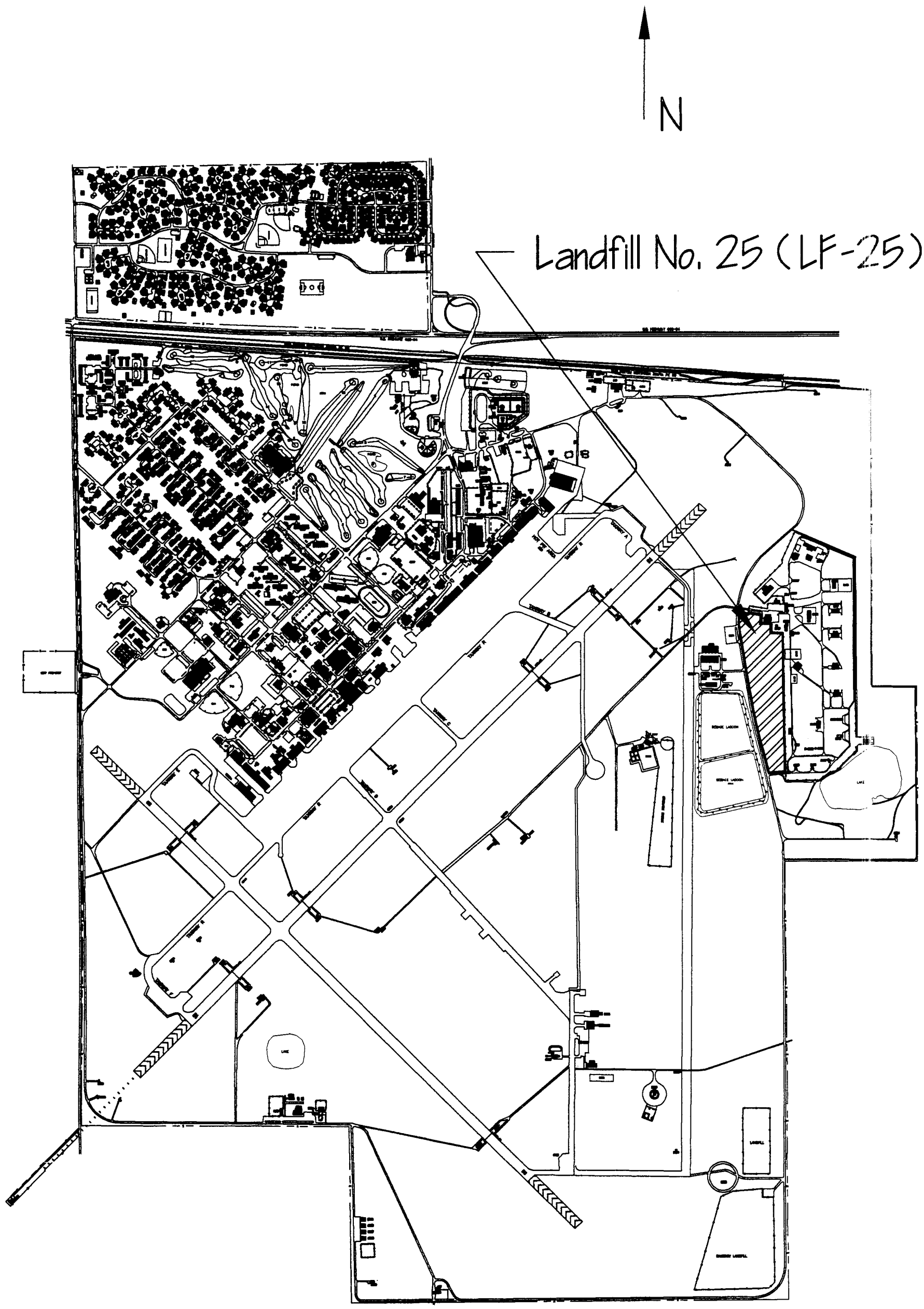
LF-25 is located in the east-central portion of Cannon AFB, bounded by a road leading to the ordnance area to the north, a road leading to the north side of Playa Lake to the south, the ordnance area to the east, and a perimeter road to the west (Figure D-1). The landfill is nearly rectangular, measuring approximately 29 acres, with dimensions approximately 650 feet (ft) by 1,950 ft (Figure D-2).

LF-25 received waste from 1945 through the 1980s; the exact date when disposal activities ceased is unknown. After World War II, construction demolition debris (concrete, wood, asbestos tiles, metal, asbestos/cement pipe, and asphalt mixed with soil) were disposed of in the landfill. Concrete pieces of various sizes and shapes are from demolition of buildings and pavement (runways) at Cannon AFB. Debris extends approximately 3 to 4 ft above natural grade over most of the site, reaching a maximum of approximately 15 ft above natural grade on the north end.

Site information indicates that an inadequate cover is placed on the site. As a result of current conditions, ponding occurs, limited cover material is in place at several locations, and signs of soil erosion are visible. Asbestos-containing material (ACM) and construction and demolition debris are exposed throughout the landfill. The primary purpose of the RA is to remove exposed ACM and concrete debris and regrade the cover to minimize infiltration and erosion while providing proper drainage.

3.0 EMERGENCY CONTACT NUMBERS

Numerous federal, state, and local regulatory requirements govern spill/release reporting and response activities. Depending on the circumstances, reporting may be deemed necessary under federal (Clean Water Act; Comprehensive Environmental Response, Compensation, and Liability Act; Superfund Amendments and Authorization Acts Title III; Resource Conservation and Recovery Act; Toxic Substances Control Act), state, and/or local spill-reporting programs. Some programs specify minimum quantities, others do not; some programs apply to virtually any spill, others are very specific. If hazardous materials are spilled or emitted into the air, federal and related state and local laws must be followed to protect the environment. New Mexico law requires that any discharge of oil, antifreeze, or



REMEDIAL ACTION WORKPLAN
SWMU 97 – LANDFILL NO. 25

Cannon Air Force Base, New Mexico

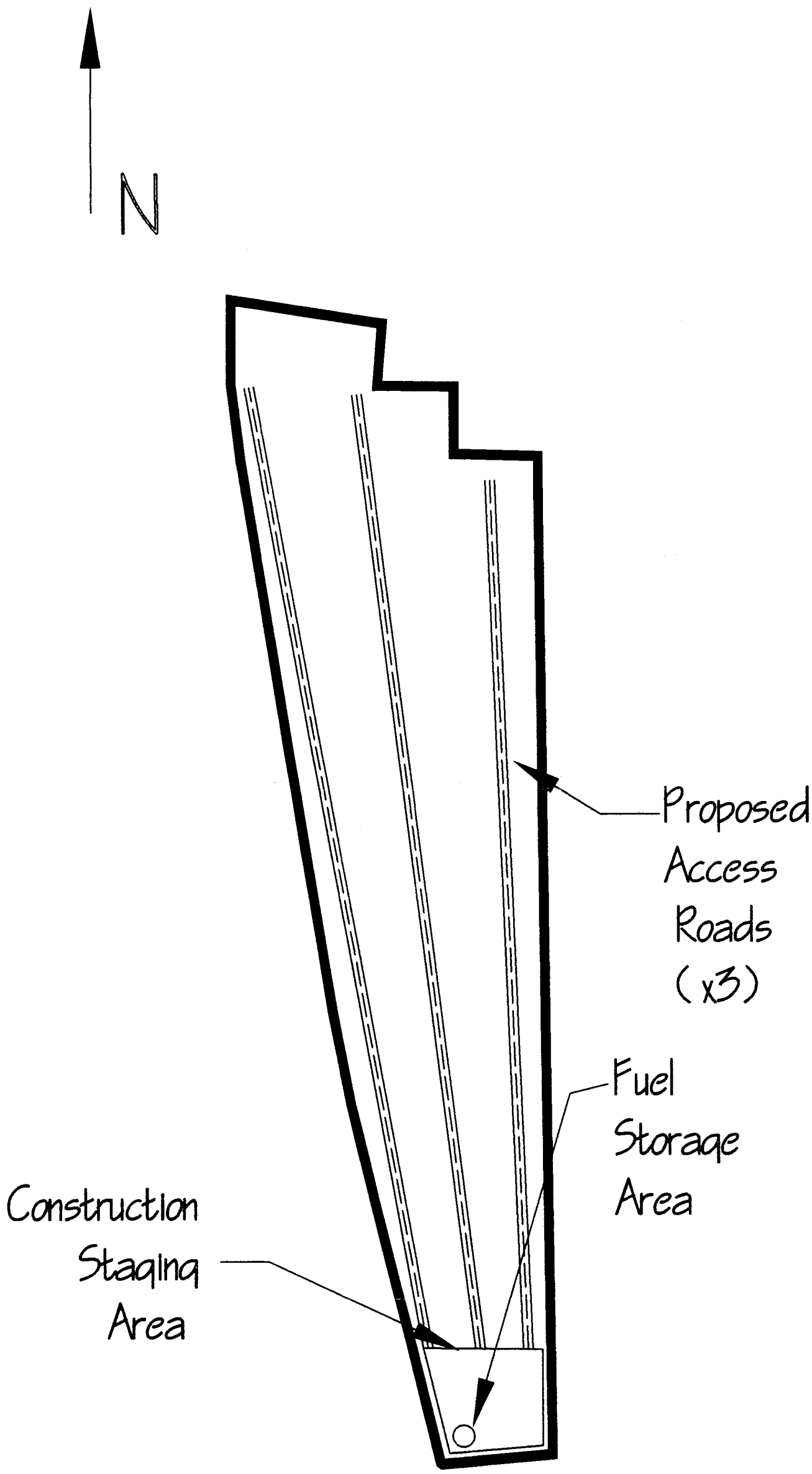
U.S. Army Corps of Engineers, Omaha District

Figure D–1
Location of Landfill No. 25

Foster Wheeler Environmental Corporation
July 5, 2000

0 1500 ft. 3000 ft.

Scale: 1 inch = 1500 ft.



REMEDIAL ACTION WORKPLAN
SWMU 97 – LANDFILL NO. 25

Cannon Air Force Base, New Mexico

U.S. Army Corps of Engineers, Omaha District

Figure D-2 Site Plan Map

Foster Wheeler Environmental Corporation
July 5, 2000

0 250 ft. 500 ft.

Scale: 1 inch = 250 ft.

other water contaminant in a quantity that may, with reasonable probability, injure or be detrimental to human health, animal or plant life, or property or that may unreasonably interfere with the public welfare or the use of the property be reported as soon as possible, but no more than 24 hours after the event.

If a diesel spill or release occurs, the following priorities must be established:

- Protect people from injury by isolating the affected area to prevent unnecessary exposure and contamination of personnel and, if necessary, evacuate personnel from the area of the release
- Prevent contamination of soil, water, and air by using sorbent pads/material and containment, as practical
- Protect property from damage
- Report the release to appropriate authorities

The required response will depend on several factors, i.e., the source, type, and quantity of materials released and into what media the material was released (air, soil, or water). As mentioned, New Mexico law requires any unplanned or threatened discharge of hazardous substances or oil be reported unless there is a reasonable belief that no significant present or future threat is posed to human health and safety or to the environment or if the release quantity is below a specified threshold quantity. Reporting requirements for spills or releases of diesel fuel at the site will be determined on a case-by-case basis. If a release is to be reported, the following actions will be taken.

The Site Health and Safety Officer (SHSO) will be designated as the Foster Wheeler Environmental Spill and Release Reporter. This individual will receive training in the Foster Wheeler Environmental Health and Safety (EHS) Program procedure EHS 1-7, Incident Reporting and Investigation. If a spill or release occurs, the SHSO will immediately notify the Delivery Order (DO) Manager and the project Regulatory Specialist (RS). The DO Manager will immediately notify the Cannon AFB On-Site Representative at (505) 784-4348, the Cannon AFB Emergency Spill Response Coordinator, the Cannon AFB Fire Prevention and Protection Branch, and the Safety and Environmental Office.

Site personnel must contact the Foster Wheeler Environmental DO Manager. If the DO Manager cannot be located, the RS must be contacted. Following is a summary of contacts regarding spill reporting and notification.

The DO Manager or RS must immediately notify the Foster Wheeler Environmental Safety and Quality (ESQ) Regional Compliance Manager at (714) 444-5534 of any spills and/or releases. A written incident report must be submitted within 24 hours.

Table D-1. Emergency Contacts

Contact	Title	Affiliation	Telephone Number
James Morning	On-Site Spill Reporting Coordinator/SHSO	FWENC	TBD
Carol Bieniulus	DO Manager	FWENC	(505) 878-8924 (505) 878-8933 – Fax
Craig O'Rourke	RS	FWENC	(714) 444-5511
Jayne Fitzgerald	ESQ Regional Manager	FWENC	(714) 444-5534
Sanford Hutsell	On-Site Representative	Cannon AFB	(505) 784-4348
TBD	Cannon AFB Emergency Spill Response Coordinator	Cannon AFB	TBD
Cannon AFB CP	NA	Cannon AFB	
Cannon AFB Fire Prevention and Protection Branch	NA	Cannon AFB	
Cannon AFB Safety and Environmental Office	NA	Cannon AFB	
James Morning	Site Construction Manager	FWENC	TBD

CP Command Post
DO Manager Delivery Order Manager
ESQ Environmental, Safety, and Quality
FWENC Foster Wheeler Environmental Corporation
NA Not Applicable
RS Regulatory Specialist
SHSO Site Health and Safety Officer
TBD to be determined

If Cannon AFB or Foster Wheeler Environmental is required to notify an agency, the notification and subsequent reporting will be made to the following agencies:

New Mexico Environment Department
Surface Water Quality Bureau
Santa Fe, New Mexico
(505) 827-2981 (8 a.m.–5 p.m.)
(505) 827-9329 (24 hour)

National Response Center (for any release where a reportable quantity [RQ] is exceeded)
(800) 424-8802
RQ (oil and diesel) = 25 gallons
RQ (Antifreeze) = 5,000 pounds

4.0 POTENTIAL FACILITY DISCHARGES AND SPILL PREVENTION MEASURES

This section presents information on the potential sources of contamination and the preventive measures used to minimize the chance of a spill.

4.1 POTENTIAL FACILITY DISCHARGE

Table D-1 lists potential contamination sources or pieces of equipment and the total quantity of liquid that could be discharged. These sources are located within two separate secondary containment units (one for the diesel storage tank and the other for the containers of POL); the units are in the form of a 40-mil high-density polyethylene (HDPE)-lined and bermed area.

Table D-2. Potential Facility Discharge from LF-25

Description	Contents	Reportable Quantities
Steel tank	Diesel (2,000 gallons)	25 gallons (oil and diesel)
Metal drum	Antifreeze (55 gallons)	5,000 pounds
Metal drum	Motor oil (55 gallons)	25 gallons (oil and diesel)
Metal drum	Hydraulic oil (55 gallons)	Not applicable

4.2 SPILL PREVENTION MEASURES

As previously indicated, the sources of POL, diesel, and antifreeze at LF-25 include one aboveground 2,000-gallon diesel fuel tank, two 55-gallon drums of motor oil and hydraulic oil, and one 55-gallon drum of antifreeze. The tanks and the containers of hydraulic oil, motor oil, and antifreeze are stored within secondary containment in the form of a 40-mil HDPE-lined and bermed area. Generally, minor spills or leaks are contained within the area of the tank or containment structure. Spills and leaks typically occur when tanks overflow, when drums and pumps leak, or during loading/unloading activities. A much less likely spill event would be the complete failure of a tank or storage drum.

Spill prevention measures will include the following:

- All oil/diesel/antifreeze transfer operations will be manually controlled. Personnel performing the transfer will remain in the area during the transfer to monitor the operation and check for any pipe, valve, or pump leaks and overflows.
- Equipment will be grounded and bonded during the transfer of liquids.
- Tanks and storage drums will be inspected regularly for leaks, structural damage, corrosion, etc. Inspections must be documented in the field logbook.

4.2.1 Loading/Unloading Operations

Diesel Fuel Tanks. The vendor tanker truck will park parallel to the secondary containment when filling the diesel tanks. The tanker driver will connect a fill hose from the tanker to the diesel tank's top-mounted opening. A Foster Wheeler Environmental representative will be on site during this activity and

will inspect all hose connections and tanker valving prior to unloading of product. Additional measures to be taken during loading/unloading activities will include:

- "Sticking" the tank to verify the volume remaining and to help the driver ensure that the tank is not overfilled.
- Using grounding for truck and tank.
- Inspecting the tanker valves to ensure that there are no leaks prior to disconnecting any hoses or moving the tanker. The Foster Wheeler Environmental representative will perform the inspection.

Oil/Antifreeze Drums. New motor oil and hydraulic oil and antifreeze are stored in closed 55-gallon drums and various approved 5-gallon containers placed on wooden pallets within the secondary containment area. Material safety data sheets for each type of oil and antifreeze are maintained at the USACE field office. Drums will be placed into and removed from delivery trucks and into the secondary containment area by hand, forklift, or clamp truck. A Foster Wheeler Environmental representative will visually inspect drums for leaks and damage before and after unloading.

4.2.2 Resources Available for Spill Response/Remediation

The project site is adequately equipped to meet preparedness and prevention requirements by maintaining a communication system, on-site equipment suitable for emergency response, and accessibility to off-site resources. The on-site equipment enables Foster Wheeler Environmental personnel to respond to emergency incidents that may arise and allows them to contain the release until, if necessary, the Base Fire Department can remedy the situation.

Foster Wheeler Environmental personnel will be equipped with a communications network that can be linked to both on-site and off-site resources. Off-site communications are available via the local telephone system. Telephones will be located in the USACE field office, the Site Construction Manager's vehicle, and the Site Health and Safety Officer's vehicle. On-site communications will be conducted by telephone and/or via two-way radio.

Primary emergency response equipment available at the project site includes the following:

- Large drip pans
- Stationary ABC-type fire extinguisher at the diesel tank storage area
- Emergency eyewash
- First-aid kit
- Personal protective equipment, including Tyvek® coveralls, rubber gloves and booties, respirators, etc.
- Shovels and rakes for spill control

- Spill containment pack, which includes sorbent pads/material
- Department of Transportation-approved recovery drums.

As a standard safety practice, personnel managing oils and lubricants will be required to wear the following minimum safety equipment:

- Hard hat and safety glasses
- Sturdy steel-toe work boots
- Work uniforms, as appropriate

In addition to being provided spill control/response equipment, Foster Wheeler Environmental personnel are trained to respond effectively to emergencies by familiarizing themselves with site emergency procedures, emergency equipment, and emergency communication systems. During this training, pollution control is stressed. Spill prevention control procedures are further explained during these sessions.

4.2.3 Spill Response Actions for Specific Units

The diesel storage tank requires special consideration in the SPCCP. If the tank ruptures, the following actions will be taken:

- The tank will be isolated and removed from service.
- Tank contents will be evacuated, if possible, to drums.
- Any free liquid within the secondary containment berm on the ground surrounding the tank will be pumped to another tank (air pumps or by vacuum truck) or to 55-gallon drums.
- Absorbent materials will be used to contain spills, where applicable.

If any 55-gallon drum leaks or releases, the following measures will be taken:

- Absorbent materials, sandbags, and/or soil will be used to dike-contain the release.
- Any free liquid accumulated within the secondary containment area as a result of a drum release or rupture will be pumped to a spare drum maintained at the site for such a purpose.

In addition, appropriate response actions specified in the RA Work Plan and the Site-Specific Safety and Health Plan will be implemented as necessary. These actions include the following:

- Management of released hazardous materials
- Post-emergency procedures (dealing with the removal and storage of cleanup materials and residues)

5.0 CONTAINMENT, DIVERSIONARY STRUCTURES, AND EQUIPMENT

This plan relies on secondary containment to prevent the release of diesel fuel and oil products to federal or state waters. Provided these controls are properly operated and maintained, the potential for release is considered very low.

The primary containment for the 2,000 gallons of diesel fuel is a new carbon-steel tank. The motor oil, hydraulic oil, and antifreeze are contained in new 55-gallons steel drums and various approved 5-gallon containers.

The 2,000-gallon tank is supported above a 40-mil HDPE-lined and bermed area by a steel frame designed to adequately support a full tank. The tank is accessed through a top opening surrounded by a sheet metal spill guard. The top-mounted access port is padlocked when not in use. The diesel tank is an atmospheric tank in which the pressure in the tank is balanced via an atmospheric vent to equal the ambient pressure outside the tank. The tank is equipped with a drain valve, which is not used for unloading and is blinded off with a threaded steel plug. There is no aboveground or buried piping connected to the tank. Foster Wheeler Environmental personnel shall monitor transfer of product at all times to prevent overfilling of fuel tanks.

A hand pump will be used to pump oil and antifreeze from the 55-gal drums. Drip pans are used during the transfer of petroleum products to mitigate the potential for drips and spills to leach into the ground. In lieu of drip pans, sorbent pads/materials, plastic sheeting, or other suitable means are acceptable. Foster Wheeler Environmental personnel shall monitor transfer of product at all times to prevent overfilling tanks.

A warning sign with the following legend will be posted at the diesel tank:

FLAMMABLE
NO SMOKING OR OPEN FLAME WITHIN 50 FEET
DIESEL FUEL

The secondary containment provided for the diesel tank and drums is in excess of 2,000 gallons and consists of a bermed area lined with a 40-mil HDPE liner. The secondary containment area is slightly sloped to the corner to allow collected liquid to accumulate, thus facilitating easy removal. Any liquid falling into the containment is drained to this low area, where it can be pumped (hand pump) or removed using absorbent materials.

6.0 DEMONSTRATION OF IMPRACTICABILITY

This section is not applicable to activities being conducted at the LF-25 site.

7.0 CONFORMANCE WITH GUIDELINES

The SPCCP requires conformance with 40 CFR 112.7 guidelines that are applicable to onshore remedial activities using portable tanks. These activities involve facility drainage, bulk storage tanks, facility tank car and tank truck loading and unloading, security, and personnel training.

7.1 FACILITY DRAINAGE

The current surface water drainage pattern for the southern portion of the site (equipment and fuel staging area) consists of overland flow to the south into a flat basin area. Drainage from the diesel fuel, antifreeze, and oil storage area is restrained by a secondary containment structure, which prevents spills or leakage of material from this area. Accumulated stormwater in the containment area will be emptied mechanically. However, the stormwater will be examined before emptying to ensure that no diesel fuel, antifreeze, or oil is discharged along with it. If there is any product release to the secondary containment area, sorbent pads/material will be used to remove *de minimis* quantities. Any larger quantities will be manually pumped into steel drums. Because it is relatively flat around the secondary containment area, no further engineering controls will be necessary. In the unlikely event of a release from the secondary containment unit, the release will remain in place where the spill occurs. However, if there is a major release from the secondary containment, earth-moving equipment, which is used during project construction activities, will be deployed to the storage area and used to dike the area ahead of the spill for containment and later recovery or disposal of the spilled material and impacted soil.

Rainwater collected in secondary containment areas may be discharged to the ground provided:

- A visual inspection of the secondary containment unit and accumulated rainwater confirms that there is no film or sheen on, or discoloration of, the surface of the water or signs of POL releases or sludge or emulsion deposited beneath the surface of the water.
- The results of the inspection are documented in the daily operating log or equivalent.
- Records of the discharge are noted in the daily operating log or equivalent. Discharge records shall consist of, at a minimum,
  - Approximate amount of discharge
  - Date and time of discharge
  - Description of discharge characteristics (i.e., free of oil/antifreeze and discoloration)

Spilled petroleum products, antifreeze, or contaminated rainwater in the secondary containment will be collected using sorbent material and/or pads, portable pumps, and/or vacuum trucks and stored in recovery drums until the appropriate management method is determined.

7.2 BULK STORAGE TANKS

The bulk storage tanks and drums used for oil, antifreeze, and diesel storage are constructed from compatible materials (e.g., steel). Secondary containment is furnished for the temporary 2,000-gallon tank and the 55-gallon drums of POLs addressed in this plan.

7.3 FACILITY TANK CAR AND TANK TRUCK LOADING/UNLOADING

This section is not applicable to activities being carried out at the LF-25 site.

7.4 SECURITY

The Base will control site access, which is limited to authorized personnel, visitors, and emergency response personnel. Any individual attempting to access the site must be approved by Base personnel at the main gate for identification and clearance before entering. Authorized personnel include project team personnel, Cannon AFB, and USACE personnel. The Foster Wheeler Environmental Site Construction Manager and Cannon AFB must approve other visitors. Authorized personnel and visitors requiring site access for more than 48 consecutive hours must meet training requirements. Delivery personnel, vendors, truck drivers, and utility company personnel will be allowed on site without training but only under the supervision of Cannon AFB or Foster Wheeler Environmental personnel. The RA Work Plan provides further site access and security requirements. Temporary fencing may also be used during construction to control site access.

8.0 PERSONNEL TRAINING AND SPILL PREVENTION PROCEDURES

Site personnel are trained to respond effectively to emergencies by familiarizing themselves with emergency procedures, equipment, and communication systems. Personnel who handle, sample, or come in contact with hazardous materials must undergo basic on-the-job training, 40-hour Occupational Safety and Health Administration training (with 8-hour refresher training, as needed), supervisor training, Department of Transportation training, waste management training, and cardiopulmonary resuscitation/first-aid training. The training will always stress pollution control and waste minimization; spill prevention control procedures are further explained during these sessions. In addition, Foster Wheeler Environmental personnel will review procedures for handling diesel fuel and drums containing new product. Documentation of personnel training will be maintained at the project site.

9.0 SPCCP AMENDMENTS

The SPCCP shall be amended when one of the following events occurs:

- The facility changes in its design, construction, operation, maintenance, or other circumstances in a way that increases the potential for a diesel or POL spill.
- The plan fails in an emergency.

- The list of site and local emergency numbers changes.
- The project duration extends more than 3 years.

10.0 RELATIONSHIP TO OTHER REGULATORY REQUIREMENTS

This SPCCP meets the requirements of 40 CFR Part 112. The SPCCP, in conjunction with the RA Work Plan and Site-Specific Safety and Health Plan, addresses the applicable regulatory requirements regarding spills/releases of chemicals for this site.

11.0 CERTIFICATION AND MANAGEMENT APPROVAL

The certification by a Professional Engineer and approval from management, which is outlined below, meets the requirements established by 40 CFR Part 112.

11.1 PROFESSIONAL ENGINEER CERTIFICATION

I hereby certify that I have examined the Equipment and Designed Application thereof, and being familiar with the 40 CFR Part 112 requirements of the *Spill Prevention Control and Countermeasures Plan*, attest that the following plan has been carefully developed and prepared in accordance with good engineering practices.

Printed Name of Registered Professional Engineer: Derek Johnson

Signature of Registered Professional Engineer: _____

Registration Number: 13069

State: New Mexico

Date: _____

(expires 2 years from date or upon revocation)

Seal:

11.2 MANAGEMENT APPROVAL

The following plan has been prepared in accordance with Federal Environmental Protection Agency Regulations, 40 CFR Part 112, *Spill Prevention Control and Countermeasures Plan*, has full management approval, and will be implemented as described herein.

Project Manager's Printed Name: _____

Project Manager's Signature: _____

Title: _____

Date: _____

Appendix E

Stormwater Pollution Prevention Plan

INSTALLATION RESTORATION PROGRAM
CANNON AIR FORCE BASE
NEW MEXICO

STORMWATER POLLUTION PREVENTION PLAN FOR REMEDIAL ACTION CONSTRUCTION AT SWMU 97, LANDFILL 25 (LF-25)

JULY 2000

Prepared For
UNITED STATES ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

TERC CONTRACT NO. DACW45-94-D-0003
DELIVERY ORDER 28, WORK AUTHORIZATION DIRECTIVE 3

Prepared By
FOSTER WHEELER ENVIRONMENTAL CORPORATION
6605 UPTOWN BOULEVARD N.E. #220
ALBUQUERQUE, NEW MEXICO 87110

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LIST OF ACRONYMS

ACM	Asbestos containing material
AFB	Air Force Base
BMP	Best Management Practice
CFR	Code of Federal Regulations
CWA	Clean Water Act
EPA	U.S. Environmental Protection Agency
Foster Wheeler Environmental	Foster Wheeler Environmental Corporation
ft	foot/feet
IRP	Installation Restoration Program
LF-25	Landfill 25
NPDES	National Pollutant Discharge Elimination System
POL	petroleum, oil, lubricants
RA	remedial action
RCP	Regulatory Compliance Plan
SWPPP	Stormwater Pollution Prevention Plan
USAF	U.S. Air Force

1.0 INTRODUCTION

NOTE: This Stormwater Pollution Prevention Plan (SWPPP) is being submitted in draft form while additional data and calculations are being prepared based on the site survey. The final document will contain all applicable data.

This SWPPP addresses construction services for the removal of exposed asbestos-containing material (ACM) and concrete, concrete crushing, stormwater management, and erosion control for Landfill No. 25 (LF-25) at Cannon Air Force Base (AFB), New Mexico. These construction activities are considered a remedial action (RA) in the ultimate corrective action at LF-25. The RA at LF-25 is being conducted under the Cannon AFB Installation Restoration Program (IRP). This SWPPP describes the existing stormwater drainage conditions, stormwater management and erosion control objectives, and the required maintenance and inspection procedures to be used during project activities. The primary purpose of the RA is to remove exposed ACM and concrete debris and regrade the cover to minimize infiltration and erosion while providing proper drainage.

To improve the quality of stormwater discharges, Congress passed the Water Quality Act of 1987. This act added a provision to the Clean Water Act (CWA) directing the U. S. Environmental Protection Agency (EPA) to establish regulations for stormwater discharges under the National Pollutant Discharge Elimination System (NPDES) program. In 1990, EPA published final regulations that established permitting requirements for stormwater discharges associated with industrial activities. The regulations are provided in Title 40 of the Code of Federal Regulations (CFR) 122.26

1.1 SITE LOCATION AND DESCRIPTION

Detailed descriptions of the site are provided in Section 2 of the RA Work Plan. Figure E-1 depicts the location of LF-25.

1.1.1 LF-25 Description/Background

LF-25 is located in the east-central portion of Cannon AFB, bounded by a road leading to the ordnance area to the north, a road leading to the north side of Playa Lake to the south, the ordnance area to the east, and a perimeter road to the west. The landfill is nearly rectangular, measuring approximately 29 acres in size, with dimensions approximately 650 feet (ft) by 1950 ft (Figure E-2).

From 1945 through the 1980s, LF-25 received waste; it is unknown when the exact date disposal activities ceased. After World War II, construction demolition debris (concrete, wood, asbestos tiles, metal, asbestos/cement pipe, and asphalt mixed with soil) was disposed of in the landfill. Concrete pieces

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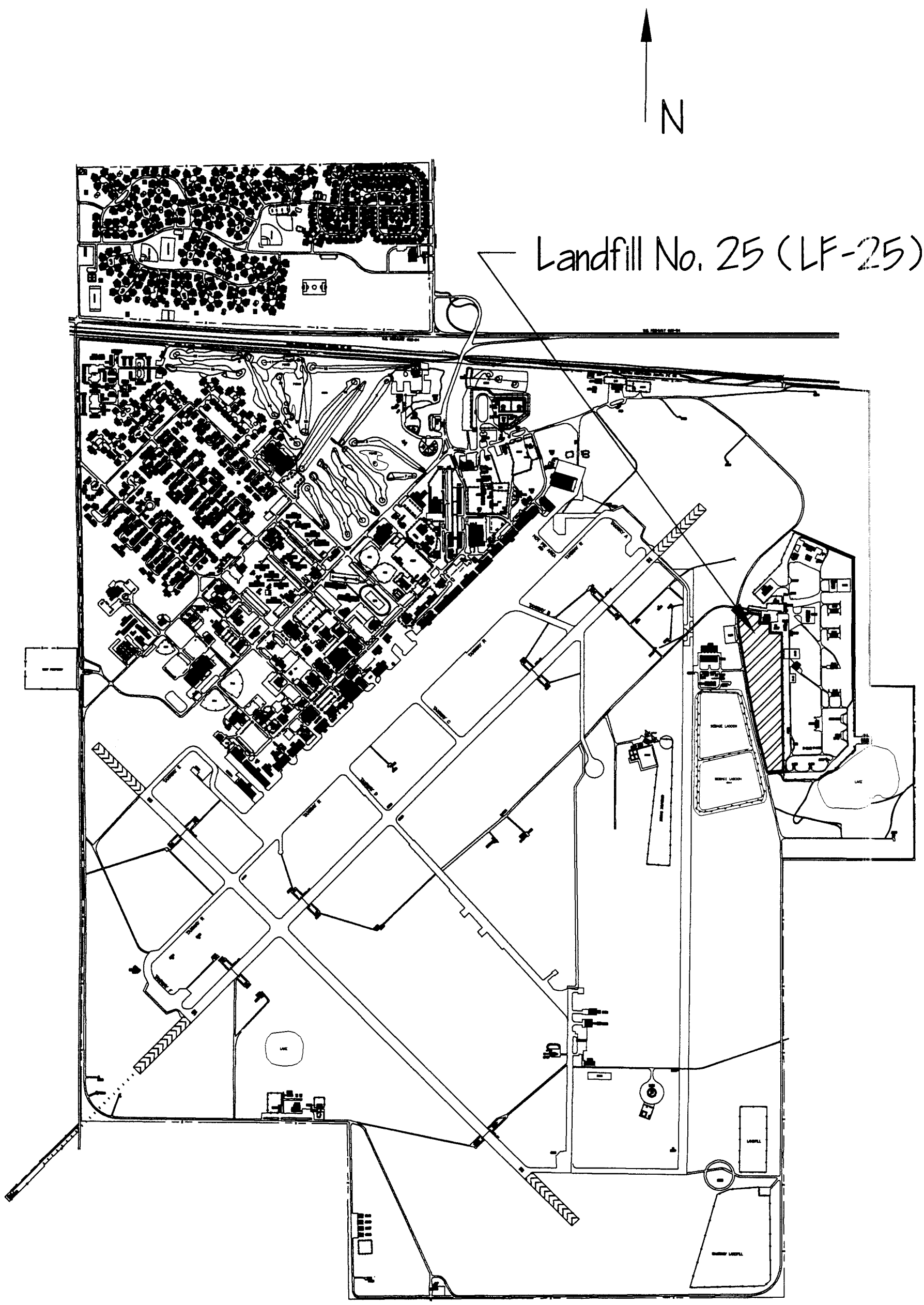


REMEDIAL ACTION WORKPLAN
SWMU 97 – LANDFILL NO. 25

Cannon Air Force Base, New Mexico

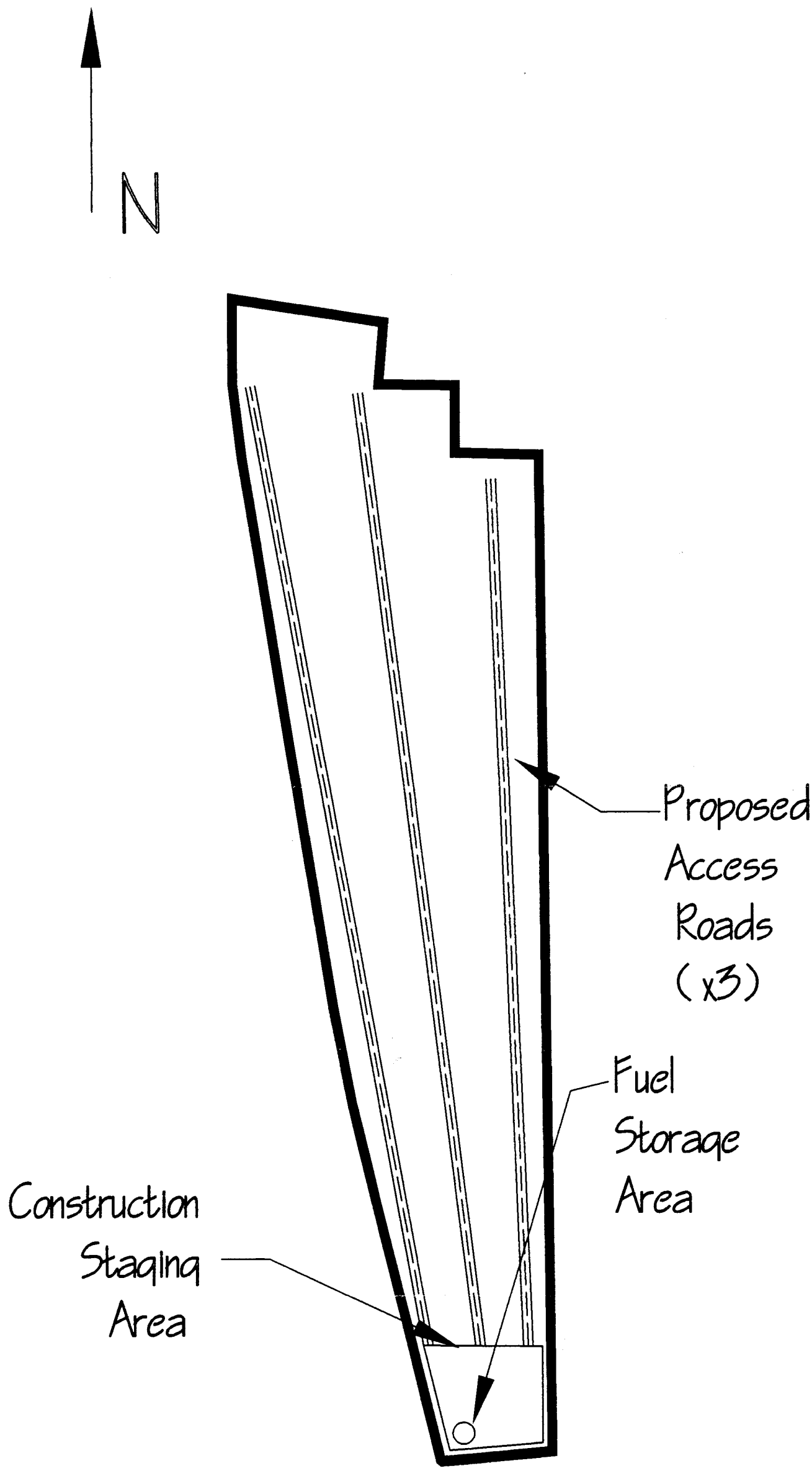
U.S. Army Corps of Engineers, Omaha District

Figure E–1
Location of Landfill No. 25

Foster Wheeler Environmental Corporation
July 5, 2000

0 1500 ft. 3000 ft.

Scale: 1 inch = 1500 ft.



REMEDIAL ACTION WORKPLAN
SWMU 97 - LANDFILL NO. 25

Cannon Air Force Base, New Mexico

U.S. Army Corps of Engineers, Omaha District

Figure E-2 Site Plan Map

Foster Wheeler Environmental Corporation
July 5, 2000

0 250 ft. 500 ft.

Scale: 1 inch = 250 ft.

of various sizes and shapes came from demolition of buildings and pavement (runways) at Cannon AFB. Debris extends approximately 3 to 4 feet (ft) above natural grade over most of the site, reaching a maximum of approximately 15 ft above natural grade at the north end.

Site information indicates that an inadequate cover is placed on the site. As a result of current conditions, ponding occurs, limited cover material is in place at several locations, and soil erosion is visible. Asbestos-containing material and construction and demolition debris are exposed throughout the landfill.

1.2 PROJECT DESCRIPTION

The project involves removing exposed ACM and concrete debris, crushing the concrete, disposing of ACM in an appropriate landfill, installing stormwater management structures, and installing the appropriate erosion control measures at the site. Borrow material will be imported to:

- Reconstruct portions of the soil cover (native soil and vegetation)
- Minimize leachate generation
- Grade the landfill cover to facilitate surface water drainage
- Minimize soil erosion
- Construct surface water control measures (i.e., drainage channels, riprap aprons, etc.) as appropriate

Initially, sections of the site will be grubbed and cleared of all vegetation prior to earthwork activities for site access. The ACM will then be removed from the site. Exposed concrete debris will be transported and stockpiled in the southern portion of the site for crusher processing. The site will be graded using the existing cover material and a limited amount of imported borrow material.

Excavators with processors will be used to crush the concrete rubble and feed it to the crusher. Processing of the concrete rubble will involve reducing the material to a maximum 4-inch size and removing the reinforcing steel. The crushed concrete will be stockpiled on site and used as general backfill material for another site.

Diversion channels will be placed along the site perimeter to prevent runon/runoff from the site during construction activities.

The following major construction activities will be performed at the LF-25 site:

- Construction staking/site surveying
- Temporary erosion and sediment control

- Utility clearance
- Clearing and grubbing
- Removing and disposing of exposed ACM
- Processing the on site demolition concrete rubble
- Earthworks
- Drainage and erosion control system construction
- Site restoration
- Required inspections and testing

A detailed description of these construction activities is provided in Section 3.2.4 of the RA Work Plan.

1.3 PURPOSE

The goal of this plan is to minimize the potential impacts to surface water quality that may result from construction activities at LF-25 during the RA construction activities. The SWPPP has been prepared in accordance with appropriate regulations and will incorporate Best Management Practices (BMPs) as presented in Attachment 1.

1.3.1 Regulatory Framework

In 1972, the CWA was passed to prohibit the discharge of any pollutants to U.S. waters from a point source unless an NPDES permit authorizes that discharge. The initial thrust to improve water quality under the NPDES program focused on reduction of pollutants in discharges of industrial process wastewater and municipal sewage. Since then, it became evident that diffuse or nonpoint sources of water pollution are major contributors to water quality degradation.

To improve the quality of stormwater discharges, Congress passed the Water Quality Act of 1987 that added a provision to the CWA directing the EPA to establish regulations for stormwater discharges under the NPDES program. In 1990, EPA published final regulations that established permitting requirements for stormwater discharges associated with industrial activities. The regulations are provided in Title 40 of the CFR 122.26. In 1998, EPA published Reissuance of NPDES General Permits for Stormwater Discharges from Activities in Region 6 (Attachment 2). The completed Notice of Intent for Stormwater Discharges Associated with Construction Activity under a NPDES General Permit is provided as Attachment 3.

1.3.2 Stormwater Pollution Prevention Plan Overview

This SWPPP identifies sources of site pollution and describes the measures to prevent or control discharges of potential stormwater pollutants in site stormwater runoff. The SWPPP also outlines site-specific BMPs that will be used to minimize the quantity of pollutants entering surface water. The provisions contained in this SWPPP shall be implemented as part of the conditions for the project-specific stormwater discharge permit.

A copy of the SWPPP will be kept with Foster Wheeler Environmental Corporation (Foster Wheeler Environmental) personnel at the project site. The plan will be available upon request to authorized regulatory agency personnel and updated as necessary, based on project activities.

1.4 POLLUTION PREVENTION TEAM

Specific members of the project team have responsibilities regarding stormwater management. These individuals are key on-site personnel who are familiar with the site and the construction activities relating to the project.

The project team includes personnel from management, safety, and construction. The team is responsible for the following activities:

- Implementing all SWPPP requirements
- Being aware of changes made during construction activities and determining if any subsequent changes must be made to the SWPPP
- Overseeing routine materials inventory and recommending ways to minimize or eliminate hazardous materials
- Implementing and overseeing employee training and the inspection program
- Identifying potential pollutant sources and making recommendations to alleviate areas of potential stormwater concern
- Coordinating the implementation of BMPs, reviewing the effectiveness of the SWPPP, and updating the plan as necessary

Table E-1 identifies the project personnel who have been assigned to the team, along with their telephone numbers and responsibilities.

Table E-1. Project Points of Contact

Name	Title	Phone	Responsibilities
Walter Migdal	Task Manager	(505) 878-8901	Supervise implementation of the SWPPP, inspections, and housekeeping
TBD	Field Engineer	TBD	Oversee implementation of the SWPPP, record keeping, housekeeping, and training; maintain current SWPPP
James Morning	Health & Safety Officer/Construction Quality Control Manager	TBD	Oversee spill prevention, preventative maintenance, and material inventory
James Morning	Site Construction Manager	TBD	Perform housekeeping and maintenance

SWPPP – Stormwater Pollution Prevention Plan
TBD – to be determined

2.0 POLLUTANT SOURCE ASSESSMENT

The SWPPP provides descriptions of potential sources that may be reasonably expected to add significant amounts of pollutants to stormwater discharges or that may result in discharges of pollutants. Figure E-2, the site plan map for LF-25, identifies pollutant sources and helps in determining stormwater management opportunities. The map and the assessment of pollutant sources facilitates the use of a risk-based approach by targeting the most important pollution sources that may require preventive and/or corrective action.

2.1 SITE ASSESSMENT

Information about the environmental setting, including physical setting (physiography/topography and cultural geography), geologic setting (surface soil and geology), and hydrology (surface water and groundwater) for LF-25 is summarized in a Remedial Investigation Report (Woodward Clyde, 1992)

LF-25 has undulating terrain with ground surfaces composed of primarily silty-sand and sandy-silt soil cover. Areas of heavy vegetation are interspersed throughout the site, with the southern portion being relatively flat and clear of vegetation.

2.2 ENDANGERED SPECIES AND HISTORIC PRESERVATION INFORMATION

The U.S. Air Force (USAF) has determined that IRP remedial actions are exempt from environmental assessments and other National Environmental Policy Act requirements because of public participation inherent to the IRP. Cultural and natural resource requirements, however, are still applicable.

The Biological Survey of Cannon Air Force Base, New Mexico, with Emphasis on Potential Occurrence of Endangered, Threatened, Candidate, and Sensitive Species (USAF, 1996) identified six federally listed endangered, threatened, and candidate species; one state endangered species; and one state rare and sensitive species that potentially occur on Cannon AFB. The survey concluded that the American peregrine falcon (Falco peregrinus anatum), Arctic peregrine falcon (Falco peregrinus tundrius), bald eagle (Haliaeetus leucocephalus), whooping crane (Grus americana), and Baird's sparrow (Ammodramus bairdii) have a low potential of occurrence, while the mountain plover (Charadrius montanus) and swift fox (Vulpes velox) have a moderate potential of occurrence. The tall plains spurge (Euphorbia strictior) is not expected to occur due to the historic use of the area for agriculture.

There are no known cultural resources located within the landfill boundaries.

2.3 MATERIALS INVENTORY

Table E-2 presents an anticipated inventory of significant materials used or stored on site that have a potential for contributing pollutants to stormwater runoff. The table also includes information relating to storage locations, quantities, likelihood of contact with stormwater, and a description of material management practices for each material listed.

Table E-2. Inventory of Significant Materials Used or Stored On Site

Material	Purpose	Location	Quantity Stored	Likelihood of Contact With Stormwater	Material Management Practice
Motor oil	Engine lubrication	Construction staging area	Two 55-gallon drums	Low, during unloading only	Stored outside, in lined/bermed area
Diesel fuel	Fuel for earth-moving equipment	Construction staging area	One 2,000-gallon tank	Low, during unloading only	Stored outside, in lined/bermed area
Hydraulic fluid	Earth-moving equipment lubrication	Construction staging area	Two 55-gallon drums	Low, during unloading only	Stored outside, in lined/bermed area
Transmission fluid	Transmission lubrication	Construction staging area	Two 55-gallon drums	Low, during unloading only	Stored outside, in lined/bermed area
Antifreeze	Engine coolant	Construction staging area	One 55-gallon drum	Low, during unloading only	Stored outside, in lined/bermed area
Used oil	Recycling	Construction staging area	Two 55-gallon drums	Low, during unloading only	Stored outside, in lined/bermed area
Trash/solid waste	Waste for disposal	Construction staging area	20-yard roll-off	Low	Stored outside, with cover
Used oil filters	Recycling	Construction staging area	One 55-gallon drum	Low	Stored outside, in lined/bermed area

The above-listed materials are all to be recycled to the maximum extent possible.
This table will be updated whenever new materials are used or stored or when existing materials quantities are changed by more than 20 percent or they are no longer used at the site. The location of these potential pollution sources is indicated on Figure E-2.

Most of the exposed materials will be located within lined, bermed areas located near the staging area. Hazardous waste is not expected to be generated during construction activities. Nonhazardous waste generated during project activities may include:

- Used oil
- Used antifreeze
- Used hydraulic fluid
- Used transmission fluid
- Spent oil filters
- Trash

Methods and locations for the on-site storage and materials management practices used to minimize contact of these materials with stormwater are presented in the following subsections.

2.3.1 Material Storage Areas

There will be a single storage area for all of the petroleum, oil, and lubricants (POL) to be used on site. The POL storage area and the diesel fuel storage tank will be located within the staging area. Both areas will be constructed with a liner and a secondary containment berm.

2.3.2 Loading and Unloading Areas

The greatest risk associated with the material management is during the loading and unloading of materials to and from storage areas. Bulk POL are to be unloaded from the delivery trucks by hydraulic lift and transferred to the storage area. The loading/unloading areas are uncontained. Once the materials are stored in the POL storage area, they are contained in a lined, bermed containment unit. Diesel fuel transfer operations will involve pumping of diesel fuel from tanker trucks directly into the 2,000-gallon diesel fuel tank and the 200-gallon tank on the crusher. Equipment will be fueled directly from the 2,000-gallon diesel fuel tank.

2.3.3 Construction Areas

Construction activities will involve the moving and stockpiling large quantities of concrete debris, crushing concrete rubble, removing ACM, excavating perimeter drainage channels, and installing erosion control measures.

2.3.4 Vehicle Maintenance Area

Vehicles and heavy equipment undergoing routine maintenance will be serviced in a designated area. Where possible, BMPs (e.g., catch pans and other spill prevention measures) will be employed to minimize the chances of a release of POL during vehicle servicing.

2.4 EXISTING STORMWATER RUNOFF QUALITY

No existing stormwater runoff quality sampling has been performed at this site.

2.5 ASSESSMENT SUMMARY

The potential project pollutant risks are identified in Table E-3. The risks associated with these areas range from low probability to a moderate possibility of a release/spill to secondary containment or to the environment (if no secondary containment present).

Table E-3. Potential Pollutant Sources at LF-25

Source of Pollutant	Pollutant of Concern
New/used POL drums/oil filters	New/waste oil, grease, ethylene glycol, and other POL
Diesel fuel (storage and loading/unloading)	Naphthalene
Loading/unloading	TSS, new/waste oil, grease, ethylene glycol, and other POL
Earthwork	TSS
Concrete stockpiling	TSS
Stormwater runon	TSS

POL – petroleum, oil, and lubricants
TSS – total suspended solids

Nonstormwater-related pollutant sources are discussed in further detail in the following subsections.

2.5.1 Diesel Fuel

Diesel fuel will be delivered to, stored in, and dispensed from a 2,000-gallon storage tank located in the construction staging area. This tank is elevated above grade and does not pose a risk for release unless

the tank ruptures or a spill occurs during filling or dispensing. Spills of this nature are discussed in the Spill Control and Countermeasures Plan contained in Appendix D of the RA Work Plan. The low velocity sheet flow movement of stormwater around the secondary containment areas does not pose a risk for fuel release and resulting stormwater pollution.

2.5.2 Petroleum, Oil, and Lubricants

All POLs in the form of equipment oils, hydraulic fluids, transmission fluid, antifreeze, and greases will be stored in small quantities in the materials storage area. These materials will be stored in containers on pallets in a designated area underlain with a liner and surrounded by a containment berm. The management of POL in accordance with this SWPPP will not pose a risk of stormwater pollution.

3.0 BEST MANAGEMENT PRACTICES

Operational and maintenance BMPs (nonstructural) are the procedures, plans, and activities that prevent or reduce the contact of potential pollutants with stormwater. Structural BMPs are the physical systems and protection measures that are constructed as part of the stormwater management and pollution protection system. A complete listing of applicable BMPs is provided as Attachment 1 to this appendix.

3.1 NONSTRUCTURAL BEST MANAGEMENT PRACTICES

The following subsections describe nonstructural BMPs that will be used for stormwater management controls. Table E-4 provides a summary of the BMPs.

3.1.1 Good Housekeeping

Good housekeeping practices will help maintain a clean and orderly work environment and will minimize accidental spills that can be caused by the mishandling of chemicals or work equipment and should reduce safety hazards to employees.

The following housekeeping measures are or will be implemented in an effort to prevent pollutants from entering stormwater discharges:

- Operation and Maintenance Practices—Proper operation and maintenance practices ensure equipment is working well and reduce the potential for spills and releases entering the environment.
- Material Storage Practices—The aboveground diesel fuel storage tank will be located within a secondary containment area large enough to hold, at a minimum, 110 percent of the volume of the tank (2,200 gallon).

Table E-4. Summary of Nonstructural Best Management Practices

BMP	Brief Description of Activities
Good Housekeeping	Catch pans will be used under vehicles to collect leaking fluids during fuel loading/unloading and equipment maintenance.
	Garbage and waste materials will be regularly picked up and properly disposed.
	Adequate aisle space will be provided to facilitate material transfer and easy access for inspections.
	Containers will be stored on pallets to prevent corrosion.
	POL will be manually transferred between containers via funnel.
	Used POL will be stored in covered drums on pallets.
	Material safety data sheets will be maintained at the U.S Army Corps of Engineers field office..
	Containers of hazardous materials will be labeled with the name of the material, expiration date, and health hazards, and the containers will be compatible with the material being stored in them.
	Containers will be kept closed except when being filled/unfilled.
	Used fluids will be promptly transferred to the proper container; full drip pans or other open containers will not be left uncovered. Drip plans and containers will be emptied and cleaned.
Preventative Maintenance	Equipment and areas that have the potential for failures or spills will be identified.
	Regularly scheduled maintenance and repair of equipment will be performed.
	Equipment will be operated according to the manufacturer's recommendations.
Visual Inspections	Containers, the POL container storage area, and diesel storage tank will be inspected daily, maintained, and replaced if leaking.
	Regular housekeeping inspections will be conducted.
	Stormwater control structures will be inspected after each major storm event and at a minimum, biweekly.
	Monthly inspections of spill response and fire prevention equipment will be performed.
	Vehicles found to be leaking fluids will be immediately repaired.
	Vehicle maintenance and loading/unloading areas will be inspected for proper implementation of control measures.
Spill Prevention and Response	Hazardous material storage areas will have secondary containment.
	Proper material transfer procedures will be used to reduce spills.
	Emergency spill response equipment will be maintained at the site.
Employee Training	Employees will be trained on the components and goals of the SWPPP, spill prevention and response, good housekeeping procedures, material handling, and inspections.

Table E-4. Summary of Nonstructural Best Management Practices (Concluded)

BMP	Brief Description of Activities
Sediment and Erosion Control	Native vegetation will be disturbed to the least extent possible during project activities.
	Temporary drainage and/or diversion channels will be used during construction.
	Where appropriate, disturbed areas will be revegetated as soon as feasible after construction.
Record Keeping and Reporting	Spills and releases will be documented using the Health and Safety Incident Report.
	A separate record-keeping system will be implemented to document housekeeping and preventative maintenance inspections.
	Project records will be maintained in the U.S. Army Corps of Engineers field office and become part of the project files.
Construction Sequencing	Construction will be sequenced to minimize amount and duration of soil exposure to wind, rain, runoff, and vehicle tracking, which can lead to erosion.

BMP – Best management Practice
POL – petroleum, oil, and lubricants
SWPPP – Stormwater Pollution Prevention Plan

- Material Inventory Procedures—Frequent personnel training in good housekeeping techniques minimizes the potential for materials being mishandled. Motivating employees to reduce spillage and minimize waste is an effective pollution prevention technique.

Employee Participation

- Site personnel will be involved in good housekeeping practices to:
  - Discuss good housekeeping measures at daily tailgate safety meetings
  - Distribute information on good housekeeping practices during employee training sessions

Employees will be informed of activities that could lead to contamination of stormwater and the importance of carefully conducting these activities in areas that do not discharge into storm drainage areas.

3.1.2 Preventive Maintenance

Earthworking equipment and site vehicles will be maintained in good working condition. Preventive maintenance involves routine inspections and testing of equipment. Equipment will be maintained and inspected on a regular basis and according to the manufacturer's recommended practices.

3.1.3 Visual Inspections

Designated site personnel will conduct inspections. These employees will report to the pollution prevention team member responsible for inspections (Field Engineer). Table E-5 is a summary schedule of the various inspections that must be performed at the site.

Table E-5. Inspection Schedule

Inspection	Minimum Frequency
Inspect diesel storage tank and secondary containment	Daily
Inspect construction equipment(including crusher)	Daily
Inspect POL storage area	Weekly
Conduct housekeeping inspections	Weekly
Inspect stormwater structures	Biweekly (and after storm events)
Inspect spill response equipment	Monthly
Inspect fire prevention equipment	Monthly
Task Manager and Environmental Safety Supervisor conduct site inspection	Monthly

POL – petroleum, oil, and lubricants

The documentation of the inspections and maintenance of these records is described below.

3.1.4 Spill Prevention and Response

The largest contributor to stormwater pollution is suspended solids in stormwater runoff from spills and leaks. Because of facility drainage, exposed materials, and site activities, spills are most likely to occur at the loading/unloading areas and the diesel storage tank area. Spills can occur from overfilling of the diesel tank or containers, hose/nozzle malfunctions, equipment damage, or human error.

The best way to manage a spill is to prevent it from happening. The following management procedures will be used to prevent a spill:

- Personnel will be trained in proper materials management.
- Tank/container filling and material transfer practices will be used to reduce probability of spills.
- Regular visual inspections will be conducted to identify tank/container problems and other potential spill indicators.

If a spill does occur during construction activities and spill prevention measures fail, site personnel will respond to prevent stormwater contamination by implementing the following procedures:

- Approach the spill from upwind to an area where the spill material can be identified.
- Shut down vehicles in the immediate area.
- Determine the source, type, and quantity of material spilled.
- Identify and assess the hazard, isolate and evacuate the area of impact based on an assessment of quantity of material spilled and the resulting threat to life.

Follow spill-reporting notification as indicated in the RA Work Plan's Regulatory Compliance Plan (RCP) section as follows:

- For large spills (more than 110 gallons):
  - Evacuate the area within 150 ft.
  - Follow spill reporting notification as indicated in the RA Work Plan.
  - Attempt to contain spilled material and prevent discharge outside of secondary containment. If not in a contained area, use available equipment to form a berm around the spill area.
  - For the cleanup of large spills, notify the Cannon AFB Fire Department.

- For small spills (less than 110 gallons):
  - Move personnel out of the spill area.
  - Attempt to contain spilled material.
  - Retain contaminated material in covered drums that are appropriately labeled and placed in a designated waste storage area.
  - Notify Cannon AFB.

- At a minimum, the following emergency spill equipment shall be maintained at the site:
  - Absorbent material
  - Large drip pans
  - A spark-resistant shovel
  - A 55-gallon drum with bolt on lid
  - Barricade tape
  - Personal protective equipment, to include Tyvek® suits, booties, gloves, and safety goggles
  - Warning tape or signs
  - Fire extinguisher

3.1.5 Employee Training

An employee training program will be implemented at the site to inform employees of the goals and components of the SWPPP. The training program will consist of:

- The RA Work Plan and associated plans contained within its appendices (i.e., the SWPPP and the Spill Prevention Control and Countermeasures Plan)
- Daily tailgate meetings covering stormwater pollution prevention techniques
- An on-site spill reporting coordinator who will be trained on the proper reporting requirements per the RA Work Plan RCP (Section 4.0)

3.1.6 Record Keeping and Reporting

Record keeping represents a good operating practice because it can increase the efficiency of site operations and the effectiveness of BMPs. A record-keeping system will help site personnel minimize incident recurrence, correctly respond with the correct cleanup response, and comply with regulatory requirements.

Spills and releases will be documented using the Foster Wheeler Environmental Health and Safety Incident Report, which is contained in the Site-Specific Safety and Health Plan, Appendix C of the RA Work Plan. The incident report will describe the quality and quantity of nonstormwater discharges.

A separate record-keeping system has been established to document housekeeping and preventative maintenance inspections. These inspections will be documented on the forms noted in Figures E-3 and E-4. Figure E-3 will be used to assess the required SWPPP components. Figure E-4 will be used for regular inspections of the in-place SWPPP components. The inspection sheets generally contain the following information:

- Date and time of inspection
- Name and signature of the inspector
- Items inspected
- Problems noted
- Corrective action required
- Date corrective action was taken and a signature the corrective action was completed
- Other ways to document inspections include field notes, timed and dated photographs, and drawings and maps. All records shall be maintained at the U.S. Army Corps of Engineers field office and become part of the project files.

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Figure E-3. Erosion, Sediment, and Pollution Control Checklist

Inspector _____ Date _____

Area Inspected _____ Approximate Area _____

CONTAINED MATERIAL STATUS

Check that all material containers are intact and are not leaking and all containment elements are in place and in good condition.

❒ Diesel Fuel
❒ Lubricants
❒ Other _____

STABILIZATION PRACTICES

Stabilization practices will be initiated on all disturbed areas where construction activity will be permanently or temporarily ceased for a period of more than 14 calendar days. Stabilization measures to be used include:

❒ Silt Fencing
❒ Hay Bales
❒ Temporary Seeding
❒ Permanent Seeding
❒ Mulching
❒ Geotextiles
❒ Other _____

STRUCTURAL PRACTICES

Flows from upstream areas will be diverted from exposed soils. Measures to be used include:

❒ Earth Dike
❒ Drainage Swale
❒ Training Dike
❒ Other _____

DRAINAGE LOCATIONS SERVING LESS THAN 10 DISTURBED ACRES

❒ Sediment controls are needed and will include the following:
- ❒ Sediment basin
- ❒ Hay bales in anticipated drainage paths
- ❒ Silt fence along all sideslope and downslope boundaries

DRAINAGE LOCATIONS SERVING 10 OR MORE DISTURBED ACRES

❒ A sediment basin will be installed.

❒ A sediment basin cannot be constructed; the following sediment controls will be installed:
- ❒ Hay bales in anticipated drainage paths
- ❒ Silt fence along all sideslope and downslope boundaries

SEDIMENT BASIN RUNOFF STORAGE CALCULATION

_____ Acres area draining to the sediment basin

× 3.60 Cubic feet of storage/acre

=

_____ Cubic feet of storage required for the basin

Observed Conditions

_____

Changes required to the SWPPP _____

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Figure E-4.
Stormwater Pollution Prevention Plan
Inspector Report
LF-25
Cannon Air Force Base, Curry County, New Mexico

Inspector Name & Title:_____ Date:_____
Days since last rainfall:_____ Amount of rainfall:_____
(Contact Base Weather Service 505-)

Erosion Control Measures

1. Stabilized construction entrances:	Yes	No
• Does sediment get tracked onto aprons and road?		
• Is the gravel clean or filled with sediment?		
• Does all traffic use the construction entrances?		
Problems observed with the construction entrances:		

2. Silt fences (on soil):	Yes	No
• Is the bottom of the silt fence fabric buried?		
• Is the silt fence fabric in good condition?		
• Are the stakes intact?		
• How deep is the sediment at the silt fence?		
Problems observed with the silt fences:		
Maintenance required for the silt fences:		
Maintenance to be performed by (Subcontractor name and date):		

3. Inlet protection barriers (on soil):	Yes	No
• Are straw bales intact?		
• Is the bottom of the straw bales buried?		
How deep is the sediment at the barriers?		
Problems observed with the barriers:		
Maintenance required for the barriers:		
Maintenance to be performed by (Subcontractor name and date):		

Figure E-4.
Stormwater Pollution Prevention Plan
Inspector Report
LF-25
Cannon Air Force Base, Curry County, New Mexico

4. Inlet protection barriers or silt fences (on pavement):	Yes	No
• Are straw bales intact?		
• Are sandbags located adjacent to the bales?		
• Are sandbags pushed together, maximizing contact area at sandbag ends?		
How deep is the sediment at the barriers/fences?		
Maintenance required for the barriers:		
Maintenance to be performed by (Subcontractor name and date):		
Changes required to the Stormwater Pollution Prevention Plan (provide reason for each required change):		

Inspector's Name

Inspector's Signature

Date

3.1.7 Sediment and Erosion Control (Applicable BMPs—ESC2, 21, 30, 31, and 52—Attachment 1)

As previously indicated, less than 29 acres will be disturbed during construction. The runoff coefficient is anticipated to be 0.3 for the site. Existing site vegetation will be preserved until construction commences, and the existing vegetation will be preserved where feasible.

During construction activities, a temporary concrete stockpiling area will be used to stockpile concrete for use at another site on Cannon AFB. The concrete will be stockpiled in a generally uncompacted condition prior to placement and will be subject to erosion. BMPs will include diversion of drainage from the stockpile areas and from stabilized areas around disturbed areas; the use of temporary berms, drains, and/or swales to divert site runoff around the construction site; and erosion and dust control measures.

3.1.8 Construction Sequencing (Applicable BMP—ESC1—Attachment 1)

Construction sequencing, which is a BMP in itself, consists of phased construction activities as outlined in the RA Work Plan. Construction will be sequenced to minimize the amount and duration of soil exposed to erosion by wind, rain, runoff, and vehicle tracking.

3.2 STRUCTURAL BEST MANAGEMENT PRACTICES

Based on the evaluation of potential pollution sources, structural BMPs will be necessary for the following areas:

- POL storage area
- Diesel tank storage area
- Loading/unloading area
- Vehicle maintenance area
- Construction areas and temporary soil stockpiling areas
- Dust and particulates

The BMPs for each of these areas are described in the following sections.

3.2.1 POL Storage Area (Applicable BMP—CA32—Attachment 1)

POL materials necessary for vehicle and equipment maintenance and use will be stored on site within a lined and bermed area (minimum 110 percent storage volume capacity) to prevent any uncontrolled discharges or spills. All POL will be securely stored in sealed containers at the POL storage area to prevent uncontrolled discharges of spilled materials. If a spill occurs during on-site material transfer

activities, the individual noting the spill will be responsible for contacting the Site Health and Safety Officer, who is responsible for managing the cleanup and making the necessary notifications.

3.2.2 Diesel Storage Tank Area (Applicable BMP—CA31—Attachment 1)

During project construction activities, diesel fuel will be stored on site in a 2,000-gallon aboveground storage tank. The tank will be contained within secondary containment to prevent any uncontrolled discharges or spills. To comply with the Spill Prevention Control and Countermeasures Plan (RA Work Plan, Appendix D), accumulated stormwater will be pumped from the bermed area after storms. If a spill occurs during on-site fueling or fuel transfer activities, the individual noting the spill will be responsible for contacting the Site Health and Safety Officer, who is responsible for managing the cleanup and making the necessary notifications.

3.2.3 Vehicle Maintenance Area (Applicable BMP—CA32—Attachment 1)

All heavy equipment and site vehicles are inspected at the beginning and end of each day for oil and lubricant leaks. Leaking equipment will be repaired or removed from service. Excessive greasing of components will be avoided and accumulated grease will be wiped off and the contaminated rags properly disposed of off site. To prevent uncontrolled discharges of spilled materials, POL will be securely stored in containers at the POL storage area. Site vehicle maintenance will be performed in designated, controlled areas. Used oil and empty oil filters generated from vehicle and equipment maintenance activities will be collected by the equipment maintenance subcontractor, who, in turn, will be responsible for transport to an approved off-site recycling facility.

3.2.4 Construction Areas (Applicable BMPs—ESC2, 10, 24, 41, and 50—Attachment 1)

In addition to the measures outlined in a previous section, the following measures will be applied to construction activities at the site:

- Silt fencing and straw bales may be used as a sediment trapping and/or a filtering device downgradient of all disturbed areas.
- Existing vegetation will be preserved to help minimize surface disturbance and serve as erosion controls. Disturbed areas will be reseeded to provide long-term stabilization of the site.
- The construction site entrance will be stabilized to provide a significant reduction in the amount of sediment (dust and mud) tracked off site.

3.2.5 Loading/Unloading Area (Applicable BMP—CA10—Attachment 1)

In addition to the BMPs, precautions will be taken to prevent spills or releases during diesel and POL loading and unloading operations. Spill control equipment will be available in the immediate vicinity.

3.2.6 Dust and Particulates (Applicable BMP—ESC21—Attachment 1)

Dust control measures will be used to stabilize soil from wind erosion and reduce dust generated from the following construction activities:

- Clearing and grading
- Construction vehicle traffic on site
- Sediment tracking onto paved roads
- Maintaining areas of unstabilized soil stockpiles

Dust control measures will be the only nonrainfall discharge associated with this project. A water truck will be used for dust control and provide water for compaction of soil fill. In addition to wet suppression (watering), preventive dust control measures include minimizing surface areas to be disturbed and limiting on-site vehicular traffic to 15 miles per hour.

4.0 WASTE MANAGEMENT

Residuals and waste may potentially be generated during the construction activities. Waste management involves the following four steps:

- Characterization
- Handling and storage
- Transportation
- Disposal

Procedures for waste management are contained in the RCP, provided as Section 4 of the RA Work Plan.

5.0 SWPPP REVISIONS AND MODIFICATIONS

This SWPPP will be amended if necessary to address changes in the physical condition of the site or to maintain compliance in areas where the SWPPP is inadequate.

6.0 CERTIFICATION AND MANAGEMENT APPROVAL

The following certifications by a Professional Engineer and approval from management conform with the requirements of 40 CFR Part 122.

6.1 PROFESSIONAL ENGINEER CERTIFICATION

This Stormwater Pollution Prevention Plan was prepared by or under the direct supervision of the undersigned, a registered Professional Engineer in the State of New Mexico with experience in stormwater runoff, landfill drainage, and erosion control. The report contains information generated by the undersigned as well as information from other sources that the undersigned believes to be true and accurate.

Printed Name of Registered Professional Engineer: Derek Johnson

Signature of Registered Professional Engineer: _____

Registration Number: 13069

State: New Mexico

Date: _____

(Expires 2 years from date or upon revocation)

Seal:

6.2 MANAGEMENT APPROVAL

I certify under penalty of law that this document and all attachments are prepared under my direction or supervision. The Stormwater Pollution Prevention Plan has full management approval and will be implemented as described herein.

Project Manager's Printed Name: _____

Project Manager's Signature: _____

Title: _____

Date: _____

7.0 REFERENCES

USAF (U.S. Air Force)
1996. Biological Survey of Cannon Air Force Base, New Mexico, with Emphasis on Potential Occurrence of Endangered, Threatened, Candidate, and Sensitive Species.

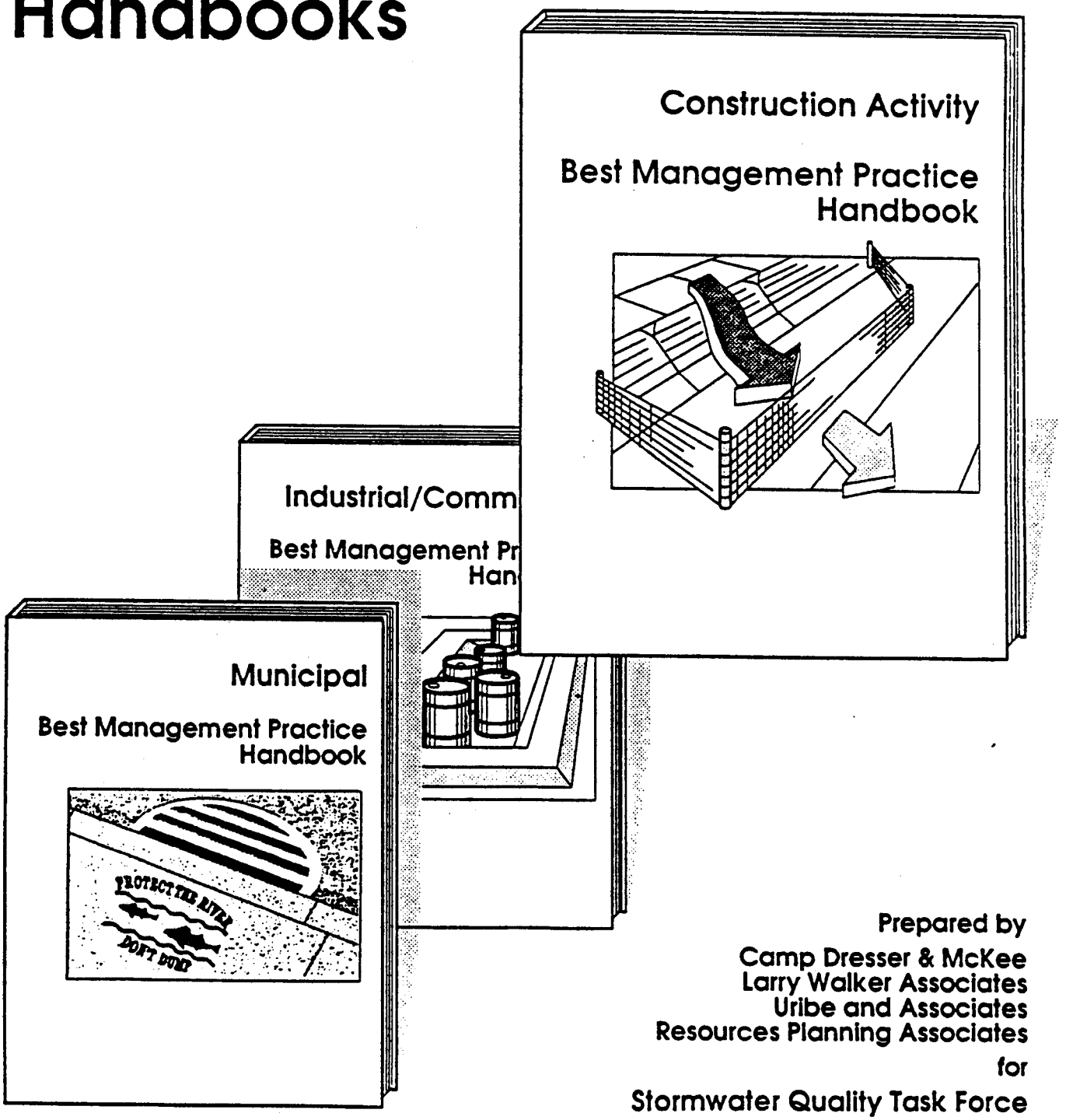
Woodward Clyde
1992. Remedial Investigation Report for 18 Solid Waste Management Units. Cannon Air Force Base, Clovis, New Mexico. October.

ATTACHMENT 1

BEST MANAGEMENT PRACTICES

March, 1993

California Storm Water Best Management Practice Handbooks



Prepared by
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DISCLAIMER

The statements and conclusions of this Handbook are those of the Grantee and not necessarily those of the State of California. The mention of commercial products, their source, or their use in connection with material reported herein is not to be construed as either an actual or implied endorsement of such products.

This Handbook was produced and published by the Storm Water Quality Task Force, an advisory body of municipal agencies regulated by the storm water program. This Handbook is not a publication of the State Water Resources Control Board or any Regional Water Quality Control Board, and none of these Boards has specifically endorsed the contents thereof. The purpose of this Handbook is to assist the members of the Task Force and other dischargers subject to storm water permits, in attaining compliance with such permits.

ABSTRACT

The Construction Best Management Practices (BMPs) Handbook presents specific guidance on selecting best management practices for reducing pollutants in storm water discharges from construction activities. The primary audience of the handbook is the owners/developers of the construction sites that are required to obtain a State of California NPDES general permit for storm water discharges. The handbook outlines a procedure and provides worksheets for preparing a Storm Water Pollution Prevention Plan (SWPPP) as required under the general permit and for selecting BMPs that become a part of the SWPPP.

Detailed fact sheets are provided for the BMPs which include information regarding where they should be applied, what are the targeted pollutants of the BMP, design criteria (when applicable), and examples of their application. The handbook also gives guidelines for measuring BMP performance.

FOREWORD

In 1972, the Federal Water Pollution Control Act (also referred to as the Clean Water Act [CWA]) was amended to provide that the discharge of pollutants to waters of the United States from storm water is effectively prohibited, unless the discharge is in compliance with a National Pollutant Discharge Elimination (NPDES) permit. The 1987 amendments to the CWA added Section 402(p) which established a framework for regulating municipal, industrial, and construction storm water discharges under the NPDES program. In California, these permits are issued through the State Water Resources Control Board (SWRCB) and the nine Regional Water Quality Control Boards (RWQCB). In general, municipalities with a population of over 100,000, industries which have been identified by the Environmental Protection Agency to be a probable source of storm water pollutants, and construction projects that disturb more than five acres must obtain an NPDES permit.

The SWRCB and California members of the American Public Works Association (APWA), recognizing the complex issues involved with developing and implementing an NPDES permit system from storm water discharges, formed the Storm Water Quality Task Force to work as a team to develop a state regulatory program that complies with federal requirements, addresses California's unique demography, topography and climatology, and is affordable for the permittee. The Task Force, in turn, identified the need to have a State handbook to guide permittees in selecting Best Management Practices (BMPs) to reduce pollutants in storm water discharges. This series of Storm Water Best Management Practices Handbooks was funded by members of the Task Force and is directed specifically at developing and implementing storm water quality management programs in California.

The Handbook consists of three volumes:

- Volume 1: Municipal BMP Handbook - Addresses storm water quality management for most municipal activities, particularly those required under the NPDES municipal permit program.

- Volume 2: Commercial/Industrial BMP Handbook - Addresses storm water quality management for facilities that are (or will eventually be) covered by a NPDES general permit for industrial activities.

- Volume 3: Construction BMP Handbook - Addresses erosion control and other storm water quality management concerns required under a NPDES general permit for construction activities.

Each handbook is comprised of six chapters. Chapter 1 describes the pertinent regulations regarding the NPDES permit and defines who must obtain a permit. Chapter 2 describes how to develop a Storm Water Management Program or Storm Water Pollution Prevention Plan, while Chapter 3 provides guidance on the selection of BMPs for the plan. Chapters 4 and 5 describe the details of individual BMPs. Chapter 6 gives guidelines for measuring BMP performance. While the handbooks are meant to provide guidance to regulators and permittees, it should be understood that any final interpretation of the regulations will be done by the appropriate Regional Water Quality Control Board.

ACKNOWLEDGEMENTS

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Fresno Metropolitan Flood Control District

City of Los Angeles

Los Angeles County Department of Public Works

Riverside County Flood Control and Water Conservation District

County of San Bernardino Environmental Public Work Agency

City of San Diego

Contra Costa County Flood Control

Orange County Storm Water Program

Santa Clara Valley Water District

City of Modesto

City of Sacramento

Sacramento County Water Resources Division

City of Monterey

Placer County Flood Control and Water Conservation District

Project Officer was Jack Lindley of Alameda County Public Works Agency and the State Contract Officer was Sid Taylor assisted by Marla Lafer of the SWRCB.

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Industrial Handbook

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Michael Krone
Pacific Gas & Electrical Company

Tom Cooper
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Construction Handbook

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Mission Viejo Company

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San Diego Construction Industry Federation

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Regulatory

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CONSTRUCTION HANDBOOK

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1. INTRODUCTION

Storm water runoff is part of a natural hydrologic process. However, human activities, including the disturbance of land from construction activities, can alter natural drainage patterns, adding pollutants to rivers, lakes, and streams. An increase in compacted and impervious surfaces increases both the volume of surface runoff, the peak rate of flow, and decreases groundwater recharge. Consequently, improperly managed storm water runoff can be a significant source of water pollution, causing declines in fisheries, habitat disruption, restrictions on swimming, and limiting our ability to enjoy many of the other benefits that water provides (USEPA, 1992).

For many years the effort to control the discharge of storm water has focused on quantity (e.g. flood control), and to a limited extent, on the quality of storm water (e.g. sediment and erosion control). However, in recent years awareness of the need to protect and preserve natural habitats and improve water quality has increased. With this awareness Federal, State and local programs have been established to pursue the ultimate goal of reducing the impacts of storm water discharges to our water ways. After October 1, 1992, construction activities must be covered by a National Pollutant Discharge Elimination System (NPDES) permit (SWRCB, 1992). **Failure to comply with these requirements may result in a fine of up to $25,000 per day of violation and possible imprisonment.**

The primary objectives of the NPDES storm water permit for construction activities are to:

- Reduce excessive erosion potential
- Minimize excessive sedimentation
- Prevent other materials used at a construction site from causing off site contamination
- Eliminate non-storm water discharges from the construction sites
- Install appropriate measures to reduce impacts on waterways from the finished project, and provide a commitment that these measures will be maintained.
- Establish maintenance commitments on post-construction sites.

PURPOSE AND SCOPE OF THE HANDBOOK

The purpose of this handbook is to provide guidance for selecting and implementing best management practices (BMPs) for construction activities. As will be discussed in this handbook, State and Federal programs require *owners* of construction sites to prepare storm water pollution prevention plans (SWPPPs) which includes the identification and implementation of various BMPs. It is not the intent of this handbook to dictate the actual BMPs (as this will be done by the permittee), but rather to provide the framework for preparing SWPPPs and selecting appropriate BMPs. It is intended that portions of this handbook be incorporated into SWPPP if modified to meet specific project conditions.

In addition, the use of the handbook does not ensure that the user will be in compliance with the requirements of its NPDES permit. Such compliance can only be provided through a review and concurrence of the appropriate Regional Water Quality Control Board.

This handbook does not describe local requirements for erosion and sediment control for storm water management. Although it is expected that the handbook will assist the users in complying with local requirements, you should consult with local authorities for their requirements.

USERS OF THE HANDBOOK

A number of people will find this handbook helpful. The primary audience is the property owners, developers, contractors, engineers, and public agencies who are involved in construction and land disturbance. Municipal departments that oversee these activities will also find this handbook useful.

ORGANIZATION OF THE HANDBOOK

The overall goal of the storm water program is to reduce the impacts of storm water discharges on receiving waters. This handbook is organized to assist the user in developing and implementing such a program. The handbook explains:

- Why is storm water management needed? (Chapter 1)
- What is a SWPPP and how do you prepare one? (Chapter 2)
- What are best management practices, and how do you select them? (Chapter 3)
- What BMPs are available and how are they used? (Chapter 4 and 5)
- How do you monitor BMPs performance? (Chapter 6)

DEFINITIONS

Many of the common terms used in the storm water program are defined in the Glossary (Appendix C). However, the user will continually encounter the following terms:

- *NPDES Construction General Permit for Storm Water Discharges*. NPDES is an acronym for National Pollutant Discharge Elimination System. NPDES is the national program for administering and regulating discharges to receiving waters according to the Clean Water Act (CWA). In California, the State Water Resources Control Board (SWRCB) has issued a general permit for storm water discharges associated with construction activities statewide (except for the Lake Tahoe Basin and Indian lands, which are covered by separate permits, see Appendix A).
- *Notice of Intent (NOI)* is a formal notice to the SWRCB submitted by the owner/ developer that a construction project is about to begin. The NOI provides information on the owner, location, type of project, and certifies that the permittee will comply with conditions of the construction general permit. The NOI is not a permit application and no approval is required.
- *The Storm Water Pollution Prevention Plan* is a report that includes site map(s), an identification of construction/ contractor activities that could cause pollutants in the storm water, and a description of measures or practices to control these pollutants. The SWPPP must be prepared and implemented before construction begins.
- *A Best Management Practice (BMP)* is defined as any program, technology, process, siting criteria, operating method, measure, or device which controls, prevents, removes, or reduces pollution.

CONSTRUCTION SITES AND THEIR IMPACTS ON WATER QUALITY

Excessive erosion and sedimentation caused by construction activities is dependent upon climatic and site conditions, as well as the type of construction activity taking place. Sediment which results from the excessive erosion of disturbed soils is the primary pollutant of concern. However, other pollutants of concern include metals, nutrients, soil additives, pesticides, construction chemicals, and miscellaneous waste from construction sites. Consequently the development of a comprehensive storm water management

program to reduce pollutants from a construction site requires a basic understanding of the erosion and sedimentation processes and the factors that influence them as well as an understanding of how other construction activities impact water quality.

EROSION AND SEDIMENTATION PROCESS

Soil erosion is the process by which soil particles are removed from the land surface, by wind, water or gravity. Most natural erosion occurs at slow rates; however, the rate of erosion increases when land is cleared or altered and left disturbed.

Sedimentation is defined as the settling out of soil particles transported by water. Sedimentation occurs when the velocity of water in which soil particles are suspended is slowed sufficiently to allow particles to settle out. Larger particles, such as gravel and sand, settle more rapidly than fine particles such as silt and clay. Sedimentation occurs after erosion has taken place. Effective construction site management first minimizes excessive soil erosion by keeping the soil stabilized as long as possible, and second directs runoff from remaining disturbed areas to locations where sediments are removed prior to discharge to water courses. Figure 1.1 shows five types of erosion which can occur on a construction project.

Erosion from Rainfall Impact - The impact of raindrops on bare soil causes erosion. Because the rainfall impact has a low velocity, this type of erosion will normally result in minimum surface erosion on undisturbed land. Even in areas of California with a semi-arid climate and minimal vegetative cover, natural desert soil conditions (including compacted hardpan) provide protection against erosion for all but the most intense rainfalls. Construction activities remove the protective cover of vegetation and natural soil resistance to impact erosion.

Sheet Erosion - After rainfall strikes the ground, it flows in a thin layer, called sheet flow for a short distance. The distance of sheet flow depends on slope, type of soil vegetative cover, and rainfall intensity. Sheet flow has a low velocity and causes little erosion on undisturbed soils. However, clearing the soil during construction makes the soil more susceptible to erosion, increases velocity, and causes the flow to concentrate in rivulets.

Rill and Gully Erosion - As runoff accumulates, it concentrates in rivulets cutting grooves into the soil surface. If the flow is sufficient, rills may develop into gullies. Rills/gullies form sooner on exposed soils than vegetated soils.

Stream and Channel Erosion - The banks and bottoms of natural drainage channels are commonly eroded by three factors which occur during construction:

- Clearing the soil during construction increases the runoff flows, velocities and volumes which reach natural streams;
- Covering the soil with buildings and pavement further increases runoff; and
- Site landscaping and improperly designed desiltation basins may disrupt the natural balance of erosion and sedimentation.

Excessive stream and channel erosion may be limited by controlling runoff flows, velocities and volumes before discharge into the stream and by widening and/or stabilizing the banks of the stream (subject to regulatory approval) to pass increased runoff without excessive erosion.

Wind Erosion - Dust is defined as solid particles or particulate matter which are predominately large enough to eventually settle out from the air but small enough to remain temporarily suspended in the air for an extended period of time. Dust from a construction site, originates as inorganic particulate from rock and soil surfaces, material storage piles and construction materials. The majority of dust generated and emitted into the air at a construction site is related to earth moving, demolition, construction traffic on unpaved surfaces, and wind over disturbed uncompacted soil surfaces (see box, page 1-5).

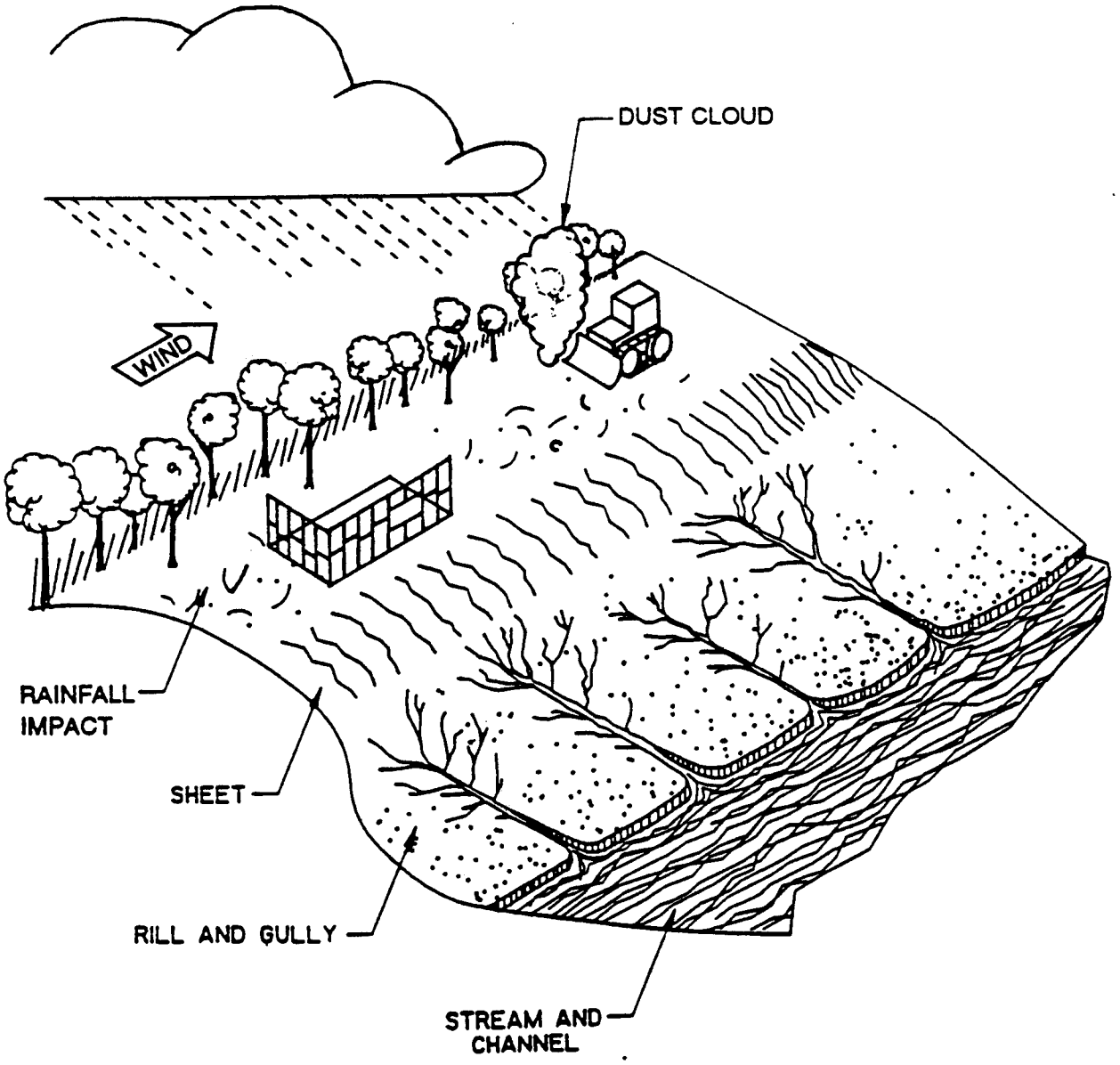

FIGURE 1.1 TYPES OF EROSION OCCURRING AT A CONSTRUCTION SITE

Dust Sources at Construction Sites or From Off-Site Construction Activities

Unpaved Travel Surfaces
- Temporary parking lots and staging areas
- Construction stock piles
- Construction traffic
- Construction access and sediment tracking off-site

Exposed Areas
- Construction sites, bare ground areas
- Land clearing and grubbing activities
- Earthwork, dozing, grading, scraping
- Drilling and blasting
- Soil and debris piles
- Tilling

Materials Handling
- Batch drop, dumping
- Conveyor transfer and stacking
- Material transfer points
- Crushing, milling, and screening operations
- Spilled materials
- Demolition and debris disposal

IMPACTS OF EROSION AND SEDIMENTATION

Degradation of Aquatic and Riparian Ecosystems

Excessive sediment can cause increased turbidity and reduced light penetration resulting in reduction in prey capture for sight feeding predators, clogging of gills and filters of fish and aquatic invertebrates, reduced spawning and juvenile fish survival, reduced angling success, smothering of bottom dwelling community, changes in substrate composition, and reduction in aesthetic values (Schueler, 1987). It can also lead to suppression of both aquatic and terrestrial vegetation and addition of nutrient particles to lakes and streams (Beaton, et al, 1972).

Pollutant Transport

Sediment is a pollutant in its own right and also transports many substances (such as nutrients, hydrocarbons, and trace metals) which cause pollution problems (APWA, 1981). Other pollutants originating as topsoil losses include soil organic components, plant residues, nutrient elements, organic material, atmospheric pollutants, and liquid and solid wastes (Berman, et al., 1991). Toxic substances in storm water have been found to concentrate in the sediments where they interfere with the reproductive cycle of many plants and animals as well as cause tumors and lesions in fish (City of Seattle, 1989). Of additional concern is that pollutants in sediment can be remobilized under suitable environmental conditions.

Erosion and Sedimentation of Water Ways and Public Facilities

Construction usually increases the amount of impervious area causing more of the rainfall to runoff, and increasing the speed at which runoff occurs. Unless properly managed, this increased runoff will erode natural and/or unprotected watercourses causing the watercourse to widen and/or deepen until a stable channel is reformed. This erosion of the watercourse may potentially damage property along the watercourse. Sedimentation can also contribute to accelerated filling of reservoirs, harbors, and drainage systems.

The storm water impacts of construction/land-altering activities do not just result from too much sediment. In many parts of California, stabilization of the land in excess of natural conditions may result in too little sediment, thus removing the natural bedload and causing erosion of downstream watercourses and possibly depleting sand from the beaches.

FACTORS INFLUENCING EROSION

There are primarily four factors that influence erosion: soil characteristics, vegetative cover, topography, and climate. ***Soil characteristics*** which determine the erodibility of the soil are particle size and gradation, organic content, soil structure, and soil permeability. Soils with a high proportion of silt and very fine clays are generally the most erodible. Organic matter creates a favorable soil structure, improving its stability and permeability. This increases infiltration capacity, delays the start of erosion, and reduces the amount of runoff. Soil

characteristics affect soil stability, permeability, and infiltration capacity. The less permeable the soil, the higher the likelihood for erosion.

Vegetative cover plays an extremely important role in controlling erosion by shielding the soil surface from the impacts of falling rain, slowing the velocity of runoff (thereby permitting greater infiltration), maintaining the soil's capacity to absorb water, and holding soil particles in place.

Regarding *topography*, slope length and steepness are key elements in determining the volume and velocity of runoff. As slope length and/or steepness increase, the rate of runoff increases and the potential for erosion is magnified.

The frequency, intensity, and duration of *rainfall* are fundamental factors in determining the amounts of erosion produced. When storms are frequent, intense, or of long duration, erosion risks are high. In California, the erosion risk period is typically highest in the winter rainy season (October through April) except in and near the Sierra Nevada Mountains and southern deserts, where summer thunderstorms may occur. On the other hand, erosion from wind and vehicle traffic can occur year round.

OTHER IMPACTS OF CONSTRUCTION ACTIVITIES

Sediment from erosion is the pollutant most frequently associated with construction activities. However, other pollutants of concern include nutrients, trace metals, other toxic chemicals, and miscellaneous wastes. These pollutants originate from a variety of construction activities. A summary of construction site pollutants is shown in Table 1.1. (Also, see the Municipal BMP Handbook for a discussion regarding the impacts these pollutants have on water quality and aquatic habitat).

NUTRIENTS

Nitrogen, phosphorous, and potassium are the major plant nutrients used for fertilizing new landscape at construction sites. Heavy use of commercial fertilizers can result in discharge of nutrients to water bodies where they may cause excessive algae growth. Phosphorous and nitrogen from fertilizers, pesticides, petroleum products, construction chemicals, and solid waste are often generated by construction site activity (Berman, et al., 1991).

TRACE METALS

Many of the artificial surfaces of the urban environment (e.g., galvanized metal, paint, or preserved wood (Berman, et al., 1991)) contain metals which enter storm water as the surfaces corrode, flake, dissolve, decay, or leach. Over half the trace metal load carried in storm water is associated with sediments (Schueler, 1987).

PESTICIDES

The three most commonly used forms of pesticides at construction sites are herbicides, insecticides, and rodenticides (USEPA, 1976). Unnecessary or improper application of these pesticides may result in direct water contamination, indirect pollution by drift or transport off soil surfaces into water (Washington DOE 1991).

OTHER TOXIC CHEMICALS

Often synthetic organic compounds (adhesives, cleaners, sealants, solvents, etc.) are widely applied and may be improperly stored and disposed. Deliberate dumping of these chemicals into storm drains and inlets (especially used crankcase oils) causes environmental harm to waterways.

MISCELLANEOUS WASTES

Miscellaneous wastes include wash water from concrete mixers, paints and painting equipment cleaning activities, solid wastes resulting from trees and shrubs removed during land clearing, wood and paper materials derived from packaging of building products, food containers such as paper, aluminum, and metal cans and sanitary wastes. The discharge of these wastes can lead to unsightly and polluted waterways.

TABLE 1.1 CONSTRUCTION SITE POLLUTANTS

CATEGORY	PRODUCT	POLLUTANTS
Adhesives	Adhesives, Glues Resins, Epoxy Synthetics Calks, Sealers, Putty, Sealing Agents Coal Tars (Naptha, Pitch)	Phenolics, Formaldehydes Phenolics, Formaldehydes Asbestos, Phenolics, Formaldehydes Benzene, Phenols, Naphthalene
Cleaners	Polishes, (Metal, Ceramic, Tile) Etching Agents Cleaners, Ammonia, Lye, Caustic Sodas Bleaching Agents Chromate Salts	Metals Metals Acidity/Alkalinity Acidity/Alkalinity Chromium
Plumbing	Solder (Lead, Tin), Flux (Zinc Chloride) Pipe Fitting (Cut Shavings) Galvanized Metals (Nails, Fences) Electric Wiring	Lead, Copper, Zinc, Tin Copper Zinc Copper, Lead
Painting	Paint Thinner, Acetone, MEK, Stripper Paints, Lacquers, Varnish, Enamels Turpentine, Gum Spirit, Solvents Sanding, Stripping Paints (Pigments), Dyes	VOC's Metals, Phenolics, Mineral Spirits VOC's Metals Metals
Woods	Sawdust Particle Board Dusts (Formaldehyde) Treated Woods	BOD Formaldehyde Copper, Creosote
Masonry & Concrete	Dusts (Brick, Cement) Colored Chalks (Pigments Concrete Curing Compounds Glazing Compounds Cleaning Surfaces	Acidity, Sediments Metals Asbestos Acidity
Floors & Walls	Flashing Drywall Tile Cutting (Ceramic Dusts) Adhesives*	Copper, Aluminum Dusts Minerals
Remodeling & Demolition	Insulation Venting Systems Brick, Cement, Saw, Drywall	Asbestos Aluminum, Zinc Dusts
Air Conditioning & Heating	Insulting Coolant Reservoirs Adhesives*	Asbestos Freon
Yard O&M	Vehicle and Machinery Maintenance Gasoline, Oils, Additives Marking Paints (Sprays) Grading, Earth Moving Portable Toilets Fire Hazard Control (Herbicides) Health and Safety Wash Waters (Herbicides, Concrete, Oils, Greases)	Oils and Grease, Coolants Benzene & Derivatives, Oils & Grease Vinyl Chloride, Metals Erosion (Sediments) BOD, Disinfectants (Spills) Sodium Arsenite, Dinitro Compounds Rodenticides, Insecticides
Landscaping & Earthmoving	Planting, Plant Maintenance Excavation, Tilling Masonry & Concrete* Solid Wastes (Trees, Shrubs) Exposing Natural Lime or Other Mineral Deposits Soils Additives Revegetation of Graded Areas	Pesticides, Herbicides, Nutrients Erosion (Sediments) BOD Acidity/Alkalinity, Metals Aluminum Sulfate, Sulfur Fertilizers
Materials Storage	Waste Storage (Used Oils, Solvents, Etc.) Hazardous Waste Containment Raw Material Piles	Spills, Leaks, Polluted discharge Spills, Leaks, Polluted discharge Dusts, Sediments, Polluted discharge

* See above categories.

Note: VOC = Volatile Organic Compounds, BOD = Biochemical Oxygen Demand due to the use of oxygen by microorganism decomposing materials.

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ALLOWABLE NON-STORM WATER DISCHARGES

The State construction general permit prohibits discharges which do not result from rainfall. However, certain "non-storm water" discharges are allowed if they do not cause a significant pollution problem (see box).

Allowable Non-Storm Water Discharges for Construction Sites

- Discharges from fire fighting
- Fire hydrant flushing
- Potable water sources including dechlorinated water line flushing
- Uncontaminated groundwater resulting from dewatering activities
- Foundation or footing drains where the flows are not contaminated with process materials
- Natural occurring water such as springs, wetlands and riparian habitat
- Irrigation water discharged during seeding, planting, and maintenance, provided fertilizer and pesticides are applied correctly
- Pavement wash waters for dust control and general housekeeping practices provided spills or leaks of toxic or hazardous materials have not occurred and where detergents are not used
- Individual car washing
- Air conditioning condensation

STORM WATER PROGRAMS

The need to protect our environment has resulted in a number of laws and subsequent regulations/programs. At times this has resulted in overlap and ambiguity between the programs. This situation is true for storm water programs. The Federal Clean Water Act, as amended in 1987, is the principal vehicle for the control of storm water pollutants. There are, however, other programs that directly or indirectly deal with the control of storm water pollutants. Examples include: Federal Coastal Zone Act Reauthorization Amendments of 1990, and the State required General Plan for municipalities.

In the following section, various Federal, State and local programs are discussed in relationship to the control of pollutants in storm water. The storm water regulatory programs are new and are expected to evolve over the next several years. Thus the user is advised to contact local regulatory and/or municipal officials for further information.

FEDERAL NPDES PROGRAM

In 1972, the Federal CWA was amended to provide that the discharge of pollutants to waters of the United States from any point source is effectively prohibited, unless the discharge is in compliance with a National Pollutant Discharge Elimination System (NPDES) permit. On November 16, 1990, US Environmental Protection Agency (EPA) published final regulations that establish application requirements for storm water permits for specific categories of industries. Construction activities of five (5) acres or more (or less than 5 acres if part of a common plan of development or sale) are defined in the regulations as an industrial activity.

STATE NPDES PROGRAM

In California, the NPDES storm water permitting program is administered by the State Water Resources Control Board (SWRCB) through the nine Regional Water Quality Control Boards. The SWRCB has established a construction general permit that can be applied to most construction activities in the State (see box next page and Appendix A). Construction permittees may also choose to obtain individual NPDES permits instead of the general permit.

MUNICIPAL NPDES PROGRAM

Municipalities with a population of over 100,000, drainage systems interconnected with these municipalities' systems, or municipalities

Key Conditions of the Construction General Permit

Who Must Comply?

- Permit applies throughout California[1]
- Applies if a total of 5 or more acres is disturbed over the life of the project[2]
- Does not apply to routine or emergency maintenance sponsored by public agencies
- Does not apply to dredging and/or filling regulated by the U.S. Army COE
- The owner/developer of the land is responsible for compliance

How to Comply?

- Prepare the SWPPP before construction begins. It describes:
  - The project
  - Controls during construction: Measures selected to control excessive erosion and other constituents
  - Post-construction controls: Measures to prevent or control pollutants in runoff after construction is complete
  - A plan to inspect and maintain these measures
- Submit Notice of Intent: Notify the SWRCB prior to the beginning of construction
- Keep the SWPPP on site and follow it during construction
- Submit Notice of Termination: Notify the SWRCB that construction is complete

[1] Except the Lake Tahoe Basin and Indian lands which are covered by a separate permit.

[2] A recent U.S. District Court ruling may require that the permit cover smaller construction projects.

determined to be significant contributors of pollutants are required to obtain a NPDES storm water permit. In California, most of the major urbanized counties have already obtained an NPDES storm water permit (see box above).

Municipalities with NPDES storm water permits for their own municipal separate storm sewer system are responsible for developing a management program for construction activities in their jurisdiction. The program addresses appropriate planning and construction procedures; ensures the implementation, inspection, and monitoring of construction sites

California Counties with NPDES Storm Water Permits (1)

Alameda	Sacramento
Los Angeles	San Bernardino
Orange	San Diego
Riverside	Santa Clara

California Municipalities/Counties Pursuing NPDES Storm Water Permits

Cities		
Bakersfield	Modesto	Stockton
Fairfield	Oxnard	Vallejo
Fresno	Suisun City	

Counties	
Contra Costa	San Mateo
Kern	Ventura

(1) Consult with local RWQCB to determine if municipality within these counties is covered by the NPDES permit.

which discharge storm water into their systems; and provides for eduction or training for construction site operators.

While construction activities and municipal drain systems are covered by separate permits with distinct conditions, compliance requirements for these two NPDES permits include related activities. The requirements and interaction between these two permits are shown in Figure 1.2.

OTHER STATE AND LOCAL PROGRAMS

In many cases storm water pollution control may already be achieved by existing regulations or programs. In California, the General Plan Law and the California Environmental Quality Act (CEQA), provide a basis for municipalities to review and comment on all projects within their jurisdiction. Under the General Plan Law, municipalities are required to develop policies and regulations which guide development within the municipality. Each development project is then reviewed for conformance with these policies. Under CEQA, projects are also subject to review and comment for any adverse impact the

Construction General Permit Requirements
(Site-Specific)

- Submit Notice of Intent (NOI) to SWRCB (and local municipality if required).
- Prepare and implement a SWPPP.
  - Controls during construction
  - Post-construction controls
- Revise SWPPP as construction conditions change.

Municipal Permit Requirements
(System-Wide)

- Prohibit, detect, and eliminate non-storm water discharges.
- Identify and reduce pollutant sources.
- Characterize current discharges with screening and monitoring.
- Detect and eliminate illicit connections and illegal dumping.
- Prepare and implement storm water management program.
- Ensure adequate funding.

Interaction Between Permits

- SWRCB will expect municipality to enforce all local storm water ordinances, floodplain management regulations, and local standards for grading, erosion, sedimentation.
- NOI for construction provides the municipality with a method for anticipating construction of:
  - New public storm drain systems
  - New source identification
  - New outfall identification
  - Pollution control BMPs
  - Current construction NPDES permit holders
- Municipal storm water management and pollution control program provides construction policies and standards:
  - Site planning requirements
  - Design and construction requirements
  - Public inspection
  - Maintenance requirements
  - Training programs
  - Review and inspection staff.
  - Guidelines and training manuals
  - Technical standards and specifications
- Post-construction controls (e.g., final site grading, erosion control, storm water treatment controls and maintenance) required under the construction general permit will be subject to municipal review and approval through existing procedures.

Figure 1.2 Relationship Between Construction and Municipal NPDES Storm Water Permits

projects may have on the environment, including impacts from storm water discharges.

Other regulations which may be applicable are summarized in Table 1.2. Actions taken under these regulations should be integrated with the SWPPP to promote consistency between activities required by local and State authorities. Because the General Plan Law, CEQA, and the subdivision map act may have a major impact on the development of SWPPP, a separate discussion on these regulations/laws is provided. For more information regarding other regulations shown in Table 1.2, the user is advised to confer with State and/or local authorities.

The General Plan Law: Each municipality is required by law to prepare a general plan to guide development. The general plan is a policy document that frames the long-term objectives for the physical development of the city/county. Each general plan must address at least seven elements (e.g., circulation, open space, conservation, etc.). The extent to which these elements are addressed is determined by the local agency. The municipality may incorporate storm water management objectives in the general plan, particularly objectives for post-construction controls, and adopt specific ordinances, policies, etc., for specific control measures required for new development. The specific plan and zoning ordinance are implementation tools of the general plan. A specific plan has a three-fold purpose: (1) refine the general plan for a "specific" area within the general plan boundaries; (2) regulate specific land uses within a "specific" area within the general plan boundary; and (3) establish detailed policies and regulations for the "specific" area. These policies and regulations may include storm water pollution controls. The specific plan can be adopted by resolution (making it a policy document) or by ordinance (making it a regulatory document).

A zoning ordinance establishes development standards for lots and parcels. Storm water pollution controls can be implemented in the specific plan and zoning stages through enactment of ordinances. These ordinances may preserve watercourses, specify detention and retention requirements, define storm water designs standards, and create open space and buffer areas within the project site (see box, below).

Typical Zoning Ordinances Providing Storm Water Pollution Control

- Preservation and use of flood plains and watercourses.
- Local detention and retention requirements.
- Erosion protection and sediment transport balance.
- Material/activity restrictions.

California Environmental Quality Act: The purpose of CEQA is to expose any adverse environmental impacts a project may have, and to suggest mitigation measures to minimize those impacts. Post-construction controls of storm water pollution are one of many possible mitigation measures which may be considered. If the project is determined to have no adverse impacts, then a negative declaration can be issued. Otherwise, an Environmental Impact Report (EIR) is written before the project will be considered for approval. The EIR discusses proposed project impacts, the means of reducing or eliminating the impacts, and realistic project alternatives. Mitigation measures for potential impacts are addressed by the EIR. Water quality impairment caused by storm water pollution from the site (during and after construction) may be one of these impacts.

Subdivision Map Act: Many privately funded construction projects within California are regulated under the authority of the Subdivision Map Act, which grants the municipality authority to develop subdivision ordinances. These ordinances may include standards for the planning and design of public facilities for proposed projects. Grading standards and erosion protection standards, detention/retention design standards, dust control regulations are

TABLE 1.2 EXISTING REGULATIONS FOR STORM WATER POLLUTION CONTROL

REGULATION	ACTIVITY	POTENTIAL
General Plan Law	Municipal development objectives Adoption of ordinances	Storm water management controls, e.g., pollutants control, watershed protection
California Environmental Quality Act (CEQA)	Environmental review of projects	Mitigation measures for reduction of pollutants
Subdivision Map Act	Adoption of ordinances	Standard/Regulations for grading, erosion protection, detention/retention design, and dust control
Flood Plain Management & Drainage Ordinances	Control of velocity	Control of erosion
	Detention/retention	Control of sediment, pollutants, and quantity
	Bank stabilization and outlet controls	Erosion and Sediment controls
Clean Water Act 401 and 404 Permits	Permits Dredging and Filling in "Waters of the United States"	Erosion control, sediment control, long-term sediment balance & minimize pollutants
		Vegetative controls to preserve riparian areas
Zoning Ordinances	Cluster Development	Minimize Basin-wide runoff & impervious areas
	Hillside Development	Slope & erosion restriction. May include revegetation or stabilization.
	Landscape/Open space	Vegetative BMPs perimeter controls reduction of runoff
Sewer Use Ordinance	Control of illicit connections	Pollutant controls
Uniform Building Code	Chapter 70 - Excavating & Grading	Minimize erosion & sedimentation
		Standards for stable cut & fill slopes
Uniform Plumbing Code	Prevention of illicit connection	Pollutant controls
	Various Chapters on materials & application/use	Pollutant controls
Fire Code	Storage of Materials	Pollutant controls
Air Quality Management Plans	Emission	Sediment & dust controls
1601 and 1603 Stream Bed Alternation Agreements	Alternations to creek and stream beds	Pollutant controls
Coastal Zone Act	Regulation of non-point pollution near the ocean	Pollutant controls

also enacted through subdivision regulations and ordinances. In addition, as part of the subdivision processes, the subdivisions must comply with the general plan, CEQA, zoning ordinances and specific plan policies and/or regulations. Such compliance may include storm water pollution control measures.

Subdivision plan review is accomplished in a two-stage process: a tentative map conditioning stage and final map review stage. The tentative map review/approval process presents the final opportunity for the municipality to require conditions of approval for the project, such as the selection of post-construction BMPs. After the tentative map approval, the project proponents must complete the second stage, submitting a final map showing that the conditions established by the tentative map are satisfied. Improvement plans for the construction of the project facilities (e.g., post-construction BMPs) are processed concurrently with the preparation of the final map. A plan for controlling erosion and sedimentation during construction should also be prepared at the time improvement and grading plans are prepared. Upon acceptance, the local agency may approve the final maps, and improvement plans based on conformance with previously established standards, ordinances, policies, and conditions of approval.

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2. *HOW TO PREPARE A STORM WATER POLLUTION PREVENTION PLAN*

INTRODUCTION

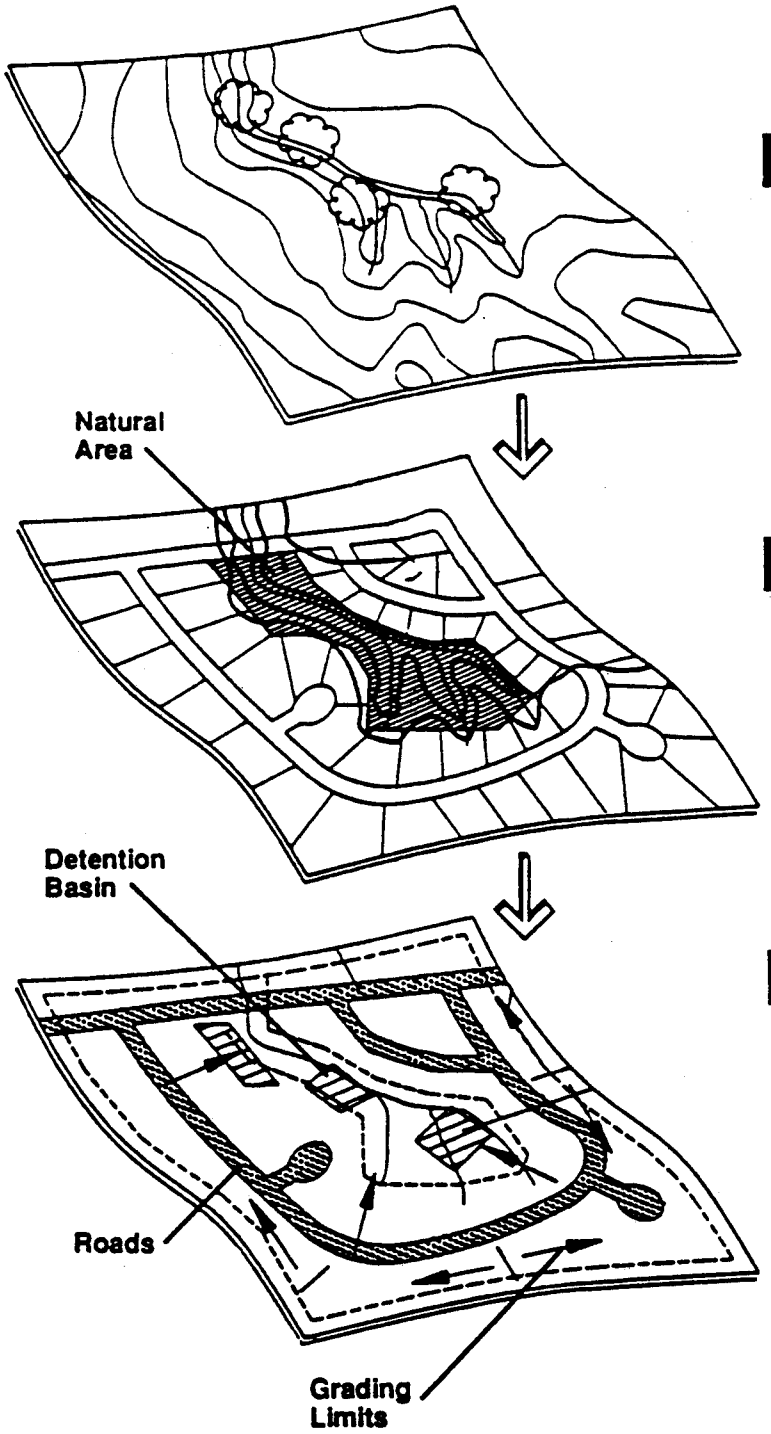
This chapter describes how to prepare and implement a storm water pollution prevention plan (SWPPP) for a construction project. The SWPPP is the focus of the NPDES General Permit issued by the California State Water Resources Control Board (SWRCB) for most construction activities in the State.

Preparing and implementing the SWPPP need not be time-consuming, and can best be accomplished using and/or slightly revising current planning, design, and construction activities employed by most projects (as shown with the accompanying Figure 2.1). The best SWPPPs are those which are prepared as an integral part of these typical project activities. This is because much of the information required by the SWPPP is already part of the project design documentation, and because the design may need to be modified to incorporate controls during construction and post-construction controls.

The SWPPP must be prepared *before* construction begins, ideally during the project planning and design phases. It may be completed at the end of the design phase or early in the construction phase, as shown in Figure 2.1. Implementation of the SWPPP begins when construction begins, typically before the initial clearing, grubbing, and grading operations since these activities can usually increase erosion potential on the site. During construction, the SWPPP should be referred to frequently, and refined by the owner and contractors as changes occur in construction operations which have significant effects on the potential for discharge of pollutants.

The SWPPP may be very dynamic for large, complicated projects constructed in multiple stages over a long period of time. For these projects, planning, design, and construction may be occurring simultaneously. The guidelines for preparing a SWPPP given in this chapter apply to complicated projects as well. In this case, it may be useful to prepare the SWPPP in sections, with each section covering each stage/portion of the project, and an overview section generally discussing the entire project. Remember--there is no required format for the SWPPP, just particular subject matter and guidance which must be provided under the General Permit.

This chapter is organized according to the phases of a construction project: planning, design and construction. For each phase guidelines are given on how to incorporate SWPPP preparation into the work effort. A series of worksheets is included at the end of this chapter to aid in preparation of the SWPPP.



Planning Phase

- Asess Site Conditions
- Develop Base Map
- Select Post-Construction BMPs
- Establish Maintenance Agreements

Design Phase

- Prepare Project Site Plan
- Define BMP Objectives
- Design Post-Construction BMPs

Construction Phase

Bidding and Mobilization
- Select BMPs
- Complete the SWPPP
- Submit the Notice of Intent

Construction Operations
- Inspect and Maintain BMPS for Construction Activities
- Construct Post-Construction BMPs
- Revise the SWPPP as Construction Evolves or Property is Sold

Complete Construction
- Permanent Site Stabilization
- Maintenance Agreement for Post-Construction BMPs
- Submit Notice of Termination

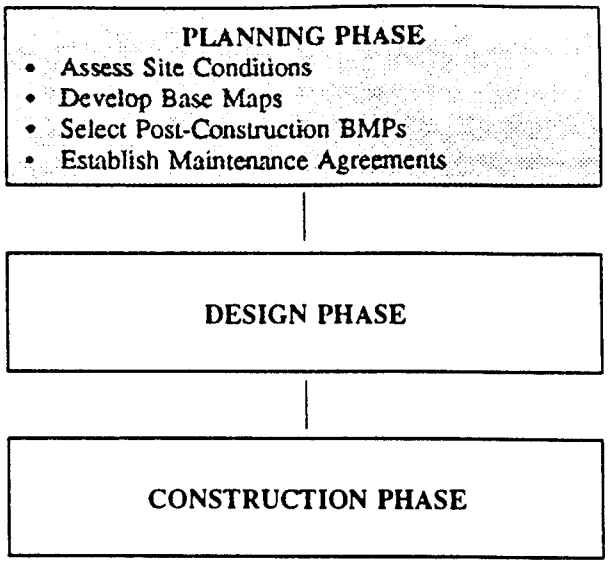
Figure 2.1

Integrating Preparation of the SWPPP Into the Normal Site Development Process

PLANNING PHASE

The planning phase is the source of much of the information needed for the SWPPP. The basis for storm water pollution control decisions are also made at this phase via the normal review process with the local municipality. This section addresses three activities which occur during planning that are important to preparation of the SWPPP:

- Assess Site Conditions
- Develop Base Map(s)
- Select Post-construction BMPs
- Establish Long-Term Maintenance Agreements



ASSESS SITE CONDITIONS

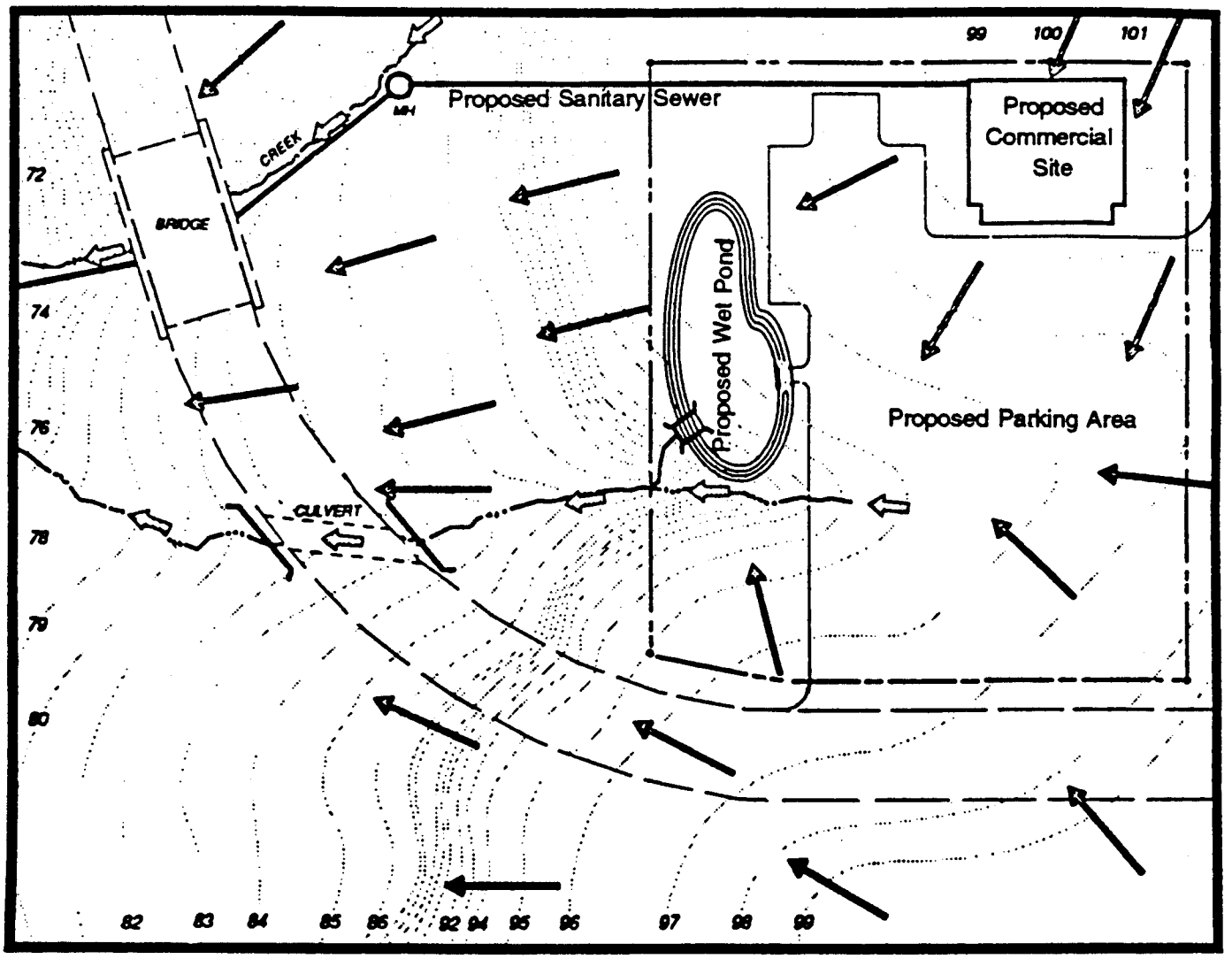
The planning phase of any construction project defines the characteristics of the site and how these characteristics will impact the project. Information on what will be built, how it will be constructed, drainage patterns, soils, topography, rainfall, and special site conditions (e.g., existing vegetation, unique cultural or environmental features) is usually obtained and used for initial planning of public works or land development projects. This information will be used in selecting BMPs for the project, and typically should be included in or referenced by the SWPPP.

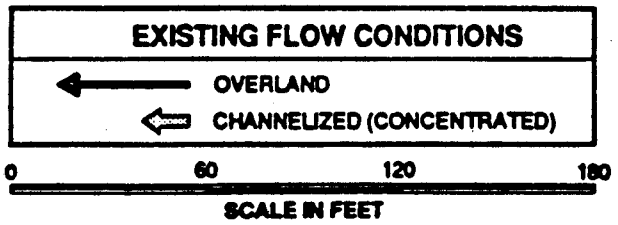
DEVELOP A BASE MAP(S)

The designer will generally prepare a site analysis as either a formal document or as an informal plan. The site analysis reviews the site's physical conditions, adjacent areas, constraints, applicable zoning, and development requirements. To avoid duplication of effort and reduce costs, the owner and the designer should prepare a site base map (Figure 2.2) to be shared by the SWPPP and other site analyses (see box above). Worksheet 2 at the end of this chapter is a checklist for preparing a topography base map.

Base Map(s) of Site for SWPPP and Other Site Planning (See Figure 2.2)

- *Use scale large enough to distinguish existing and proposed features of the site*
- *Location map must extend 1/4 mile beyond the property boundary*
- *Site map(s) should show:*
  - *Topography*
  - *Limits of Construction*
  - *Conceptual project layout*
  - *Surface water bodies, water courses, known wetlands, springs and wells*
  - *Locations where drainage leaves/will leave the property*
  - *Existing land use*
  - *Existing vegetation*
  - *Steep or unstable slopes*
  - *Areas used to store soils and wastes*
  - *Areas of cut and fill*
  - *Existing and planned paved areas and buildings*





Source: Adapted from City of Austin

FIGURE 2.2 SITE BASE MAP

SELECT POST-CONSTRUCTION BMPs

Post-construction BMPs are the final improvements to and configuration of the project which are designed to control long-term storm water pollution. Post-construction BMPs are normally selected in the planning phase in conjunction with the approval of the tentative map, designed during the design phase of a project and completed to the satisfaction of the municipality and/or the ultimate owner. Occasionally, unforeseen natural or man-made factors may require revisions to or additions of post-construction BMPs during the construction phase. Post-construction BMPs are typically integrated with the normal project features (see box). In the planning phase (tentative map), it is important to indicate the maintenance responsibility for the post-construction BMPs.

During construction the contractor must ensure that the post-construction BMPs are installed properly and that any maintenance that may be necessary during construction is performed. After the project is complete it will then be the responsibility of the owner, private or public, to provide for long term operation and maintenance. A discussion of selecting post-construction BMPs is presented in Chapter 3 as well as in the Municipal Handbook.

Typical Post-Construction BMPs

1. *Stabilize the site by establishing final land grades, contours, and drainage patterns.*
2. *Control of the volume, flow, and/or velocity of storm water runoff by such means as detention/retention basins, porous pavement, dry wells, debris basins, etc.*
3. *Channel stabilization, energy dissipators, or other drainage structures.*
4. *Permanent landscaping, rock rip rap, vegetation, or other permanent ground cover designed to stabilize the soil or slopes.*

ESTABLISH MAINTENANCE AGREEMENTS

The General Permit requires that the project owner arrange for the maintenance of any drainage/storm water pollution control measures after construction is complete. The local municipality usually will have an established policy defining maintenance responsibilities for community infrastructure, and may require a maintenance agreement as a condition for approval of a tentative map. Two fundamental choices exist:

- Private maintenance: Here, the owners of the property, after construction is complete, retain the responsibility for maintenance. The responsible party may be the owner or an association of property owners/homeowners. It is advisable that a formal agreement such as a deed restriction recorded on the property, be drawn between the municipality and the party responsible for maintenance.

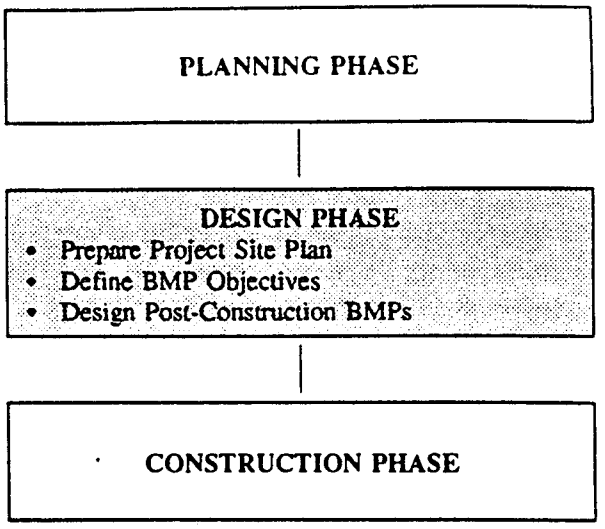
- Public Maintenance: Here, a public agency agrees to assume the maintenance for some or all of the infrastructure. Such maintenance may be incorporated into a municipality-wide program, funded from the municipality's general fund or user fee structure. Alternatively, an agency or special district may be established, to assess property owners within the district. Common examples of special funding methods in California include community service areas (CSA), area drainage plans, and benefit assessment areas.

DESIGN PHASE

There are three principal activities which are typically incorporated into the SWPPP during the design phase:

- Prepare Project Site Plan
- Define BMP Objectives
- Design Post-Construction BMPs

Design considerations for Post-Construction BMPs can be found in Chapter 5 of the Municipal BMP Handbook. The remainder of this section discusses how to incorporate the other two activities at little additional effort beyond normal project design activities.



Studies and Reports Prepared during Project Design

Type of Report	*Information Available for the SWPPP*
Preliminary Design	
Soils Report	*Areas of highly erodible soils*
EIR/EA	*Previous and proposed uses of toxic materials on the site*
Preliminary Site Layout	*Locations of buildings and paved surfaces and/or lot layouts*
Final Design	
Drainage or Hydrology Report	*Drainage patterns and drainage area boundaries*
	Storm water conveyance structures
	Detention/retention facilities
Grading/Drainage Plan	*Areas of cut and fill*
	Slopes during and after construction
	Protection of existing vegetation
	Areas of soil disturbance
Landscape Plan	*Buffer areas and set backs*
	Permanent site stabilization
	Multi-purpose uses of open space

PREPARE PROJECT SITE PLAN

Numerous studies, reports, and documents are typically prepared during preliminary and final design as the basis for many decisions about the project (see box, this page).

The Hydrology Report, Drainage Study, or similar document is typically required as part of project infrastructure design. Such a study is often required by the local municipality as a condition of a Tentative Map for a land development project, or as part of improvement plans or concept plans for public projects. The Hydrology Report should address the design storm which will be used for erosion and sedimentation control. A common design storm is a two-year, 24-hour storm.

The Soils Report is normally prepared based upon site soil sampling which will identify soil constraints, design criteria, slope stability, etc. Both of these reports are used by the engineer in preparation of the preliminary grading and drainage plan. They also form the technical basis for selection of erosion and sedimentation control BMPs and post-construction BMPs.

Figure 2.3 shows a typical preliminary site layout based on information which is usually readily available during the preliminary design phase of a building project. This preliminary site plan includes several items which are required for the SWPPP:

- Locations of buildings and paved areas
- Proposed flow paths:
  - On-site flow paths where erosion during construction may occur and erosion and sedimentation BMPs should be applied.
  - Locations where runoff will leave the property.
  - Diversion of or conveyance for upstream runoff.
- Locations of flood control facilities and post-construction BMPs.
- Approximate locations where cut and fill will occur.
- Access points for construction traffic.
- Areas where existing vegetation may be preserved.
- Areas to be paved.
- Areas most suitable for the contractors yard, material storage area, and vehicle maintenance area (consider location in areas to be paved).

DEFINE BMP OBJECTIVES

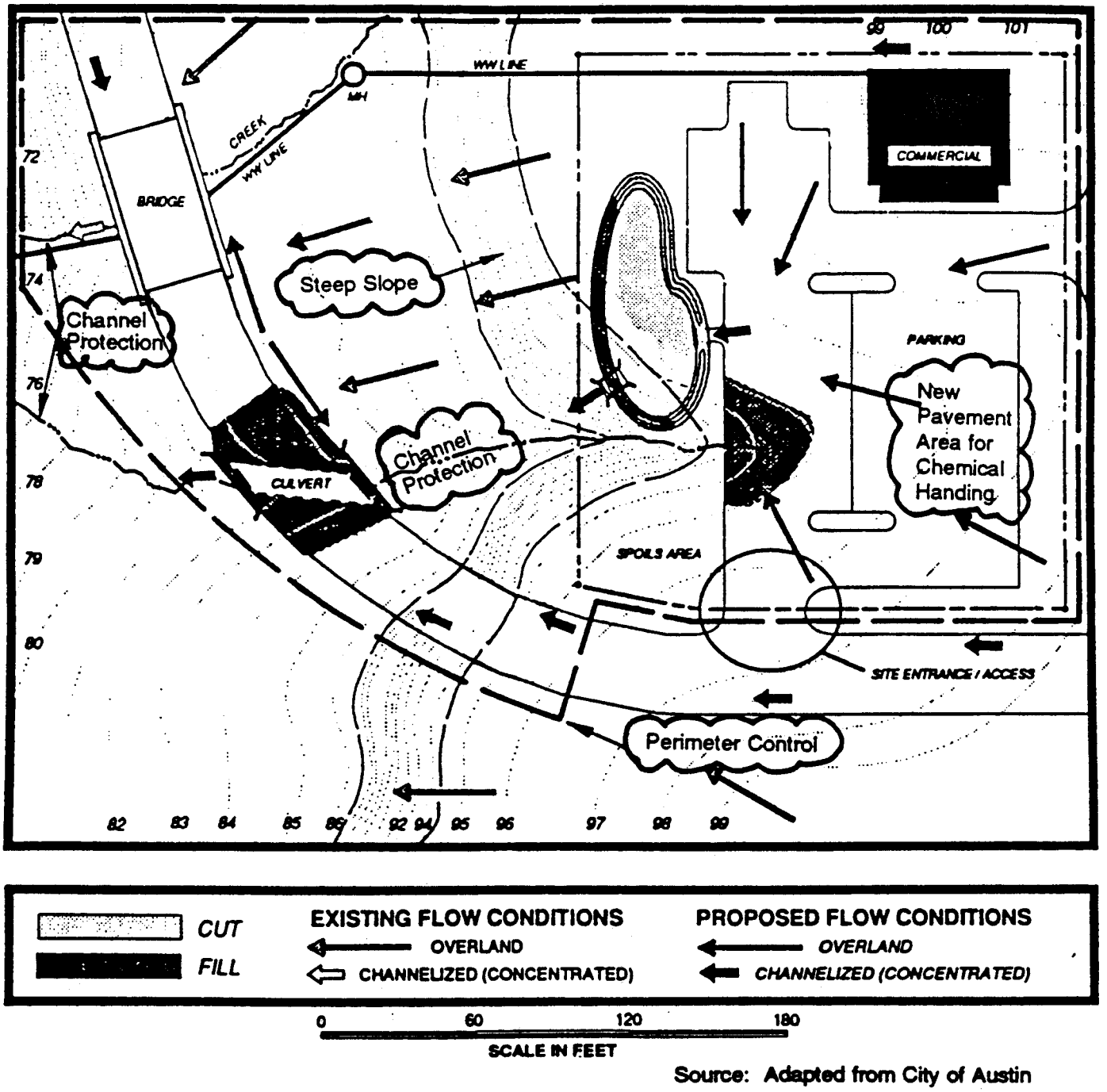
During the final project design process, the engineer, architect or landscape architect will prepare detailed grading plans, paving and drainage plans, landscape plans, and other plans as necessary for the successful construction of the project. These plans provide the construction design requirements, specifications, and other construction documents necessary for the construction bidding, permitting, and inspection. For the SWPPP to be compatible with the other engineering plans, the most practical process may be for the engineer or architect to develop BMP objectives for the construction period based on contractor activities, and the grading and drainage plan for the site (see box).

BMP Objectives

- *Practice Good Housekeeping*
- *Contain Waste*
- *Minimize Disturbed Area*
- *Stabilize Disturbed Area*
- *Protect Slopes and Channels*
- *Control Perimeter of Site*
- *Control Internal Erosion*

A narrative discussion of these objectives should be prepared suitable for inclusion in the SWPPP, as well as to guide the BMP selection process. Worksheets 3, 4, and 5, at the end of this chapter, may be used in conjunction with the site map to define BMP objectives. The locations of various objectives can be shown on a site map (Figure 2.3). Determining objectives facilitates the selection of BMPs.

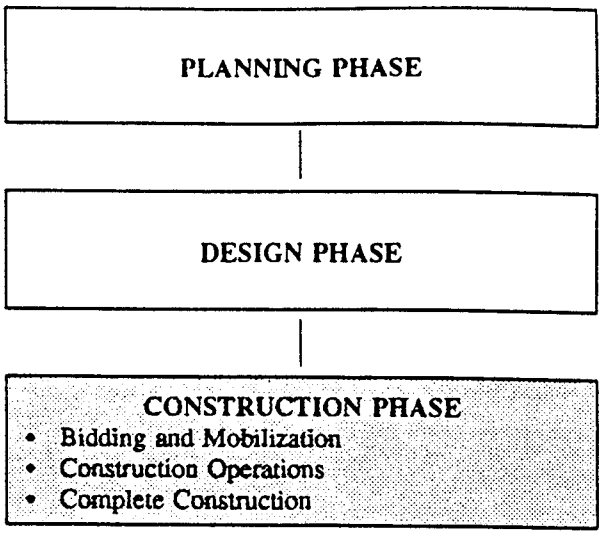
This step can occur as part of the grading and drainage plan and included in the bid package and/or construction documents for consideration by the contractor. This allows the owner to explicitly address unique site conditions which may impact storm water pollution control during construction. Alternatively, the owner could require the contractor to prepare such a map to justify the selection of BMPs.



Source: Adapted from City of Austin

FIGURE 2.3 IDENTIFICATION OF BMP OBJECTIVES ON PRELIMINARY BASE MAP

CONSTRUCTION PHASE:



BIDDING AND MOBILIZATION

During bidding and mobilization, the owner selects a contractor(s), who in turn, plans and prepares to construct the project according to the construction plans and specifications. Four activities which must be addressed during this phase include:

- Select BMPs
- Complete the SWPPP
- Submit the Notice of Intent (NOI)
- Train Personnel

Select BMPs

Either the owner, the owner's design consultant, or the contractor may perform these activities, at the discretion of the owner and the local municipality. The construction documentation should specify what the responsibilities of the owner and the contractor are with regard to storm water pollution control both before, during and after construction.

Chapter 3 presents a complete discussion on selecting BMPs for construction activities which can be used by the owner, the project engineer, and the contractor, as appropriate. The following sections discuss how to complete the SWPPP and to prepare the NOI.

Complete the SWPPP

The SWPPP should be directed at personnel on the construction project (e.g., supervisors, foreman, inspectors). The SWPPP should provide specific guidance on actions to be taken by these personnel, and should be presented in a format which accommodates day-to-day use (e.g., loose leaf, pullout sections, check lists). Worksheets for preparing the SWPPP are included at the end of this chapter.

Contents of the SWPPP - The SWPPP should provide a simple narrative and diagram that locates the construction site, identifies potential pollutant sources on-site, shows the location of the management practices to be used to *minimize* erosion and sedimentation during construction, describes measures which *eliminate* pollution of storm runoff by any chemicals and materials used during the construction process, and shows areas of long-term post-construction control measures. Information is provided either in narrative or site plan form (see box, next page). The level of detail will vary with the intensity, size and type of construction. The SWPPP may include copies of detail plans and specifications of the construction work..

Guidelines for SWPPP Preparation - The SWPPP should be an independent document which concisely provides the erosion, sedimentation and pollution control measures to be used. All of the necessary planning work has been done during the site

planning and design process. The final step consists of consolidating the pertinent information and developing it into a specific erosion and sediment control plan for the project. The plan consists of three parts: a site plan, a narrative, and an inspection and maintenance plan. The site plan is one or more of a series of maps or drawings pictorially explaining information contained in the narrative. The narrative verbally explains the problems and their solutions with all necessary documentation. The inspection and maintenance plan describes the procedures whereby the BMPs are maintained in good and effective condition.

Contents of the SWPPP

Project Information (Worksheet 1)

- *Project Name and Location*
- *Owners Name and Address*
- *Contractors present on-site*
- *The Notice of Intent (NOI)*

Site Map(s) (Worksheet 2)

- *Project Location*
- *Area to be Disturbed*
- *Improvements to be Constructed*
- *On-site or Downstream Water Bodies and Water Courses*
- *Pre- and Post-Construction Drainage Patterns*
- *Locations where BMPs will be used*
  - *BMPs for Erosion and Sedimentation Control During Construction*
  - *BMPs for Other Contractor Activities (as appropriate)*
  - *Post-Construction BMPs to be Installed during Construction*

Narrative Descriptions (Worksheets 3, 4, 5 and 6)

- *Known sources of contamination on site before construction*
- *Construction activities which may cause storm water pollution*
- *Pollutants expected to be present on the construction site*
- *BMPs for these constituents/pollutant sources*
- *Responsible party for maintenance*

Monitoring, Inspection and Maintenance (Worksheet 7)

- *Inspection and reporting procedures*
- *Maintenance procedures*
- *Training program*

- *Site Plan*: The SWPPP site plan should be a simple illustration of the project site, showing key physical features and the location of erosion and sediment control measures and all construction operation measures such as entrance drives and construction yards. To the extent possible locally required grading plans and/or erosion control plans should be used in preparing the SWPPP.

  Two scales of site maps will usually be required for all but the smallest construction sites:

  Project Location Map: A figure showing the project site and the surrounding area (one-quarter mile beyond the project limits and with additional areas if necessary to clearly show local drainage patterns). A USGS 1:24000 scale topographic map is often used as a project location map.

  Detailed Site Plan: A series of one or more drawings of the construction site at a scale (typically, no smaller than 1 inch = 400 feet) sufficient to clearly show on-site drainage patterns and the location of erosion and sedimentation controls.

  Typical project construction drawings usually include a project site plan which includes most (if not all) of the required information. Simplified details and drawings may also be included or referenced where standard specifications exist. Worksheet 2 may be used as a check list for preparing a site plan.

  When the layout of the site has been decided upon, a plan to control erosion, sedimentation, and other pollutants from the disturbed areas must be formulated.

Figure 2.4 is a typical site plan showing locations of BMPs for erosion and sedimentation control based for the BMP objectives indicated in Figure 2.3. Chapter 3 describes procedures for site assessment and BMP selection.

- *Narrative*: The narrative is a written statement which explains the erosion, sediment, and other pollutant control decisions made for a particular project and the justification for those decisions. The narrative should contain concise information concerning existing site conditions, construction schedules, and other pertinent items which are not contained in a typical site plan.

  Worksheets 3, 4, 5 and 6 are intended for guidance on preparing the narrative portions of the SWPPP.

  The narrative is important to the construction superintendent and inspector who are responsible for implementing the plan. It provides them with a single report which describes where and when the various BMPs for contractor activities, erosion and sediment control, and post-construction control should be installed.

- *Monitoring, Inspection, and Maintenance Plan*: Every BMP installed on a construction site must be checked periodically and maintained sufficiently to ensure proper performance. The construction general permit requires that an Inspection and Maintenance Plan be implemented which:

  - Assigns personnel responsible for BMP inspection and maintenance.
  - Requires maintenance of any BMPs whose effectiveness is compromised (e.g., replace failed BMPs, remove trapped sediment, increase size of spill containment flushed out by rain).
  - Keep inspection and maintenance records on file for at least three years.

  Maintenance requirements for each BMP are presented in Chapters 4 and 5. Chapter 6 discusses inspection requirements and methods for assessing the effectiveness of the BMPs.

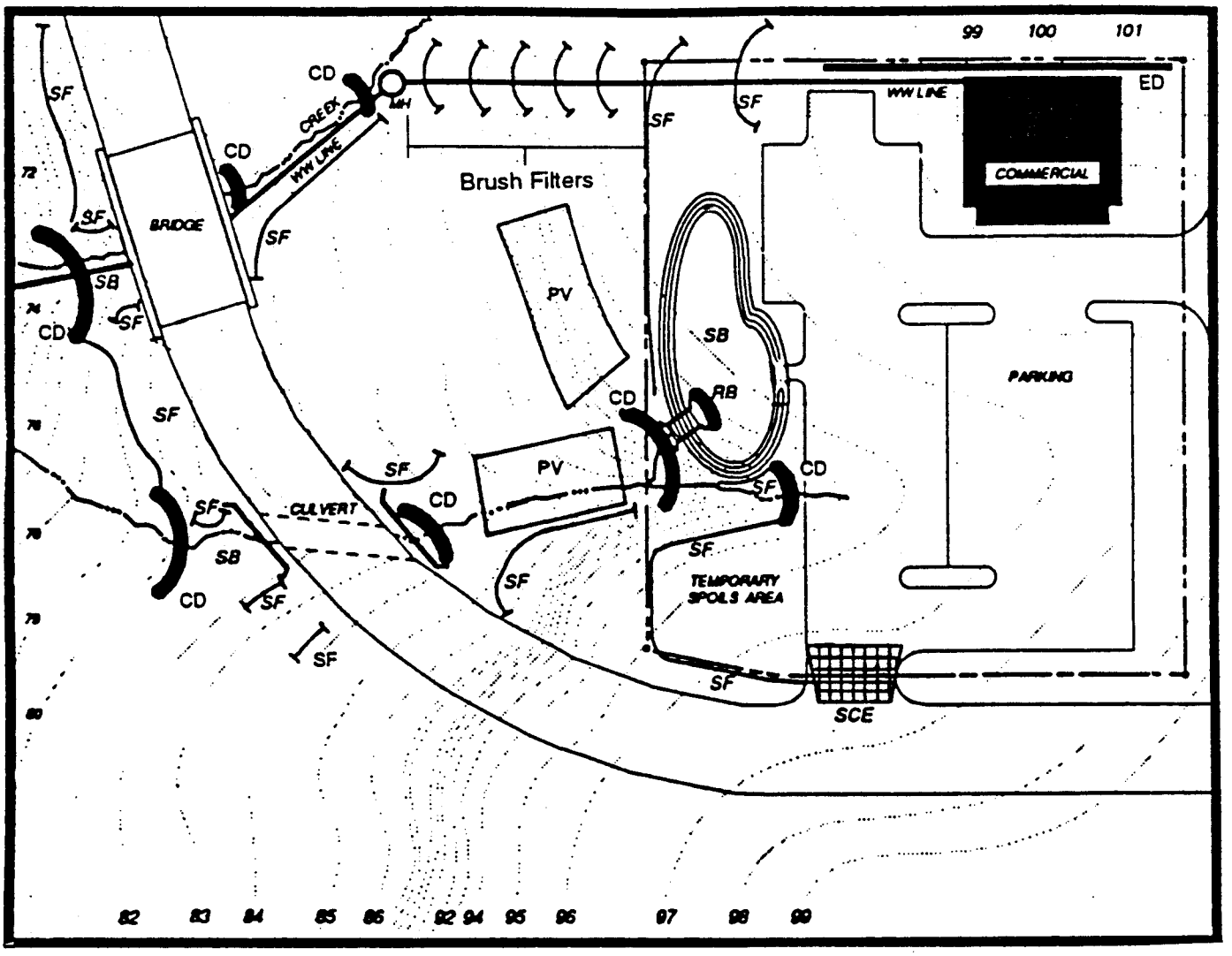
Submit Notice of Intent

The construction general permit requires that a NOI be submitted to the State Water Resources Control Board (SWRCB) prior to the start of construction. The NOI is not an application for a permit and is not subject to approval--it simply notifies the SWRCB that a construction project is about to begin, the location of that project, the responsible parties, and a certification that a SWPPP has been prepared and will be followed. The owner of the construction project (i.e., permittee) is responsible for submitting the NOI. Owners who submit NOIs are authorized to discharge storm water under the terms and conditions of the construction general permit. The completed NOI must be attached to the SWPPP.

Where to Send the NOI - In California, all permit correspondence regarding the construction general permit (including the NOI and the appropriate annual fee) is submitted to:

California State Water Resources
Control Board
Division of Water Quality
Storm Water Permit Unit
P.O. Box 1977
Sacramento, California 95812-1977

The permittee may also be required to submit NOIs, as well as all other construction general permit correspondence,



Source: Adapted from City of Austin (1989)

SEDIMENTATION CONTROL BMPs

RB	ROCK BERM
SF	SILT FENCE
BF	BRUSH FILTER
SB	SEDIMENT BASIN (TEMPORARY)
SCE	STABILIZED CONSTRUCTION ENTRANCE
ED	EARTH DIKE

EROSION CONTROL BMPs

CD	CHECK DAM
PV	PRESERVE EXISTING VEGETATION

0 60 120 180

SCALE IN FEET

FIGURE 2.4 SITE PLAN SHOWING LOCATIONS OF BMPs FOR EROSION AND SEDIMENTATION CONTROL

to the local municipality. (Check with your local municipality.)

Failure to Submit the NOI - If a construction project begins before the NOI is submitted, the NOI should be submitted as soon as possible thereafter. All construction projects are subject to the general permit including projects which began before the general permit was issued. Owners of active construction projects without an NOI on file with the SWRCB, or without a SWPPP in place, are discharging storm water without an NPDES permit and are in violation of the Clean Water Act. Violations may result in fines or imprisonment. **Failure to comply with the Clean Water Act may result in fines up to *$25,000* per day of violation or any other appropriate sanction.** In California, the State may also bring forth civil and criminal penalties under the Porter-Cologne Water Quality Act. Municipalities may make plan approval, building permits, etc., subject to submittal of the NOI.

Contents of the NOI - The construction general permit and NOI are included in Appendix A. Much of the information provided on the NOI should have been developed for the SWPPP (see box).

The SWRCB has provided line-by-line instructions on the NOI. An annual fee must be submitted with the NOI. The SWRCB will send an annual invoice each year that the project is under construction.

Contents of the Notice of Intent

- *Owner/Developer's Name, Address, and Telephone Number*
- *Construction Site Information*
  - *Project Name and Address*
  - *Construction Start and Completion Date*
- *Site Map*
  - *Existing and proposed buildings and paved areas*
  - *Storm drainage system*
  - *Adjacent streets*
- *Receiving Water Information*
  - *Municipality where project is located*
  - *Nearest downstream water course or water body (from USGS Map or equivalent)*
- *Type of Construction*
  - *Size of site*
  - *Change in impervious surface area*
- *Material Handling/Management Practices*
  - *Materials to be used during construction*
  - *Management practices to control possible pollutants*
- *Regulatory Status*

TRAIN PERSONNEL

Training is imperative to the success of the BMPs identified in Chapters 4 and 5. Adequate training is required if these BMPs are to be installed and maintained properly. These BMPs will fail if not properly installed and maintained. Thus, only trained personnel should be assigned these responsibilities.

An effective training program is based on four objectives:

- How to identify a storm water pollution problem;
- How to define solutions (i.e., select BMPs);
- Making every employee responsible for storm water pollution and its solution; and
- Soliciting feedback to improve the BMPs.

More information on employee training can be found in BMP CA40 in Chapter 4.

CONSTRUCTION OPERATIONS

The construction bid package will usually contain specifications that the contractor comply with the construction general permit by implementing the SWPPP. This may be done contractually, or the owner may require the contractor/subcontractor to prepare some or all of the SWPPP, and submit the NOI/fee to cover their particular construction activity. During construction, the contractor then implements the BMPs according to the SWPPP. The owner/contractor is also responsible for maintenance and inspection of BMPs for erosion and sediment control and other contractor activities, and the installation of the post-construction BMPs. Because site conditions will vary during construction, the SWPPP should be revised as necessary, with any changes highlighted on the copy maintained at the construction site. There is no formal revision process; upon inspection the SWPPP must reflect the existing status and condition of these site.

If the plan is found to be deficient in meeting one or more of the minimum construction general permit requirements and/or requirements of the local municipality, the owner will be notified by the SWRCB. The owner then has 30 days to provide the SWRCB and/or the municipality written certification that the requested changes have been made.

COMPLETE CONSTRUCTION

During construction, the post-construction BMPs (if any) should have been installed according to construction plans and specifications (see the Design Phase section of this chapter). The general construction permit remains in force until construction is complete. Post-construction BMPs should be properly installed, and responsible parties must be designated and funds committed to the long-term maintenance needs of these BMPs. The local municipality will often have a policy about the installation and maintenance of these post-construction BMPs, and should be consulted.

The SWRCB (and possibly the local municipality) must be notified of two conditions:

- When construction is completed
- When a change of ownership occurs

The SWRCB requires that a Notice of Termination be provided for such notification. If a new owner is assuming responsibility for some or all of the construction site, a revised Notice of Intent and annual fee must also be submitted, and the SWPPP must be revised by the new owner for any changes in construction conditions. It may be appropriate to notify the SWRCB of other significant changes in the status of the property (e.g., the construction site is part of an annexation or incorporation, a change in address) to eliminate any confusion about a particular site. As conditions of project approval, the municipality may also require that the owner be responsible for the performance of post-construction BMPs for a set period of time after the municipality has accepted the improvement and/or after an Occupancy Certification is issued.

REVISIONS	DATE

NOI attached?
[ ] Yes
[ ] No

Storm Water Pollution Prevention Plan (SWPPP) Worksheet
California Construction General Permit

Worksheet 1. Project Information

Project Name: _____

Project Location: Street Address (or Equivalent): _____

City: _____ County: _____ Zip Code: _____

Project Owner: _____

Contact Person: _____ Phone No. _____

Owner's Mailing Address: Street Address (or Equivalent): _____

City: _____ County: _____ Zip Code: _____

[ ] Identify responsible personnel:

- [ ] Implementing and revising the SWPPP: _____
- [ ] Inspecting equipment: _____
- [ ] Regular inspections of BMPs: _____
- [ ] Training employees about BMPs affecting their job: _____

List all Contractors and Subcontractors responsible for implementing SWPPP for the project:

NAME	CONTACT PERSON	DATE WORK BEGINS	DATE WORK ENDS

Worksheet 2. Project Site Map Requirements

Please Check the Boxes, and provide supporting information as requested:

[ ] Topographic Base Map Attached? Map shows:

- [ ] An area extending one-quarter mile beyond the property boundaries of the construction site:
- [ ] The boundary of the construction site. Construction Area = _____ Acres.
- [ ] Nearby surface water bodies, including water courses, wetlands, springs and wells.
- [ ] The location(s) where storm water drains onto or off of the property.
- [ ] Boundary of off-site areas that drain into the construction site.

[ ] Site map(s) attached? Maps show:

- [ ] Temporary storm water structures used during construction.
- [ ] Areas used to store soils and construction waste.
- [ ] Areas of cut and fill.
- [ ] Drainage patterns and slopes anticipated after major grading activities, including the location of storm water structures to be constructed on the property (e.g., storm drains, detention ponds, channels).
- [ ] Areas of soil disturbance.
- [ ] Locations of potential soil erosion requiring BMPs during construction.
- [ ] Existing and proposed paved areas and buildings.

  Existing Area:_____ percent of site Proposed Area: _____ percent of site

- [ ] Estimated runoff coefficient before construction: _____ after construction _____
  (See the local municipality for approved runoff coefficients for your community.)
- [ ] Locations where storm water structures and controls will be built to control storm water pollution after construction is complete.
- [ ] The boundary of the drainage area upstream of each location where storm water leaves the property.
- [ ] Any vehicles storage and service areas.
- [ ] Areas of existing vegetation.

Worksheet 3. Inventory of Contractor's Activities and Special Site Conditions

Provide a description of contractor's activities that could result in the discharge of pollutants in the storm water runoff from the site. In addition, provide a description of special site conditions that may impact pollutants in storm water discharges.

Contractor's Activities

[ ] Describe toxic materials that are known to have been stored, disposed, spilled, or leaked in significant quantities onto the construction site:

[ ] Describe construction materials, equipment and vehicles that comes in contact with storm water:

[ ] Describe construction material loading, unloading and access areas/activities:

[ ] Describe equipment storage, cleaning, and maintenance areas/activities:

[ ] Describe storage and disposal of construction materials (on-site and off-site):

Special Site Conditions

[ ] Describe storm water structures and controls on the site prior to construction and how these structures/controls will be integrated into the SWPPP to reduce sediment and other pollutants in storm water discharges:

[ ] List materials/waters other than storm water which will flow from the site during dry weather, the approximate amount of flow, and methods for preventing other dry weather flows:

Worksheet 4. BMPs for Contractor Activities

Provide a list of BMPs selected to reduce pollutants associated with contractor activities (see Worksheet 3). For each BMP selected, identify the pollution(s) of concern (see Table 1.1). Attach modified BMP fact sheets and/or appropriate information for the BMP selected. (See Chapter 4, BMPs for Contract or Activities.)

Contractor Activities (Worksheet 3)	Construction Practices			Materials Management			Waste Management					Vehicle & Equipment Management			Primary Pollutant(s) of Concern
	CA1	CA2	CA3	CA10	CA11	CA12	CA20	CA21	CA22	CA23	CA24	CA30	CA31	CA32	
1. Toxic material on-site															
2. Construction material equipment & vehicles in contact with storm water															
3. Material loading, unloading and access areas/activities															
4. Equipment storage cleaning, and maintenance areas/activities															
5. Storage and disposal of construction materials (on-site and off-site)															

Worksheet 5. BMPs for Erosion and Sedimentation Control

[ ] Describe the source and composition of the existing soil and fill material (Soil Report Attached? Yes____ No____)

[ ] Provide a site map showing locations where BMPs for erosion and sediment control are placed. This map should be updated when BMPs are revised to meet evolving construction conditions. Provide a brief description of BMP selected, and, if appropriate, attach modified fact sheets or additional information for erosion and sedimentation control BMPs.

✔	BMPs SELECTED	DESCRIPTION OF BMPs FOR EROSION & SEDIMENTATION CONTROL
SITE PLANNING CONSIDERATIONS		
	Scheduling	
	Preservation of Existing Vegetation	
SOIL STABILIZATION		
	Seeding and Planting	
	Mulching	
PHYSICAL STABILIZATION		
	Geotextiles and Mats	
	Dust Control	
	Temporary Stream Crossing	
	Construction Road Stabilization	
	Stabilized Construction Entrance	

✓	BMPs SELECTED	DESCRIPTION OF BMPs FOR EROSION & SEDIMENTATION CONTROL
DIVERSION OF RUNOFF		
	Earth Dike	
	Temporary Drains and Swales	
	Slope Drain	
VELOCITY REDUCTION		
	Outlet Protection	
	Check Dams	
	Slope Roughening/Terracing	
SEDIMENT TRAPPING/FILTERING		
	Silt Fence	
	Straw Bale Barrier	
	Sand Bag Barrier	
	Rock or Brush Filter	
	Storm Drain Inlet Protection	
	Sediment Trap	
	Sediment Basin	

Worksheet 6. Post-Construction BMPs

Provide a site map locating treatment control BMPs which will be constructed as part of this project to reduce storm water pollution after construction is complete. Selection of these and other post-construction BMPs may be guided using the Municipal BMP Handbook, and must consider site-specific and seasonal conditions. Provide on the worksheet below the BMP selected, the responsible party for maintenance and operation, and source for funding the operation and maintenance.

✓	BMPs SELECTED	MAINTENANCE RESPONSIBILITY	FUNDING SOURCE FOR O&M
	TREATMENT CONTROL BMPs (See Chapter 5, Municipal Handbook)		
	Infiltration		
	Wet Ponds		
	Constructed Wetlands		
	Vegetated Swales and Strips		
	Extended Detention Basins		
	Media Filtration		
	Oil/Water Separators and Water Quality Inlets		
	Multiple Systems		
	SOURCE CONTROL BMPs (See Chapter 4, Municipal Handbook)		

Describe other measures which will be employed on the project site to control storm water pollution after construction is complete, and steps to be taken by the current owner to ensure that these measures are conducted.

Worksheet 7. Monitoring, Inspection and Maintenance Plan

[ ] Describe maintenance/repair efforts to ensure BMPs are in good and effective condition:

[ ] Describe inspection procedures and record keeping efforts:

[ ] Annual Inspection:

[ ] Pre-storm Inspection:

[ ] Post-storm Inspection:

[ ] Describe training program/material for site personnel responsible for installing, inspecting, and maintaining BMPs:

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name_____ Title_____

Signature_____ Date_____

This SWPPP was prepared by:

Name_____ Title_____

Signature_____ Date_____

3. BMP SELECTION

OVERVIEW

BMPs are generally selected in a three step process:

- Define BMP Objectives: Define locations where erosion is likely to occur, and where other construction related pollutants may be generated.

- Identify BMP Category: Select the appropriate category or categories of BMPs which address each objective.

- Select appropriate BMPs: BMPs for contractor activities and erosion and sedimentation control are chosen from each category based on site constraints, construction requirements, and cost-effectiveness considerations.

Table 3.1 shows the relationship between BMP objectives and categories of BMPs. Chapters 4 and 5 present the particular BMPs by each category, including key information describing appropriate applications and cost-effectiveness considerations. The number in parentheses correspond to the BMP Fact Sheets in Chapters 4 and 5 (CA stands for Contractor Activities and ESC stands for Erosion and Sedimentation Control). The remainder of this chapter outlines a BMP selection process. **The selection procedures for post-construction BMPs are discussed briefly at the end of this chapter and in more detail in the Municipal BMP Handbook.**

DEFINE BMP OBJECTIVES

Each construction project is unique. Therefore, an understanding of the pollution risks of the construction activity is essential for selecting and implementing BMPs. Defining these risks requires review of the characteristics of the site and the nature of the construction, information which you should have assembled for the SWPPP. Once these pollution risks are defined, BMP objectives are developed, and BMPs selected. The BMP objectives for construction projects are as follows:

- Practice Good Housekeeping: Perform activities in a manner which keeps potential pollutants from either draining or being transported off-site by managing pollutant sources and modifying construction activities.

- Contain Waste: Dispose of all construction waste in designated areas, and keep storm water from flowing on to or off of these areas.

- Minimize Disturbed Areas: Only clear land which will be actively under construction in the near term (e.g., within the next 6-12 months), minimize new land disturbance during the rainy season, and avoid clearing/disturbing sensitive areas (e.g., steep slopes and natural watercourses) and other areas where site improvements will not be constructed.

- Stabilize Disturbed Areas: Provide temporary stabilization of disturbed soils whenever active construction is not occurring on a portion of the site. Provide permanent stabilization during finish grade and landscape the site.

BMP CATEGORY	BMP OBJECTIVES						
	Practice Good Housekeeping	Contain Waste	Minimize Disturbed Areas	Stabilize Disturbed Areas	Protect Slope & Channels	Control Site Perimeter	Control Internal Erosion
BMPs FOR CONTRACTOR ACTIVITIES (Chapter 4)							
Construction Practices (CA 1 to 10)	✓			✓	✓	✓	✓
Material Management (CA 10 to 19)	✓						
Waste Management (CA 20 to 29)		✓	✓	✓			
Vehicle & Equipment Management (CA 30 to 39)	✓					✓	✓
Contractor Training (CA40)	✓	✓					
BMPs FOR EROSION & SEDIMENT CONTROL (Chapter 5)							
Site Planning Considerations (ESC 01 to ESC 10)	✓	✓	✓	✓	✓	✓	✓
Vegetative Stabilization (ESC 10 to ESC 19)				✓	✓		
Physical Stabilization (ESC 20 to ESC 29)	✓		✓	✓	✓	✓	
Diversion of Runoff (ESC 30 to ESC 39)		✓			✓	✓	✓
Velocity Reduction (ESC 40 to ESC 49)				✓	✓		
Sediment Trapping/Filtering (ESC 50 to ESC 59)					✓	✓	✓
POST CONSTRUCTION BMPs (See Municipal BMP Handbook)				✓	✓	✓	✓

TABLE 3.1 CATEGORIES OF BMPs AND THE BMP OBJECTIVES MET BY EACH

- Protect Slopes and Channels: Outside of approved grading plan area, avoid disturbing steep or unstable slopes. Safely convey runoff from the top of the slope, and stabilize disturbed slopes as quickly as possible. Avoid disturbing natural channels. Stabilize temporary and permanent channel crossings as quickly as possible, and ensure that increases in runoff velocity caused by the project do not erode the channel.

- Control Site Perimeter: Upstream runoff should be diverted around or safely conveyed through the construction project. Local codes usually state that such diversions must not cause downstream property damage or be diverted into another watershed. Runoff from the project site should be free of excessive sediment and other constituents.

- Control Internal Erosion: Detain sediment-laden waters from disturbed, active areas within the site.

Site characteristics and contractor activities affect both the potential for erosion and contamination by other constituents used on the construction site. Before defining BMP objectives, you should carefully consider:

1. Site conditions that affect sedimentation and erosion including:
   a. Soil type, including underlying soil strata which are likely to be exposed to storm water.
   b. Natural terrain and slope.
   c. Final slopes and grades.
   d. Location of concentrated flows, storm drains, and streams.
   e. Existing vegetation and ground cover.

2. Climatic factors, which in arid and semi-arid regions include:
   a. Seasonal rainfall patterns.
   b. Appropriate design storm
      - quantity of rainfall
      - intensity of rainfall

3. Type of construction activity.

4. Construction schedules.

5. Construction sequencing and phasing of construction.

6. Size of construction project and area to be graded.

7. Location of the construction activity relative to adjacent uses and public improvements.

8. Cost-effectiveness considerations.

9. Types of construction materials and potential pollutants present on-site.

Chapter 2 discussed how these considerations are incorporated into site planning (see Figure 2.3) and design activities.

IDENTIFY BMP CATEGORIES

Once the BMP objectives are defined, it is necessary to identify the category of BMPs that is best suited to meet each objective. A category is a groupings of BMPs which are related in how they control storm water pollution (see Table 3.1). The particular BMP selected from each category depends on the specific site conditions, construction activities, and cost-effectiveness considerations.

To determine where to place categories of BMPs, a map of the project site is prepared (Chapter 2) with sufficient topographic detail to show existing and proposed drainage patterns and existing and proposed permanent storm water control structures. The project site map should identify the following:

- Locations where storm water enters and exits the site. Include both sheet and channel flow for the existing and final grading contours.

- Locate permanent storm water collection and control structures.

- Identify locations subject to high rates of erosion such as steep slopes and unlined channels. Long, steep slopes over 100' in length are considered as areas of moderate to high erosion potential.

- Categorize slopes as:

  - Low Erosion Potential (0 to 5 percent slope)
  - Moderate Erosion Potential (5 to 10 percent slope)
  - High Erosion Potential (slope greater than 10 percent)

- Identify sensitive areas which must not be disturbed, as well as other areas where site improvements will not be constructed. Establish clearing limits around these areas to prevent disturbance by the construction activity.

- Identify the boundaries of drainage areas if your site has more than one drainage outlet. Then calculate the approximate area of each drainage area.

- Define areas where various contractor activities have a likely risk of causing a pollutant discharge.

With this site map in hand, categories of BMPs can be selected and located. In Figure 3.1, the example presented in Chapter 2 is modified to show the integration of BMP categories into the site plan. In general, the categories of BMPs should be considered in the order listed in Table 3.1. This is because it is more effective to prevent erosion/pollution than to remove sediment/pollutants, and because erosion prevention is achieved most cost-effectively by planning before construction begins and phasing construction activities.

As shown in Table 3.1, many BMPs achieve more than one BMP objective. This should be taken into account when selecting BMPs to achieve maximum cost-effectiveness. For instance, it is not always necessary to install extensive sediment trapping controls during construction. In fact, sediment trapping should be used only as a short-term measure for active construction areas, and replaced by permanent stabilization measures as soon as possible. In arid and semi-arid areas of California, the seasonal rainfall patterns are such that for *short* duration construction activities, the scheduling of the grading activities is often a site planning management strategy. However, because the timing of construction may be difficult to predict and rainfall may occur in off seasons, the contractor should always stabilize each portion of the construction site as soon as active construction ends, and install sediment trapping BMPs.

SELECTING BMPS FOR CONTRACTOR ACTIVITIES

Certain contractor activities (see box, page 3-6) may cause pollution if not properly managed. BMPs should be selected for each activity shown in the box.

Chapter 4 describes BMPs for preventing storm water pollution potentially caused by these contractor activities. Not all of the BMPs listed on each fact sheet will apply to every construction site. However, all of the suggested BMPs in Chapter 4 should be considered, and those which are appropriate for the project at hand should be selected. When the Fact Sheets in Chapter 4 suggest several BMPs for a particular construction activity, the activity must be evaluated and the risk assessed of pollutants reaching the drainage system or otherwise being transported off-site. Considerations include the following:

- Is it expected to rain? BMPs may be different on rainy days vs. dry days, winter vs. summer, etc. For instance, a material storage area may be covered with a tarp during the rainy season, but not in the summer.

- How much material is used? Less stringent BMPs may be used if a "small" amount of

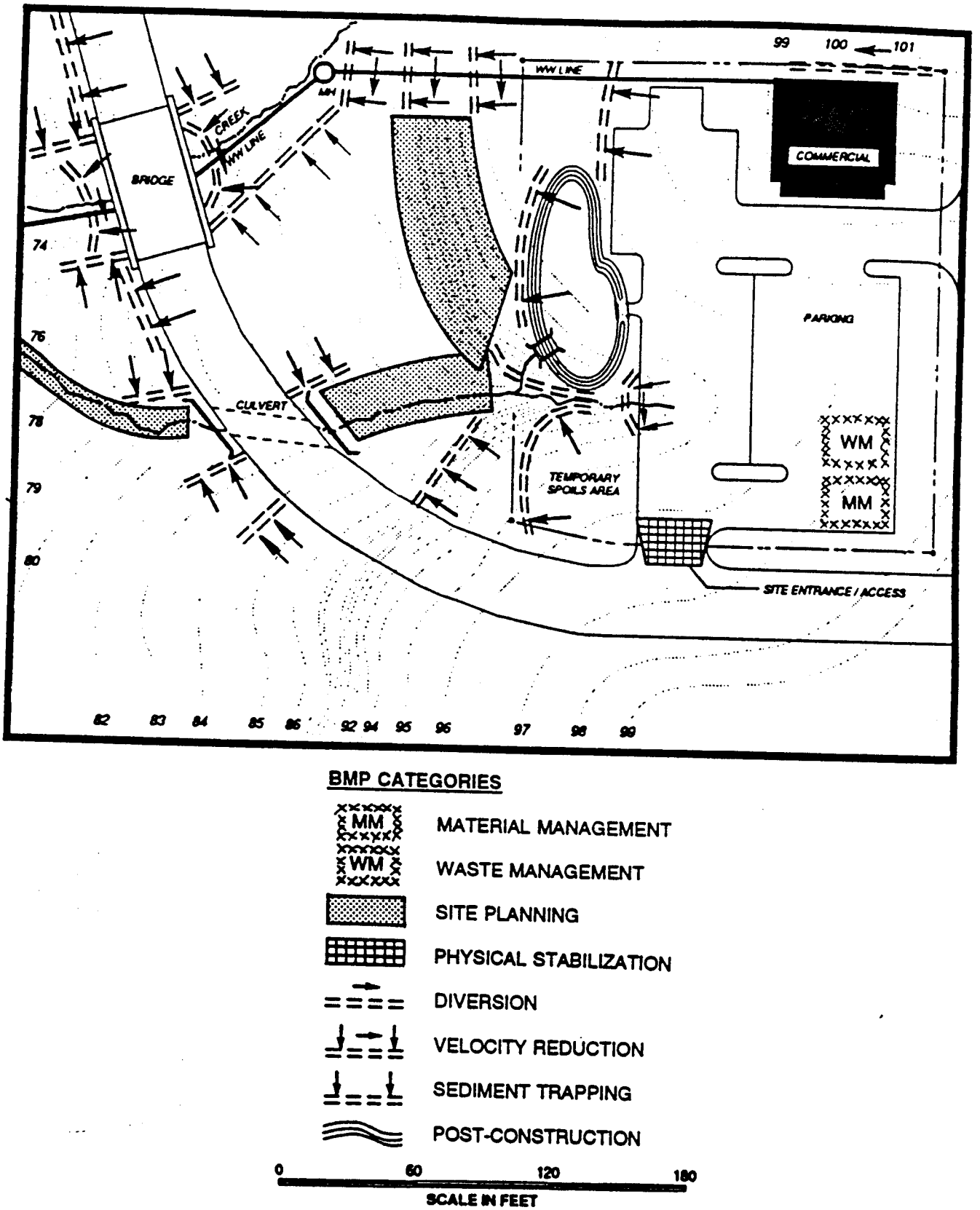


FIGURE 3.1 SELECTION OF BMP CATEGORIES

Contractor Activities That Impact Storm Water Quality

Construction Practices
- Dewatering Operations (CA1)
- Paving Operations (CA2)
- Structure Construction (Wood, Concrete, Steel) and Painting (CA3)

Material Management
- Material Delivery and Storage (CA10)
- Material Use (CA11)
- Spill Prevention and Control (CA12)

Waste Management
- Solid Waste (CA20)
- Hazardous Waste (CA21)
- Contaminated Soils (CA22)
- Concrete Wastes, Sandblasting Grit (CA23)
- Sanitary/Septic Waste (CA24)

Vehicle and Equipment Management
- Cleaning (CA30)
- Fueling (CA31)
- Maintenance (CA32)

Note: The number in parenthesis corresponds to the BMP Fact Sheet in Chapter 4.

material is used (however, remember that different materials pollute in different amounts).

- How much water is used? The more water used and wastewater generated, the more likely that pollutants transported by this water will reach the drainage system or be transported off-site. Washing out one concrete truck on a flat area of the site may be sufficient (as long as the concrete is safely removed later), but a containment pit should be constructed if a number of trucks will be washed out at the same site. Consideration should be given to recycling water whenever possible.

- What are the site conditions? BMPs selected will differ depending on whether the activity is conducted on a slope or flat ground, near a drainage structure or watercourse, etc. Anticipating problems and conducting activities away from certain sensitive areas will reduce the cost and inconvenience of performing BMPs.

- What about accidents? Pre-establishing a BMP for every conceivable pollutant discharge may be very costly and significantly disrupt construction. As a rule of thumb, establish controls for common activities, and be prepared to respond quickly to accidents (define the difference--not everything can be called an accident).

Therefore, keep in mind that the BMPs for contractor activities in Chapter 4 are suggested practices which may or may not apply in every case. Construction personnel should be instructed to develop additional or alternative BMPs which are more cost-effective for a particular project. **The best BMP is a construction work force aware of the pollution potential of their activities, and committed to a clean worksite.**

SELECTING BMPs FOR EROSION AND SEDIMENT CONTROL

BMPs for erosion and sediment control are selected to meet the BMP objectives based on specific site conditions, construction activities, and cost-effectiveness. Different BMPs may be needed at different times during construction since construction activities are constantly changing site conditions. Thus the SWPPP may include a set of BMPs suitable for different stages of the project. Refer to Table 3.1 to match the BMP objective to the appropriate category of BMPs in Chapter 5. The remainder of this section discusses how each BMP objective in Table 3.1 should be met to address the dynamics of a typical construction project.

MINIMIZE DISTURBED AREAS

The first step for selecting BMPs is to compare the project layout and schedule with on-site management measures that where appropriate can limit the exposure of the project site to erosion and sedimentation. Scheduling and

planning considerations are generally discussed in Section 2, with each site planning BMP described in detail in the first section of Chapter 5. These BMPs all have a similar goal, which is to minimize the amount of the site subject to erosion. Consider the following BMPs:

1. Do not disturb any portion of the site unless an improvement is to be constructed there.

2. The staging and timing of construction can minimize the size of exposed areas and the length of time the areas are exposed and subject to erosion.

3. The staging of grading operations should limit the amount of areas exposed to erosion at any one time. Only the areas that are actively involved in cut and fill operations or are otherwise being graded should be exposed. Exposed areas should be stabilized as soon as grading is complete in that area.

4. Retain existing vegetation and ground cover where feasible, especially along watercourses and along the downstream perimeter of the site.

5. Do not clear any portion of the site until active construction begins.

6. Quickly complete construction on each portion of the site.

7. Install landscaping and other improvements that permanently stabilize each part of the site immediately after the land has been graded to its final contour.

8. Minimize the amount of denuded areas and any new grading activities during the wet months of October through April.

9. Construct post-construction storm water control facilities (e.g., detention basins) early in the project and use for sediment trapping, slope stabilization, velocity reduction, etc. during the construction period.

Site Stabilization BMPs

Vegetative Stabilization
- Seeding and Planting (ESC10)
- Mulching (ESC11)

Physical Stabilization
- Geotextiles and Mats (ESC20)
- Dust Control (ESC21)
- Temporary Stream Crossing (ESC22)
- Construction Road Stabilization (ESC23)
- Stabilized Construction Entrance (ESC24)

STABILIZE DISTURBED AREAS

The purpose of site stabilization BMPs is to prevent erosion by covering disturbed soil. This covering may be vegetative, chemical, or physical (see box, above). Any exposed soil is subject to erosion--either by rainfall striking the ground, runoff flowing over the soil, wind blowing across the soil, and vehicles driving on the soil. Thus all exposed soils should be stabilized except where active construction is in progress. Locations on a construction site which are particularly subject to erosion and should be stabilized as soon as possible include:

- Slopes
- Highly erosive soils
- Construction entrances
- Stream channels
- Soil stockpiles

Stabilize disturbed areas keeping in mind the following:

1. As a rule, native vegetation in undisturbed areas represents the "baseline" for erosion control. The Subdivision Map Act provides language to limit erosion to pre-development levels. Thus, retaining native vegetation in undisturbed areas provides the first and best line of defense against erosion and sedimentation and does so at least cost to the contractor, while minimizing the requirement to revegetate or provide structural controls.

2. Temporary ground covers (e.g., temporary seeding, mulch, chemical and fabric stabilizers) protect the soil from erosion until permanent vegetation can be established or permanent construction is installed.

3. Timing of revegetation efforts is critical in arid regions. Revegetation should be performed just before or during the rainy season unless an irrigation system exists on-site.

4. Certain relative non-toxic chemicals, such as magnesium chloride or lignum sulfate may be used for soil stabilization where revegetation is not practicable (see ESC21, Dust Control, Chapter 5). These two chemicals do not have an adverse impact on plant life and are a low-cost stabilization treatment.

5. Ground cover of gravel, decomposed granite, wood chips, or mulch may be used.

6. Oil treatment or sodium chloride is unacceptable.

PROTECT SLOPES AND CHANNELS

The next step is to provide slope protection in disturbed areas. Consider the following BMPs:

1. Avoid constructing steep slopes. Increasing slope length and steepness increases the velocity of runoff, which greatly increases its erosive energy. If slope steepness is doubled while other factors are held constant, soil loss potential is increased 2½ times. If both slope steepness and length are doubled, soil loss potential is nearly 4 times greater.

2. Divert or intercept storm water before it reaches long and/or steep slopes using temporary dikes, swales, or pipe slope drains.

3. Long or steep slopes should be terraced at regular intervals (per local requirements). Terraces will slow down the runoff and provide a place for small amounts of sediment to settle out.

4. Slope benches may be constructed with either ditches along them or back-sloped at a gentle angle toward the hill. These benches and ditches intercept runoff before it can reach an erosive velocity and divert it to a stable outlet.

5. Slope stability for cuts and fills should conform to local agency grading ordinances, Uniform Building Code requirements, and/or soil report recommendations.

6. Overland flow velocities can be reduced by creating a rough surface for runoff to cross. Driving a bulldozer up and down a slope (called trackwalking) creates tread marks parallel to slope contours. These miniature terraces both slow runoff velocity and provide flat places for vegetation to hold.

7. Raking or disking the soil surface before seeding also keeps runoff velocities down and increases plant establishment rates. Vegetation, once established, will further reduce runoff rates.

8. Build check dams or other energy dissipation structures in unlined drainage channels to slow runoff velocity and encourage settlement of sediments.

9. Construct velocity reducing structures or riprap linings as soon as storm water outfalls are constructed.

CONTROL SITE PERIMETER

Perimeter control establishes barriers along the perimeter of the project site. Several strategies

for using BMPs for perimeter control may be considered.

1. Divert upstream runoff around or though the construction site (according to local drainage policies) with no contact with exposed soils or construction activities (i.e., the diversion of runoff BMP category);

2. Runoff from areas upslope of those that have been denuded should not be allowed to cross the exposed soils, particularly when the denuded areas are on slopes (i.e., the diversion of runoff BMP category);

3. Leave a vegetative barrier along the property boundary and interior water courses (i.e., the site planning BMP category); and

4. Trap and remove sediment in runoff from the construction site before it leaves the property (i.e., the sediment trapping BMP category).

Perimeter controls should be placed everywhere runoff enters or leaves the site. They are usually installed just before clearing, grubbing and rough grading begin. Perimeter controls for all but the smallest projects will become overloaded by both runoff and sediment, and should be supplemented by additional controls within the interior of the construction site once rough grading is complete.

Runoff which is free of excessive sediment should be diverted around disturbed areas of the construction site and other locations highly susceptible to erosion. If possible, the runoff should be diverted to stabilized areas where the runoff can be retained and allowed to soak into the ground, or into stabilized drainage ways with sufficient hydraulic capacity to convey any increases in flow. Major flow diversions (i.e., from areas greater than 1 acre) should be designed according to local design standards, and approved by the local municipality as part of the project approval process. This avoids potential flood damage to the construction site or downstream areas. When possible, permanent drainage structures should be built early in the construction project to collect and convey flow diversions.

Runoff Diversion BMPS

- Earth Dike (ESC30)
- Temporary Drains/ Swales/Drains (ESC31)
- Slope Drain (ESC32)

Note: Runoff diversions from areas greater than 1 acre should be constructed according to local drainage design criteria.

Several types of temporary runoff diversions are described in this Handbook (see box, above). Runoff diversions should be considered in the following situations:

1. Divert upslope water around unvegetated areas of the construction site with dikes, swales, or temporary storm drains.

2. Divert runoff to soils able to absorb water (areas which are vegetated, mulched, or where surface roughening exists.

3. Dikes and ditches are the two most common BMPs to divert upland runoff away from a disturbed area; to intercept runoff on cut or fill slopes; and to prevent runoff from entering a disturbed area, such as a group of building pads.

4. Upstream, off-site flow can be taken to the downstream area of the project site and released (according to local drainage policies) back into the natural drainage pattern. A spreading basin or other temporary form of energy dissipator may be needed for large diverted flows or at the base of steep slopes.

5. Perimeter channel or berm to divert flow should not flood, cause erosion or otherwise adversely impact surrounding properties. While structures designed for

sediment control are temporary and are designed to remove sediment from frequent storms (e.g., less than 2-year storm), they must be designed to safely detain and/or carry major floods without increased risk of property damage.

CONTROL INTERNAL EROSION

Once all other erosion and sediment control BMPs have been exhausted, excessive sediment should be removed from the storm water both within and along the perimeter of the project site. The appropriate controls work on the same principle: the velocity of sediment-laden runoff is slowed by temporary barrier basins which pond the storm water to allow sediments to settle out (see box, this page). Appropriate strategies for implementing sediment trapping controls include:

1. Direct sediment-laden storm water to temporary sediment traps.

2. Locate sediment basins and traps at low points below disturbed areas.

3. Protect all existing or newly-installed storm drainage structures from sediment clogging by providing inlet protection for area drains and curb inlets.

4. Direct off-site and/or sediment-free storm water away from denuded areas and away from temporary sediment traps.

5. Construct temporary sediment traps or basins at the drainage outlet for the site. The discharge from one basin should not enter the inlet of another basin.

6. Excavate post-construction storm water detention basins early in the project, use them as sedimentation basins during construction, remove accumulated sediment, and landscape the basin when the upstream drainage area is stabilized.

7. Temporary sediment barriers such as:

   - Silt Fences
   - Straw Bale Barriers
   - Sand Bag Barriers
   - Brush or Rock Filter

   should only be used in areas where sheet flow runoff occurs. They are ineffective if the runoff is concentrated into rill or gully flow (see Figure 1.1). Temporary sediment barriers should only be installed along a contour line on relatively flat slopes where sufficient area for ponding sediment-laden water exists. These barriers are not appropriate for large drainage areas unless the drainage area is split and additional barriers are placed upstream so that the incremental drainage area to each barrier is less than one acre.

8. Protect all existing or newly-installed storm drainage structures from sediment clogging by providing inlet protection for area drains and curb inlets.

Sediment Trapping BMPs

- Silt Fence Barrier (ESC50)
- Straw Bale Barrier (ESC51)
- Sand Bag Barrier (ESC52)
- Brush or Rock Filter (ESC53)
- Storm Drain Inlet Protection (ESC54)
- Sediment Trap (ESC55)
- Sediment Basin (ESC56)

SELECTION OF POST-CONSTRUCTION BMPS

Most post-construction BMPs will be proposed by the developer early in the planning stage of a project. Usually, these BMPs will be oriented toward municipal requirements established in a master plan or by ordinance. For most projects, there will be no single BMP which addresses all the post-construction storm water quality problems. Instead, a multi-level strategy will be worked out with the local municipality which incorporates source controls, on-site treatment controls, and community-wide treatment controls. This section provides a brief discussion of selecting post-construction BMPs from the owner/developers perspective. A more thorough discussion may be found in Chapters 3, 4, and 5 of the Municipal Handbook.

SOURCE CONTROL BMPs

The following six categories of source control BMPs are described in Chapter 4 of the Municipal Handbook:

- Planning Management: Municipalities may regulate through zoning ordinances, subdivision ordinances, or buffer/setback requirements the amount of runoff from a site. The municipality may discourage development in environmentally sensitive areas. For a specific project, the developer may achieve these goals by minimizing the impervious area that is directly connected to the drainage system, and by incorporating setbacks from surface waters.

- Materials Management: The objective of these BMPs is to minimize the opportunity for rainfall or runoff to come into contact with pollutants. Commercial and industrial project designs should be adopted to keep pollutant storage/use/disposal areas out of floodplains, away from drainage paths, under cover, and/or in containment areas.

- Spill Prevention: Spill prevention BMPs should be incorporated into project design by using containments, leak-resistent materials, and accessways for proper cleanup.

- Illegal Dumping: Signs may be installed at inlets or along drainageways, and brochures may be distributed to residents/tenants of new facilities to increase awareness about illegal dumping.

- Illegal Connections: Most municipalities will have ordinances, and may require inspection of construction sites, to prevent connections to the storm water system from non-storm water sources. This includes connections of floor drains, washdown areas, septic tank overflows, and the like.

- Street/Storm Drain Maintenance: Infrastructure maintenance after construction will be required and may be performed by the municipality or property owner. Such BMPs would include street sweeping, catch basin cleaning, and drainage structure cleanouts. Maintenance considerations (e.g., easements, access, disposal) should be integrated into the infrastructure when designed.

TREATMENT CONTROL BMPs

When are treatment control BMPs needed? No clear answer to this question exists in the regulations or general permits. The decision to provide a treatment control BMP should be made during the planning/design phase for a project. The municipality may have conducted a master plan (or equivalent planning procedures) to determine where on-site and community-wide facilities are appropriate. Where on-site facilities are needed, the municipality would most likely define the performance standards through ordinances or policies. Typical performance standards include holding peak flow and/or runoff volume after construction equal to runoff peak flow/volume before development, or capture of a specific amount of runoff. Where community-wide facilities are desired, the developer may need to

construct these facilities (for larger development projects), or pay a share of these facilities' cost through an equitable fee-in-lieu of method.

Thus it is important that the construction site owner/developer and municipality establish the overall performance standard. This will allow the developer to select the appropriate treatment control BMPs given site conditions, costs, and performance standards.

The treatment control BMPs presented in the Municipal Handbook include:

Infiltration
Wet Ponds
Constructed Wetlands
Biofilters
Extended Detention Basins
Media Filtration
Oil/Water Separators and
Water Quality Inlets
Multiple-Systems

Using the site characteristic and the design guidance provided in Chapter 5 of the Municipal Handbook, potential applicable BMPs can be sized and their cost estimated.

In most cases treatment control BMPs can be implemented most effectively when they can be integrated into other aspects of the project design.

- Is a detention/retention facility useful for flood control? Often, facilities needed to maintain peak runoff at predevelopment levels are either required by the local municipality or desired to reduce downstream conveyance system costs. Most treatment control BMPs can be incorporated into flood control detention/retention facilities with modest design refinements, and limited increasing land and cost. This alternative should be reviewed by the local flood control agency to check that both flood control and pollution control objectives are met.

- Are open space/parkland requirements a condition of development? Planned open space which will be relatively flat (e.g., final grade slopes less than 5 percent) may be merged with storm water quality/quantity facilities. Such integrated, multi-use areas may achieve several objectives a modest cost.

- Is water conservation an issue? Storm water runoff can be used to supplement other water resources. Infiltration BMPs may serve as groundwater recharge facilities, detention/retention areas may be created in landscaped areas of the project, and vegetated swales/filters may be used as roadside/median vegetated areas to reduce water demand.

- Is habitat/wetland preservation/mitigation needed? Project EIRs and other regulatory reviews may require that these issues be addressed. Treatment control BMPs like constructed wetlands and wet detention ponds are also excellent habitat. However, regulatory issues will likely exist and require early negotiations.

4. BMPs FOR CONTRACTOR ACTIVITIES

INTRODUCTION

This chapter describes specific Best Management Practices (BMPs) for common construction activities that may pollute storm water. Chapter 2 led you through the steps of identifying activities at your site that can pollute storm water, while Chapter 3 provided guidance on BMP selection. This chapter will provide a list of BMPs that can be used to fit your site's needs.

BMP fact sheets are provided for each of the contractor's activities, noted in the box, are consistent with Worksheet 4 in Chapter 2.

Each fact sheet contains a cover sheet with:

- A description of the BMP
- Approach
- Requirements
  - Costs, including capital costs, and operation and maintenance (O&M) costs
  - Maintenance (including administrative and staffing)
- Limitations
- References

The side bar presents information on which BMP objective applies, targeted constituents, and an indication of the level of effort and costs to implement. For some BMPs, further information is provided in additional sheets.

Contractor Activities

Construction Practices
- CA1 Dewatering Operations
- CA2 Paving Operations
- CA3 Structure Construction and Painting

Material Management
- CA10 Material Delivery and Storage
- CA11 Material Use
- CA12 Spill Prevention and Control

Waste Management
- CA20 Solid Waste Management
- CA21 Hazardous Waste Management
- CA22 Contaminated Soil Management
- CA23 Concrete Waste Management
- CA24 Sanitary/Septic Waste Management

Vehicle and Equipment Management
- CA30 Vehicle and Equipment Cleaning
- CA31 Vehicle and Equipment Fueling
- CA32 Vehicle and Equipment Maintenance

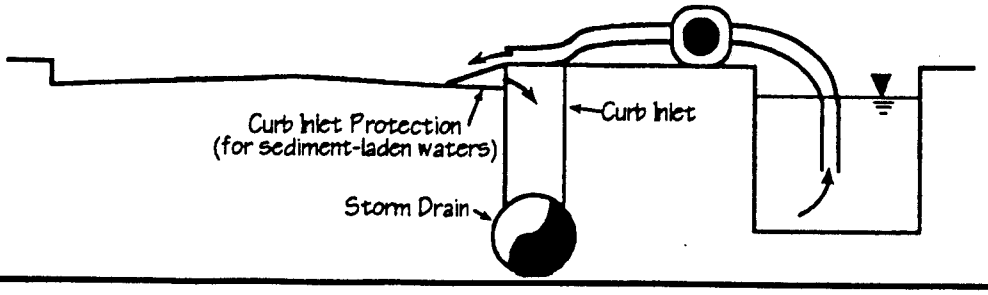
Contractor Training
- CA40 Employee/Subcontractor Training

These BMP fact sheets are suitable for inclusion in many storm water pollution prevention plans for typical contractor activities. The BMPs listed are not an exhaustive list, nor will every BMP be appropriate for every situation. Therefore, suggested BMPs which are inappropriate may be deleted and additional BMPs for specific site conditions should be added. In addition, your selection and implementation of BMPs should be reviewed on a regular basis to match the changing conditions at construction sites.

TABLE 4.1 CONTRACTOR ACTIVITIES AND BMP OBJECTIVES

	BMP CATEGORY	BMP OBJECTIVES						
		PRACTICE GOOD HOUSE-KEEPING	CONTAIN WASTE	MINIMIZE DISTURBED AREA	STABILIZE DISTURBED AREA	PROTECT SLOPES AND CHANNELS	CONTROL SITE PERIMETER	CONTROL INTERNAL EROSION
	Construction Practices							
CA01	Dewatering Operations	✓				✓	✓	✓
CA02	Paving Operations	✓						
CA03	Structure Construction and Painting	✓			✓			
	Material Management							
CA10	Material Delivery and Storage	✓						
CA11	Material Use	✓						
CA12	Spill Prevention and Control	✓						
	Waste Management							
CA20	Solid Waste Management		✓					
CA21	Hazardous Waste Management		✓					
CA22	Contaminated Soil Management		✓	✓	✓			
CA23	Concrete Waste Management		✓					
CA24	Sanitary/Septic Waste Management		✓					
	Vehicle and Equipment Management							
CA30	Vehicle and Equipment Cleaning	✓					✓	✓
CA31	Vehicle and Equipment Fueling	✓						
CA32	Vehicle and Equipment Maintenance	✓						
	Contractor Training							
CA40	Employee/Subcontractor Training	✓	✓					

ACTIVITY: DEWATERING OPERATIONS



Objectives

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

DESCRIPTION

Prevent or reduce the discharge of pollutants to storm water from dewatering operations by using sediment controls and by testing the groundwater for pollution.

APPROACH

There are two general classes of pollutants that may result from dewatering operations; sediment, and toxics and petroleum products. A high sediment content in dewatering discharges is common because of the nature of the operation. On the other hand, toxics and petroleum products are not commonly found in dewatering discharges unless, the site or surrounding area has been used for light or heavy industrial activities, or the area has a history of groundwater contamination. The following steps will help reduce storm water pollution from dewatering discharges:

Sediment

- Use sediment controls to remove sediment from water generated by dewatering (See Sediment Trap (ESC 55) and Sediment Basin (ESC 56) in Chapter 5).
- Use filtration to remove sediment from a sediment trap or basin. Filtration can be achieved with:
  - Sump pit and a perforated or slit standpipe with holes and wrapped in filter fabric. The standpipe is surrounded by stones which filters the water as it collects in the pit before being pumped out.Wrapping the standpipe in filter fabric may require an increased suction inlet area to avoid clogging and unacceptable pump operation.
  - Floating suction hose to allow cleaner surface water to be pumped out.

Toxics and Petroleum Products

- In areas suspected of having groundwater pollution, sample the groundwater near the excavation site and have the water tested for known or suspected pollutants at a certified laboratory. Check with the Regional Water Quality Control Board and the local wastewater treatment plant for their requirements for dewatering, additional water quality tests, and disposal options.
- With a permit from the Regional Water Quality Control Board, you may be able to recycle/reuse pumped groundwater for landscape irrigation, or discharge to the storm sewer. With a permit from the local agency, you may be able to treat pumped groundwater and discharge it to the municipal wastewater treatment plant via the sanitary sewer.
- For a quick reference on disposal alternatives for specific wastes, see Table 4.2, CA40, Employee/Subcontractor Training.

Targeted Pollutants

- ● Sediment
- ○ Nutrients
- ◒ Toxic Materials
- ○ Oil & Grease
- ○ Floatable Materials
- ○ Other Construction Waste

● Likely to Have Significant Impact
○ Probable Low or Unknown Impact

Implementation Requirements

- ◒ Capital Costs
- ◒ O&M Costs
- ◒ Maintenance
- ◒ Training
- ○ Suitability for Slopes >5%

● High ○ Low

CA1

Best Management Practices

CONTRACTOR ACTIVITY: DEWATERING OPERATIONS (Continue)

REQUIREMENTS

- Costs (Capital, O&M)
  - Sediment controls are low cost measures.
  - Treatment and/or discharge of polluted groundwater can be quite expensive.
- Maintenance
  - Maintain sediment controls and filters in good working order. (See Chapter 5 for details)
  - Inspect excavated areas daily for signs of contaminated water as evidenced by discoloration, oily sheen, or odors.

LIMITATIONS

- The presence of contaminated water may indicate contaminated soil as well. See CA22 (Contaminated Soil Management) in this chapter for more information.

REFERENCES

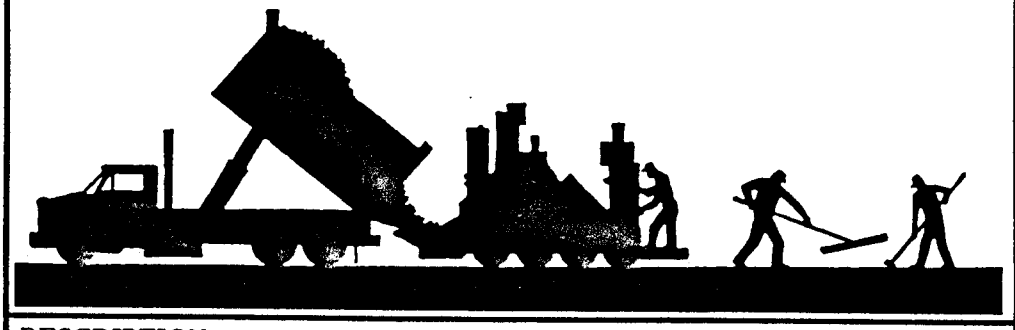
Blueprint for a Clean Bay-Construction-Related Industries: Best Management Practices for Storm Water Pollution Prevention; Santa Clara Valley Nonpoint Source Pollution Control Program, 1992.

Storm Water Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

CA1

ACTIVITY: PAVING OPERATIONS

Graphic: North Central Texas COG, 1993



Objectives

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

DESCRIPTION

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

APPROACH

- Avoid paving during wet weather.
- Store materials away from drainage courses to prevent storm water runon (see CA10 Material Delivery and Storage).
- Protect drainage courses, particularly in areas with a grade, by employing BMPs to divert runoff or trap/filter sediment (see Chapter 5).
- 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 rather than burying. See CA32 (Vehicle and Equipment Maintenance) and CA12 (Spill Prevention and Control) in this chapter.
- Cover catch basins and manholes when applying seal coat, tack coat, slurry seal, fog seal, etc.
- Shovel or vacuum saw-cut slurry and remove from site. Cover or barricade storm drains during saw cutting to contain slurry.
- If paving involves portland cement concrete, see CA23 (Concrete Waste Management) in this chapter.
- If paving involves asphaltic concrete, follow these steps:
  - Do not allow sand or gravel placed over new asphalt to wash into storm drains, streets, or creeks by sweeping. Properly dispose of this waste by referring to CA20 (Solid Waste Management) in this chapter.
  - Old asphalt must be disposed of properly. Collect and remove all broken asphalt from the site and recycle whenever possible.
  - If paving involves on-site mixing plant, follow the storm water permitting requirements for industrial activities.
- Train employees and subcontractors.

REQUIREMENTS

- Costs (Capital, O&M)
  - All of the above are low cost measures.
- Maintenance
  - Inspect employees and subcontractors to ensure that measures are being followed.
  - Keep ample supplies of drip pans or absorbent materials on-site.

LIMITATIONS

- There are no major limitations to this best management practice.

Targeted Pollutants

- ◒ Sediment
- ○ Nutrients
- ◒ Toxic Materials
- ◒ Oil & Grease
- ○ Floatable Materials
- ○ Other Construction Waste

● Likely to Have Significant Impact
○ Probable Low or Unknown Impact

Implementation Requirements

- ○ Capital Costs
- ○ O&M Costs
- ◒ Maintenance
- ◒ Training
- ○ Suitability for Slopes >5%

● High ○ Low

CA2

Best Management Practices

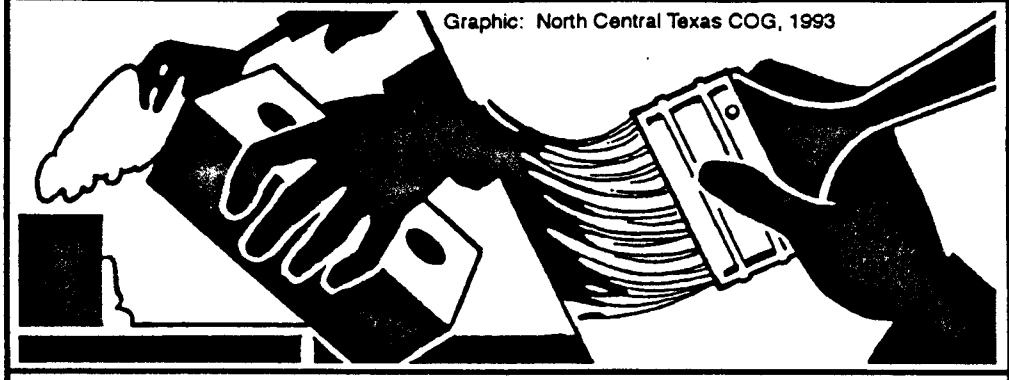
REFERENCES

Blueprint for a Clean Bay-Construction-Related Industries: Best Management Practices for Storm Water Pollution Prevention; Santa Clara Valley Nonpoint Source Pollution Control Program, 1992.

Hot-mix Asphalt Paving Handbook, U.S, Army Corps of Engineers, AC 150/5370-14, Appendix I, July 1991.

CA2

ACTIVITY: STRUCTURE CONSTRUCTION AND PAINTING



Graphic: North Central Texas COG, 1993

Objectives

- *Housekeeping Practices*
- *Contain Waste*
- *Minimize Disturbed Areas*
- *Stabilize Disturbed Areas*
- *Protect Slopes/Channels*
- *Control Site Perimeter*
- *Control Internal Erosion*

DESCRIPTION

Prevent or reduce the discharge of pollutants to storm water from structure construction and painting by enclosing or covering or berming building material storage areas, using good housekeeping practices, using safer alternative products, and training employees and subcontractors.

APPROACH

- Keep the work site clean and orderly. Remove debris in a timely fashion. Sweep the area.
- Use soil erosion control techniques if bare ground is exposed (See Chapter 5).
- Buy recycled or less hazardous products to the maximum extent practicable.
- Conduct painting operations consistent with local air quality and OSHA regulations.
- Properly store paints and solvents. See CA10 (Material Delivery and Storage) in this chapter.
- Properly store and dispose waste materials generated from the activity. See the waste management BMPs (CA20 to CA24) in this chapter.
- Recycle residual paints, solvents, lumber, and other materials to the maximum extent practicable.
- Make sure that nearby storm drains are well marked to minimize the chance of inadvertent disposal of residual paints and other liquids.
- Clean the storm drain system in the immediate construction area after construction is completed.
- Educate employees who are doing the work.
- Inform subcontractors of company policy on these matters and include appropriate provisions in their contract to make certain proper housekeeping and disposal practices are implemented.
- For a quick reference on disposal alternatives for specific wastes, see Table 4.2, CA40, Employee/Subcontractor Training.

REQUIREMENTS

- Costs (Capital, O&M)
  - These BMPs are generally of low to moderate cost.
- Maintenance
  - Maintenance should be minimal.

LIMITATIONS

- Safer alternative products may not be available, suitable, or effective in every case.
- Hazardous waste that cannot be re-used or recycled must be disposed of by a licensed hazardous waste hauler.

Targeted Pollutants

- ○ *Sediment*
- ○ *Nutrients*
- ◒ *Toxic Materials*
- ○ *Oil & Grease*
- ● *Floatable Materials*
- ● *Other Construction Waste*

● *Likely to Have Significant Impact*
○ *Probable Low or Unknown Impact*

Implementation Requirements

- ○ *Capital Costs*
- ○ *O&M Costs*
- ○ *Maintenance*
- ◒ *Training*
- ○ *Suitability for Slopes >5%*

● *High* ○ *Low*

CA3

Best Management Practices

- Be certain that actions to help storm water quality are consistent with Cal- and Fed-OSHA and air quality regulations.

Construction and painting activities can generate pollutants that can reach storm water if proper care is not taken. The sources of these contaminants may be solvents, paints, paint and varnish removers, finishing residues, spent thinners, soap cleaners, kerosene, asphalt and concrete materials, adhesive residues, and old asbestos insulation. For specific information on some of these wastes see the following BMPs in this chapter:

CA20 Solid Waste,
CA21 Hazardous Waste, and
CA23 Concrete Waste.

More specific information on structure construction practices is listed below.

Erosion and Sediment Control

If the work involves exposing large areas of soil or if old buildings are being torn down and not replaced in the near future, employ the appropriate soil erosion and control techniques described in Chapter 5.

Storm/Sanitary Sewer Connections

Carefully install all plumbing and drainage systems. Cross connections between the sanitary and storm drain systems, as well as any other connections into the drainage system from inside a building, are illegal. Color code or flag pipelines on the project site to prevent such connections, and train construction personnel.

Painting

Local air pollution regulations may, in many areas of the state, specify painting procedures which if properly carried out are usually sufficient to protect storm water quality. These regulations may require that painting operations be properly enclosed or covered to avoid drift. Use temporary scaffolding to hang drop cloths or draperies to prevent drift. Application equipment that minimizes overspray also helps. When using sealants on wood, pavement, roofs, etc, quickly clean up spills. Remove excess liquid with absorbent material or rags.

If painting requires scraping or sand blasting of the existing surface, use a drop cloth to collect most of the chips. Dispose the residue properly. If the paint contains lead or tributyl tin, it is considered a hazardous waste. Refer to the waste management BMPs in this chapter for more information.

Mix paint indoors, in a containment area, or in a flat unpaved area not subject to significant erosion. Do so even during dry weather because cleanup of a spill will never be 100% effective. Dried paint will erode from sloped surfaces and be washed away by storms. If using water based paints, clean the application equipment in a sink that is connected to the sanitary sewer or in a containment area where the dried paint can be readily removed. Properly store leftover paints if they are to be kept for the next job, or dispose of properly.

Roof work

When working on roofs, if small particles have accumulated in the gutter, either sweep out the gutter or wash the gutter and trap the particles at the outlet of the downspout. A sock or geofabric placed over the outlet may effectively trap the materials. If the downspout is lined tight, place a temporary plug at the first convenient point in the storm drain and pump out the water with a vactor truck, and clean the catch basin sump where you placed the plug.

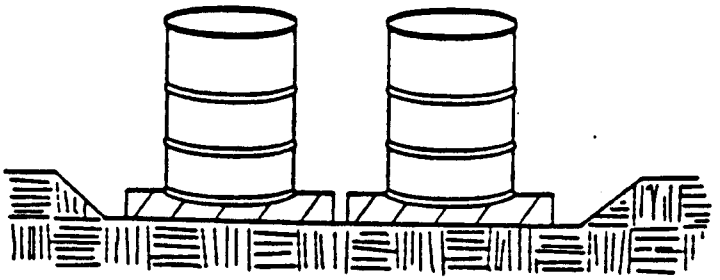
REFERENCES

Blueprint for a Clean Bay-Construction-Related Industries: Best Management Practices for Storm Water Pollution Prevention; Santa Clara Valley Nonpoint Source Pollution Control Program, 1992.

CA3

Best Management Practices

ACTIVITY: MATERIAL DELIVERY AND STORAGE



Objectives

- *Housekeeping Practices*
- *Contain Waste*
- *Minimize Disturbed Areas*
- *Stabilize Disturbed Areas*
- *Protect Slopes/Channels*
- *Control Site Perimeter*
- *Control Internal Erosion*

Targeted Pollutants

- ◒ *Sediment*
- ◒ *Nutrients*
- ◒ *Toxic Materials*
- ◒ *Oil & Grease*
- ◒ *Floatable Materials*
- ○ *Other Construction Waste*

● *Likely to Have Significant Impact*
○ *Probable Low or Unknown Impact*

Implementation Requirements

- ○ *Capital Costs*
- ○ *O&M Costs*
- ○ *Maintenance*
- ◒ *Training*
- ○ *Suitability for Slopes >5%*

● *High* ○ *Low*

CA10

Best Management Practices

DESCRIPTION

Prevent or reduce the discharge of pollutants to storm water from material delivery and storage by minimizing the storage of hazardous materials on-site, storing materials in a designated area, installing secondary containment, conducting regular inspections, and training employees and subcontractors.

This best management practice covers only material delivery and storage. For other information on materials, see CA11 (Material Use), or CA12 (Spill Prevention and Control). For information on wastes, see the waste management BMPs in this chapter.

APPROACH

The following materials are commonly stored on construction sites:

- Soil,
- Pesticides and herbicides,
- Fertilizers,
- Detergents,
- Plaster or other products,
- Petroleum products such as fuel, oil, and grease, and
- Other hazardous chemicals such as acids, lime, glues, paints, solvents, and curing compounds.

Storage of these materials on-site can pose the following risks:

- Storm water pollution,
- Injury to workers or visitors,
- Groundwater pollution, and
- Soil contamination.

Therefore, the following steps should be taken to minimize your risk:

- Designate areas of the construction site for material delivery and storage.
  - Place near the construction entrances, away from waterways
  - Avoid transport near drainage paths or waterways
  - Surround with earth berms (see ESC30, Earth Dike.)
  - Place in an area which will be paved
- Storage of reactive, ignitable, or flammable liquids must comply with the fire codes of your area. Contact the local Fire Marshal to review site materials, quantities, and proposed storage area to determine specific requirements. See the Flammable and Combustible Liquid Code, NFPA30.
- For a quick reference on disposal alternatives for specific wastes, see Table 4.2, CA40, Employee/Subcontractor Training.
- Keep an accurate, up-to-date inventory of materials delivered and stored on-site.
- Keep your inventory down.

- Minimize hazardous materials on-site storage.
- Handle hazardous materials as infrequently as possible.
- During the rainy season, consider storing materials in a covered area. Store materials in secondary containments such as an earthen dike, horse trough, or even a children's wading pool for non-reactive materials such as detergents, oil, grease, and paints. Small amounts of material may be secondarily contained in "bus boy" trays or concrete mixing trays.
- Do not store chemicals, drums, or bagged materials directly on the ground. Place these items on a pallet and, when possible, in secondary containment.
- If drums must be kept uncovered, store them at a slight angle to reduce ponding of rainwater on the lids and to reduce corrosion.
- Try to keep chemicals in their original containers, and keep them well labeled.
- Train employees and subcontractors.
- Employees trained in emergency spill cleanup procedures should be present when dangerous materials or liquid chemicals are unloaded.
- If significant residual materials remain on the ground after construction is complete, properly remove materials and any contaminated soil (See CA22). If the area is to be paved, pave as soon as materials are removed to stabilize the soil.

REQUIREMENTS

- Cost (Capital, O&M)
  - All of the above are low cost measures.
- Maintenance
  - Keep the designated storage area clean and well organized.
  - Conduct routine weekly inspections and check for external corrosion of material containers.
  - Keep an ample supply of spill cleanup materials near the storage area.

LIMITATIONS

- Storage sheds often must meet building and fire code requirements.

REFERENCES

Best Management Practices and Erosion Control Manual for Construction Sites; Flood Control District of Maricopa County, AZ, September 1992.

Blueprint for a Clean Bay-Construction-Related Industries: Best Management Practices for Storm Water Pollution Prevention; Santa Clara Valley Nonpoint Source Pollution Control Program, 1992; Santa Clara Valley Nonpoint Source Pollution Control Program, 1992.

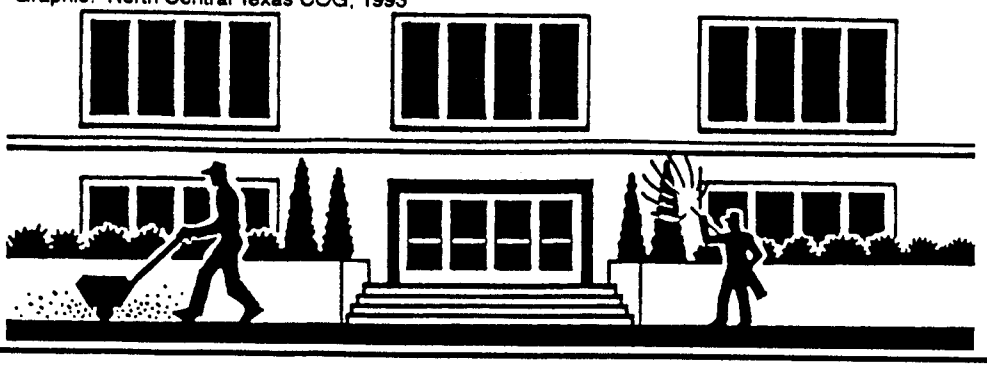
Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance, Working Group Working Paper; USEPA, April 1992.

Storm Water Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

CA10

ACTIVITY: MATERIAL USE

Graphic: North Central Texas COG, 1993



Objectives

- *Housekeeping Practices*
- *Contain Waste*
- *Minimize Disturbed Areas*
- *Stabilize Disturbed Areas*
- *Protect Slopes/Channels*
- *Control Site Perimeter*
- *Control Internal Erosion*

DESCRIPTION

Prevent or reduce the discharge of pollutants to storm water from material use by using alternative products, minimizing hazardous material use on-site, and training employees and subcontractors.

APPROACH

The following materials are commonly used on construction sites:

- Pesticides and herbicides,
- Fertilizers,
- Detergents,
- Plaster and other products,
- Petroleum products such as fuel, oil, and grease, and
- Other hazardous chemicals such as acids, lime, glues, paints, solvents, and curing compounds.

Use of these materials on-site can pose the following risks:

- Storm water pollution,
- Injury to workers or visitors,
- Groundwater pollution, and
- Soil contamination.

Therefore, the following steps should be taken to minimize your risk:

- Use less hazardous, alternative materials as much as possible.
- Minimize use of hazardous materials on-site.
- Use materials only where and when needed to complete the construction activity.
- Follow manufacturer's instructions regarding uses, protective equipment, ventilation, flammability, and mixing of chemicals.
- Personnel who use pesticides should be trained in their use. The California Department of Pesticide Regulation and county agricultural commissioners license pesticide dealers, certify pesticide applicators, and conduct on-site inspections.
- Do not over-apply fertilizers, herbicides, and pesticides. Prepare only the amount needed. Follow the recommended usage instructions. Over-application is expensive and environmentally harmful. Unless on steep slopes, till fertilizers into the soil rather than hydroseeding. Apply surface dressings in several smaller applications, as opposed to one large application, to allow time for infiltration and to avoid excess material being carried off-site by runoff. Do not apply these chemicals just before it rains.
- Train employees and subcontractors in proper material use.

Targeted Pollutants

- ○ *Sediment*
- ◒ *Nutrients*
- ◒ *Toxic Materials*
- ◒ *Oil & Grease*
- ◒ *Floatable Materials*
- ○ *Other Construction Waste*

● *Likely to Have Significant Impact*
○ *Probable Low or Unknown Impact*

Implementation Requirements

- ○ *Capital Costs*
- ○ *O&M Costs*
- ○ Maintenance
- ◒ *Training*
- ○ *Suitability for Slopes >5%*

● *High* ○ *Low*

CA11

Best Management Practices

ACTIVITY: MATERIAL USE (Continue)

REQUIREMENTS

- Costs (Capital, O&M)
  - All of the above are low cost measures.
- Maintenance
  - Maintenance of this best management practice is minimal.

LIMITATIONS

- Alternative materials may not be available, suitable, or effective in every case.

REFERENCES

Blueprint for a Clean Bay-Construction-Related Industries: Best Management Practices for Storm Water Pollution Prevention; Santa Clara Valley Nonpoint Source Pollution Control Program, 1992; Santa Clara Valley Nonpoint Source Pollution Control Program, 1992.

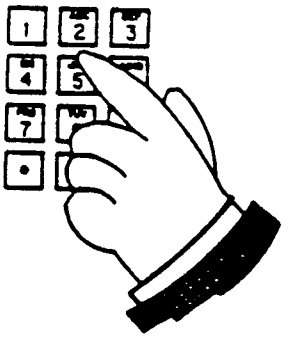
Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance, Working Group Working Paper; USEPA, April 1992.

Storm Water Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

CA11

Best Management Practices

ACTIVITY: SPILL PREVENTION AND CONTROL



Objectives

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

DESCRIPTION

Prevent or reduce the discharge of pollutants to storm water from leaks and spills by reducing the chance for spills, stopping the source of spills, containing and cleaning up spills, properly disposing of spill materials, and training employees.

This best management practice covers only spill prevention and control. However, CA10 (Material Delivery and Storage) and CA11 (Material Use), also contain useful information, particularly on spill prevention. For information on wastes, see the waste management BMPs in this chapter.

APPROACH

The following steps will help reduce the storm water impacts of leaks and spills:

Define "Significant Spill"

- Different materials pollute in different amounts. Make sure that each employee knows what a "significant spill" is for each material they use, and what is the appropriate response for "significant" and "insignificant" spills.

General Measures

- Hazardous materials and wastes should be stored in covered containers and protected from vandalism.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- Train employees in spill prevention and cleanup.
- Designate responsible individuals.

Cleanup

- Clean up leaks and spills immediately.
- On paved surfaces, clean up spills with as little water as possible. Use a rag for small spills, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to either a certified laundry (rags) or disposed of as hazardous waste.
- Never hose down or bury dry material spills. Clean up as much of the material as possible and dispose of properly. See the waste management BMPs in this chapter for specific information.

Reporting

- Report significant spills to local agencies, such as the Fire Department; they can assist in cleanup.
- Federal regulations require that any significant oil spill into a water body or onto an adjoining shoreline be reported to the National Response Center (NRC) at 800-424-8802 (24 hour).

Targeted Pollutants

- ○ Sediment
- ○ Nutrients
- ◒ Toxic Materials
- ◒ Oil & Grease
- ○ Floatable Materials
- ○ Other Construction Waste

- ● Likely to Have Significant Impact
- ○ Probable Low or Unknown Impact

Implementation Requirements

- ○ Capital Costs
- ◒ O&M Costs
- ○ Maintenance
- ◒ Training
- ○ Suitability for Slopes >5%

● High ○ Low

CA12

Best Management Practices

ACTIVITY: SPILL PREVENTION AND CONTROL (Continue)

Use the following measures related to specific activities:

Vehicle and Equipment Maintenance

- If maintenance must occur on-site, use a designated area and/or a secondary containment, located away from drainage courses, to prevent the runon of storm water and the runoff of spills.
- Regularly inspect on-site vehicles and equipment for leaks, and repair immediately.
- Check incoming vehicles and equipment (including delivery trucks, and employee and subcontractor vehicles) for leaking oil and fluids. Do not allow leaking vehicles or equipment on-site.
- Always use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.
- Place drip pans or absorbent materials under paving equipment when not in use.
- Use adsorbent materials on small spills rather than hosing down or burying the spill. Remove the adsorbent materials promptly and dispose of properly.
- Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around.
- Oil filters disposed of in trash cans or dumpsters can leak oil and pollute storm water. Place the oil filter in a funnel over a waste oil recycling drum to drain excess oil before disposal. Oil filters can also be recycled. Ask your oil supplier or recycler about recycling oil filters.
- 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.

Vehicle and Equipment Fueling

- If fueling must occur on-site, use designated areas, located away from drainage courses, to prevent the runon of storm water and the runoff of spills.
- Discourage "topping-off" of fuel tanks.
- Always use secondary containment, such as a drain pan, when fueling to catch spills/leaks.

REQUIREMENTS

- Costs (Capital, O&M)
  - Prevention of leaks and spills is inexpensive. Treatment and/or disposal of contaminated soil or water can be quite expensive.
- Maintenance
  - Keep ample supplies of spill control and cleanup materials on-site, near storage, unloading, and maintenance areas.
  - Update your spill prevention and control plan and stock cleanup materials as changes occur in the types of chemicals on-site.

LIMITATIONS

- If necessary, use a private spill cleanup company.

REFERENCES

Blueprint for a Clean Bay-Construction-Related Industries: Best Management Practices for Storm Water Pollution Prevention; Santa Clara Valley Nonpoint Source Pollution Control Program, 1992; Santa Clara Valley Nonpoint Source Pollution Control Program, 1992.

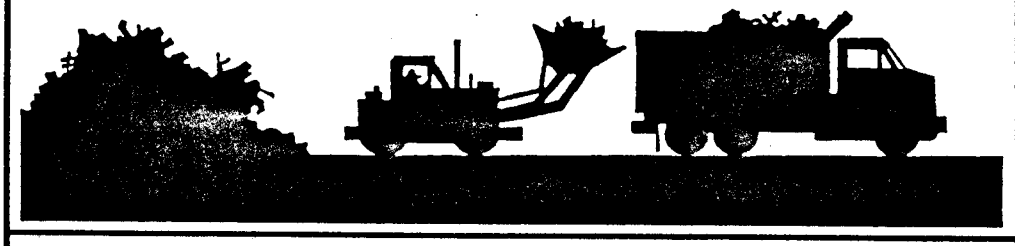
Storm Water Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

CA12

Best Management Practices

ACTIVITY: SOLID WASTE MANAGEMENT

Graphic: North Central Texas COG, 1993



Objectives

- *Housekeeping Practices*
- *Contain Waste*
- *Minimize Disturbed Areas*
- *Stabilize Disturbed Areas*
- *Protect Slopes/Channels*
- *Control Site Perimeter*
- *Control Internal Erosion*

DESCRIPTION

Prevent or reduce the discharge of pollutants to storm water from solid or construction waste by providing designated waste collection areas and containers, arranging for regular disposal, and training employees and subcontractors.

APPROACH

Solid waste is one of the major pollutants resulting from construction. Construction debris includes:

- Solid waste generated from trees and shrubs removed during land clearing, demolition of existing structures (rubble), and building construction;
- Packaging materials including wood, paper and plastic;
- Scrap or surplus building materials including scrap metals, rubber, plastic, glass pieces, and masonry products; and
- Domestic wastes including food containers such as beverage cans, coffee cups, paper bags, and plastic wrappers, and cigarettes.

The following steps will help keep a clean site and reduce storm water pollution:

- Select designated waste collection areas on-site.
- Inform trash hauling contractors that you will accept only water-tight dumpsters for on-site use. Inspect dumpsters for leaks and repair any dumpster that is not water tight.
- Locate containers in a covered area and/or in a secondary containment.
- Provide an adequate number of containers with lids or covers that can be placed over the container to keep rain out or to prevent loss of wastes when it's windy.
- Plan for additional containers and more frequent pickup during the demolition phase of construction.
- Collect site trash daily, especially during rainy and windy conditions.
- Erosion and sediment control devices tend to collect litter. Remove this solid waste promptly.
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.
- Salvage or recycle any useful material. For example, trees and shrubs from land clearing can be used as a brush barrier (see ESC53), or converted into wood chips, then used as mulch on graded areas (see ESC11).
- Do not hose out dumpsters on the construction site. Leave dumpster cleaning to trash hauling contractor.
- Arrange for regular waste collection before containers overflow.

Targeted Pollutants

- ◒ *Sediment*
- ○ *Nutrients*
- ○ *Toxic Materials*
- ○ *Oil & Grease*
- ● *Floatable Materials*
- ● *Other Construction Waste*

● *Likely to Have Significant Impact*
○ *Probable Low or Unknown Impact*

Implementation Requirements

- ○ *Capital Costs*
- ○ *O&M Costs*
- ◒ *Maintenance*
- ◒ *Training*
- ○ *Suitability for Slopes >5%*

● *High* ○ *Low*

CA20

Best Management Practices

ACTIVITY: SOLID WASTE MANAGEMENT (Continue)

- If a container does spill, clean up immediately.
- Make sure that construction waste is collected, removed, and disposed of only at authorized disposal areas.
- Train employees and subcontractors in proper solid waste management.
- For a quick reference on disposal alternatives for specific wastes, see Table 4.2, CA40, Employee/Subcontractor Training.

REQUIREMENTS

- Costs (Capital, O&M)
  - All of the above are low cost measures.
- Maintenance
  - Collect site trash daily.
  - Inspect construction waste area regularly.
  - Arrange for regular waste collection.

LIMITATIONS

- There are no major limitations to this best management practice.

REFERENCES

Best Management Practices and Erosion Control Manual for Construction Sites; Flood Control District of Maricopa County, AZ, September 1992.

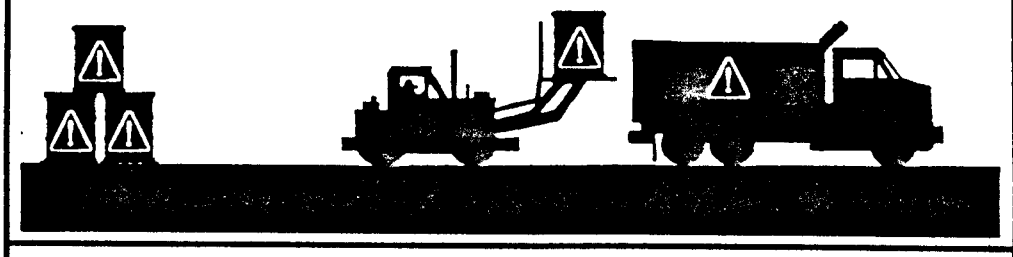
Processes, Procedures, and Methods to Control Pollution Resulting from all Construction Activity; USEPA, 430/9-73-007, 1973.

Storm Water Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

CA20

ACTIVITY: HAZARDOUS WASTE MANAGEMENT

Graphic: North Central Texas COG, 1993



Objectives

- *Housekeeping Practices*
- *Contain Waste*
- *Minimize Disturbed Areas*
- *Stabilize Disturbed Areas*
- *Protect Slopes/Channels*
- *Control Site Perimeter*
- *Control Internal Erosion*

DESCRIPTION

Prevent or reduce the discharge of pollutants to storm water from hazardous waste through proper material use, waste disposal, and training of employees and subcontractors.

APPROACH

Many of the chemicals used on-site can be hazardous materials which become hazardous waste upon disposal. These wastes may include:

- Paints and solvents;
- Petroleum products such as oils, fuels, and grease;
- Herbicides and pesticides;
- Acids for cleaning masonry; and
- Concrete curing compounds.

In addition, sites with existing structures may contain wastes which must be disposed of in accordance with Federal, State, and local regulations. These wastes include:

- Sandblasting grit mixed with lead-, cadmium-, or chromium-based paints;
- Asbestos; and
- PCBs (particularly in older transformers).

The following steps will help reduce storm water pollution from hazardous wastes:

Material Use

- Use all of the product before disposing of the container.
- Do not remove the original product label, it contains important safety and disposal information.
- Do not over-apply herbicides and pesticides. Prepare only the amount needed. Follow the recommended usage instructions. Over-application is expensive and environmentally harmful. Apply surface dressings in several smaller applications, as opposed to one large application, to allow time for infiltration and to avoid excess material being carried off-site by runoff. Do not apply these chemicals just before it rains. People applying pesticides must be certified in accordance with Federal and State regulations.
- Do not clean out brushes or rinse paint containers into the dirt, street, gutter, storm drain, or stream. "Paint out" brushes as much as possible. Rinse water-based paints to the sanitary sewer. Filter and re-use thinners and solvents. Dispose of excess oil-based paints and sludge as hazardous waste.

Targeted Pollutants

- ○ *Sediment*
- ○ *Nutrients*
- ◒ *Toxic Materials*
- ○ *Oil & Grease*
- ○ *Floatable Materials*
- ○ *Other Construction Waste*

● *Likely to Have Significant Impact*
○ *Probable Low or Unknown Impact*

Implementation Requirements

- ○ *Capital Costs*
- ○ *O&M Costs*
- ◒ *Maintenance*
- ◒ *Training*
- ○ *Suitability for Slopes >5%*

● *High* ○ *Low*

CA21

Best Management Practices

Waste Recycling/Disposal

- Select designated hazardous waste collection areas on-site.
- Hazardous materials and wastes should be stored in covered containers and protected from vandalism.
- Place hazardous waste containers in secondary containment.
- Do not mix wastes, this can cause chemical reactions, make recycling impossible, and complicate disposal.
- Recycle any useful material such as used oil or water-based paint.
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.
- Arrange for regular waste collection before containers overflow.
- Make sure that hazardous waste (e.g. excess oil-based paint and sludges) is collected, removed, and disposed of only at authorized disposal areas.
- For a quick reference on disposal alternatives for specific wastes, see Table 4.2, CA40, Employee/Subcontractor Training.

Training

- Train employees and subcontractors in proper hazardous waste management.
- Warning signs should be placed in areas recently treated with chemicals.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- If a container does spill, clean up immediately.

REQUIREMENTS

- Costs (Capital, O&M)
  - All of the above are low cost measures.
- Maintenance
  - Inspect hazardous waste receptacles and area regularly.
  - Arrange for regular hazardous waste collection.

LIMITATIONS

- Hazardous waste that cannot be reused or recycled must be disposed of by a licensed hazardous waste hauler.

REFERENCES

Blueprint for a Clean Bay-Construction-Related Industries: Best Management Practices for Storm Water Pollution Prevention; Santa Clara Valley Nonpoint Source Pollution Control Program, 1992.

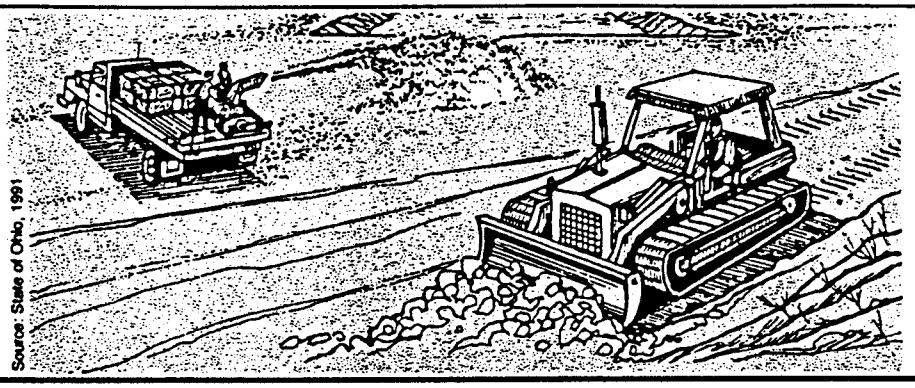
Processes, Procedures, and Methods to Control Pollution Resulting from all Construction Activity; USEPA, 430/9-73-007, 1973.

Storm Water Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

CA21

Best Management Practices

ACTIVITY: CONTAMINATED SOIL MANAGEMENT



Objectives

- *Housekeeping Practices*
- *Contain Waste*
- *Minimize Disturbed Areas*
- *Stabilize Disturbed Areas*
- *Protect Slopes/Channels*
- *Control Site Perimeter*
- *Control Internal Erosion*

DESCRIPTION

Prevent or reduce the discharge of pollutants to storm water from contaminated soil and highly acidic or alkaline soils by conducting pre-construction surveys, inspecting excavations regularly, and remediating contaminated soil promptly.

APPROACH

Contaminated soils may occur on your site for several reasons including:

- Past site uses and activities;
- Detected or undetected spills and leaks; and
- Acid or alkaline solutions from exposed soil or rock formations high in acid or alkaline-forming elements.

Most developers conduct pre-construction environmental assessments as a matter of routine. Recent court rulings holding contractors liable for cleanup costs when they unknowingly move contaminated soil, highlight the need for contractors to confirm that a site assessment is completed before earth moving begins.

The following steps will help reduce storm water pollution from contaminated soil:

- Conduct thorough site planning including pre-construction geologic surveys.
- Look for contaminated soil as evidenced by discoloration, odors, differences in soil properties, abandoned underground tanks or pipes, or buried debris.
- Prevent leaks and spills to the maximum extent practicable. Contaminated soil can be expensive to treat and/or dispose of properly. However, addressing the problem before construction is much less expensive than after the structures are in place.
- Test suspected soils at a certified laboratory.
- If the soil is contaminated, work with the local regulatory agencies to develop options for treatment and/or disposal.
- For a quick reference on disposal alternatives for specific wastes, see Table 4.2, CA40, Employee/Subcontractor Training.

REQUIREMENTS

- Costs (Capital, O&M)
  - Prevention of leaks and spills is inexpensive. Treatment and/or disposal of contaminated soil can be quite expensive.
- Maintenance
  - Inspect excavated areas daily for signs of contaminated soil.
  - Implement CA12, Spill Prevention and Control, to prevent leaks and spills as much as possible.

Targeted Pollutants

- ◒ *Sediment*
- ○ *Nutrients*
- ● *Toxic Materials*
- ○ *Oil & Grease*
- ○ *Floatable Materials*
- ○ *Other Construction Waste*

● *Likely to Have Significant Impact*
○ *Probable Low or Unknown Impact*

Implementation Requirements

- ○ *Capital Costs*
- ◒ *O&M Costs*
- ◒ *Maintenance*
- ◒ *Training*
- ○ *Suitability for Slopes >5%*

● *High* ○ *Low*

CA22

Best Management Practices

LIMITATIONS

- Contaminated soils that cannot be treated on-site must be disposed of off-site by a licensed hazardous waste hauler.
- The presence of contaminated soil may indicate contaminated water as well. See CA1 (Dewatering Operations) in this chapter for more information.

REFERENCES

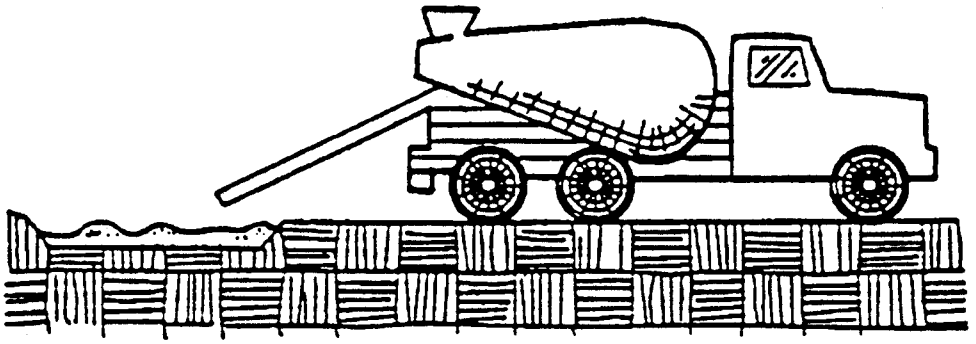
Blueprint for a Clean Bay-Construction-Related Industries: Best Management Practices for Storm Water Pollution Prevention; Santa Clara Valley Nonpoint Source Pollution Control Program, 1992.

Processes, Procedures, and Methods to Control Pollution Resulting from all Construction Activity; USEPA, 430/9-73-007, 1973.

Storm Water Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

CA22

ACTIVITY: CONCRETE WASTE MANAGEMENT



Objectives

- *Housekeeping Practices*
- *Contain Waste*
- *Minimize Disturbed Areas*
- *Stabilize Disturbed Areas*
- *Protect Slopes/Channels*
- *Control Site Perimeter*
- *Control Internal Erosion*

DESCRIPTION

Prevent or reduce the discharge of pollutants to storm water from concrete waste by conducting washout off-site, performing on-site washout in a designated area, and training employees and subcontractors.

APPROACH

The following steps will help reduce storm water pollution from concrete wastes:

- Store dry and wet materials under cover, away from drainage areas.
- Avoid mixing excess amounts of fresh concrete or cement on-site.
- Perform washout of concrete trucks off site or in designated areas only.
- Do not wash out concrete trucks into storm drains, open ditches, streets, or streams.
- Do not allow excess concrete to be dumped on-site, except in designated areas.
- For on-site washout:
  - locate washout area at least 50 feet from storm drains, open ditches, or water bodies. Do not allow runoff from this area by constructing a temporary pit or bermed area large enough for liquid and solid waste;
  - wash out wastes into the temporary pit where the concrete can set, be broken up, and then disposed of properly.
- When washing concrete to remove fine particles and expose the aggregate, avoid creating runoff by draining the water to a bermed or level area.
- Do not wash sweepings from exposed aggregate concrete into the street or storm drain. Collect and return sweepings to aggregate base stock pile, or dispose in the trash.
- Train employees and subcontractors in proper concrete waste management.
- For a quick reference on disposal alternatives for specific wastes, see Table 4.2, CA40, Employee/Subcontractor Training.

REQUIREMENTS

- Costs (Capital, O&M)
  - All of the above are low cost measures.
- Maintenance
  - Inspect subcontractors to ensure that concrete wastes are being properly managed.
  - If using a temporary pit, dispose hardened concrete on a regular basis.

LIMITATIONS

- Off-site washout of concrete wastes may not always be possible.

Targeted Pollutants

- ○ *Sediment*
- ○ *Nutrients*
- ○ *Toxic Materials*
- ○ *Oil & Grease*
- ◒ *Other Construction Waste*

- ● *Likely to Have Significant Impact*
- ○ *Probable Low or Unknown Impact*

Implementation Requirements

- ○ *Capital Costs*
- ○ *O&M Costs*
- ◒ *Maintenance*
- ◒ *Training*
- ○ *Suitability for Slopes >5%*

● *High* ○ *Low*

CA23

Best Management Practices

REFERENCES

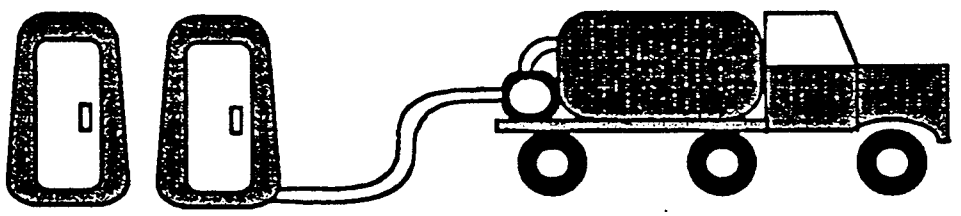
Best Management Practices and Erosion Control Manual for Construction Sites; Flood Control District of Maricopa County, AZ, July 1992.

Blueprint for a Clean Bay-Construction-Related Industries: Best Management Practices for Storm Water Pollution Prevention; Santa Clara Valley Nonpoint Source Pollution Control Program, 1992.

Storm Water Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

CA23

ACTIVITY: SANITARY/SEPTIC WASTE MANAGEMENT



Objectives

- *Housekeeping Practices*
- *Contain Waste*
- *Minimize Disturbed Areas*
- *Stabilize Disturbed Areas*
- *Protect Slopes/Channels*
- *Control Site Perimeter*
- *Control Internal Erosion*

DESCRIPTION

Prevent or reduce the discharge of pollutants to storm water from sanitary/septic waste by providing convenient, well-maintained facilities, and arranging for regular service and disposal.

APPROACH

Sanitary or septic wastes should be treated or disposed of in accordance with State and local requirements. These requirements may include:

- Locate sanitary facilities in a convenient location.
- Untreated raw wastewater should never be discharged or buried.
- Temporary septic systems should treat wastes to appropriate levels before discharging.
- If using an on-site disposal system (OSDS), such as a septic system, comply with local health agency requirements.
- Temporary sanitary facilities that discharge to the sanitary sewer system should be properly connected to avoid illicit discharges.
- If discharging to the sanitary sewer, contact the local wastewater treatment plant for their requirements.
- Sanitary/septic facilities should be maintained in good working order by a licensed service.
- Arrange for regular waste collection by a licensed hauler before facilities overflow.
- For a quick reference on disposal alternatives for specific wastes, see Table 4.2, CA40, Employee/Subcontractor Training.

REQUIREMENTS

- Costs (Capital, O&M)
  - All of the above are low cost measures.
- Maintenance
  - Inspect facilities regularly.
  - Arrange for regular waste collection.

LIMITATIONS

- There are no major limitations to this best management practice.

REFERENCES

Best Management Practices and Erosion Control Manual for Construction Sites; Flood Control District of Maricopa County, AZ, September 1992.

Storm Water Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Targeted Pollutants

- ○ *Sediment*
- ○ *Nutrients*
- ○ *Toxic Materials*
- ○ *Oil & Grease*
- ○ *Floatable Materials*
- ◒ *Other Construction Waste*

- ● *Likely to Have Significant Impact*
- ○ *Probable Low or Unknown Impact*

Implementation Requirements

- ○ *Capital Costs*
- ○ *O&M Costs*
- ◒ *Maintenance*
- ○ *Training*
- ○ *Suitability for Slopes >5%*

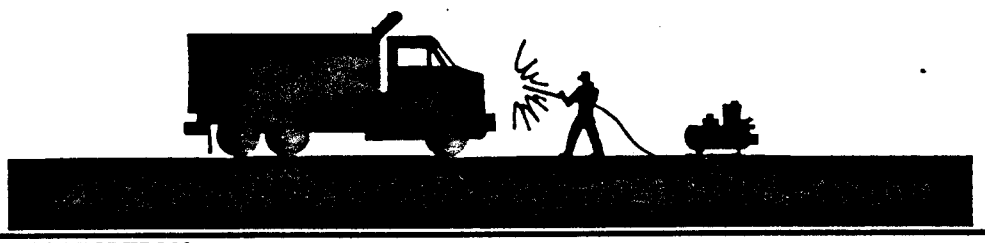
● *High* ○ *Low*

CA24

Best Management Practices

ACTIVITY: VEHICLE AND EQUIPMENT CLEANING

Graphic: North Central Texas COG, 1993



Objectives

- *Housekeeping Practices*
- *Contain Waste*
- *Minimize Disturbed Areas*
- *Stabilize Disturbed Areas*
- *Protect Slopes/Channels*
- *Control Site Perimeter*
- *Control Internal Erosion*

DESCRIPTION

Prevent or reduce the discharge of pollutants to storm water from vehicle and equipment cleaning by using off-site facilities, washing in designated, contained areas only, eliminating discharges to the storm drain by infiltrating or recycling the wash water, and/or training employees and subcontractors.

APPROACH

- Use off-site commercial washing businesses as much as possible. Washing vehicles and equipment outdoors or in areas where wash water flows onto paved surfaces or into drainage pathways can pollute storm water. If you wash a large number of vehicles or pieces of equipment, consider conducting this work at an off-site commercial business. These businesses are better equipped to handle and dispose of the wash waters properly. Performing this work off-site can also be economical by eliminating the need for a separate washing operation at your site.
- If washing must occur on-site, use designated, bermed wash areas to prevent wash water contact with storm water, creeks, rivers, and other water bodies. The wash area can be sloped for wash water collection and subsequent infiltration into the ground.
- Use as little water as possible to avoid having to install erosion and sediment controls for the wash area.
- Use phosphate-free, biodegradable soaps.
- Educate employees and subcontractors on pollution prevention measures.
- Do not permit steam cleaning on-site. Steam cleaning can generate significant pollutant concentrations.
- For a quick reference on disposal alternatives for specific wastes, see Table 4.2, CA40, Employee/Subcontractor Training.

REQUIREMENTS

- Costs (Capital, O&M)
  - All of the above are low cost measures.
- Maintenance
  - Minimal, some berm repair may be necessary.

LIMITATIONS

- Even phosphate-free, biodegradable soaps have been shown to be toxic to fish before the soap degrades.
- Sending vehicles/equipment off-site should be done in conjunction with ESC24 (Stabilized Construction Entrance).

REFERENCE

Swisher, R.D., 1987. Surfactant Biodegradation, Marcel Decker Corporation

Targeted Pollutants

- ○ *Sediment*
- ○ *Nutrients*
- ◒ *Toxic Materials*
- ◒ *Oil & Grease*
- ○ *Floatable Materials*
- ○ *Other Construction Waste*

● *Likely to Have Significant Impact*
○ *Probable Low or Unknown Impact*

Implementation Requirements

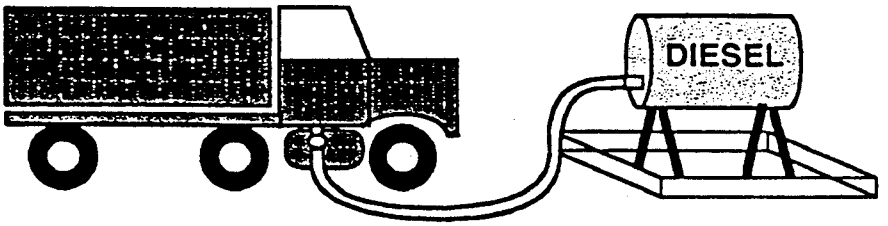
- ◒ *Capital Costs*
- ○ *O&M Costs*
- ◒ *Maintenance*
- ○ *Training*
- ○ *Suitability for Slopes >5%*

● *High* ○ *Low*

CA30

Best Management Practices

ACTIVITY: VEHICLE AND EQUIPMENT FUELING



Objectives

- *Housekeeping Practices*
- *Contain Waste*
- *Minimize Disturbed Areas*
- *Stabilize Disturbed Areas*
- *Protect Slopes/Channels*
- *Control Site Perimeter*
- *Control Internal Erosion*

DESCRIPTION

Prevent fuel spills and leaks, and reduce their impacts to storm water by using off-site facilities, fueling in designated areas only, enclosing or covering stored fuel, implementing spill controls, and training employees and subcontractors.

APPROACH

- Use off-site fueling stations as much as possible. Fueling vehicles and equipment outdoors or in areas where fuel may spill/leak onto paved surfaces or into drainage pathways can pollute storm water. If you fuel a large number of vehicles or pieces of equipment, consider using an off-site fueling station. These businesses are better equipped to handle fuel and spills properly. Performing this work off-site can also be economical by eliminating the need for a separate fueling area at your site.
- If fueling must occur on-site, use designated areas, located away from drainage courses, to prevent the runon of storm water and the runoff of spills.
- Discourage "topping-off" of fuel tanks.
- Always use secondary containment, such as a drain pan or drop cloth, when fueling to catch spills/leaks.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- Use adsorbent materials on small spills rather than hosing down or burying the spill. Remove the adsorbent materials promptly and dispose of properly.
- Carry out all Federal and State requirements regarding stationary above ground storage tanks.
- 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 perhaps forklifts, 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.
- For a quick reference on disposal alternatives for specific wastes, see Table 4.2, CA40, Employee/Subcontractor Training.

REQUIREMENTS

- Costs (Capital, O&M)
  - 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.
- Maintenance
  - Keep ample supplies of spill cleanup materials on-site.
  - Inspect fueling areas and storage tanks on a regular schedule.

LIMITATIONS

- Sending vehicles/equipment off-site should be done in conjunction with ESC24 (Stabilized Construction Entrance).

Targeted Pollutants

- ○ *Sediment*
- ○ *Nutrients*
- ◒ *Toxic Materials*
- ◒ *Oil & Grease*
- ○ *Floatable Materials*
- ○ *Other Construction Waste*

- ● *Likely to Have Significant Impact*
- ○ *Probable Low or Unknown Impact*

Implementation Requirements

- ◒ *Capital Costs*
- ○ *O&M Costs*
- ◒ *Maintenance*
- ◒ *Training*
- ○ *Suitability for Slopes >5%*

● *High* ○ *Low*

CA31

Best Management Practices

ACTIVITY: VEHICLE AND EQUIPMENT MAINTENANCE

Graphic: North Central Texas COG, 1993

Objectives

- *Housekeeping Practices*
- *Contain Waste*
- *Minimize Disturbed Areas*
- *Stabilize Disturbed Areas*
- *Protect Slopes/Channels*
- *Control Site Perimeter*
- *Control Internal Erosion*

Targeted Pollutants

- ○ *Sediment*
- ○ *Nutrients*
- ◒ *Toxic Materials*
- ◒ *Oil & Grease*
- ○ *Floatable Materials*
- ○ *Other Construction Waste*

● *Likely to Have Significant Impact*
○ *Probable Low or Unknown Impact*

Implementation Requirements

- ○ *Capital Costs*
- ○ *O&M Costs*
- ○ *Maintenance*
- ◒ *Training*
- ○ *Suitability for Slopes >5%*

● *High* ○ *Low*

CA32

Best Management Practices

DESCRIPTION

Prevent or reduce the discharge of pollutants to storm water from vehicle and equipment maintenance by running a "dry site". This involves using off-site facilities, performing work in designated areas only, providing cover for materials stored outside, checking for leaks and spills, containing and cleaning up spills immediately, and training employees and subcontractors.

APPROACH

- Keep vehicles and equipment clean, don't allow excessive build-up of oil and grease.
- Use off-site repair shops as much as possible. Maintaining vehicles and equipment outdoors or in areas where vehicle or equipment fluids may spill or leak onto the ground can pollute storm water. If you maintain a large number of vehicles or pieces of equipment, consider using an off-site repair shop. These businesses are better equipped to handle vehicle fluids and spills properly. Performing this work off-site can also be economical by eliminating the need for a separate maintenance area.
- If maintenance must occur on-site, use designated areas, located away from drainage courses, to prevent the runon of storm water and the runoff of spills.
- Always use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- Use adsorbent materials on small spills rather than hosing down or burying the spill. Remove the adsorbent materials promptly and dispose of properly.
- Regularly inspect on-site vehicles and equipment for leaks, and repair immediately.
- Check incoming vehicles and equipment (including delivery trucks, and employee and subcontractor vehicles) for leaking oil and fluids. Do not allow leaking vehicles or equipment on-site.
- Segregate and recycle wastes, such as greases, used oil or oil filters, antifreeze, cleaning solutions, automotive batteries, hydraulic, and transmission fluids.
- Train employees and subcontractors in proper maintenance and spill cleanup procedures.
- For a quick reference on disposal alternatives for specific wastes, see Table 4.2, CA40, Employee/Subcontractor Training.

REQUIREMENTS

- Costs (Capital, O&M)
  - All of the above are low cost measures.
- Maintenance
  - Keep ample supplies of spill cleanup materials on-site.
  - Inspect maintenance areas on a regular schedule.

LIMITATIONS

- Sending vehicles/equipment off-site should be done in conjunction with ESC24 (Stabilized Construction Entrance).

Outdoor vehicle or equipment maintenance is a potentially significant source of storm water pollution. Activities that can contaminate storm water include engine repair and service, particularly changing or replacement of fluids, and outdoor equipment storage and parking (dripping engines). For further information on vehicle or equipment servicing, see CA30, Vehicle and Equipment Cleaning, and CA31, Vehicle and Equipment Fueling.

Listed below is further information if you must perform vehicle or equipment maintenance on-site.

Waste Reduction

Parts are often cleaned using solvents such as trichloroethylene, 1,1,1-trichloroethane, or methylene chloride. Many of these parts cleaners are harmful and 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 (1,1,1-trichloroethane, methylene chloride, etc.) with non-chlorinated solvents. Non-chlorinated solvents like kerosene or mineral spirits are less toxic and less expensive to dispose of properly. Check 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/Disposal

Separating wastes allows for easier recycling and may reduce disposal costs. Keep hazardous and non-hazardous wastes separate, do not mix used oil and solvents, and keep chlorinated solvents (like 1,1,1-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.

Oil filters disposed of in trash cans or dumpsters can leak oil and contaminate storm water. Place the oil filter in a funnel over a waste oil recycling drum to drain excess oil before disposal. Oil filters can also 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.

Do not bury used tires.

REFERENCES

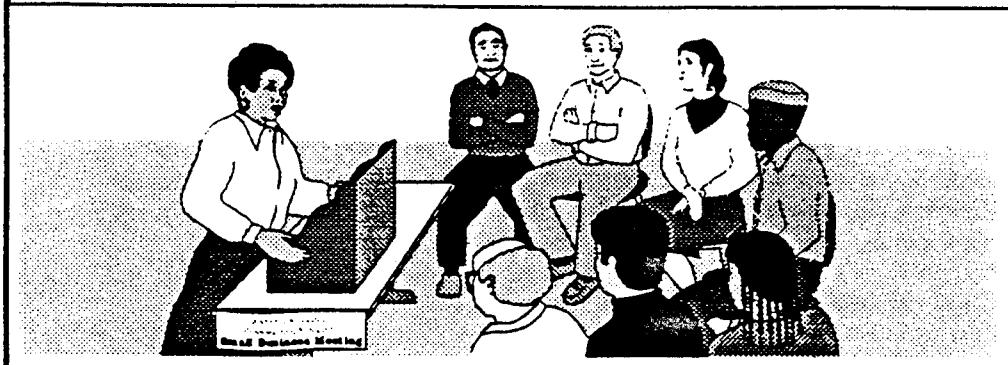
Best Management Practices and Erosion Control Manual for Construction Sites; Flood Control District of Maricopa County, AZ, September 1992.

Blueprint for a Clean Bay-Construction-Related Industries: Best Management Practices for Storm Water Pollution Prevention; Santa Clara Valley Nonpoint Source Pollution Control Program, 1992.

Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance, Working Group Working Paper; USEPA, April 1992.

CA32

ACTIVITY: EMPLOYEE/SUBCONTRACTOR TRAINING



Objectives

- *Housekeeping Practices*
- *Contain Waste*
- *Minimize Disturbed Areas*
- *Stabilize Disturbed Areas*
- *Protect Slopes/Channels*
- *Control Site Perimeter*
- *Control Internal Erosion*

DESCRIPTION

Employee/subcontractor training, like maintenance or a piece of equipment, is not so much a best management practice as it is a method by which to implement BMPs. This fact sheet highlights the importance of training and of integrating the elements of employee/subcontractor training from the individual source controls into a comprehensive training program as part of a company's Storm Water Pollution Prevention Plan (SWPPP).

The specific employee/subcontractor training aspects of each of the source controls are highlighted in the individual fact sheets. The focus of this fact sheet is more general, and includes the overall objectives and approach for assuring employee/subcontractor training in storm water pollution prevention. Accordingly, the organization of this fact sheet differs somewhat from the other fact sheets in this chapter.

OBJECTIVES

Employee/subcontractor training should be based on four objectives:

- Promote a clear identification and understanding of the problem, including activities with the potential to pollute storm water;
- Identify solutions (BMPs);
- Promote employee/subcontractor ownership of the problems and the solutions; and
- Integrate employee/subcontractor feedback into training and BMP implementation.

APPROACH

- Integrate training regarding storm water quality management with existing training programs that may be required for your business by other regulations such as: the Illness and Injury Prevention Program (IIPP) (SB 198) (California Code of Regulations Title 8, Section 3203), the Hazardous Waste Operations and Emergency Response (HAZWOPER) standard (29 CFR 1910.120), the Spill Prevention Control and Countermeasure (SPCC) Plan (40 CFR 112), and the Hazardous Materials Management Plan (Business Plan) (California Health and Safety Code, Section 6.95).
- Businesses, particularly smaller ones that may not be regulated by Federal, State, or local regulations, may use the information in this Handbook to develop a training program to reduce their potential to pollute storm water.
- Use the quick reference on disposal alternatives (Table 4.2) to train employee/subcontractors in proper and consistent methods for disposal.

CA40

Best Management Practices

ACTIVITY: EMPLOYEE/SUBCONTRACTOR TRAINING (Continue)

- Consider posting the quick reference table around the job site or in the on-site office trailer to reinforce training.
- Train employee/subcontractors in standard operating procedures and spill cleanup techniques described in the fact sheets. Employee/subcontractors trained in spill containment and cleanup should be present during the loading/ unloading and handling of materials.
- Personnel who use pesticides should be trained in their use. The California Department of Pesticide Regulation and county agricultural commissioners license pesticide dealers, certify pesticide applicators, and conduct on-site inspections.
- Proper education of off-site contractors is often overlooked. The conscientious efforts of well trained employee/ subcontractors can be lost by unknowing off-site contractors, so make sure they are well informed about what they are expected to do on-site.

CA40

Best Management Practices

TABLE 4.2 QUICK REFERENCE - DISPOSAL ALTERNATIVES
(Adopted from Santa Clara County Nonpoint Source Pollution Control Program - December 1992)

All of the waste products on this chart are prohibited from discharge to the storm drain system. Use this matrix to decide which alternative disposal strategies to use. **ALTERNATIVES ARE LISTED IN PRIORITY ORDER.**

Key: HHW — Household hazardous waste (Government-sponsored drop-off events)
POTW — Publically Owned Treatment Plant
Reg.Bd. — Regional Water Quality Control Board (Oakland)
"Dispose to sanitary sewer" means dispose into sink, toilet, or sanitary sewer clean-out connection.
"Dispose as trash" means dispose in dumpsters or trash containers for pickup and/or eventual disposal in landfill.
"Dispose as hazardous waste" for business/commercial means contract with a hazardous waste hauler to remove and dispose.

DISCHARGE/ACTIVITY	BUSINESS/COMMERCIAL Disposal Priorities	Approval	RESIDENTIAL Disposal Priorities
General Construction and Painting; Street and Utility Maintenance			
Excess paint (oil-based)	1. Recycle/reuse. 2. Dispose as hazardous waste.		1. Recycle/reuse. 2. Take to HHW drop-off.
Excess paint (water-based)	1. Recycle/reuse. 2. Dry residue in cans, dispose as trash. 3. If volume is too much to dry, dispose as hazardous waste.		1. Recycle/reuse. 2. Dry residue in cans, dispose as trash. 3. If volume is too much to dry, take to HHW drop-off
Paint cleanup (oil-based)	Wipe paint out of brushes, then: 1. Filter & reuse thinners, solvents. 2. Dispose as hazardous waste.		Wipe paint out of brushes, then: 1. Filter & reuse thinners, solvents. 2. Take to HHW drop-off.
Paint cleanup (water-based)	Wipe paint out of brushes, then: 1. Rinse to sanitary sewer.		Wipe paint out of brushes, then: 1. Rinse to sanitary sewer.
Empty paint cans (dry)	1. Remove lids, dispose as trash.		1. Remove lids, dispose as trash.
Paint stripping (with solvent)	1. Dispose as hazardous waste.		1. Take to HHW drop-off.
Building exterior cleaning (high-pressure water)	1. Prevent entry into storm drain and remove offsite 2. Wash onto dirt area, spade in 3. Collect (e.g. mop up) and discharge to sanitary sewer	POTW	
Cleaning of building exteriors which have **HAZARDOUS MATERIALS** (e.g. mercury, lead) in paints	1. Use dry cleaning methods 2. Contain and dispose washwater as hazardous waste (Suggestion: dry material first to reduce volume)		

DISCHARGE/ACTIVITY	BUSINESS/COMMERCIAL Disposal Priorities	Approval	RESIDENTIAL Disposal Priorities
General Construction and Painting; Street and Utility Maintenance (cont'd)			
Non-hazardous paint scraping/ sand blasting	1. Dry sweep, dispose as trash		1. Dry sweep, dispose as trash
HAZARDOUS paint scraping/sand blasting (e.g. marine paints or paints containing lead or tributyl tin)	1. Dry sweep, dispose as hazardous waste		1. Dry sweep, take to HHW drop-off
Soil from excavations during periods when storms are forecast	1. Should not be placed in street or on paved areas 2. Remove from site or backfill by end of day 3. Cover with tarpaulin or surround with hay bales, or use other runoff controls 4. Place filter mat over storm drain Note: Thoroughly sweep following removal of dirt in all four alternatives.		
Soil from excavations placed on paved surfaces during periods when storms are not forecast	1. Keep material out of storm conveyance systems and thoroughly remove via sweeping following removal of dirt		
Cleaning streets in construction areas	1. Dry sweep and minimize tracking of mud 2. Use silt ponds and/or similar pollutant reduction techniques when flushing pavement		
Soil erosion, sediments	1. Cover disturbed soils, use erosion controls, block entry to storm drain. 2. Seed or plant immediately.		
Fresh cement, grout, mortar	1. Use/reuse excess 2. Dispose to trash		1. Use/reuse excess 2. Dispose as trash
Washwater from concrete/mortar (etc.) cleanup	1. Wash onto dirt area, spade in 2. Pump and remove to appropriate disposal facility 3. Settle, pump water to sanitary sewer	POTW	1. Wash onto dirt area, spade in 2. Pump and remove to appropriate disposal facility 3. Settle, pump water to sanitary sewer
Aggregate wash from driveway/patio construction	1. Wash onto dirt area, spade in 2. Pump and remove to appropriate disposal facility 3. Settle, pump water to sanitary sewer	POTW	1. Wash onto dirt area, spade in 2. Pump and remove to appropriate disposal facility 3. Settle, pump water to sanitary sewer

DISCHARGE/ACTIVITY	BUSINESS/COMMERCIAL Disposal Priorities	Approval	RESIDENTIAL Disposal Priorities
General Construction and Painting; Street and Utility Maintenance (cont'd)			
Rinsewater from concrete mixing trucks	1. Return truck to yard for rinsing into pond or dirt area 2. At construction site, wash into pond or dirt area		
Non-hazardous construction and demolition debris	1. Recycle/reuse (concrete, wood, etc.) 2. Dispose as trash		1. Recycle/reuse (concrete, wood, etc. 2. Dispose as trash
Hazardous demolition and construction debris (e.g. asbestos)	1. Dispose as hazardous waste		1. Do not attempt to remove yourself. Contact asbestos removal service for safe removal and disposal 2. Very small amounts (less than 5 lbs) may be double-wrapped in plastic and taken to HHW drop-off
Saw-cut slurry	1. Use dry cutting technique and sweep up residue 2. Vacuum slurry and dispose off-site. 3. Block storm drain or berm with low weir as necessary to allow most solids to settle. Shovel out gutters; dispose residue to dirt area, construction yard or landfill.		
Construction dewatering (Nonturbid, uncontaminated groundwater)	1. Recycle/Reuse 2. Discharge to storm drain		
Construction dewatering (Other than nonturbid, uncontaminated groundwater)	1. Recycle/reuse 2. Discharge to sanitary sewer 3. As appropriate, treat prior to discharge to storm drain	POTW Reg. Bd.	
Portable toilet waste	1. Leasing company shall dispose to sanitary sewer at POTW	POTW	
Leaks from garbage dumpsters	1. Collect, contain leaking material. Eliminate leak, keep covered, return to leasing company for immediate repair 2. If dumpster is used for liquid waste, use plastic liner		

DISCHARGE/ACTIVITY	BUSINESS/COMMERCIAL Disposal Priorities	Approval	RESIDENTIAL Disposal Priorities
General Construction and Painting; Street and Utility Maintenance (cont'd)			
Leaks from construction debris bins	1. Insure that bins are used for dry nonhazardous materials only (Suggestion: Fencing, covering help prevent misuse)		
Dumpster cleaning water	1. Clean at dumpster owner's facility and discharge waste through grease interceptor to sanitary sewer 2. Clean on site and discharge through grease interceptor to sanitary sewer	POTW POTW	
Cleaning driveways, paved areas * (Special Focus = Restaurant alleys Grocery dumpster areas) * Note: Local drought ordinances may contain additional restrictions	1. Sweep and dispose as trash (Dry cleaning only). 2. For vehicle leaks, restaurant/grocery alleys, follow this 3-step process: a. Clean up leaks with rags or absorbents. b. Sweep, using granular absorbent material (cat litter). c. Mop and dispose of mopwater to sanitary sewer (or collect rinsewater and pump to the sanitary sewer). 3. Same as 2 above, but with rinsewater (2c)(no soap) discharged to storm drain.		1. Sweep and dispose as trash (Dry cleaning only). 2. For vehicle leaks, follow this 3-step process: a. Clean up leaks with rags or absorbents; dispose as hazardous waste. b. Sweep, using granular absorbent material (cat litter). c. Mop and dispose of mopwater to sanitary sewer.
Steam cleaning of sidewalks, plazas * * Note: Local drought ordinances may contain additional restrictions	1. Collect all water and pump to sanitary sewer. 2. Follow this 3-step process: a. Clean oil leaks with rags or adsorbents b. Sweep (Use dry absorbent as needed) c. Use no soap, discharge to storm drain		
Potable water/line flushing Hydrant testing	1. Deactivate chlorine by maximizing time water will travel before reaching creeks		
Super-chlorinated (above 1 ppm) water from line flushing	1. Discharge to sanitary sewer 2. Complete dechlorination required before discharge to storm drain		

DISCHARGE/ACTIVITY	BUSINESS/COMMERCIAL Disposal Priorities	Approval	RESIDENTIAL Disposal Priorities
Landscape/Garden Maintenance			
Pesticides	1. Use up. Rinse containers use rinsewater as product. Dispose rinsed containers as trash 2. Dispose unused pesticide as hazardous waste		1. Use up. Rinse containers, use rinsewater as pesticide. Dispose rinsed container as trash. 2. Take unused pesticide to HHW drop-off
Garden clippings	1. Compost 2. Take to Landfill		1. Compost 2. Dispose as trash.
Tree trimming	1. Chip if necessary, before composting or recycling		1. Chip if necessary, before composting or recycling
Swimming pool, spa, fountain water (emptying)	1. Do not use metal-based algicides (i.e. Copper Sulfate) 2. Recycle/reuse (e.g. irrigation) 3. Determine chlorine residual = 0, wait 24 hours and then discharge to storm drain.	POTW	1. Do not use metal-based algicides (i.e. Copper Sulfate) 2. Recycle/reuse (e.g. irrigation) 3. Determine chlorine residual = 0, wait 24 hours and then discharge to storm drain.
Acid or other pool/spa/fountain cleaning	1. Neutralize and discharge to sanitary sewer	POTW	
Swimming pool, spa filter backwash	1. Reuse for irrigation 2. Dispose on dirt area 3. Settle, dispose to sanitary sewer		1. Use for landscape irrigation 2. Dispose on dirt area 3. Settle, dispose to sanitary sewer
Vehicle Wastes			
Used motor oil	1. Use secondary containment while storing, send to recycler.		1. Put out for curbside recycling pickup where available 2. Take to Recycling Facility or auto service facility with recycling program 3. Take to HHW events accepting motor oil
Antifreeze	1. Use secondary containment while storing, send to recycler.		1. Take to Recycling Facility
Other vehicle fluids and solvents	1. Dispose as hazardous waste		1. Take to HHW event
Automobile batteries	1. Send to auto battery recycler 2. Take to Recycling Center		1. Exchange at retail outlet 2. Take to Recycling Facility or HHW event where batteries are accepted
Motor home/construction trailer waste	1. Use holding tank. Dispose to sanitary sewer		1. Use holding tank, dispose to sanitary sewer.

DISCHARGE/ACTIVITY	BUSINESS/COMMERCIAL Disposal Priorities	Approval	RESIDENTIAL Disposal Priorities
Vehicle Wastes (cont'd)			
Vehicle Washing	1. Recycle 2. Discharge to sanitary sewer, never to storm drain	POTW	1. Take to Commercial Car Wash. 2. Wash over lawn or dirt area 3. If soap is used, use a bucket for soapy water and discharge remaining soapy water to sanitary sewer.
Mobile Vehicle Washing	1. Collect washwater and discharge to sanitary sewer.	POTW	
Rinsewater from dust removal at new car fleets	1. Discharge to sanitary sewer 2. If rinsing dust from exterior surfaces from appearance purposes, use no soap (water only); discharge to storm drain.	POTW	
Vehicle leaks at Vehicle Repair Facilities	Follow this 3-step process: 1. Clean up leaks with rags or absorbents 2. Sweep, using granular absorbent material (cat litter) 3. Mop and dispose of mopwater to sanitary sewer.		
Other Wastes			
Carpet cleaning solutions & other mobile washing services	1. Dispose to sanitary sewer	POTW	1. Dispose to sanitary sewer
Roof drains	1. If roof is contaminated with industrial waste products, discharge to sanitary sewer 2. If no contamination is present, discharge to storm drain		
Cooling water Air conditioning condensate	1. Recycle/reuse 2. Discharge to sanitary sewer	POTW	
Pumped groundwater, infiltration/ foundation drainage (contaminated)	1. Recycle/reuse (landscaping, etc.) 2. Treat if necessary; discharge to sanitary sewer 3. Treat and discharge to storm drain	Reg. Bd. POTW Reg. Bd.	
Fire fighting flows	If contamination is present, Fire Dept. will attempt to prevent flow to stream or storm drain		

DISCHARGE/ACTIVITY	BUSINESS/COMMERCIAL Disposal Priorities	Approval	RESIDENTIAL Disposal Priorities
Other Wastes (cont'd)			
Kitchen Grease	1. Provide secondary containment, collect, send to recyler. 2. Provide secondary containment, collect, send to POTW via hauler.	POTW	1. Collect, solidify, dispose as trash
Restaurant cleaning of floor mats, exhaust filters, etc.	1. Clean inside building with discharge through grease trap to sanitary sewer. 2. Clean outside in container or bermed area with discharge to sanitary sewer.		
Clean-up wastewater from sewer back-up	1. Follow this procedure: a. Block storm drain, contain, collect, and return spilled material to the sanitary sewer. b. Block storm drain, rinse remaining material to collection point and pump to sanitary sewer. (no rinse-water may flow to storm drain)		

5. *BMPs FOR EROSION AND SEDIMENTATION CONTROL*

INTRODUCTION

This chapter describes specific Best Management Practices (BMPs) for common construction activities that result in erosion of the construction site and the generation of sediment which impacts waterways and off-site property. Chapter 2 led you through the steps of identifying activities at your site that can cause erosion, while Chapter 3 provided guidance with BMP selection. This chapter will provide you with the BMPs that best fit your site's needs.

Each fact sheet contains a cover sheet with:

- A description of the BMP
- Suitable Applications
- Installation/Application Criteria
- Requirements
  - Costs, including capital costs, and operations and maintenance (O&M)
  - Maintenance (including administrative and staffing)
- Limitations

The side bar presents information on which BMP objective applies, targeted constituents, and an indication of the level of effort and costs to implement. The remainder of the fact sheet provides further information on some or all of these topics, and provides references for additional guidelines.

BMPs for Erosion and Sedimentation Control

Site Planning Considerations
- ESC1 Scheduling
- ESC2 Preservation of Existing Vegetation

Vegetative Stabilization
- ESC10 Seeding and Planting
- ESC11 Mulching

Physical Stabilization
- ESC20 Geotextiles and Mats
- ESC21 Dust Control
- ESC22 Temporary Stream Crossing
- ESC23 Construction Road Stabilization
- ESC24 Stabilized Construction Entrance

Diversion of Runoff
- ESC30 Earth Dike
- ESC31 Temporary Drains and Swales
- ESC32 Slope Drain

Velocity Reduction
- ESC40 Outlet Protection
- ESC41 Check Dams
- ESC42 Slope Roughening/Terracing

Sediment Trapping/Filtering
- ESC50 Silt Fence
- ESC51 Straw Bale Barrier
- ESC52 Sand Bag Barrier
- ESC53 Brush or Rock Filter
- ESC54 Storm Drain Inlet Protection
- ESC55 Sediment Trap
- ESC56 Sediment Basin

Sizing and design criteria for erosion and sedimentation control may be standardized for each local area. This handbook cannot develop specific sizing criteria for all topographies and climates in California. Many local agencies have developed such criteria and should be consulted before sizing specific BMPs. A common design storm for sizing temporary erosion and sedimentation controls is a two-year, 24-hour storm. Sizing criteria given in this handbook assume that such a storm would result in 0.042 ac-ft/ac. of runoff (0.5 inches of runoff). This should be appropriate for sizing controls in most areas. Keep in mind that these controls must also be able to safely contain or

convey storms larger than the design storm for erosion and sediment control.

These BMP fact sheets are suitable for inclusion in many SWPPPs for erosion and sedimentation control. They may be used to supplement and provide details for erosion and sedimentation controls shown on the project site map. In all cases, however, local erosion and sedimentation criteria and standards supersede the suggested criteria on these fact sheets.

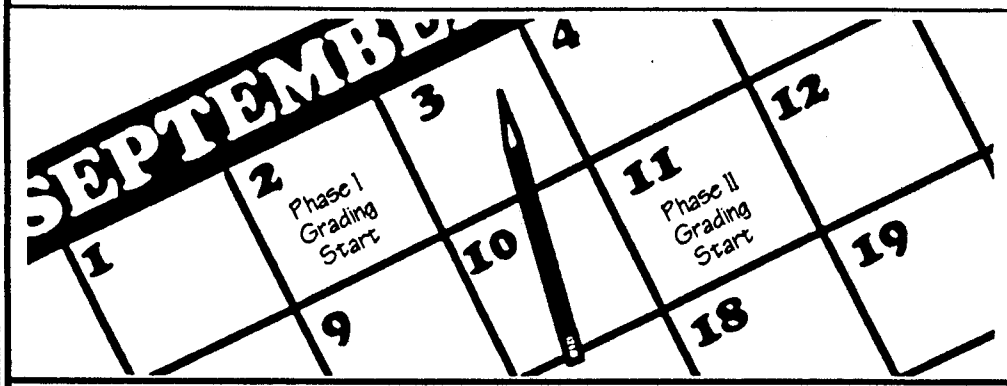
BMPs fact sheets are provided for each of the following BMP categories, and are consistent with Worksheet 5 in Chapter 2.

TABLE 5.1 EROSION AND SEDIMENT CONTROL AND BMP OBJECTIVES

	BMP CATEGORY	BMP OBJECTIVES						
		PRACTICE GOOD HOUSE-KEEPING	CONTAIN WASTE	MINIMIZE DISTURBED AREA	STABILIZE DISTURBED AREA	PROTECT SLOPES AND CHANNELS	CONTROL SITE PERIMETER	CONTROL INTERNAL EROSION
	Site Planning Considerations							
ESC1	Scheduling	✓	✓	✓	✓	✓	✓	✓
ESC2	Preservation of Existing Vegetation			✓	✓	✓	✓	
	Vegetative Stabilization							
ESC10	Seeding and Planting				✓	✓		
ESC11	Mulching				✓	✓		
	Physical Stabilization							
ESC20	Geotextiles and Mats				✓	✓		
ESC21	Dust Control	✓		✓	✓		✓	
ESC22	Temporary Stream Crossing	✓		✓	✓	✓		
ESC23	Construction Road Stabilization	✓		✓	✓	✓		
ESC24	Stabilized Construction Entrance	✓		✓	✓		✓	
	Diversion of Runoff							
ESC30	Earth Dike		✓			✓	✓	✓
ESC31	Temporary Drains and Swales					✓	✓	✓
ESC32	Slope Drain					✓		
	Velocity Reduction							
ESC40	Outlet Protection					✓		
ESC41	Check Dams (see ESC 53 also)					✓		
ESC42	Slope Roughening/Terracing				✓	✓		

BMP CATEGORY		BMP OBJECTIVES						
		PRACTICE GOOD HOUSE-KEEPING	CONTAIN WASTE	MINIMIZE DISTURBED AREA	STABILIZE DISTURBED AREA	PROTECT SLOPES AND CHANNELS	CONTROL SITE PERIMETER	CONTROL INTERNAL EROSION
	Sediment Trapping/Filtering							
ESC50	Silt Fence						✓	✓
ESC51	Straw Bale Barrier						✓	✓
ESC52	Sand Bag Barrier					✓	✓	✓
ESC53	Brush or Rock Filter					✓	✓	✓
ESC54	Storm Drain Inlet Protection						✓	✓
ESC55	Sediment Trap							✓
ESC56	Sediment Basin							✓

BMP: SCHEDULING



Objectives

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

DESCRIPTION

Sequencing the construction project to reduce the amount and duration of soil exposed to erosion by wind, rain, runoff, and vehicle tracking.

SUITABLE APPLICATIONS

Proper sequencing of construction activities to reduce erosion potential should be incorporated into the schedule of every construction project. Use of other, more costly yet less effective, erosion and sedimentation controls, may often be reduced through proper construction sequencing.

APPROACH

- Project design considerations: Design project to integrate into existing land contours. Significant regrading of a site will require more costly erosion and sedimentation control measures and may require that on-site drainage facilities be installed.
- Incorporate existing, natural areas: Inventory and evaluate the existing site terrain and vegetation. Disturbance of highly erosive natural areas (e.g., steep, unstable slope areas, watercourses) should be minimized, while protecting other areas may enhance site aesthetics. Construction should not disturb these areas (see ESC2).
- Avoid rainy periods: Schedule major grading operations during dry months. Allow enough time before rainfall begins to stabilize the soil with vegetation or physical means (see ESC 10 to 24) or to install temporary sediment trapping devices (see ESC 50 to 56).
- Practice erosion and sediment control year round: Erosion may be caused during dry seasons by "freak" rainfall, wind and vehicle tracking. Therefore, keep the site stabilized year-round, and retain wet season sediment trapping devices.
- Minimize soil exposed at one time: Schedule projects to disturb only small portions of the site at any one time. Complete grading as soon as possible. Immediately stabilize the disturbed portion before grading the next portion. Practice staged seeding—revegetate cut and fill slopes as the work progresses.
- Trenching: Close and stabilize open trenches as soon as possible. Sequence trenching projects so that most open portions of the trench are closed before new trenching is begun.

REQUIREMENTS

- Cost
  - 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.

Targeted Pollutants

- ○ Sediment
- ○ Nutrients
- ○ Toxic Materials
- ○ Oil & Grease
- ○ Floatable Materials
- ○ Other Construction Waste

- ● Likely to Have Significant Impact
- ○ Probable Low or Unknown Impact

Implementation Requirements

- ○ Capital Costs
- ○ O&M Costs
- ○ Maintenance
- ○ Training
- ○ Suitability for Slopes >5%

● High ○ Low

ESC1

Best Management Practices

LIMITATIONS
There are no significant limitations to the use of this BMP.

REFERENCES
Best Management Practices and Erosion Control Manual for Construction Sites, Flood Control District of Maricopa County, Arizona - 1992.

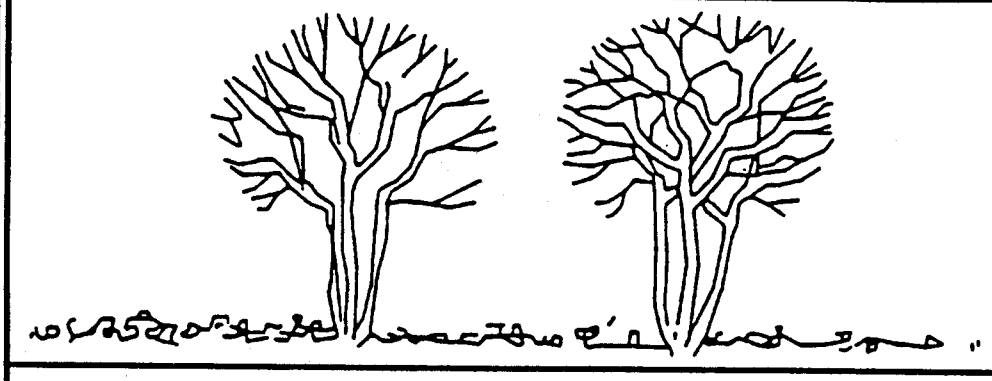
Erosion and Sediment Control Guidelines for Developing Areas in Texas, U.S. Department of Agriculture, Soil Conservation Service, Fort Worth, Texas - 1976.

Storm Water Management for Construction Activites. Developing Pollution Prevention Plans and Best Management Practices, U.S. Environmental Protection Agency, Office of Water (EPA 832-R-92-005) - September, 1992.

Virginia Erosion and Sediment Control Handbook, Third Edition, Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation - 1992.

ESC1

BMP: PRESERVATION OF EXISTING VEGETATION



GENERAL DESCRIPTION

Carefully planned preservation of existing vegetation minimizes the potential of removing or injuring existing trees, vines, shrubs and/or grasses that serve as erosion controls.

SUITABLE APPLICATIONS

- Areas within site where no construction activity occurs, or occurs at a later date.
- Sensitive areas where natural vegetation exist and should be preserved, such as: steep slopes, watercourses, and building sites in wooded areas.
- Areas where local, state and federal government requires preservation, such as: vernal pools, wetlands, marshes, certain oak trees, etc.

INSTALLATION/APPLICATION CRITERIA

- Clearly mark, flag or fence vegetation or areas where vegetation should be preserved.
- Prepare landscaping plans which include as much existing vegetation as possible and state proper care of this vegetation both during and after construction.
- Define and protect with berms, fencing, signs, etc., a setback area from vegetation to be preserved. Setback area size should be based on the location, species, size, age and potential impact of adjacent construction activities or permanent improvements.
- Proposed landscaping plans which do not include plant species that compete with the existing vegetation.
- Do not locate construction traffic routes, spoil piles, etc., where significant adverse impact on existing vegetation may occur.

REQUIREMENTS

- Maintenance
  - Inspection and maintenance requirements for protection of vegetation are low.
  - During construction the limits of grading or disturbance should be clearly marked at all times.
  - Irrigation or maintenance of native trees or vegetation should conform to specifications on the Landscape Plan.
- Cost
  - There is little cost associated with preserving existing vegetation if properly planned during the project design, and may yield aesthetic benefits which enhance property values.

LIMITATIONS

- Requires forward planning by the owner/developer, contractor and design staff.
- For sites with diverse topography, it is often difficult and expensive to save existing trees while grading the site satisfactorily for the planned development.

Objectives

Housekeeping Practices

Contain Waste

Minimize Disturbed Areas

Stabilize Disturbed Areas

Protect Slopes/Channels

Control Site Perimeter

Control Internal Erosion

Targeted Pollutants

- ● *Sediment*
- ○ *Nutrients*
- ○ *Toxic Materials*
- ○ *Oil & Grease*
- ○ *Floatable Materials*
- ○ *Other Construction Waste*

- ● *Likely to Have Significant Impact*
- ○ *Probable Low or Unknown Impact*

Implementation Requirements

- ○ *Capital Costs*
- ○ *O&M Costs*
- ○ *Maintenance*
- ○ *Training*
- ● *Suitability for Slopes >5%*

● *High* ○ *Low*

ESC2

Best Management Practices

Additional Information — Preservation of Existing Vegetation

The best way to prevent excessive erosion is to not disturb the land. On a construction site, where extensive land disturbance is necessary, a reasonable BMP would be to not disturb land in sensitive areas of the site which need not be altered for the project to be viable (e.g., natural watercourses, steep slopes), and to design the site to incorporate particularly unique or desireable existing vegetation into the site landscaping plan. Clearly marking and leaving a buffer area around these unique areas will both help to preserve these areas as well as take advantage of natural erosion prevention and sediment trapping in naturally vegetated areas.

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 insure the survival of desirable vegetation for shade, beautification, and erosion protection. Mature vegetation has extensive root systems that help to hold soil in place, thus reducing erosion. Also, vegetation helps to 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.

The following criteria may be used for deciding which vegetation will remain on the site:

- Aesthetic values: Consideration should be given to foliage, flowering habits, bark and crown characteristics (for trees).
- Freedom from disease and rot.
- Life span of trees: Short-lived trees need not be preserved.
- Environmental values: Habitat; screening; and buffers.
- Sudden exposure: Save vegetation which grows in direct sunlight and is able to withstand radiated heat from proposed buildings and pavement.
- Space needed: Sufficient space must be provided between the vegetation and any structures, electric and telephone lines, water and sewer lines, driveways and streets. Mark trees and shrubs with bright paint or ribbon so there is no doubt as to which trees and shrubs are to be left and protected from damage during construction.

Saving existing vegetation and mature trees on-site, beautifies the area and may save money by reducing new landscaping requirements. Mature trees also increase property values and satisfy consumer aesthetic needs.

Preserving and protecting existing vegetation can often result in more stable soil conditions during construction. Careful site planning and identification of plantings to preserve can provide erosion and sedimentation controls during construction, and contribute to the aesthetics of the development. For example, in Sacramento County a tree ordinance has been adopted that protects the native California Oak tree. Provisions to protect the tree and its root system during construction must be specified in the project plans, and an area must be provided where the soil stability may not be disturbed. No grading or construction storage within the tree dripline is allowed.

Installation/Application

Building sites may be planned to integrate existing vegetation and trees. Construction impacts must be considered. Trench width for pipe construction projects and the location of permanent structures, such as buildings, needs to be considered when preserving existing vegetation, including mature trees and their root system. Native vegetation should be preserved since it is able to adapt to the climate. The USDA Soil Conservation Service should be contacted about existing vegetation for sites throughout California. Mature trees are generally preferable to newly planted trees because of the greater soil stabilization provided by the extensive root system of a mature tree.

ESC2

Best Management Practices

Additional Information — Preservation of Existing Vegetation

Methods for protecting existing vegetation and trees:

- Stake off root system limits (drip line of tree). Some counties limit construction within 5 feet of the tree drip line.
- Fence off the area to be preserved or along the tree drip line.
- Flag or mark trees to remain in place.
- Tree wells and retaining walls (permanent) help preserve existing vegetation, but must be large enough to protect the root system (see below).
- For the California Oak tree, no trenching or irrigation should be allowed within the driplines of the tree, since both these activities are detrimental to the preservation of the tree.
- Where grading under trees is necessary, excavation and fill should be limited to 1 foot within the driplines.

REFERENCES

Best Management Practices and Erosion Control Manual for Construction Sites, Flood Control District of Maricopa County, Arizona, September 1992.

County of Sacramento Tree Preservation Ordinance - September 1981.

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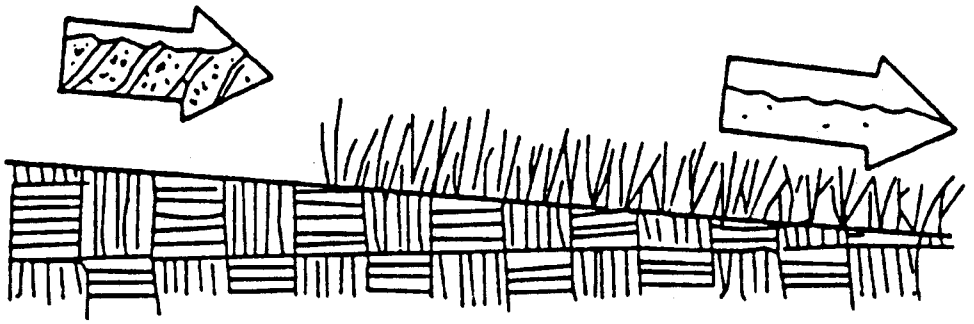
ESC2

Best Management Practices

BMP: SEEDING AND PLANTING



Objectives

- *Housekeeping Practices*
- *Contain Waste*
- *Minimize Disturbed Areas*
- *Stabilize Disturbed Areas*
- *Protect Slopes/Channels*
- *Control Site Perimeter*
- *Control Internal Erosion*

GENERAL DESCRIPTION

Seeding of grasses and plantings of trees, shrubs, vines and ground covers provide long-term stabilization of soil. In some areas, with suitable climates, grasses can be planted for temporary stabilization.

SUITABLE APPLICATIONS

- Appropriate for site stabilization both during construction and post-construction.
- Any graded/cleared areas where construction activities have ceased.
- Open space cut and fill areas.
- Steep slopes.
- Spoil piles.
- Vegetated swales.
- Landscape corridors.
- Stream banks.

INSTALLATION/APPLICATION CRITERIA

Type of vegetation, site and seedbed preparation, planting time, fertilization and water requirements should be considered for each application.

Grasses:

- Ground preparation: fertilize and mechanically stabilize the soil.
- Tolerant of short-term temperature extremes and waterlogged soil conditions.
- Appropriate soil conditions: shallow soil base, good drainage, slope 2:1 or flatter.
- Develop well and quickly from seeds.
- Mowing, irrigating, and fertilizing are vital for promoting vigorous grass growth.

Trees and Shrubs:

- Selection Criteria: vigor, species, size, shape & wildlife food source.
- Soil conditions: select species appropriate for soil,drainage & acidity.
- Other Factors: wind/exposure, temperature extremes, and irrigation needs.

Vines and Ground Covers:

- Ground preparation: lime and fertilizer preparation.
- Use proper seeding rates.
- Appropriate soil conditions: drainage, acidity, slopes.
- Generally avoid species requiring irrigation.

Targeted Pollutants

- ● *Sediment*
- ◒ *Nutrients*
- ◒ *Toxic Materials*
- ○ *Oil & Grease*
- ○ *Floatable Materials*
- ○ *Other Construction Waste*

● *Likely to Have Significant Impact*
○ *Probable Low or Unknown Impact*

Implementation Requirements

- ◒ *Capital Costs*
- ◒ *O&M Costs*
- ◒ *Maintenance*
- ◒ *Training*
- ◒ *Suitability for Slopes >5%*

● *High* ○ *Low*

ESC10

Best Management Practices

REQUIREMENTS

- Maintenance
  - Shrubs and trees must be adequately watered and fertilized and if needed pruned.
  - Grasses may need to be watered and mowed.
- Cost: Average annual cost for installation and maintenance (2-year useful life, source: EPA, 1992)
  - Seeding: $300 per acre, appropriate for flat slopes and stable soils.
  - Seeding with Mulching: $1,100 per acre, appropriate for moderate to steep slopes and/or erosive soils.
  - Trees, shrubs, vines, and ground cover: Cost, applicability based on species used and terrain features.

LIMITATIONS

- Permanent and temporary vegetation may not be appropriate in dry periods without irrigation.
- Fertilizer requirements may have potential to create storm water pollution if improperly applied.

ESC10

Additional Information — Seeding and Planting

Permanent seeding of grasses, sodding, and planting of trees, shrubs, vines and ground covers can provide long-term stabilization of soil. Permanent seeding and planting contributes to long-term site aesthetics and helps reduce erosion by reducing the velocity of runoff, allowing infiltration to occur, filtering sediments, and by holding soil particles in place.

Seeding and planting should be applied as soon as final grading is done to all graded and cleared areas of the construction site where plant cover is ultimately desired. For example, vegetation may be established along landscaped corridors and buffer zones where they may act as filter strips (see TC6 in Chapter 5 of the Municipal Handbook). Additionally, vegetated swales, steep and/or rocky slopes and stream banks can also serve as appropriate areas for seeding and plantings.

Installation/Application Criteria

Application of appropriate vegetation must consider: the seedbed or plantbed, proper seasonal planting times, water requirements fertilizer requirements and availability of the selected vegetation within the project's region. Permanent plantings during the construction stage of projects require careful coordination between the local agency inspectors, project managers, construction managers, and landscape contractor. Protocols for coordination and implementation procedures regarding site access, construction staging, and short- and long-term planting areas should be developed prior to the construction bid process. Where possible, these protocols should be established by and remain the responsibility of the site owner.

Because of the many available types of plants and ground covers and because site conditions and land use vary so widely within California, a set of general guidelines is included for installation/application of grasses, trees and shrubs, vines and ground covers. However, your local municipality, Soil Conservation Service, agricultural extention, or other resources should be consulted on appropriate species, planting requirements, and maintenance needs for your climate and soils.

Grasses

Grasses, depending on the type, provide short-term soil stabilization during construction or can serve as long- term/ permanent soil stabilization for disturbed areas. In general, grasses provide low maintenance to areas that have been cleared, graded and mechanically stabilized.

Selection:

The selection of the grass type is determined by the climate, irrigation, mowing frequency, maintenance effort and soil-bed conditions. Although grasses provide quick germination and rapid growth, they also have a shallow root system and are not as effective in stabilizing deep soils, where trees, shrubs and deep rooted ground covers may be more appropriate. Several grasses are adaptable to the various California climates. The figure at the end of these fact sheets shows appropriate grasses for regions within California. Blue grass is well adapted throughout California except for in the valley regions. The blue grass is found on dry, sandy soils that have good drainage. Bermuda grass, on the other hand is well adapted in the valley region where soils are dry, coarse and heavier. Specific seed mix and/or varieties for each site should be provided by an approved/qualified plant materials specialist.

ESC10

Additional Information — Seeding and Planting

Planting:
The following steps should be followed to ensure established growth:

1. Select the proper grass for the site.
2. Prepare the seedbed; soil should be fertilized and contain good topsoil or soil at least a 2:1 or flatter slope.
3. Broadcast the seedings in the late fall or early spring. In the late fall, seedings should be planted by mid- September to have established grass by the October rainy season.
4. Initial irrigation will be required often for most grasses, with follow-up irrigation and fertilization as needed. Mulching may be required in dry climates or during drought years.

Trees & Shrubs

Selection:
Trees and shrubs, when properly selected, are low maintenance plantings that stabilize adjacent soils, moderate the adjacent temperatures, filter air pollutants, and serve as a barrier to wind. Some desirable characteristics to consider in selecting trees and shrubs include: vigor, species, age, size and shape, and use as a wildlife food source and habitat.

Trees and shrubs to be saved should be clearly marked so that no construction activity will take place within the dripline of the plant. The sites for new plantings should be evaluated. Consider the prior use of the land: adverse soil conditions such as poor drainage or acidity; exposure to wind; temperature extremes; location of utilities, paved areas, and security lighting and traffic problems.

Transplanting:
Time of Year - Late fall through winter (November to February) is the preferred time for transplanting in most of California.

Preparation - Proper digging of a tree/shrub includes the conservation of as much of the root system as possible. Soil adhering to the roots should be damp when the tree is dug, and kept moist until re-planting. The soil ball should be 12 inches in diameter for each inch of diameter of the trunk.

Site preparation - Refer to landscape plans and specifications for site and soil preparation, and for ability to coordinate construction strategy with permanent vegetation.

Supporting the trunk - Many newly planted trees/shrubs need artificial support to prevent excessive swaying.

Watering - Soil around the tree should be thoroughly watered after the tree is set in place. When the soil becomes dry, the tree should be watered deeply, but not often. Mulching around the base of the tree is helpful in preventing roots from drying out.

Vines & Ground Covers

Selection:
Vines, ground covers, and low growing plants, that can quickly spread, come in many types, colors, and growth habits. Some are suitable only as part of a small maintained landscape area, while some can stabilize large areas with little maintenance. Flowers, which provide little long-term erosion control may be planted to add color and varietal appearances.

ESC10

Best Management Practices

Additional Information — Seeding and Planting

Caution should be exercised in the non-native vegetation because of impacts to native vegetation on adjacent lands. For example, species that may be planted at the construction site can quickly spread and compete with originally undisturbed vegetation such as the California Poppy and California buckwheat, both of which complete poorly with introduced grasses (e.g., planting wild oats is illegal in California). In addition to stabilizing disturbed soil, vines and ground covers can perform the following functions:

1. Provide attractive cover that does not need mowing.
2. Help to define traffic areas and control pedestrian movement.

Site Preparation:
Ground covers are plants that naturally grow very close together, causing severe competition for space nutrients and water. Soil for ground covers should be well prepared. The entire area should be spaded, disced, or rototilled to a depth of six to eight inches. Two to three inches of organic material, such as good topsoil or peat, should be spread over the entire area.

Planting:
The following steps will help ensure good plant growth.

1. Make the plantings following the contours of the land.
2. Dig the holes 1/3 larger than the plant root ball.
3. Know what depth to place the plants.
4. Use good topsoil or soil mixture with a lot of organic matter.
5. Fill hole 1/3 to 1/2 full, shake plants to settle soil among roots, then water.
6. Leave saucer-shaped depression around the plant to hold water.
7. Water thoroughly and regularly.
8. Space plants according to the type of plant and the extent of covering desired.

Materials:
There are many different species of vines and ground covers from which to choose, but care must be taken in their selection. It is essential to select planting materials suited to both the intended use and specific site characteristics. The plants discussed in this handbook are those which are known to be adapted to California, and commonly available from commercial nurseries. Additional information can be obtained from local nurserymen, landscape architects, and extension agents. An approved low water use plant list may be obtained from the State Department of Water Resources or the Soils Conservation Service.

Requirements
Maintenance

General requirements include:

- Grass maintenance should be minimal to none. Irrigation and regular fertilizing may be required for some types of grasses. Mowing is only required in areas where aesthetics or fire hazards are a concern.
- Young trees should receive an inch of water each week for the first two years after planting. The tree should be watered deeply, but not more often than once per week.
- Transplanted trees should be fertilized on an annual basis.
- Proper pruning, watering, and application of fertilizer is necessary to maintain healthy and vigorous shrubs. A heavy layer of mulch applied around the shrubs reduces weeds and retains moisture.
- Trim old growth as needed to improve the appearance of ground covers. Most covers need once-a-year trimming to promote growth.

ESC10

Best Management Practices

Additional Information — Seeding and Planting

Limitations

- Construction activities are likely to injure or kill trees unless adequate protective measures are taken. Direct contact by equipment is the most obvious problem, but damage is also caused by root stress from filling, excavation, or compacting too close to trees.
- Temporary seeding can only be viable when adequate time is available for plants to grow and establish.
- Over fertilizing of plants may cause pollution of storm water runoff.
- Irrigation source and supply may be limiting.

REFERENCES

Best Management Practices and Erosion Control Manual for Construction Sites, Flood Control District of Maricopa County, September 1992.

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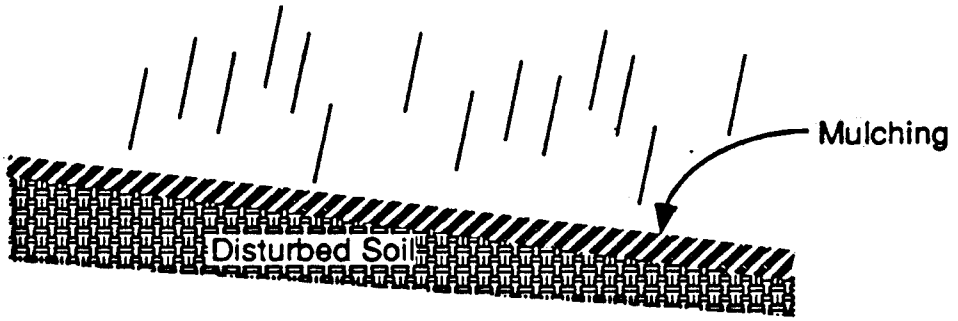
ESC10

BMP: MULCHING



Objectives

- *Housekeeping Practices*
- *Contain Waste*
- *Minimize Disturbed Areas*
- *Stabilize Disturbed Areas* (●)
- *Protect Slopes/Channels* (●)
- *Control Site Perimeter*
- *Control Internal Erosion*

GENERAL DESCRIPTION

Mulching is used to temporarily and permanently stabilize cleared or freshly seeded areas. Types of mulches include organic materials, straw, wood chips, bark or other wood fibers, decomposed granite, and gravel.

SUITABLE APPLICATIONS

- Temporary stabilization of freshly seeded and planted areas.
- Temporary stabilization during periods unsuitable for growing vegetation.
- Temporary stabilization of areas that cannot be seeded or planted (e.g., insufficient rain, steep slope).
- Mulches such as gravel and decomposed soils may be used as post-construction BMPs, particularly in arid regions.

INSTALLATION/APPLICATION CRITERIA

Mulch prevents erosion by protecting the soil surface and fostering growth of new seedings that do not stabilize by themselves.

- May be used with netting to supplement soil stabilization.
- Apply to planting areas where slopes are 2:1 or greater.
- Binders may be required for steep areas, or if wind and runoff is a problem.
- Type of mulch, binders, and application rates should be recommended by manufacturer/contractor.

REQUIREMENTS

- Maintenance
  - Must be inspected weekly and after rain for damage or deterioration.
- Cost: Average annual cost for installation and maintenance (3-4 month useful life, source: EPA, 1992)
  - Straw Mulch: $7,500 per acre.
  - Wood Fiber Mulch: $3,500 per acre.
  - Jute Netting: $12,500 per acre.

LIMITATIONS

- Wood fiber mulches should be used only in areas with over 20 inches annual precipitation.
- Organic mulches are not permanent erosion control measures.
- Mulches tend to lower the soil surface temperature, and may delay germination of some seeds.
- Permanent mulches for arid regions should include gravel and decomposed soils.

Targeted Pollutants

- ● *Sediment*
- ◒ *Nutrients*
- ○ *Toxic Materials*
- ○ *Oil & Grease*
- ○ *Floatable Materials*
- ○ *Other Construction Waste*

● *Likely to Have Significant Impact*
○ *Probable Low or Unknown Impact*

Implementation Requirements

- ◒ *Capital Costs*
- ◒ *O&M Costs*
- ◒ *Maintenance*
- ○ *Training*
- ● *Suitability for Slopes >5%*

● *High* ○ *Low*

ESC11

Best Management Practices

Additional Information — Mulching

Mulching protects the soil from rainfall impact; increases infiltration; conserves moisture around trees, shrubs and seedings; prevents compaction and cracking of soil; and aids plant growth for seedings and plantings by holding the seeds, fertilizers and topsoil in place until growth occurs. Mulches include organic materials, straw, wood chips, bark or other wood fibers, decomposed granite and gravel. A variety of nettings or mats of organic or non-organic materials and chemical soil stabilization are practices that may be used conjunctively with mulching.

Mulching may be applied to all graded and cleared areas of the construction site:

- Areas which have been permanently seeded to assist in retaining moisture, and to hold seedings;
- Areas which need temporary soil surface protection because seeding cannot occur due to the season;
- Areas between trees, shrubs and certain ground covers;
- Areas where climatic conditions require a soil moisture retention aid to avoid cracking of the soil and associated compaction, and require soil temperature modification.

Installation/Application Criteria

Only a set of general guidelines is included for application and installation of mulching on disturbed lands because of the various climates, soil conditions and land uses in California. Installation of mulch consists of furnishing all materials, preparing the soil surface and applying the mulch to all soil surface areas designated on the project plans or established by the site engineer.

Materials

Organic mulch materials, such as straw, wood chips, bark and wood fiber, have been found to be most effective where re-vegetation will be provided by reseeding. The choice of mulch should be based on the size of the area, site slopes, surface conditions such as hardness and moisture; weed growth and availability of mulch materials.

Wood Fiber Mulches: Wood fiber mulches consist of specially prepared wood fiber processed to contain no growth germination inhibiting factors. The mulch should be from virgin wood, and be manufactured and processed so the fibers will remain in uniform suspension in water under agitation to form a homogenous slurry. The fiber lengths should be as long as possible to increase the effectiveness for erosion control. Wood fiber mulching should not be used in areas of extremely hot summer and late fall seasons because of fire danger. When used as a tackifier with straw mulch, wood fiber mulches are good for steep slopes and severe climates. The California Office of the Soils Conservation Service recommends a non-toxic mulch green dye be used to provide a visual aid in metering applications.

Wood Chips and Bark Chips: Wood and bark chips are suitable for application in landscaped areas that will not be closely mowed. Wood chips do not require tacking, but do require nitrogen treatment (12 pounds/ton) to prevent nutrient deficiency. Bark chips do not require additional nitrogen fertilizer. When the wood source is near the project site, wood and bark chips can be very inexpensive. Caution must be used in areas of steep slopes, since both wood and bark chips tend to wash down slopes exceeding 6 percent.

Straw Mulch: Straw mulch is a good short-term protection most commonly used with seeding. The mulch should be from the current season's crop. A letter of certification from the supplier should be required to show that the straw was baled less than 12 months from the delivery date. Wheat or oat straw is recommended.

Emulsified Asphalt: Asphalt is used to adhere the mulch to the ground surface, preventing the mulch from blowing or washing off. The type and quantity of asphalt used should not result in a storm water pollution problem.

Binder: Binder should be free flowing, noncorrosive powder produced from natural plant gum such as those marketed under M-Binder, M145 Binder, or AZ-TAC. Synthetic, spray-on materials are not recommended since they tend to create an impervious surface, and may enter the stormwater sewer system via discharge runoff.

ESC11

Best Management Practices

Additional Information — Mulching

Preparations/Methods and Equipment

Straw Mulch: Should be applied in an even, uniform manner, either by hand or by mulch blowing equipment. Straw mulches must be anchored to prevent the mulch from being blown or washed off the site. Anchoring is achieved in two ways:

- Crimping: The mulch is anchored by running a heavy disc with flat, dull, serrated, closely-spaced blades over the mulched soil. Effective crimping embeds the mulch about 2 inches into the soil without completely covering it. The disc should be run once or twice across the soil. About 2 1/2 tons of straw mulch per acre should be applied if the mulch is anchored by crimping.
- Tacking: Achieved using a emulsified asphalt or binder either independently or followed by crimping. If tacked, straw mulch may be applied at a rate of 1 3/4 ton per acre, and tacked with emulsified asphalt at a rate of 500 gallons per acre.

Wood Fiber Mulch: Typically applied with a hydroseeder at a rate of about 1000 to 1500 pounds per acre, or as a slurry consisting of at least 150 pounds of binder, 400 pounds of wood fiber mulch, and 200 gallons of water per acre.

Requirements

Maintenance: Mulched areas require frequent inspection for damage and deterioration. Requirements will vary greatly based on the type of mulch used and the type of vegetation to be established. Vegetative mulches are usually not intended to be permanent; but are extended only as a base for re-seeding or re-vegetation. Where a permanent anchor for vegetation is required, along steep slopes or areas of higher velocity flows, then a geotextile mat or net is recommended (see ESC20).

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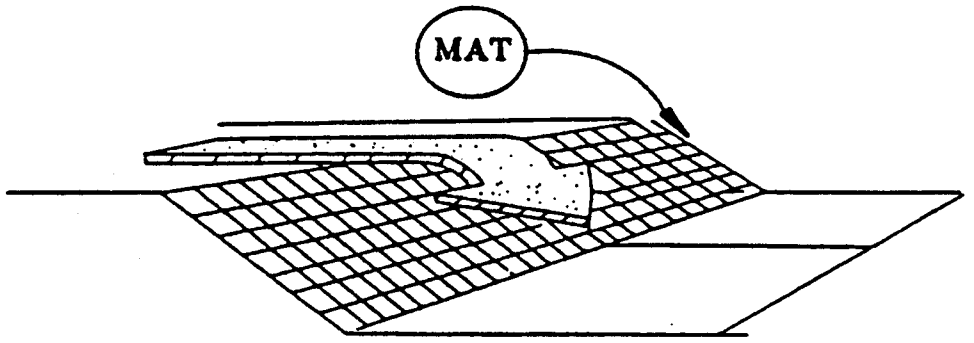
ESC11

Best Management Practices

BMP: GEOTEXTILES AND MATS



Objectives

- *Housekeeping Practices*
- *Contain Waste*
- *Minimize Disturbed Areas*
- *Stabilize Disturbed Areas*
- *Protect Slopes/Channels*
- *Control Site Perimeter*
- *Control Internal Erosion*

GENERAL DESCRIPTION

Mattings made of natural or synthetic material which are used to temporarily or permanently stabilize soil.

SUITABLE APPLICATIONS

Typically suited for post-construction site stabilization, but may be used for temporary stabilization of highly erosive soils.

- Channels and streams.
- Steep slopes.

INSTALLATION/APPLICATION CRITERIA

Mattings may be applied to disturbed soils and where existing vegetation has been removed. The following organic matting materials provide temporary protection until permanent vegetation is established, or when seasonal circumstances dictate the need for temporary stabilization until weather or construction delays are resolved.

- Jute mattings.
- Straw mattings.

The following synthetic mattings may be used for either temporary or post-construction stabilization, both with and without vegetation

- Excelsior matting.
- Glass fiber matting.
- Staples.
- Mulch nettings.

REQUIREMENTS

- Maintenance
  - Inspect monthly and after significant rainfall.
  - Re-anchor loosened matting and replace missing matting and staples as required.
- Cost
  - Relatively high compared to other BMPs.

LIMITATIONS

- Mattings are more costly than other BMP practices, limiting their use to areas where other BMPs are ineffective (e.g., channels, steep slopes).
- May delay seed germination, due to reduction in soil temperature.
- Installation requires experienced contractor to ensure soil stabilization and erosion protection.

Targeted Pollutants

- ● *Sediment*
- ○ *Nutrients*
- ○ *Toxic Materials*
- ○ *Oil & Grease*
- ○ *Floatable Materials*
- ○ *Other Construction Waste*

- ● *Likely to Have Significant Impact*
- ○ *Probable Low or Unknown Impact*

Implementation Requirements

- ● *Capital Costs*
- ◒ *O&M Costs*
- ◒ *Maintenance*
- ○ *Training*
- ● *Suitability for Slopes >5%*

● *High* ○ *Low*

ESC20

Best Management Practices

Additional Information — Geotextiles and Mats

Mattings are used to reduce erosion from rainfall impact, hold soil in place, and absorb and hold moisture near the soil surface. Additionally, mattings may be used to stabilize soils until vegetation is established. This practice may be used alone or with a mulch during the establishment of protective cover on critical slopes (see ESC11, Mulching).

Suitable Applications

Mattings are commonly applied on short, steep slopes where erosion hazard is high and vegetation will be slow to establish. Mattings are also used on stream banks where moving water at velocities between 3 fps and 6 fps is likely to wash out new vegetation, and in areas where the soil surface is disturbed and where existing vegetation has been removed. Matting may also be used when seeding cannot occur (e.g., late season construction and/or the arrival of an early rain season). Erosion control matting should be considered when the soils are fine grained and potentially erosive.

The following natural or synthetic mattings are commonly used:

Jute Mat - should be cloth of a uniform plain weave of undyed and unbleached single jute yarn, 48" in width, and weighing an average of 1.2 pounds per linear yard of cloth with a tolerance of plus or minus five (5) percent, with approximately 78 warp ends per width of cloth and 41 weft ends per linear yard of cloth. The yarn should be of a loosely twisted construction having an average twist of not less than 1.6 turns per inch and shall not vary in thickness by more than its normal diameter.

Straw Mat - should be a machine produced mat consisting of 70% (±3%) agricultural straw and 30% (±3%) coconut fiber. The blanket should be of consistent thickness with the straw and coconut fiber evenly distributed over the entire area of the mat. The blanket should be covered on the top side with polypropylene netting having an approximate 5/8" x 5/8" mesh containing ultraviolet additives to resist breakdown, and on the bottom with a polypropylene netting with an approximate " x " mesh. The blanket should be sewn together with cotton thread.

Excelsior Mat - should be wood excelsior, 48 inches in width plus or minus one inch and weighing 0.8 pound per square yard plus or minus ten percent. The excelsior material should be covered with a netting to facilitate handling and to increase strength.

Glass Fiber Matting - should be of bonded textile glass fibers with an average fiber diameter of eight to twelve microns, two to four inch strands of fiber bonded with phenol formaldehyde resin. Mat should be roll type, water permeable, minimum thickness inch, maximum thickness inch, density not less than three pounds per cubic foot.

Staples for anchoring soil stabilizing materials should be Number 11 gauge wire or heavier. Their length should be six to ten inches, with longer staples used in loose, unstable soils.

Other Mulch Netting - such as paper, plastic, cotton or fiber glass matting should be installed according to the manufacturer's recommendations.

Installation/Application Criteria

Organic matting materials have been found to be effective where re-vegetation will be provided by re-seeding. The choice of matting should be based on the size of area, side slopes, surface conditions such as hardness and moisture; weed growth and availability of materials. Matting strengths and uses vary, therefore, manufacturer's specifications must be followed. Proper installation of mattings is critical in order to obtain firm, continuous contact with the soil.

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Best Management Practices

Additional Information — Geotextiles and Mats

Site Preparation: After the site has been shaped and graded to the approved design, prepare a friable seed bed relatively free from clods and rocks more than 1 inches in diameter and any foreign material that will prevent contact of the protective mat with the soil surface.

Planting: Fertilize and seed in accordance with seeding specifications or other types of landscaping plans. When using jute matting on a seeded area, apply approximately half the seed before laying the mat and the remainder after laying the mat. The protective matting can be laid over areas where grass has been planted and the seedlings have emerged. Where vines or other ground covers are to be planted, lay the protective matting first and then plant through matting according to design of planting.

Erosion Stops: Erosion stops are made of glass fiber strips, excelsior matting strips or tight-folded jute matting blanket or strips for use on steep, highly erodible watercourses. The stops are placed in narrow trenches six to twelve inches deep across the channel and left flush with the soil surface. They are to cover the full cross section of designed flow.

Laying and Securing Matting: Before laying the matting, all erosion stops should be installed and the friable seed bed made free from clods, rocks, and roots. The surface upon which the separation fabric will be placed should be compacted and finished according to the requirements of the manufacturer's recommendations.

Most matting comes with the manufacturer's recommendations for installation. Most channels will require multiple widths of matting, and the matting should be unrolled starting at the upper end of the channel, allowing a four inch overlap of mattings along the center of the channel. To secure, bury the top ends of the matting in a narrow trench, a minimum of six inches deep. Backfill trench and tamp firmly to conform to channel cross section. Secure with a row of staples about four inches down slope from the trench with staples twelve inches apart.

Where matting crosses erosion stops, reinforce with a double row of staples at six inch spacing, using a staggered pattern on either side of the erosion stop. When the matting is overlapped, the discharge end of the matting liner should be similarly secured with a double row of staples.

Mechanical or manual laydown equipment should be capable of handling full rolls of fabric, and laying the fabric smoothly, without wrinkles or folds. The equipment should meet the fabric manufacturer's recommendations or equivalent standards.

Final Check: Check the following after the mating is installed:

- Make sure matting is uniformly in contact with the soil.
- All lap joints are secure.
- All staples are flush with the ground.
- All disturbed areas seeded.

Limitations

Properly installed mattings provide excellent erosion control but do so at relatively high cost. This high cost typically limits the use of mattings to areas of concentrated channel flow and steep slopes.

Installation is critical and requires experienced contractors. The contractor should install the matting material in such a manner that continuous contact between the material and the soil occurs, otherwise the material will not stabilize the soil and erosion will occur beneath the material. Ultraviolet protection may be required on some geotextiles. Matting strengths and uses vary; the manufacturer's specifications should be followed.

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Best Management Practices

Additional Information — Geotextiles and Mats

REFERENCES

Best Management Practices and Erosion Control Manual for Construction Sites, Flood Control District of Maricopa County, September 1992.

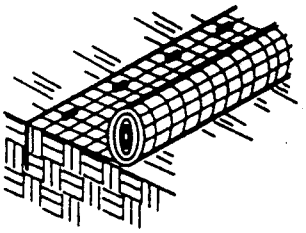
Guides for Erosion and Sediment Controls in California, USDA Soils Conservation Service - January 1991.

Stormwater Management Water for the Puget Sound Basin, Washington State Department of Ecology, The Technical Manual - February 1992, Publication # 91-75.

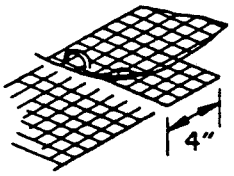
Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency - November 1988.

ESC20

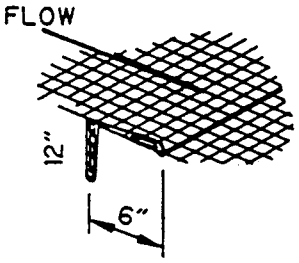
Best Management Practices



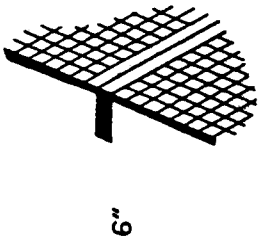
ANCHOR SLOT: BURY THE UP-CHANNEL END OF THE NET IN A 12" DEEP TRENCH. TAMP THE SOIL FIRMLY. STAPLE AT 12" INTERVALS ACROSS THE NET.



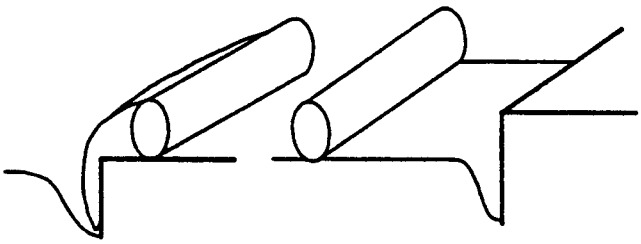
OVERLAP: OVERLAP EDGES OF THE STRIPS AT LEAST 4". STAPLE EVERY 12" DOWN THE CENTER OF THE STRIP.



JOINING STRIPS: INSERT THE NEW ROLL OR NET IN A TRENCH, AS WITH THE ANCHOR SLOT. OVERLAP THE UP-CHANNEL END OF THE PREVIOUS ROLL 18" AND TURN THE END OF THE PREVIOUS ROLL, JUST BELOW THE ANCHOR SLOT, LEAVING 6" OVERLAP.



CHECK SLOTS: ON ERODIBLE SOILS OR STEEP SLOPES, CHECK SLOTS SHOULD BE MADE EVERY 15 FEET. INSERT A FOLD OF THE NET INTO A 6" TRENCH AND TRAMP FIRMLY. STAPLE AT 12" INTERVALS ACROSS THE NET. LAY THE NET SMOOTHLY ON THE SURFACE OF THE SOIL - DO NOT STRETCH THE NET, AND DO NOT ALLOW WRINKLES.



ANCHORING ENDS AT STRUCTURES: PLACE THE END OF THE NET IN A 12" SLOT ON THE UP-CHANNEL SIDE OF THE STRUCTURE. FILL THE TRENCH AND TAMP FIRMLY. ROLL THE NET UP THE CHANNEL. PLACE STAPLES AT 12" INTERVALS ALONG THE ANCHOR END OF THE NET.

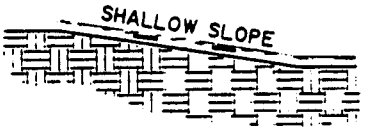
INSTALLATION OF NETTING AND MATTING

ESC20

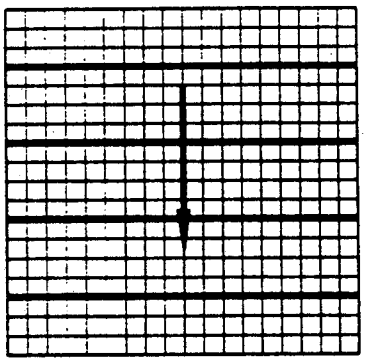
Best Management Practices

Additional Information — Geotextiles and Mats

ON SHALLOW SLOPES, STRIPS OF NETTING MAY BE APPLIED ACROSS THE SLOPE.



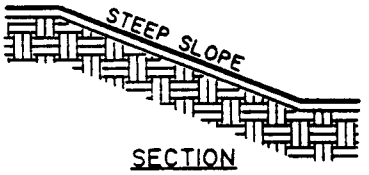
SECTION



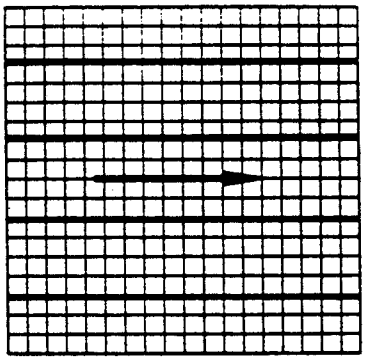
(SHALLOW SLOPES)

PLAN

ON STEEP SLOPES, APPLY STRIPS OF NETTING PARALLEL TO THE DIRECTION OF FLOW AND ANCHOR SECURELY.



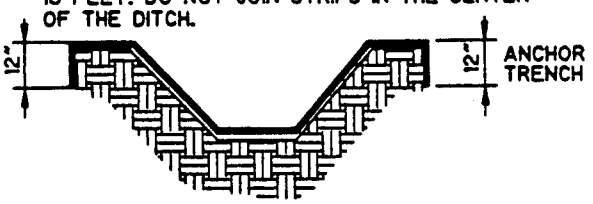
SECTION



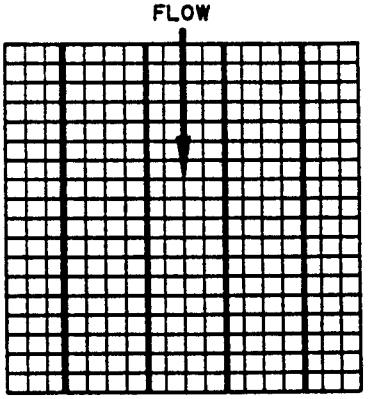
(STEEP SLOPE)

PLAN

IN DITHCHES, APPLY NETTING PARALLEL TO THE DIRECTION OF FLOW. USE CHECK SLOTS EVERY 15 FEET. DO NOT JOIN STRIPS IN THE CENTER OF THE DITCH.

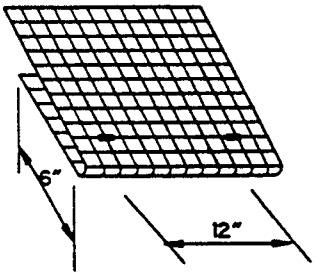


SECTION

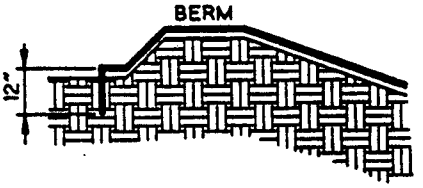


(DITCH)

PLAN



BRING NETTING DOWN TO A LEVEL BEFORE TERMINATING THE INSTALLATION. TURN THE END UNDER 6" AND STAPLE AT 12" INTERVALS.



WHERE THERE IS A BERM AT THE TOP OF THE SLOPE, BRING THE MATTING OVER THE BERM AND ANCHOR IT BEHIND THE BERM WITH A 12" ANCHOR TRENCH.

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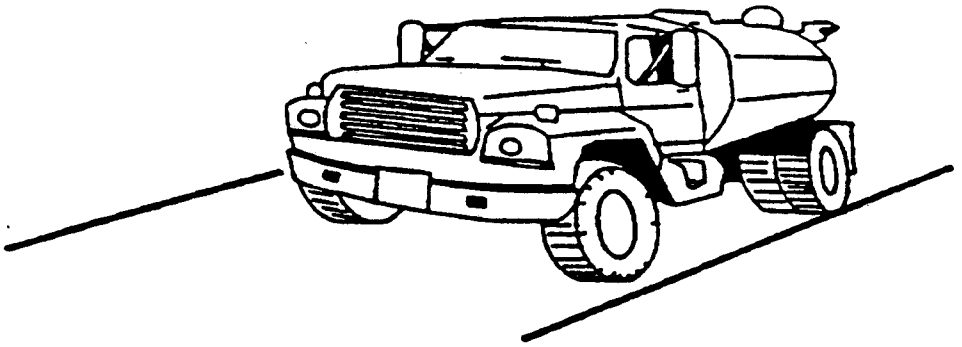
Best Management Practices

ORIENTATION OF NETTING AND MATTING

BMP: DUST CONTROLS



Objectives

- *Housekeeping Practices*
- *Contain Waste*
- *Minimize Disturbed Areas*
- *Stabilize Disturbed Areas*
- *Protect Slopes/Channels*
- *Control Site Perimeter*
- *Control Internal Erosion*

GENERAL DESCRIPTION

Dust control measures are used to stabilize soil from wind erosion, and reduce dust generated by construction activities.

SUITABLE APPLICATIONS

- Clearing and grading activities.
- Construction vehicle traffic on unpaved roads.
- Drilling and blasting activities.
- Sediment tracking onto paved roads.
- Soil and debris storage piles.
- Batch drop from front end loaders.
- Areas with unstabilized soil.
- Final grading/site stabilization usually is sufficient to control post-construction dust sources.

INSTALLATION/APPLICATION CRITERIA

- Schedule construction activities to minimize exposed area (See ESC 1).
- Quickly stabilize exposed soils using vegetation, mulching, spray-on adhesives, calcium chloride, sprinkling, and stone/gravel layering (See ESC 10 and 11).
- Identify and stabilize key access points prior to commencement of construction (See ESC 24).
- Minimizing the impact of dust by anticipating the direction of prevailing winds.
- Direct most construction traffic to stabilized roadways within the project site (See ESC 23).

REQUIREMENTS

- Maintenance
  - Most dust control measures require frequent, often daily, attention.
- Cost
  - Installation costs for water/chemical dust suppression are low, but annual costs may be quite high since these measures are effective for only a few hours to a few days.

LIMITATIONS

- Watering prevents dust only for a short period and should be applied daily (or more often) to be effective.
- Overwatering may cause erosion.
- Oil should not be used for dust control because the oil may migrate into drainageway and/or seep into the soil.
- Certain chemically-treated subgrades may make soil water repellant, increasing runoff.

Targeted Pollutants

- ● *Sediment*
- ○ *Nutrients*
- ◒ *Toxic Materials*
- ◒ *Oil & Grease*
- ○ *Floatable Materials*
- ○ *Other Construction Waste*

- ● *Likely to Have Significant Impact*
- ○ *Probable Low or Unknown Impact*

Implementation Requirements

- ○ *Capital Costs*
- ◒ *O&M Costs*
- ◒ *Maintenance*
- ○ *Training*
- ○ *Suitability for Slopes >5%*

● *High* ○ *Low*

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Best Management Practices

Additional Information — Dust Controls

California's mediterranean climate, with short wet seasons and long hot dry seasons, allow the soils to thoroughly dry out. During these dry seasons, construction activities are at their peak, and disturbance and exposed areas are increasingly subject to wind erosion, sediment tracking and dust generated by construction equipment.

Dust control, as a BMP, is a practice that is already in place for many construction activities. Los Angeles, the North Coast and Sacramento, among others have enacted dust control ordinances for construction activities that cause dust to be transported beyond the construction project property line. Recently, the State Air Resources Control Board has, under the authority of the Clean Air Act, started to address air quality in relation to inhalable particulate matter less than 10 microns (PM-10). 90% of these small particles are considered to be dust. Existing dust control regulations by local agencies, municipal departments, public works department, and/or public health departments are in place in some regions within California. For jurisdictions that have no formal dust control regulations and/or standards, Sections 10, 17 and 18 of CalTrans' Standard Specifications provide detailed provisions for dust control practices.

Many local agencies require dust control in order to comply with local nuisance laws, opacity laws (visibility impairment) and the requirements of the Clean Air Act. The following are measures that local agencies may have already implemented as requirements for dust control from contractors:

- Construction & Grading Permits: Require provisions for dust control plans;
- Opacity Emission Limits: Enforce compliance with California air pollution control laws;
- Increase overall enforcement activities: Priority given to cases involving citizen complaints;
- Maintain Field Application Records: Require records of dust control measures from contractor;
- Stormwater Pollution Prevention Plan: (SWPPP): Integrate dust control measures into SWPPP.

Dust Control Practices

Dust control BMP's generally stabilize exposed surfaces and minimize activities that suspend or track dust particles. Table ESC21.1 shows which Dust Control BMPs apply to site conditions which cause dust. For heavily traveled and disturbed areas, wet suppression (watering), chemical dust suppression, gravel or asphalt surfacing, temporary gravel construction entrances, equipment wash-out areas, and haul truck covers can be employed as dust control applications. Permanent or temporary vegetation and mulching and sand fences can be employed for areas of occasional or no construction traffic. Preventive measures would include minimizing surface areas to be disturbed, limiting on-site vehicle traffic to 15 miles per hour, and controlling the number and activity of vehicles on a site at any given time.

Many of the reasonably available control measures for controlling dust from construction sites can also be implemented as BMPs for storm water pollution prevention. Those BMPs include:

- Pave, vegetate, or chemically stabilize access points where unpaved traffic surfaces adjoin paved roads.
- Provide covers for haul trucks transporting materials that contribute to dust.
- Provide for wet suppression or chemical stabilization of exposed soils.
- Provide for rapid clean-up of sediments deposited on paved roads. Furnish stabilized construction road entrances and vehicle wash down areas.
- Stabilize unpaved haul roads, parking and staging areas. Reduce speed and trips on unpaved roads.
- Implement dust control measures for material stockpiles.
- Prevent drainage of sediment laden storm water onto paved surfaces.
- Stabilize abandoned construction sites using vegetation or chemical stabilization methods.
- Limit the amount of areas disturbed by clearing and earth moving operations by scheduling these activities in phases.

For the chemical stabilization, there are many products available for chemically stabilizing gravel roadways and stockpiles. The types of chemicals available and recommendations for their use are tabulated in Table ESC 21.2, Commonly Used Chemicals for Dust Control.

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Best Management Practices

Additional Information — Dust Controls

In addition, there are many other BMPs identified in this handbook that provide dust control including:

- Seeding and Plantings (ESC 10)
- Mulching (ESC 11)
- Construction Road Stabilization (ESC 23)
- Stabilized Construction Entrances (ESC 24)

Limitations

- Oil treated subgrades should not be used because the oil may migrate into drainageways and/or seep into the soil.
- Chemically treated subgrades may make the soil water repellant, interfering with long-term infiltration, and the vegetation/re-vegetation of the site. Some chemical dust suppressants may be subject to freezing and may contain solvents and should be handled properly.
- Asphalt, as a mulch tack or chemical mulch, requires a 24 hour curing time to avoid adherence to equipment, worker shoes, etc. Application should be limited because asphalt surfacing may eventually migrate into the drainage system.
- In compacted areas, watering and other liquid dust control measures may wash sediment or other constituents into the drainage system.

REFERENCES

Best Management Practices and Erosion Control Manual for Construction Sites, Flood Control District of Maricopa County, Arizona, September 1992.

California Air Pollution Control Laws, California Air Resources Board, 1992.

CalTrans, Standard Specifications, Sections 10, "Dust Control"; Section 17, "Watering"; and Section 18, "Dust Palliative".

Prospects for Attaining the State Ambient Air Quality Standards for Suspended Particulate Matter (PM10), Visibility Reducing Particles, Sulfates, Lead, and Hydrogen Sulfide, California Air Resources Board, April 1991.

Sacramento County, Winterization Ordinance & Dust Control Ordinance (example).

USDA Soil Conservation Service, "Guides for Erosion and Sediment Control".

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Best Management Practices

TABLE ESC 21.1 DUST CONTROL BMPs FOR GIVEN SITE CONDITIONS

SITE CONDITION	DUST CONTROL BMPs								
	Permanent Vegetation	Mulching	Wet Suppression (Watering)	Chemical Dust Suppression	Gravel or Asphalt Surfacing	Sand Fences	Temporary Gravel Construction Entrances/Equipment Wash Down	Haul Truck Covers	Minimize Extent of Area Disturbed
Disturbed Areas not Subject to Traffic	X	X	X	X	X				X
Disturbed Areas Subject to Traffic			X	X	X				X
Material Stock Pile Stabilization			X	X		X			X
Demolition			X				X	X	
Clearing/Excavation			X	X					X
Truck Traffic on Unpaved Roads			X	X	X			X	
Mud/Dirt Carry-Out					X		X		

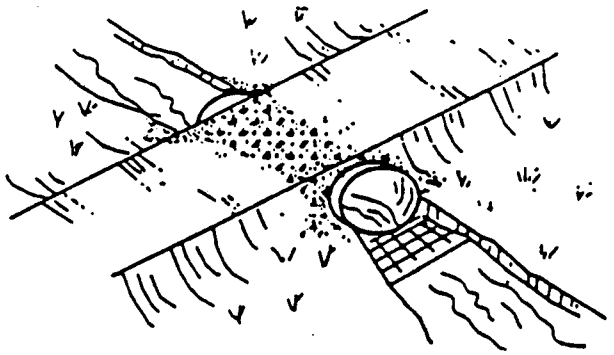
TABLE ESC 21.2 COMMONLY USED CHEMICALS FOR DUST CONTROL

	SALTS	ORGANIC, NON PETROLEUM-BASED	PETROLEUM BASED PRODUCTS[1]
CHEMICAL TYPES	• Calcium Chloride[2] • Magnesium Chloride • Natural Brines	• Calcium Lignosulfonate • Sodium Lignosulfonate • Ammonium Lignosulfonate	• Bunker Oil • Asphalt Primer • Emulsified Asphalt
LIMITATIONS	Can lose effectiveness in dry periods with low humidity. Leaches from road in heavy rain Not recommended for gravel road surfaces with low fines. Recommended 10-20% fines.	Not affected by dry weather and low humidity. Leached from road in heavy rain if not sufficiently cured. Best performance on gravel roads with high surface fines (10-30%) and dense compact surface with loose gravel.	Generally effective regardless of climatic conditions may pothole in wet weather. Best performance on gravel roads with 5-10% fines.
COMMENTS	Calcium Chloride is popular. May become slippery when wet on gravel surfaces with high fines.	Ineffective on gravel surfaces low in fines. May become slippery when wet on gravel surfaces with high fines content.	Creates a hardened crust.

[1] Motor oils and oil treatments are not recommended due to adverse effects on plant life and groundwater.

[2] Not recommended due to adverse effects on plant life.

BMP: TEMPORARY STREAM CROSSING



Objectives

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

Targeted Pollutants

- ● Sediment
- ○ Nutrients
- ○ Toxic Materials
- ◒ Oil & Grease
- ○ Floatable Materials
- ○ Other Construction Waste

● Likely to Have Significant Impact
○ Probable Low or Unknown Impact

Implementation Requirements

- ◒ Capital Costs
- ○ O&M Costs
- ◒ Maintenance
- ○ Training
- ○ Suitability for Slopes >5%

● High ○ Low

GENERAL DESCRIPTION

A temporary access stream crossing is a temporary culvert, ford or bridge placed across a waterway to provide access for construction purposes for a period of less than one year. Temporary access crossings are not intended to be used to maintain traffic for the general public.

SUITABLE APPLICATIONS

Temporary stream crossings should be installed at all designated crossings of perennial and intermittent streams on the construction site, as well as for dry channels which may be significantly eroded by construction traffic.

INSTALLATION/APPLICATION CRITERIA

Requires knowledge of stream flows and soil strength and should be designed under the direction of a California registered engineer with knowledge of both hydraulics and construction loading requirements for structures.

REQUIREMENTS

- Maintenance
  - Inspect weekly and after each significant rainfall, including assessment of foundations.
  - Periodically remove silt from crossings.
  - Replace lost aggregate from inlets and outlets of culverts.
- Cost
  - CalTrans Construction Cost Index for temporary bridge crossing is $45-$95 per square feet.

LIMITATIONS

- May be an expensive for a temporary improvement.
- Requires other BMPs to minimize soil disturbance during installation and removal.
- Fords should only be used in dry weather.

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Best Management Practices

Additional Information — Temporary Stream Crossing

A temporary access stream crossing is a culvert, ford, or bridge placed across a waterway to provide access for construction for a period of less than one year. Temporary access crossings are not intended to be used for general public traffic.

The purpose of this BMP is to provide a safe, erosion-free access across a stream for construction equipment. Minimum standards and specifications for the design, construction, maintenance, and removal of the structure should be established by an engineer registered in California. Temporary stream crossings may be necessary to prevent construction equipment from causing erosion of the stream and tracking sediment and other pollutants into the stream.

Temporary stream crossings are used as access points to construction sites when other detour routes may be too long or burdensome for the construction equipment. Often heavy construction equipment must cross streams or creeks, and detour routes may impose too many constraints such as being too narrow or poor soil strength for the equipment loadings. Additionally, the contractor may find a temporary stream crossing more economical for light-duty vehicles to use for frequent crossings, and may have less environmental impact than construction of a temporary access road.

Installation/Application

Temporary access stream crossings should be sized and installed according to the drainage design criteria of the local municipality. Design criteria should be based on standard engineering practices for culvert design with provisions for minimizing impacts on disturbed crossing areas. Three types of temporary access stream crossings may be considered:

Temporary Access Culvert: A temporary access culvert is effective in controlling erosion but will cause erosion during installation and removal. A temporary culvert can be easily constructed and allows for heavy equipment loads.

Temporary Access Ford: A temporary access ford provides little sediment and erosion control and is ineffective in controlling erosion in the stream channel. A temporary ford is the least expensive stream crossing and allows for maximum load limits. It also offers very low maintenance. Fords are more appropriate during the dry season and in arid areas of California.

Temporary Access Bridge: With the appropriate materials and designs, a temporary access bridge causes the least erosion of the stream channel crossing during its installation and removal.

During the long summer construction season in California, rainfall is infrequent and many streams are dry. Under these conditions, a temporary access ford may be sufficient. A ford is not appropriate if construction will continue through the winter rainy season, if summer thunderstorms are likely, or if the stream flows during most of the year. Temporary access culverts and bridges should then be considered and, if used, should be sized to pass a significant design storm (i.e., at least a 10-year storm). The temporary stream crossing should be protected against erosion, both to prevent excessive sedimentation in the stream and to prevent washout of the crossing (and, consequently, costly construction delays).

Limitations

Special care must be taken when crossing an environmentally sensitive waterway. Oils or other potentially hazardous materials shall not be used for surface treatments. Street runoff should not be allowed to spill down crossing sideslopes. Construction in watercourses should be at or near the natural elevation of the stream bed to prevent any potential flooding upstream of the crossing. In addition, the following limitations may apply:

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Best Management Practices

Additional Information — Temporary Stream Crossing

- May be expensive temporary cost
- Increased soil disturbance upon installation and removal
- Temporary culverts need regular maintenance and can cause erosion if the culvert becomes clogged.
- A temporary ford offers little if any erosion control in flowing streams and can often make erosion worse. Fords should only be used in the dry season on dry streams.

Construction in waterways is subject to additional permit requirements. Contact the local municipal storm water agency for additional information.

REFERENCES

Bank and Shore Protection, CalTrans - November 1970.

Best Management Practices and Erosion Control Manual for Construction Sites, Flood Control District of Maricopa County, Arizona, September, 1992.

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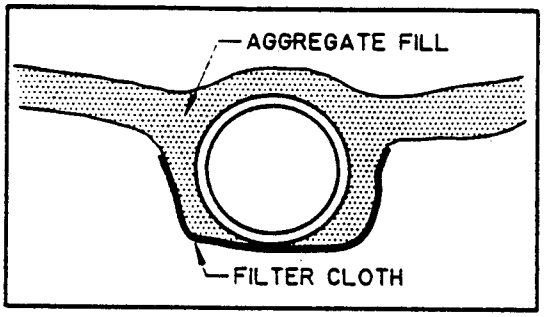
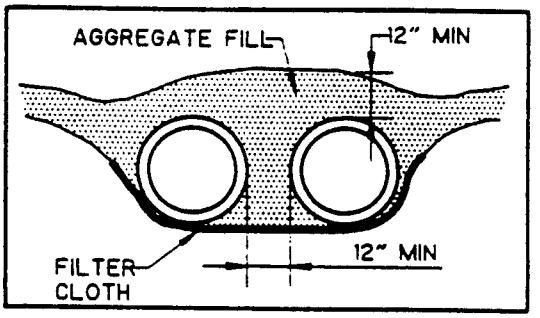
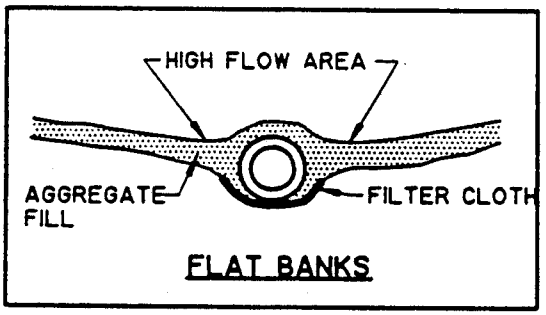
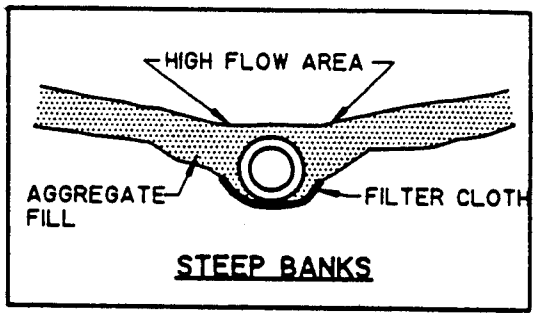
Best Management Practices

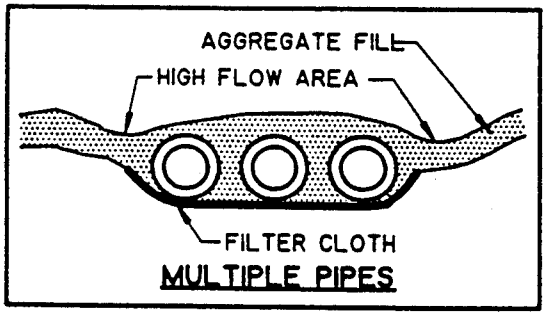
Additional Information — Temporary Stream Crossing

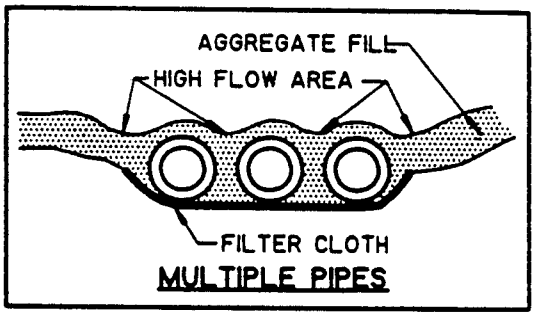


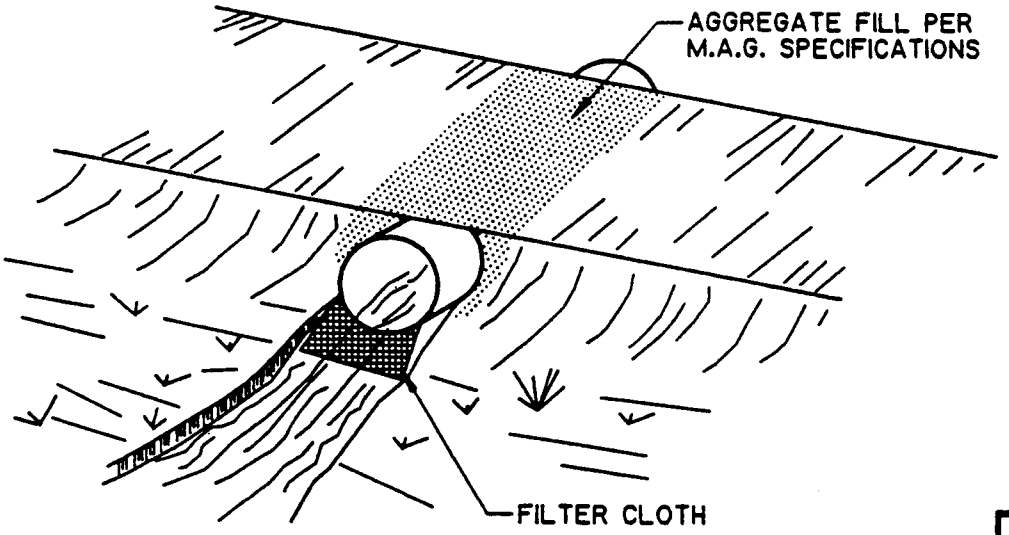










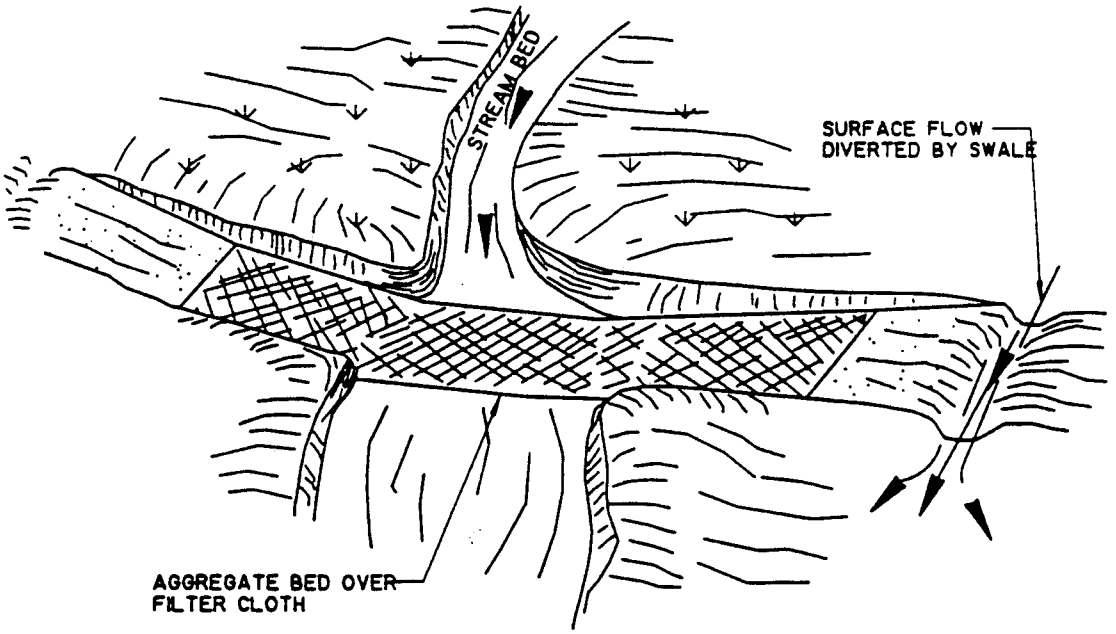


TEMPORARY ACCESS CULVERT

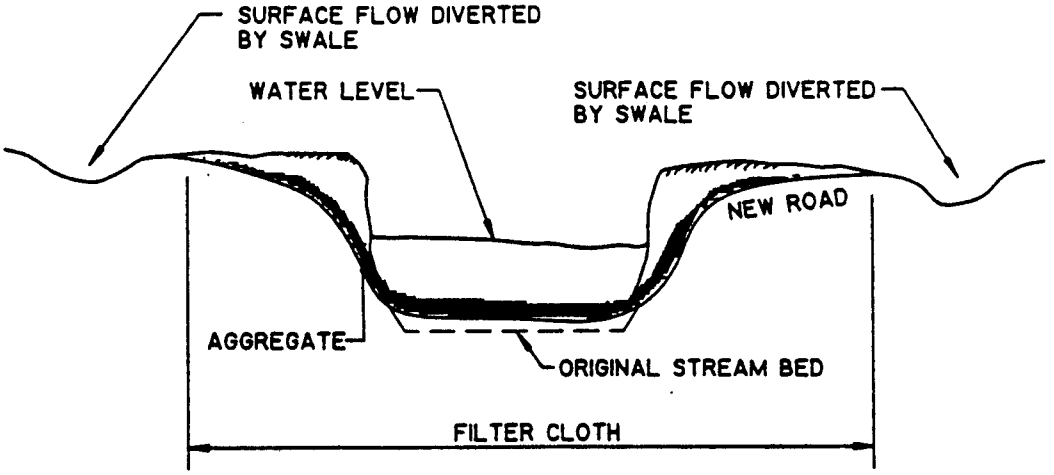
ESC22

Best Management Practices

Additional Information — Temporary Stream Crossing



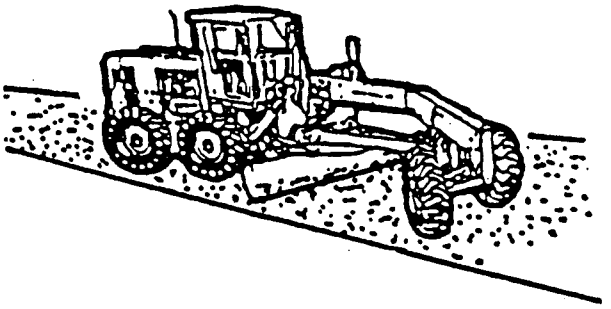
AGGREGATE APPROACH
5 : 1 MAXIMUM, SLOPE ON ROAD



TEMPORARY ACCESS FORD

ESC22

BMP: CONSTRUCTION ROAD STABILIZATION



Objectives

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

GENERAL DESCRIPTION

Access roads, subdivision roads, parking areas, and other on-site vehicle transportation routes should be stabilized immediately after grading and frequently maintained to prevent erosion and control dust.

SUITABLE APPLICATIONS

- Temporary construction traffic.
- Phased construction projects and off-site road access.
- Detour roads.
- Construction during wet weather.

INSTALLATION/APPLICATION CRITERIA

- Road should follow topographic contours to reduce erosion of the roadway.
- The roadway slope should not exceed 15 percent.
- Gravel roads should be a minimum 4-inch thick, 2-3 inch coarse aggregate base applied immediately after grading, or as recommended by soils engineer.
- Chemical stabilizers or water are usually required on gravel or dirt roads to prevent dust (see Dust Control ESC 21).

REQUIREMENTS

- Maintenance
  - Periodically apply additional aggregate on gravel roads.
  - Active dirt construction roads are commonly watered three or more times per day during the dry season.
  - Inspect weekly, and after each rain.
  - Repair any eroded areas immediately.
- Cost
  - Gravel construction roads are moderately expensive, but cost is often balanced by reductions in construction delay.
  - No additional costs for dust control on construction roads should be required above that needed to meet local air quality requirements.

LIMITATIONS

- The roadway must be removed or paved when construction is complete.
- Certain chemical stabilization methods may cause storm water or soil pollution and should not be used (see Dust Control ESC 21).
- Management of construction traffic is subject to air quality control measures. Contact the local air quality management agency.

Targeted Pollutants

- ● Sediment
- ○ Nutrients
- ○ Toxic Materials
- ○ Oil & Grease
- ○ Floatable Materials
- ○ Other Construction Waste

● Likely to Have Significant Impact
○ Probable Low or Unknown Impact

Implementation Requirements

- ◒ Capital Costs
- ◒ O&M Costs
- ◒ Maintenance
- ○ Training
- ◒ Suitability for Slopes >5%

● High ○ Low

ESC23

Best Management Practices

Additional Information — Construction Road Stabilization

Areas which are graded for construction vehicle transport and parking purposes are especially susceptible to erosion and dust. The exposed soil surface is continually disturbed, leaving no opportunity for vegetative stabilization. Such areas also tend to collect and transport runoff waters along their surfaces. During wet weather, they often become muddy quagmires which generate significant quantities of sediment that may pollute nearby streams or be transported off-site on the wheels of construction vehicles. Dirt roads can become so unstable during wet weather that they are virtually unusable.

Efficient construction road stabilization not only reduces on-site erosion but can significantly speed on-site work, avoid instances of immobilized machinery and delivery vehicles, and generally improve site efficiency and working conditions during adverse weather.

Installation/Application Criteria

Where feasible, alternative routes should be made for construction traffic; one for use in dry condition, the other for wet conditions which incorporate the measures listed for this BMP. Permanent roads and parking areas should be paved as soon as possible after grading. As an alternative where construction will be phased, the early application of gravel or chemical stabilization may solve potential erosion and stability problems. Temporary gravel roadway should be considered during the rainy season and/or on slopes greater than 5 percent.

When gravel road is needed, apply a minimum 4-inch course of 2 to 4-inch crushed rock, gravel base, or crushed surfacing base course immediately after grading or the completion of utility installation within the right-of-way. Chemical stabilization may also be used upon compacted native sub-grade (see the Dust Control BMP ESC 21). These chemical controls should be applied per the manufacturer's directions.

Temporary roads should follow the contour of the natural terrain to the maximum extent possible. Slope should not exceed 15 percent. Roadways should be carefully graded to drain transversely. Provide drainage swales on each side of the roadway in the case of a crowned section, or one side in the case of super-elevated section. Simple gravel berms without a trench can also be used.

Installed inlets should be protected to prevent sediment-laden water from entering the storm sewer system (see "Storm Drain Inlet Protection" ESC 54).

REFERENCES

Best Management Practices and Erosion Control Manual for Construction Sites, Flood Control District of Maricopa County, Arizona, September1992.

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, June1981.

Stormwater Management Water for the Puget Sound Basin, Washington State Department of Ecology, The Technical Manual - February 1992, Publication # 91-75.

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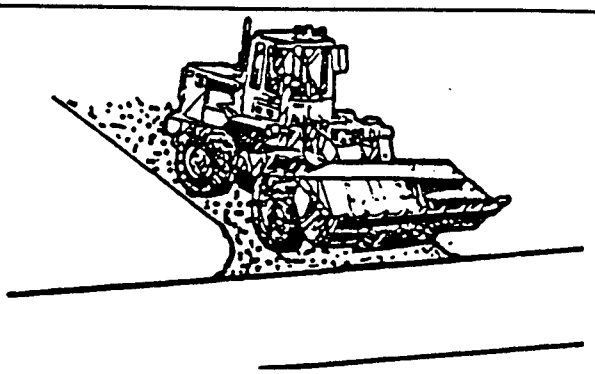
ESC23

Best Management Practices

BMP: STABILIZED CONSTRUCTION ENTRANCE



Objectives

- (Housekeeping Practices)
- Contain Waste
- (Minimize Disturbed Areas)
- (Stabilize Disturbed Areas)
- Protect Slopes/Channels
- (Control Site Perimeter)
- Control Internal Erosion

GENERAL DESCRIPTION

The construction entrance practice is a stabilized pad of aggregate underlain with filter cloth located at any point where traffic will be entering or leaving a construction site to or from a public right-of-way, street, alley, sidewalk or parking area. Stabalizing the construction entrance significantly reduces the amount of sediment (dust, mud) tracked off-site, especially if a washrack incorporated for removing caked on sediment.

SUITABLE APPLICATIONS

- All points of construction ingress and egress.
- Unpaved areas where sediment tracking occurs from site onto paved roads.

INSTALLATION/APPLICATION CRITERIA

- Construct on level ground where possible.
- Stones should be 1-3 inches.
- Minimum depth of stones should be 6 inches or as recommended by soils engineer.
- Length should be 50-foot minimum, and 30-foot minimum width.
- Provide ample turning radii as part of entrance.

REQUIREMENTS

- Maintenance
  - Inspect monthly and after each rainfall.
  - Replace gravel material when surface voids are visible.
  - Remove all sediment deposited on paved roadways within 24 hours.
  - Remove gravel and filter fabric at completion of construction
- Cost: Average annual cost for installation and maintenance (Source: EPA, 1992)
  - Without Wash Rock: $1500 each.
  - With Wash Rock: $2200 each.

LIMITATIONS

- Requires periodic top dressing with additional stones.
- Should be used in conjunction with street sweeping on adjacent public right-of-way.

Targeted Pollutants

- ◒ Sediment
- ◒ Nutrients
- ◒ Toxic Materials
- ◒ Oil & Grease
- ○ Floatable Materials
- ○ Other Construction Waste

- ● Likely to Have Significant Impact
- ○ Probable Low or Unknown Impact

Implementation Requirements

- ◒ Capital Costs
- ○ O&M Costs
- ○ Maintenance
- ○ Training
- ○ Suitability for Slopes >5%

● High ○ Low

ESC24

Best Management Practices

Additional Information — Stabilized Construction Entrance

A stabilized construction entrance is a pad of aggregate underlain with filter cloth located at any point where traffic will be entering or leaving a construction site to or from a public right-of-way, street, alley, sidewalk or parking area. The purpose of a stabilized construction entrance is to reduce or eliminate the tracking of sediment onto public rights-of-way or streets. Reducing trackout of sediments and other pollutants onto paved roads helps prevent deposition of sediments into local storm drains and production of airborne dust.

Where traffic will be entering or leaving, a stabilized construction entrance should be used at all points of construction ingress and egress. NPDES permits require that appropriate measures be implemented to prevent trackout of sediments onto paved roadways, which is a significant source of sediments derived from mud and dirt carryout from the unpaved roads and construction sites.

Stabilized construction entrances are moderately effective in removing sediment from equipment leaving a construction site. The entrance should be build on the level ground. Advantages of the Stabilized Construction Entrance is that it does remove some sediment from equipment and serves to channel construction traffic in and out of the site at specified locations. Efficiency is greatly increased when a washing rack is included as part of a stabilized construction entrance.

The aggregate for a stabilized construction entrance aprons should be 1 to 3 inches in size, washed, well-graded gravel or crushed rock. Minimum apron dimensions of 30 ft. x 50 ft. and 6 inches deep is adequate for two-way ingress/egress traffic.

The entrance must be properly graded to prevent runoff from leaving the construction site.
When wash areas are provided, washing is done on a reinforced concrete pad (if significant washing is necessary) or in an area stabilized with crushed stone which drains into a properly constructed sediment trap or basin (ESC 55 and 56). Sediment barriers are provided to prevent sediments from entering into the stormwater sewer system, ditch, or waterway.

Limitations

- Construct on level ground.
- Stabilized construction entrances are rather expensive to construct and when a wash rack is included, a sediment trap of some kind must also be provided to collect wash water runoff.
- Requires periodic top dressing with additional stones.
- Should be used in conjunction with street sweeping on adjacent public right-of-way.

REFERENCES

Best Management Practices and Erosion Control Manual for Construction Sites, Flood Control District of Maricopa County, Arizona, September 1992.

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, June 1981.

Proposed Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, Work Group Working Paper, USEPA, April, 1992.

Stormwater Management Water for the Puget Sound Basin, Washington State Department of Ecology, The Technical Manual - February 1992, Publication # 91-75.

Virginia Erosion and Sedimentation Control Handbook, Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation, 1991.

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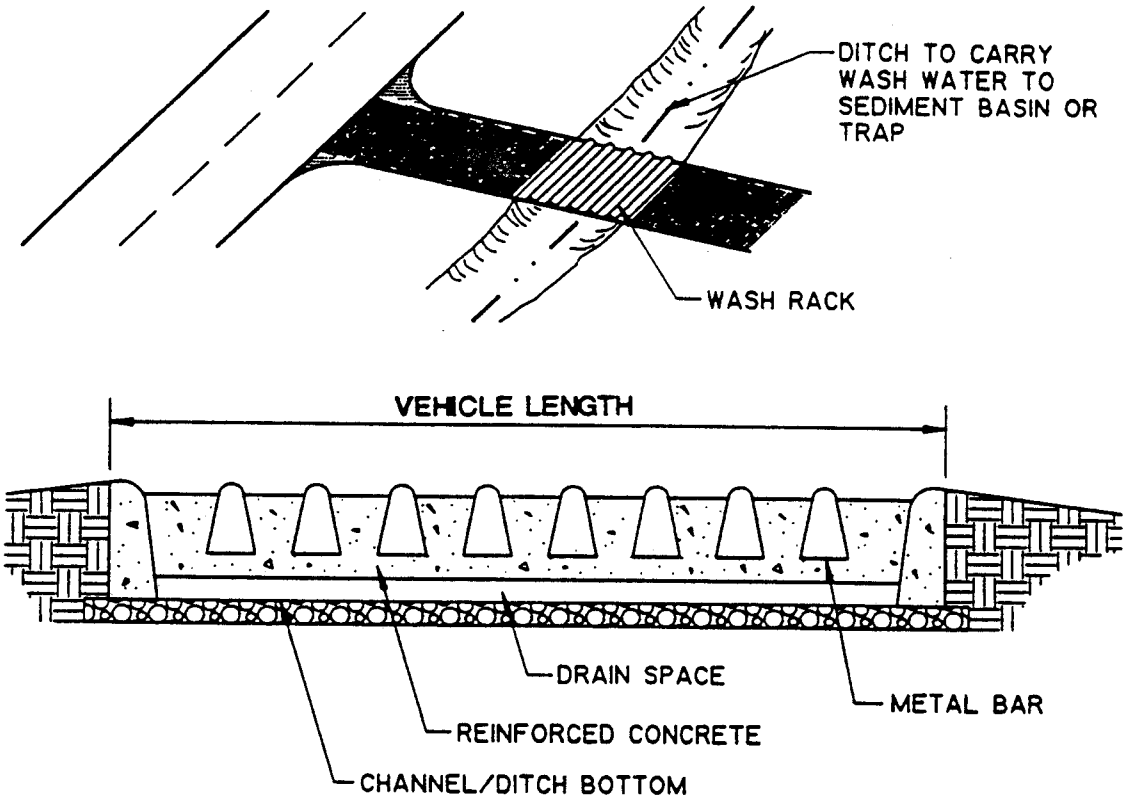
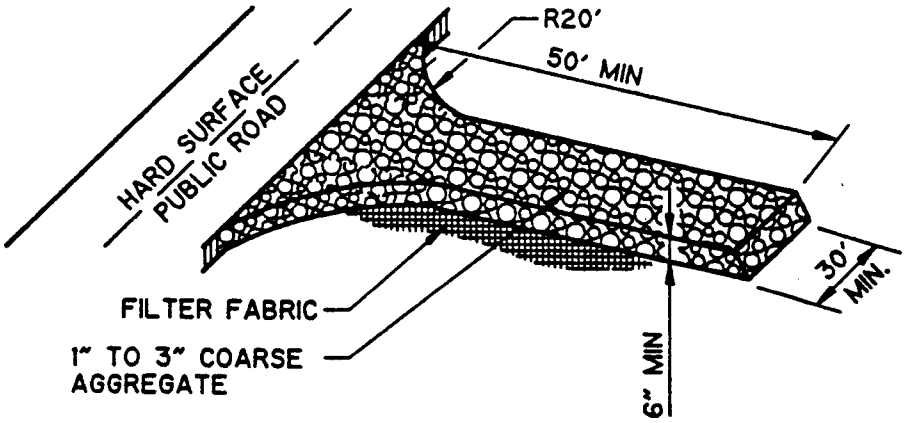
ESC24

Best Management Practices

Additional Information — Stabilized Construction Entrance



WASH RACK (SCHEMATIC)

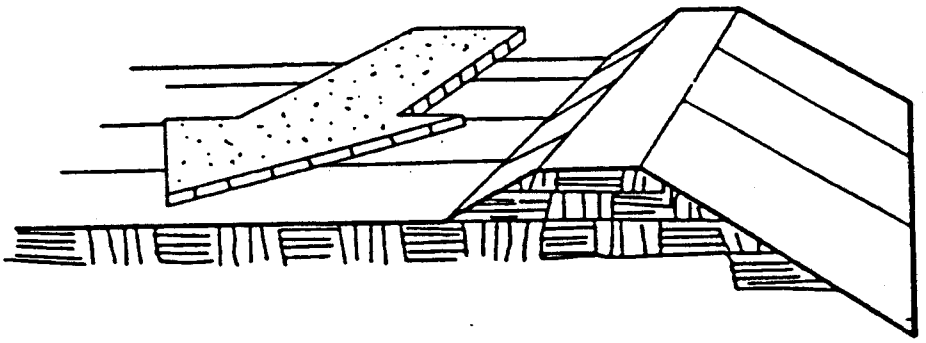


STABILIZED CONSTRUCTION ENTRANCE

ESC24

Best Management Practices

BMP: EARTH DIKE



Objectives

- Housekeeping Practices
- (Contain Waste)
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- (Protect Slopes/Channels)
- (Control Site Perimeter)
- (Control Internal Erosion)

GENERAL DESCRIPTION

The temporary earth dike is a temporary berm or ridge of compacted soil, used to divert runoff or channel water to a desired location.

SUITABLE APPLICATIONS

Earth dikes are typically used to divert concentrated runoff through disturbed areas into another BMP (e.g., sediment basins), to divert runoff away from disturbed or unstable slopes, to divert runoff from off-site and undisturbed areas around disturbed areas, and as a containment for construction materials and wastes. The dikes should remain in place until the disturbed areas are permanently stabilized. The dikes must be on-site and must safely convey anticipated flood flows.

INSTALLATION/APPLICATION CRITERIA

- All dikes should be compacted by earth-moving equipment.
- All dikes should have positive drainage to a stabilized outlet.
- Top width may be wider and side slopes may be flatter at crossings for construction traffic.
- Dikes should direct sediment-laden runoff into a sediment trapping device.
- Dikes should be stabilized with vegetation, chemicals, or physical devices.

REQUIREMENTS

- Maintenance
  - Inspect periodically and after every significant rainfall; repair as necessary.
- Cost
  - Cost ranges from $15 to $55 per foot for both earthwork and stabilization and depends on availability of material, site location, and access.

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 storm water may cause downstream flood damage.
- Dikes should not be constructed of soils which may be easily eroded.
- Regrading the site to remove the dike may add additional cost.

Targeted Pollutants

- ● Sediment
- ○ Nutrients
- ◒ Toxic Materials
- ◒ Oil & Grease
- ○ Floatable Materials
- ◒ Other Construction Waste

● Likely to Have Significant Impact
○ Probable Low or Unknown Impact

Implementation Requirements

- ◒ Capital Costs
- ○ O&M Costs
- ◒ Maintenance
- ○ Training
- ◒ Suitability for Slopes >5%

● High ○ Low

ESC30

Best Management Practices

Additional Information — Earth Dike

The temporary earth dike is a berm or ridge of compacted soil, located in such a manner as to divert storm water to a sediment trapping device or 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%.

- The advantages of the temporary earth dike include the ability to handle flows from large drainage areas.
- Once stabilized, earth dikes require relatively little maintenance. Additionally, the earth dikes are relatively inexpensive to install since the soil material required for construction may be available on-site, and can be constructed as part of the initial grading operations, while the equipment is on-site.
- Uses on-site materials.

Installation/Application Criteria

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

1. All dikes should be compacted by earth-moving equipment.
2. All dikes should have positive drainage to an outlet.
3. All dikes should have 2:1 side slopes, 18 inches minimum height, and a minimum top width of 24 inches. Top width may be wider and side slopes may be flatter at crossings for construction traffic.
4. 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 (ESC 55) or sediment basin (ESC 56)when either the dike channel or the drainage area above the dike are not adequately stabilized.
5. 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.
6. If riprap is used to stabilize the channel formed along the toe of the dike, the following typical specifications apply:

CHANNEL GRADE	RIPRAP STABILIZATION
0.5-1.0%	4" Rock
1.1-2.0%	6" Rock
2.1-4.0%	8" Rock
4.1-5.0%	8-12" Riprap

7. The stone riprap, recycled concrete, etc. used for stabilization should be pressed into the soil with construction equipment.
8. Filter cloth may be used to cover dikes in use for long periods.
9. Construction activity on the earth dike should be kept to a minimum.

REFERENCES

Best Management Practices and Erosion Control Manual for Construction Sites, Flood Control District of Maricopa County, Arizona, September 1992.

"Draft - Sedimentation and Erosion Control, An Inventory of Current Practices", U.S.E.P.A., April, 1990.

ESC30

Best Management Practices

Additional Information — Earth Dike

Erosion and Sediment Control Handbook, S.J. Goldman, K. Jackson, T.A. Bursetynsky, P.E., McGraw Hill Book Company.

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, June 1981.

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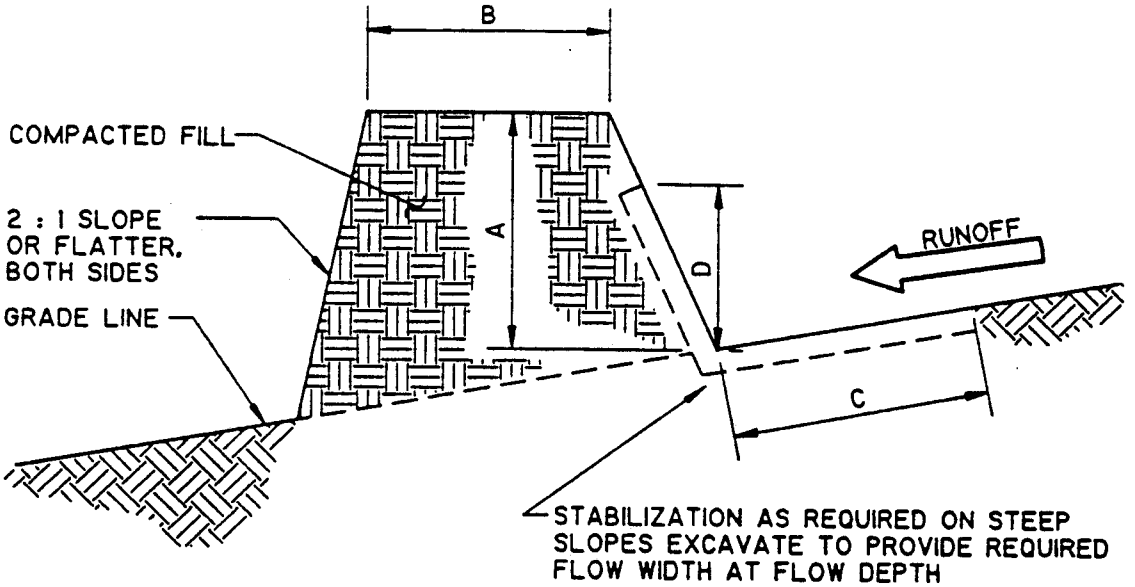
ESC30

Additional Information — Earth Dike



REQUIREMENTS BASED ON UPSTREAM DRAINAGE AREA

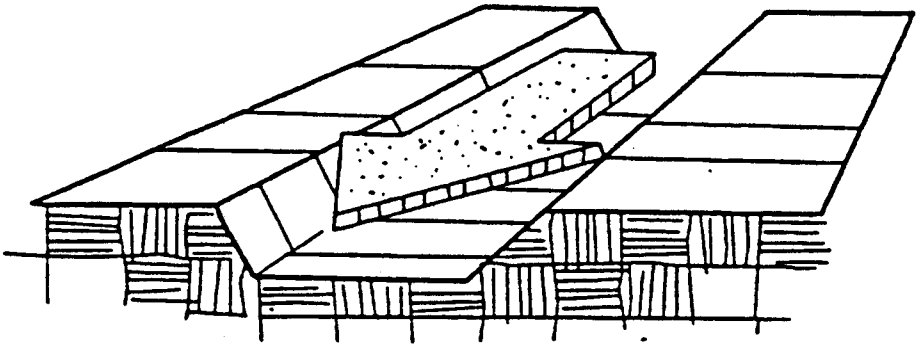
	DIKE 1 (5 ACRES OR LESS)	DIKE 2 (5-10 ACRES)
A-DIKE HEIGHT	18"	36"
B-DIKE WIDTH	24"	36"
C-FLOW WIDTH	4'	6'
D-FLOW DEPTH	8"	15"

TEMPORARY DIVERSION DIKE

ESC30

Best Management Practices

BMP: TEMPORARY DRAINS AND SWALES



Objectives

- *Housekeeping Practices*
- *Contain Waste*
- *Minimize Disturbed Areas*
- *Stabilize Disturbed Areas*
- *Protect Slopes/Channels*
- *Control Site Perimeter*
- *Control Internal Erosion*

GENERAL DESCRIPTION

Temporary drains and swales are used to divert off-site runoff around the construction site, divert runoff from stabilized areas around disturbed areas, and direct runoff into sediment basins or traps.

SUITABLE APPLICATIONS

Temporary drains and swales are appropriate for diverting any upslope runoff around unstabilized or disturbed areas of the construction site:

- Prevent slope failures.
- Prevent damage to adjacent property.
- Prevents erosion and transport of sediments into water ways.
- Increases the potential for infiltration.
- Diverts sediment-laden runoff into sediment basins or traps.

INSTALLATION/APPLICATION CRITERIA

Temporary drainage swales will effectively convey runoff and avoid erosion if built properly:

- Size temporary drainage swales using local drainage design criteria.
- A permanent drainage channel must be designed by a professional engineer (see the local drainage design criteria for proper design).
- At a minimum, the drain/swale should conform to predevelopment drainage patterns and capacities.
- Construct the drain/swale with an uninterrupted, positive grade to a stabilized outlet.
- Provide erosion protection or energy dissipation measures if the flow out of the drain or swale can reach an erosive velocity.

REQUIREMENTS

- Maintenance
  - Inspect weekly and after each rain.
  - Repair any erosion immediately.
  - Remove sediment which builds up in the swale and restricts its flow capacity.
- Cost
  - The cost of a drainage swale increases with drainage area and slope. Typical. swales for controlling internal erosion are inexpensive.

LIMITATIONS

- 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.

Targeted Pollutants

- ● *Sediment*
- ○ *Nutrients*
- ○ *Toxic Materials*
- ○ *Oil & Grease*
- ○ *Floatable Materials*
- ○ *Other Construction Waste*

● *Likely to Have Significant Impact*
○ *Probable Low or Unknown Impact*

Implementation Requirements

- ◒ *Capital Costs*
- ○ *O&M Costs*
- ○ *Maintenance*
- ○ *Training*
- ◒ *Suitability for Slopes >5%*

● *High* ○ *Low*

ESC31

Best Management Practices

Additional Information — Temporary Drains and Swales

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 (see ESC30) at the top of a slope can safely divert runoff to a location where it can safely be brought to the bottom of the slope (see Pipe Slope Drain ESC32). 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/or the slopes are stabilized.

Diversion practices concentrate the volume of 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. A swale should be stabilized using vegetation, chemical treatment, rock rip-rap, matting, or other physical means of stabilization, if significant erosion will occur. Any drain or swale which conveys sediment-laden runoff must be diverted into a sediment basin or trap before it is discharged from the site.

Installation/Application Criteria

Diversion drains or 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, drains or swales should be designed as follows:

- No more than 5 acres may drain to a temporary drain or swale
- Place the drain or swale above, not on, a cut and fill slope
- Swale bottom width should be at least 2 ft
- Depth of the swale should be at least 18 inches
- Side slopes should be 2:1 or flatter
- Drain or swale should be layed at a grade of at least 1 percent, but not more than 15 percent
- The swale must not be overtopped by the 10-year, 24-hour storm, irrespective of the design criteria stated above
- 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
- Do not operate construction vehicles across a swale unless a stabilized crossing is provided.
- The cost of swales and other diversion devices is generally included in the earthwork cost, as a separate item under the grading budget of the project construction contract.

REFERENCES

Best Management Practices and Erosion Control Manual for Construction Sites, Flood Control District of Maricopa County, Arizona, September 1992.

"Draft - Sedimentation and Erosion Control, An Inventory of Current Practices", U.S.E.P.A., April, 1990.

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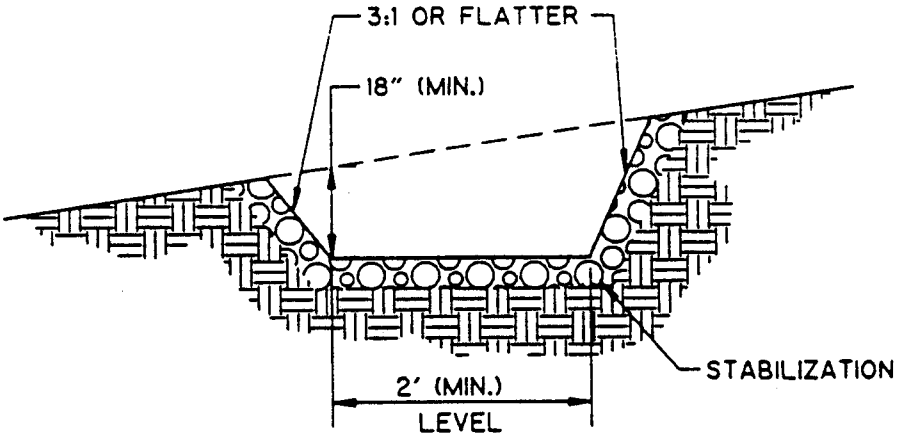
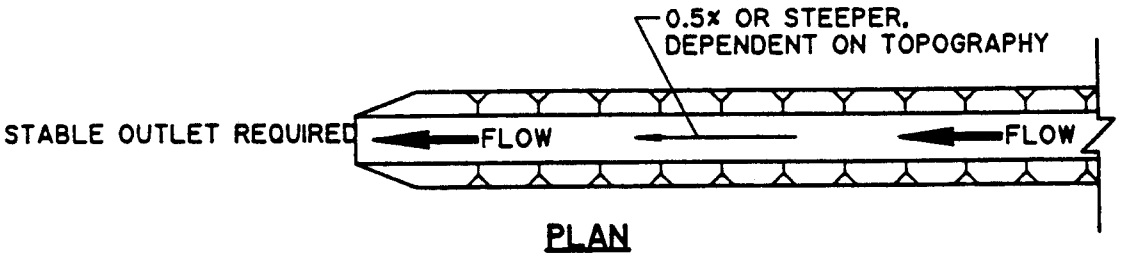
ESC31

Best Management Practices



CROSS SECTION

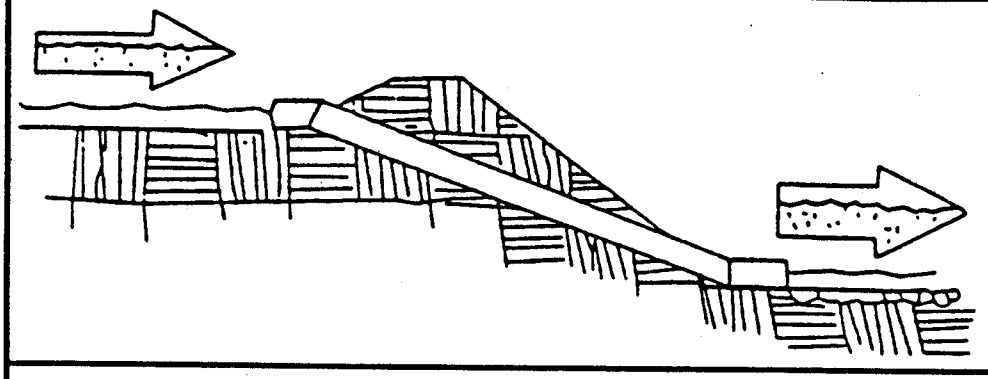


PLAN

TEMPORARY DRAINAGE SWALE

ESC31

BMP: SLOPE DRAIN



Objectives

- *Housekeeping Practices*
- *Contain Waste*
- *Minimize Disturbed Areas*
- *Stabilize Disturbed Areas*
- *Protect Slopes/Channels*
- *Control Site Perimeter*
- *Control Internal Erosion*

GENERAL DESCRIPTION

A temporary pipe or lined channel to drain the top of a slope to a stable discharge point at the bottom of a slope without causing erosion.

SUITABLE APPLICATIONS

- Where concentrated flow of surface runoff must be conveyed down a slope in order to prevent erosion.
- Drainage for top of slope diversion dikes or swales.
- Emergency spillway for a sediment basin.
- Drainage for top of cut/fill slopes where water can accumulate.

The types of slope drain can include:

- Pipe drops.
- Flexible downdrains.
- Sectional downdrains.
- Lined terrace drains.

INSTALLATION/APPLICATION CRITERIA

- Secure inlet and surround with dikes to prevent gully erosion, and anchor pipe to slope.
- Size to convey at least the peak of a 10-year, 24-hour storm (See local flood control agency for requirements).
- Stabilize outlet.

REQUIREMENTS

- Maintenance
  - Structure must be inspected regularly and after storms.
  - Inlet must be free of undercutting and no water should circumvent the entry.
  - Outlet should not produce erosion; velocity dissipators must be maintained.
  - Pipe anchors must be checked to ensure that the pipe remains anchored to the slope.
- Cost
  - CalTrans Cost Schedule gives regional cost ranges.

LIMITATIONS

- Maximum drainage area per slope drain is 5 acres. (For large areas use a paved chute, rock lined channel or additional pipes.)
- Clogged slope drains will force water around the pipe and cause slope erosion.
- Dissipation of high flow velocities at the pipe outlet is required to avoid downstream erosion.
- Failure can result in flooding and severe erosion.

Targeted Pollutants

- ● *Sediment*
- ○ *Nutrients*
- ○ *Toxic Materials*
- ○ *Oil & Grease*
- ○ *Floatable Materials*
- ○ *Other Construction Waste*

- ● *Likely to Have Significant Impact*
- ○ *Probable Low or Unknown Impact*

Implementation Requirements

- ◒ *Capital Costs*
- ○ *O&M Costs*
- ◒ *Maintenance*
- ○ *Training*
- ◒ *Suitability for Slopes >5%*

● *High* ○ *Low*

ESC32

Best Management Practices

Additional Information — Slope Drain

The slope drain may be a rigid pipe, such as corrugated metal, a flexible conduit, or a lined terrace drain with the inlet placed on the top of a slope. The drain conveys concentrated runoff down to the bottom of the slope. The BMP typically is used in combination with a diversion control, such as a temporary dike or swale, at the top of the slope, and serves as a temporary BMP to reduce or eliminate slope erosion until permanent BMPs are installed and the slope is stabilized.

The slope drain is applicable for any construction site where concentrated surface runoff can accumulate and must be conveyed down the slope in order to prevent erosion. The slope drain is effective because it prevents the stormwater from flowing directly down the slope by confining all the runoff into an enclosed pipe or channel. Due to the time lag between grading slopes and installation of permanent storm water collection systems and slope stabilization measures, temporary provisions to intercept runoff are sometimes necessary. Particularly in steep terrain, slope drains can protect unstabilized areas from erosion. Typical uses include:

- Emergency spillway for a sediment basin.
- Drainage for top of cut/fill slopes where storm water can accumulate and must be conveyed down the slope.

Installation/Application Criteria

Temporary slope drains are highly effective in eliminating slope erosion. Installation and maintenance requirements are small, especially when flexible pipe is used. General criteria:

- Gully erosion is the major problem with slope drains. Inlet structures must be securely entrenched and compacted to avoid severe gully erosion.
- The drain must be securely anchored to the slope and must be adequately sized to carry the capacity of the design storm and associated forces.
- The outlet must be stabilized with rip-rap, concrete or other type of energy dissipator, or directed into a stable sediment trap or basin.
- A debris rack is recommended at the inlet, and should be encouraged for larger pipes and at the outlet as a safety device to prevent small children from entering the pipe.

Materials:

Material selection and criteria for the pipe slope drain is often established by the local municipality. Soil type, rainfall patterns, construction schedule, and available supply are some of the factors to be considered. The following types of slope drains are commonly used:

- Rigid Pipe: This type of slope drain is also known as a pipe drop. The pipe usually consists of corrugated metal pipe or rigid plastic pipe. The pipe is placed on undisturbed or compacted soil and secured into the slope. One foot minimum cover is required on the pipe, and concrete thrust blocks must be used when required by the municipality or warranted by the calculated thrust forces. Collars should be properly installed and secured with metal strappings or watertight collars.
- Flexible Pipe: The flexible pipe slope drain consists of a flexible conduit of heavy duty material. The conduit material is securely anchored into the slope and connections are watertight. The conduit should be securely fastened to the metal inlet and outlet conduit sections with metal strappings or water tight collars.
- Sectional Downdrains: The sectional downdrain consists of pre-fabricated, sectional conduit of half-round or third-round material. The sectional downdrain performs similar to a flume or chute. The pipe must be placed on undisturbed or compacted soil and secured into the slope.
- Concrete-lined Terrace Drain: This is a concrete channel for draining water from a terrace on a slope to the next level. These drains are after permenant structures which should be designed according to local drainage design criteria.

ESC32

Best Management Practices

Additional Information — Slope Drain

Design:
Unless specified by the local municipality, the capacity for temporary drains should be sufficient to handle the peak runoff from a 10-year, 24-hour rainfall event. The pipe size may be computed using the Rational Method or a method established by the local municipality. Higher flows must be safely stored or routed to prevent any offsite concentration of flow, and any erosion of the slope.

As a guide, temporary pipe slope drains should not be sized smaller than shown in the following table:

MINIMUM PIPE DIAMETER	MAXIMUM DRAINAGE AREA (ACRES)
12"	0.5
18"	1.5
21"	2.5
24"	3.5
30"	5.0

Permanent improvements must be designed and installed if the drainage area is greater than 5 acres.

The following additional design criteria should be considered:

- Construct the pipe slope drain entrance of a standard flared end section with a minimum 6-inch metal toe plate to prevent runoff from undercutting the pipe inlet. The slope of the entrance is usually at least 3 percent.
- Thoroughly compact the soil around and under the pipe and entrance section.
- Securely fasten the slope drain sections together, have gasketed watertight fittings, and securely anchored into the soil.
- Secure the flared inlet section to the slope drain and have watertight connecting bands.
- Use interceptor dikes to direct runoff into a slope drain. The height of the dike should be at least 1 foot higher at all points than the top of the inlet pipe.
- If the pipe slope drain is conveying sediment-laden water, direct all flows into a sediment trap (ESC55) or sediment basin (ESC56).
- Unless the pipe directly enters a sediment trap/basin, stabilize the area below the outlet with a riprap apron.

Limitations
Installation is critical for effective use of the pipe slope drain to minimize potential gully erosion. Maximum drainage area per pipe slope drain is 5 acres. For larger areas use a paved chute, rock lined channel or additional pipes. (See the local municipality for drainage requirements)

- During large storms, pipe slope drains may become clogged or overcharged, forcing water around the pipe and causing extreme slope erosion.
- Structures for dissipation of high flow velocities at the pipe outlet must be constructed to avoid downstream erosion.
- Failure of this type of temporary structure may result in flooding and severe erosion.
- If the sectional downdrain is not sized correctly, the runoff can spill over the drain sides causing gully erosion, and potential failure of the structure.

ESC32

Best Management Practices

Additional Information — Slope Drain

REFERENCES

Best Management Practices and Erosion Control Manual for Construction Sites, Flood Control District of Maricopa County, Arizona, September 1992.

"Draft - Sedimentation and Erosion Control, An Inventory of Current Practices", U.S.E.P.A., April, 1990.

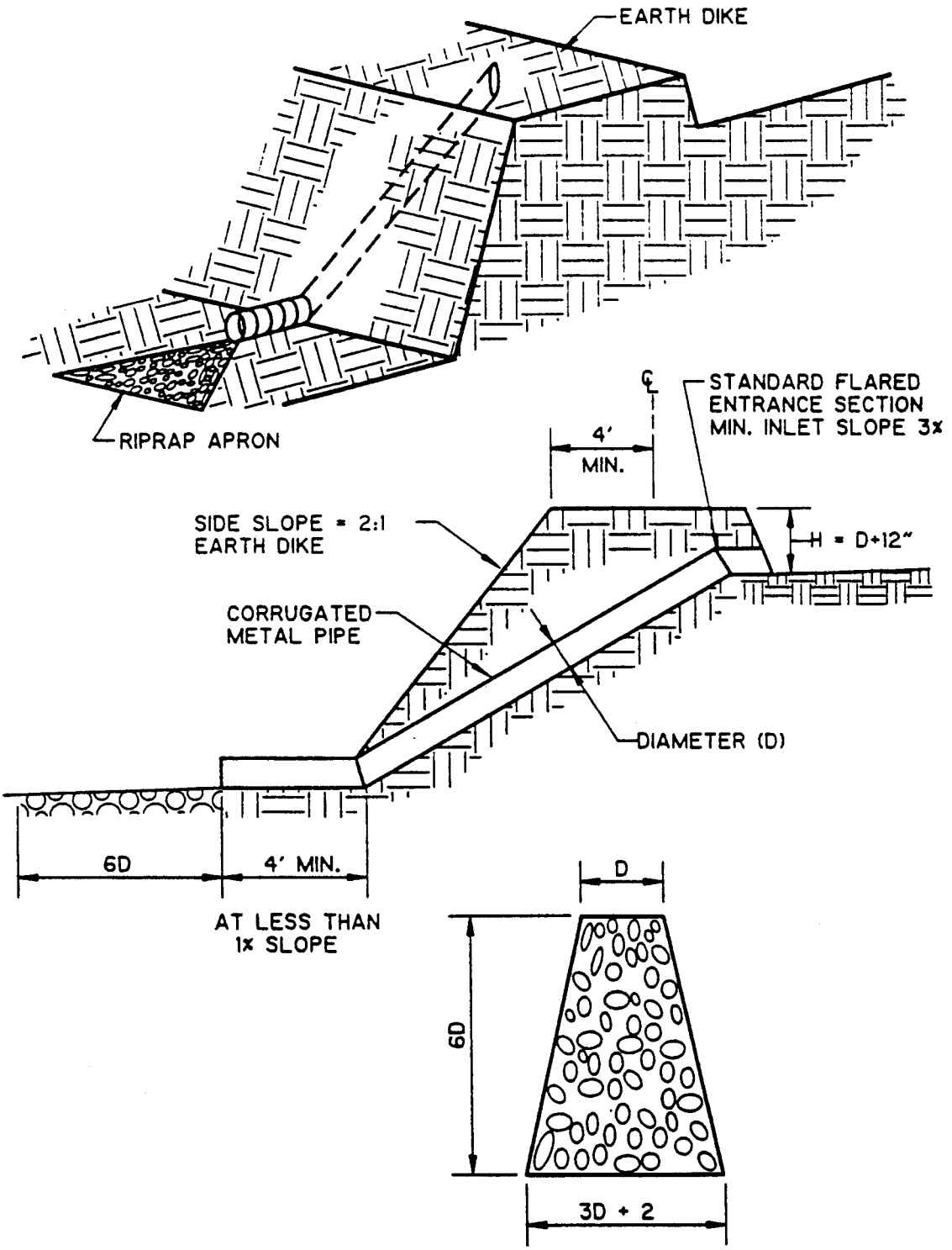
Stormwater Management Water for the Puget Sound Basin, Washington State Department of Ecology, The Technical Manual - February 1992, Publication # 91-75.

Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency - November 1988.

ESC32

Best Management Practices

Additional Information — Slope Drain



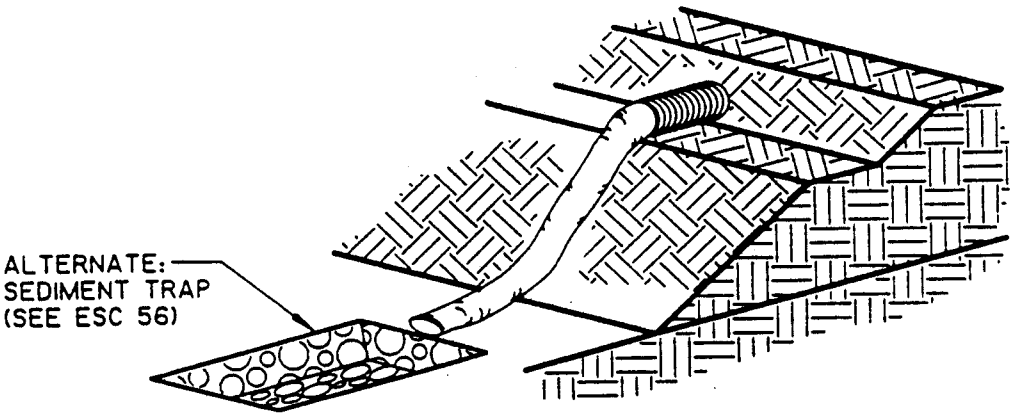
RIPRAP SHOULD CONSIST OF 6" DIAMETER STONE PLACED AS SHOWN AND SHOULD BE A MINIMUM OF 12" IN THICKNESS.

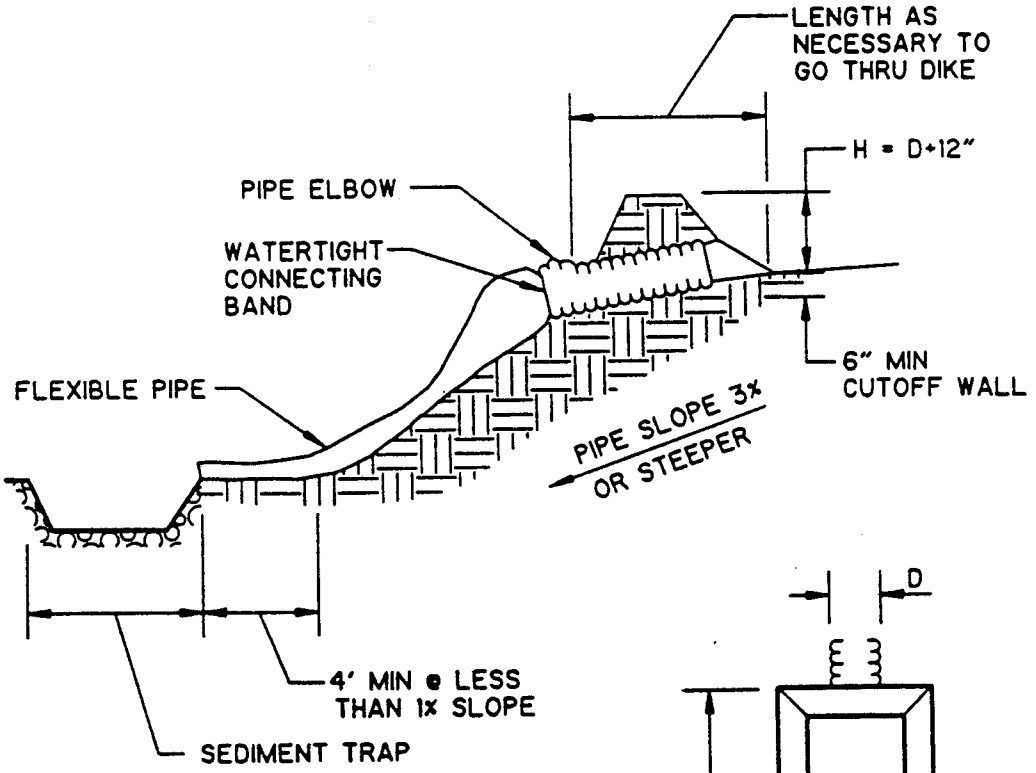
PIPE SLOPE DRAIN (RIGID)

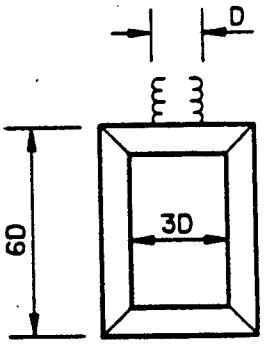
ESC32

Best Management Practices

Additional Information — Slope Drain







RIPRAP SHOULD CONSIST OF 6" DIA STONE PLACED AS SHOWN. DEPTH OF APRON SHOULD EQUAL THE PIPE DIA AND RIPRAP SHALL BE A MINIMUM OF 12" IN THICKNESS.

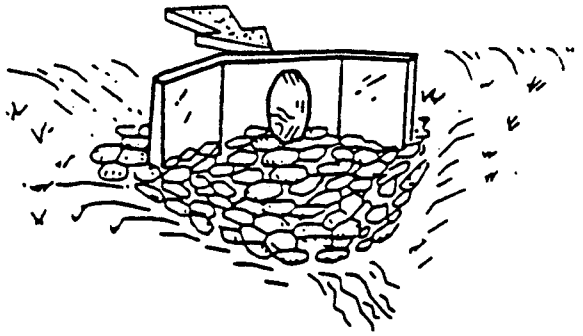
ALTERNATIVE SEDIMENT TRAP: RIPRAP PLAN

PIPE SLOPE DRAIN (FLEXIBLE)

ESC32

Best Management Practices

BMP: OUTLET PROTECTION



Objectives

- *Housekeeping Practices*
- *Contain Waste*
- *Minimize Disturbed Areas*
- *Stabilize Disturbed Areas*
- *Protect Slopes/Channels*
- *Control Site Perimeter*
- *Control Internal Erosion*

GENERAL DESCRIPTION

Rock outlet protection is a physical device composed of rock, grouted riprap, or concrete rubble which is placed at the outlet of a pipe to prevent scour of the soil caused by high pipe flow velocities, and to absorb flow energy to produce non-erosive velocities.

SUITABLE APPLICATIONS

- Wherever discharge velocities and energies at the outlets of culverts, conduits or channels are sufficient to erode the next downstream reach.
- Rock outlet protection is best suited for temporary use during construction because it is usually less expensive and easier to install than concrete aprons or energy dissipators.
- A sediment trap below the pipe outlet is recommended if runoff is sediment laden.
- Permanent rock riprap protection should be designed and sized by the engineer as part of the culvert, conduit or channel design.
- Grouted riprap should be avoided in areas of freeze and thaw because the grout will break up.

INSTALLATION/APPLICATION CRITERIA

Rock outlet protection is effective when the rock is sized and placed properly. When this is accomplished, rock outlets do much to limit erosion at pipe outlets. Rock size should be increased for high velocity flows. General recommendations for rock size and length of outlet protection mat are presented in the additional information sheet. Best results are obtained when sound, durable, angular rock is used. CalTrans Standard Specifications or the local municipality can provide additional specifications for constructing outlet protection devices.

REQUIREMENTS

- Maintenance
  - Inspect after each significant rain for erosion and/or disruption of the rock, and repair immediately.
  - Grouted or wire-tied rock riprap can minimize maintenance requirements.
- Cost
  - CalTrans Cost Schedule gives regional cost ranges.

LIMITATIONS

- Large storms often wash away the rock outlet protection and leave the area susceptible to erosion.
- Sediment captured by the rock outlet protection may be difficult to remove without removing the rock.
- Outlet protection may negatively impact the channel habitat.

Targeted Pollutants

- ● *Sediment*
- ○ *Nutrients*
- ○ *Toxic Materials*
- ○ *Oil & Grease*
- ○ *Floatable Materials*
- ○ *Other Construction Waste*

- ● *Likely to Have Significant Impact*
- ○ *Probable Low or Unknown Impact*

Implementation Requirements

- ◒ *Capital Costs*
- ○ *O&M Costs*
- ◒ *Maintenance*
- ○ *Training*
- ○ *Suitability for Slopes >5%*

● *High* ○ *Low*

ESC40

Best Management Practices

Additional Information — Outlet Protection

Outlet protection is needed where discharge velocities and energies at the outlets of culverts, conduits or channels are sufficient to erode the immediate downstream reach. This practice protects the inlet or outlet from developing small eroded pools (plange pools), and protects against gully erosion resulting from scouring at a culvert mouth.

Rock outlet protection is usually less expensive and easier to install than concrete aprons or energy dissipators. It also serves to trap sediment and reduce flow velocities.

As with most channel design projects, depth of flow, roughness, gradient, side slopes, discharge rate and velocity should be considered in the outlet design. Compliance to local and state regulations should also be considered while working in environmentally sensitive streambeds. General recommendations for rock size and length of outlet protection mat is shown in the rock outlet protection figure. Best results are obtained when sound, durable, angular rock is used. Rock depth and outlet protection length are governed by the discharge pipe size, but hydraulic calculations and velocities should be used to determine length. Your local municipality or CalTrans should be consulted for appropriate sizing criteria in your area.

REFERENCES

Best Management Practices and Erosion Control Manual for Construction Sites, Flood Control District of Mariposa County, Arizona, September 1992.

County of Sacramento Improvement Standards, Sacramento County - May 1989.

Environmental Criteria Manual, City of Austin, TX, 1989.

Erosion and Sediment Control Handbook, S.J. Goldman, K. Jackson, T.A. Bursztynsky, P.E., McGraw Hill Book Company, 1986.

Handbook of Steel Drainage & Highway Construction, American Iron and Steel Institute, 1983.

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, Jun 1981.

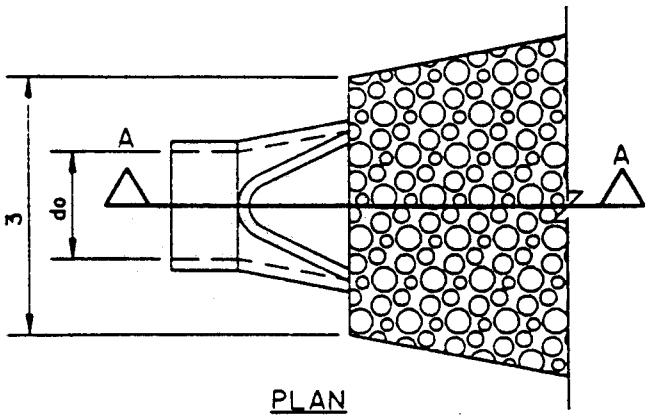
Stormwater Management Water for the Puget Sound Basin, Washington State Department of Ecology, The Technical Manual - February 1992, Publication # 91-75.

Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency - November 1988.

ESC40

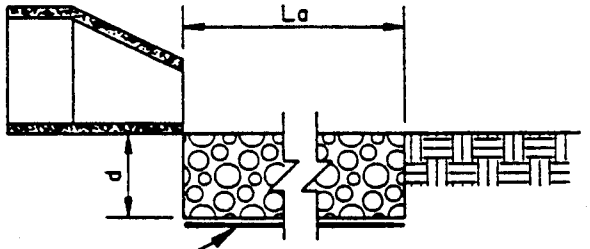
Best Management Practices

Additional Information — Outlet Protection



PLAN

La = LENGTH OF APRON
do = INSIDE PIPE DIAMETER
w = APRON WIDTH
d = APRON THICKNESS



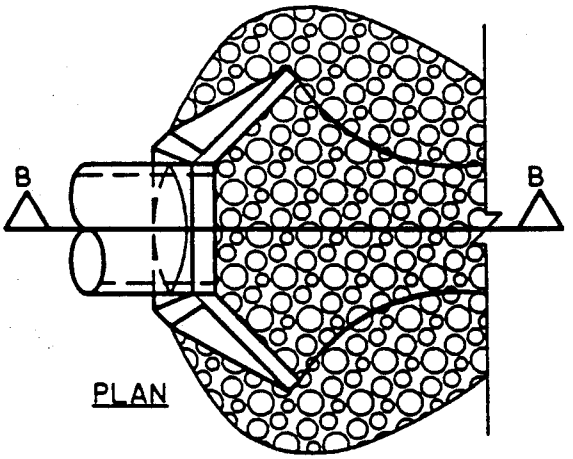
FILTER FABRIC

SECTION A-A

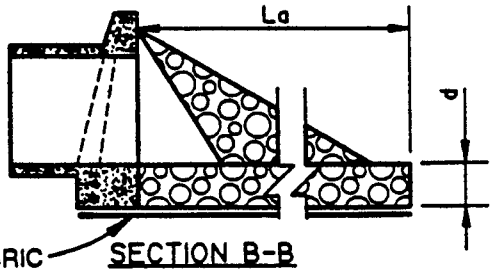
PIPE OUTLET TO FLAT AREA WITH NO DEFINED CHANNEL

NOTES

1. APRON LINING MAY BE RIPRAP, GROUTED RIPRAP, OR CONCRETE
2. PIPE DIAMETER, APRON DIMENSIONS, AND AVERAGE ROCK SIZE FOR RIPRAP ARE BASED ON THE DESIGN FLOW RATE AND VELOCITY. La AND ROCK SIZE MUST BE SET TO SLOW THE FLOW TO NON-EROSIVE VELOCITIES (e.g., LESS THAN 10 fps). SEE CALTRANS AND LOCAL AGENCY DESIGN CRITERIA FOR APPROPRIATE SIZING CRITERIA.
3. d = 1.5 TIMES THE MAXIMUM ROCK SIZE DIAMETER BUT NOT LESS THAN 6 INCHES.



PLAN



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SECTION B-B

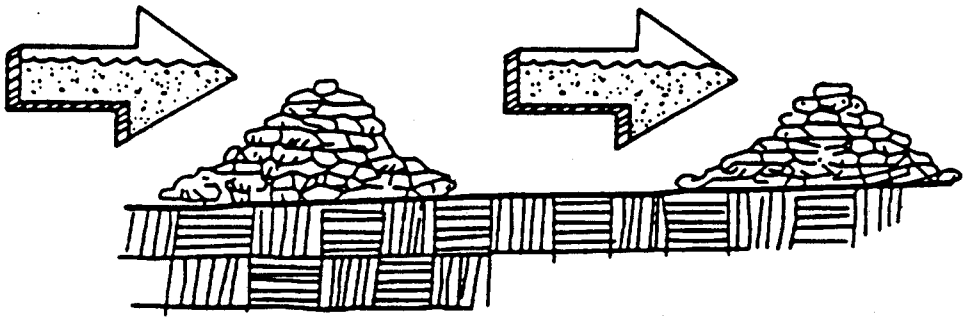
PIPE OUTLET TO WELL-DEFINED CHANNEL

PIPE OUTLET CONDITIONS

ESC40

Best Management Practices

BMP: CHECK DAMS



Objectives

- *Housekeeping Practices*
- *Contain Waste*
- *Minimize Disturbed Areas*
- *Stabilize Disturbed Areas*
- *Protect Slopes/Channels* (●)
- *Control Site Perimeter*
- *Control Internal Erosion*

GENERAL DESCRIPTION

Small temporary dams constructed across a swale or drainage ditch. Check dams reduce the velocity of concentrated stormwater flows, thereby reducing erosion of the swale or ditch, and promoting sedimentation behind the dam. If properly anchored, brush or rock filter berms (ESC53) may be used for check dams.

SUITABLE APPLICATIONS

- Used to prevent erosion by reducing the velocity of channel flow in small intermittent channels and temporary swales.
- May also promote sedimentation behind the dam, but should not be considered to be a primary sediment trapping device because subsequent storms will scour and resuspend much of the trapped sediment.

INSTALLATION/APPLICATION CRITERIA

- Check dams should be placed at a distance and height to allow small pools to form between each one.
- Backwater from a downstream check dam should reach the toe of the upstream check dam.
- Major floods (2 year storm or larger) should safely flow over the check dam without an increase in upstream flooding or destruction of the checkdam.
- Primarily used in small, steep channels where velocities exceed 2 fps.
- Used in steep terrain where velocity reduction is required.
- A deep sump may be provided immediately upstream of the check dam to capture excessive sediment.
- Check dams may be built of rocks or logs, which are secured against damage during significant floods.

REQUIREMENTS

- Maintenance
  - Inspect for sediment buildup behind the check dam and signs of erosion around the check dam after each rain.
  - Remove accumulated sediment whenever it reaches one-half the sump depth.
- Cost
  - See CalTrans Cost Schedule for regional cost data.

LIMITATIONS

- Use only in small open channels which drain 10 acres of less.
- Not to be used in live streams.
- Do not install in lined or vegetated channels.

Targeted Pollutants

- ● *Sediment*
- ○ *Nutrients*
- ○ *Toxic Materials*
- ○ *Oil & Grease*
- ○ *Floatable Materials*
- ○ *Other Construction Waste*

● *Likely to Have Significant Impact*
○ *Probable Low or Unknown Impact*

Implementation Requirements

- ◒ *Capital Costs*
- ○ *O&M Costs*
- ◒ *Maintenance*
- ○ *Training*
- ○ *Suitability for Slopes >5%*

● *High* ○ *Low*

ESC41

Best Management Practices

Additional Information — Check Dams

Check dams create small pools in swales and ditches which drain 10 acres or less. These pools reduce the velocity of storm water flows, thus reducing erosion of the swale/ditch. Sedimentation also occurs in these small pools, but probably results in little net sediment removal because of the small detention time and probable scour during longer storms. A sediment trap (ESC55) may be placed immediately upstream of the check dam to increase sediment removal efficiency (but never in a natural stream or channel). Check dams should not be placed in swales/ditches with a base flow during some or all of the year.

Installation/Application Criteria

Check dams must be sized and constructed correctly and maintained properly, or they will be either washed out or cause flooding. Check dams can be constructed of either rock or logs. Use of other natural materials available on-site that can withstand the stormwater flow velocities is acceptable, such as pea-gravel filled in sand bags. Check dams should not be constructed from straw bales or silt fences, since concentrated flows quickly wash out these materials.

A sediment trap (ESC55) may be installed immediately upstream of the check dam, but may be of limited effectiveness if channel flows are large enough to scour the trap during moderate to large storms. Maximum velocity reduction is achieved if the toe of the upstream dam is at the same elevation as the top of the downstream dam. The center section of the dam should be lower than the edge sections so that the check dam will act like a weir during major floods.

Rock check dams are usually constructed of appropriately 8"-12" rock. The rock is placed either by hand or mechanically, but never just dumped into the channel. The dam must completely span the ditch or swale to prevent washout. The rock used must be large enough to stay in place given the expected design flow through the channel.

Log check dams are usually constructed of 4 to 6-inch diameter logs. The logs should be embedded into the soil at least 18 inches.

If grass is planted to stabilize the ditch or swale, the check dam should be removed when the grass has matured (unless the slope of the swale is greater than 4 percent).

REFERENCES

Best Management Practices and Erosion Control Manual for Construction Sites, Flood Control District of Mariposa County, Arizona, September 1992.

"Draft - Sedimentation and Erosion Control, An Inventory of Current Practices", U.S.E.P.A., April, 1990.

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, June 1981.

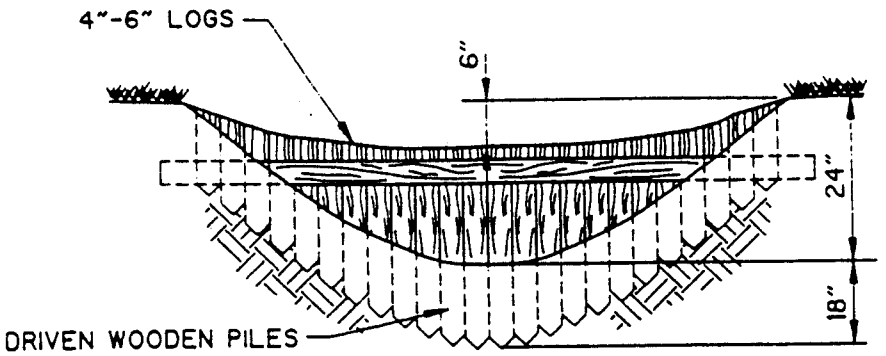
Stormwater Management Water for the Puget Sound Basin, Washington State Department of Ecology, The Technical Manual - February 1992, Publication # 91-75.

Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency - November 1988.

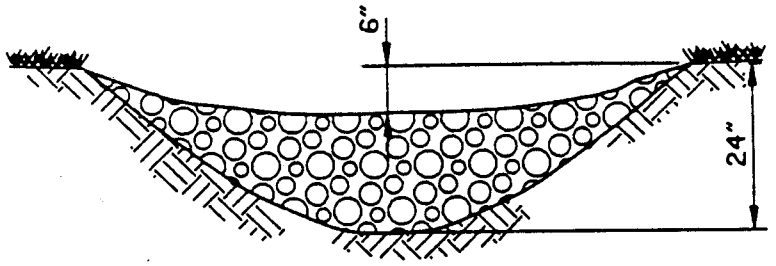
ESC41

Best Management Practices

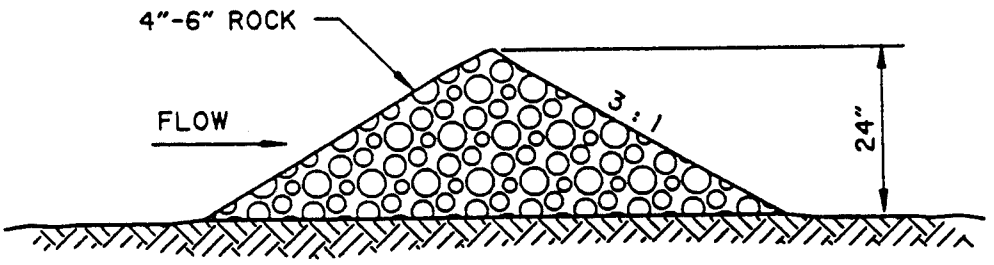
Additional Information — Check Dams



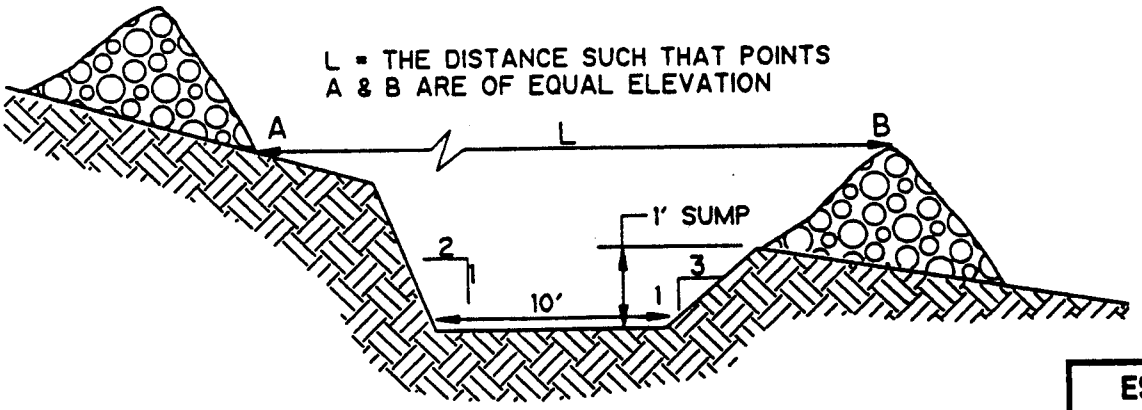
LOG CHECK DAM



ROCK CHECK DAM



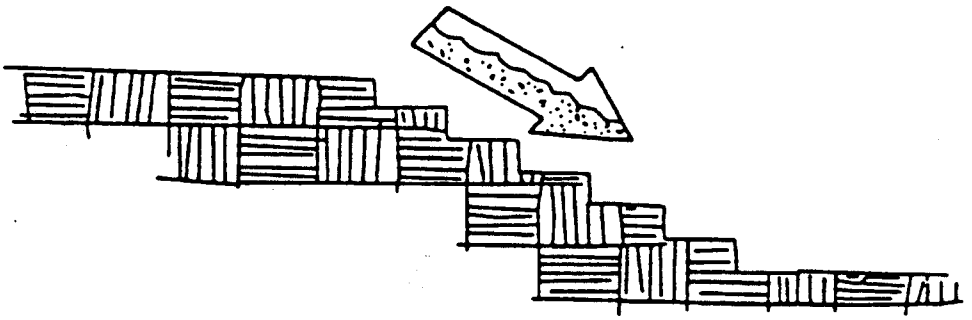
ROCK CHECK DAM CROSS-SECTION



SPACING BETWEEN CHECK DAMS

ESC41

BMP: SLOPE ROUGHENING/TERRACING



Objectives

- *Housekeeping Practices*
- *Contain Waste*
- *Minimize Disturbed Areas*
- *Stabilize Disturbed Areas* (●)
- *Protect Slopes/Channels* (●)
- *Control Site Perimeter*
- *Control Internal Erosion*

GENERAL DEFINITION

Slope roughening/terracing creates microclimates for establishing vegetation, reduces runoff velocity, increases infiltration, and provides small depressions for trapping sediment.

SUITABLE APPLICATIONS

- Any cleared area prior to seeding and planting.
- Required for cleared, erodible slopes steeper than 3:1 and higher than 5 feet prior to seeding and planting.

INSTALLATION/APPLICATION CRITERIA

Slope roughening/terracing is performed in several ways:

- Stair-step grading.
- Grooving.
- Furrowing.
- Tracking.
- Rough grading.
- No grading.

REQUIREMENTS

- Maintenance
  - Inspect roughened slopes weekly and after rainfall for excessive erosion.
  - Revegetate as quickly as possible.
- Cost (source: EPA, 1992)
  - Surface Roughening: Performed at no (e.g., rough grading) to low (e.g., tracking) cost.
  - Terracing: Average annual cost is $4 per linear foot (2 year useful life).

LIMITATIONS

- Roughening is of limited effectiveness on its own, but is used to speed revegetation.

Targeted Pollutants

- ● *Sediment*
- ○ *Nutrients*
- ○ *Toxic Materials*
- ○ *Oil & Grease*
- ○ *Floatable Materials*
- ○ *Other Construction Waste*

● *Likely to Have Significant Impact*
○ *Probable Low or Unknown Impact*

Implementation Requirements

- ○ *Capital Costs*
- ○ *O&M Costs*
- ○ *Maintenance*
- ○ *Training*
- ● *Suitability for Slopes >5%*

● *High* ○ *Low*

ESC42

Best Management Practices

Additional Information — Slope Roughening/Terracing

Slope roughening/terracing creates uneven depressions, steps or grooves on the soil surface to aid in establishment of vegetation, reduce runoff velocity, increase infiltration, and provide for sediment trapping.

Surface roughening may be applied to all slopes steeper than 3:1, and greater than 5 vertical feet, providing some instant erosion protection on bare soil while vegetative cover is being establisned. It is an inexpensive, simple and short-term erosion control measure for roadway cut slopes.

Terracing usually is a more permanent measure used to stabilize a steep slope. Terraces should be designed by a registered professional engineer and included in the project construction plans. Local design criteria should be used.

Installation/Application

Graded areas with smooth, hard surfaces give a false impression of "finished grading" and a job well done. It is difficult to establish vegetation on such surfaces due to reduced water infiltration and the potential for erosion. Rough slope surfaces with uneven soil and rocks left in place may appear unattractive or unfinished at first, but they encourage water infiltration, speed the establishment of vegetation, and decreased runoff velocity. Rough, loose soil surfaces give lime, fertilizer, and seed some natural coverage. Niches in the surface provide microclimates which generally provide a cooler and more favorable moisture level than hard flat surfaces; this aids seed germination.

There are different methods for achieving a roughened soil surface on a slope, and the selection of an appropriate method depends upon the type of slope. Roughening methods include stair-step grading, grooving, and tracking. Factors to be considered in choosing a method are slope steepness, mowing requirements, and whether the slope is formed by cutting or filling.

1. Disturbed areas which will not require mowing may be stair-step graded, grooved, or left rough after filling.
2. Graded areas steeper than 3:1 should be stair-stepped with benches (See figure at end of fact sheet). The stair-steping will help vegetation become attached and also trap soil eroded from the slopes above. Stair-step grading is particularly appropriate in soils containing large amounts of soft rock. Each "step" catches material which sloughs from above, and provides a level site where vegetation can become established. Stairs should be wide enough to work with standard earth moving equipment.
3. Areas which will be mowed (there areas should have slopes less than 3:1) may have small furrows left by disking, harrowing, raking, or seed-planting machinery operated on the contour.
4. It is important to avoid excessive compacting of the soil surface when scarifying. Tracking with bulldozer treads is preferable to not roughening at all, but is not as effective as other forms of roughening, as the soil surface is severely compacted and runoff is increased. Tracking can be accomplished in a variety of ways, including "track walking," or driving a crawler tractor up and down the slope, in leaving a pattern of cleat imprints parallel to slope contours.

REFERENCES

Best Management Practices and Erosion Control Manual for Construction Sites, Flood Control District of Maricopa County, Arizona, September 1992.

Handbook of Steel, Drainage & Highway Construction, American Iron and Steel Institute, 1983.

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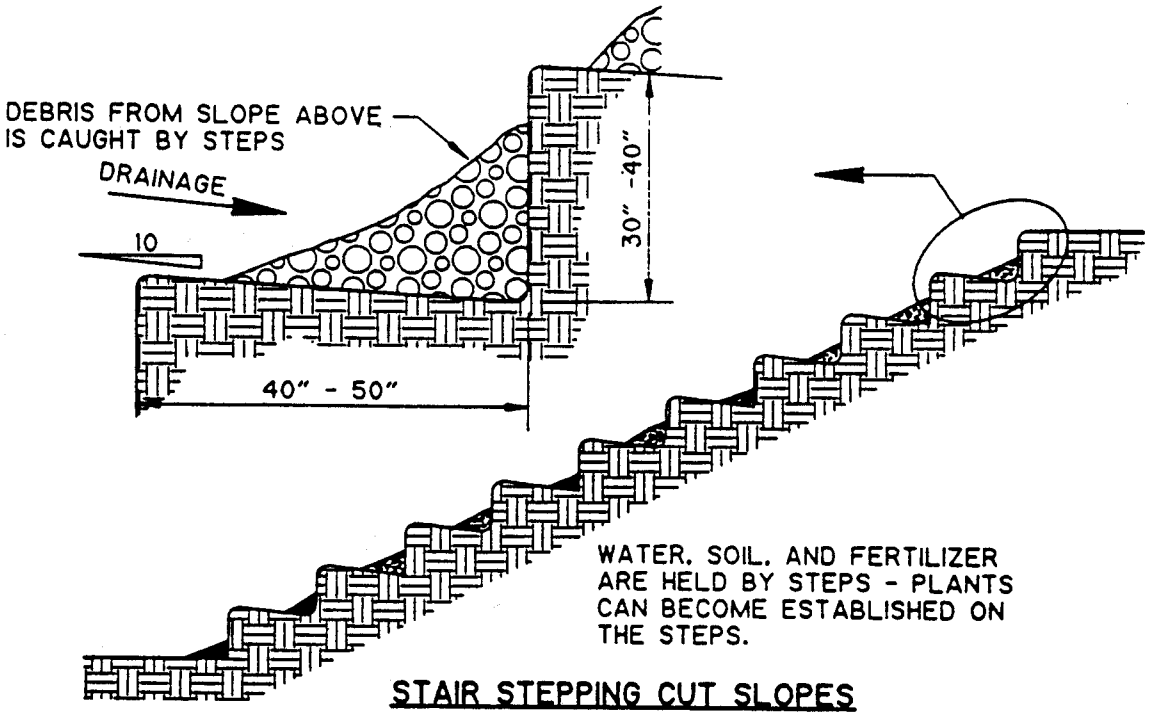
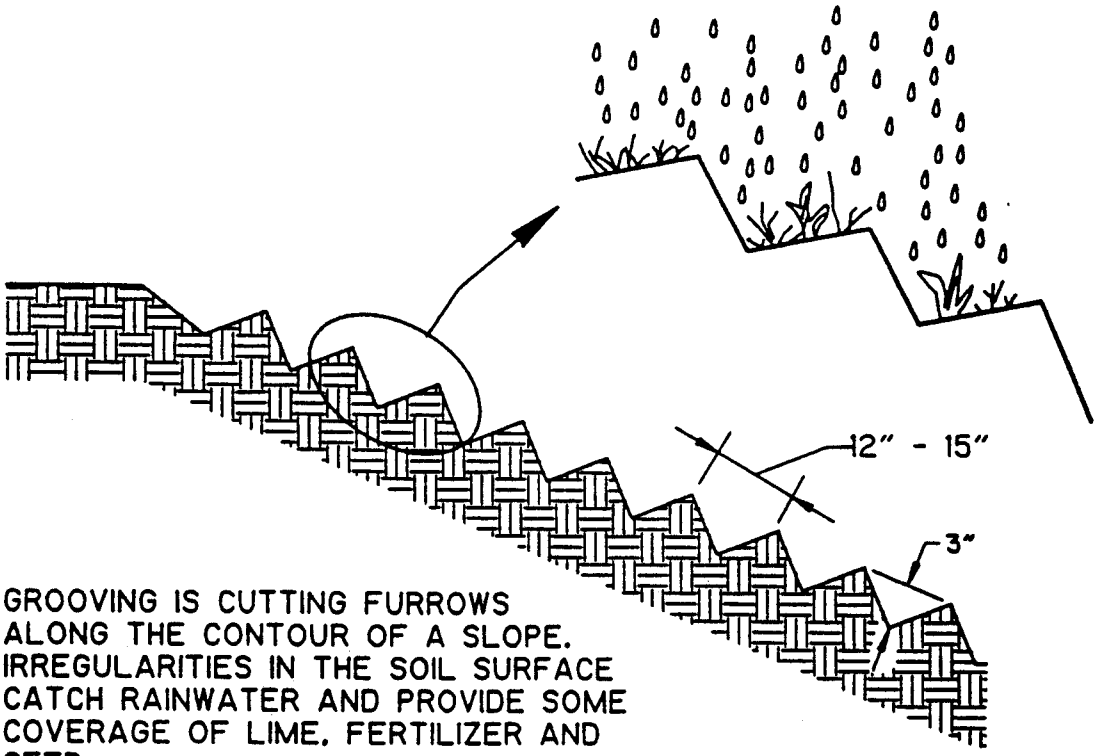
ESC42

Additional Information — Slope Roughening/Terracing



STAIR STEPPING CUT SLOPES



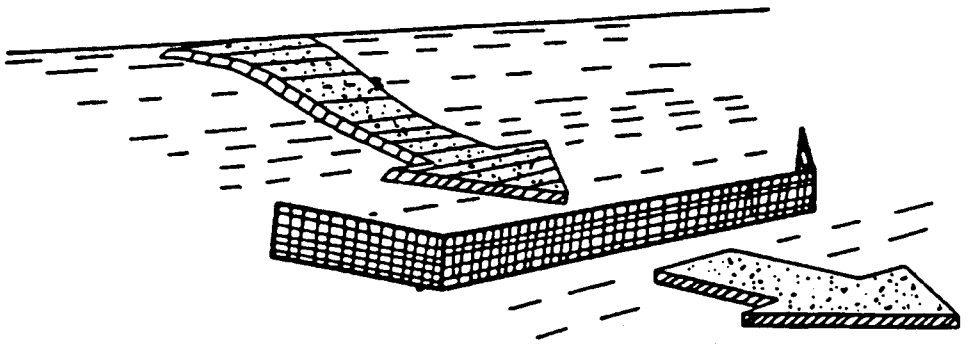
GROOVING IS CUTTING FURROWS ALONG THE CONTOUR OF A SLOPE. IRREGULARITIES IN THE SOIL SURFACE CATCH RAINWATER AND PROVIDE SOME COVERAGE OF LIME, FERTILIZER AND SEED.

GROOVING SLOPES

ESC42

STAIR-STEPPING CUT SLOPES AND GROOVING SLOPES

BMP: SILT FENCE



Objectives

- *Housekeeping Practices*
- *Contain Waste*
- *Minimize Disturbed Areas*
- *Stabilize Disturbed Areas*
- *Protect Slopes/Channels*
- *Control Site Perimeter*
- *Control Internal Erosion*

GENERAL DESCRIPTION

A silt fence is made of a filter fabric which has been entrenched, attached to supporting poles, and sometimes backed by a wire fence for support. The silt fence detains sediment-laden water, promoting sedimentation behind the fence.

SUITABLE APPLICATIONS

- Along the perimeter of the site.
- Below the toe of a cleared slope.
- Along streams and channels.
- Around temporary spoil areas.
- Across swales with catchments less than 1 acre.
- Below other small cleared areas.

INSTALLATION/APPLICATION

- Use principally in areas where sheet flow occurs.
- Install along a level contour, so water does not pond more than 1.5 feet at any point.
- No more than 1 acre, 100 ft., or 0.5 cfs of concentrated flow should drain to any point along the silt fence.
- Turn ends of fence uphill.
- Provide area behind the fence for runoff to pond and sediment to settle (approx. 1200 sq. ft. per acre draining to the silt fence).
- Select filter fabric which retains 85% of the soil, by weight, based on sieve analysis, but is not finer than an equivalent opening size of 70.

REQUIREMENTS

- Maintenance
  - Inspect weekly and after each rainfall.
  - Repair wherever fence is damaged.
  - Remove sediment when it reaches 1/3 the height of the fence.
- Cost (source: EPA, 1992)
  - Average annual cost for installation and maintenance (assumes 6 month useful life): $7 per lineal foot ($850 per drainage acre)

LIMITATIONS

- Do not use where 85% of the soil, by weight, passes through a No. 200 sieve because the filter fabric will clog.
- Do not place fence on a slope, or across any contour line.
- Do not use in streams, channels, or anywhere flow has concentrated.
- Do not use in locations where ponded water may cause flooding.

Targeted Pollutants

- ● *Sediment*
- ○ *Nutrients*
- ○ *Toxic Materials*
- ○ *Oil & Grease*
- ○ *Floatable Materials*
- ○ *Other Construction Waste*

- ● *Likely to Have Significant Impact*
- ○ *Probable Low or Unknown Impact*

Implementation Requirements

- ◒ *Capital Costs*
- ◒ *O&M Costs*
- ◒ *Maintenance*
- ○ *Training*
- ○ *Suitability for Slopes >5%*

● *High* ○ *Low*

ESC50

Best Management Practices

Additional Information — Silt Fence

A silt fence is a temporary sediment barrier consisting of filter fabric stretched across and attached to supporting posts, entrenched, and, depending upon the strength of the fabric used, supported with wire fence. Silt fences trap sediment in two ways: (1) by intercepting and detaining small amounts of sediment from disturbed areas during construction operations in order to promote sedimentation behind the fence; and (2) by decreasing the velocity of low flows (up to 0.5 cfs) in swales.

Silt fences may be used for perimeter control, placed upstream of the point(s) of discharge of sheet flow from a site. They may also be used as interior controls below disturbed areas where runoff may occur in the form of sheet and rill erosion, and perpendicular to minor swales or ditch lines for up to one acre contributing drainage areas. Silt fences are generally ineffective in locations where the flow is concentrated and are only applicable for sheet or overland flows.

Installation/Application

Planning:

Silt fences are generally most effective when the following placement criteria are followed:

- Limit the upstream drainage area to 1 acre or less when used alone or in combination with sediment basin in a larger site.
- The maximum slope perpendicular to the fence line should be 1:1.
- Limit the maximum sheet or overland flow path length to any point along the fence to 100 feet.
- Limit the concentrated flows reaching the fence to 0.5 cfs.

Silt fences are preferable to straw barriers in many cases. Laboratory work at the Virginia Highway and Transportation Research Council has shown that silt fences can trap a much higher percentage of suspended sediments than can straw bales. While the failure rate of silt fences is lower than that of straw barriers, there are many instances where silt fences have been improperly installed. The following installation methods can improve performance and should be followed:

- Construct the silt fence along a level contour.
- Silt fences should remain in place until the disturbed area is permanently stabilized.
- 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 sq. ft. of ponding area should be provided for every acre draining to the fence.
- Turn the ends of the filter fence uphill to prevent storm water from flowing around the fence.
- Leave an undisturbed or stabilized area immediately downslope from the fence.
- Do not place in live streams or intermittently flowing channels.

Design:

Selection of a filter fabric is based on soil conditions at the construction site (which affect the equivalent opening size (EOS) fabric specification) and characteristics of the support fence (which affect the choice of tensile strength). The designer should specify a filter fabric that retains the soil found on the construction site yet will have openings large enough to permit drainage and prevent clogging. The following criteria is recommended for selection of the equivalent opening size:

1. If 50 percent or less of the soil, by weight, will pass the U.S. standard sieve No. 200, select the EOS to retain 85 percent of the soil. The EOS should not be finer than EOS 70.
2. For all other soil types, the EOS should be no larger than the openings in the U.S. Standard Sieve No. 70 [0.0083 in. (0.21 mm.)] except where direct discharge to a stream, lake, or wetland will occur, then the EOS should be no larger than Standard Sieve No. 100.

ESC50

Best Management Practices

Additional Information — Silt Fence

To reduce the chance of clogging, it is preferable to specify a fabric with openings as large as allowed by the criteria. No fabric should be specified with an EOS smaller than U.S. Standard Sieve No. 100 [0.0059 in. (0.15 mm.)]. If 85 percent or more of a soil, by weight, passes through the openings in a No. 200 sieve [0.0029 in. (0.074 mm.)], filter fabric should not be used. Most of the particles in such a soil would not be retained if the EOS was too large, and they would clog the fabric quickly if the EOS was small enough to capture the soil.

The fence should be supported by a wire mesh if the fabric selected does not have sufficient strength and bursting strength characteristics for the planned application (as recommended by the fabric manufacturer). Filter fabric material should contain ultraviolet ray inhibitors and stabilizers to provide a minimum of six months of expected usable construction life at a temperature range of 0° F. to 120° F.

Installation Guidelines:
Filter fences are to be constructed on a level contour. Sufficient area should exist behind the fence for ponding to occur without flooding or overtopping the fence.

- Posts should be spaced a maximum of 6 feet apart and driven securely into the ground a minimum of 30 inches.
- A trench should be excavated approximately 8 inches wide and 12 inches deep along the line of posts and upslope from the barrier.
- When standard strength filter fabric is used, a wire mesh support fence should be fastened securely to the upslope side of the posts using heavy-duty wire staples at least 1 inch long, tie wires or hog rings. The wire should extend into the trench a minimum of 4 inches.
- The standard strength filter fabric should be stapled or wired to the fence, and 40 inches of the fabric should extend into the trench. When extra-strength filter fabric and closer post spacing are used, the wire mesh support fence may be eliminated and the filter fabric stapled or wired directly to the posts.
- Avoid the use of joints. The filter fabric should be purchased in a continuous roll, then cut to the length of the barrier. When joints are necessary, filter cloth should be spliced together only at a support post, with a minimum 6 inch overlap, and both ends securely fastened to the post.
- The trench should be backfilled with compacted native material.

Requirements
Maintenance:

Inspect monthly during dry periods and immediately after each rainfall. Repair as necessary. Sediment must be removed when it reaches approximately one third the height of the fence, especially if heavy rains are expected.

Filter fences should not be removed until the upslope area has been permanently stabilized.

Limitations
- Filter fences will create a temporary sedimentation pond on the upstream side of the fence and may cause temporary flooding. Fences not constructed on a level contour will be overtopped by concentrated flow resulting in failure of the filter fence.
- Filter fences are not practical where large flows of water are involved, hence the need to restrict their use to drainage areas of one acre or less, and flow rates of less than 0.5 cfs.
- Problems may arise from incorrect selection of pore size and/or improper installation.
- Do not allow water depth to exceed 1.5 ft. at any point.
- Improperly installed fences are subject to failure from undercutting, overlapping, or collapsing.

ESC50

Best Management Practices

Additional Information — Silt Fence

REFERENCES

Best Management Practices and Erosion Control Manual for Construction Sites, Flood Control District of Maricopa County, Arizona, September 1992.

Environmental Action Manual, City of Austin, Texas, 1989.

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, Jun 1981.

Proposed Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, Work Group Working Paper, USEPA, April, 1992.

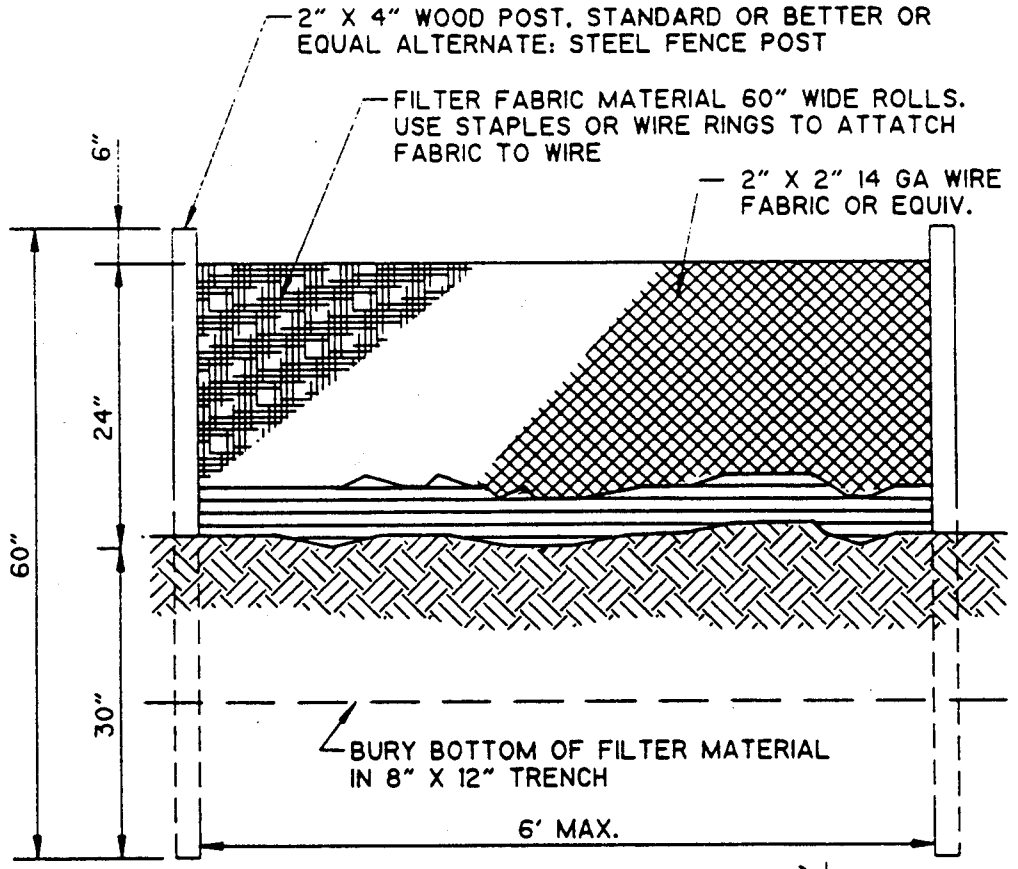
Sedimentation and Erosion Control Practices, An Introductory of Current Practices (Draft), USEPA, 1990.

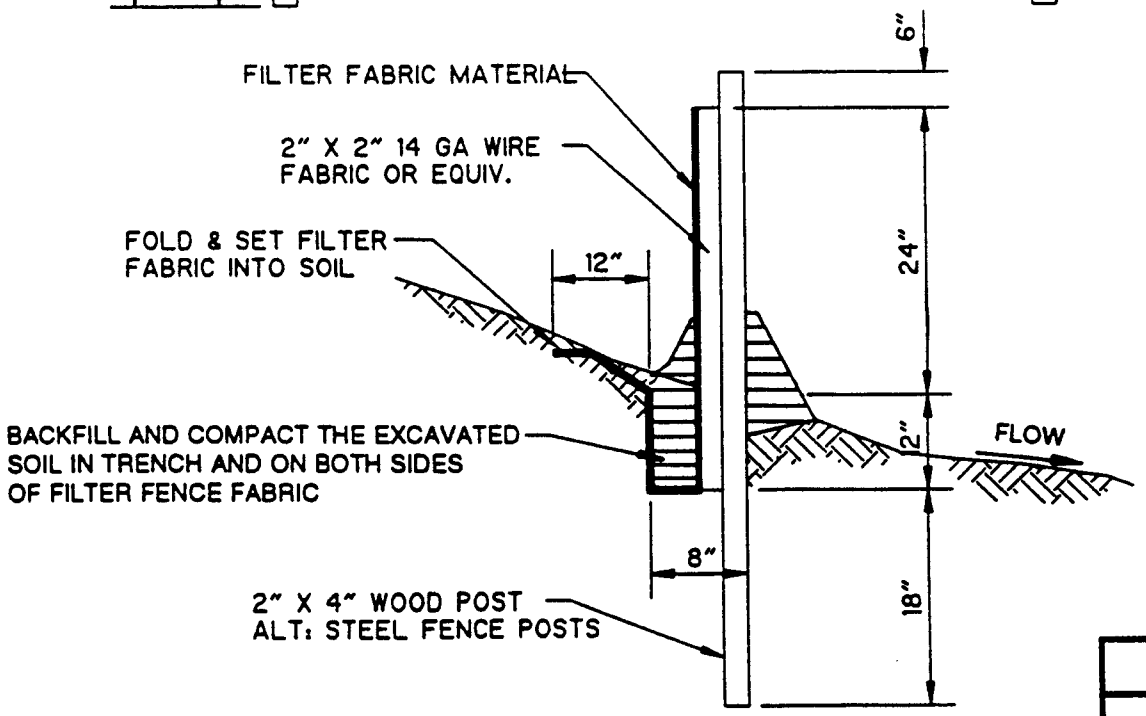
Stormwater Management Manual for The Puget Sound Basin, Washington State Department of Ecology, Public Review Draft, 1991.

Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency - November 1988.

ESC50

Additional Information — Silt Fence



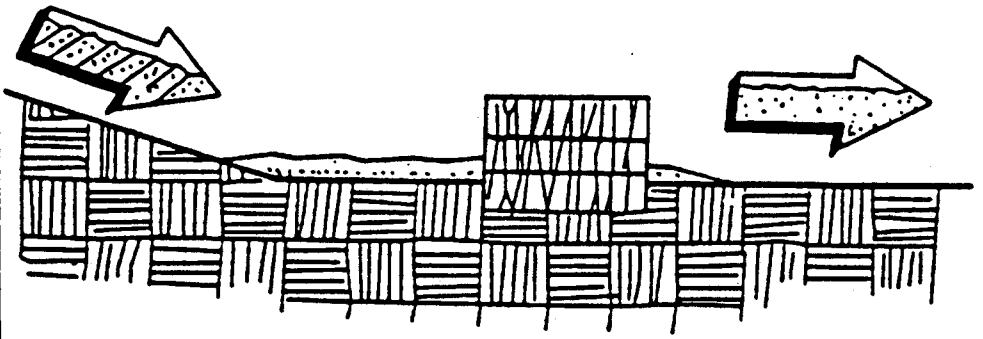


SILT FENCE

ESC50

Best Management Practices

BMP: STRAW BALE BARRIERS



Objectives

- *Housekeeping Practices*
- *Contain Waste*
- *Minimize Disturbed Areas*
- *Stabilize Disturbed Areas*
- *Protect Slopes/Channels*
- *Control Site Perimeter* (●)
- *Control Internal Erosion* (●)

GENERAL DEFINITION

A straw bale barrier consists of straw bales placed end to end along a level contour in a shallow trench and staked to hold them in place. The barrier detains runoff, creating a pond behind the barrier where sedimentation occurs.

SUITABLE APPLICATIONS

- Along the perimeter of the site.
- Along streams and channels.
- Across swales with small catchments.
- Around temporary spoil areas.
- Below other small, cleared areas.

INSTALLATION/APPLICATION CRITERIA

- Use primarily in areas where sheet or rill flow occurs.
- No more than 1/4 acre per 100 feet of barrier should drain to the barrier.
- Install along a level contour.
- Place in a 4-inch deep trench.
- Backfill and compact the excavated soil on the upstream face of the barrier.
- Secure each bale with two stakes.
- Leave enough area (about 1200 sq. ft. per acre) behind the barrier for runoff to pond (no more than 1.5 ft. depth) and sediment to settle.

REQUIREMENTS

- Maintenance
  - Inspect weekly and after each rain.
  - Replace bales which have decomposed or whose bindings have broken.
  - Remove sediment behind the barrier when it reaches a depth of 6 inches.
- Costs (source: EPA, 1992)
  - Average annual cost for installation and maintenance (assumes 3 month useful life): $17 per lineal foot ($6,800 per drainage acre).

LIMITATIONS

- Straw bale barriers are not to be used for extended periods of time because they tend to rot and fall apart.
- Suitable only for sheet flow on slopes of 2% or flatter.
- Not appropriate for large drainage areas, limit to one acre or less.
- Straw bales lose their effectiveness rapidly due to rotting, thus constant maintenance is required.
- Not recommended for concentrated flow, inlet protection, channel flow, and live streams.
- Bale bindings of jute or cotton not recommended.

Targeted Pollutants

- ● *Sediment*
- ○ *Nutrients*
- ○ *Toxic Materials*
- ○ *Oil & Grease*
- ○ *Floatable Materials*
- ○ *Other Construction Waste*

● *Likely to Have Significant Impact*
○ *Probable Low or Unknown Impact*

Implementation Requirements

- ● *Capital Costs*
- ● *O&M Costs*
- ● *Maintenance*
- ○ *Training*
- ○ *Suitibility for Slopes >5%*

● *High* ○ *Low*

ESC51

Best Management Practices

BMP: STRAW BALE BARRIERS (Continue)

- Straw bale barriers have not been as effective as expected due to improper use. These barriers have been placed in streams and drainageways where runoff volumes and velocities have caused the barriers to wash out. In addition, failure to stake and entrench the straw bale has allowed undercutting and end flow.

ESC51

Additional Information — Straw Bale Barrier

A straw bale barrier consists of a series of secured anchored bales placed to intercept sediment-laden runoff from small drainage areas of disturbed soil. The barrier ponds runoff and allow sediment to settle. Straw bale dikes should not be used for extended periods of time because they tend to rot and fall apart.

The straw bale barrier is used where there are no concentrations of water in a channel or drainageway, and where erosion would occur from sheet flow. These barriers are typically constructed below disturbed areas subject to sheet flow of runoff.

Installation/Application

Straw bale barriers should be used for drainage areas no more than 1/4 acre per 100 feet of barrier length, with no more than 100 ft upstream of any point along the barrier. The barrier should be placed along a level contour no greater than 2:1. When installed and maintained according to the guidelines on this fact sheet, straw bale dikes remove approximately 67% of the sediment transported in construction site runoff. This optimum efficiency can only be achieved through careful maintenance, with special attention to replacing rotted or broken bales. The barrier should be constructed on a level contour to prevent concentration of flow against a small portion of the barrier.

An effective straw bale barrier should be installed in the following manner:

1. Bales should be placed on the contour and in a row with ends tightly abutting the adjacent bales.
2. Leave area for runoff to pond upstream of the barrier by locating barrier away from the toe of slopes. This also provides access for maintenance.
3. Each bale should be embedded in the soil a minimum of (4) inches and placed so the bindings are horizontal. Bindings placed on soil will soon disintegrate and cause the barrier to fail.
4. Bales should be securely anchored in place by either two stakes or re-bars driven through the bale. The first stake in each bale should be driven toward the previously laid bale at an angle to force the bales together. Stakes should be driven flush with the bale.
5. Backfill and compact the excavated soil along the upstream face of the barrier.
6. Remove the barrier when it has served its usefulness so as not to block or impede storm flow or drainage.

REFERENCES

Best Management Practices and Erosion Control Manual for Construction Sites, Flood Control District of Maricopa County, Arizona, September 1992.

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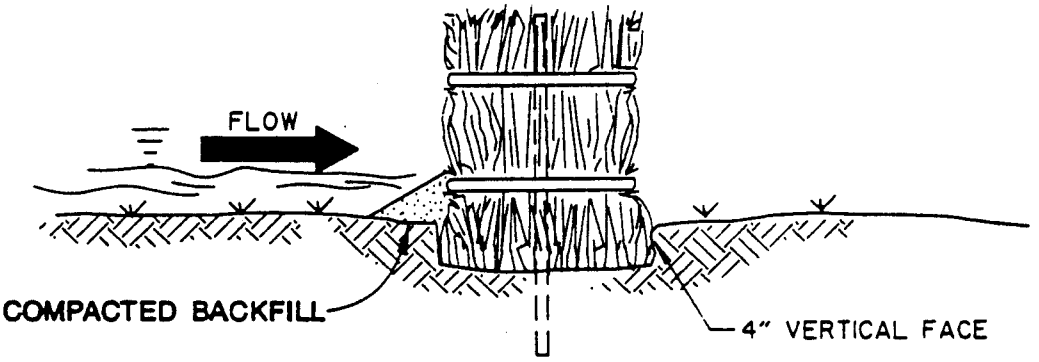
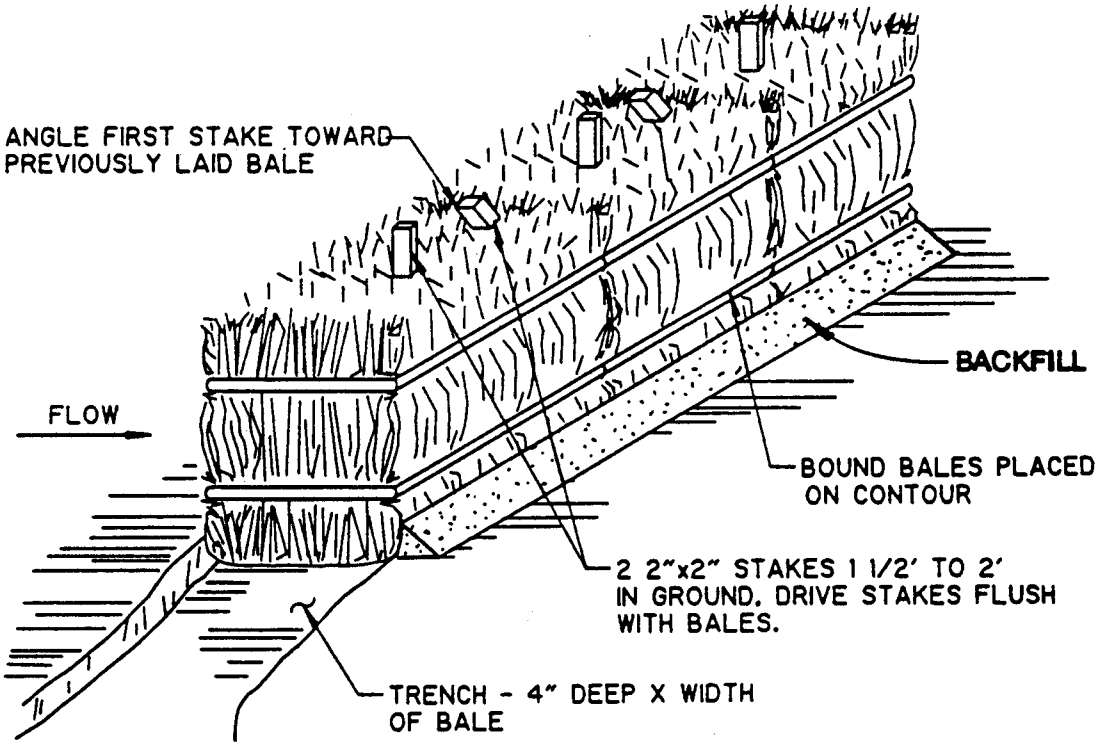
ESC51

Additional Information — Straw Bale Barrier



• PROMOTES ON SITE SEDIMENTATION BY CREATING A TEMPORARY POND.

BEDDING DETAIL



SUBSTITUTION OF STEEL BARS FOR WOODEN STAKES IS NOT RECOMMENDED DUE TO POTENTIAL FOR DAMAGING CONSTRUCTION EQUIPMENT

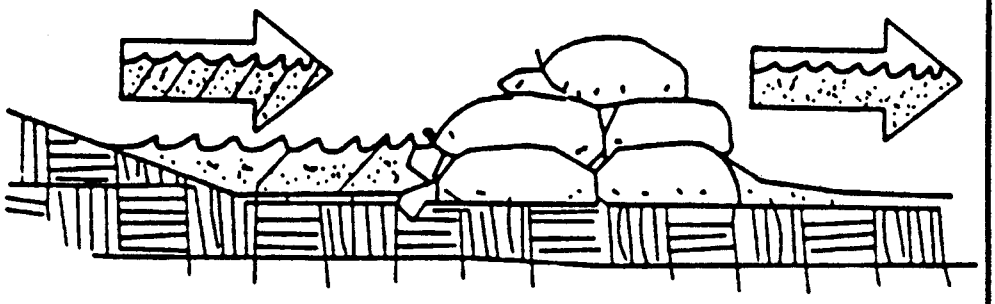
ANCHORING DETAIL

STRAW BALE BARRIERS

ESC51

Best Management Practices

BMP: SAND BAG BARRIER



Objectives

- *Housekeeping Practices*
- *Contain Waste*
- *Minimize Disturbed Areas*
- *Stabilize Disturbed Areas*
- *Protect Slopes/Channels*
- *Control Site Perimeter*
- *Control Internal Erosion*

GENERAL DEFINITION

Stacking sand bags along a level contour creates a barrier which detains sediment-laden water, ponding water upstream of the barrier and promoting sedimentation.

SUITABLE APPLICATIONS

- Along the perimeter of the site.
- Check dams across streams and channels.
- Along streams and channels.
- Barrier for utility trenches in a channel.
- Across swales with small catchments.
- Division dike or berm.
- Below the toe of a cleared slope.
- Create a temporary sediment trap.
- Around temporary spoil areas.
- Below other small cleared areas.

INSTALLATION/APPLICATION CRITERIA

- May be used in drainage areas up to 5 acres.
- Install along a level contour.
- Base of sand bag barrier should be at least 48 inches wide.
- Height of sand bag barrier should be at least 18 inches high.
- 4 inch PVC pipe may be installed between the top layer of sand bags to drain large flood flows.
- Provide area behind barrier for runoff to pond and sediment to settle, size according to sediment trap BMP criteria (ESC55).
- Place below the toe of a slope.
- Use sand bags large enough and sturdy enough to withstand major flooding.

REQUIREMENTS

- Maintenance
  - Inspect after each rain.
  - Reshape or replace damaged sand bags immediately.
  - Remove sediment when it reaches six inches in depth.
- Cost
  - Sand bag barriers are more costly, but typically have a longer useful life than other barriers.

LIMITATIONS

- Sand bags are more expensive than other barriers, but also more durable.
- Burlap should not be used for sand bags.

Targeted Pollutants

- ● *Sediment*
- ○ *Nutrients*
- ○ *Toxic Materials*
- ○ *Oil & Grease*
- ○ *Floatable Materials*
- ○ *Other Construction Waste*

● *Likely to Have Significant Impact*
○ *Probable Low or Unknown Impact*

Implementation Requirements

- ● *Capital Costs*
- ○ *O&M Costs*
- ○ *Maintenance*
- ○ *Training*
- ◒ *Suitability for Slopes >5%*

● *High* ○ *Low*

ESC52

Best Management Practices

Additional Information — Sand Bag Barrier

Suitable Applications

Sand bag berms may be used during construction activities in stream beds and utility construction in channels, temporary channel crossing for construction equipment, etc. Sand bag berms may also be installed parallel to roadway construction. Sand bag berms may also be used to create temporary sediment traps, retention basins and in place of straw bales or silt fences. Examples of applications include:

- Check dams across stream channels.
- Barriers for utility trenches or other construction in a stream channel.
- At temporary channel crossings.
- May be used on a slope where straw bales and silt fences are not appropriate.
- As a diversion dike.
- Embankment for a temporary sediment basin or retention basin.
- Sediment barriers near the toe of slopes.
- At construction perimeter.

Advantages

- Provides a semi-permeable barrier in potentially wet areas.
- More permanent than silt fences or straw bales.
- Allows for easy relocation on site to meet changing needs during construction.

Installation/Application

Sand bag barriers may be used for sediment trapping in locations where silt fences and straw bale barriers are not strong enough. In addition, sand bag barriers are appropriate to use when construction of check dams or sumps in a stream is undesirable. The sand bag berms can provide the same function as a check dam without disturbing the stream or vegetation. The sand bag berm will also allow a small sediment retention area to be created prior to construction of final detention basins. For installation of a sand bag berm, the following criteria should be observed:

- Drainage Area - Up to five (5) acres.
- Height of Berm - 18 inches minimum height, measured from the top of the existing ground at the upslope toe to the top of the barrier.
- Width of Berm - 48 inches minimum width measured at the bottom of the barrier; 18 inches at the top.
- Sand bag Size - Length 24 to 30 inches, width 16 to 18 inches and thickness six (6) to eight (8) inches. Weight 90 to 125 pounds.
- Sand bag Material - Polypropylene, polyethylene or polyamide woven fabric, minimum unit weight four (4) ounces per square yard, mullen burst strength exceeding 300 psi and ultraviolet stability exceeding 70 percent. Use of burlap is discouraged since it rots and deteriorates easily.
- Grade of Sand - Coarse sand, gravel.
- Runoff water should be allowed to flow over the tops of the sand bags or through four (4) inch polyvinyl chloride pipes embedded below the top layer of bags.
- Area behind the sand bag barrier should be established according to sizing criteria for sediment trap BMP (ESC55).

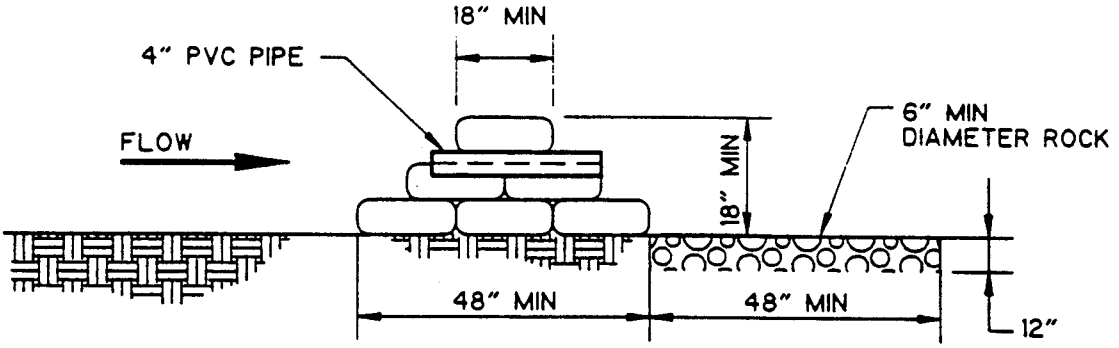
REFERENCES

Best Management Practices and Erosion Control Manual for Construction Sites, Flood Control District of Maricopa County, Arizona, September 1992.

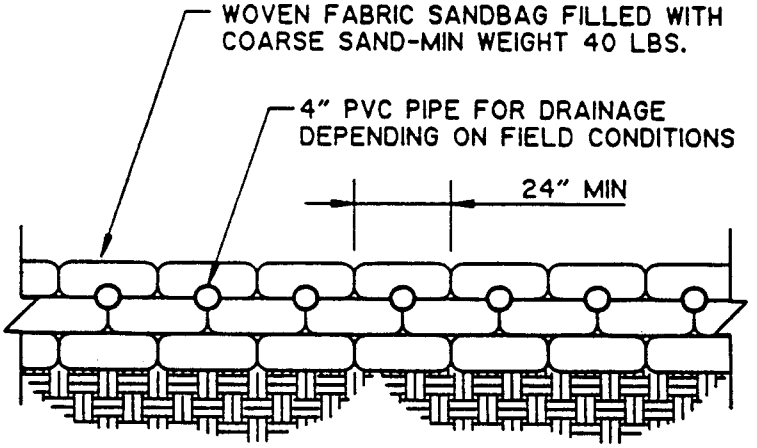
Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency - November 1988.

ESC52

Additional Information — Sand Bag Barrier



CROSS-SECTION

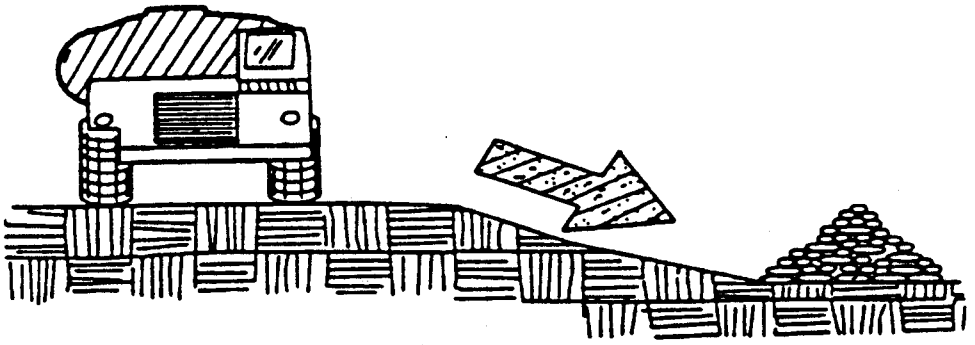


FRONT VIEW

SAND BAG BERM

ESC52

BMP: BRUSH OR ROCK FILTER



Objectives

- *Housekeeping Practices*
- *Contain Waste*
- *Minimize Disturbed Areas*
- *Stabilize Disturbed Areas*
- *Protect Slopes/Channels*
- *Control Site Perimeter*
- *Control Internal Erosion*

GENERAL DEFINITION

A rock filter berm is made of rock 3/4 to 3 inches in diameter and placed along a level contour where sheet flow may be detained and ponded, promoting sedimentation. A brush barrier is composed of brush (usually obtained during the site clearing) wrapped in filter cloth and anchored to the toe of the slope. If properly anchored brush or rock filters may be used for sediment trapping and velocity reduction. See Check Dam BMP (ESC41) for more information.

SUITABLE APPLICATIONS

- As check dams across mildly sloped construction roads.
- Below the toe of slopes.
- Along the site perimeter.
- Along streams and channels.
- Around temporary spoil areas.
- Below other small cleared areas.
- At sediment traps at culvert/pipe outlets.

INSTALLATION/APPLICATION CRITERIA

- Use principally in areas where sheet or rill flow occurs.
- For rock filter, use larger rock and place in a staked, woven wire sheathing if placed where concentrated flows occur.
- Install along a level contour.
- Leave area behind berm where runoff can pond and sediment can settle.
- Drainage area should not exceed 5 acres.

REQUIREMENTS

- Maintenance
  - Inspect monthly and after each rainfall.
  - If berm damaged, reshape and replace lost/dislodged rock.
  - Remove sediments when depth reaches 1/3 of berm height, or 1 ft.
- Cost
  - Brush filter: Low to moderate cost if debris from on-site clearing and grubbing is used.
  - Rock filter: Expensive, since off-site materials, hand construction and demolition/removal are usually required.

Targeted Pollutants

- ● *Sediment*
- ○ *Nutrients*
- ○ *Toxic Materials*
- ○ *Oil & Grease*
- ○ *Floatable Materials*
- ○ *Other Construction Waste*

● *Likely to Have Significant Impact*
○ *Probable Low or Unknown Impact*

Implementation Requirements

- ◒ *Capital Costs*
- ◒ *O&M Costs*
- ○ *Maintenance*
- ○ *Training*
- ◒ *Suitability for Slopes >5%*

● *High* ○ *Low*

ESC53

Best Management Practices

LIMITATIONS

- Rock berms may be difficult to remove.
- Removal problems limit their usefulness in landscaped areas.
- Not appropriate for drainage areas greater than 5 acres.
- Runoff will pond upstream of the filter, possibly causing flooding if sufficient space does not exist.

ESC53

Additional Information — Brush or Rock Filter

Rock Filter

A rock filter consists of open graded rock installed at the toe of a slope, along the perimeter of a developing or disturbed area, and as a checkdam across construction roads. Their purpose is to intercept sediment laden runoff from disturbed areas of the site, allow the runoff to pond, promote sedimentation behind the filter, and slowly release the water as sheet flow.

Rock filters are appropriate where a temporary measure is needed to prevent sediments from entering right-of-ways of traffic areas such as near the toe of slopes, incorporated into temporary stabilized construction entrances (ESC 26), or at other locations along the construction site perimeter. Rock filters may also be used as check dams across one or more lanes of construction traffic temporary roads, or unsurfaced rights of way subject to construction traffic.

Advantages of the rock filters are that they may be less costly than other temporary barriers, and are relatively efficient at sediment removal.

Installation/Application:

Planning:

- Rock filters should be placed along a level contour to intercept sheet flow.
- Allow ample room for ponding, sedimentation, and access by sediment removal equipment between the berm and the toes of slopes.
- Flow through the filter should occur as sheet flow into an undisturbed or stabilized area.
- Installation in stream beds requires large rock, staking of woven wire sheathing, and daily inspection.

Design & Sizing Criteria:

The following design criteria are commonly used to construct filters:

- In Non-Traffic Areas:
  - Maximum flow-through rate per square foot of filter = 60 gpm
  - Height = 18 inches minimum
  - Top width = 24 inches minimum
  - Side slopes = 2:1 or flatter
  - Woven wire sheathing (poultry netting) is recommended in areas of concentrated flow. The wire should be 1 inch diameter hexagonal mesh, galvanized 20 gauge.
  - Build the filter along on a level contour.
  - Rock: 3/4 to 3 inches open graded for sheet flow, 3 to 5 inches open graded for concentrated flow.

- In Construction Traffic Areas:
  - Height = 12" maximum
  - Provide multiple filters in series, spaced as shown.
    - Every 300 ft on slopes less than 5 percent
    - Every 200 ft on slopes 5 to 10 percent
    - Every 100 ft on slopes greater than 10 percent.

Brush Filter

Brush filters trap and filter sediments in a manner similar to other barriers in this handbook (e.g., silt fence, straw bale barrier, rock filter), but have the advantage of being constructed from brush cleared from the site and usually disposed off-site at a cost.

ESC53

Best Management Practices

Additional Information — Brush or Rock Filter

Steps in Construction of a Brush Filter:

1. Stack the brush at the toe of a slope or along the perimeter of the site just outside the limits of clearing and grabbing. The brush may be stacked up to 15 ft. high and 15 ft. wide.
2. Construct a trench 1 to 3 ft. deep immediately upslope from the brush.
3. Place filter fabric over the brush filter and in the trench, extending 1 to 2 ft. upslope of the trench.
4. Backfill the trench with aggregate or compacted soil. The trench should be deep enough and backfill material sufficient to hold the barrier in place during a storm.

REFERENCES

Best Management Practices and Erosion Control Manual for Construction Sites, Flood Control District of Maricopa County, Arizona, September1992.

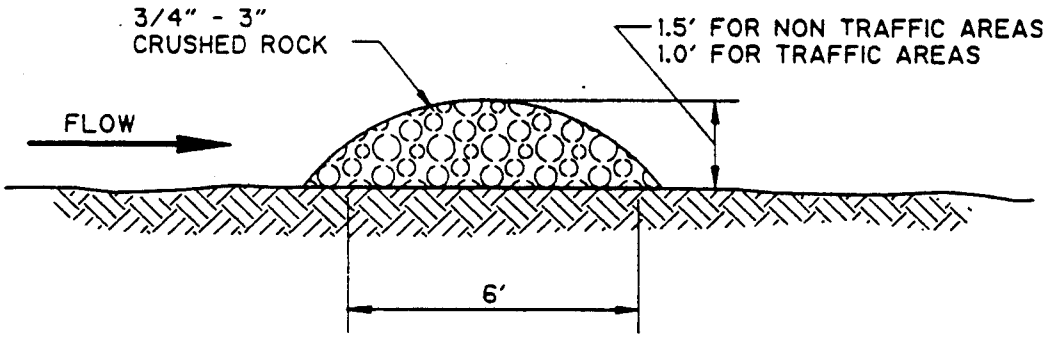
Handbook of Steel Drainage & Highway Construction, American Iron and Steel Institute, 1983.

Stormwater Management Water for the Puget Sound Basin, Washington State Department of Ecology, The Technical Manual - February 1992, Publication # 91-75.

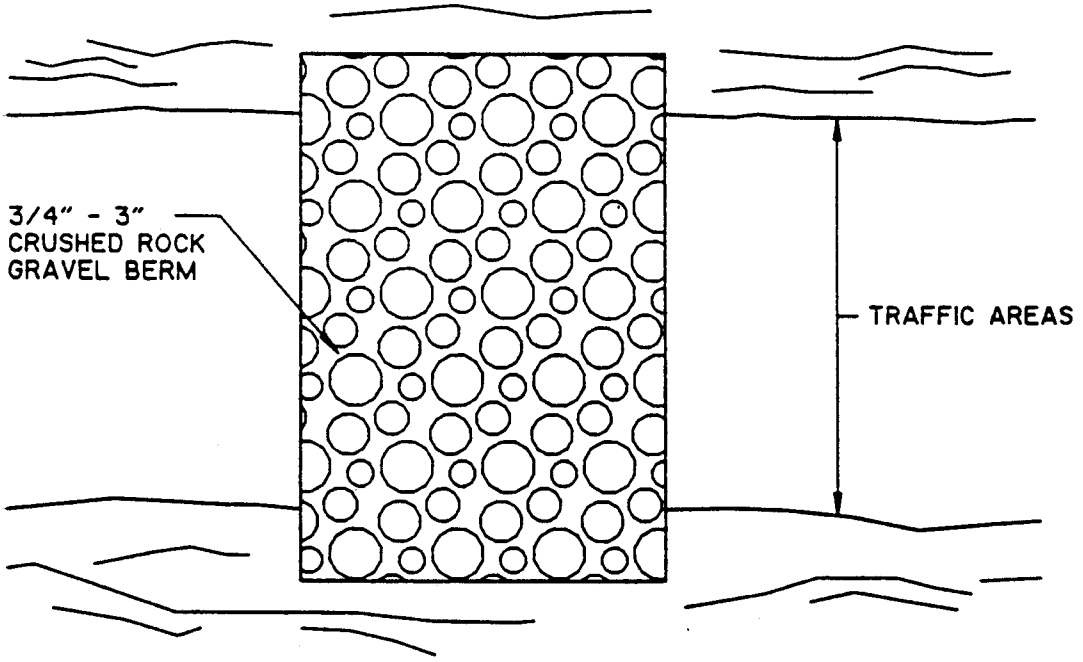
Storm Water Pollution Plan Handbook, First Edition, State of California, Department of Transportation Division of New Technology, Materials and Research, October 1992.

ESC53

Additional Information — Brush or Rock Filter



SECTION

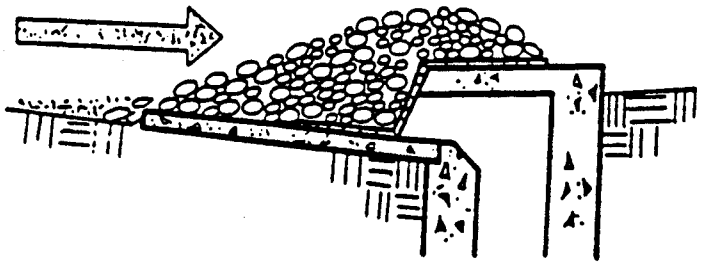


PLAN

GRAVEL FILTER BERM

ESC53

BMP: STORM DRAIN INLET PROTECTION



Objectives

- *Housekeeping Practices*
- *Contain Waste*
- *Minimize Disturbed Areas*
- *Stabilize Disturbed Areas*
- *Protect Slopes/Channels*
- *Control Site Perimeter*
- *Control Internal Erosion*

GENERAL DEFINITION

Devices of various designs which detain sediment-laden runoff and allow the sediment it to settle prior to discharge into a storm drain inlet or catch basin.

SUITABLE APPLICATIONS

- Every storm drain inlet receiving sediment-laden runoff should be protected, either by covering the inlet or promoting sedimentation upstream of the inlet.

INSTALLATION/APPLICATION

- Five types of inlet protection are presented below, however, it is recognized that other effective methods and proprietary device, exist and may be selected:
  - Filter Fabric Fence: Appropriate for drainage basins less than one acre with less than a 5 percent slope.
  - Block and Gravel Filter: Appropriate for flows greater than 0.5 cfs.
  - Gravel and Wire Mesh Filter: Used on curb or drop inlets where construction equipment may drive over the inlet.
  - Sand bag barrier: Used to create a small sediment trap upstream of inlets on sloped, paved streets.
  - Excavated Drop Inlet Sediment Trap: An excavated area around the inlet to trap sediment (see Sediment Trap ESC 55).
- Select the appropriate type of inlet protection and design as referred to or as described in this fact sheet.
- Use only for drainage areas smaller than one acre unless a sediment trap first intercepts the runoff.
- Provide area around the inlet for water to pond without flooding structures and property.

REQUIREMENTS

- Maintenance
  - Inspect weekly and after each rain.
  - Replace clogged filter fabric or stone filters immediately.
  - Remove sediment when depth exceeds half the height of the filter, or half the depth of the sediment trap.
  - Remove as soon as upstream soils are stabilized and streets are swept.
- Cost (source: EPA, 1992)
  - Average annual cost for installation and maintenance (1 year useful life) is $150 per inlet.

Targeted Pollutants

- ● *Sediment*
- ○ *Nutrients*
- ○ *Toxic Materials*
- ○ *Oil & Grease*
- ◒ *Floatable Materials*
- ○ *Other Construction Waste*

● *Likely to Have Significant Impact*
○ *Probable Low or Unknown Impact*

Implementation Requirements

- ◒ *Capital Costs*
- ○ *O&M Costs*
- ◒ *Maintenance*
- ○ *Training*
- ○ *Suitability for Slopes >5%*

● *High* ○ *Low*

ESC54

Best Management Practices

LIMITATIONS

- Drainage area should not exceed 1 acre.
- Runoff will bypass protected inlets on slopes.
- Ponding will occur at a protected inlet, with possible short-term flooding.
- Straw bales are not effective for inlet protection.

ESC54

Best Management Practices

Additional Information — Storm Drain Inlet Protection

Storm drain inlet protection consists of a sediment filter or an impounding area around or upstream of a storm drain, drop inlet, or curb inlet. This erosion and sedimentation control BMP prevents excessive sediment from entering storm drainage systems prior to permanent stabilization of the disturbed area.

All on-site storm drain inlets should be protected. Off-site, inlets should be protected in areas where construction activity tracks sediment onto paved areas or where inlets receive runoff from disturbed areas.

Installation/Aplication Criteria

Planning

Large amounts of sediment may enter the storm drain system when storm drains are installed before the upslope drainage area is stabilized, or where construction is adjacent to an existing storm drain. In cases of extreme sediment loading, the storm drain itself may clog and lose a major portion of its capacity. To avoid these problems, it is necessary to prevent sediment from entering the system at the inlets.

Inlet control measures presented in this handbook should not be used for inlets draining more than one acre. Runoff from larger disturbed areas should be first routed through a Temporary Sediment Trap (see ESC 56). Different types of inlet protection are appropriate for different applications depending on site conditions and the type of inlet. Inlet protection methods not presented in this handbook should be approved by the local storm water management agency.

General Design and sizing criteria:

- Grates and spaces around all inlets should be sealed to prevent seepage of sediment-laden water.
- Excavate sediment sumps (where needed)1 to 2 feet with 2:1 side slopes around the inlet.

Installation procedures for filter fabric fence:

a. Place 2 inch by 2 inch wooden stakes around the perimeter of the inlet a maximum of 3 feet apart and drive them at least 8 inches into the ground. The stakes must be at least 3 feet long.
b. Excavate a trench approximately 8 inches wide and 12 inches deep around the outside perimeter of the stakes.
c. Staple the filter fabric (for materials and specifications, see Silt Fence ESC 50) to wooden stakes so that 32 inches of the fabric extends out and can be formed into the trench. Use heavy-duty wire staples at least one inch in length.
d. Backfill the trench with 3/4 inch or less washed gravel all the way around.

Installation procedure for block and gravel filter:

a. Place hardware cloth or comparable wire mesh with one-half inch openings over the drop inlet so that the wire extends a minimum of 1 foot beyond each side of the inlet structure. If more than one strip is necessary, overlap the strips. Place filter fabric over the wire mesh.
b. Place concrete blocks lengthwise on their sides in a single row around the perimeter of the inlet, so that the open ends face outward, not upward. The ends of adjacent blocks should abut. The height of the barrier can be varied, depending on design needs, by stacking combinations of blocks that are 4 inches, 8 inches, and 12 inches wide. The row of blocks should be at least 12 inches but no greater than 24 inches high.
c. Place wire mesh over the outside vertical face (open end) of the concrete blocks to prevent stone from being washed through the blocks. Use hardware cloth or comparable wire mesh with one half inch openings.
d. Pile washed stone against the wire mesh to the top of the blocks. Use 3/4 to 3 inch gravel.

Installation procedure for gravel and wire mesh filters:

a. Place wire mesh over the drop inlet so that the wire extends a minimum of 1 foot beyond each side of the inlet structure. Use hardware cloth or comparable wire mesh with one-half inch openings. If more than one strip of mesh is necessary, overlap the strips. Place filter fabric over wire mesh.

ESC54

Best Management Practices

b. Place 3/4 to 3 inch gravel over the filter fabric/wire mesh. The depth of the gravel should be at least 12 inches over the entire inlet opening (see attached figure).

Installation procedure for sand bag barrier:

a. Use sand bag made of geotextile fabric (not burlap), and fill with 3/4 in. rock or 1/4 in. pea gravel.
b. Construct on gently sloping street.
c. Leave room upstream of barrier for water to pond and sediment to settle.
d. Place several layers of sand bags--overlapping the bags and packing them tightly together.
e. Leave gap of one bag on the top row to serve as a spillway. Flow from a severe storm (e.g., 10-year storm) should not overtop the curb.

Maintenance Requirements

- For filter fabric fences: Inspections should be made on a regular basis, especially after large storm events. If the fabric becomes clogged, it should be replaced. Sediment should be removed when it reaches approximately one-half the height of the fence. If a sump is used, sediment should be removed when it fills approximately one-half the depth of the hole.
- For gravel filters: If the gravel becomes clogged with sediment, it must be carefully removed from the inlet, and either cleaned or replaced. Since cleaning gravel at a construction site may be difficult, use the sediment-laden stone instead as fill and put fresh stone around the inlet.
- The inlet protection should be removed 30 days after the upslope area has been fully stabilized. Any sediment around the inlet must be carefully removed and disposed.

REFERENCES

Best Management Practices and Erosion Control Manual for Construction Sites, Flood Control District of Maricopa County, Arizona, September 1992.

"Draft - Sedimentation and Erosion Control, An Inventory of Current Practices", U.S.E.P.A., April, 1990.

Erosion and Sediment Control Handbook, S.J. Goldman, K. Jackson, T.A. Bursetynsky, P.E., McGraw Hill Book Company.

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, June 1981.

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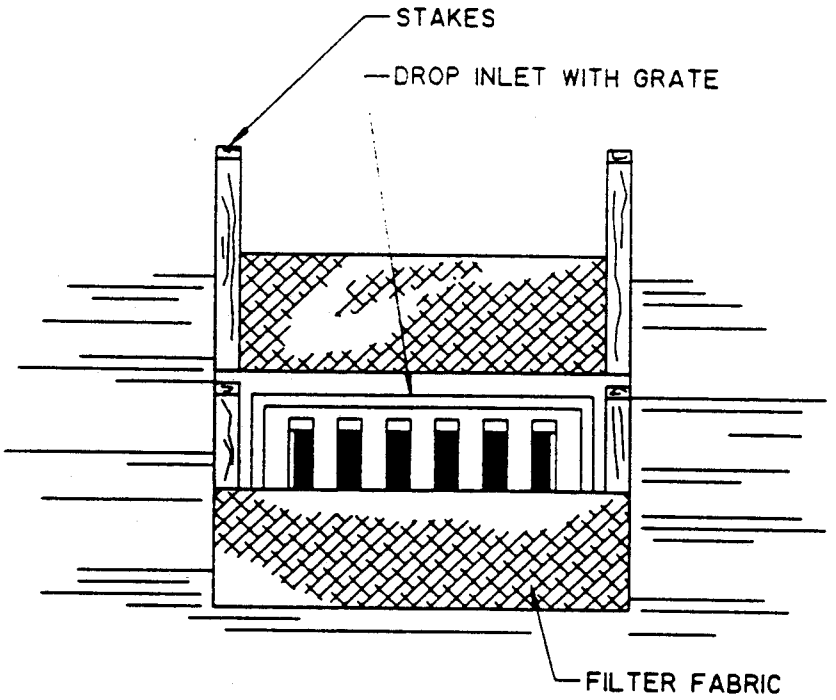
Stormwater Management Water for the Puget Sound Basin, Washington State Department of Ecology, The Technical Manual - February 1992, Publication # 91-75.

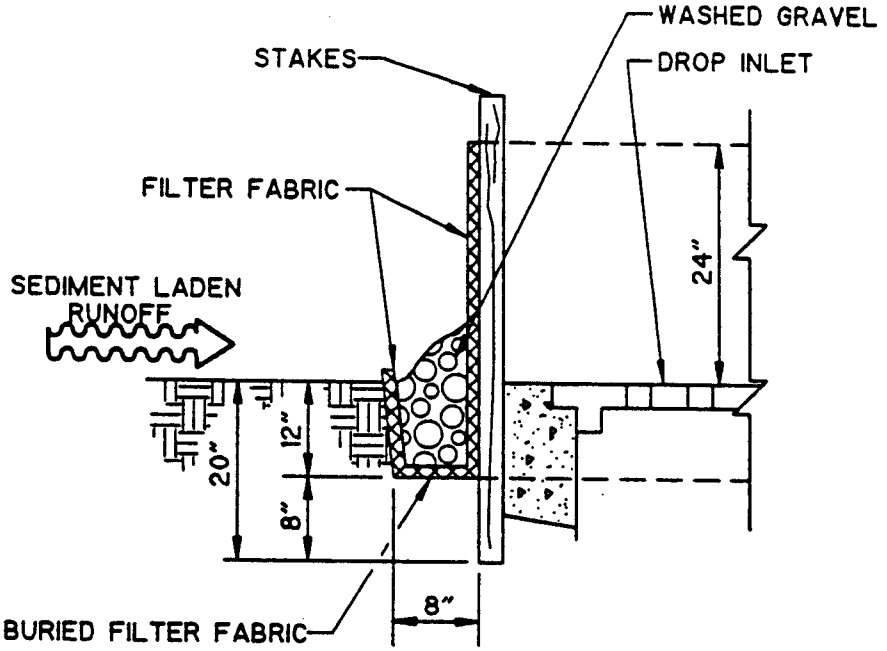
Storm Water Pollution Prevention Handbook, First Edition, State of California, Department of Transportation Division of New Technology, Materials, and Research, October 1992.

ESC54

Additional Information — Storm Drain Inlet Protection



ELEVATION

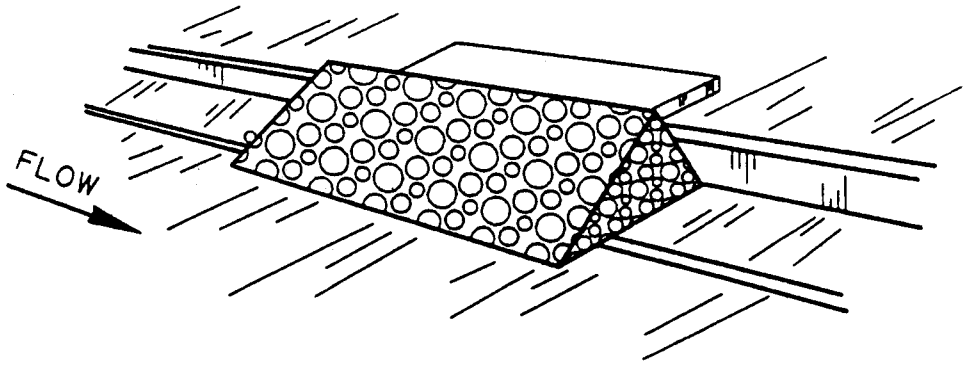


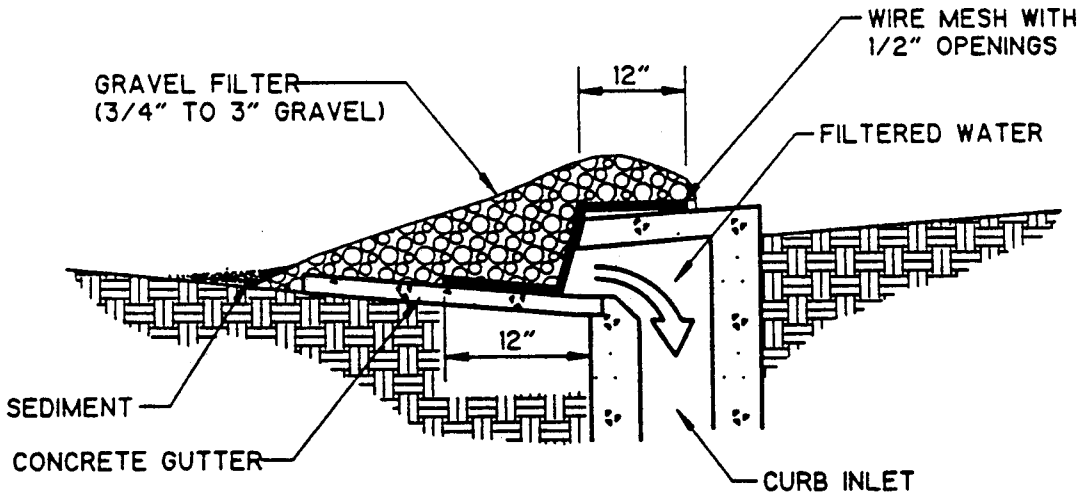
PROFILE

FILTER FABRIC FENCE DROP INLET FILTER

ESC54

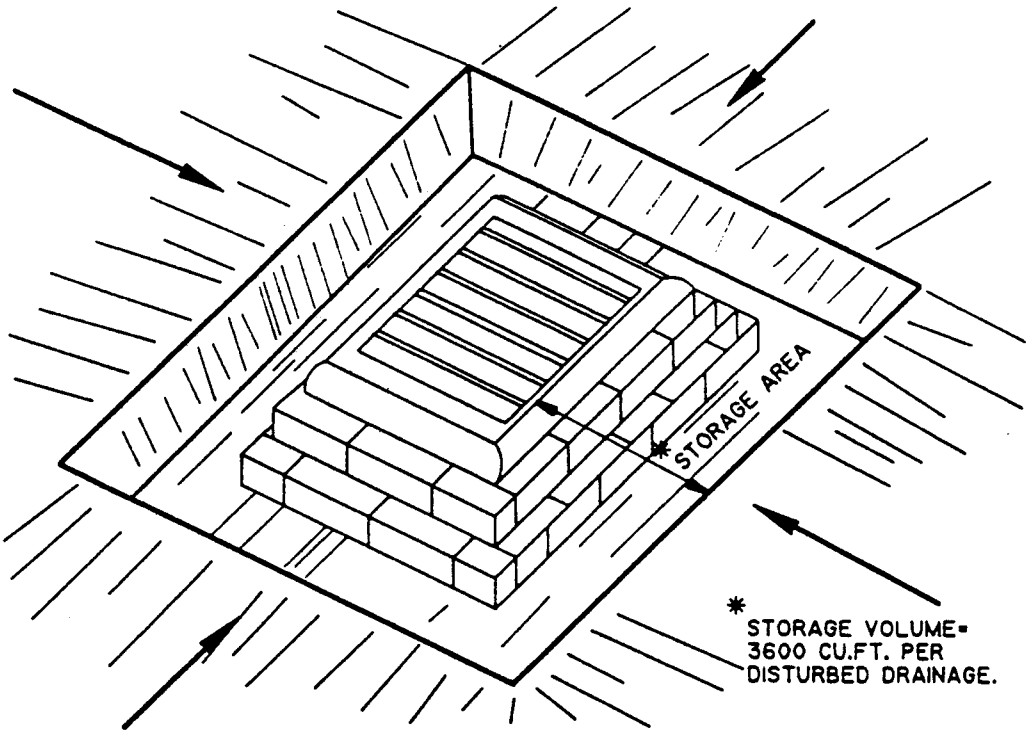
Additional Information — Storm Drain Inlet Protection

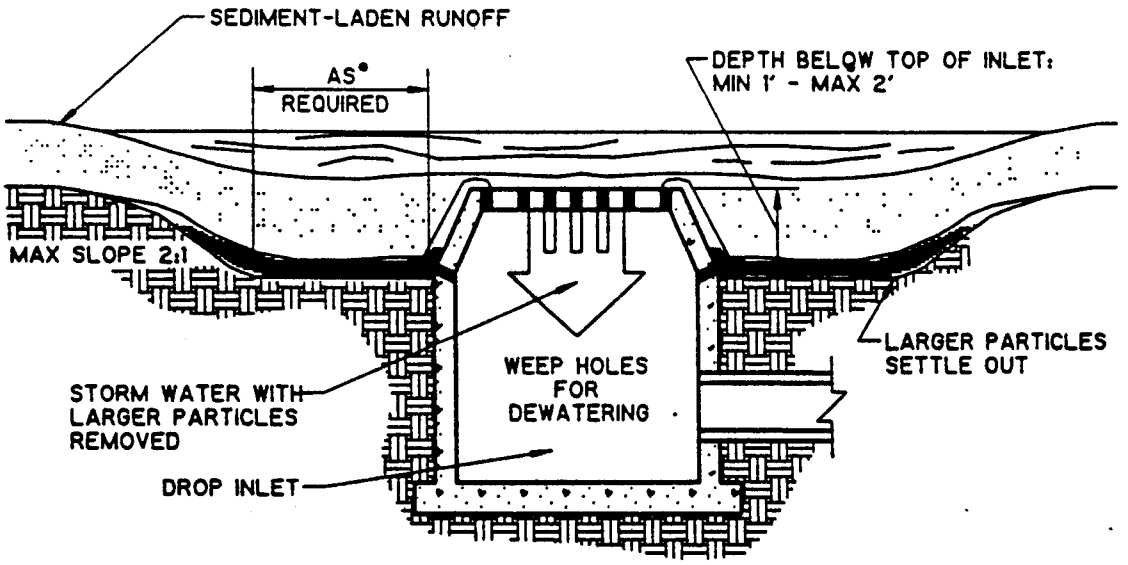




GRAVEL AND WIRE MESH FILTER FOR CURB INLET

ESC54





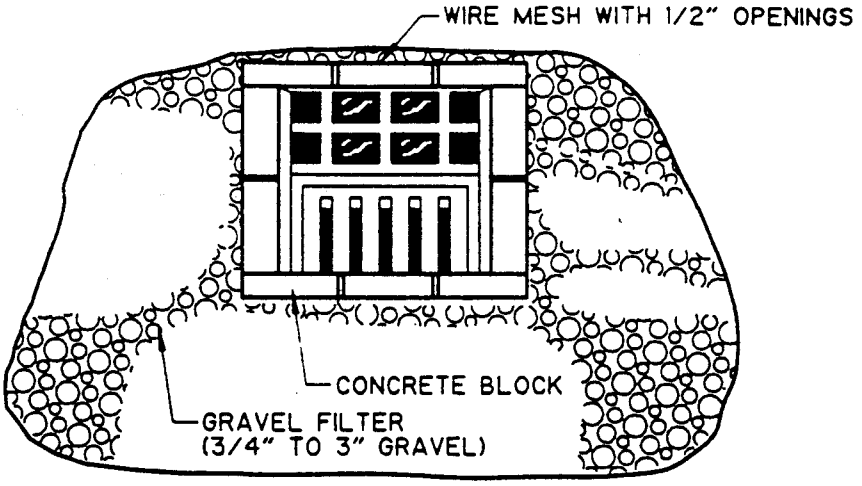
SPECIFIC APPLICATION

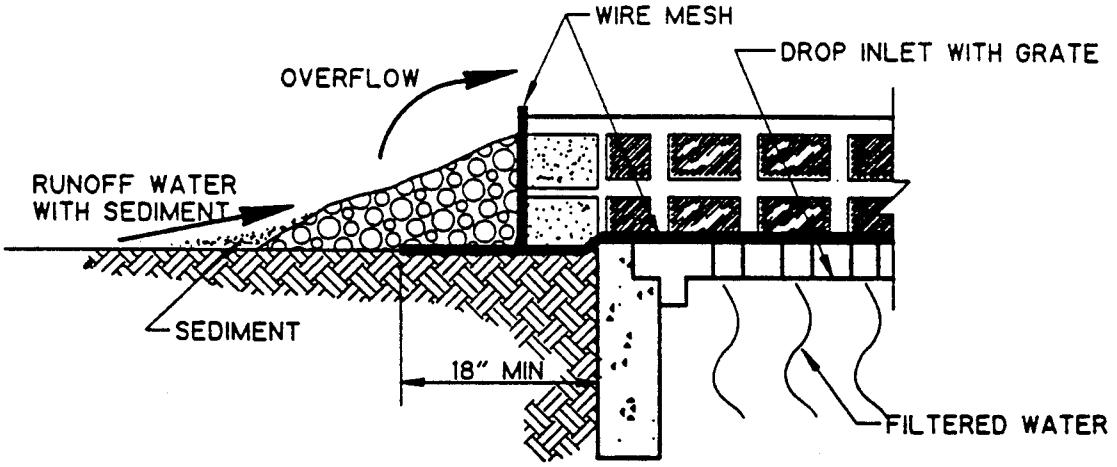
THIS METHOD OF INLET PROTECTION IS APPLICABLE WHERE HEAVY FLOWS ARE EXPECTED AND WHERE AN OVERFLOW CAPABILITY AND EASE OF MAINTENANCE ARE DESIRABLE.

ESC54

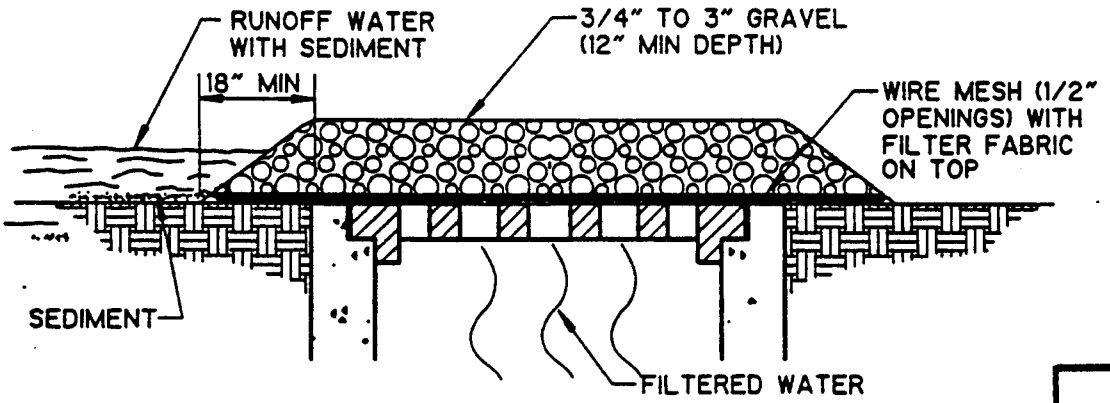
EXCAVATED DROP INLET SEDIMENT TRAP

Additional Information — Storm Drain Inlet Protection





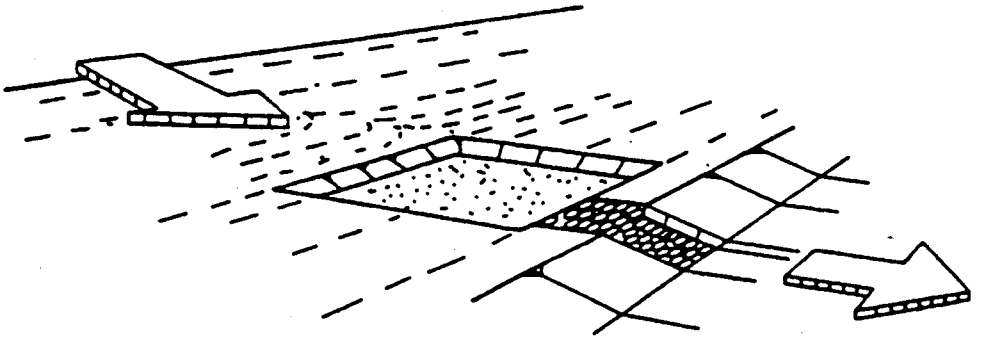
BLOCK AND GRAVEL FILTER AT DROP INLET



GRAVEL AND WIRE MESH FILTER FOR DROP INLET

ESC54

BMP: SEDIMENT TRAP



Objectives

- *Housekeeping Practices*
- *Contain Waste*
- *Minimize Disturbed Areas*
- *Stabalize Disturbed Areas*
- *Protect Slopes/Channels*
- *Control Site Perimeter*
- *Control Internal Erosion*

GENERAL DEFINITION

A sediment trap is a small, excavated or bermed area where runoff from small drainage areas is detained and sediment can settle.

SUITABLE APPLICATIONS

- Any disturbed area less than 5 acres. (Sediment Basins, ESC56, must be used for drainage areas greater than 5 acres).
- Along the perimeter of the site at locations where sediment-laden runoff is discharged off-site.
- Around and/or upslope from storm drain inlet protection measures.
- At any point within the site where sediment-laden runoff can enter stabilized or natural areas or waterways.

INSTALLATION/APPLICATION CRITERIA

- Build outside the area to be graded before clearing, grubbing, and grading begin.
- Locate where the trap can be easily cleared of sediment.
- Trap size depends on the type of soil, size of the drainage area, and desired sediment removal efficiency.
- The larger the trap, the less frequently sediment must be removed.
- The outlet of the trap must be stabilized with rock, vegetation, or another suitable material.
- A stable emergency spillway must be installed to safely convey major floods (see your local flood control agency).

REQUIREMENTS

- Maintenance
  - Remove sediment when the sediment storage zone is no more than 1 ft. from being full.
  - Inspect weekly and after each rain.
- Cost (source: EPA, 1992)
  - Average annual cost per installation and maintenance (18 month useful life) is \$0.70 per $ft.^3$ (\$1,300 per drainage acre).

LIMITATIONS

- Only use for drainage areas up to 5 acres (see Sedimentation Basin BMP ST8 for larger areas).
- Only removes coarse sediment (medium silt size and larger) unless sized like a sedimentation basin.

Targeted Pollutants

- ● *Sediment*
- ○ *Nutrients*
- ◒ *Toxic Materials*
- ○ *Oil & Grease*
- ○ *Floatable Materials*
- ○ *Other Construction Waste*

- ● *Likely to Have Significant Impact*
- ○ *Probable Low or Unknown Impact*

Implementation Requirements

- ○ *Capital Costs*
- ◒ *O&M Costs*
- ○ *Maintenance*
- ○ *Training*
- ○ *Suitability for Slopes >5%*

● *High* ○ *Low*

ESC 55

Best Management Practices

Additional Information — Sediment Trap

A sediment trap is a small temporary ponding area, usually with a gravel outlet, formed by excavation and/or by constructing an earthen embankment. Its purpose is to collect and store sediment from sites cleared and/or graded during construction. It is intended for use on small drainage areas, with no unusual drainage features, and projected for a quick build-out time. It should help in removing coarse sediment from runoff. The trap is a temporary measure with a design life of approximately 6 months, and is to be maintained until the site area is permanently protected against erosion by vegetation and/or structures.

Application Criteria

Planning:

Sediment traps should be used only for small drainage areas. If the contributing drainage area is greater than 5 acres, refer to Sediment Basins (ST8), or subdivide the catchment area into smaller drainage basins.

Sediment usually must be removed from the trap after each rainfall event. The SWPPP should detail how this sediment is to be disposed of, such as for in fill areas on-site, or removal to an approved off-site dump. Sediment traps used as a perimeter control should be installed before any land disturbance takes place in the drainage area.

Sediment traps are usually small enough that a failure of the structure would not result in a loss of life, damage to home or buildings, or interruption in the use of public roads or utilities. Also, sediment traps are attractive to children and can be dangerous. The following recommendations should be implemented to reduce risks.

1. Install continuous fencing around the sediment trap or pond. Consult local ordinances regarding requirements for maintaining health and safety.
2. Restrict basin side slopes to 3:1 or flatter.

Design:

Sediment trap size depends on the type of soil, size of the drainage area, and desired sediment removal efficiency (see Sedimentation Basin ESC56). As a rule of thumb, the larger the basin volume the greater the sediment removal efficiency. Sizing criteria are typically established under the local grading ordinance or equivalent. The runoff volume from a two-year, 24-hour storm is a common design criteria for sedimentation trap. The sizing criteria below assume that this runoff volume is 0.042 ac-ft/ac (0.5 inches of runoff). While the climatic, topographic, and soil type extremes make it difficult to establish a statewide standard, the following criteria should trap moderate to high amounts of sediment in most areas of California.

- Trap settling volume at least 67 cu. yd. per acre.
- Trap sediment storage volume at least 33 cu. yd. per acre (note: the larger this volume, the less frequently the trap must be cleaned out).
- Trap length greater than twice the basin width.
- Flood volume large enough to contain a major flood without upstream damage and overtopping the embankment.

Installation

Sediment traps can be constructed by excavating a depression in the ground or creating an impoundment with a barrier or low-head dam. Sediment traps should be installed outside the area being graded and should be built prior to the start of the grading activities or removal of vegetation. To minimize the area disturbed by them, sediment traps should be installed in natural depressions or in small swales or drainageways. The following steps must be followed during installation.

1. The area under the embankment must be cleared, grubbed, and stripped of any vegetation and root mat. The pool area should be cleared.
2. The fill material for the embankment must be free of roots or other woody vegetation as well as oversized stones, rocks, organic material, or other objectionable material. The embankment may be compacted by traversing with equipment while it is being constructed.

ESC55

Best Management Practices

Additional Information — Sediment Trap

3. The trap is removed and the area stabilized when the upslope drainage area has been properly stabilized.
4. All cut-and-fill slopes should be 3:1 or flatter.
5. When a riser is used, all pipe joints must be watertight.
6. When a riser is used, at least the top two-thirds of the riser shall be perforated with 1/2-inch diameter holes spaced 8 inches vertically and 10 to 12 inches horizontally. (See Sediment Basin, ESC56)
7. When an earth or stone outlet is used, the outlet crest elevation should be at least 1 foot below the top of the embankment.
8. When a crushed stone outlet is used, the crushed stone used in the outlet should meet AASHTO M43, size No. 2 or 24, or its equivalent such as MSHA No. 2. Gravel meeting the above gradation may be used if crushed stone is not available.

REFERENCES

Best Management Practices and Erosion Control Manual for Construction Sites, Flood Control District of Maricopa County, Rough Draft - July 1992.

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Proposed Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, Work Group Working Paper, USEPA, April, 1992.

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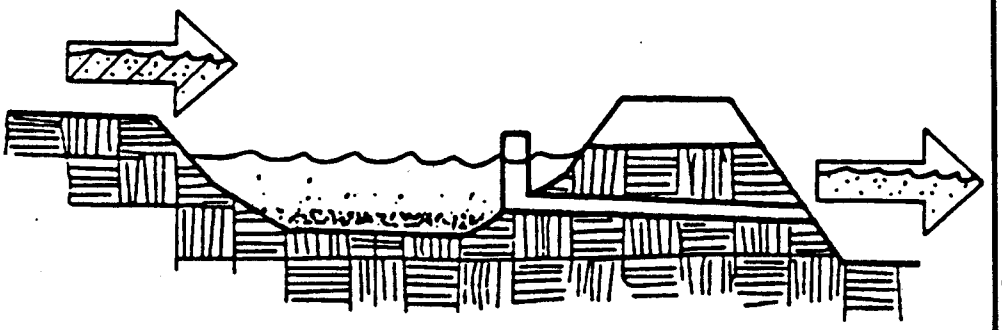
Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency - November 1988.

ESC55

BMP: SEDIMENT BASIN



Objectives

- *Housekeeping Practices*
- *Contain Waste*
- *Minimize Disturbed Areas*
- *Stabalize Disturbed Areas*
- *Protect Slopes/Channels*
- *Control Site Perimeter*
- *Control Internal Erosion*

GENERAL DEFINITION

A pond created by excavation or constructing an embankment, and designed to retain or detain runoff sufficiently to allow excessive sediment to settle.

SUITABLE APPLICATIONS

- At the outlet of all disturbed watershed 10 acres or larger.
- At the outlet of smaller disturbed watersheds, as necessary.
- Where post construction detention basins will be located.
- Should be used in association with dikes, temporary channels, and pipes used to divert disturbed areas into the basin and undisturbed areas around the basin.

INSTALLATION/APPLICATION

- Construct before clearing and grading work begins.
- Do <u>not</u> locate in a stream.
- All basin sites should be located where failure of the embankment would not cause loss of life/property damage.
- Large basins are subject to state/local dam safety requirements.
- Securely anchor and install an anti-seep collar on the outlet pipe/riser, and provide an emergency spillway for passing major floods (see local flood control agency).
- The basin volume should be sized to capture runoff from a 2-year, 24-hour storm, or other appropriate design storms specified by the local agency. A detention time of 24 to 40 hours should allow 70 to 80 percent of sediment to settle.
- The basin volume consists of two zones:
  - A sediment storage zone at least 1 foot deep.
  - A settling zone at least 2 feet deep.
- The length to settling depth ratio (L/SD) should be less than 200.
- The length to width ratio should be greater than 6:1, or baffles are required to prevent short circuiting.

REQUIREMENTS

- Maintenance
  - Inspect weekly and after each rain.
  - Remove sediment where the sediment storage zone is half full.
- Cost: Average annual cost for installation and maintenance (2 year useful life, source: EPA, 1992)
  - Basin less than 50,000 $ft.^3$: \$0.40 per $ft.^3$ (\$700 per drainage acre)
  - Basin size greater than 50,000 $ft.^3$: \$0.20 per $ft.^3$ (\$350 per drainage acre)

Targeted Pollutants

- ● *Sediment*
- ○ *Nutrients*
- ◒ *Toxic Materials*
- ○ *Oil & Grease*
- ○ *Floatable Materials*
- ○ *Other Construction Waste*

- ● *Likely to Have Significant Impact*
- ○ *Probable Low or Unknown Impact*

Implementation Requirements

- ○ *Capital Costs*
- ◒ *O&M Costs*
- ○ *Maintenance*
- ○ *Training*
- ○ *Suitability for Slopes >5%*

● *High* ○ *Low*

ESC56

Best Management Practices

LIMITATIONS

- The basin should have shallow side slopes (minimum 4:1) or be fenced to prevent drowning.
- Sites with very fine sediments (fine silt and clay) may require longer detention times for effective sediment removal.
- Basins in excess of 25 feet height and/or an impounding capacity of 50 ac. ft. must obtain approval from Division of Safety of Dams.
- Standing water may cause mosquitos or other pests to breed.
- Basins in excess of certain depth and storage volume criteria must meet State Division of Safety of Dams (DSOD) and local safety requirements.

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Best Management Practices

Additional Information — Sediment Basin

A sediment basin is a controlled storm water release structure formed by excavation or by constructing an embankment of compacted soil across a drainageway, or other suitable location. Its purpose is to collect and store sediment from sites cleared and/or graded during construction or for extended periods of time before reestablishment of permanent vegetation and/or construction of permanent drainage structures. It is intended to trap sediment before it leaves the construction site. The basin is a temporary measure (with a design life of 12 to 18 months) and is to be maintained until the site area is permanently protected against erosion or a permanent detention basin is constructed.

Sedimentation basins are suitable for nearly all types of construction projects. Whenever possible, construct the sedimentation basins before clearing and grading work begins.
Basins should be located at the stormwater outlet from the site, but not in any natural or undisturbed stream. A typical application would include temporary dikes, pipes, and/or channels to divert runoff to the basin inlet.

Many development projects in California will be required by local ordinances to provide a storm water detention basin for post-construction flood control, desiltation, or storm water pollution control. A temporary sediment basin may be constructed by rough grading the post-construction control basins early in the project.

Sediment basins trap 70-80 percent of the sediment which flows into them if designed according to this handbook. Therefore, they should be used in conjunction with erosion control practices such as temporary seeding, mulching, diversion dikes, etc., to reduce the amount of sediment flowing into the basin.

Installation/Application Criteria
Planning:
To improve the effectiveness of the basin, it should be located to intercept runoff from the largest possible amount of disturbed area. The best locations are generally low areas below disturbed areas. Drainage into the basin can be improved by the use of diversion dikes and ditches. The basin must not be located in a stream but should be located to trap sediment-laden runoff before it enters the stream. The basin should not be located where its failure would result in the loss of life or interruption of the use or service of public utilities or roads.

Design:
- The sedimentation basin volume consists of two zones:
  - The sediment storage zone (at least 1 foot in depth).
  - A settling zone at least 2 feet in depth.
- The sedimentation basin may be formed by partial excavation and/or by construction of a compacted embankment. It may have one or more inflow points.
- A securely anchored riser pipe with an anti-seep collar is the principal outlet, along with an emergency overflow spillway. A solid riser pipe with two 1-inch diameter dewatering holes located at the top of the sediment storage volume on opposite sides of the riser pipe usually provides sufficient detention time for basins draining about 10 acres. Rock, rip-rap, or other suitable outlet protection is provided to reduce erosion at the riser pipe outlet.
- Settling Zone Volume

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Best Management Practices

Additional Information — Sediment Basin

The settling zone volume is determined by the following equation:

$$(V) = 1.2(SD)Q / V_{SED}$$

Q = design inflow based on the peak discharge from a specified design storm (e.g., a 2-year, 24-hour duration design storm event) from the tributary drainage area as computed using the methods required by the local flood control agency. Provide a minimum of 67 cubic yards of settling volume per acre of drainage if a design storm is not specified.

V_{SED} = the settling velocity of the design soil particle. The design particle chosen is medium silt (0.02 mm). This has a settling velocity (V_{SED}) of 0.00096 ft/sec. As a general rule it will not be necessary to design for a particle of size less than 0.02 mm, especially since the surface area requirement increases dramatically for smaller particle sizes. For example, a design particle of 0.01 mm requires about three times the surface area of 0.02 mm. Note also that choosing V_{SED} of 0.00096 ft/sec equates to a surface area (SA) of 1250 sq. ft. per cfs of inflow.

SD = settling depth, which should be at least 2 ft., and no shallower than the average distance from the inlet to the outlet of the pond (L) divided by 200 (i.e., SD > L/200).

Total sediment basin volume and dimension are determined as outlined below:

a. The details shown in the attached figure may be useful in designing the sediment basin.
b. Determine basin geometry for the sediment storage volume calculated above using a minimum of 1 ft depth and 3:1 side slopes from the bottom of the basin. Note, the basin bottom is level.
c. Extend the basin side slopes (at 3:1 max.) as necessary to obtain the settling zone volume as determined above.
d. Adjust the geometry of the basin to effectively combine the settling zone volume and sediment storage volumes while preserving the depth and side slope criteria.
e. Provide an emergency spillway with a crest elevation one foot above the top of the riser pipe.
f. The ratio between the basin length and width of the pond should either be greater than 6:1, or baffles should be installed to prevent short-circuiting.

Limitations

Sediment traps and ponds must be installed only within the property limits. Failure of the structure must not result in loss of life, damage to homes or buildings, or interruption of use or service of public roads or utilities. Also, sediment traps and ponds are attractive to children and can be very dangerous. Local ordinances regarding health and safety must be adhered to. If fencing of the pond is required, the type of fence and its location shall be shown in the SWPPP and in the construction specifications.

- Generally, temporary sedimentation ponds are limited to drainage of 5 acres or more.
- Sediment ponds may be capable of trapping smaller sediment particles if additional detention time is provided. However, they are most effective when used in conjunction with other BMPs such as seeding or mulching.
- Ponds may become an "attractive nuisance" and care must be taken to adhere to all safety practices.
- Sediment ponds designed according to this handbook are only practically effective in removing sediment down to about the medium silt size fraction. Sediment-laden runoff with smaller size fractions (fine silt and clay) will pass through untreated emphasizing the need to stabilize the soil quickly.

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Additional Information — Sediment Basin

REFERENCES

A Current Assessment of Urban Best Management Practices: Techniques for Reducing Nonpoint Source Pollution in the Coastal Zones, Metropolitan Washington Council of Governments, March, 1992.

Best Management Practices and Erosion Control Manual for Construction Sites, Flood Control District of Maricopa County, Rough Draft - July 1992.

Draft - Sedimentation and Erosion Control, An Inventory of Current Practices, U.S.E.P.A., April, 1990.

Environmental Criteria Manual, City of Austin, Texas.

Guidlines for the Design and Construction of Small Embankment Dams, Division of Safety of Dams, California Department of Water Resources, March 1986.

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, Jun 1981.

Proposed Guidance Specifying Mnangement Measures for Sources of Nonpoint Pollution in Coastal Water, Work Group Working Paper, USEPA, April, 1992.

Stormwater Management Water for the Puget Sound Basin, Washington State Department of Ecology, The Technical Manual - February 1992, Publication # 91-75.

Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency - November 1988.

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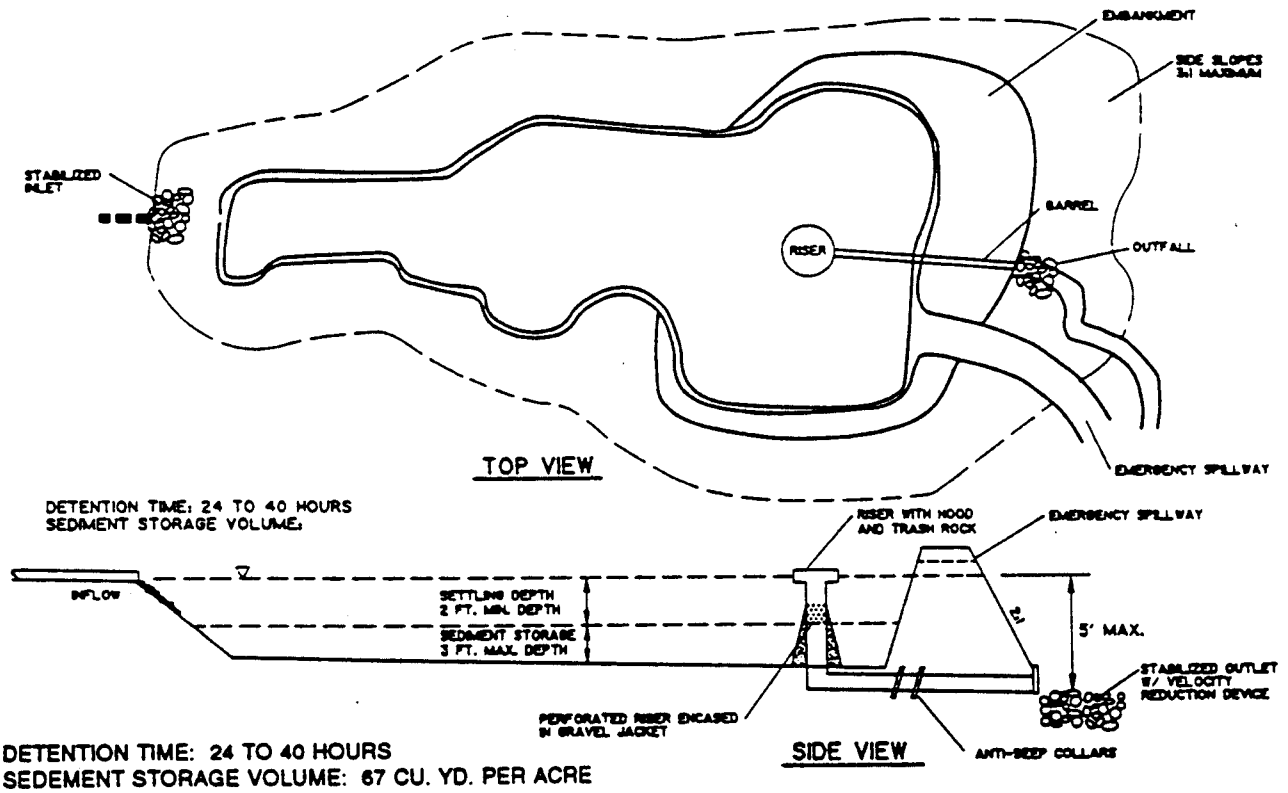
Additional Information — Sediment Basin



DETENTION TIME: 24 TO 40 HOURS
SEDEMENT STORAGE VOLUME: 67 CU. YD. PER ACRE

TEMPORARY SEDIMENT BASIN

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Best Management Practices

6. MEASURING BMP PERFORMANCE

INTRODUCTION

One of the final steps in the preparation of the Storm Water Pollution Prevention Plan (SWPPP) is to develop a program to monitor how well the BMPs work, and to evaluate whether additional BMPs are required. The construction general permit requires that a monitoring, inspection, and maintenance plan with the following objectives be a component of the SWPPP:

- To inspect BMPs annually, as well as prior to and after a storm event.
- To aid in implementation of the SWPPP.
- To measure the effectiveness of the BMPs.

To meet these objectives the monitoring effort has these elements:

- Site inspection
- Certification of compliance
- BMPs monitoring
- Record keeping
- SWPPP review and modifications

SITE INSPECTIONS

Inspections before and after a storm event are required by the construction general permit. At the onset of a construction project (e.g., clearing, grubbing, earth movement) it may be more appropriate to perform inspection of the BMPs on a regular basis instead of just before and after a storm. This will allow sufficient time for any corrections or improvements to be made in time before the storm. An inspector should be identified in the SWPPP. Inspection can usually be performed as part of a regular construction inspection program.

According to the general permit, a tracking or follow-up procedure must follow an inspection which discovers deficiencies in the BMPs.

The results of the inspection and assessment must be written. Include the date of the inspection, the person(s) who performed the inspection, and the observations. Inspection records must be retained for three years. A sample inspection form is provided at the end of this chapter.

It is possible that activities may have changed since the last inspection, by type or location. These should be noted. New BMPs and adjustments to the SWPPP may be necessary.

CERTIFICATION OF COMPLIANCE

You must certify, based on the annual inspection, that your facility is in compliance with the requirements of the general permit and the SWPPP. If the inspection indicates you are not in compliance, you are to notify your Regional Water Quality Control Board. The notification is to identify the type(s) of noncompliance, the actions identified to come into compliance, and a time schedule to achieve compliance.

BMPs MONITORING

The type of BMP monitoring depends on which BMP is implemented. In the case of contractor activity BMPs the monitoring consists of visual inspection to ensure that the BMP was implemented and maintained according to the SWPPP. Such inspection would include:

- looking for evidence of spills and resulting clean -up procedures (e.g., supplies of spill cleanup material);

- examining integrity of containment structures;
- verifying use of employees education programs for the various activities;
- noting the location of activity (e.g., outdoor vs. indoor, concrete vs. grass);
- verifying adequacy of trash receptacles;
- verifying waste disposal practices (e.g., recycle vs. hazardous waste bins);

Other inspection areas are described in the fact sheets found in Chapter 4.

In the case of sediment and erosion control BMPs, the monitoring program should consist of regular inspection to determine the following:

Are the BMPs installed effective?

The effectiveness of the BMP would be based on the presence of silt behind or within control devices, the presence of silt downstream of the site and signs of erosion in stabilized areas after a storm event. The system may be deemed ineffective if:

1. Silt is present outside of the control area;

2. Structural controls are breached or fail under storm events of minor (less than 2 year, 24 hour) intensity;

3. Rills and gullies are present in stabilized slopes;

4. Evidence of silt buildup in downstream storm drains and drainage ways is apparent; and

5. Controls are not maintained in accordance with design guidelines.

Have drainage patterns changed?

If the site has undergone significant grading operations, changing the drainage patterns, adjustments to the BMP controls will likely be required to address this change. The inspector shall determine the extent of the drainage pattern changes, if the changes are addressed in the SWPPP and if modifications to the erosion and sediment controls are required to address this change.

Are sediment and erosion BMPs installed properly?

The SWPPP BMPs should include details or references to allow for the proper construction of structural or vegetative erosion and sediment control devices. The inspector should insure that these systems are installed according to the SWPPP in the proper locations.

Are areas stabilized as quickly as possible after completion of construction activities in an area?

Active construction areas (inactive construction areas may be defined as areas in which no construction activity will occur for a period of 30 days or longer) which have been disturbed should be stabilized through the use of vegetation, mulch, erosion control matting or structural methods within 7 calendar days from the last construction activity in the area. If construction, climatological, or other site conditions do not allow stabilization within seven (7) days, the SWPPP should define alternative approaches (e.g., watering or chemicals for dust control).

Are the BMPs properly maintained?

Maintenance of the erosion and sediment control devices is the most critical as well as the potentially most expensive erosion control plan. The inspector should inspect the site on a regular basis and after any storm of 0.5 inches or greater to determine maintenance requirements and general condition of the installed system. The local jurisdiction may also inspect the site on a typical bi-weekly basis to assess the maintenance performed on the systems. The following maintenance tasks should be performed on a regular basis. All maintenance related to a storm event should be completed within 48 hours of the storm event.

1. Removal of silt from barriers and sedimentation devices.

2. Replacement or repair of worn or damaged geotextile fabric.

3. Repair or replacement of damaged structural controls.

4. Seeding or mulching of damaged stabilized areas.

5. BMPs for any chemicals or fuels not addressed in the SWPPP must be developed.

6. Other control maintenance as defined in the BMP fact sheet of this handbook or part of the approved SWPPP.

RECORD KEEPING

Records of all inspections, compliance certifications, and noncompliance reporting are to be retained for at least three years by the owner/developer.

It is suggested that records of incidents such as spills, or other episodic releases be kept. Analyzing a history of this information can provide insight into modifying the BMPs. The history may suggest a predominance of spills in particular locations, from particular activities, and/or of particular materials. Efforts can be focused accordingly. Photographs may be useful. Also keep a record of maintenance activities or any other BMPs that are of an "action" nature. It is easy to demonstrate that a BMP that involves a physical change, such as berming or covering, has been accomplished. But actions that relate to good housekeeping can only be demonstrated by record keeping. Keeping a record of sediment trap cleaning, for example, also provides insight into how soon it takes for the trap to refill.

SWPPP REVIEW AND MODIFICATIONS

During the course of construction, unanticipated changes may occur which affects the SWPPP, such as schedule changes, phasing changes, staging area modifications, off-site drainage impacts and repeated failures of designed controls. These changes must be made known and SWPPP revised accordingly. During the preparation and review of the modified SWPPP, construction may continue with temporary modifications to the erosion and sediment control BMPs.

Revisions to the SWPPP are also required when the properly installed systems are ineffective in the prevention of silt transport off of the site. This may be due to unforseen site conditions or construction techniques which adversely affect the system as designed. Revisions to the SWPPP are also required if there is a new, deleted, or moved activity that could result in a significant amount of pollutants discharged in the storm water.

SAMPLE
Construction General Permit
Inspection Checklist

[ ] Regular Inspection

[ ] Rainfall Event Inspection (Before)
[ ] Rainfall Event Inspection (After) Rainfall _____ Inches

Inspected By:_____ Date:_____

Project:_____

YES	NO	DOES NOT APPLY	
			Are the BMPs called for on the SWPPP installed in the proper location and according to the specifications for the SWPPP?
			Are all operational storm drain inlets protected from sediment inflow?
			Do any structural practices require repair or clean-out to maintain adequate function? If yes, indicate which ones:
			Are construction on-site traffic routes, parking, and storage of equipment and supplies restricted to areas specifically designated for those uses?
			Are locations of temporary soil stock piles or construction materials in approved areas?
			Do any seeded or landscaped areas require maintenance, irrigation, fertilization, seeding, or mulching?
			Is there any evidence that sediment is leaving the site?
			Is there any evidence of erosion or cut or fill slopes?
			Is there any evidence of sediment, debris, or mud on public roads at intersections with site access roads?
			Does the SWPPP require revisions? If yes, explain:

STATE OF CALIFORNIA - CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY
STATE WATER RESOURCES CONTROL BOARD
PAUL R. BONDERSON BUILDING
901 P STREET
P. O. BOX 100
SACRAMENTO, CALIFORNIA 95812-0100
916/657-0941

FAX: 916/657-0932

PETE WILSON, Governor

SEP 8 1992

TO: Interested Parties

GENERAL CONSTRUCTION ACTIVITY STORM WATER PERMIT

Enclosed is a copy of the General Construction Activity Storm Water Permit (Permit), including the Fact Sheet, Notice of Intent (NOI) form, and NOI instructions, which was adopted by the State Water Resources Control Board (State Water Board) on August 20, 1992.

To be covered by this Permit, the owners of land where a construction activity occurs must submit the completed NOI form, with the appropriate fee, to the State Water Board. Permits are required for all storm water discharges associated with a construction activity where clearing, grading, and excavation results in a land disturbance of five or more acres. Storm water discharges from a construction activity that results in a land disturbance of less than five acres, but which is part of a larger common plan of development or sale, also require a permit. Permits are required until the construction is complete.

A permit must be obtained by October 1, 1992 for an ongoing construction activity that satisfies these criteria. For a new construction activity that begins after October 1, 1992, a permit must be obtained before construction starts.

The NOI must be sent to the following address:

State Water Resources Control Board
Division of Water Quality
Attention: Storm Water Permit Unit
P. O. Box 1977
Sacramento, CA 95812-1977

The NOI must be accompanied by the appropriate annual fee. The fee will either be $250.00 or $500.00 depending on the area of the construction activity. The NOI will not be processed if not accompanied by the fee. Enclosure 1 describes those areas in which the $250.00 annual fee applies. Dischargers in all other areas of the State must pay the $500.00 fee.

SEP 8 1992

Attachment No. 1 to the Permit lists the nine California Regional Water Quality Control Boards' (Regional Water Boards) addresses and telephone numbers. If you have any questions or concerns related to the Permit, you should discuss them with Regional Water Board staff.

We would appreciate it if you would inform other members of the construction industry of the need to obtain a storm water permit. If you know of others that need to obtain a permit but may be unaware of the State's program, please have them call the State Water Board's Construction Activity Storm Water Hotline at 916/657-1146.

Sincerely,

Walt Pettit

Walt Pettit
Executive Director

Enclosures (2)

September 3, 1992

Enclosure 1

AREAS OF THE STATE IN WHICH THE $250.00 ANNUAL FEE APPLIES

Municipality	Permitted Area
1. Alameda County	The permitted area of the county is the westerly side of the county which drains to San Francisco Bay.
2. Los Angeles County	The permitted area consists of the five hydrologic subbasins which drain into the Pacific Ocean as follows: Santa Monica Bay, Upper Los Angeles River, including Sycamore Channel, Upper San Gabriel River, Lower Los Angeles River, and Lower San Gabriel River, including Santa Clarita Valley. The permit does not cover the cities of Avalon, Lancaster, and Palmdale.
3. Orange County	The permitted area is delineated by the Los Angeles County line on the northwest, the San Bernardino County line on the north and northeast, the Riverside County line on the east, the San Diego County line on the south, and the Pacific Ocean on the southwest.
4. Riverside County	The permitted area is delineated by the San Bernardino County line on the north and northwest, the Orange County line on the west, the San Diego County line on the south, and the Santa Ana/Colorado River Basin Regional Boards' boundary line on the east (mountain crest).
5. Sacramento County	The entire county except for the incorporated City of Isleton.
6. San Bernardino County	The permitted area is delineated by the Santa Ana-Lahontan Regional Board boundary line on the north and northeast, the Santa Ana-Colorado River Basin Regional Board boundary line on the east, the San Bernardino-Riverside

Municipality	Permitted Area
	County boundary line on the south and southeast, the San-Bernardino-Orange County boundary line on the southwest, and the San Bernardino-Los Angeles County boundary line on the west.
7. San Diego County	The permitted area is delineated by the San Diego County lines on the north and south, the Pacific Ocean on the west, and the San Diego/Colorado River Basin Regional Board boundary on the east (mountain crest).
8. Santa Clara County	The Santa Clara Valley Basin portion of the county containing eleven hydrologic subbasins which discharge into watercourses which in turn flow into South San Francisco Bay.

STATE WATER RESOURCES CONTROL BOARD

901 P STREET, SACRAMENTO, CA 95814

FACT SHEET

FOR

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

GENERAL PERMIT FOR

STORM WATER DISCHARGES ASSOCIATED WITH

CONSTRUCTION ACTIVITY

BACKGROUND

In 1972, the Federal Water Pollution Control Act (also referred to as the Clean Water Act [CWA]) was amended to provide that the discharge of pollutants to waters of the United States from any point source is unlawful, unless the discharge is in compliance with a NPDES permit. The 1987 amendments to the CWA added Section 402(p) which establishes a framework for regulating municipal and industrial storm water discharges under the NPDES program. On November 16, 1990, the U.S. Environmental Protection Agency (USEPA) published final regulations that establish storm water permit application requirements for specified categories of industries. The regulations require that discharges of storm water associated with construction activity (storm water discharges) from soil disturbances of five (5) acres or more must be regulated as an industrial activity and covered by a NPDES permit.

In a recent ruling, the Ninth Circuit Court of Appeals invalidated the exemption granted by USEPA for storm water discharges from soil disturbances of less than five acres but remanded the regulation to USEPA for further action. The State Water Board, at this time, is not requiring storm water discharges from soil disturbances of less than five acres to be covered by this general permit. Instead, the State Water Board will await future USEPA or court action clarifying the types of storm water discharges that must be permitted. If necessary, the State Water Board will reopen the general permit to accommodate such a clarification.

While Federal regulations allow two permitting options for storm water discharges (individual permits and general permits), the State Water Board has elected to adopt only one statewide general permit at this time that will apply to all storm water discharges, except from those on Indian lands and the Lake Tahoe Hydrologic Unit. The State Water Board has previously adopted a separate statewide general permit for all other industrial storm water discharge categories, except for those discharges in Santa Clara County that drain to San Francisco Bay and on Indian Lands.

This general permit requires all owners of land where construction activity occurs (dischargers) to:

1. Eliminate or reduce non-storm water discharges to storm sewer systems and other waters of the nation,
2. Develop and implement a storm water pollution prevention plan, and
3. Perform inspections of storm water pollution prevention measures (control practices).

This general permit will be implemented and enforced by the nine California Regional Water Quality Control Boards (Regional Water Boards).

The general permit accompanying this fact sheet is intended to initiate regulation of storm water discharges. Regulating many storm water discharges under one permit will greatly reduce the otherwise overwhelming administrative burden associated with permitting individual storm water discharges. Dischargers must submit a notice of intent (NOI) to obtain coverage under this general permit. It is expected that as the storm water program develops, the Regional Water Boards may issue general permits containing more specific permit provisions. When this occurs, those dischargers will no longer be regulated by this general permit.

TYPES OF CONSTRUCTION ACTIVITY COVERED BY THIS GENERAL PERMIT

Construction activity includes clearing, grading, or excavation that results in soil disturbance of at least five acres of total land area. Construction activity that results in soil disturbances of less than five acres requires a permit if the construction activity is part of a larger common plan of development or sale. Construction activity does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of the facility, nor does it include emergency construction activities required to protect public health and safety. Dischargers may confirm with the local Regional Water Board that a particular routine maintenance is not subject to this general permit.

Storm water discharges from those portions of a construction project which include dredging and/or filling which are subject to regulation by the U.S. Army Corps of Engineers (Corps), pursuant to Section 10 of the Rivers and Harbors Act and/or Section 404 of the CWA, are excluded from regulation under this general permit. Said portions of the project are, however, subject to the certification requirements of Section 401 of the CWA and must be addressed via the certification process. Storm water discharges from dredge spoil placement which occurs outside of Corps jurisdiction (upland sites) and is part of a construction activity which disturbs five or more acres of land are covered by this general permit.

NOTIFICATION REQUIREMENTS

The owner of the land where the construction activity is occurring is responsible for obtaining coverage under this general permit by filing a NOI and appropriate fee in accordance with the NOI instructions. For construction activity conducted on easements, or on nearby property by agreement or permission, the entity responsible for the construction activity must file a NOI.

A separate NOI must be submitted to the State Water Board for each covered construction activity. Owners of land with ongoing construction activity will be required to submit a NOI by September 30, 1992. Owners of land with construction activity commencing after September 30, 1992 must submit a NOI prior to commencement of construction activity. The NOI requirements of the general permit are intended to establish a mechanism which can be used to clearly identify the responsible parties, locations, and scope of operations of dischargers covered by the general permit.

The NOI must be sent to the following address:

California State Water Resources Control Board
Division of Water Quality
Storm Water Permit Unit
P.O. Box 1977
Sacramento, CA 95812-1977

The current annual fee for this general permit is either $500 or $250 depending on location. Dischargers who fail to obtain coverage under this general permit and are not otherwise covered by a NPDES permit for storm water discharges will be in violation of the CWA and the California Water Code. When construction is complete or ownership has been transferred, dischargers are required to notify the State Water Board indicating that all State and local requirements have been met in accordance with Special Provision 7 of the general permit.

TYPES OF CONSTRUCTION ACTIVITY NOT COVERED BY THIS GENERAL PERMIT

This general permit does not apply to storm water discharges from those areas on Indian lands and the Lake Tahoe Hydrologic Unit. Storm water discharges in the Lake Tahoe Hydrologic Unit will be regulated by a separate permit(s) adopted by the California Regional Water Quality Control Board, Lahontan Region (Lahontan Regional Water Board). USEPA will regulate storm water discharges on Indian lands. Permit applications for storm water discharges that will be conducted in the Lake Tahoe Hydrologic Unit should be submitted directly to the Lahontan Regional Water Board.

DESCRIPTION OF GENERAL PERMIT CONDITIONS

The following is a brief description of the major provisions of the general permit and the basis for the general permit. Dischargers should read the general permit carefully.

Prohibitions

This general permit authorizes the discharge of storm water associated with construction activity from construction sites. It prohibits the discharge of materials other than storm water and all discharges which contain a hazardous substance in excess of reportable quantities established at 40 Code of Federal Regulations (CFR) 117.3 or 40 CFR 302.4 unless a separate NPDES permit has been issued to regulate those discharges.

Effluent Limitations

Permits for storm water discharges associated with construction activity must meet all applicable provisions of Sections 301 and 402 of the CWA. These provisions require controls of pollutant discharges that utilize best available technology economically achievable (BAT) and best conventional pollutant control technology (BCT) to reduce pollutants, and any more stringent controls necessary to meet water quality standards.

It is not feasible at this time for the State Water Board to establish numeric effluent limitations. The reasons why establishment of numeric effluent limitations is not feasible is discussed in detail in State Water Board Orders Nos. WQ 91-03 and WQ 91-04. Therefore, the effluent limitations contained in this general permit are narrative and include the requirement to implement appropriate pollution prevention control practices and/or Best Management Practices (BMPs). The BMPs may include treatment of storm water discharges, along with source reduction, which will constitute BAT and BCT and will achieve compliance with water quality standards. The effluent limitations constitute compliance with the requirements of the CWA. However, if storm water discharges cause water quality standards to be exceeded, this general permit may be amended, or the appropriate Regional Water Board may adopt a general permit which replaces this general permit to include additional effluent limitations necessary to achieve water quality standards. Elimination or reduction of non-storm water discharges is a major goal of this general permit. Non-storm water discharges include a wide variety of sources, including improper dumping, spills, or leakage from storage tanks or transfer areas. Non-storm water discharges may contribute a significant pollutant load to receiving waters. Measures to control spills, leakage, and dumping and to prevent illicit connections during construction can often be addressed through BMPs. This general permit prohibits the discharge of materials other than storm water. The general permit, however, recognizes that certain non-storm water discharges may be necessary for the practical performance and completion of construction projects. Such discharges include, but are not limited to: landscape irrigation of erosion control measures, pipe flushing and testing, street washing, and dewatering. Such discharges are allowed by this general permit if the discharges are (1) infeasible to eliminate, (2) comply with BMPs as described in the Storm Water Pollution Prevention Plan, (3) do not cause or contribute to a violation of water quality standards, and (4) are not required to be permitted by the local Regional Water Board (e.g., some Regional Water Boards have adopted general permits for dewatering discharges).

Storm Water Pollution Prevention Plan (SWPPP)

This general permit requires development and implementation of SWPPPs emphasizing storm water BMPs. This approach provides the flexibility necessary to establish control practices which can appropriately address sources of pollutants at different construction activities.

All dischargers must prepare, retain at the construction site, and implement a SWPPP. The SWPPP has two major objectives: (1) to help identify the sources of sediment and other pollutants that affect the quality of storm water discharges and (2) to describe and ensure the implementation of practices to reduce sediment and other pollutants in storm water discharges. The SWPPP must include BMPs which address source reduction, and, if necessary, should include BMPs which require treatment.

The SWPPPs are considered reports available to the public under Section 308(b) of the CWA and will be made available by the Regional Water Board upon request. Required elements of the SWPPPs include: (1) site description, (2) erosion and sediment controls, (3) waste disposal, (4) implementation of approved local plans, (5) proposed post-construction controls, including description of local post-construction erosion and sediment control requirements, and (6) non-storm water management.

Monitoring Program

Another major feature of the general permit is the development and implementation of a monitoring program. All dischargers are required to conduct inspections of the construction site prior to anticipated storm events and after actual storm events to identify areas contributing to a storm water discharge and to evaluate whether measures to reduce pollutant loadings identified in the SWPPP are adequate and properly implemented in accordance with the terms of the general permit or whether additional control practices are needed.

Each discharger must certify annually that its construction activity is in compliance with the requirements of this general permit and its SWPPP. Dischargers who cannot annually certify compliance or who have had other instances of noncompliance must notify the appropriate Regional Water Board. A well-developed monitoring program will provide a good method for checking on the effectiveness of the SWPPP.

Retention of Records

The discharger is required to retain records of all monitoring information, copies of all reports required by this general permit, and records of all data used to complete the NOI for the construction activity to be covered by the general permit for a period of at least three years. This period may be extended by request of the State and/or Regional Water Boards. With the exception of noncompliance reporting, dischargers are not required to submit the records, except upon specific request by the Regional Water Board.

STATE WATER RESOURCES CONTROL BOARD (STATE WATER BOARD)
ORDER NO. 92-08-DWQ
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
GENERAL PERMIT NO. CAS000002

WASTE DISCHARGE REQUIREMENTS (WDRS)
FOR
DISCHARGES OF STORM WATER RUNOFF ASSOCIATED WITH CONSTRUCTION ACTIVITY

The State Water Board finds that:

1. Federal regulations for controlling pollutants in storm water runoff discharges were issued by the U.S. Environmental Protection Agency (USEPA) on November 16, 1990 (40 Code of Federal Regulations (CFR) Parts 122, 123, and 124). The regulations require discharges of storm water associated with construction activity including clearing, grading, and excavation activities (except operations that result in disturbance of less than five acres of total land area and which are not part of a larger common plan of development or sale)[1/] to obtain a NPDES permit and to implement Best Available Technology Economically Achievable (BAT) and Best Conventional Pollutant Control Technology (BCT) to reduce or eliminate storm water pollution.

2. This general permit shall regulate pollutants in discharges of storm water associated with construction activity (storm water discharges) except from those areas on Indian lands, the Lake Tahoe Hydrologic Unit, and where the storm water discharge is determined ineligible for coverage under this general permit by the California Regional Water Quality Control Boards (Regional Water Boards). Attachment 1 contains addresses and telephone numbers of each Regional Water Board office.

3. This general permit does not preempt or supersede the authority of local storm water management agencies to prohibit, restrict, or control storm water discharges to separate storm sewer systems or other watercourses within their jurisdiction, as allowed by State and Federal law.

4. To obtain authorization for current and future storm water discharges pursuant to this general permit, the owner of a site where construction activity occurs (discharger) must submit a Notice of Intent (NOI) and appropriate fee to the State Water Board. Dischargers who submit a NOI and appropriate fee are authorized to discharge storm water under the terms and conditions of this general permit.

5. If an individual NPDES permit is issued to a discharger otherwise subject to this general permit, or an alternative general permit is subsequently adopted which covers storm water discharges regulated by this general permit, the applicability of this general permit to such discharges is automatically terminated on the effective date of the individual permit or the date of approval for coverage under the subsequent general permit.

6. This action to adopt a NPDES permit is exempt from the provisions of the California Environmental Quality Act (Public Resources Code Section 21100, et seq.), in accordance with Section 13389 of the California Water Code.

1/ In a recent ruling, the Ninth Circuit Court of Appeals invalidated the exemption granted by USEPA for storm water discharges from soil disturbances less than five acres but remanded to USEPA for further action. This general permit may be reopened, as necessary, to accommodate a redefinition of the types of storm water discharges that must be permitted.

7. The State Water Board adopted the California Ocean Plan on March 22, 1990 and the California Inland Surface Waters Plan and Enclosed Bays and Estuaries Plan on April 11, 1991. In addition, the Regional Water Boards have adopted and the State Water Board has approved Water Quality Control Plans (Basin Plans). Dischargers regulated by this general permit must comply with the water quality standards in these Plans and subsequent amendments thereto.

8. It is not feasible at this time to establish numeric effluent limitations for pollutants in storm water discharges from construction activities. Instead, the provisions of this general permit that require implementation of Best Management Practices (BMPs) to control and abate the discharge of pollutants in storm water discharges constitute compliance with BAT/BCT requirements and with requirements to achieve water quality standards.

9. Discharges of non-storm water may be necessary for the practical performance and completion of certain construction projects. Such discharges include, but are not limited to: landscape irrigation of erosion control measures, pipe flushing and testing, street washing, and dewatering. Such discharges are allowed under this general permit so long as they comply with BMPs as described in the Storm Water Pollution Prevention Plan and they do not cause or contribute to violation of any water quality standard.

10. Following adoption of this general permit, the Regional Water Boards shall enforce the provisions of this general permit including the monitoring and reporting requirements.

11. Following public notice in accordance with State and Federal laws and regulations, the State Water Board in a public meeting held May 14, 1992 heard and considered all comments. The State Water Board has prepared written responses to all significant comments.

12. This Order is a NPDES permit in compliance with Section 402 of the Clean Water Act (CWA) and shall take effect upon adoption by the State Water Board.

13. This general permit does not authorize discharges of fill or dredged material regulated by the U.S. Army Corps of Engineers under CWA Section 404 and does not constitute a waiver of water quality certification under CWA Section 401.

IT IS HEREBY ORDERED that all dischargers who file a Notice of Intent (NOI) indicating their intention to be regulated under the provisions of this general permit shall comply with the following:

A. DISCHARGE PROHIBITIONS:

1. Discharges of material other than storm water, which are not otherwise regulated by a NPDES permit, to a separate storm sewer system or waters of the nation are prohibited, except as allowed in Provision C.3.

2. Storm water discharges shall not cause or threaten to cause pollution, contamination, or nuisance.

3. Storm water discharges regulated by this general permit shall not contain a hazardous substance equal to or in excess of a reportable quantity listed in 40 CFR Part 117 and/or 40 CFR Part 302.

B. RECEIVING WATER LIMITATIONS:

1. Storm water discharges to any surface or ground water shall not adversely impact human health or the environment.

2. Storm water discharges shall not cause or contribute to a violation of any applicable water quality standards contained in the California Ocean Plan, Inland Surface Waters Plan, Enclosed Bays and Estuaries Plan, or the applicable Regional Water Board's Basin Plan.

C. SPECIAL PROVISIONS FOR CONSTRUCTION ACTIVITY:

1. All dischargers must file a NOI and appropriate fee for construction activities conducted at each site as required by Attachment 2: Notice of Intent--General Instructions.

2. All dischargers must develop and implement a Storm Water Pollution Prevention Plan in accordance with Section A: Storm Water Pollution Prevention Plan (SWPPP).

3. Discharges of non-storm water are allowed only when necessary for performance and completion of construction projects and where they do not cause or contribute to a violation of any water quality standard. Such discharges must be described in the SWPPP. Wherever feasible, alternatives which do not result in discharge of non-storm water shall be implemented, in accordance with Section A.7 of the SWPPP requirements.

4. All dischargers must develop and implement a monitoring program and reporting plan in accordance with Section B: Monitoring Program and Reporting Requirements.

5. All dischargers must comply with the lawful requirements of municipalities, counties, drainage districts, and other local agencies regarding discharges of storm water to separate storm sewer systems or other watercourses under their jurisdiction, including applicable requirements in municipal storm water management programs developed to comply with NPDES permits issued by the Regional Water Boards to local agencies.

6. All dischargers must comply with the standard provisions and reporting requirements contained in Section C: Standard Provisions.

7. The discharger may revoke (cancel) coverage under this general permit by submitting to the State Water Board certification, in accordance with the signatory requirements of Section C: Standard Provisions, Items 9 and 10, that construction activity has been completed, that all elements of the SWPPP have been completed, that construction and equipment maintenance waste have been disposed of properly, that the site is in compliance with all local storm water management requirements including erosion/sediment control requirements, policies, and guidelines. In addition, a discharger may revoke (cancel) coverage under this general permit when ownership of all or a portion of the project has been transferred. The new owner must comply with the provisions of Section A(2)(c) and B(3)(b) of this general permit. The revocation should accompany the NOI from the new owner when possible.

8. This general permit will expire on August 20, 1997. Upon reissuance of a NPDES general permit by the State Water Board, dischargers subject to the reissued general permit may be required to file a revised NOI.

D. REGIONAL WATER BOARD AUTHORITIES:

1. Following adoption of this general permit, Regional Water Boards shall:

   a. Implement the provisions of this general permit. Implementation of this general permit may include, but is not limited to, reviewing SWPPPs, reviewing monitoring reports, conducting compliance inspections, and taking enforcement actions.

   b. Issue permits as they deem appropriate to individual dischargers, categories of dischargers, or dischargers in a geographic area. Upon issuance of such permits by a Regional Water Board, the affected dischargers shall no longer be regulated by this general permit.

2. Regional Water Boards may provide guidance to dischargers on SWPPP and Monitoring Program implementation.

3. Regional Water Boards may require dischargers to retain records for more than three years.

4. Regional Water Boards may require additional monitoring and reporting program requirements.

CERTIFICATION

The undersigned, Administrative Assistant to the State Water Board, does hereby certify that the foregoing is a full, true, and correct copy of an order duly and regularly adopted at a meeting of the State Water Resources Control Board held on August 20, 1992.

AYE: W. Don Maughan
Eliseo M. Samaniego
Marc Del Piero
James M. Stubchaer

NO: None

ABSENT: John Caffrey

ABSTAIN: None

Maureen Marché
Administrative Assistant to the Board

Section A: STORM WATER POLLUTION PREVENTION PLAN

1. Objectives

A Storm Water Pollution Prevention Plan (SWPPP) shall be developed and implemented for each construction site covered by this general permit. The SWPPP shall be certified in accordance with the signatory requirements of Standard Provision C.9. The SWPPP shall be developed and amended, when necessary, to meet the following objectives:

a. To identify pollutant sources that may affect the quality of discharges of storm water associated with construction activity (storm water discharges) from the construction site, and

b. To identify, construct, and implement storm water pollution prevention measures (control practices) to reduce pollutants in storm water discharges from the construction site both during construction and after construction is completed.

2. Implementation Schedule

a. For construction activity commencing on and after October 1, 1992, the SWPPP must be developed and implemented concurrent with commencement of construction activities.

b. For construction activity commencing prior to and continuing beyond October 1, 1992, the SWPPP must be developed and implemented by October 1, 1992.

c. For ongoing construction activity involving a change of ownership of property covered by this general permit, the new owner must accept and maintain the existing SWPPP.

3. Availability

The SWPPP shall be kept on site during construction activity and made available upon request of a representative of the Regional Water Board and/or local agency.

4. Required Changes

a. The discharger shall amend the SWPPP whenever there is a change in construction or operations which may affect the discharge of significant quantities of pollutants to surface waters, ground waters, or a municipal separate storm sewer system. The SWPPP should also be amended if it is in violation of any condition of this general permit or has not achieved the general objective of reducing pollutants in storm water discharges.

b. The Regional Water Board, or local agency with the concurrence of the Regional Water Board, may require the discharger to amend the SWPPP.

5. Source Identification

The SWPPP shall provide a description of potential sources which are likely to add significant quantities of pollutants to storm water discharges or which may result in non-storm water discharges from the construction site. The SWPPP shall include, at a minimum, the following items:

a. A map extending approximately one-quarter mile beyond the property boundaries of the construction site showing: the construction site, surface water bodies (including known springs and wetlands[1/]), known wells, an outline of off-site drainage areas that discharge into the construction site, general topography, and the anticipated discharge location(s) where the construction site's storm water discharges to a municipal storm sewer system or other water body. The requirements of this paragraph may be included in the site map required under the following paragraph if appropriate.

b. A site map(s) showing:

   i. Location of control practices used during construction;

   ii. Areas used to store soils and wastes;

   iii. Areas of cut and fill;

   iv. Drainage patterns and slopes anticipated after major grading activities are completed;

   v. Areas of soil disturbance;

   vi. Surface water locations;

   vii. Areas of potential soil erosion where control practices will be used during construction;

   viii. Existing and planned paved areas and buildings;

   ix. Locations of post-construction control practices;

   x. An outline of the drainage area for each on-site storm water discharge point;

   xi. Vehicle storage and service areas; and

   xii. Areas of existing vegetation.

c. A narrative description of the following:

   i. Toxic materials that are known to have been treated, stored, disposed, spilled, or leaked in significant quantities onto the construction site;

   ii. Practices to minimize contact of construction materials, equipment, and vehicles with storm water;

   iii. Construction material loading, unloading, and access areas;

   iv. Preconstruction control practices (if any) to reduce sediment and other pollutants in storm water discharges;

   v. Equipment storage, cleaning, and maintenance areas;

1/ The determination of whether wetlands exist shall be made by the person who prepares the SWPPP and shall not be binding upon any other person.

vi. Methods of on-site storage and disposal of construction materials; and

vii. The nature of fill material and existing data describing the soil on the construction site.

d. A list of pollutants (other than sediment) that are likely to be present in storm water discharges in significant quantities. Describe the control practices (if different from Item 6 below) appropriate to reduce these pollutants in the storm water discharges.

e. An estimate of the size of the construction site (in acres or square feet), an estimate of the runoff coefficient of the construction site before and after construction, and an estimate of the percentage of the area of the construction site that is impervious (e.g., pavement, buildings, etc.) before and after construction.

f. A copy of the NOI.

6. Erosion and Sediment Control

The SWPPP shall include:

a. A description of soil stabilization practices. These practices shall be designed to preserve existing vegetation where feasible and to revegetate open areas as soon as feasible after grading or construction. In developing these practices, the discharger shall consider: temporary seeding, permanent seeding, mulching, sod stabilization, vegetative buffer strips, protection of trees, or other soil stabilization practices. At a minimum, the operator must implement these practices on all disturbed areas during the rainy season.

b. A description or illustration of control practices which, to the extent feasible, will prevent a net increase of sediment load in storm water discharge. In developing control practices, the discharger shall consider a full range of erosion and sediment controls such as detention basins, straw bale dikes, silt fences, earth dikes, brush barriers, velocity dissipation devices, drainage swales, check dams, subsurface drain, pipe slope drain, level spreaders, storm drain inlet protection, rock outlet protection, sediment traps, temporary sediment basins, or other controls. At a minimum, sandbag dikes, silt fences, straw bale dikes, or equivalent controls practices are required for all significant sideslope and downslope boundaries of the construction area. The discharger must consider site-specific and seasonal conditions when designing the control practices.

c. Control practices to reduce the tracking of sediment onto public or private roads. These public and private roads shall be inspected and cleaned as necessary.

d. Control practices to reduce wind erosion.

7. Non-Storm Water Management

The SWPPP shall include provisions which eliminate or reduce to the extent feasible the discharge of materials other than storm water to the storm sewer system and/or receiving waters. Such provisions shall ensure, to the extent feasible, that no materials are discharged in quantities which will have an adverse effect on receiving waters. Materials other than storm water that are discharged shall be listed along with the estimated quantity of the discharged material.

8. Post-Construction Storm Water Management

The SWPPP shall describe the control practices to reduce pollutants in storm water discharges after all construction phases have been completed at the site. These must be consistent with all local post-construction storm water management requirements, policies, and guidelines. The discharger must consider site-specific and seasonal conditions when designing the control practices. Operation and maintenance of control practices after construction is completed shall be addressed, including short- and long-term funding sources and the responsible party.

9. Waste Management and Disposal

All wastes (including equipment maintenance waste) disposed at the site or removed from the site for disposal shall be disposed of in compliance with Federal, State, and local laws, regulations, and ordinances.

10. Maintenance, Inspection, and Repair

The SWPPP shall include maintenance, inspections, and repair procedures to ensure that all grade surfaces, walls, dams and structures, vegetation, erosion and sediment control measures, and other protective devices identified in the site plan are maintained in good and effective condition and are promptly repaired or restored.

11. Training

The SWPPP shall include procedures to ensure that all inspections required in Section B.4 of the Monitoring Program and Reporting Requirements of this general permit and maintenance and repair required in Paragraph 10 of this Section are done by trained personnel.

12. List of Contractors/Subcontractors

The SWPPP shall include a list of all contractors (or subcontractors) responsible for implementing the SWPPP.

13. Other Plans

This SWPPP may incorporate, by reference, the appropriate elements of other plans required by local, State, or Federal agencies. A copy of any requirements incorporated by reference shall be kept at the construction site.

14. Public Access

The SWPPP is considered a report that shall be available to the public under Section 308(b) of the CWA. Upon request by members of the public, the discharger shall make available for review a copy of the SWPPP either to the Regional Water Board or directly to the requestor.

15. Preparer

The SWPPP shall include the signature and title of the person responsible for preparation of the SWPPP and include the date of initial preparation and each amendment, thereto.

Section B: MONITORING PROGRAM AND REPORTING REQUIREMENTS

1. General

Dischargers are required to conduct inspections before and after storm events and to annually certify that they are in compliance with the general permit and their SWPPP. Other than reporting incidents of noncompliance, dischargers are not required to submit reports or certifications.

2. Required Changes

The Regional Water Board may require the discharger to conduct additional site inspections, submit reports and certifications, or to perform sampling and analysis.

3. Implementation

a. The requirements of this Section shall be implemented by October 1, 1992 or commencement of the construction activity. The discharger is responsible for implementing these requirements until construction activity is complete.

b. For ongoing construction activity involving a change in ownership of property covered by this general permit, the new owner must implement the requirements of this Section concurrent with the change of ownership.

4. Site Inspections

Dischargers shall conduct inspections of the construction site prior to anticipated storm events and after actual storm events to identify areas contributing to a discharge of storm water associated with construction activity and to evaluate whether control practices to reduce pollutant loadings identified in the SWPPP are adequate and properly implemented in accordance with the terms of the general permit or whether additional control practices are needed. A record of the inspections must include the date of the inspection, the individual(s) who performed the inspection, and the observations.

5. Compliance Certification

Each discharger must annually certify that its construction activity is in compliance with the requirements of this general permit and its SWPPP. This certification should be based upon the site inspections required in Paragraph 4 of this Section. The first certification must be completed by July 1, 1993, and each July 1 thereafter.

6. Noncompliance Reporting

Dischargers who cannot certify compliance, in accordance with Paragraph 5 of this Section and/or who have had other instances of noncompliance, must notify the appropriate Regional Water Board. The notifications shall identify the type(s) of noncompliance, describe the actions necessary to achieve compliance, and include a time schedule, subject to the modifications by the Regional Water Board, indicating when compliance will be achieved. Noncompliance notifications must be submitted within 30 days of identification of noncompliance.

7. Monitoring Records

Records of all inspections, compliance certifications, and noncompliance reporting must be retained for a period of at least three years. With the exception of noncompliance reporting, dischargers are not required to submit these records.

Section C: STANDARD PROVISIONS FOR CONSTRUCTION ACTIVITY

1. Duty to Comply

The discharger must comply with all of the conditions of this general permit. Any permit noncompliance constitutes a violation of the CWA and the Porter-Cologne Water Quality Control Act and is grounds for enforcement action and/or removal from general permit coverage.

The discharger shall comply with effluent standards or prohibitions established under Section 307(a) of the CWA for toxic pollutants within the time provided in the regulations that establish these standards or prohibitions, even if this general permit has not yet been modified to incorporate the requirement.

2. General Permit Actions

This general permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the discharger for a general permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any general permit condition.

If any toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is promulgated under Section 307(a) of the Clean Water Act for a toxic pollutant which is present in the discharge and that standard or prohibition is more stringent than any limitation on the pollutant in this general permit, this general permit shall be modified or revoked and reissued to conform to the toxic effluent standard or prohibition; and the dischargers so notified.

3. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for a discharger in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this general permit.

4. Duty to Mitigate

The discharger shall take all responsible steps to minimize or prevent any discharge in violation of this general permit which has a reasonable likelihood of adversely affecting human health or the environment.

5. Proper Operation and Maintenance

The discharger shall at all times properly operate and maintain any facilities and systems of treatment and control (and related appurtenances) which are installed or used by the discharger to achieve compliance with the conditions of this general permit and with the requirements of storm water pollution prevention plans. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. Proper operation and maintenance may require the operation of backup or auxiliary facilities or similar systems, installed by a discharger when necessary to achieve compliance with the conditions of this general permit.

6. Property Rights

This general permit does not convey any property rights of any sort, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State, or local laws or regulations.

7. Duty to Provide Information

The discharger shall furnish the Regional Water Board, State Water Board, or USEPA, within a reasonable time, any requested information to determine compliance with this general permit. The discharger shall also furnish, upon request, copies of records required to be kept by this general permit.

8. Inspection and Entry

The discharger shall allow the Regional Water Board, State Water Board, USEPA, and/or, in the case of construction sites which discharge through a municipal separate storm sewer, an authorized representative of the municipal operator of the separate storm sewer system receiving the discharge, upon the presentation of credentials and other documents as may be required by law, to:

a. Enter upon the discharger's premises at reasonable times where a regulated construction activity is being conducted or where records must be kept under the conditions of this general permit;

b. Have access to and copy at reasonable times, any records that must be kept under the conditions of this general permit;

c. Inspect at reasonable times the construction site and the related erosion/sediment controls; and

d. Sample or monitor at reasonable times for the purpose of ensuring general permit compliance.

9. Signatory Requirements

a. All Notices of Intent submitted to the State Water Board shall be signed as follows:

1. For a corporation: by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means: (a) a president, secretary, treasurer, or vice president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation, or (b) the manager of the construction activity if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

2. For a partnership or sole proprietorship: by a general partner or the proprietor, respectively; or

3. For a municipality, State, Federal, or other public agency: by either a principal executive officer, ranking elected official, or duly authorized representative. The principal executive officer of a Federal agency includes the chief executive officer of the agency or the senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of USEPA).

b. All storm water pollution prevention plans, reports, certifications, or other information required by the general permit and/or requested by the Regional Water Board, State Water Board, USEPA, or the local storm water management agency shall be signed by a person described above or by a duly authorized representative. A person is a duly authorized representative if:

1. The authorization is made in writing by a person described above and retained as part of the SWPPP;

2. The authorization specifies either an individual or a position having responsibility for the overall operation of the construction activity, such as the position of manager, operator, superintendent, or position of equivalent responsibility or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.); and

3. If an authorization is no longer accurate because a different individual or position has responsibility for the overall operation of the construction activity, a new authorization must be attached to the SWPPP prior to submittal of any reports, information, or certifications to be signed by the authorized representative.

10. Certification

Any person signing documents under Provision 8 shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

11. Anticipated Noncompliance

The discharger will give advance notice to the Regional Water Board and local storm water management agency of any planned changes in the construction activity which may result in noncompliance with general permit requirements.

12. Penalties for Falsification of Reports.

Section 309(c)(4) of the CWA provides that any person who knowingly makes any false material statement, representation, or certification in any record or other document submitted or required to be maintained under this general permit, including reports of compliance or noncompliance shall, upon conviction, be punished by a fine of not more than $10,000 or by imprisonment for not more than two years or by both.

13. Oil and Hazardous Substance Liability

Nothing in this general permit shall be construed to preclude the institution of any legal action or relieve the discharger from any responsibilities, liabilities, or penalties to which the discharger is or may be subject under Section 311 of the CWA.

14. Severability

The provisions of this general permit are severable, and, if any provision of this general permit or the application of any provision of this general permit to any circumstance is held invalid, the application of such provision to other circumstances and the remainder of this general permit shall not be affected thereby.

15. Reopener Clause

This general permit may be modified, revoked and reissued, or terminated for cause due to promulgation of amended regulations, receipt of USEPA guidance concerning regulated activities, judicial decision, or in accordance with 40 CFR 122.62, 122.63, 122.64, and 124.5.

16. Penalties for Violations of Permit Conditions

a. Section 309 of the CWA provides significant penalties for any person who violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the CWA or any permit condition or limitation implementing any such section in a permit issued under Section 402. Any person who violates any permit condition of this general permit is subject to a civil penalty not to exceed $25,000 per day of such violation, as well as any other appropriate sanction provided by Section 309 of the CWA.

b. The Porter-Cologne Water Quality Control Act also provides for civil and criminal penalties which in some cases are greater than those under the CWA.

17. Availability

A copy of this general permit shall be maintained at the construction site during construction activity and be available to operating personnel.

18. Transfers

This general permit is not transferable. A new owner of an ongoing construction activity must submit a NOI in accordance with the requirements of this general permit to be authorized to discharge under this general permit. An owner who sells property covered by this general permit shall inform the new owner of the duty to file a NOI and shall provide the new owner with a copy of this general permit.

19. Continuation of Expired Permit

This general permit continues in force and effect until a new general permit is issued or the State Water Board rescinds this general permit. Only those dischargers authorized to discharge under the expiring general permit are covered by the continued general permit.

STATE WATER RESOURCES CONTROL BOARD

P. O. Box 100, Sacramento, CA 95812-0100

Legislative and Public Affairs: (916)657-2390
Water Quality Information: (916) 657-0687
Clean Water Programs Information: (916) 739-4400
Water Rights Information: (916) 657-2170

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARDS

NORTH COAST REGION (1)

5550 Skylane Blvd. Suite A
Santa Rosa, CA 95403
(707) 576-2220

SAN FRANCISCO BAY REGION (2)

2101 Webster Street, Ste. 500
Oakland, CA 94612
(510) 464-1255

CENTRAL COAST REGION (3)

81 Higuera St., Suite 200
San Luis Obispo, CA 93401-5414
(805) 549-3147

LOS ANGELES REGION (4)

101 Centre Plaza Drive
Monterey Park, CA 91754-2156
(213) 266-7500

CENTRAL VALLEY REGION (5)

3443 Routier Road, Suite A
Sacramento, CA 95827-3098
(916) 361-5600

Fresno Branch Office

3614 East Ashlan Ave.
Fresno, CA 93726
(209) 445-5116

Redding Branch Office

415 Knollcrest Drive
Redding, CA 96002
(916) 224-4845

LAHONTAN REGION (6)

2092 Lake Tahoe Boulevard, Suite 2
South Lake Tahoe, CA 96150
(916) 544-3481

Victorville Branch Office

Civic Plaza,
15428 Civic Drive, Suite 100
Victorville, CA 92392-2359
(619) 241-6583

COLORADO RIVER BASIN REGION (7)

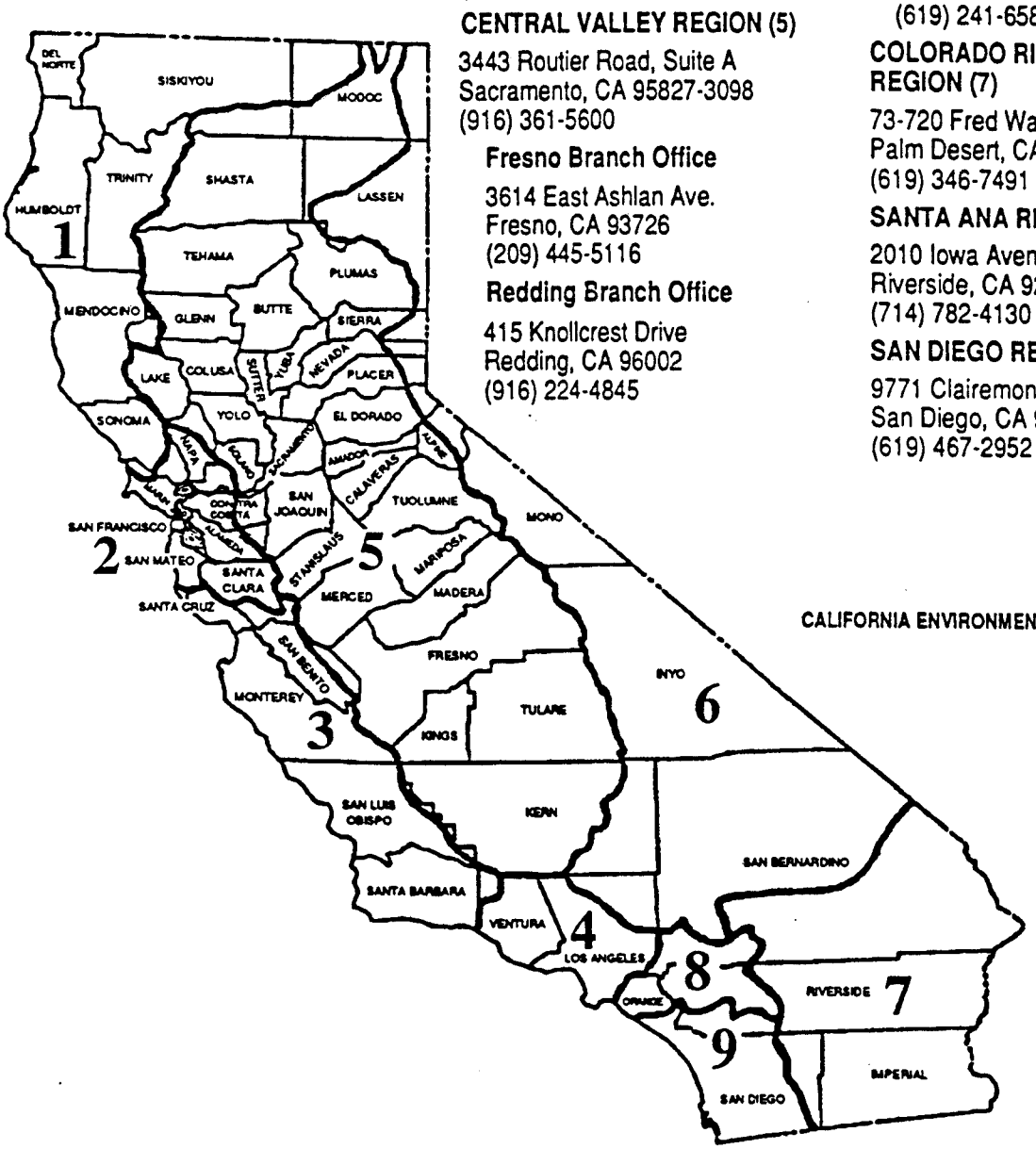
73-720 Fred Waring Drive, Suite 100
Palm Desert, CA 92260
(619) 346-7491

SANTA ANA REGION (8)

2010 Iowa Avenue, Suite 100
Riverside, CA 92507-2409
(714) 782-4130

SAN DIEGO REGION (9)

9771 Clairemont Mesa Blvd. Ste. B
San Diego, CA 92124
(619) 467-2952



STATE OF CALIFORNIA
Pete Wilson, Governor

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY
James M. Strock, Secretary

Attachment 2

NOTICE OF INTENT (NOI) TO COMPLY WITH THE TERMS OF THE GENERAL PERMIT TO DISCHARGE STORM WATER ASSOCIATED WITH CONSTRUCTION ACTIVITY

GENERAL INSTRUCTIONS

Who Must Submit

Discharges of storm water associated with construction activity (storm water discharges) that results in the disturbance of five acres or more of total land area or which is part of a larger common area of development or sale must be permitted. Construction activity includes clearing, grading, excavation, and reconstruction of existing facilities involving removal and replacement. Construction activity does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of the facility.

The owner of the land where the construction activity is occurring is responsible for obtaining a permit. Owners may obtain coverage under the General Storm Water Permit to Discharge Storm Water Associated with Construction Activity (General Permit) by filing a NOI in accordance with the following instructions. Coverage for construction activity conducted on easements (e.g., pipeline construction), or on nearby properties by agreement or permission, shall be obtained by the entity responsible for the construction activity.

Construction Activities Not Covered by This General Permit

Storm water discharges in the Lake Tahoe Hydrologic Unit will be regulated by a separate permit(s) adopted by the California Regional Water Quality Control Board, Lahonton Region, and may not seek coverage under the State Water Board's general permit. Storm water discharges on Indian lands will be regulated by the U.S. Environmental Protection Agency.

Where to Apply

The NOI should be mailed to the State Water Resources Control Board at the following address:

State Water Resources Control Board
Division of Water Quality
Attn: Storm Water Permit Unit
P.O. Box 1977
Sacramento, CA 95812-1977

When to Apply

Owners of ongoing construction must file a NOI, along with the appropriate annual fee, by September 30, 1992. Owners of new construction (those beginning construction after September 30, 1992) must file a NOI prior to the commencement of construction. For ongoing construction activity involving a change of ownership, the new owner must submit a new NOI within 30 days of the date of change of ownership. Preferably, the NOI should be sent with the revocation prepared by the previous owner.

Fees

The current annual fee is $250.00 for each construction site which discharges into a municipal separate storm sewer system regulated by an areawide urban storm water permit and $500.00 for all other construction sites.

Completing the NOI

Completion and submittal of the attached NOI (Form NOI-2) is required to gain coverage under the general permit. It must be completely and accurately filled out. A construction site will be considered to be covered by the general permit upon filing a complete and accurate NOI and submitting the appropriate annual fee. Upon receipt of the NOI and fee, each discharger will be sent a letter containing the discharger's identification number.

Questions?

If you have any questions on completing the NOI after reading the following line-by-line instructions, please call us at (916) 657-1146.

NOI-- BY LINE INSTRUCTIONS

The NOI consists of two parts--a NOI Form (Form NOI-2) and a site map. Please type or print when completing the NOI Form and site map.

Mark one of the three boxes at the top portion of the NOI. Check box 1 if the NOI is being completed for ongoing construction, box 2 if the construction site is new (commencing on or after October 1, 1992), and box 3 if the NOI is being submitted to report changes for a construction site already covered by the general permit. An example of a change that warrants a resubmittal of the NOI would be a change of ownership of the construction site. Complete only those portions of the NOI that apply to the changes (the NOI must always be signed). If box 3 is checked, the WDID No. must be included.

SECTION I--OWNER

Enter the owner of the construction site's official or legal name, address, contact person, and contact person's title and telephone number.

SECTION II--CONSTRUCTION SITE INFORMATION

In Part A, enter the name of the developer (or general contractor), official, or legal name, address, contact person, and contact person's title and telephone number. The contact person should be the construction site manager completely familiar with the construction site and charged with compliance and oversight of the general permit.

In Part B, enter the address, county, and telephone number (if any) of the construction site. Construction sites that do not have a street address must attach to the NOI a legal description of the construction site.

In Part C, indicate whether the construction site is part of a larger common plan of development or sale. For example, indicate yes if the construction activity is occuring on a two-acre site within an industrial park development of greater than five acres. If the construction site is part of a larger common plan of development or sale, name the common plan (e.g., XYZ Estates, ABC Industrial Park).

In Part D, indicate the construction commencement date (month, day, year). When there is a change in ownership of the property that requires a new NOI, the construction commencement date should be the date of the change in ownership.

In Part E, indicate when the construction is expected to be completed.

SECTION III--BILLING ADDRESS

To continue coverage under the general permit, the annual fee must be paid. Use this section to indicate whether the annual fee invoices should be sent to the owner, developer, or other party (include address).

SECTION IV--RECEIVING WATER INFORMATION

In Part A of this section, the owner is required to indicate whether the construction site's storm water runoff discharges to a separate storm sewer system, directly to waters of the United States, or indirectly to waters of the United States.

Discharges to separate storm sewer systems are those that discharge to a collection system operated by municipalities, flood control districts, utilities, or similar entities. Storm water discharges directly to waters of the United States will typically have an outfall structure directly from the facility to a river, creek, ocean, etc. Indirect discharges are those that may flow over adjacent properties or rights-of-way prior to discharging to waters of the United States.

Regardless of point of discharge, the owner must determine the closest receiving water for the construction site's storm water discharge. If discharge is to a separate storm sewer system, the owner of that system should know the receiving water. The name of the receiving water of a direct discharge should be easily available while the receiving water of an indirect discharge may require some effort to identify.

SECTION V--TYPE OF CONSTRUCTION

Indicate the type of construction taking place. Transportation should be checked for the construction of roads. Utility should be checked for installation of sewer, electric, and telephone systems.

SECTION VI--MATERIAL HANDLING/MANAGEMENT PRACTICES

Part A of this section requires identification of the type(s) of materials stored and handled outdoors. If materials other than those listed are maintained on site, please check "other" and describe the type of material.

Part B of this section requests information on proposed management practices to reduce pollutants in storm water discharges. Check the appropriate categories or list other control measures you will use at your construction site.

SECTION VII--SITE INFORMATION

List the size, in acres, of the facility and the percentage of the site that is impervious before construction and after construction is completed.

SECTION VIII--REGULATORY STATUS

Indicate whether the construction site's erosion/sediment control plan must be reviewed and approved by a local agency. If yes, identify the name of the local agency.

SECTION IX—CERTIFICATION

This section must be completed by the owner of the construction site. The certification provides for assurances that the NOI and site map were completed in an accurate and complete fashion and with the knowledge that penalties exist for providing false information. It also requires the owner to certify that the provisions in the general permit will be complied with.

The NOI must be signed by:

For a corporation: a responsible corporate officer (or authorized individual).
For a partnership or sole proprietorship: a general partner or the proprietor, respectively.
For a municipality, State, Federal, or other public agency: either a principal executive officer, ranking elected official, or duly authorized representative.

SITE MAP

Provide a "to scale" drawing of the construction site and its immediate surroundings. Include as much detail about the construction site as possible. At a minimum, show existing and proposed buildings, roadways, storm water collection and discharge points, a north arrow, and the names of adjacent streets.

V. TYPE OF CONSTRUCTION (Check all that apply)

1. ☐ Residential 2. ☐ Commercial 3. ☐ Industrial 4. ☐ Reconstruction 5. ☐ Transportation

6. ☐ Utility 99. ☐ Other (Please List)

VI. MATERIAL HANDLING/MANAGEMENT PRACTICES

A. Types of materials that will be handled and/or stored at the site: (Check all that apply)

1. ☐ Solvents 2. ☐ Metal 3. ☐ Petroleum Products 4. ☐ Plated Products

5. ☐ Asphalt/Concrete 6. ☐ Hazardous Substances 7. ☐ Paints 8. ☐ Wood Treated Products

99. ☐ Other (Please list)

B. Identify proposed management practices to reduce pollutants in storm water discharges: (Check all that apply)

1. ☐ Oil/Water Separator 2. ☐ Erosion Controls 3. ☐ Sedimentation Controls 4. ☐ Overhead Coverage

5. ☐ Detention/Desiltation Pond 99. ☐ Other (Please list)

VII. SITE INFORMATION

A. Total size of construction site:	B. Percent of site impervious: (Including rooftops)
_____ Acres	Before construction _____ % After construction _____ %

VIII. REGULATORY STATUS

Is the site subject to a locally approved erosion/sediment control plan ? ☐ Yes ☐ No

If yes, name of local agency

IX. CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction and supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. In addition, I certify that the provisions of the permit, including the development and implementation of a Storm Water Pollution Prevention Plan and a Monitoring Program Plan, will be complied with.

Printed Name: _____

Signature: _____ Date: _____

Title: _____

State of California
State Water Resources Control Board

NOTICE OF INTENT

TO COMPLY WITH THE TERMS OF THE
GENERAL PERMIT TO DISCHARGE STORM WATER
ASSOCIATED WITH CONSTRUCTION ACTIVITY (WQ Order No. 92-08-DWQ)

MARK ONLY ONE ITEM	1. ☐ Ongoing Construction 2. ☐ New Construction	3. ☐ Change of Information WDID # _____

I. OWNER

Name			Contact Person
Local Mailing Address			Title
City	State	Zip	Phone

II. CONSTRUCTION SITE INFORMATION

A. Developer			Contact Person
Local Mailing Address			Title
City	State	Zip	Phone
B. Site Address			County
City	State CA	Zip	Phone

C. Is the construction site part of a larger common plan of development or sale ? ☐ Yes ☐ No

If yes, name of plan or development

D. Construction commencement date M M D D Y Y

E. Projected construction completion date M M D D Y Y

III. BILLING ADDRESS

Send to:

☐ OWNER ☐ DEVELOPER

☐ OTHER *(Enter information at right)*

Name

Mailing Address

City | State | Zip

IV. RECEIVING WATER INFORMATION

A. Does your construction site's storm water discharge to: (Check one)

1. ☐ Storm drain system - Enter system owners name
2. ☐ Directly to waters of U.S. (e.g., river, lake, creek, ocean)
3. ☐ Indirectly to waters of U.S.

B. Name of closest receiving water

STATE USE ONLY

WDID:	Regional Board Office:	Date Permit Issued:

NPDES Permit Number:	Order Number:	Fee Amount Received:	Date NOI Received:
CA_____	_____	$ _____	_____

NC
8/2

DEFINITIONS

1. "Best Management Practices" ("BMPs") means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the United States. BMPs also include treatment requirements, operating procedures, and practices to control site runoff, spillage or leaks, waste disposal, or drainage from raw material storage.

2. "Clean Water Act" ("CWA") means the Federal Water Pollution Control Act enacted by Public Law 92-500 as amended by Public Laws 95-217, 95-576, 96-483, and 97-117; 33 USC. 1251 et seq.

3. "Construction Site" is the location of the construction activity.

4. "Non-Storm Water Discharge" means any discharge to storm sewer systems that is not composed entirely of storm water except discharges pursuant to a NPDES Permit and discharges resulting from fire fighting activities.

5. "Significant Materials" includes, but is not limited to: raw materials; fuels; materials such as solvents, detergents, and plastic pellets; finished materials such as metallic products; raw materials used in food processing or production; hazardous substances designated under Section 101(14) of Comprehensive Environmental Response, Compensation, and Liability Act (CERLCA); any chemical the facility is required to report pursuant to Section 313 of Title III of Superfund Amendments and Reauthorization Act (SARA); fertilizers; pesticides; and waste products such as ashes, slag, and sludge that have the potential to be released with storm water discharges.

6. "Significant Quantities" is the volume, concentrations, or mass of a pollutant in storm water discharge that can cause or threaten to cause pollution, contamination, or nuisance; adversely impact human health or the environment; and cause or contribute to a violation of any applicable water quality standards for the receiving water.

7. "Storm Water" means storm water runoff, snow melt runoff, and surface runoff and drainage. It excludes infiltration and runoff from agricultural land.

8. "Pollution" means "the man-made or man-induced alternation of the chemical, physical, biological, and radiological integrity of water". [Clean Water Act Section 502(19)]. Pollution also means "an alternation of the quality of the waters of the state by waste to a degree which unreasonably affects either...the waters for beneficial uses...or facilities which serve these beneficial uses." [California Water Code Section 13050(1)]

9. "Contamination" means "an impairment of the quality of the waters of the state by waste to a degree which creates a hazard to the public health through poisoning or through the spread of disease ... including any equivalent effect resulting from the disposal of waste, whether or not waters of the state are affected." [California Water Code Section 13050(k)]

10. "Nuisance" means "anything which meets all of the following requirements: (1) is injurious to health, or is indecent or offensive to the senses, or an obstruction to the free use of property, so as to interfere with the comfortable enjoyment of life and property; (2) affects at the same time an entire community or neighborhood, or any considerable number of persons, although the extent of the annoyance or damage inflicted upon individuals may be unequal; (3) occurs during or as a result of the treatment or disposal of wastes." [California Water Code Section 13050(m)]

11. "Local Agency" means any agency that is involved with providing review, approval, or oversight of the construction sites' (a) construction activity, (b) erosion and sediment controls, or (c) storm water discharge.

APPENDIX B

EXAMPLE SWPPP FOR A CONSTRUCTION PROJECT

This Appendix gives an example of a storm water pollution prevention plan (SWPPP) for a relatively straight forward, short-term construction project. It uses the SWPPP worksheets found at the end of Chapter 2. The level of detail provided is appropriate for projects in California of similar size and complexity. The BMPs selected for this example are appropriate for the example problem only -- other projects/sites will typically require a unique set of BMPs tailored to the particular site conditions. It may be useful to include additional working site maps and/or other materials used for selecting appropriate BMPS, such as those discussed in Chapters 2 and 3, for background. These materials are not required in the SWPPP, however, and are not included here. Also, a project location map and complete set of BMP fact sheets are not included in this example, but should be part of a complete SWPPP.

It is impossible to cover the full range of construction projects within California with a single example. Long-term, complex construction projects will probably require additional information to supplement the SWPPP worksheet, or may require phased SWPPPs for each construction phase. The concepts and level of detail shown in this example should be used only as a guide for preparing an SWPPP.

REVISIONS	DATE

NOI attached?
[ ] Yes
[✓] No

Storm Water Pollution Prevention Plan (SWPPP) Worksheet
California Construction General Permit

Worksheet 1. Project Information

Project Name: NOI WAREHOUSE

Project Location: Street Address (or Equivalent): 461 MAJOR ROAD

City: ANYTOWN County: CONTRA PERMIT Zip Code: 99999

Project Owner: NOI PACKAGING, INC.

Contact Person: S.W. RUNOFF Phone No. (213) 555-1212

Owner's Mailing Address: Street Address (or Equivalent): 999 INDUSTRY BLVD.

City: ANYTOWN County: CONTRA PERMIT Zip Code: 99999

[✓] Identify responsible personnel:

[✓] Implementing and revising the SWPPP: S.W. RUNOFF

[✓] Inspecting equipment: M. POOL

[✓] Regular inspections of BMPs: I. C. PROBLEMS

[✓] Training employees about BMPs affecting their job: U. C. FIXES

List all Contractors and Subcontractors responsible for implementing SWPPP for the project:

NAME	CONTACT PERSON	DATE WORK BEGINS	DATE WORK ENDS
ABC General Contractor	**Geo. Foreman**	**10/15/92**	**9/1/93**
XYZ Electric	**U. R. Sparks**	**3/10/93**	**6/10/93**
DEF Mechanical	**C. R. Gear**	**2/1/93**	**7/1/93**
Dirt Excavation	**E. Mover**	**10/15/92**	**12/1/92**
Flowers Landscaping	**Fred Flowers**	**7/1/93**	**9/1/93**

Worksheet 2. Project Site Map Requirements

Please Check the Boxes, and provide supporting information as requested:

[✓] Topographic Base Map Attached? Map shows:

[✓] An area extending one-quarter mile beyond the property boundaries of the construction site: **See Location Map on Project Construction Drawings.**

[✓] The boundary of the construction site. Construction Area = __12__ Acres

[✓] Nearby surface water bodies, including water courses, wetlands, springs and wells.

[✓] The location(s) where storm water drains onto or off of the property.

[✓] Boundary of off-site areas that drain into the construction site.

[✓] Site map(s) attached? Maps show:

[✓] Temporary storm water structures used during construction.

[✓] Areas used to store soils and construction waste.

[✓] Areas of cut and fill.

[✓] Drainage patterns and slopes anticipated after major grading activities, including the location of storm water structures to be constructed on the property (e.g., storm drains, detention ponds, channels).

[✓] Areas of soil disturbance.

[✓] Locations of potential soil erosion requiring BMPs during construction.

[✓] Existing and proposed paved areas and buildings.

Existing Area: __0__ percent of site Proposed Area: __70__ percent of site

[✓] Estimated runoff coefficient before construction: __35__ after construction __78__
(See the local municipality for approved runoff coefficients for your community.)

[✓] Locations where storm water structures and controls will be built to control storm water pollution after construction is complete.

[✓] The boundary of the drainage area upstream of each location where storm water leaves the property. **See Hydrology Report for Project, Page 25.**

[✓] Any vehicles storage and service areas. NONE

[✓] Areas of existing vegetation.

Worksheet 3. Inventory of Contractor's Activities and Special Site Conditions

Provide a description of contractor's activities that could result in the discharge of pollutants in the storm water runoff from the site. In addition, provide a description of special site conditions that may impact pollutants in storm water discharges.

Contractor's Activities

[✓] Describe toxic materials that are known to have been stored, disposed, spilled, or leaked in significant quantities onto the construction site:
No toxic materials were stored, disposed, spilled or leaked on-site prior to construction.

[✓] Describe construction materials, equipment and vehicles that comes in contact with storm water:
Construction Materials: Concrete, structural steel, aluminum wall panels, asphalt roofing, shrubbery, fertilizer, corrugated metal drainage pipe.
Equipment & Vehicles: Bulldozer, grader, concrete truck/forming, welder.

[✓] Describe construction material loading, unloading and access areas/activities:
All construction materials will be delivered to and stored on pallets in a bermed area staging at the northwest corner of the site (except concrete and asphalt roofing, which will be used immediately upon delivery to the site.

[✓] Describe equipment storage, cleaning, and maintenance areas/activities:
Equipment will be stored off-site if not needed within a 21 day period. Equipment will be stored on-site either in the bermed staging area or inside the partially completed warehouse. Fueling and routine maintenance will take place in the bermed staging area. Major equipment overhauls will take place off-site.

[✓] Describe storage and disposal of construction materials (on-site and off-site):
Materials will be stored on pallets in a bermed staging area until installation, and will be installed within 72 hours after removing from the bermed staging area. Building material waste will be placed nightly in dumpsters in the waste containment areas which will be emptied weekly. Excess concrete and asphalt roofing materials will be taken to approved off-site disposal areas.

Special Site Conditions

[✓] Describe storm water structures and controls on the site prior to construction and how these structures/controls will be integrated into the SWPPP to reduce sediment and other pollutants in storm water discharges:
No structures/controls existed on-site prior to construction.

[✓] List materials/waters other than storm water which will flow from the site during dry weather, the approximate amount of flow, and methods for preventing other dry weather flows:
No dry weather flows/discharges will be generated on-site by this construction project.

Worksheet 4. BMPs for Contractor Activities

Provide a list of BMPs selected to reduce pollutants associated with contractor activities (see Worksheet 3). For each BMP selected, identify the pollution(s) of concern (see Table 1.1). Attach modified BMP fact sheets and/or appropriate information for the BMP selected. (See Chapter 4, BMPs for Contract or Activities.)

Contractor Activities (Worksheet 3)	Construction Practices			Materials Management			Waste Management					Vehicle & Equipment Management			Primary Pollutant(s) of Concern
	CA1	CA2	CA3	CA10	CA11	CA12	CA20	CA21	CA22	CA23	CA24	CA30	CA31	CA32	
1. Toxic material on-site															
2. Construction material equipment & vehicles in contact with storm water		✓	✓		✓								✓	✓	See Worksheet 3
3. Material loading, unloading and access areas/activities				✓		✓									Various Building Materials (Floatables)
4. Equipment storage cleaning, and maintenance areas/activities													✓	✓	Fuels, Oil, Grease, Hydraulic Fluids
5. Storage and disposal of construction materials (on-site and off-site)							✓			✓	✓				Various Building Materials (Floatables), Concrete, Asphalt

NOTE: Modified BMP Fact Sheet CA10 is included as an example. The Complete SWPPP would include other modified BMP Fact Sheets.

Worksheet 5. BMPs for Erosion and Sedimentation Control

[ ] Describe the source and composition of the existing soil and fill material
(Soil Report Attached? Yes [ ] No [✓])
No significant fill materials are needed for this project. Only native soils available on-site will be used. The native soil is a loamy clay. Temporary stock piles will be created during construction.

[ ] Provide a site map showing locations where BMPs for erosion and sediment control are placed. This map should be updated when BMPs are revised to meet evolving construction conditions. Provide a brief description of BMP selected, and, if appropriate, attach modified fact sheets or additional information for erosion and sedimentation control BMPs.

✓	BMPs SELECTED	DESCRIPTION OF BMPs FOR EROSION & SEDIMENTATION CONTROL
SITE PLANNING CONSIDERATIONS		
	Scheduling	
✓	Preservation of Existing Vegetation	**Existing tree, vegetation along Minor Creek**
SOIL STABILIZATION		
✓	Seeding and Planting	**Final site stabilization of slopes, site periphery**
	Mulching	
PHYSICAL STABILIZATION		
	Geotextiles and Mats	
	Dust Control	
	Temporary Stream Crossing	
	Construction Road Stabilization	
✓	Stabilized Construction Entrance	**Perimeter Control: vehicular sediment tracking onto major road**
DIVERSION OF RUNOFF		
	Earth Dike	
✓	Temporary Drains and Swales	**Intercept, collect flows to prevent slope erosion**
✓	Slope Drain	**Slope Protection: convey runoff from top to toe of slope**

✓	BMPs SELECTED	DESCRIPTION OF BMPs FOR EROSION & SEDIMENTATION CONTROL
VELOCITY REDUCTION		
✓	Outlet Protection	**Prevent stream erosion from high velocities at pipe outlets**
	Check Dams	
	Slope Roughing/Terracing	
SEDIMENT TRAPPING/FILTERING		
✓	Silt Fence	**Trap sediment along Minor Creek**
	Straw Bale Barrier	
	Sand Bag Barrier	
	Rock or Brush Filter	
✓	Storm Drain Inlet Protection	**Prevent sediment from entering new D.I.'s**
	Sediment Trap	
✓	Sediment Basin	**Sedimentation for most site runoff before discharge to Minor Creek**

Worksheet 6. Post-Construction BMPs

Provide a site map locating treatment control BMPs which will be constructed as part of this project to reduce storm water pollution after construction is complete. Selection of these and other post-construction BMPs may be guided using the Municipal BMP Handbook, and must consider site-specific and seasonal conditions. Provide on the worksheet below the BMP selected, the responsible party for maintenance and operation, and source for funding the operation and maintenance.

✓	BMPs SELECTED	MAINTENANCE RESPONSIBILITY	FUNDING SOURCE FOR O&M
	TREATMENT CONTROL BMPs		
	Infiltration		
	Wet Ponds		
	Constructed Wetlands		
	Vegetated Swales and Strips		
✓	Extended Detention Basins **(To be constructed where sediment basin is located during construction.)**	**NOI Packaging will contract for maintenance services annually**	**NOI Packaging will pay for all maintenance costs**
	Media Filtration		
	Oil/Water Separators and Water Quality Inlets		
	Multiple Systems		
	SOURCE CONTROL BMPs		
✓	**Inlet Stencilling/Employee Education**	**Anytown O&M crews will stencil and provide brochure to employees**	**Restencil every 3 years, regular Anytown O&M activity**
✓	**Prevent Illicit Connections**	**Anytown City inspectors will check drains before issuing occupancy permit**	**Fee for occupancy permit covers inspection cost.**

Describe other measures which will be employed on the project site to control storm water pollution after construction is complete, and steps to be taken by the current owner to ensure that these measures are conducted.

Worksheet 7. Monitoring, Inspection, and Maintenance Plan

[✓] Describe maintenance/repair efforts to ensure BMPs are in good and effective condition:

- **Sediment will be removed from sedimentation basin, silt fence, and inlet protection when sediment depth reaches 1/3 of the total available depth.**
- **Any silt fence/inlet protection washed out or otherwise disrupted will be replaced or repaired within 48 hours of discovery.**

[✓] Describe inspection procedures and record keeping efforts:
Attached inspection form to be filled out and inserted after this worksheet in the SWPPP.

[✓] Annual Inspection:
Inspection will occur about October 10, when site clearing is complete and all ESC measures are installed.

[✓] Pre-storm Inspection:
On days before predicted rainfall, a drive-by inspection will be conducted to check for any damage. Inspector will call a crew to immediately repair damage.

[✓] Post-storm Inspection:
Each BMP will be closely inspected within 48 hours after each rainfall of 0.5" or more. BMPs will be checked for 1) structural integrity; 2) sediment accumulation greater than 1/3 total depth of BMP; 3) evidence of excessive sediment downstream of the site; and 4) evidence of other construction materials washed off-site.

[✓] Describe training program/material for site personnel responsible for installing, inspecting, and maintaining BMPs:

1) **BMP fact sheets from this SWPPP will be copied and distributed to site personnel engaged in the activity in question and/or installation/maintenance of ESC BMPs.**

2) **Site inspector observing improper construction measures or pollution caused by ineffective construction pollution management practices will inform site personnel performing these practices of proper BMPs, along with special follow-up inspections for further training.**

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

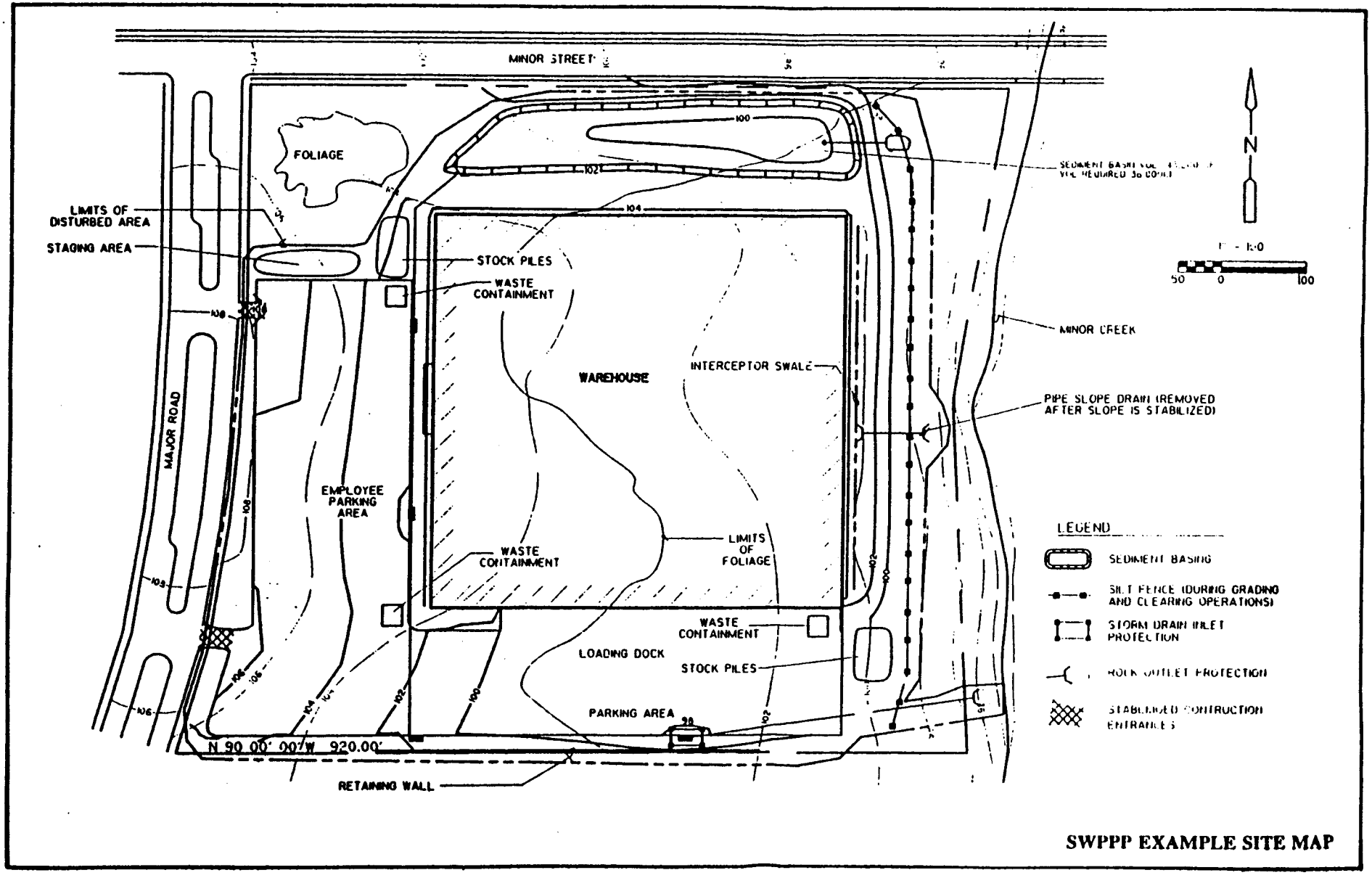
Name S. W. Runoff Title Environmental Coordinator

Signature S. W. Runoff Date October 1, 1992

This SWPPP was prepared by:

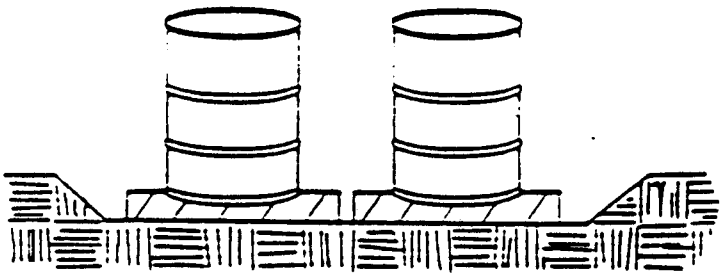
Name S. W. Runoff Title Environmental Coordinator

Signature S. W. Runoff Date October, 1992



SWPPP EXAMPLE SITE MAP

ACTIVITY: MATERIAL DELIVERY AND STORAGE



Objectives

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

Targeted Pollutants

- ◒ Sediment
- ◒ Nutrients
- ◒ Toxic Materials
- ◒ Oil & Grease
- ◒ Floatable Materials
- ○ Other Construction Waste

● Likely to Have Significant Impact
○ Probable Low or Unknown Impact

Implementation Requirements

- ○ Capital Costs
- ○ O&M Costs
- ○ Maintenance
- ◒ Training
- ○ Suitability for Slopes >5%

● High ○ Low

SYMBOL

CA10

Best Management Practices

DESCRIPTION

Prevent or reduce the discharge of pollutants to storm water from material delivery and storage by minimizing the storage of hazardous materials on-site, storing materials in a designated area, installing secondary containment, conducting regular inspections, and training employees and subcontractors.

This best management practice covers only material delivery and storage. For other information on materials, see CA11 (Material Use), or CA12 (Spill Prevention and Control). For information on wastes, see the waste management BMPs in this chapter.

APPROACH

The following materials are commonly stored on this construction sites:

- ~~Soil,~~
- ~~Pesticides and herbicides,~~
- Fertilizers,
- ~~Detergents,~~
- Petroleum products such as fuel, oil, and grease, and
- Other hazardous chemicals such as acids, lime, glues, paints, solvents, and curing compounds.

Storage of these materials on-site can pose the following risks:

- Storm water pollution,
- Injury to workers or visitors,
- Groundwater pollution, and
- Soil contamination.

Therefore, the following steps should be taken to minimize your risk:

- Designate areas of the construction site for material delivery and storage.
  - -Place near the construction entrances, away from waterways (Southeast corner)
  - -Avoid transport near drainage paths or waterways
  - -Surround with earth berms (see ESC30, Earth Dike.)
  - -Place in an area which will be paved
- Storage of reactive, ignitible, or flammable liquids must comply with the fire codes of your area. Contact the local Fire Marshal to review site materials, quantities, and proposed storage area to determine specific requirements. See the Flammable and Combustible Liquid Code, NFPA30.
- Keep an accurate, up-to-date inventory of materials delivered and stored on-site.
- Keep your inventory down.
- Minimize hazardous materials on-site storage.
- Handle hazardous materials as infrequently as possible.
- During the rainy season, consider storing materials in a covered area. Store materials in ~~secondary containment such as an earthen dike, hay bale, or even a children's wading pool for non-reactive materials such as detergents, oil, grease, and paints.~~

Small amounts of material ~~may~~ will be secondarily contained in "bus boy" trays or concrete mixing trays.

- Do not store chemicals, drums, or bagged materials directly on the ground. Place these items on a pallet and, when possible, in secondary containment.
- ~~If drums must be kept uncovered, store them at a slight angle to reduce ponding of rainwater on the lids and to reduce corrosion.~~ No Drum Storage
- Try to keep chemicals in their original containers, and keep them well labeled.
- Train employees and subcontractors.
- Employees trained in emergency spill cleanup procedures should be present when dangerous materials or liquid chemicals are unloaded.
- If significant residual materials remain on the ground after construction is complete, properly remove materials and any contaminated soil(See CA22). If the area is to be paved, pave as soon as materials are removed to stabilize the soil.

REQUIREMENTS

Cost (Capital, O&M)

- All of the above are low cost measures.

Maintenance

- Keep the designated storage area clean and well organized.
- Conduct routine weekly inspections and check for external corrosion of material containers.
- Keep an ample supply of spill cleanup materials near the storage area.

LIMITATIONS

- ~~Storage sheds often must meet building and fire code requirements.~~ No storage sheds.

REFERENCES

Storm Water Pollution Prevention for Construction Activities (Draft); USEPA, April 1992

Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance, Working Group Working Paper; USEPA, April 1992

Best Management Practices and Erosion Control Manual for Construction Sites; Flood Control District of Maricopa County, AZ, September 1992

Construction-Related Industries: Best Management Practices for Industrial Storm Water Pollution Control; Santa Clara Valley Nonpoint Source Pollution Control Program, 1992

Additional BMPs

- Use materials removed from bermed storage area w/in 72 hrs.
- Deliver concrete & asphalt roofing materials directly to points of application, and follow appropriate material use BMP (CA 11)

SYMBOL

CA10

State of California
State Water Resources Control Board

NOTICE OF INTENT

TO COMPLY WITH THE TERMS OF THE
GENERAL PERMIT TO DISCHARGE STORM WATER
ASSOCIATED WITH CONSTRUCTION ACTIVITY (WQ Order No. 92-08-DWQ)

MARK ONLY ONE ITEM
1. ☐ Ongoing Construction
2. ☒ New Construction
3. ☐ Change of Information
WDID # _____

I. OWNER

Name: NOI Packaging, Inc
Contact Person: S. W. Runoff
Local Mailing Address: 999 Industry Blvd
Title: Facility Manager
City: AnyTown
State: CA
Zip: 99999-0000
Phone: 213-555-1212

II. CONSTRUCTION SITE INFORMATION

A. Developer: Same as Owner
Contact Person:
Local Mailing Address:
Title:
City:
State:
Zip:
Phone:

B. Site Address: 401 Major Road
County: Contra Permit
City: AnyTown
State: CA
Zip: 99999-0000
Phone: NONE

C. Is the construction site part of a larger common plan of development or sale? ☐ Yes ☒ No
If yes, name of plan or development:

D. Construction commencement date (MMDDYY): 101592
E. Projected construction completion date (MMDDYY): 090193

III. BILLING ADDRESS

Send to:
☒ OWNER ☐ DEVELOPER
☐ OTHER *(Enter information at right)*

Name: Same as Owner
Mailing Address:
City:
State:
Zip:

IV. RECEIVING WATER INFORMATION

A. Does your construction site's storm water discharge to: (Check one)
1. ☐ Storm drain system - Enter system owners name
2. ☒ Directly to waters of U.S. (e.g., river, lake, creek, ocean)
3. ☐ Indirectly to waters of U.S.

B. Name of closest receiving water: Minor Creek

STATE USE ONLY

WDID:
Regional Board Office:
Date Permit Issued:
NPDES Permit Number: CA
Order Number:
Fee Amount Received: $
Date NOI Received:

V. TYPE OF CONSTRUCTION (Check all that apply)

1. ☐ Residential 2. ☒ Commercial 3. ☐ Industrial 4. ☐ Reconstruction 5. ☐ Transportation
6 ☐ Utility 99. ☐ Other (Please List)

VI. MATERIAL HANDLING/MANAGEMENT PRACTICES

A. Types of materials that will be handled and/or stored at the site: (Check all that apply)

1. ☐ Solvents 2. ☒ Metal 3. ☐ Petroleum Products 4. ☐ Plated Products
5. ☒ Asphalt/Concrete 6. ☐ Hazardous Substances 7. ☐ Paints 8. ☐ Wood Treated Products
99. ☐ Other (Please list)

B. Identify proposed management practices to reduce pollutants in storm water discharges: (Check all that apply)

1. ☐ Oil/Water Separator 2. ☒ Erosion Controls 3. ☒ Sedimentation Controls 4. ☐ Overhead Coverage
5. ☒ Detention/Desiltation Pond 99. ☐ Other (Please list)

VII. SITE INFORMATION

A. Total size of construction site:	B. Percent of site impervious: (Including rooftops)
12 Acres	Before construction 0 % After construction 70 %

VIII. REGULATORY STATUS

Is the site subject to a locally approved erosion/sediment control plan ? ☒ Yes ☐ No

If yes, name of local agency Anytown Public Works Dept.

IX. CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction and supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. In addition, I certify that the provisions of the permit, including the development and implementation of a Storm Water Pollution Prevention Plan and a Monitoring Program Plan, will be complied with.

Printed Name: S. W. Runoff

Signature: S. W. Runoff Date: 10/1/92

Title: Facility Manager

APPENDIX C

GLOSSARY

Backfill: Earth refilling a trench or an excavation.

Berm: An earthen mound used to direct the flow of runoff around or through a structure.

Best Management Practices (BMPs): Includes schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the United States. BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

Buffer Strip or Zone: Strip of erosion-resistant vegetation between a waterway and an area of more intensive land use.

Catch Basin: Box-like underground concrete structure with openings in curbs and gutters designed to collect runoff from streets and pavement.

Clean Water Act (CWA): (33 U.S.C. 1251 et seq.) requirement of the NPDES program are defined under Sections 307, 402, 318 and 405 of the CWA.

Conduit: Any pipe for collecting and directing the storm water.

Conveyance System: Any channel or pipe for collecting and directing the storm water.

Construction General Permit: A National Pollutant Discharge Elimination System (NPDES) permit issued by the State Water Resources Control Board for the discharge of storm water associated with construction activity from soil disturbance of five (5) acres or more.

Culvert: A covered channel or a large-diameter pipe that directs water flow below the ground level.

Denuded: Land stripped of vegetation or land that has had its vegetation worn down due to the impacts from the elements or humans.

Discharge: The release of storm water or other substance from a conveyance system or storage container.

Erosion: The wearing away of land surface by wind or water. Erosion occurs naturally from weather or runoff but can be intensified by land-clearing practices related to farming, residential or industrial development, road building, or timber-cutting.

Excavation: The process of removing earth, stone, or other materials, usually by digging.

Filter Fabric: Textile of relatively small mesh or pore size that is used to (a) allow water to pass through while keeping sediment out (permeable), or (b) prevent both runoff and sediment from passing through (impermeable).

Grading: The cutting and/or filling of the land surface to a desired slope or elevation.

Hazardous Substance:

1. Any material that poses a threat to human health and/or the environment. Typical hazardous substances are toxic, corrosive, ignitable, explosive, or chemically reactive.

2. Any substance named by EPA to be reported is a designated quantity of the substance is spilled in the waters of the United States or if otherwise emitted into the environment.

Hazardous Waste: By-products of society that can pose a substantial or potential hazard to human health or the environment when improperly managed. Possesses at least one of four characteristics (flammable, corrosivity, reactivity, or toxicity), or appears on special EPA lists.

Illegal Discharge: Any discharge to a municipal separate storm sewer that is not composed entirely of storm water except discharges authorized by an NPDES permit (other than the NPDES permit for discharges from the municipal separate storm sewer) and discharges resulting from fire-fighting and other miscellaneous activities.

Inlet: An entrance into a ditch, storm drain, or other waterway.

Material Storage Areas: On site locations where raw materials, products, final products, by-products, or waste materials are stored.

Non-Storm Water Discharge: Any discharge to municipal separate storm sewer that is not composed entirely of storm water. Discharges containing process wastewater, non-contact cooling water, or sanitary wastewater are non-storm water discharges.

Notice of Intent (NOI): A formal notice to SWRCB submitted by the owner/developer that a construction project is about to begin. The NOI provides information on the owner, location, type of project, and certifies that the permittee will comply with the conditions of the construction general permit.

Notice of Termination (NOT): Form to notify authorities when a construction project is complete.

NPDES Permit: An authorization, license, or equivalent control document issued by EPA or an approved State agency to implement the requirements of the NPDES program.

Oil Sheen: A thin, glistening layer of oil on water.

Organic Pollutants: Substances containing carbon which may cause pollution problems in receiving waters.

Organic Solvents: Liquid organic compounds capable of dissolving solids, gases, or liquids.

Outfall: The point where storm water discharges from a pipe, channel, ditch, or other conveyance to a waterway.

Permeability: The quality of a soil that enables water or air to move through it. Usually expressed in inches/hour or inches/day.

Point Source: Any discernible, confined, and discrete conveyance from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural storm water runoff.

Pollutant: Generally, any substance introduced into the environment that adversely affects the usefulness of a resource.

Precipitation: Any form of rain or snow.

Retention: The storage of storm water to prevent it from leaving the development site; may be temporary or permanent.

Runon: Off-site flows which flows onto your site.

Runoff: Water originating from rainfall and other sources (e.g., sprinkler irrigation) that is found in drainage facilities, rivers, streams, springs, seeps, ponds, lakes, wetlands, and shallow groundwater.

Scour: The erosive and digging action in watercourse by flowing water.

Secondary Containment: Structures, usually dikes or berms, surrounding tanks or other storage containers and designed to catch spilled material from the storage containers.

Sedimentation: The process of depositing soil particles, clays, sands, or other sediments that were picked up by runoff.

Sediments: Soil, sand, and minerals washed from land into water usually after rain, that pile up in reservoirs, rivers, and harbors, destroying fish-nesting areas and holes of water animals and clouding the water so that needed sunlight might not reach aquatic plants. Careless farming, mining, and building activities will expose sediment materials, allowing them to be washed off the land after rainfalls.

Significant Materials: Include, but not limited to, raw materials; fuels; materials such as solvents, detergents, and plastic pellets; finished materials such as metallic products; raw materials used in food processing or production; hazardous substances designed under Section 101(14) of CERLCA; any chemical the facility is required to report pursuant to Section 313 of Title III or SARA; fertilizers; pesticides; and waste products such as ashes, slag and sludge that have the potential to be released with storm water discharges.

Significant Quantities: Is the volume, concentrations, or mass of a pollutant in storm water discharge that can cause or threaten to cause pollution, contamination, or nuisance, that adversely impact human health or the environment, and cause or contribute to a violation of any applicable water quality standards for the receiving water.

Source Control BMPs: Everyday operational practices that prevent pollution by reducing potential pollutants at the source.

Spill Guard: A device used to prevent spills of liquid materials from storage containers.

Spill Prevention Control and Countermeasures Plan (SPCC): Plan consisting of structures, such as curbing, and action plans to prevent and respond to spills of hazardous substances as defined in the Clean Water Act.

Storm Drains: Above and below ground structures for transporting storm water to streams or outfalls for flood control purposes.

Storm Water: Rainfall runoff, snow melt runoff, surface runoff, and drainage. It excludes infiltration.

APPENDIX D

LIST OF ACRONYMS

APWA	American Public Works Association
BMPs	Best Management Practices
CA	Contractor Activities
CCR	California Code of Regulations
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CEQA	California Environmental Quality Act
CFR	Code of Federal Register
COE	U.S. Army Corps of Engineers
CWA	Clean Water Act (Federal Water Pollution Control Act of 1972 as amended in 1987)
DTSC	California Department of Toxic Substance Control
EIR	Environmental Impact Report
ESC	Erosion and Sedimentation Control
FHWA	Federal Highway Authority
Hazmat	Hazardous Material
O&M	Operations and Maintenance
MSDS	Material Safety Data Sheet
NOAA	National Oceanographic and Atmospheric Administration
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
OSHA	Occupational Safety and Health Administration
PAHs	Polyaromatic Hydrocarbons
POTW	Publicly Owned Treatment Works
RWQCB	Regional Water Quality Control Board
SARA	Superfund Amendments and Reauthorization Act
SPCC	Spill Prevention Control and Countermeasure
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TSS	Total Suspended Solids
UFC	Uniform Fire Code
USEPA	United States Environmental Protection Agency

ATTACHMENT 2

REISSUANCE OF NPDES GENERAL PERMITS
FOR STORMWATER DISCHARGES
FROM ACTIVITIES IN REGION 6

federal register

Monday
July 6, 1998

Part II

Environmental Protection Agency

Reissuance of NPDES General Permits for Storm Water Discharges From Construction Activities in Region 6; Notice

ENVIRONMENTAL PROTECTION AGENCY

[FRL–6119–7]

Reissuance of NPDES General Permits for Storm Water Discharges from Construction Activities in Region 6

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice of final NPDES general permits.

SUMMARY: Region 6 is issuing the final National Pollutant Discharge Elimination System (NPDES) general permits for storm water discharges associated with construction activity in Region 6. EPA first issued permits for these activities in September 1992. These permits subsequently expired in September 1997. Today's permits, which replace those expired permits, are similar to the permits issued in 1992. The main changes from those 1992 permits are summarized in the **SUPPLEMENTARY INFORMATION** section, below.

ADDRESSES: The index to the administrative record and the complete administrative record are available at the Water Docket, MC–4101, U.S. EPA, 401 M Street SW, Washington, DC 20460. Copies of information in the record are available upon request. A reasonable fee may be charged for copying. The index to the administrative record is also available from EPA Region 6, Water Quality Protection Division, Customer Service Branch (6WQ–CA) 1445 Ross Avenue, Suite 1200, Dallas, TX 75202.

DATES: These general permits shall be effective on July 6, 1998.

NOTICE OF INTENT: A NOTICE OF INTENT (NOI) FORM MUST BE SUBMITTED TO OBTAIN COVERAGE FOR STORM WATER DISCHARGES UNDER THESE PERMITS. THE NOI FORM IS GIVEN IN ADDENDUM C OF THESE PERMITS. DEADLINES FOR SUBMITTAL OF NOI'S ARE PROVIDED IN PART II.A OF THE PERMITS.

FOR FURTHER INFORMATION CONTACT: For further information on the NPDES Construction General Permits, call the EPA Region 6 Storm Water Hotline at 1–800–245–6510. Information is also available through the EPA Region 6's storm water web site at "http://www.epa.gov/region6/sw/ and on the PIPES bulletin board web site at "http://pipes.ehsg.saic.com/pipes.htm".

SUPPLEMENTARY INFORMATION:

Contents

I. Introduction
II. Answers to Common Questions
III. Section 401 Certification and Coastal Zone Management Act
IV. Endangered Species Protection
V. Historic Properties Protection
VI. Regulatory Review (Executive Order 12866)
VII. Unfunded Mandates Reform Act
VIII. Paperwork Reduction Act
IX. Regulatory Flexibility Act

I. Introduction

The United States Environmental Protection Agency Region 6 office is reissuing the general permits which authorizes the discharge storm water associated with construction activity. As used in this permit, "storm water associated with construction activity" means construction activity disturbing at least five acres, or construction activity disturbing less than five acres which is part of a larger common plan of development or sale with the potential to disturb cumulatively five or more acres (*See* 40 CFR 122.26(b)(14)(x)).

These permits replace the previous Baseline Construction General Permits which were issued for a five-year term in September 1992. The most significant changes from the 1992 permits are:

► New conditions to protect listed endangered and threatened species and critical habitats;

► Expanded coverage to construction sites under five acres of disturbed land which are not part of a larger common plan of development or sale when an operator has been designated by the Director to obtain coverage.

► A requirement to post at the construction site the confirmation of permit coverage (the permit number or copy of the Notice of Intent (NOI) if a permit number has not yet been assigned) including a brief description of the project;

► Storm water pollution prevention plan performance objectives have been added.

These general permits for storm water discharges associated with construction activity was proposed on June 2, 1997 (62 FR 29786), and are hereby issued for the following areas in Region 6: The States of New Mexico and Texas; Indian Country lands in Louisiana, Oklahoma, Texas and New Mexico (except Navajo Reservation Lands and Ute Mountain Reservation Lands); and oil and gas construction in the State of Oklahoma.

II. Answers to Common Questions

In this section, EPA provides answers to some of the more common questions on the construction storm water permitting program. These answers are fairly broad and may not take into account all scenarios possible at construction sites. More details on these issues are provided at 63 FR 7858 (February 17, 1998) in the "Summary of Responses to Comments on the Proposed Permit" section of the reissuance of NPDES General Permits From Construction Activities for Regions 1, 2, 3, 7, 8, 9 and 10.

How do I Know if I Need a Permit?

You need a storm water permit if you can be considered an "operator" of the construction activity that would result in the "discharge of storm water associated with construction activity." You must become a permittee if you meet either of the following two criteria:

► You have operational control of construction project plans and specifications, including the ability to make modifications to those plans and specifications; or

► You have day-to-day operational control of those activities at a project which are necessary to ensure compliance with a storm water pollution prevention plan (SWPPP) for the site or other permit conditions (e.g., you are authorized to direct workers at a site to carry out activities required by the SWPPP or comply with other permit conditions).

There may be more than one party at a site performing the tasks relating to "operational control" as defined above. Depending on the site and the relationship between the parties (e.g., owner, developer), there can either be a single party acting as site operator and consequently be responsible for obtaining permit coverage, or there can be two or more operators with all needing permit coverage. The following are three general operator scenarios (variations on any of the three are possible as the number of "owners" and contractors increases):

► *Owner as Sole Permittee.* The property owner designs the structures for the site, develops and implements the SWPPP, and serves as general contractor (or has an on-site representative with full authority to direct day-to-day operations). He may be the only party that needs a permit, in which case everyone else on the site may be considered subcontractors and not need permit coverage.

► *Contractor as Sole Permittee.* The property owner hires a construction company to design the project, prepare the SWPPP, and supervise implementation of the plan and compliance with the permit (e.g., a "turnkey" project). Here, the contractor would be the only party needing a permit. It is under this scenario that an individual having a personal residence built for his own use (e.g., not those to be sold for profit or used as rental property) would not be considered an

operator. EPA believes that the general contractor, being a professional in the building industry, should be the entity rather than the individual who is better equipped to meet the requirements of both applying for permit coverage and developing and properly implementing a SWPPP. However, individuals would meet the definition of "operator" and require permit coverage in instances where they perform general contracting duties for construction of their personal residences.

► *Owner and Contractor as Co-Permittees.* The owner retains control over any changes to site plans, SWPPPs, or storm water conveyance or control designs; but the contractor is responsible for overseeing actual earth disturbing activities and daily implementation of SWPPP and other permit conditions. In this case, both parties may need coverage.

However, you are probably not an operator and subsequently do not need permit coverage if:

► You are a subcontractor hired by, and under the supervision of, the owner or a general contractor (i.e., if the contractor directs your activities on-site, you probably are not an operator); or

► your activities on site result in earth disturbance and you are not legally a subcontractor, but a SWPPP specifically identifies someone other than you (or your subcontractor) as the party having operational control to address the impacts your activities may have on storm water quality (i.e., another operator has assumed responsibility for the impacts of your construction activities). This particular provision will apply to most utility service line installations. For further information concerning whether utility service line installations meet the definition of operator and require permit coverage, see the discussion under "Installation of Utility Service Lines" in Section VIII, Summary Response to Public Comments of the Fact Sheet.

In addition, for purposes of this permit and determining who is an operator, "owner" refers to the party that owns the structure being built. Ownership of the land where construction is occurring does not necessarily imply the property owner is an operator (e.g., a landowner whose property is being disturbed by construction of a gas pipeline). Likewise, if the erection of a structure has been contracted for, but possession of the title or lease to the land or structure is not to occur until after construction, the would-be owner may not be considered an operator (e.g., having a house built by a residential homebuilder).

My Project Will Disturb Less Than Five Acres, but it May Be Part of a "Larger Common Plan of Development or Sale." How Can I Tell and What Must I do?

If your smaller project is part of a larger common plan of development or sale that collectively will disturb five or more acres (e.g., you are building on six half-acre residential lots in a 10-acre development or are putting in a parking lot in a large retail center) you need permit coverage. The "plan" in a common plan of development or sale is broadly defined as any announcement or piece of documentation (including a sign, public notice or hearing, sales pitch, advertisement, drawing, permit application, zoning request, computer design, etc.) or physical demarcation (including boundary signs, lot stakes, surveyor markings, etc.) indicating construction activities may occur on a specific plot. You must still meet the definition of operator in order to be required to get permit coverage, regardless of the acreage you personally disturb. As a subcontractor, it is unlikely you would need a permit.

For some situations where less than five acres of the original common plan of development remain undeveloped, a permit may not be needed for the construction projects "filling in" the last parts of the common plan of development. A case in which a permit would not be needed is where several empty lots totaling less than five acres remain after the rest of the project had been completed, providing stabilization had also been completed for the entire project. However, if the total area of all the undeveloped lots in the original common plan of development was more than five acres, a permit would be needed.

When Can You Consider Future Construction on a Property To Be Part of a Separate Plan of Development or Sale?

In many cases, a common plan of development or sale consists of many small construction projects that collectively add up to five (5) or more acres of total disturbed land. For example, an original common plan of development for a residential subdivision might lay out the streets, house lots, and areas for parks, schools and commercial development that the developer plans to build or sell to others for development. All these areas would remain part of the common plan of development or sale until the intended construction occurs. After this initial plan is completed for a particular parcel, any subsequent development or redevelopment of that parcel would be regarded as a new plan of development, and would then be subject to the five-acre cutoff for storm water permitting.

What Must I do to Satisfy The Permit Eligibility Requirements Related to Endangered Species?

In order to be eligible for this permit, you must follow the procedures and examples found in Addendum A for the protection of endangered species. You cannot submit your NOI until you are able to certify your eligibility for the permit. Enough lead time should be built into your project schedule to accomplish these procedures. If another operator has certified eligibility for the project (or at least the portion of the project you will be working on) in his NOI, you will usually be able to rely on his certification of project eligibility and not have to repeat the process. EPA created this "coat tail" eligibility option for protection of endangered species to allow the site developer/owner to obtain up-front "clearance" for a project, thereby avoiding duplication of effort by his contractors and unnecessary delays in construction.

What Does the Permit Require Regarding Historic Preservation?

Today's permit does not currently impose requirements related to historic preservation, though EPA may modify the permit at a later date after further discussions with the Advisory Council on Historic Preservation. Therefore, under today's permit, EPA will conduct consultations as it did under the pre-existing Baseline Construction General Permit on a case-by-case basis as needed. Removal of the proposed permit provisions related to historic preservation in no way relieves applicants and permittees of their obligations to comply with applicable State, Tribal or local laws for the preservation of historic properties. EPA reminds permittees that according to section 110(k) of the National Historic Preservation Act (NHPA), an intentional action to significantly adversely affect historic resources with intent to avoid Federal historic preservation requirements may jeopardize future permit coverage for such a permittee.

How Many Notices of Intent (NOIs) Must I Submit? Where and When Are They Sent?

You only need to submit one NOI to cover all activities on any one common plan of development or sale. The site map you develop for the storm water pollution prevention plan identifies which parts of the overall project are

under your control. For example, if you are a homebuilder in a residential development, you need submit only one NOI to cover all your lots, even if they are on opposite sides of the development.

The NOI must be postmarked two days before you begin work on site. The address for submitting NOIs is found in the instruction portion of the NOI form and in Part II.C. of the CGP. You must also look in Part X of the permit to determine if copies of the NOI form are to be sent to a State or Indian Tribe.

If I Am on an ongoing Construction Project, do I Have to Fill in a New NOI To Be Covered by the Permit?

Yes, if you are on an ongoing construction project, a construction project which started prior to the effective date of this permit, you must complete a revised NOI Form (EPA Form 3510–9) to obtain coverage under this permit. However, applicants who have previously submitted an NOI for permit coverage prior to the effective date of this permit have the option to leave the section regarding Addendum A on endangered species blank unless there is a potential impact on endangered species or their habitat.

How do I Know Which Permit Conditions Apply to Me?

You are responsible for complying with all parts of the permit that are applicable to the construction activities you perform. Part III.E. of the permit defines the roles of various operators at a site. In addition, several States and Indian Tribes require alternative or additional permit conditions, and these can be found in Part X of the permit.

Do I Have Flexibility in Preparing the Storm Water Pollution Prevention Plan (SWPPP) and Selecting Best Management Practices (BMPs) for My Site?

Storm water pollution prevention plan requirements were designed to allow maximum flexibility to develop the needed storm water controls based on the specifics of the site. Some of the factors you might consider include: more stringent local development requirements and/or building codes; precipitation patterns for the area at the time the project will be underway; soil types; slopes; layout of structures for the site; sensitivity of nearby water bodies; safety concerns of the storm water controls (e.g., potential hazards of water in storm water retention ponds to the safety of children; the potential of drawing birds to retention ponds and the hazards they pose to aircraft); and coordination with other site operators.

Must Every Permittee Have His Own Separate SWPPP or Is a Joint Plan Allowed?

The only requirement is that there be at least one SWPPP for a site which incorporates the required elements for all operators, but there can be separate plans if individual permittees so desire. EPA encourages permittees to explore possible cost savings by having a joint SWPPP for several operators. For example, the prime developer could assume the inspection responsibilities for the entire site, while each homebuilder shares in the installation and maintenance of sediment traps serving common areas.

If a Project Will Not Be Completed Before This Permit Expires, How Can I Keep Permit Coverage?

If the permit is reissued or replaced with a new one before the current one expires, you will need to comply with whatever conditions the new permit requires in order to transition coverage from the old permit. This usually includes submitting a new NOI. If the permit expires before a replacement permit can be issued, the permit will be administratively "continued." You are automatically covered under the continued permit, without needing to submit anything to EPA, until the earliest of:

- The permit being reissued or replaced;
- Submittal of a Notice of Termination (NOT);
- Issuance of an individual permit for your activity; or
- The Director issues a formal decision not to reissue the permit, at which time you must seek coverage under an alternative permit.

When Can I Terminate Permit Coverage? Can I Terminate Coverage (i.e., Liability for Permit Compliance) Before the Entire Project Is Finished?

You can submit an NOT for your portion of a site providing: (1) You have achieved final stabilization of the portion of the site for which you are a permittee (including, if applicable, returning agricultural land to its pre-construction agricultural use); (2) another operator/permittee has assumed control according to Part VI.G.2.c. of the permit over all areas of the site that have not been finally stabilized which you were responsible for (for example, a developer can pass permit responsibility for lots in a subdivision to the homebuilder who purchases those lots, providing the homebuilder has filed his own NOI); or (3) for residential construction only, you have completed temporary stabilization and the residence has been transferred to the homeowner.

III. Section 401 Certification and Coastal Zone Management Act

Section 401 of the Clean Water Act states that EPA may not issue an NPDES permit until the State in which the discharge will originate grants or waives certification to ensure compliance with appropriate requirements of the Act and State law. The Region has received section 401 certification from the appropriate States and Indian Tribes for all facilities covered by today's permits. Additional permit requirements were required as a condition of certification by the State of Texas and by the Pueblos of Isleta, Nambe, Picuris, Pojoaque, Sandia, Tesuque and Santa Clara in New Mexico. These additional permit requirements are contained in Part X of the permits.

The Coastal Zone Management Act (CZMA) requires all Federal permitting actions to be reviewed for consistency with each approved State Coastal Zone Management Plan. Texas is the only State covered by these permits that has an approved Coastal Zone Management Plan. EPA Region 6 has determined that the permit is consistent with the Texas Coastal Zone Management Plan. The Texas Coastal Zone Management Plan procedures for Federal consistency with Coastal Management Program goals and policies (31 TAC 506.12) state that if an activity requiring a state agency or subdivision action above thresholds requires an equivalent Federal permit, the Texas Coastal Coordination Council may determine the consistency of the state agency/subdivision action or the Federal permit, but not both. Permittees whose construction projects are located within the boundary of the Texas Coastal Management Program above thresholds will be required, as a part of pre-construction project approval, to have a consistency review by the Texas Council. An additional consistency review by the Texas Coastal Coordination Council of the storm water discharges from these construction projects covered by today's permit is, therefore, not required.

IV. Endangered Species Protection

A. Background

The Construction General Permit (CGP) also contains conditions to ensure the activities regulated by it are protective of species that are listed under the Endangered Species Act (ESA) as endangered or threatened (known as "listed species"), and listed species habitat that is designated under

the ESA as critical ("critical habitat"). In addition, the permit's coverage does not extend to discharges and discharge-related activities likely to jeopardize the continued existence of species proposed but not yet listed as endangered or threatened or result in the adverse modification of habitat proposed to be designated critical habitat.

The ESA places several different requirements on activities covered by the CGP. First, section 9 of the ESA and the ESA implementing regulations generally prohibit any person from "taking" a listed animal species (e.g., harassing or harming it) unless the take is authorized under the ESA. This prohibition applies to all entities and includes EPA, permit applicants, permittees and the public at large. Second, section 7(a)(2) of the ESA requires that Federal agencies consult with the Fish and Wildlife Service (FWS) or the National Marine Fisheries Service (NMFS) ("the Services") to insure that any action authorized, funded or carried out by them (also known as "agency actions") are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat. Jeopardizing the continued existence of a listed species means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers or distribution of that species (*See* 40 CFR 402.02).

The ESA section 7 implementing regulations at 50 CFR 402 apply this consultation requirement to any action authorized by a Federal agency that may affect listed species or critical habitat, including permits. This effect, among other things, can be beneficial, detrimental, direct and indirect. The issuance of the CGP by EPA is thus subject to the ESA section 7(a)(2) consultation requirements. Finally, ESA section 7(a)(1) directs Federal agencies to use their authority to further the purposes of the ESA by carrying out programs for the conservation of listed species, and section 7(a)(4) directs Federal agencies to confer with the Services on Agency actions likely to jeopardize the existence of species proposed but not yet finally listed or result in the adverse modification of critical habitat proposed to be designated.

The ESA regulations provide for two types of consultation: formal and informal. Informal consultation is an optional process that includes discussions, correspondence, etc. between the Services and a Federal agency or a designated non-Federal representative (NFR) to determine whether a Federal action is likely to have an adverse effect on listed species or critical habitat. During informal consultation the Services may suggest modifications to the action that a Federal agency, permit applicant or non-Federal representative could implement to avoid likely adverse effects to listed species or critical habitat. If adverse effects are likely and those effects cannot be addressed through informal consultation, then formal consultation generally occurs.

Also of relevance for the CGP are ESA section 10 incidental taking permits. Section 10 of the ESA allows persons, including non-Federal entities to incidentally take listed animal species, where otherwise prohibited, through the issuance of a permit after development of a habitat conservation plan (HCP). These procedures were developed to allow non-Federal entities such as developers to, among other things, alter habitat without incurring takings liability where take is minimized to the extent practicable.

B. Conditions in the June 2, 1997 Proposed Permit To Protect Species and Critical Habitat

The CGP was proposed with a number of conditions to ensure that storm water discharges and best management practices (BMPs) to control storm water runoff were protective of listed species or critical habitat. Specifically, coverage under the proposed CGP would be granted only under the following circumstances:

1. An applicant's storm water discharges or BMPs to control storm water runoff were not likely to adversely affect listed species (identified in Addendum A of the permit) or critical habitat; or

2. The applicant's activity was previously authorized under § 7 or § 10 of the Endangered Species Act (ESA) and that authorization addressed storm water discharges and BMPs to control storm water runoff; or

3. The applicant's activity was considered as part of a larger, more comprehensive assessment of impacts on endangered and threatened species under § 7 or § 10 of the ESA which accounted for storm water discharges and BMPs to control storm water runoff; or

4. Consultation under § 7 of the ESA was conducted for the applicant's activity which resulted in either a no jeopardy opinion or a written concurrence on a finding of no likelihood of adverse effects; or

5. The applicant's activity was considered as part of a larger, more comprehensive site-specific assessment of impacts on endangered and threatened species by the owner or other operator of the site and that permittee certified eligibility under items 1., 2., 3. or 4. above.

The proposal required that applicants assess the impacts of their "storm water discharges" and "BMPs to control storm water runoff" on listed species and critical habitat that are located "in proximity" to the those discharges and BMPs when developing Storm Water Pollution Prevention Plans (SWPPPs) as part of the application process. The proposed CGP also required applicants to include measures in SWPPPs to protect listed species and critical habitat. "In proximity" was defined in Addendum A to include species:

► Located in the path or immediate area through which or over which contaminated point source storm water flows from construction activities to the point of discharge into the receiving water;

► Located in the immediate vicinity of, or nearby, the point of discharge into receiving waters; or

► Located in the area of a site where storm water BMPs are planned or are to be constructed.

EPA also solicited comment on whether the area or scope of impacts to be considered by applicants should be broadened to encompass listed species found on the entire construction site and not just those species found "in proximity" as currently defined in Addendum A.

Failure by permittees to abide by measures in their SWPPPs to protect species and critical habitat would invalidate permit coverage. Attached to the proposed permits were instructions (Addendum A) to assist permit applicants in making this inquiry. The proposal indicated that a county-by-county species list would be included in Addendum A of the final permit to assist applicants in determining if listed species might be "in proximity" to storm water discharges and BMPs. EPA did not provide a draft species list in proposed Addendum A. Instead, EPA referred commenters to a similar species list that was used for an earlier EPA-issued storm water permit, the Multisector Storm Water General Permit, that was issued on September 29, 1995 (*See* 62 FR 29792, note 12, June 2, 1997).

C. Final CGP Conditions To Protect Listed Species

On April 28, 1997, EPA entered into formal consultation with the Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NMFS) (the "Services") for issuance of the CGP. After discussions with the Services, EPA terminated formal consultation and entered into ESA section 7 informal consultation and conferencing with the Fish and Wildlife Service (FWS) and the National Fisheries Service Services (NMFS) on June 11, 1997. On November 4, and 26, 1997, EPA completed ESA informal consultation when NMFS and FWS provided their respective concurrences with EPA's finding that issuance of the CGP was not likely to adversely affect listed species or critical habitat. However, the negotiations on CGP did not consider ongoing construction projects; i.e., construction projects which started prior to the effective date of these permits.

In January, 1998, Region 6 decided to address ESA certification issues for ongoing construction projects before finalizing the permit. In February, 1998, EPA Region 6 began a supplemental informal consultation with FWS and NMFS on language to clarify requirements for ongoing construction activity. EPA Region 6 completed ESA informal section 7 consultation and conferencing when FWS and NMFS provided their concurrences that issuance of these permits is unlikely to adversely affect listed species or critical habitat on June 9, and 15, respectively. With the completion of these consultations, EPA Region 6 has reduced the administrative burden associated with obtaining permit coverage for ongoing construction projects for the federal agencies and the regulated community.

Based on that consultation and in consideration of comments received on the June 2, 1997, proposal, EPA has placed the following conditions in the permit to protect listed species and critical habitat (*See* Part I.B.3.e). Coverage under the CGP is available for construction projects only if:

a. The storm water discharges and storm water discharge-related activities are not likely to adversely affect listed species or critical habitat (Part I.B.3.e.(2)(a)); or

b. Formal or informal consultation with the Services under section 7 of the Endangered Species Act (ESA) has been concluded which addresses the effects of the applicant's storm water discharges and storm water discharge-related activities on listed species and critical habitat and the consultation results in either a no jeopardy opinion or a written concurrence by the Service(s) on a finding that the applicant's storm water discharges and storm water discharge-related activities are not likely to adversely affect listed species or critical habitat. A section 7 consultation may occur in the context of another Federal on (e.g., an ESA section 7 consultation was performed for issuance of a wetlands dredge and fill permit for the project, or as part of a National Environmental Policy Act [NEPA] review); or

c. The applicant's construction activities are covered by a permit under section 10 of the ESA and that permit addresses the effects of the applicant's storm water discharges and storm water discharge-related activities on listed species and critical habitat (Part I.B.3.e.(2)(c)); or

d. The applicant's storm water discharges and storm water discharge-related activities were already addressed in another operator's certification of eligibility under Part I.B.3.e.(2)(a), (b), or (c) which included the applicant's project area. By certifying eligibility under Part I.B.3.e.(2)(d), the applicant agrees to comply with any measures or controls upon which the other operator's certification under Part I.B.3.e.(2)(a), (b) or (c) was based.

The CGP requires that applicants consider effects to listed species and critical habitat when developing SWPPPs and require that those plans include measures, as appropriate, to protect those resources. Failure by permittees to abide by measures in the SWPPPs to protect species and critical habitat may invalidate permit coverage.

This permit requires all projects commencing construction after the effective date of this permit, to follow the procedures provided in Addendum A of the permit when applying for permit coverage. The Director may also require any existing permittee or applicant to provide documentation of eligibility for this permit using the procedures in Addendum A, where EPA or the Fish and Wildlife Services determine that there is a potential impaction on endangered or threatened species or a critical habitat. Nothing in the permit relieves applicants which are under construction as of the effective date of this permit of their obligations they may have to comply with any requirements of the Endangered Species Act.

Addendum A contains instructions to assist permit applicants in making this inquiry. Those instructions require that applicants ascertain: (1) If their construction activities would occur in critical habitat; (2) whether listed species are in the project area; and (3) whether the applicant's storm water discharges and discharge-related activities are likely to adversely affect listed species or critical habitat. If adverse effects are likely, then applicants would have to meet one of the eligibility requirements of Part I.B.3.e.(2)(b)–(d) (paragraphs b., c., and d. above) to receive permit coverage. "Discharge-related activities" include activities which cause point source storm water pollutant discharges including but not limited to excavation, site development, and other surface disturbing activities, and measures to control, reduce or prevent storm water pollution including the siting, construction and operation of BMPs. The "project area" includes:

1. Area(s) on the construction site where storm water discharges originate and flow towards the point of discharge into the receiving waters (this includes the entire area or areas where excavation, site development, or other ground disturbance activities occur), and the immediate vicinity;

2. Area(s) where storm water discharges flow from the construction site to the point of discharge into receiving waters;

3. Area(s) where storm water from construction activities discharges into the receiving waters and the area(s) in the immediate vicinity of the point of discharge; and

4. Area(s) where storm water BMPs will be constructed and operated, including any area(s) where storm water flows to and from BMPs.

The project area will vary with the size and structure of the construction activity, the nature and quantity of the storm water discharges, the measures (including BMPs) to control storm water runoff, and the type of receiving waters.

Addendum A also contains information on where to find information on listed and proposed species organized by State and county to assist applicants in determining if further inquiry is necessary as to whether listed species are present in the project area. Applicants can check the Office of Wastewater Management's website (http://www.epa.gov/owm). CGP applicants can also get updated species information for their county by calling the appropriate FWS or NMFS office. EPA Region 6 applicants can also contact the EPA Region 6 Storm Water Hotline (1–800–245–6510) for updated species information.

The CGP also requires that applicants comply with any conditions imposed under the eligibility requirements of Part I.B.3.e.(2)a., b., c., or d. above to remain eligible for coverage under this

permit. Such conditions must be incorporated in the applicant's SWPPP. The CGP does not authorize any prohibited take (as defined under section 3 of the ESA and 50 CFR 17.3) of endangered or threatened species unless such takes are authorized under sections 7 or 10 of the ESA. The CGP does not authorize any storm water discharges or storm water discharge-related activities that are likely to jeopardize the continued existence of any species that are listed or proposed to be listed as endangered or threatened under the ESA or result in the adverse modification or destruction of habitat that is designated or proposed to be designated as critical under the ESA.

It is EPA's intention to provide permit applicants with the greatest possible flexibility in meeting permit requirements for protecting listed species and critical habitat. Thus, EPA is allowing applicants to use either section 7 or section 10 ESA mechanisms to address situations where adverse effects are likely (*See* Part I.B.3.e.(2)(b) and (c)). Also, to give applicants additional flexibility in meeting the Part I.B.3.e. eligibility requirements and with the timing of informal consultations, the permit automatically designates CGP applicants as non-Federal representatives for the purpose of carrying out informal consultation. However, EPA notes that meeting ESA requirements raises difficult implementation issues on how to best ensure that the permits are protective of listed species and critical habitats without unduly burdening permit applicants, permittees, and State, local, and Federal governmental entities. Thus, EPA intends in the future to review those permit conditions and procedures that relate to the ESA and the protection of historic resources to see how well that goal has been achieved and may revise the permits if necessary to better achieve that goal.

V. Historic Property Protection

A. Background

The National Historic Preservation Act of 1966, as amended, (NHPA) establishes a national historic preservation program for the identification and protection of historic properties and resources. Under the NHPA, identification of historic properties is coordinated by the State Historic Preservation Officers (SHPOs), Tribal Historic Preservation Officers (THPOs) or other Tribal Representatives (in the absence of a THPO). Section 106 of the NHPA requires Federal agencies to take into account the effects of their actions on historic properties that are listed or eligible for listing on the National Register of Historic Places and to seek comments from the Advisory Council on Historic Preservation (ACHP). The permit was proposed with a number of conditions pertaining to the consideration of historic properties. EPA has decided to not include those conditions because the ACHP and the National Conference of State Historic Preservation Officers (NCSHPO) have requested that EPA not include such conditions in the final permit at this time. The ACHP and the NCSHPO have recommended that EPA issue the permit but recommend that EPA continue working with them and Tribes regarding the possible development of a more comprehensive and efficient approach to ensure that effects to historic properties are given appropriate consideration while ensuring undue burdens are not imposed on applicants and regulatory authorities. EPA plans to continue working with the ACHP, NCSHPO and Tribes on this effort and may modify the permit to incorporate procedures regarding the protection of historic resources at a later date.

B. Future CGP Conditions To Protect or Consider Effects to Historic Properties

In response to comments received on the permit proposal and because the Agency is still discussing historic preservation with the Advisory Council on Historic Preservation (ACHP), the final permit reserves permit requirements related to historic preservation. Today's final permit does not include the eligibility restrictions and evaluation requirements from the proposed permit. After future discussions with the ACHP, EPA may modify the permit to reflect those discussions.

VI. Regulatory Review (Executive Order 12866)

Under Executive Order 12866, (58 FR 51735 [October 4, 1993]) the Agency must determine whether the regulatory action is "significant" and therefore subject to OMB review and the requirements of the Executive Order. The Order defines "significant regulatory action" as one that is likely to result in a rule that may have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local or Tribal governments or communities; create a serious inconsistency or otherwise interfere with an action taken or planned by another agency; materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order. It has been determined that this re-issued general permit is not a "significant regulatory action" under the terms of Executive Order 12866.

VII. Unfunded Mandates Reform Act

Title II of the Unfunded Mandates Reform Act of 1995 (UMRA), Pub. L. 104–4, establishes requirements for Federal agencies to assess the effects of their regulatory actions on State, local, and Tribal governments and the private sector. Under UMRA section 202, EPA generally must prepare a written statement, including a cost-benefit analysis, for proposed and final rules with "Federal mandates" that may result in expenditures to State, local, and Tribal governments, in the aggregate, or to the private sector, of $100 million or more in any one year. Before promulgating an EPA rule for which a written statement is needed, UMRA § 205 generally requires EPA to identify and consider a reasonable number of regulatory alternatives and adopt the least costly, most cost-effective or least burdensome alternative that achieves the objectives of the rule. The provisions of UMRA § 205 do not apply when they are inconsistent with applicable law. Moreover, UMRA § 205 allows EPA to adopt an alternative other than the least costly, most cost-effective or least burdensome alternative if the Administrator publishes an explanation with the final rule why the alternative was not adopted.

Before EPA establishes any regulatory requirements that may significantly or uniquely affect small governments, including Tribal governments, it must have developed under UMRA § 203 a small government agency plan. The plan must provide for notifying potentially affected small governments, enabling officials of affected small governments to have meaningful and timely input in the development of EPA regulatory proposals with significant Federal intergovernmental mandates, and informing, educating and advising small governments on compliance with the regulatory requirements.

A. UMRA Section 202 and the Construction General Permit

UMRA § 202 requires a written statement containing certain assessments, estimates and analyses prior to the promulgation of certain general notices of proposed rulemaking (2 U.S.C. 1532). UMRA § 421(10) defines

"rule" based on the definition of rule in the Regulatory Flexibility Act. Section 601 of the Regulatory Flexibility Act defines "rule" to mean any rule for which an agency publishes a general notice of proposed rulemaking pursuant to § 553 of the Administrative Procedure Act. EPA does not propose to issue NPDES general permits based on APA § 553. Instead, EPA relies on publication of general permits in the **Federal Register** in order to provide "an opportunity for a hearing" under CWA § 402(a), 33 U.S.C. 1342(a). Nonetheless, EPA has evaluated permitting alternatives for regulation of storm water discharges associated with construction activity. The general permit that EPA proposes to re-issue would be virtually the same NPDES general permit for construction that many construction operators have used over the past five years. Furthermore, general permits provide a more cost and time efficient alternative for the regulated community to obtain NPDES permit coverage than that provided through individually drafted permits.

B. UMRA Section 203 and the Construction General Permit

Agencies are required to prepare small government agency plans under UMRA § 203 prior to establishing any regulatory requirement that might significantly or uniquely affect small governments. "Regulatory requirements" might, for example, include the requirements of these NPDES general permits for discharges associated with construction activity, especially if a municipality sought coverage under one of the general permits. EPA envisions that some municipalities—those with municipal separate storm sewer systems serving a population over 100,000—may elect to seek coverage under these proposed general permits. For many municipalities, however, a permit application is not required until August 7, 2001, for a storm water discharge associated with construction activity where the construction site is owned or operated by a municipality with a population of less than 100,000. (See 40 CFR 122.26(e)(1)(ii) and (g)).

In any event, any such permit requirements would not significantly affect small governments because most State laws already provide for the control of sedimentation and erosion in a similar manner as today's general permit. Permit requirements also would not uniquely affect small governments because compliance with the permit's conditions affects small governments in the same manner as any other entity seeking coverage under the permit. Thus, UMRA § 203 would not apply.

VIII. Paperwork Reduction Act

On June 2, 1997, EPA solicited comments on the proposed revision to the current Information Collection Request (ICR) document for this permit (ICR approved OMB; OMB No. 2040–0086, expiration, August 31, 1998) to accommodate the increased information requirements in the new NOI for the construction general permit (62 FR 29826). A revised NOI form has been approved (EPA Form 3510–9 OMB No. 2040–0188.) This revised form is included in the permit in Addendum C. EPA estimates an increase in the burden associated with filling out the NOI form for the permit due to added requirements under the Endangered Species Act. EPA also anticipates a small increase in the time because of the requirement to submit an NOT upon completion of construction activities.

IX. Regulatory Flexibility Act

Under the Regulatory Flexibility Act (RFA), 5 U.S.C. 601 *et seq.*, a Federal agency must prepare an initial regulatory flexibility analysis "for any proposed rule" for which the agency "is required by section 553 of [the Administrative Procedure Act (APA)], or any other law, to publish general notice of proposed rulemaking." The RFA exempts from this requirement any rule that the issuing agency certifies "will not, if promulgated, have a significant economic impact on a substantial number of small entities."

EPA did not prepare an initial regulatory flexibility analysis (IRFA) for the proposed CGP. (Note that in today's action, EPA is issuing a separate general permit for each jurisdiction where EPA issues permits; i.e., in certain States, Indian Country lands and Federal facilities within certain States. However, for purposes of readability, reference is made to the permits in the singular form such as "permit" or "CGP" rather than in plural form.) In the notice of the proposed permit, EPA explained its view that issuance of an NPDES general permit is not subject to rulemaking requirements, including the requirement for a general notice of proposed rulemaking, under APA section 553 or any other law, and is thus not subject to the RFA requirement to prepare an IRFA. Nevertheless, in keeping with EPA's policy to consider the impact of its actions on small entities even when it is not legally required to do so, the Agency considered the potential impact of the permit on small entities that would be eligible for coverage under the permit. EPA concluded that the permit, if issued as drafted, would not have a significant impact on a substantial number of small entities. EPA based its conclusion on the fact that the draft permit was largely the same as the previous permit issued in 1992 and, to the extent it differed, provided dischargers with more flexibility than that permit allowed.

Some commenters on the proposed CGP disagreed with EPA's conclusions that NPDES general permits are not subject to rulemaking requirements and that the proposed permit would not have a significant impact on small entities. They asserted that the CGP is subject to rulemaking requirements and thus the RFA, and that the Agency should have prepared an IRFA for the permit.

In light of the comments received, EPA further considered whether NPDES general permits are subject to rulemaking requirements. The Agency reviewed its previous NPDES general permitting actions and related statements in the **Federal Register** or elsewhere. This review suggests that the Agency has generally treated NPDES general permits effectively as rules, though at times it has given contrary indications as to whether these actions are rules or permits. EPA also reviewed again the applicable law, including the CWA, relevant CWA case law and the APA, as well as the Attorney General's Manual on the APA (1947). On the basis of its review, EPA has concluded, as set forth in the proposal, that NPDES general permits are permits under the APA and thus not subject to APA rulemaking requirements or the RFA.

The APA defines two broad, mutually exclusive categories of agency action—"rules" and "orders." Its definition of "rule" encompasses "an agency statement of general or particular applicability and future effect designed to implement, interpret, or prescribe law or policy or describing the organization, procedure, or practice requirements of an agency * * *" APA section 551(4). Its definition of "order" is residual: "a final disposition * * * of an agency in a matter other than rule making but including *licensing*." APA section 551(6) (emphasis added). The APA defines "license" to "include * * * an agency permit * * *" APA section 551(8). The APA thus categorizes a permit as an order, which by the APA's definition is not a rule.

Section 553 of the APA establishes "rule making" requirements. The APA defines *rule making* as "the agency process for formulating, amending, or repealing a rule." APA § 551(5). By its terms, then, § 553 applies only to "rules" and not also to "orders," which

include permits. As the Attorney General's Manual on the APA explains, "the entire Act is based upon a dichotomy between rule making and adjudication [the agency process for formulation of an order]" (p. 14).

The CWA specifies the use of permits for authorizing the discharge of pollutants to waters of the United States. Section 301(a) of the CWA prohibits discharges of pollutants "[except as in compliance with" specified sections of the CWA, including section 402. 33 U.S.C. 1311(a). Section 402 of the CWA authorizes EPA "to issue a permit for the discharge of any pollutant * * *, notwithstanding section [301(a) of the CWA]." 33 U.S.C. 1342(a). Thus, the only circumstances in which a discharge of pollution may be authorized is where the Agency has issued a permit for the discharge. Courts, recognizing that a permit is the necessary condition-precedent to any lawful discharge, specifically suggested the use of area-wide and general permits as a mechanism for addressing the Agency's need to issue a substantial number of permits. See *NRDC* v. *Train*, 396 F.Supp. 1393, 1402 (D.D.C. 1975); *NRDC* v. *Costle*, 568 F.2d 1369, 1381. (D.C. Cir. 1977). Adopting the courts' suggestion, EPA has made increasing use of general permits in its CWA regulatory program, particularly for storm water discharges.

In the Agency's view, the fact that an NPDES general permit may apply to a large number of different dischargers does not convert it from a permit into a rule. As noted above, the courts which have faced the issue of how EPA can permit large numbers of discharges under the CWA have suggested use of a general *permit*, not a rule. Under the APA, the two terms are mutually exclusive. Moreover, an NPDES general permit retains unique characteristics that distinguish a permit from a rule. First, today's NPDES general permit for storm water discharges associated with construction activity is effective only with respect to those dischargers that *choose* to be bound by the permit. Thus, unlike the typical rule, this NPDES general permit does not impose immediately effective obligations of general applicability. A discharger must choose to be covered by this general permit and so notify EPA. A discharger always retains the option of obtaining its own individual permit. Relatedly, the terms of the NPDES general permit are enforceable only against dischargers that choose to make use of the permit. If a source discharges without authorization of a general or an individual permit, the discharger violates § 301 of the Act for discharging without a permit, not for violating the terms of an NPDES general permit.

Because the CWA and its case law make clear that NPDES permits are the congressionally chosen vehicle for authorizing discharges of pollutants to waters of the United States, the APA's rulemaking requirements are inapplicable to issuance of such permits, including today's general permit. Further, while the CWA requires that NPDES permits be issued only after an opportunity for a hearing, it does not require publication of a general notice of proposed rulemaking. Thus, NPDES permitting is not subject to the requirement to publish a general notice of proposed rulemaking under the APA or any other law. Accordingly, it is not subject to the RFA.

At the same time, the Agency recognizes that the question of the applicability of the APA, and thus the RFA, to the issuance of a general permit is a difficult one, given the fact that a large number of dischargers may choose to use the general permit. Indeed, the point of issuing a general permit is to provide a speedier means of permitting large number of sources and save dischargers and EPA time and effort. Since the Agency hopes that many dischargers will make use of a general permit and since the CWA requires EPA to provide an opportunity for "a hearing" prior to issuance of a permit, EPA provides the public with notice of a draft general permit and an opportunity to comment on it. From public comments, EPA learns how to better craft a general permit to make it appropriate for, and acceptable to, the largest number of potential permittees. This same process also provides an opportunity for EPA to consider the potential impact of general permit terms on small entities and how to craft the permit to avoid any undue burden on small entities. This process, however, is voluntary, and does not trigger rulemaking or RFA requirements.

In the case of the CGP being issued today, the Agency has considered and addressed the potential impact of the general permit on small entities in a manner that would meet the requirements of the RFA if it applied. Specifically, EPA has analyzed the potential impact of the general permit on small entities and found that it will not have a significant economic impact on a substantial number of small entities. Like the previous general permit that it replaces (the Baseline Construction General Permit), the permit will make available to many small entities, particularly operators of construction sites, a streamlined process for obtaining authorization to discharge. Of the possible permitting mechanisms available to dischargers subject to the CWA, NPDES general permits are designed to reduce the reporting and monitoring burden associated with NPDES permit authorization, especially for small entities with discharges having comparatively less potential for environmental degradation than discharges typically regulated under individual NPDES permits. Thus, general permits like the permit at issue here provide small entities with a permitting application option that is much less burdensome than NPDES individual permit applications.

Furthermore, the general permit is virtually identical to its predecessor, the Baseline Construction General Permit, under which many construction operators have operated during the past five years. Moreover, the other new provisions of the permit have been designed to minimize burdens on small entities, including eliminating the requirement that construction site operators require that their contractors and subcontractors sign a standard certification statement agreeing to abide by storm water pollution prevention plan provisions developed for a project. In today's general permit, only the operator(s) of a construction site are required to satisfy certification requirements under the permit. EPA believes this modification from the prior permit should reduce any such adverse economic impacts on both operators and contractors/subcontractors who, in many instances, are small entities. In view of the foregoing, the Regional Administrators find that the final general permit, even if it were a rule, will not have a significant economic impact on a substantial number of small entities.

Storm Water General Permit for Construction Activities in Region 6

NPDES Permit No. [See Part I.A.]

Authorization to Discharge Under the National Pollutant Discharge Elimination System

In compliance with the provisions of the Clean Water Act, as amended, (33 U.S.C. 1251 et. seq.), except as provided in Part I.B.3 of this permit, operators of construction activities located in an area specified in Part I.A. and who submit a Notice of Intent in accordance with Part II, are authorized to discharge pollutants to waters of the United States in accordance with the conditions and requirements set forth herein.

This permit shall become effective on [insert the date of publication of the final permit in the **Federal Register**].

This permit and the authorization to discharge shall expire at midnight, July 7, 2003.

Signed: June 24, 1998.

William B. Hathaway,

Director, Water Quality Protection Division.

NPDES General Permits for Storm Water Discharges from Construction Activities

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Part I. Coverage Under This Permit

A. Permit Area

The permit language is structured as if it were a single permit, with State, Indian Country land, or other area-specific conditions specified in Part X. Permit coverage is actually provided by legally separate and distinctly numbered permits covering each of the following areas:

Region 6

LAR10*##I: Indian Country lands in the State of Louisiana

NMR10*###: The State of New Mexico, except Indian Country lands

NMR10*##I: Indian Country lands in the State of New Mexico, except Navajo Reservation Lands and Ute Mountain Reservation Lands

OKR10*##I: Indian Country lands in the State of Oklahoma

OKR10*##F: Oil and Gas Sites in State of Oklahoma

TXR10*###: The State of Texas, except Indian Country lands

TXR10*##I: Indian Country lands in the State of Texas

B. Eligibility

1. Permittees are authorized to discharge pollutants in storm water runoff associated with construction activities as defined in 40 CFR 122.26(b)(14)(x) and those construction site discharges designated by the Director as needing a storm water permit under 122.26(a)(1)(v) or under 122.26(a)(9) and 122.26(g)(1)(i). Discharges identified under Part I.B.3 are excluded from coverage. Any discharge authorized by a different NPDES permit may be commingled with discharges authorized by this permit.

2. This permit also authorizes storm water discharges from support activities (e.g., concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, borrow areas) provided:

a. The support activity is directly related to a construction site that is required to have NPDES permit coverage for discharges of storm water associated with construction activity;

b. The support activity is not a commercial operation serving multiple unrelated construction projects by different operators, and does not operate beyond the completion of the construction activity at the last construction project it supports; and

c. Appropriate controls and measures are identified in a storm water pollution prevention plan covering the discharges from the support activity areas.

3. Limitations on Coverage

a. *Post Construction Discharges.* This permit does not authorize storm water discharges that originate from the site *after* construction activities have been completed and the site, including any temporary support activity site, has undergone final stabilization. Industrial post-construction storm water discharges may need to be covered by a separate NPDES permit.

b. *Discharges Mixed with Non-Storm Water.* This permit does not authorize discharges that are mixed with sources of non-storm water, other than those discharges which are identified in Part III.A.2. or 3. (exceptions to prohibition on non-storm water discharges) and are in compliance with Part IV.D.5 (non-storm water discharges).

c. *Discharges Covered by Another Permit.* This permit does not authorize storm water discharges associated with construction activity that have been covered under an individual permit or required to obtain coverage under an alternative general permit in accordance with Part VI.L.

d. *Discharges Threatening Water Quality.* This permit does not authorize storm water discharges from construction sites that the Director (EPA) determines will cause, or have reasonable potential to cause or contribute to, violations of water quality standards. Where such determinations have been made, the Director may notify the operator(s) that an individual permit application is necessary in accordance with Part VI.L. However, the Director may authorize coverage under this permit after appropriate controls and implementation procedures designed to bring the discharges into compliance with water quality standards have been included in the storm water pollution prevention plan;

e. *Storm water discharges and storm water discharge-related activities that are not protective of Federally listed endangered and threatened ("listed") species or designated critical habitat ("critical habitat").*

(1) For the purposes of complying with the Part I.B.3.e. eligibility requirements, "storm water discharge-related activities" include:

(a) Activities which cause, contribute to, or result in point source storm water pollutant discharges, including but not limited to: excavation, site development, grading and other surface disturbance activities; and

(b) Measures to control storm water including the siting, construction and operation of best management practices

(BMPs) to control, reduce or prevent storm water pollution.

(2) Coverage under this permit is available only if the applicant certifies that it meets at least one of the criteria in paragraphs (a)–(d) below. Failure to continue to meet one of these criteria during the term of the permit will render a permittee ineligible for coverage under this permit.

(a) The storm water discharges and storm water discharge-related activities are not likely to adversely affect listed species or critical habitat; or

(b) Formal or informal consultation with the Fish and Wildlife Service and/or the National Marine Fisheries Service (the "Services") under section 7 of the Endangered Species Act (ESA) has been concluded which addresses the effects of the applicant's storm water discharges and storm water discharge-related activities on listed species and critical habitat and the consultation results in either a no jeopardy opinion or a written concurrence by the Service(s) on a finding that the applicant's storm water discharges and storm water discharge-related activities are not likely to adversely affect listed species or critical habitat. A section 7 consultation may occur in the context of another Federal action (e.g., a ESA section 7 consultation was performed for issuance of a wetlands dredge and fill permit for the project, or as part of a National Environmental Policy Act (NEPA) review); or

(c) The applicant's construction activities are authorized under section 10 of the ESA and that authorization addresses the effects of the applicant's storm water discharges and storm water discharge-related activities on listed species and critical habitat; or

(d) The applicant's storm water discharges and storm water discharge-related activities were already addressed in another operator's certification of eligibility under Part I.B.3.e.(2)(a), (b), or (c) which included the applicant's project area. By certifying eligibility under Part I.B.3.e.(2)(d), the applicant agrees to comply with any measures or controls upon which the other operator's certification under Part I.B.3.e.(2)(a), (b) or (c) was based.

(3) For all projects commencing construction after the effective date of this permit, applicants must follow the procedures provided at Addendum A of this permit when applying for permit coverage. The Director may also require any existing permittee or applicant to provide documentation of eligibility for this permit using the procedures in Addendum A, where EPA or the Fish and Wildlife Services determine that there is a potential impaction on endangered or threatened species or a critical habitat. Nothing in this permit relieves applicants which are under construction as of the effective date of this permit of their obligations they may have to comply with any requirements of the Endangered Species Act.

(4) The applicant must comply with any applicable terms, conditions or other requirements developed in the process of meeting eligibility requirements of Part I.B.3.e.(2)(a), (b), (c), or (d) above to remain eligible for coverage under this permit. Such terms and conditions must be incorporated in the applicant's storm water pollution prevention plan.

(5) Applicants who choose to conduct informal consultation to meet the eligibility requirements of Part I.B.3.e.(2)(b) are automatically designated as non-Federal representatives under this permit. See 50 CFR 402.08. Applicants who choose to conduct informal consultation as a non-Federal representatives must notify EPA and the appropriate Service office in writing of that decision.

(6) This permit does not authorize any storm water discharges where the discharges or storm water discharge-related activities cause prohibited "take" (as defined under section 3 of the Endangered Species Act and 50 CFR 17.3) of endangered or threatened species unless such takes are authorized under sections 7 or 10 of the Endangered Species Act.

(7) This permit does not authorize any storm water discharges where the discharges or storm water discharge-related activities are likely to jeopardize the continued existence of any species that are listed or proposed to be listed as endangered or threatened under the ESA or result in the adverse modification or destruction of habitat that is designated or proposed to be designated as critical under the ESA.

f. *Storm water Discharges and Storm Water Discharge-Related Activities with Unconsidered Adverse Effects on Historic Properties.* (Reserved)

C. Obtaining Authorization

1. In order for storm water discharges from construction activities to be authorized under this general permit, an operator must:

a. Meet the Part I.B eligibility requirements;

b. Except as provided in Parts II.A.5 and II.A.6, develop a storm water pollution prevention plan (SWPPP) covering either the entire site or all portions of the site for which they are operators (see definition in Part IX.N) according to the requirements in Part IV. A "joint" SWPPP may be developed and implemented as a cooperative effort where there is more than one operator at a site; and

c. Submit a Notice of Intent (NOI) in accordance with the requirements of Part II, using an NOI form provided in Addendum C of this permit. Only one NOI need be submitted to cover all of the permittee's activities on the common plan of development or sale (e.g., you do not need to submit a separate NOI for each separate lot in a residential subdivision or for two separate buildings being constructed at a manufacturing facility, provided your SWPPP covers each area for which you are an operator). The SWPPP must be implemented upon commencement of construction activities.

2. Any new operator on site, including those who replace an operator who has previously obtained permit coverage, must submit an NOI to obtain permit coverage.

3. Unless notified by the Director to the contrary, operators who submit a correctly completed NOI in accordance with the requirements of this permit are authorized to discharge storm water from construction activities under the terms and conditions of this permit two (2) days after the date that the NOI is postmarked. The Director may deny coverage under this permit and require submittal of an application for an individual NPDES permit based on a review of the NOI or other information (see Part VI.L).

D. Terminating Coverage

1. Permittees wishing to terminate coverage under this permit must submit a Notice of Termination (NOT) in accordance with Part VIII of this permit. Compliance with this permit is required until an NOT is submitted. The permittee's authorization to discharge under this permit terminates at midnight of the day the NOT is signed.

2. All permittees must submit a NOT within thirty (30) days after one or more of the following conditions have been met:

a. Final stabilization (see definition Part IX.I) has been achieved on all portions of the site for which the permittee is responsible (including if applicable, returning agricultural land to its pre-construction agricultural use);

b. Another operator/permittee has assumed control according to Part VI.G.2.c. over all areas of the site that have not been finally stabilized; or

c. For residential construction only, temporary stabilization has been completed and the residence has been transferred to the homeowner.

Enforcement actions may be taken if a permittee submits a NOT without

meeting one or more of these conditions.

Part II. Notice of Intent Requirements

A. Deadlines for Notification

1. Except as provided in Parts II.A.3, II.A.4, II.A.5 or II.A.6 below, parties defined as operators (see definition in Part IX.N) due to their operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications, must submit a Notice of Intent (NOI) in accordance with the requirements of this Part at least two (2) days prior to the commencement of construction activities (i.e., the initial disturbance of soils associated with clearing, grading, excavation activities, or other construction activities).

2. Except as provided in Parts II.A.3, II.A.4, II.A.5 or II.A.6 below, parties defined as operators (see definition in Part IX.N) due to their day-to-day operational control over activities at a project which are necessary to ensure compliance with a storm water pollution prevention plan or other permit conditions (e.g., general contractor, erosion control contractor) must submit a NOI at least two (2) days prior to commencing work on-site.

3. For storm water discharges from construction projects where the operator changes, including instances where an operator is added after a NOI has been submitted under Parts II.A.1 or II.A.2, the new operator must submit a NOI at least two (2) days before assuming operational control over site specifications or commencing work on-site.

4. Operators are not prohibited from submitting late NOIs. When a late NOI is submitted, authorization is only for discharges that occur after permit coverage is granted. The Agency reserves the right to take appropriate enforcement actions for any unpermitted activities that may have occurred between the time construction commenced and authorization of future discharges is granted (typically 2 days after a complete NOI is submitted).

5. Operators of on-going construction projects as of the effective date of this permit which received authorization to discharge for these projects under the 1992 baseline construction general permit must:

a. Submit a NOI according to Part II.B. within 90 days of the effective date of this permit. If the permittee is eligible to submit a Notice of Termination (e.g., construction is finished and final stabilization has been achieved) before the 90th day, a new NOI is not required to be submitted;

b. For the first 90 days from the effective date of this permit, comply with the terms and conditions of the 1992 baseline construction general permit they were previously authorized under; and

c. Update their storm water pollution prevention plan to comply with the requirements of Part IV within 90 days after the effective date of this permit.

6. Operators of on-going construction projects as of the effective date of this permit which did *not* receive authorization to discharge for these projects under the 1992 baseline construction general permit must:

a. Prepare and comply with an interim storm water pollution prevention plan in accordance with the 1992 baseline construction general permit prior to submitting an NOI;

b. Submit a NOI according to Part II.B; and

c. Update their storm water pollution prevention plan to comply with the requirements of Part IV within 90 days after the effective date of this permit.

B. Contents of Notice of Intent (NOI)

1. Use of Revised NOI Form

The revised NOI form [EPA Form 3510–9] shall be signed in accordance with Part VI.G of this permit and shall include the following information:

a. The name, address, and telephone number of the operator filing the NOI for permit coverage;

b. An indication of whether the operator is a Federal, State, Tribal, private, or other public entity;

c. The name (or other identifier), address, county, and latitude/longitude of the construction project or site;

d. An indication of whether the project or site is located on Indian Country lands;

e. Confirmation that a storm water pollution prevention plan (SWPPP) has been developed or will be developed prior to commencing construction activities, and that the SWPPP will be compliant with any applicable local sediment and erosion control plans. Copies of SWPPPs or permits should *not* be included with the NOI submission;

f. Optional information: the location where the SWPPP may be viewed and the name and telephone number of a contact person for scheduling viewing times;

g. The name of the receiving water(s);

h. Estimates of project start and completion dates, and estimates of the number of acres of the site on which soil will be disturbed (if less than 1 acre, enter "1");

i. Based on the instructions in Addendum A, whether any listed or proposed threatened or endangered species, or designated critical habitat, are in proximity to the storm water discharges or storm water discharge-related activities to be covered by this permit;

j. Under which section(s) of Part I.B.3.e. (Endangered Species) the applicant is certifying eligibility; and

Note that as of the effective date of this permit, reporting of information relating to the preservation of historic properties has been reserved and is not required at this time. Such reservation in no way relieves applicants or permittees from any otherwise applicable obligations or liabilities related to historic preservation under State, Tribal or local law. After further discussions between EPA and the Advisory Council on Historic Preservation, the Agency may modify the permit. Any such modification may affect future Notice of Intent reporting requirements.

C. Where To Submit

1. NOIs must be signed in accordance with Part VI.G. and sent to the following address: Storm Water Notice of Intent (4203), US EPA, 401 M Street, SW, Washington, DC 20460.

Part III. Special Conditions, Management Practices, and Other Non-Numeric Limitations

A. Prohibition on Non-Storm Water Discharges

1. Except as provided in Parts I.B.2 or 3 and III.A.2 or 3, all discharges covered by this permit shall be composed entirely of storm water associated with construction activity.

2. Discharges of material other than storm water that are in compliance with an NPDES permit (other than this permit) issued for that discharge may be discharged or mixed with discharges authorized by this permit.

3. The following non-storm water discharges from active construction sites are authorized by this permit provided the non-storm water component of the discharge is in compliance with Part IV.D.5 (non-storm water discharges): discharges from fire fighting activities; fire hydrant flushings; waters used to wash vehicles where detergents are not used; water used to control dust in accordance with Part IV.D.2.c.(2); potable water sources including waterline flushings; routine external building wash down which does not use detergents; pavement washwaters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used; air

conditioning condensate; uncontaminated ground water or spring water; and foundation or footing drains where flows are not contaminated with process materials such as solvents.

B. Releases in Excess of Reportable Quantities

The discharge of hazardous substances or oil in the storm water discharge(s) from a facility shall be prevented or minimized in accordance with the applicable storm water pollution prevention plan for the facility. This permit does not relieve the permittee of the reporting requirements of 40 CFR 110, 40 CFR 117 and 40 CFR 302. Where a release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity established under either 40 CFR 110, 40 CFR 117 or 40 CFR 302, occurs during a 24 hour period:

1. The permittee is required to notify the National Response Center (NRC) (800–424–8802; in the Washington, DC, metropolitan area call 202–426–2675) in accordance with the requirements of 40 CFR 110, 40 CFR 117 and 40 CFR 302 as soon as he or she has knowledge of the discharge;

2. The storm water pollution prevention plan required under Part IV of this permit must be modified within 14 calendar days of knowledge of the release to: provide a description of the release, the circumstances leading to the release, and the date of the release. In addition, the plan must be reviewed to identify measures to prevent the reoccurrence of such releases and to respond to such releases, and the plan must be modified where appropriate.

C. Spills

This permit does not authorize the discharge of hazardous substances or oil resulting from an on-site spill.

D. Discharge Compliance With Water Quality Standards

Operators seeking coverage under this permit shall not be causing or have the reasonable potential to cause or contribute to a violation of a water quality standard. Where a discharge is already authorized under this permit and is later determined to cause or have the reasonable potential to cause or contribute to the violation of an applicable water quality standard, the Director will notify the operator of such violation(s). The permittee shall take all necessary actions to ensure future discharges do not cause or contribute to the violation of a water quality standard and document these actions in the storm water pollution prevention plan. If violations remain or re-occur, then coverage under this permit may be terminated by the Director, and an alternative general permit or individual permit may be issued. Compliance with this requirement does not preclude any enforcement activity as provided by the Clean Water Act for the underlying violation.

E. Responsibilities of Operators

Permittees may meet one or both of the operational control components in the definition of "operator" found in Part IX.N. Either Parts III.E.1 or III.E.2 or both will apply depending on the type of operational control exerted by an individual permittee. Part III.E.3 applies to all permittees.

1. Permittees with operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications (e.g., developer or owner), must:

a. Ensure the project specifications that they develop meet the minimum requirements of Part IV (Storm Water Pollution Prevention Plans (SWPPP)) and all other applicable conditions;

b. Ensure that the SWPPP indicates the areas of the project where they have operational control over project specifications (including the ability to make modifications in specifications), and ensure all other permittees implementing portions of the SWPPP impacted by any changes they make to the plan are notified of such modifications in a timely manner; and

c. Ensure that the SWPPP for portions of the project where they are operators indicates the name and NPDES permit number for parties with day-to-day operational control of those activities necessary to ensure compliance with the SWPPP or other permit conditions. If these parties have not been identified at the time the SWPPP is initially developed, the permittee with operational control over project specifications shall be considered to be the responsible party until such time as the authority is transferred to another party (e.g., general contractor) and the plan updated.

2. Permittee(s) with day-to-day operational control of those activities at a project which are necessary to ensure compliance with a SWPPP for the site or other permit conditions (e.g., general contractor) must:

a. Ensure that the SWPPP for portions of the project where they are operators meets the minimum requirements of Part IV (Storm Water Pollution Prevention Plan) and identifies the parties responsible for implementation of control measures identified in the plan;

b. Ensure that the SWPPP indicates areas of the project where they have operational control over day-to-day activities;

c. Ensure that the SWPPP for portions of the project where they are operators indicates the name and NPDES permit number of the party(ies) with operational control over project specifications (including the ability to make modifications in specifications);

3. Permittees with operational control over only a portion of a larger construction project (e.g., one of four homebuilders in a subdivision) are responsible for compliance with all applicable terms and conditions of this permit as it relates to their activities on their portion of the construction site, including protection of endangered species and implementation of BMPs and other controls required by the SWPPP. Permittees shall ensure either directly or through coordination with other permittees, that their activities do not render another party's pollution controls ineffective. Permittees must either implement their portions of a common SWPPP or develop and implement their own SWPPP.

F. Consistency With the Texas Coastal Management Program

This permit does not relieve permittees whose construction project is located within the boundary of the Texas Coastal Management Program of their responsibility to insure consistency with all applicable requirements of this State program. While pre-construction approval of development projects is not within the jurisdiction of the Federal NPDES permit program, State or local pre-construction project approvals and/or permits may be required. The permittee's Storm Water Pollution Prevention Plan must be consistent with any storm water discharge-related requirements established pursuant to, or necessary to be consistent with, the Texas Coastal Management Program. This permit may be reopened, upon petition by the State, to include more stringent discharge requirements applying to areas within the State's designated coastal zone.

The Texas Coastal Management Program boundary covers part or all of the following Texas Counties: Aransas, Brazoria, Calhoun, Cameron, Chambers, Galveston, Harris, Jackson, Jefferson, Kenedy, Kleberg, Matagorda, Nueces, Orange, Refugio, San Patricio, Victoria, and Willacy. To determine if a construction project is located within the Texas Coastal Zone, and if so, the applicable requirements of the Texas Coastal Management Program, please

contact the Texas General Land Office's Coastal Hotline at 1-800-85-BEACH or access their Internet site at "http://red.glo.state.tx.us/res-mgmt/coastal/". Information is also available from the Texas Coastal Coordination Council's Coastal Permitting Assistance Office at 1-888-3-PERMIT or via the Internet at "http://red.glo.state.tx.us/coastalpermits/".

Part IV. Storm Water Pollution Prevention Plans

At least one storm water pollution prevention plan (SWPPP) shall be developed for each construction project or site covered by this permit. For more effective coordination of BMPs and opportunities for cost sharing, a cooperative effort by the different operators at a site to prepare and participate in a comprehensive SWPPP is encouraged. Individual operators at a site may, but are not required, to develop separate SWPPPs that cover only their portion of the project provided reference is made to other operators at the site. In instances where there is more than one SWPPP for a site, coordination must be conducted between the permittees to ensure the storm water discharge controls and other measures are consistent with one another (e.g., provisions to protect listed species and critical habitat).

Storm water pollution prevention plans shall be prepared in accordance with good engineering practices. The SWPPP shall identify potential sources of pollution which may reasonably be expected to affect the quality of storm water discharges from the construction site. The SWPPP shall describe and ensure the implementation of practices which will be used to reduce the pollutants in storm water discharges associated with construction activity at the construction site and assure compliance with the terms and conditions of this permit.

When developing SWPPPs, applicants must follow the procedures in Addendum A of this permit to determine whether listed endangered or threatened species or critical habitat would be affected by the applicant's storm water discharges or storm water discharge-related activities. Any information on whether listed species or critical habitat are found in proximity to the construction site must be included in the SWPPP. Any terms or conditions that are imposed under the eligibility requirements of Part I.B.3.e and Addendum A of this permit to protect listed species or critical habitat from storm water discharges or storm water discharge-related activity must be incorporated into the SWPPP. Permittees must implement the applicable provisions of the SWPPP required under this part as a condition of this permit.

A. Deadlines for Plan Preparation and Compliance

The storm water pollution prevention plan shall:

1. Be completed prior to the submittal of an NOI to be covered under this permit (except as provided in Parts II.A.5 and II.A.6) updated as appropriate; and

2. Provide for compliance with the terms and schedule of the SWPPP beginning with the initiation of construction activities.

B. Signature, Plan Review and Making Plans Available

1. The SWPPP shall be signed in accordance with Part VI.G, and be retained on-site at the facility which generates the storm water discharge in accordance with Part V (Retention of Records) of this permit.

2. The permittee shall post a notice near the main entrance of the construction site with the following information:

a. The NPDES permit number for the project or a copy of the NOI if a permit number has not yet been assigned;

b. The name and telephone number of a local contact person;

c. A brief description of the project; and

d. The location of the SWPPP if the site is inactive or does not have an on-site location to store the plan.

If posting this information near a main entrance is infeasible due to safety concerns, the notice shall be posted in a local public building. If the construction project is a linear construction project (e.g., pipeline, highway, etc.), the notice must be placed in a publicly accessible location near where construction is actively underway and moved as necessary. This permit does not provide the public with any right to trespass on a construction site for any reason, including inspection of a site; nor does this permit require that permittees allow members of the public access to a construction site.

3. The permittee shall make SWPPPs available upon request to the Director, a State, Tribal or local agency approving sediment and erosion plans, grading plans, or storm water management plans; local government officials; or the operator of a municipal separate storm sewer receiving discharges from the site. The copy of the SWPPP that is required to be kept on-site or locally available must be made available to the Director for review at the time of an on-site inspection. Also, in the interest of public involvement, EPA encourages permittees to make their SWPPPs available to the public for viewing during normal business hours.

4. The Director may notify the permittee at any time that the SWPPP does not meet one or more of the minimum requirements of this Part. Such notification shall identify those provision of this permit which are not being met by the SWPPP as well as those requiring modification in order to meet the minimum requirements of this Part. Within seven (7) calendar days of receipt of such notification from the Director (or as otherwise provided by the Director), the permittee shall make the required changes to the SWPPP and shall submit to the Director a written certification that the requested changes have been made. The Director may take appropriate enforcement action for the period of time the permittee was operating under a plan that did not meet the minimum requirements of this permit.

C. Keeping Plans Current

The permittee must amend the storm water pollution prevention plan whenever:

1. There is a change in design, construction, operation, or maintenance which has a significant effect on the discharge of pollutants to the waters of the United States which has not been addressed in the SWPPP; or

2. Inspections or investigations by site operators, local, State, Tribal or Federal officials indicate the SWPPP is proving ineffective in eliminating or significantly minimizing pollutants from sources identified under Part IV.D.1 of this permit, or is otherwise not achieving the general objectives of controlling pollutants in storm water discharges associated with construction activity.

D. Contents of Plan

The storm water pollution prevention plan (SWPPP) shall include the following items:

1. Site Description

Each SWPPP shall provide a description of potential pollutant sources and other information as indicated below:

a. A description of the nature of the construction activity;

b. A description of the intended sequence of major activities which disturb soils for major portions of the site (e.g., grubbing, excavation, grading, utilities and infrastructure installation);

c. Estimates of the total area of the site and the total area of the site that is

expected to be disturbed by excavation, grading, or other activities including off-site borrow and fill areas;

d. An estimate of the runoff coefficient of the site for both the pre-construction and post-construction conditions and data describing the soil or the quality of any discharge from the site;

e. A general location map (e.g., a portion of a city or county map) and a site map indicating the following: drainage patterns and approximate slopes anticipated after major grading activities; areas of soil disturbance; areas which will not be disturbed; locations of major structural and nonstructural controls identified in the SWPPP; locations where stabilization practices are expected to occur; locations of off-site material, waste, borrow or equipment storage areas; surface waters (including wetlands); and locations where storm water discharges to a surface water;

f. Location and description of any discharge associated with industrial activity other than construction, including storm water discharges from dedicated asphalt plants and dedicated concrete plants, which is covered by this permit;

g. The name of the receiving water(s) and the areal extent and description of wetland or other special aquatic sites (as described under 40 CFR 230.3(q-1)) at or near the site which will be disturbed or which will receive discharges from disturbed areas of the project;

h. A copy of the permit requirements (attaching a copy of this permit is acceptable);

i. Information on whether listed endangered or threatened species, or critical habitat, are found in proximity to the construction activity and whether such species may be affected by the applicant's storm water discharges or storm water discharge-related activities; and

j. Information on whether storm water discharges or storm water discharge-related activities would have an affect on a property that is listed or eligible for listing on the National Register of Historic Places; where effects may occur, any written agreements with the State Historic Preservation Officer, Tribal Historic Preservation Officer, or other Tribal leader to mitigate those effects.

2. Controls

Each SWPPP shall include a description of appropriate control measures (i.e., BMPs) that will be implemented as part of the construction activity to control pollutants in storm water discharges. The SWPPP must clearly describe for each major activity identified in Part IV.D.1.b: (a) appropriate control measures and the general timing (or sequence) during the construction process that the measures will be implemented; and (b) which permittee is responsible for implementation (e.g., perimeter controls for one portion of the site will be installed by Contractor A after the clearing and grubbing necessary for installation of the measure, but before the clearing and grubbing for the remaining portions of the site; and perimeter controls will be actively maintained by Contractor B until final stabilization of those portions of the site up-gradient of the perimeter control; and temporary perimeter controls will be removed by the owner after final stabilization). The description and implementation of control measures shall address the following minimum components:

a. *Erosion and Sediment Controls.*

(1) Short and Long Term Goals and Criteria:

(a) The construction-phase erosion and sediment controls should be designed to retain sediment on site to the extent practicable.

(b) All control measures must be properly selected, installed, and maintained in accordance with the manufacturers specifications and good engineering practices. If periodic inspections or other information indicates a control has been used inappropriately, or incorrectly, the permittee must replace or modify the control for site situations.

(c) If sediment escapes the construction site, off-site accumulations of sediment must be removed at a frequency sufficient to minimize offsite impacts (e.g., fugitive sediment in street could be washed into storm sewers by the next rain and/or pose a safety hazard to users of public streets).

(d) Sediment must be removed from sediment traps or sedimentation ponds when design capacity has been reduced by 50%.

(e) Litter, construction debris, and construction chemicals exposed to storm water shall be prevented from becoming a pollutant source for storm water discharges (e.g., screening outfalls, picked up daily).

(f) Offsite material storage areas (also including overburden and stockpiles of dirt, borrow areas, etc.) used solely by the permitted project are considered a part of the project and shall be addressed in the SWPPP.

(2) *Stabilization Practices:* The SWPPP must include a description of interim and permanent stabilization practices for the site, including a schedule of when the practices will be implemented. Site plans should ensure that existing vegetation is preserved where attainable and that disturbed portions of the site are stabilized. Stabilization practices may include but are not limited to: establishment of temporary vegetation, establishment of permanent vegetation, mulching, geotextiles, sod stabilization, vegetative buffer strips, protection of trees, preservation of mature vegetation, and other appropriate measures. Use of impervious surfaces for stabilization should be avoided.

The following records shall be maintained and attached to the SWPPP: the dates when major grading activities occur; the dates when construction activities temporarily or permanently cease on a portion of the site; and the dates when stabilization measures are initiated.

Except as provided in Parts IV.D.2.a.(2)(a), (b), and (c) below, stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than 14 days after the construction activity in that portion of the site has temporarily or permanently ceased.

(a) Where the initiation of stabilization measures by the 14th day after construction activity temporary or permanently cease is precluded by snow cover or frozen ground conditions, stabilization measures shall be initiated as soon as practicable.

(b) Where construction activity on a portion of the site is temporarily ceased, and earth disturbing activities will be resumed within 21 days, temporary stabilization measures do not have to be initiated on that portion of site.

(c) In arid areas (areas with an average annual rainfall of 0 to 10 inches), semi-arid areas (areas with an average annual rainfall of 10 to 20 inches), and areas experiencing droughts where the initiation of stabilization measures by the 14th day after construction activity has temporarily or permanently ceased is precluded by seasonal arid conditions, stabilization measures shall be initiated as soon as practicable.

(3) *Structural Practices:* The SWPPP must include a description of structural practices to divert flows from exposed soils, store flows or otherwise limit runoff and the discharge of pollutants from exposed areas of the site to the degree attainable. Structural practices may include but are not limited to: silt fences, earth dikes, drainage swales, sediment traps, check dams, subsurface drains, pipe slope drains, level spreaders, storm drain inlet protection,

rock outlet protection, reinforced soil retaining systems, gabions, and temporary or permanent sediment basins. Placement of structural practices in floodplains should be avoided to the degree attainable. The installation of these devices may be subject to section 404 of the CWA.

(a) For common drainage locations that serve an area with ten (10) or more acres disturbed at one time, a temporary (or permanent) sediment basin that provides storage for a calculated volume of runoff from a 2 year, 24 hour storm from each disturbed acre drained, or equivalent control measures, shall be provided where attainable until final stabilization of the site. Where no such calculation has been performed, a temporary (or permanent) sediment basin providing 3,600 cubic feet of storage per acre drained, or equivalent control measures, shall be provided where attainable until final stabilization of the site. When computing the number of acres draining into a common location it is not necessary to include flows from offsite areas and flows from onsite areas that are either undisturbed or have undergone final stabilization where such flows are diverted around both the disturbed area and the sediment basin.

In determining whether installing a sediment basin is attainable, the permittee may consider factors such as site soils, slope, available area on site, etc. In any event, the permittee must consider public safety, especially as it relates to children, as a design factor for the sediment basin and alternative sediment controls shall be used where site limitations would preclude a safe design. For drainage locations which serve ten (10) or more disturbed acres at one time and where a temporary sediment basin or equivalent controls is not attainable, smaller sediment basins and/or sediment traps should be used. Where neither the sediment basin nor equivalent controls are attainable due to site limitations, silt fences, vegetative buffer strips, or equivalent sediment controls are required for all down slope boundaries of the construction area and for those side slope boundaries deemed appropriate as dictated by individual site conditions. EPA encourages the use of a combination of sediment and erosion control measures in order to achieve maximum pollutant removal.

(b) For drainage locations serving less than 10 acres, smaller sediment basins and/or sediment traps should be used. At a minimum, silt fences, vegetative buffer strips, or equivalent sediment controls are required for all down slope boundaries (and for those side slope boundaries deemed appropriate as dictated by individual site conditions) of the construction area unless a sediment basin providing storage for a calculated volume of runoff from a 2 year, 24 hour storm or 3,600 cubic feet of storage per acre drained is provided. EPA encourages the use of a combination of sediment and erosion control measures in order to achieve maximum pollutant removal.

b. *Storm Water Management.* A description of measures that will be installed during the construction process to control pollutants in storm water discharges that will occur after construction operations have been completed must be included in the SWPPP. Structural measures should be placed on upland soils to the degree attainable. The installation of these devices may also require a separate permit under section 404 of the CWA. Permittees are only responsible for the installation and maintenance of storm water management measures prior to final stabilization of the site, and are not responsible for maintenance after storm water discharges associated with construction activity have been eliminated from the site. However, post-construction storm water BMPs that discharge pollutants from point sources once construction is completed may, in themselves, need authorization under a separate NPDES permit.

(1) Such practices may include but are not limited to: storm water detention structures (including wet ponds); storm water retention structures; flow attenuation by use of open vegetated swales and natural depressions; infiltration of runoff onsite; and sequential systems (which combine several practices). The SWPPP shall include an explanation of the technical basis used to select the practices to control pollution where flows exceed predevelopment levels.

(2) Velocity dissipation devices shall be placed at discharge locations and along the length of any outfall channel to provide a non-erosive flow velocity from the structure to a water course so that the natural physical and biological characteristics and functions are maintained and protected (e.g., no significant changes in the hydrological regime of the receiving water).

c. *Other Controls.*

(1) No solid materials, including building materials, shall be discharged to waters of the United States, except as authorized by a permit issued under section 404 of the CWA.

(2) Off-site vehicle tracking of sediments and the generation of dust shall be minimized.

(3) The SWPPP shall be consistent with applicable State, Tribal and/or local waste disposal, sanitary sewer or septic system regulations to the extent these are located within the permitted area.

(4) The SWPPP shall include a description of construction and waste materials expected to be stored on-site with updates as appropriate. The SWPPP shall also include a description of controls to reduce pollutants from these materials including storage practices to minimize exposure of the materials to storm water, and spill prevention and response.

(5) The SWPPP shall include a description of pollutant sources from areas other than construction (including storm water discharges from dedicated asphalt plants and dedicated concrete plants), and a description of controls and measures that will be implemented at those sites to minimize pollutant discharges.

(6) The SWPPP shall include a description of measures necessary to protect listed endangered or threatened species, or critical habitat, including any terms or conditions that are imposed under the eligibility requirements of Part I.B.3.e(4) of this permit. Failure to describe and implement such measures will result in storm water discharges from construction activities that are ineligible for coverage under this permit.

d. *Approved State, Tribal or Local Plans.*

(1) Permittees which discharge storm water associated with construction activities must ensure their storm water pollution prevention plan is consistent with requirements specified in applicable sediment and erosion site plans or site permits, or storm water management site plans or site permits approved by State, Tribal or local officials.

(2) Storm water pollution prevention plans must be updated as necessary to remain consistent with any changes applicable to protecting surface water resources in sediment and erosion site plans or site permits, or storm water management site plans or site permits approved by State, Tribal or local officials for which the permittee receives written notice.

3. Maintenance

All erosion and sediment control measures and other protective measures identified in the SWPPP must be maintained in effective operating condition. If site inspections required by Part IV.D.4. identify BMPs that are not operating effectively, maintenance shall be performed before the next anticipated storm event, or as necessary to maintain the continued effectiveness of storm

water controls. If maintenance prior to the next anticipated storm event is impracticable, maintenance must be scheduled and accomplished as soon as practicable.

4. Inspections

Qualified personnel (provided by the permittee or cooperatively by multiple permittees) shall inspect disturbed areas of the construction site that have not been finally stabilized, areas used for storage of materials that are exposed to precipitation, structural control measures, and locations where vehicles enter or exit the site, at least once every fourteen (14) calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater.

Where sites have been finally or temporarily stabilized, runoff is unlikely due to winter conditions (e.g., site is covered with snow, ice, or frozen ground exists), or during seasonal arid periods in arid areas (areas with an average annual rainfall of 0 to 10 inches) and semi-arid areas (areas with an average annual rainfall of 10 to 20 inches) such inspections shall be conducted at least once every month.

Permittees are eligible for a waiver of monthly inspection requirements until one month before thawing conditions are expected to result in a discharge if all of the following requirements are met: (1) the project is located in an area where frozen conditions are anticipated to continue for extended periods of time (i.e., more than one month); (2) land disturbance activities have been suspended; and (3) the beginning and ending dates of the waiver period are documented in the SWPPP.

a. Disturbed areas and areas used for storage of materials that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the drainage system. Sediment and erosion control measures identified in the SWPPP shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Where discharge locations are inaccessible, nearby downstream locations shall be inspected to the extent that such inspections are practicable. Locations where vehicles enter or exit the site shall be inspected for evidence of offsite sediment tracking.

b. Based on the results of the inspection, the SWPPP shall be modified as necessary (e.g., show additional controls on map required by Part IV.D.1; revise description of controls required by Part IV.D.2) to include additional or modified BMPs designed to correct problems identified. Revisions to the SWPPP shall be completed within 7 calendar days following the inspection. If existing BMPs need to be modified or if additional BMPs are necessary, implementation shall be completed before the next anticipated storm event. If implementation before the next anticipated storm event is impracticable, they shall be implemented as soon as practicable.

c. A report summarizing the scope of the inspection, name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, and major observations relating to the implementation of the SWPPP shall be made and retained as part of the SWPPP for at least three years from the date that the site is finally stabilized. Major observations should include: the location(s) of discharges of sediment or other pollutants from the site; location(s) of BMPs that need to be maintained; location(s) of BMPs that failed to operate as designed or proved inadequate for a particular location; and location(s) where additional BMPs are needed that did not exist at the time of inspection. Actions taken in accordance with Part IV.D.4.b of this permit shall be made and retained as part of the storm water pollution prevention plan for at least three years from the date that the site is finally stabilized. Such reports shall identify any incidents of non-compliance. Where a report does not identify any incidents of non-compliance, the report shall contain a certification that the facility is in compliance with the storm water pollution prevention plan and this permit. The report shall be signed in accordance with Part VI.G of this permit.

5. Non-Storm Water Discharges

Except for flows from fire fighting activities, sources of non-storm water listed in Part III.A.2 or 3 of this permit that are combined with storm water discharges associated with construction activity must be identified in the SWPPP. The SWPPP shall identify and ensure the implementation of appropriate pollution prevention measures for the non-storm water component(s) of the discharge.

Part V. Retention of Records

A. Documents

The permittee shall retain copies of storm water pollution prevention plans and all reports required by this permit, and records of all data used to complete the Notice of Intent to be covered by this permit, for a period of at least three years from the date that the site is finally stabilized. This period may be extended by request of the Director at any time.

B. Accessibility

The permittee shall retain a copy of the storm water pollution prevention plan required by this permit (including a copy of the permit language) at the construction site (or other local location accessible to the Director, a State, Tribal or local agency approving sediment and erosion plans, grading plans, or storm water management plans; local government officials; or the operator of a municipal separate storm sewer receiving discharges from the site) from the date of project initiation to the date of final stabilization. Permittees with day-to-day operational control over SWPPP implementation shall have a copy of the SWPPP available at a central location on-site for the use of all operators and those identified as having responsibilities under the SWPPP whenever they are on the construction site.

C. Addresses

Except for the submittal of NOIs and NOTs (see Parts II.C and VIII.B, respectively), all written correspondence concerning discharges in any State, Indian Country land or from any Federal facility covered under this permit and directed to the EPA, including the submittal of individual permit applications, shall be sent to the address listed below: United States EPA, Region 6, Storm Water Staff, Enforcement and Compliance Assurance Division (GEN-WC), EPA SW Construction GP, P.O. Box 50625, Dallas, TX 75205.

Part VI. Standard Permit Conditions

A. Duty To Comply

1. The Permittee Must Comply With All Conditions of This Permit

Any permit noncompliance constitutes a violation of CWA and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.

2. Penalties for Violations of Permit Conditions

The Director will adjust the civil and administrative penalties listed below in accordance with the Civil Monetary Penalty Inflation Adjustment Rule (**Federal Register**: December 31, 1996, Volume 61, Number 252, pages 69359–69366, as corrected, March 20, 1997, Volume 62, Number 54, pages 13514–

13517) as mandated by the Debt Collection Improvement Act of 1996 for inflation on a periodic basis. This rule allows EPA's penalties to keep pace with inflation. The Agency is required to review its penalties at least once every four years thereafter and to adjust them as necessary for inflation according to a specified formula. The civil and administrative penalties listed below were adjusted for inflation starting in 1996.

a. *Criminal.*

(1) Negligent Violations. The CWA provides that any person who negligently violates permit conditions implementing sections 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to a fine of not less than $2,500 nor more than $25,000 per day of violation, or by imprisonment for not more than 1 year, or both.

(2) Knowing Violations. The CWA provides that any person who knowingly violates permit conditions implementing sections 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to a fine of not less than $5,000 nor more than $50,000 per day of violation, or by imprisonment for not more than 3 years, or both.

(3) Knowing Endangerment. The CWA provides that any person who knowingly violates permit conditions implementing sections 301, 302, 306, 307, 308, 318, or 405 of the Act and who knows at that time that he is placing another person in imminent danger of death or serious bodily injury is subject to a fine of not more than $250,000, or by imprisonment for not more than 15 years, or both.

(4) False Statement. The CWA provides that any person who knowingly makes any false material statement, representation, or certification in any application, record, report, plan, or other document filed or required to be maintained under the Act or who knowingly falsifies, tampers with, or renders inaccurate, any monitoring device or method required to be maintained under the Act, shall upon conviction, be punished by a fine of not more than $10,000 or by imprisonment for not more than two years, or by both. If a conviction is for a violation committed after a first conviction of such person under this paragraph, punishment shall be by a fine of not more than $20,000 per day of violation, or by imprisonment of not more than four years, or by both. (See section 309.c.4 of the Clean Water Act).

b. *Civil Penalties.* The CWA provides that any person who violates a permit condition implementing sections 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to a civil penalty not to exceed $27,500 per day for each violation.

c. *Administrative Penalties.* The CWA provides that any person who violates a permit condition implementing sections 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to an administrative penalty, as follows:

(1) *Class I Penalty.* Not to exceed $11,000 per violation nor shall the maximum amount exceed $27,500.

(2) *Class II Penalty.* Not to exceed $11,000 per day for each day during which the violation continues, nor shall the maximum amount exceed $137,500.

B. Continuation of the Expired General Permit

If this permit is not reissued or replaced prior to the expiration date, it will be administratively continued in accordance with the Administrative Procedures Act and remain in force and effect. Any permittee who was granted permit coverage prior to the expiration date will automatically remain covered by the continued permit until the *earlier* of:

1. Reissuance or replacement of this permit, at which time the permittee must comply with the Notice of Intent conditions of the new permit to maintain authorization to discharge; or
2. The permittee's submittal of a Notice of Termination; or
3. Issuance of an individual permit for the permittee's discharges; or
4. A formal permit decision by the Director not to reissue this general permit, at which time the permittee must seek coverage under an alternative general permit or an individual permit.

C. Need To Halt or Reduce Activity Not a Defense

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

D. Duty To Mitigate

The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

E. Duty To Provide Information

The permittee shall furnish to the Director or an authorized representative of the Director any information which is requested to determine compliance with this permit or other information.

F. Other Information

When the permittee becomes aware that he or she failed to submit any relevant facts or submitted incorrect information in the Notice of Intent or in any other report to the Director, he or she shall promptly submit such facts or information.

G. Signatory Requirements

All Notices of Intent, Notices of Termination, storm water pollution prevention plans, reports, certifications or information either submitted to the Director or the operator of a large or medium municipal separate storm sewer system, or that this permit requires be maintained by the permittee, shall be signed as follows:

1. All Notices of Intent and Notices of Termination shall be signed as follows:

a. For a corporation: by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means: a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or the manager of one or more manufacturing, production or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25,000,000 (in second-quarter 1980 dollars) if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

b. For a partnership or sole proprietorship: by a general partner or the proprietor, respectively; or

c. For a municipality, State, Federal, or other public agency: by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes (1) the chief executive officer of the agency, or (2) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of EPA).

2. All reports required by this permit and other information requested by the Director or authorized representative of the Director shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

a. The authorization is made in writing by a person described above and submitted to the Director.

b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of manager, operator, superintendent, or position of equivalent responsibility or an

individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position).

c. *Changes to Authorization.* If an authorization under Part II.B is no longer accurate because a different operator has responsibility for the overall operation of the construction site, a new Notice of Intent satisfying the requirements of Part II.B must be submitted to the Director prior to or together with any reports, information, or applications to be signed by an authorized representative. The change in authorization must be submitted within the time frame specified in Part II.A.3, and sent to the address specified in Part II.C.

d. *Certification.* Any person signing documents under Part VI.G shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

H. Penalties for Falsification of Reports

Section 309(c)(4) of the Clean Water Act provides that any person who knowingly makes any false material statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including reports of compliance or noncompliance shall, upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than two years, or by both.

I. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under section 311 of the CWA or section 106 of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA).

J. Property Rights

The issuance of this permit does not convey any property rights of any sort, nor any exclusive privileges, nor does it authorize any injury to private property nor any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations.

K. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit shall not be affected thereby.

L. Requiring an Individual Permit or an Alternative General Permit

1. The Director may require any person authorized by this permit to apply for and/or obtain either an individual NPDES permit or an alternative NPDES general permit. Any interested person may petition the Director to take action under this paragraph. Where the Director requires a permittee authorized to discharge under this permit to apply for an individual NPDES permit, the Director shall notify the permittee in writing that a permit application is required. This notification shall include a brief statement of the reasons for this decision, an application form, a statement setting a deadline for the permittee to file the application, and a statement that on the effective date of issuance or denial of the individual NPDES permit or the alternative general permit as it applies to the individual permittee, coverage under this general permit shall automatically terminate. Applications shall be submitted to the appropriate Regional Office indicated in Part V.C of this permit. The Director may grant additional time to submit the application upon request of the applicant. If a permittee fails to submit in a timely manner an individual NPDES permit application as required by the Director under this paragraph, then the applicability of this permit to the individual NPDES permittee is automatically terminated at the end of the day specified by the Director for application submittal.

2. Any permittee authorized by this permit may request to be excluded from the coverage of this permit by applying for an individual permit. In such cases, the permittee shall submit an individual application in accordance with the requirements of 40 CFR 122.26(c)(1)(ii), with reasons supporting the request, to the Director at the address for the appropriate Regional Office indicated in Part V.C of this permit. The request may be granted by issuance of any individual permit or an alternative general permit if the reasons cited by the permittee are adequate to support the request.

3. When an individual NPDES permit is issued to a permittee otherwise subject to this permit, or the permittee is authorized to discharge under an alternative NPDES general permit, the applicability of this permit to the individual NPDES permittee is automatically terminated on the effective date of the individual permit or the date of authorization of coverage under the alternative general permit, whichever the case may be. When an individual NPDES permit is denied to an owner or operator otherwise subject to this permit, or the owner or operator is denied for coverage under an alternative NPDES general permit, the applicability of this permit to the individual NPDES permittee is automatically terminated on the date of such denial, unless otherwise specified by the Director.

M. State/Tribal Environmental Laws

1. Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State/Tribal law or regulation under authority preserved by section 510 of the Act.

2. No condition of this permit shall release the permittee from any responsibility or requirements under other environmental statutes or regulations.

N. Proper Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit and with the requirements of storm water pollution prevention plans. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. Proper operation and maintenance requires the operation of backup or auxiliary facilities or similar systems, installed by a permittee only when necessary to achieve compliance with the conditions of this permit.

O. Inspection and Entry

The permittee shall allow the Director or an authorized representative of EPA, the State/Tribe, or, in the case of a construction site which discharges

through a municipal separate storm sewer, an authorized representative of the municipal owner/operator or the separate storm sewer receiving the discharge, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted or where records must be kept under the conditions of this permit;

2. Have access to and copy at reasonable times, any records that must be kept under the conditions of this permit; and

3. Inspect at reasonable times any facilities or equipment (including monitoring and control equipment).

P. Permit Actions

This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

Part VII. Reopener Clause

A. If there is evidence indicating that the storm water discharges authorized by this permit cause, have the reasonable potential to cause or contribute to, a violation of a water quality standard, the permittee may be required to obtain an individual permit or an alternative general permit in accordance with Part I.C of this permit, or the permit may be modified to include different limitations and/or requirements.

B. Permit modification or revocation will be conducted according to 40 CFR 122.62, 122.63, 122.64 and 124.5.

C. EPA may propose a modification to this permit after further discussions between the Agency and the Advisory Council on Historic Preservation for the protection of historic properties.

Part VIII. Termination of Coverage

A. Notice of Termination

Permittees must submit a completed Notice of Termination (NOT) that is signed in accordance with Part VI.G of this permit when one or more of the conditions contained in Part I.D.2. (Terminating Coverage) have been met at a construction project. The NOT form found in Addendum D will be used unless it has been replaced by a revised version by the Director. The Notice of Termination shall include the following information:

1. The NPDES permit number for the storm water discharge identified by the Notice of Termination;

2. An indication of whether the storm water discharges associated with construction activity have been eliminated (i.e., regulated discharges of storm water are being terminated) or the permittee is no longer an operator at the site;

3. The name, address and telephone number of the permittee submitting the Notice of Termination;

4. The name of the project and street address (or a description of location if no street address is available) of the construction site for which the notification is submitted;

5. The latitude and longitude of the construction site; and

6. The following certification, signed in accordance with Part VI.G (signatory requirements) of this permit. For construction projects with more than one permittee and/or operator, the permittee need only make this certification for those portions of the construction site where the permittee was authorized under this permit and not for areas where the permittee was not an operator:

"I certify under penalty of law that all storm water discharges associated with industrial activity from the identified facility that authorized by a general permit have been eliminated or that I am no longer the operator of the facility or construction site. I understand that by submitting this notice of termination, I am no longer authorized to discharge storm water associated with industrial activity under this general permit, and that discharging pollutants in storm water associated with industrial activity to waters of the United States is unlawful under the Clean Water Act where the discharge is not authorized by a NPDES permit. I also understand that the submittal of this Notice of Termination does not release an operator from liability for any violations of this permit or the Clean Water Act."

For the purposes of this certification, elimination of storm water discharges associated with construction activity means that all disturbed soils at the portion of the construction site where the operator had control have been finally stabilized (as defined in Part IX.I) and temporary erosion and sediment control measures have been removed or will be removed at an appropriate time to ensure final stabilization is maintained, or that all storm water discharges associated with construction activities from the identified site that are authorized by a NPDES general permit have otherwise been eliminated from the portion of the construction site where the operator had control.

B. Addresses

1. All Notices of Termination, signed in accordance with Part VI.G of this permit, are to be submitted using the form provided by the Director (or a photocopy thereof), to the address specified on the NOT form.

Part IX. Definitions

A. *Best Management Practices* ("BMPs") means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants to waters of the United States. BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

B. *Control Measure* as used in this permit, refers to any Best Management Practice or other method used to prevent or reduce the discharge of pollutants to waters of the United States.

C. *Commencement of Construction* the initial disturbance of soils associated with clearing, grading, or excavating activities or other construction activities.

D. *CWA* means the Clean Water Act or the Federal Water Pollution Control Act, 33 U.S.C. § 1251 *et seq.*

E. *Director* means the Regional Administrator of the Environmental Protection Agency or an authorized representative.

F. *Discharge* when used without qualification means the "discharge of a pollutant."

G. *Discharge of Storm Water Associated With Construction Activity* as used in this permit, refers to a discharge of pollutants in storm water runoff from areas where soil disturbing activities (e.g., clearing, grading, or excavation), construction materials or equipment storage or maintenance (e.g., fill piles, borrow areas, concrete truck washout, fueling), or other industrial storm water directly related to the construction process (e.g., concrete or asphalt batch plants) are located.

H. *Facility or Activity* means any NPDES "point source" or any other facility or activity (including land or appurtenances thereto) that is subject to regulation under the NPDES program.

I. *Final Stabilization* means that either:

1. All soil disturbing activities at the site have been completed and a uniform (e.g., evenly distributed, without large bare areas) perennial vegetative cover with a density of 70% of the native background vegetative cover for the area

has been established on all unpaved areas and areas not covered by permanent structures, or equivalent permanent stabilization measures (such as the use of riprap, gabions, or geotextiles) have been employed. In some parts of the country, background native vegetation will cover less than 100% of the ground (e.g., arid areas, beaches). Establishing at least 70% of the natural cover of native vegetation meets the vegetative cover criteria for final stabilization (e.g., if the native vegetation covers 50% of the ground, 70% of 50% would require 35% total cover for final stabilization; on a beach with no natural vegetation, no stabilization is required); or

2. For individual lots in residential construction by either: (a) the homebuilder completing final stabilization as specified above, or (b) the homebuilder establishing temporary stabilization including perimeter controls for an individual lot prior to occupation of the home by the homeowner and informing the homeowner of the need for, and benefits of, final stabilization. (Homeowners typically have an incentive to put in landscaping functionally equivalent to final stabilization as quick as possible to keep mud out of their homes and off their sidewalks and driveways.); or

3. For construction projects on land used for agricultural purposes (e.g., pipelines across crop or range land), final stabilization may be accomplished by returning the disturbed land to its preconstruction agricultural use. Areas disturbed that were not previously used for agricultural activities, such as buffer strips immediately adjacent to "waters of the United States," and areas which are not being returned to their preconstruction agricultural use must meet the final stabilization criteria in (1) or (2) above.

J. *Flow-Weighted Composite Sample* means a composite sample consisting of a mixture of aliquots collected at a constant time interval, where the volume of each aliquot is proportional to the flow rate of the discharge.

K. *Large and Medium Municipal Separate Storm Sewer System* means all municipal separate storm sewers that are either:

1. Located in an incorporated place (city) with a population of 100,000 or more as determined by the latest Decennial Census by the Bureau of Census (these cities are listed in Appendices F and G of 40 CFR 122); or

2. Located in the counties with unincorporated urbanized populations of 100,000 or more, except municipal separate storm sewers that are located in the incorporated places, townships or towns within such counties (these counties are listed in Appendices H and I of 40 CFR 122); or

3. Owned or operated by a municipality other than those described in paragraph (i) or (ii) and that are designated by the Director as part of the large or medium municipal separate storm sewer system.

L. *NOI* means Notice of Intent to be covered by this permit (see Part II of this permit).

M. *NOT* means Notice of Termination (see Part VIII of this permit).

N. *Operator* for the purpose of this permit and in the context of storm water associated with construction activity, means any party associated with a construction project that meets either of the following two criteria:

1. The party has operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications; or

2. The party has day-to-day operational control of those activities at a project which are necessary to ensure compliance with a storm water pollution prevention plan for the site or other permit conditions (e.g., they are authorized to direct workers at a site to carry out activities required by the SWPPP or comply with other permit conditions).

This definition is provided to inform permittees of EPA's interpretation of how the regulatory definitions of "owner or operator" and "facility or activity" are applied to discharges of storm water associated with construction activity.

O. *Owner or operator* means the owner or operator of any "facility or activity" subject to regulation under the NPDES program.

P. *Point Source* means any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel or other floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural storm water runoff.

Q. *Pollutant* is defined at 40 CFR 122.2. A partial listing from this definition includes: dredged spoil, solid waste, sewage, garbage, sewage sludge, chemical wastes, biological materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial or municipal waste.

R. *Runoff coefficient* means the fraction of total rainfall that will appear at the conveyance as runoff.

S. *Storm Water* means storm water runoff, snow melt runoff, and surface runoff and drainage.

T. *Storm Water Associated With Industrial Activity* is defined at 40 CFR 122.26(b)(14) and incorporated here by reference. Most relevant to this permit is 40 CFR 122.26(b)(14)(x), which relates to construction activity including clearing, grading and excavation activities that result in the disturbance of five (5) or more acres of total land area, or are part of a larger common plan of development or sale.

U. *Waters of the United States* means:

1. All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

2. All interstate waters, including interstate "wetlands";

3. All other waters such as interstate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce including any such waters:

a. Which are or could be used by interstate or foreign travelers for recreational or other purposes;

b. From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or

c. Which are used or could be used for industrial purposes by industries in interstate commerce;

4. All impoundments of waters otherwise defined as waters of the United States under this definition;

5. Tributaries of waters identified in paragraphs (a) through (d) of this definition;

6. The territorial sea; and

7. Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs 1. through 6. of this definition.

Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of the CWA (other than cooling ponds for steam electric generation stations per 40 CFR 423 which also meet the criteria of this definition) are not waters of the United States. Waters of the United States do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean

Water Act jurisdiction remains with EPA.

Part X. Permit Conditions Applicable to Specific States and Indian Country Lands

The provisions of this Part provide additions to the applicable conditions of Parts I through IX of this permit to reflect specific additional conditions required as part of the State or Tribal CWA Section 401 certification process. The additional revisions and requirements listed below are set forth in connection with, and only apply to, the following States and Indian Country lands.

1. LAR10##I: Indian Country Lands in the State of Louisiana*

No additional requirements.

2. NMR10###: The State of New Mexico, Except Indian Country Lands*

No additional requirements.

3. NMR10##I: Indian Country Lands in the State of New Mexico, Except Navajo Reservation Lands (see Region 9) and Ute Mountain Reservation Lands (see Region 8)*

a. *Pueblo of Isleta.* Copies of Notices of Intent (NOI), Notices of Termination (NOT), and Storm Water Pollution Prevention Plans (SWPPPs) must be submitted to the Pueblo of Isleta's Environment Department, Water Quality Program.

(1) Part II.C.2 of the permit is added as follows:

Special NOI Requirements for the Pueblo of Isleta. NOIs shall also be submitted to the Pueblo of Isleta's Environment Department, Water Quality Program, concurrently with their submission to EPA at the following address: Isleta Environment Department, Water Quality Program, Pueblo of Isleta, PO Box 1270, Isleta, New Mexico 87022.

(2) Part VIII.B.2 is added to the permit as follows:

Special NOI Requirements for the Pueblo of Isleta. NOTs shall also be submitted to the Pueblo of Isleta's Environment Department, Water Quality Program, concurrently with their submission to EPA. NOTs are to be sent to the address given in Part II.C.2.

(3) Part IV.A.3 is added to the permit as follows:

Special Storm Water Pollution Prevention Plan Requirements for the Pueblo of Isleta. Storm water pollution prevention plans must be submitted to the Pueblo of Isleta Environment Department, Water Quality Program, ten working days prior to commencing the project on Pueblo of Isleta tribal lands. SWPPPs are to be sent to the address given in Part II.C.2.

b. *Pueblo of Nambe.* Copies of Notices of Intent (NOI), Notices of Termination (NOT), and Storm Water Pollution Prevention Plans (SWPPPs) must be submitted to the Pueblo of Nambe Department of Environment and Natural Resources.

(1) Part II.C.2 is added to the permit as follows:

Special NOI Requirements for the Pueblo of Nambe. NOIs shall also be submitted to the Pueblo of Nambe Department of Environment and Natural Resources at the same time they are submitted to EPA at the following address: Pueblo of Nambe, Department of Environment and Natural Resources, Route 1 Box 11788, Santa Fe, New Mexico 87501, Phone (505) 455-2036, Fax (505) 455-2038.

(2) Part VIII.B.2 is added to the permit as follows:

Special NOT Requirements for the Pueblo of Nambe. NOTs shall also be submitted to the Pueblo of Nambe Department of Environment and Natural Resources at the same time they are submitted to EPA. NOTs are to be sent to the address given in Part II.C.2.

(3) Part IV.A.3 is added to the permit as follows:

Special Storm Water Pollution Prevention Plan Requirements for the Pueblo of Nambe. Storm water pollution prevention plans must be submitted to the Pueblo of Nambe Department of Environment and Natural Resources before the project on Pueblo of Nambe tribal lands begins. SWPPPs are to be sent to the address given in Part II.C.2.

c. *Pueblo of Picuris.* Copies of Notices of Intent (NOI), Notices of Termination (NOT), and Storm Water Pollution Prevention Plans (SWPPPs) must be submitted to the Pueblo of Picuris Environment Department.

(1) Part II.C.2 is added to the permit as follows:

Special NOI Requirements for the Pueblo of Picuris. NOIs shall also be submitted to the Pueblo of Picuris Environment Department at the same time they are submitted to EPA at the following address: Pueblo of Picuris, Environment Department, P.O. Box 127, Penasco, New Mexico 87553, Phone (505) 587-2519, Fax (505) 587-1071.

(2) Part VIII.B.2 is added to the permit as follows:

Special NOT Requirements for the Pueblo of Picuris. NOTs shall also be submitted to the Pueblo of Picuris Environment Department at the same time they are submitted to EPA. NOTs are to be sent to the address given in Part II.C.2.

(3) Part IV.A.3 is added to the permit as follows:

Special Storm Water Pollution Prevention Plan Requirements for the Pueblo of Picuris. Storm water pollution prevention plans must be submitted to the Picuris Environment Department before the project on Pueblo of Picuris tribal lands begins. SWPPPs are to be sent to the address given in Part II.C.2.

d. *Pueblo of Pojoaque.* Copies of Notices of Intent (NOI), Notices of Termination (NOT), and Storm Water Pollution Prevention Plans (SWPPPs) must be submitted to the Pueblo of Pojoaque Environment Department Director.

(1) Part II.C.2 is added to the permit as follows:

Special NOI Requirements for the Pueblo of Pojoaque. NOIs shall also be submitted to the Pueblo of Pojoaque Environment Department Director at the same time they are submitted to EPA at the following address: Pueblo of Pojoaque, Environment Department, Route 11, P.O. Box 208, Santa Fe, New Mexico 87501, Phone (505) 455-3383, Fax (505) 455-3633.

(2) Part VIII.B.2 of the permit is added as follows:

Special NOT Requirements for the Pueblo of Pojoaque. NOTs shall also be submitted to the Pueblo of Pojoaque Environment Department Director at the same time they are submitted to EPA. NOTs are to be sent to the address given in Part II.C.2.

(3) Part IV.A.3 is added to the permit as follows:

Special Storm Water Pollution Prevention Plan Requirements for the Pueblo of Pojoaque. Storm water pollution prevention plans must be submitted to the Pueblo of Pojoaque Environment Department Director before the project on Pueblo of Pojoaque tribal lands begins. SWPPPs are to be sent to the address given in Part II.C.2.

e. *Pueblo of San Juan.* No additional requirements.

f. *Pueblo of Sandia.* Copies of Notices of Intent (NOI), Notices of Termination (NOT), and Storm Water Pollution Prevention Plans (SWPPPs) must be submitted to the Pueblo of Sandia Environment Department.

(1) Part II.C.2 of the permit is added as follows:

Special NOI Requirements for the Pueblo of Sandia. NOIs shall also be submitted to the Pueblo of Sandia Environment Department at the same time they are submitted to EPA at the following address: Pueblo of Sandia, Environment Department, Box 6008, Bernalillo, New Mexico 87004, Phone (505) 867-4533; Fax (505) 867-9235.

(2) Part VIII.B.2 is added to the permit as follows:

Special NOT Requirements for the Pueblo of Sandia. NOTs shall also be submitted to the Pueblo of Sandia Environment Department at the same time they are submitted to EPA. NOTs are to be sent to the address given in Part II.C.2.

(3) Part IV.A.3 is added to the permit as follows:

Special Storm Water Pollution Prevention Plan Requirements for the Pueblo of Sandia. Storm water pollution prevention plans must be submitted to the Pueblo of Sandia Environment Department before commencement of the project on Pueblo of Sandia tribal lands. SWPPPs are to be sent to the address given in Part II.C.2.

g. Pueblo of Tesuque. Copies of Notices of Intent (NOI), Notices of Termination (NOT), Storm Water Pollution Prevention Plans (SWPPPs), inspection reports, all certifications and "other information" must be submitted, by hand delivery or certified mail, to the Pueblo of Tesuque.

(1) Part II.C.2 of the permit is added as follows:

Special NOI Requirements for the Pueblo of Tesuque. NOIs shall also be submitted to the Pueblo of Tesuque at least five (5) days prior to any ground disturbing activity at the following address: Pueblo of Tesuque, Environment Department, Route 5, Box 3260-T, Santa Fe, New Mexico 87501, Phone (505) 983-2667; Fax (505) 982-2331.

(2) Part VIII.B.2 is added to the permit as follows:

Special NOT Requirements for the Pueblo of Tesuque. NOTs shall also be submitted to the Pueblo of Tesuque at the same time they are submitted to EPA. NOTs are to be sent to the address given in Part II.C.2.

(3) Part IV.A.3 is added to the permit as follows:

Special Storm Water Pollution Prevention Plan Requirements for the Pueblo of Tesuque. Storm water pollution prevention plans must be submitted to the Pueblo of Tesuque at least five (5) days prior to any ground disturbing activity on Pueblo of Tesuque tribal lands. SWPPPs are to be sent to the address given in Part II.C.2.

(4) Part V.D is added to the permit as follows:

Special Reporting Requirements for the Pueblo of Tesuque. Copies of all certifications required by Section IV.D, and copies of "other information" required by Section VI.F shall be provided to the Pueblo of Tesuque, by hand delivery or certified mail. Also, copies of all inspection reports required under Section IV.D.4.c. shall be submitted within five (5) days of completion of the inspection. All information sent to the Pueblo of Tesuque is to be sent to the address given in Part II.C.2.

h. Santa Clara Pueblo. Copies of Notices of Intent (NOI) and Notices of Termination (NOT) must be submitted to the Santa Clara Pueblo Governors Office with a copy to the Office of Environmental Affairs.

(1) Part I.C.4. is added to the permit as follows:

Special Authorization Requirements for the Santa Clara Pueblo. Prior to submitting a Notice of Intent, the operator must obtain permission from the Santa Clara Governors Office to do the construction. If the project is approved by the tribal administration, the operator may proceed with submitting a Notice of Intent (NOI).

(2) Part II.C.2 is added to the permit as follows:

Special NOI Requirements for the Santa Clara Pueblo. NOIs shall also be submitted to the Santa Clara Pueblo Governors Office with a copy to the Office of Environmental Affairs at least two (2) weeks prior to the start of construction at the following address: Santa Clara Governors Office, PO Box 580, Espanola, New Mexico 87532, Phone (505) 753-7326; Fax (505) 753-8988.

(3) Part VIII.B.2 is added to the permit as follows:

Special NOT Requirements for the Santa Clara Pueblo. NOTs shall also be submitted to the Santa Clara Pueblo Governors Office with a copy to the Office of Environmental Affairs at least two (2) weeks prior to the start of construction. NOTs are to be sent to the address given in Part II.C.2.

i. All Other Indian Country lands in New Mexico. No additional requirements.

4. OKR10##I: Indian Country Lands in the State of Oklahoma*

No additional requirements.

5. OKR10##F: Oil and Gas Sites in the State of Oklahoma*

No additional requirements.

6. TXR10###: The State of Texas, Except Indian Country Lands*

a. Part III of the permit is modified as follows: Change the title of Part III. (*Special Conditions, Management Practices, and other Non-Numeric Limitations*) to: *Part III. Special Conditions, Management Practices, and other Limitations.*

b. Part III.G is added to the permit as follows:

Special Numeric Limitations for Discharges from Ready-Mixed Concrete Plants in the State of Texas, except Indian Country lands. All discharges of storm water from ready-mixed concrete plants covered by this permit must comply with the following limitations:

pH—Between 6.0 and 9.0 standard units

Oil and Grease—15 mg/l as a daily maximum

Total Suspended Solids—65 mg/l as a daily maximum

These limitations must be taken into account when designing the storm water control measures to be used for areas draining any ready-mixed concrete plants operated by the permittee.

7. TXR10##I: Indian Country Lands in the State of Texas*

No additional requirements.

Addendum A—Endangered Species

I. Instructions for Applicants

A. Background

To meet its obligations under the Clean Water Act and the Endangered Species Act (ESA) and to promote those Acts' goals, the Environmental Protection Agency (EPA) is seeking to ensure the activities regulated by the Construction General Permit (CGP) are protective of endangered and threatened species and critical habitat. To ensure that those goals are met, applicants for CGP coverage are required under Part I.B.3.e. to assess the impacts of their storm water discharges and storm water discharge-related activities on Federally listed endangered and threatened species ("listed species") and designated critical habitat ("critical habitat") by following Steps One through Six listed below. EPA strongly recommends that applicants follow these steps at the earliest possible stage to ensure that measures to protect listed species and critical habitat are incorporated early in the planning process. At minimum, the procedures should be followed when developing the storm water pollution prevention plan.

Permittees and applicants also have an independent ESA obligation to ensure that their activities do not result in any prohibited "takes" of listed species.[1] Many of the measures required in the CGP and in these instructions to protect species may also assist permittees in ensuring that their construction activities do not result in a prohibited take of species in violation of § 9 of the ESA. Applicants who plan construction activities in areas that harbor endangered and threatened species are advised to ensure that

[1] Section 9 of the ESA prohibits any person from "taking" a listed species (e.g., harassing or harming it) unless: (1) the taking is authorized through a "incidental take statement" as part of undergoing ESA § 7 formal consultation; (2) where an incidental take permit is obtained under ESA § 10 (which requires the development of a habitat conservation plan); or (3) where otherwise authorized or exempted under the ESA. This prohibition applies to all entities including private individuals, businesses, and governments.

they are protected from potential takings liability under ESA § 9 by obtaining either an ESA § 10 permit or by requesting formal consultation under ESA § 7 (as described in more detail in Step Seven below). Applicants who seek protection from takings liability should be aware that it is possible that some specific construction activities may be too unrelated to storm water discharges to be afforded incidental take coverage through an ESA § 7 consultation that is performed to meet the eligibility requirements for CGP coverage. In such instances, applicants should apply for an ESA § 10 permit. Where applicants are not sure whether to pursue a § 10 permit or a § 7 consultation for takings protection, they should confer with the appropriate Fish and Wildlife Service (FWS) or National Marine Fisheries Service (NMFS) office.

This permit provides for the possibility of multiple permittees at a construction site. Applicants should be aware that in many cases they can meet the permit eligibility requirements by relying on another operator's certification of eligibility under Part I.B.3.e.(2)(a), (b), or (c). This is allowed under Part I.B.3.e.(2)(d) of the permit. However, the other operator's certification must apply to the applicant's project area and must address the effects from the applicant's storm water discharges and storm water discharge-related activities on listed species and critical habitat. By certifying eligibility under Part I.B.3.e.(2)(d), the applicant agrees to comply with any measures or controls upon which the other operator's certification under Part I.B.3.e.(2)(a), (b) or (c) was based. This situation will typically occur where a developer or primary contractor, such as one for construction of a subdivision or industrial park, conducts a comprehensive assessment of effects on listed species and critical habitat for the entire construction project, certifies eligibility under Part I.B.3.e.(2)(a), (b) or (c), and that certification is relied upon by other operators (i.e., contractors) at the site. However, applicants that consider relying on another operator's certification should carefully review that certification along with any supporting information. If an applicant does not believe that the operator's certification provides adequate coverage for the applicant's storm water discharges and storm water discharge-related activities or for the applicant's particular project area, the applicant should provide its own independent certification under Part I.B.3.e.(2)(a), (b), or (c).

B. Procedures

To receive coverage under the Construction General Permit, applicants must assess the potential effects of their storm water discharges and storm water discharge-related activities on listed species and their critical habitat. To make this assessment, applicants must follow the steps outlined below prior to completing and submitting Notice of Intent (NOI) form. Applicants who are able to certify eligibility under Parts I.B.3.e.(2)(b), (c) or (d) because of a previously issued ESA § 10 permit, a previously completed ESA § 7 consultation, or because the applicant's activities were already addressed in another operator's certification of eligibility may proceed directly to Step Six.

Note.—The revised NOI form which was included in the CGP (*see* 62 FR 29822–29823, June 2, 1997) requires that applicants provide detailed certification information on listed species. That form is still under development and is not expected to be finalized before this permit is issued. Until the revised NOI form is finalized, applicants must use the existing NOI form which does not contain the specific certification provisions relating to listed species and critical habitats at construction projects. However, use of the existing NOI form does not relieve applicants of their obligation to follow the procedures listed below to determine if their construction storm water discharges or storm water discharge-related activities meet permit eligibility requirements for the protection of listed species and critical habitat. By following these instructions, applicants will have sufficient information on listed species and critical habitat in order to complete either the existing or revised NOI form and sign the certification statement.

Step One: Determine if the Construction Site Is Found Within Designated Critical Habitat for Listed Species

Some, but not all, listed species have designated critical habitat. Exact locations of such habitat is provided in the Service regulations at 50 CFR Parts 17 and 226. To determine if their construction site occurs within designated critical habitat, applicants should either:

- Contact the nearest Fish and Wildlife Service (FWS) and National Marine Fisheries Service (NMFS) Office. A list of FWS and NMFS offices is found in Section II of this Addendum; or
- Contact the State or Tribal Natural Heritage Centers. These centers compile and disseminate information on Federally listed and other protected species. They frequently have the most current information on listed species and critical habitat. A list of these centers is provided in Section III of this Addendum; or
- Review those regulations (which can be found in many larger libraries).

If the construction site is not located in designated critical habitat, then the applicant does not need to consider impacts to critical habitat when following Steps Two through Six below. If the site is located within critical habitat, then the applicant must look at impacts to critical habitat when following Steps Two through Six. Note that many but not all measures imposed to protect listed species under these steps will also protect critical habitat. Thus, meeting the eligibility requirements of this permit may require measures to protect critical habitat that are separate from those to protect listed species.

Step Two: Determine if Listed Species Are Located in the County(ies) Where the Construction Activity Will Occur

Section IV of the Addendum contains a county-by-county list of listed endangered and threatened species ("listed species"), and proposed endangered and threatened species ("proposed species"). Since the list was current as of September 1, 1997, applicants must also check with other sources for updated species and county information. These sources include: Sections II and III of this Addendum; EPA's Office of Wastewater Management's web page at "http://www.epa.gov/owm" where updates of the county-by-county list will be posted on a periodic basis; **Federal Register** Notices; State wildlife protection offices; a biologist or similar professional in the environmental field; or any other method which can be reasonably expected to provide this information. Applicants with construction projects located in EPA Region 2 and Region 6 can call the Storm Water General Permits Hotline at (800) 245–6510 for further assistance, while applicants with projects located in EPA Regions 1, 3, 7, 8, 9 and 10 may contact the appropriate EPA Regional Office.

Where a facility is located in more than one county, the lists for all counties should be reviewed. Where a facility discharges into a water body which serves as a border between counties or which crosses a county line which is in the immediate vicinity of the point of discharge, applicants should also review the species list for the county which lies immediately downstream or is across the water body from the point of discharge.

After a review of the available information from the sources mentioned above, if no listed species are located in a facility's county or if a facility's county is not listed, and the construction site is not located in critical habitat as described under Step One, an applicant is eligible for CGP coverage without further inquiry into the presence of, or effect to, listed species. The applicant must check the appropriate certification item on the revised NOI form (Part I.B.3.e.(2)(a)).

Once the applicant has determined which listed species are located in his or her facility's county, the applicant must follow Step Three.

Step Three: Determine if any Federally Listed Endangered and Threatened Species May Be Present in the Project Area

The project area consists of:

- The areas on the construction site where storm water discharges originate and flow toward the point of discharge into the receiving waters (including areas where excavation, site development, or other ground disturbance activities occur) and the immediate vicinity.

Example(s)

1. Where bald eagles nest in a tree that is on or bordering a construction site and could be disturbed by the construction activity.
2. Where grading causes storm water to flow into a small wetland or other habitat that is on the site which contains listed species.

- The areas where storm water discharges flow from the construction site to the point of discharge into receiving waters.

Example(s)

1. Where storm water flows into a ditch, swale, or gully which leads to receiving waters and where listed species (such as amphibians) are found in the ditch, swale, or gully.

- The areas where storm water from construction activities discharge into receiving waters and the areas in the immediate vicinity of the point of discharge.

Example(s)

1. Where storm water from construction activities discharges into a stream segment that is known to harbor listed aquatic species.

• The areas where storm water BMPs will be constructed and operated, including any areas where storm water flows to and from BMPs.

Example(s)

1. Where a storm water retention pond would be built.

The project area will vary with the size and structure of the construction activity, the nature and quantity of the storm water discharges, the storm water discharge-related activities and the type of receiving water. Given the number of construction activities potentially covered by the CGP, no specific method to determine whether listed species may be located in the project area is required for coverage under the CGP. Instead, applicants should use the method which allows them to determine, to the best of their knowledge, whether listed species are located in their project area. These methods may include:

• Conducting visual inspections: This method may be particularly suitable for construction sites that are smaller in size or located in non-natural settings such as highly urbanized areas or industrial parks where there is little or no natural habitat, or for construction activities that discharge directly into municipal storm water collection systems.

• Contacting the nearest State or Tribal wildlife agency, the Fish and Wildlife Service (FWS), or the National Marine Fisheries Service (NMFS). Many endangered and threatened species are found in well-defined areas or habitats. Such information is frequently known to State, Tribal, or Federal wildlife agencies. A list of FWS and NMFS offices is provided in Section II of this Addendum below.

• Contacting local/regional conservation groups or the State or Tribal Natural Heritage Centers (see Section III of this Addendum). State and local conservation groups may have location specific listed species information. The Natural Heritage Centers inventory species and their locations and maintain lists of sightings and habitats.

• Submitting a data request to a Natural Heritage Center. Many of these centers will provide site specific information on the presence of listed species in a project area. Some of these centers will charge a fee for researching data requests.

• Conducting a formal biological survey. Larger construction sites with extensive storm water discharges may choose to conduct biological surveys as the most effective way to assess whether species are located in the project area and whether there are likely adverse effects. Biological surveys are frequently performed by environmental consulting firms. A biological survey can be used to follow Steps Four through Six of these instructions.

• Conducting an environmental assessment under the National Environmental Policy Act (NEPA). Some construction activities may require environmental assessments under NEPA. Such assessments may indicate if listed species are in the project area. Coverage under the CGP does not trigger such an assessment because the permit does not regulate any dischargers subject to New Source Performance Standards under Section 306 of the Clean Water Act, and is thus statutorily exempted from NEPA. *See* CWA § 511(c). However, some construction activities might require review under NEPA because of Federal funding or other Federal involvement in the project.

If no species are found in the project area, an applicant is eligible for CGP coverage. Applicants must provide the necessary certification on the revised NOI form. If listed species are found in the project area, applicants must indicate the location and nature of this presence in the storm water pollution prevention plan and follow Step Four.

Step Four: Determine if Listed Species or Critical Habitat Are Likely To Be Adversely Affected by the Construction Activity's Storm Water Discharges or Storm Water Discharge-Related Activities

To receive CGP coverage, applicants must assess whether their storm water discharges or storm water discharge-related activities are likely to adversely affect listed species or critical habitat. "Storm water discharge-related activities" include:

• Activities which cause, contribute to, or result in point source storm water pollutant discharges, including but not limited to excavation, site development, grading, and other surface disturbance activities; and

• Measures to control storm water discharges including the siting, construction, operation of best management practices (BMPs) to control, reduce or prevent storm water pollution.

Potential adverse effects from storm water discharges and storm water discharge-related activities include:

• *Hydrological.* Storm water discharges may cause siltation, sedimentation or induce other changes in receiving waters such as temperature, salinity or pH. These effects will vary with the amount of storm water discharged and the volume and condition of the receiving water. Where a storm water discharge constitutes a minute portion of the total volume of the receiving water, adverse hydrological effects are less likely. Construction activity itself may also alter drainage patterns on a site where construction occurs which can impact listed species or critical habitat.

• *Habitat.* Excavation, site development, grading, and other surface disturbance activities from construction activities, including the installation or placement of storm water BMPs, may adversely affect listed species or their habitat. Storm water may drain or inundate listed species habitat.

• *Toxicity.* In some cases, pollutants in storm water may have toxic effects on listed species.

The scope of effects to consider will vary with each site. If the applicant is having difficulty in determining whether his or her project is likely to adversely Affect a listed species or critical habitat, then the appropriate office of the FWS, NMFS or Natural Heritage Center listed in Sections II and III of this Addendum should be contacted for assistance. If adverse effects are not likely, then the applicant should make the appropriate certification on the revised NOI form and apply for coverage under the permit. If adverse effects are likely, applicants must follow Step Five.

Step Five: Determine if Measures Can Be Implemented To Avoid Any Adverse Effects

If an applicant makes a preliminary determination that adverse effects are likely, it can still receive coverage under Part I.B.3.e.(2)(a) of the CGP if appropriate measures are undertaken to avoid or eliminate the likelihood of adverse effects prior to applying for permit coverage. These measures may involve relatively simple changes to construction activities such as re-routing a storm water discharge to bypass an area where species are located, relocating BMPs, or by changing the "footprint" of the construction activity. Applicants may wish to contact the FWS and/or NMFS to see what appropriate measures might be suitable to avoid or eliminate the likelihood of adverse impacts to listed species and/or critical habitat. (See 50 CFR 402.13(b).) This can entail the initiation of informal consultation with the FWS and/or NMFS which is described in more detail in Step Six.

If applicants adopt measures to avoid or eliminate adverse effects, they must continue to abide by those measures during the course of permit coverage. These measures must be described in the storm water pollution prevention plan and may be enforceable as permit conditions. If appropriate measures to avoid the likelihood of adverse effects are not available to the applicant, the applicant must follow Step Six.

Step Six: Determine if the Eligibility Requirements of Part I.B.3.e.(2)(b)-(d) Can Be Met

Where adverse effects are likely, the applicant must contact the EPA and FWS/NMFS. Applicants may still be eligible for CGP coverage if any likely adverse effects can be addressed through meeting the criteria of Part I.B.3.e.(2)(b)-(d) of the permit. These criteria are as follows:

1. An ESA Section 7 Consultation Is Performed for the Applicant's Activity (See Part I.B.3.e.(2)(b)

Formal or informal ESA § 7 consultation is performed with the FWS and/or NMFS which addresses the effects of the applicant's storm water discharges and storm water discharge-related activities on listed species and critical habitat. The formal consultation must result in either a "no jeopardy opinion" or a "jeopardy opinion" that identifies reasonable and prudent alternatives to avoid jeopardy which are to be implemented by the applicant. The informal consultation must result in a written concurrence by the Service(s) on a finding that the applicant's storm water discharge(s) and storm water discharge-related activities are not likely to adversely affect listed species or critical habitat (for informal consultation, see 50 CFR 402.13).

Most consultations are accomplished through informal consultation. By the terms of this permit, EPA has automatically designated applicants as non-Federal representatives for the purpose of conducting informal consultations. *See* Part I.B.3.e.(5) and 50 CFR 402.08 and 402.13. When conducting informal ESA § 7 consultation as a non-Federal representative, applicants must follow the procedures found in 50 CFR 402 of the ESA regulations.

Applicants must also notify EPA and the Services of their intention and agreement to conduct consultation as a non-Federal representative. Consultation may occur in the context of another Federal action at the construction site (e.g., where ESA § 7 consultation was performed for issuance of a wetlands dredge and fill permit for the project or where a NEPA review is performed for the project which incorporates a section 7 consultation). Any terms and conditions developed through consultations to protect listed species and critical habitat must be incorporated into the SWPPP. As noted above, applicants may, if they wish, initiate consultation with the Services at Step Five.

Whether ESA § 7 consultation must be performed with either the FWS, NMFS or both Services depends on the listed species which may be affected by the applicant's activity. In general, NMFS has jurisdiction over marine, estuarine, and anadromous species. Applicants should also be aware that while formal § 7 consultation provides protection from incidental takings liability, informal consultation does not.

2. An Incidental Taking Permit Under Section 10 of the ESA Is Issued for the Applicants Activity (See Part I.B.3.e.(2)(c))

The applicant's construction activities are authorized through the issuance of a permit under § 10 of the ESA and that authorization addresses the effects of the applicant's storm water discharge(s) and storm water discharge-related activities on listed species and critical habitat. Applicants must follow FWS and/or NMFS procedures when applying for an ESA Section 10 permit (see 50 CFR § 17.22(b)(1) (FWS) and § 222.22 (NMFS)). Application instructions for Section 10 permits for NMFS species can be obtained by (1) accessing the "Office of Protected Resources" sector of the NMFS Home Page at "http://www.nmfs.gov" or by contacting the National Marine Fisheries Service, Office of Protected Resources, Endangered Species Division, F/PR3, 1315 East-West Highway, Silver Spring, Maryland 20910; telephone (301) 713-1401, fax (301) 713-0376.

3. The Applicant Is Covered Under the Eligibility Certification of Another Operator for the Project Area (See Part I.B.3.e.(2)(d))

The applicant's storm water discharges and storm water discharge-related activities were already addressed in another operator's certification of eligibility under Part I.B.3.e.(2)(b), or (c) which also included the applicant's project area. By certifying eligibility under Part I.B.3.e.(2)(d), the applicant agrees to comply with any measures or controls upon which the other operator's certification under Part I.B.3.e.(2)(a), (b) or (c) was based. Certification under Part I.B.3.e.(2)(d) is discussed in more detail in Section I.A. of this addendum.

The applicant must comply with any terms and conditions imposed under the eligibility requirements of paragraphs I.B.3.e(2)(a), (b), (c), (d) to ensure that its storm water discharges and storm water discharge-related activities are protective of listed species and/or critical habitat. Such terms and conditions must be incorporated in the project's SWPPP. If the eligibility requirements of Part I.B.3.e.(2)(a)-(d) cannot be met, then the applicant may not receive coverage under the CGP. Applicants should then consider applying to EPA for an individual permit.

II. List of Fish and Wildlife Service and National Marine Fisheries Service Offices

A. U.S. Fish and Wildlife Service Offices

National Website for Endangered Species Information

Endangered Species Home page: http://www.fws.gov/r9endspp/endspp.html

Regional, State, Field and Project Offices

USFWS Region Two

Regional Office

Division Chief, Endangered Species, U.S. Fish and Wildlife Service, ARD Ecological Services, P.O. Box 1306, Albuquerque, NM 87103

State, Field, and Project Offices (Region Two)

Field Supervisor, U.S. Fish and Wildlife Service, Corpus Christi Field Office, 6300 Ocean Dr., Campus Box 338, Corpus Christi, TX 78412

Field Supervisor, U.S. Fish and Wildlife Service, Arlington Field Office, 711 Stadium Dr., East, Suite 252, Arlington, TX 76011

Field Supervisor, U.S. Fish and Wildlife Service, Clear Lake Field Office, 17629 El Camino Real, Suite 211, Houston, TX 77058

Field Supervisor, U.S. Fish and Wildlife Service, Oklahoma Field Office, 222 S. Houston, Suite a, Tulsa, OK 74127

Field Supervisor, U.S. Fish and Wildlife Service, New Mexico Field Office, 2105 Osuna, NE, Albuquerque, NM 87113

Field Supervisor, U.S. Fish and Wildlife Service, Austin Ecological Serv. Field Office, 10711 Burnet Road, Suite 200, Austin, TX 78758

Field Supervisor, U.S. Fish and Wildlife Service, Arizona State Office, 2321 W. Royal Palm Road, Suite 103, Phoenix, AZ 85021-4951

USFWS Region Four

Regional Office

Division Chief, Endangered Species, U.S. Fish and Wildlife Service, ARD—Ecological Services, 1875 Century Blvd., Suite 200, Atlanta, GA 30345

State, Field, and Project Offices (Region Four)

Field Supervisor, U.S. Fish and Wildlife Service, Panama City Field Office, 1612 June Avenue, Panama City, FL 32405-3721

Field Supervisor, U.S. Fish and Wildlife Service, South Florida Ecosystem Field Office, 1360 U.S. Hwy 1, #5; P.O. Box 2676, Vero Beach, FL 32961-2676

Field Supervisor, U.S. Fish and Wildlife Service, Caribbean Field Office, P.O. Box 491, Boqueron, PR 00622

Field Supervisor, U.S. Fish and Wildlife Service, Puerto Rican Parrot Field Office, P.O. Box 1600, Rio Grande, PR 00745

Field Supervisor, U.S. Fish and Wildlife Service, Brunswick Field Office, 4270 Norwich Street, Brunswick, GA 31520-2523

Field Supervisor, U.S. Fish and Wildlife Service, Jacksonville Field Office, 6620 Southpoint Drive S., Suite 310, Jacksonville, FL 32216-0912

Field Supervisor, U.S. Fish and Wildlife Service, Charleston Field Office, 217 Ft. Johnson Road, P.O. Box 12559, Charleston, SC 29422-2559

Field Supervisor, U.S. Fish and Wildlife Service, Clemson F.O., Dept. of Forest Resources, 261 Lehotsky Hall, Box 341003, Clemson, SC 29634-1003

Field Supervisor, U.S. Fish and Wildlife Service, Raleigh Field Office, P.O. Box 33726, Raleigh, NC 27636-3726

Field Supervisor, U.S. Fish and Wildlife Service, Cookeville Field Office, 446 Neal Street, Cookeville, TN 38501

Field Supervisor, U.S. Fish and Wildlife Service, Asheville Field Office, 160 Zillicoa Street, Asheville, NC 28801

Field Supervisor, U.S. Fish and Wildlife Service, Daphne Field Office, P.O. Drawer 1190, Daphne, AL 36526

Field Supervisor, U.S. Fish and Wildlife Service, Vicksburg Field Office, 2524 S. Frontage Road, Suite B, Vicksburg, MS 39180-5269

Field Supervisor, U.S. Fish and Wildlife Svc., Lafayette Field Office, Brandywine II, Suite 102, 825 Kaliste Saloom Road, Lafayette, LA 70508

Field Supervisor, U.S. Fish and Wildlife Service, Jackson Field Office, 6578 Dogwood View Pkwy Suite A, Jackson, MS 39213

B. National Marine Fisheries Service Offices

The National Marine Fisheries Service is developing a database to provide county and territorial water (up to three miles offshore) information on the presence of endangered and threatened species and critical habitat. The database is projected to be available to the public sometime in December 1997. The database should be found at the "Office of Protected Resources" site on the NMFS Homepage at "http://www.nmfs.gov".

Regional and Field Office

Southeast Region

Protective Species Management Branch, National Marine Fisheries Service, Southeast Region, 9721 Executive Center Drive, St. Petersburg, Florida 33702-2432

III. Natural Heritage Centers

The Natural Heritage Network comprises 85 biodiversity data centers throughout the Western Hemisphere. These centers collect, organize, and share data relating to endangered and threatened species and habitat. The network was developed to inform land-use decisions for developers,

corporations, conservationists, and government agencies and is also consulted for research and educational purposes. The centers maintain a Natural Heritage Network Control Server Website (http://www.heritage.tnc.org) which provides website and other access to a large number of specific biodiversity centers. Some of these centers are listed below:

Oklahoma Natural Heritage Inventory

Oklahoma Biological Survey, 111 East Chesapeake Street, University of Oklahoma, Norman, OK 73019-0575, 405/325-1985 Fax: 405/325-7702, Web site: http://obssun02.uoknor.edu/biosurvey/onhi/home.html

Louisiana Natural Heritage Program

Department of Wildlife & Fisheries, P.O. Box 98000, Baton Rouge, LA 70898-9000, 504/765-2821 Fax: 504/765-2607

Navajo Natural Heritage Program

P.O. Box 1480, Window Rock, Navajo Nation, AZ 86515, (520) 871-7603, (520) 871-7069 (FAX)

Texas Biological and Conservation Data System

3000 South IH-35, Suite 100, Austin, TX 78704, 512/912-7011 Fax: 512/912-7058

IV. County List of Endangered and Threatened Species

Please see February 17, 1998, **Federal Register** Vol. 63 no. 31 for county by county listing or contact EPA Region 6 Storm Water Hotline (1-800-245-6510). EPA's Office of Wastewater Management's web page at "http://www.epa.gov/owm" will post periodic updates of the county-by-county list. You may also check the list of endangered and threatened species published by the Fish and Wildlife Service on the Endangered Species Home Page (http://www.fws.gov/~r9endspp/enddspp.htm) which is also attached to the FWS Home Page in the "Nationwide Activities Category". List of species under NMFS jurisdiction can be found on the NMFS Homepage (http:www.nmfs.gov) under the "Protected Resources Program." Lists and maps of critical habitat can be found in the Code of Federal Regulations (CFRs) at 50 CFR parts 17 and 226.

Addendum B—Historic Properties (Reserved)

Instructions related to historic preservation have not been included in the permit at this time. EPA may modify the permit to include such provisions at a later date. This does not relieve applicants or permittees of their responsibility to comply with applicable State, Tribal or local laws for the protection of historic properties.

Addendum C—Revised Notice of Intent Form

The Notice of Intent form (EPA3510-9) replaces the Notice of Intent form (EPA 3510-6 (8-98)). The revised form is contained in this Addendum. According to the provisions in Part II.B.1 of this permit, applicants are reminded they must certify that they meet all eligibility requirements of Part I.B. of this permit and are informing the Director of their intent to be covered by, and comply with, those terms and conditions. These conditions include certifications that the applicant's storm water discharges and storm water-related discharge activities will not adversely affect listed endangered or threatened species, or their critical habitat. EPA may modify this permit to include provisions relating to historic preservation.

BILLING CODE 6560-50-P

ATTACHMENT 3

NOTICE OF INTENT FOR STORMWATER DISCHARGES
ASSOCIATED WITH CONSTRUCTION ACTIVITY

THIS FORM REPLACES PREVIOUS FORM 3510-6 (8-98)
See Reverse for Instructions

Form Approved. OMB No. 2040-0188

NPDES FORM

EPA

United States Environmental Protection Agency
Washington, DC 20460

Notice of Intent (NOI) for Storm Water Discharges Associated with CONSTRUCTION ACTIVITY Under a NPDES General Permit

Submission of this Notice of Intent constitutes notice that the party identified in Section I of this form intends to be authorized by a NPDES permit issued for storm water discharges associated with construction activity in the State/Indian Country Land identified in Section II of this form. Submission of this Notice of Intent also constitutes notice that the party identified in Section I of this form meets the eligibility requirements in Part I.B. of the general permit (including those related to protection of endangered species determined through the procedures in Addendum A of the general permit), understands that continued authorization to discharge is contingent on maintaining permit eligibility, and that implementation of the Storm Water Pollution Prevention Plan required under Part IV of the general permit will begin at the time the permittee commences work on the construction project identified in Secion II below. IN ORDER TO OBTAIN AUTHORIZATION, ALL INFORMATION REQUESTED MUST BE INCLUDED ON THIS FORM. SEE INSTRUCTIONS ON BACK OF FORM.

I. Owner/Operator (Applicant) Information

Name: _____ Phone: _____

Address: _____ Status of Owner/Operator: ☐

City: _____ State: ___ Zip Code: _____-____

II. Project/Site Information

Is the facility located on Indian Country Lands? Yes ☐ No ☐

Project Name: _____

Project Address/Location: _____

City: _____ State: ___ Zip Code: _____-____

Latitude: _____ Longitude: _____ County: _____

Has the Storm Water Pollution Prevention Plan (SWPPP) been prepared? Yes ☐ No ☐

Optional: Address of location of SWPPP for viewing ☐ Address in Section I above ☐ Address in Section II above ☐ Other address (if known) below:

SWPPP Address: _____ Phone: _____

City: _____ State: ___ Zip Code: _____-____

Name of Receiving Water: _____

Month Day Year — Estimated Construction Start Date

Month Day Year — Estimated Completion Date

Estimate of area to be disturbed (to nearest acre): _____

Estimate of Likelihood of Discharge (choose only one):

1. ☐ Unlikely
2. ☐ Once per month
3. ☐ Once per week
4. ☐ Once per day
5. ☐ Continual

Based on instruction provided in Addendum A of the permit, are there any listed endangered or threatened species, or designated critical habitat in the project area?

Yes ☐ No ☐

I have satisfied permit eligibility with regard to protection of endangered species through the indicated section of Part I.B.3.e.(2) of the permit (check one or more boxes):

(a) ☐ (b) ☐ (c) ☐ (d) ☐

III. Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage this system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Print Name: _____ Date: _____

Signature: _____

EPA Form 3510-9 replaced 3510-6 (8-98)

EPA

Instructions – EPA Form 3510-9

Notice of Intent (NOI) for Storm Water Discharges Associated with Construction Activity to be Covered Under a NPDES Permit

Form Approved. OMB No. 2040-0188

Who Must File a Notice of Intent Form

Under the provisions of the Clean Water Act, as amended, (33 U.S.C. 1251 et.seq.; the Act), except as provided by Part I.B.3 the permit, Federal law prohibits discharges of pollutants in storm water from construction activities without a National Pollutant Discharge Elimination System Permit. Operator(s) of construction sites where 5 or more acres are disturbed, smaller sites that are part of a larger common plan of development or sale where there is a cumulative disturbance of at least 5 acres, or any site designated by the Director, must submit an NOI to obtain coverage under an NPDES Storm Water Construction General Permit. If you have questions about whether you need a permit under the NPDES Storm Water program, or if you need information as to whether a particular program is administered by EPA or a State agency, write to or telephone the Notice of Intent Processing Center at (703) 931-3230.

Where to File NOI Form

NOIs must be sent to the following address:

Storm Water Notice of Intent (4203)
USEPA
401 M. Street, SW
Washington, D.C. 20460

Do not send Storm Water Pollution Prevention Plans (SWPPPs) to the above address. For overnight/express delivery of NOIs, please include the room number 2104 Northeast Mail and phone number (202) 260-9541 in the address.

When to File

This form must be filed at least 48 hours before construction begins.

Completing the Form

OBTAIN AND READ A COPY OF THE APPROPRIATE EPA STORM WATER CONSTRUCTION GENERAL PERMIT FOR YOUR AREA. To complete this form, type or print, using uppercase letters, in the appropriate areas only. Please place each character between the marks (abbreviate if necessary to stay within the number of characters allowed for each item). Use one space for breaks between words, but not for punctuation marks unless they are needed to clarify your response. If you have any questions on this form, call the Notice of Intent Processing Center at (703) 931-3230.

Section I. Facility Owner/Operator (Applicant) Information

Provide the legal name, mailing address, and telephone number of the person, firm, public organization, or any other entity that meet either of the following two criteria: (1) they have operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications; or (2) they have the day-to-day operational control of those activities at the project necessary to ensure compliance with SWPPP requirements or other permit conditions. Each person that meets either of these criteria must file this form. Do not use a colloquial name. Correspondence for the permit will be sent to this address.

Enter the appropriate letter to indicate the legal status of the owner/operator of the project: F = Federal; S = State; M = Public (other than federal or state); P = Private.

Section II. Project/Site Information

Enter the official or legal name and complete street address, including city, county, state, zip code, and phone number of the project or site. If it lacks a street address, indicate with a general statement the location of the site (e.g., Intersection of State Highways 61 and 34). Complete site information must be provided for permit coverage to be granted.

The applicant must also provide the latitude and longitude of the facility in degrees, minutes, and seconds to the nearest 15 seconds. The latitude and longitude of your facility can be located on USGS quadrangle maps. Quadrangle maps can be obtained by calling 1-800 USA MAPS. Longitude and latitude may also be obtained at the Census Bureau Internet site: http://www.census.gov/cgi-bin/gazetteer.

Latitude and longitude for a facility in decimal form must be converted to degrees, minutes and seconds for proper entry on the NOI form. To convert decimal latitude or longitude to degrees, minutes, and seconds, follow the steps in the following example.

Convert decimal latitude 45.1234567 to degrees, minutes, and seconds.

1) The numbers to the left of the decimal point are degrees.
2) To obtain minutes, multiply the first four numbers to the right of the decimal point by 0.006. 1234 x .006 = 7.404.
3) The numbers to the left of the decimal point in the result obtained in step 2 are the minutes: 7'.
4) To obtain seconds, multiply the remaining three numbers to the right of the decimal from the result in step 2 by 0.06: 404 x 0.06 = 24.24. Since the numbers to the right of the decimal point are not used, the result is 24".
5) The conversion for 45.1234 = 45° 7' 24".

Indicate whether the project is on Indian Country Lands.

Indicate if the Storm Water Pollution Prevention Plan (SWPPP) has been developed. Refer to Part IV of the general permit for information on SWPPPs. To be eligible for coverage, a SWPPP must have been prepared.

Optional: Provide the address and phone number where the SWPPP can be viewed if different from addresses previously given. Check appropriate box.

Enter the name of the closest water body which receives the project's construction storm water discharge.

Enter the estimated construction start and completion dates using four digits for the year (i.e. 05/27/1998).

Enter the estimated area to be disturbed including but not limited to: grubbing, excavation, grading, and utilities and infrastructure installation. Indicate to the nearest acre; if less than 1 acre, enter "1." Note: 1 acre = 43,560 sq. ft.

Indicate your best estimate of the likelihood of storm water discharges from the project. EPA recognizes that actual discharges may differ from this estimate due to unforeseen or chance circumstances.

Indicate if there are any listed endangered or threatened species, or designated critical habitat in the project area.

Indicate which Part of the permit that the applicant is eligible with regard to protection of endangered or threatened species, or designated critical habitat.

Section III. Certification

Federal Statutes provide for severe penalties for submitting false information on this application form. Federal regulations require this application to be signed as follows:

For a corporation: by a responsible corporate officer, which means: (i) president, secretary, treasurer, or vice president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision making functions, or (ii) the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

For a partnership or sole proprietorship: by a general partner of the proprietor, or

For a municipality, state, federal, or other public facility: by either a principal executive or ranking elected official. An unsigned or undated NOI form will not be granted permit coverage.

Paperwork Reduction Act Notice

Public reporting burden for this application is estimated to average 3.7 hours. This estimate includes time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. Send comments regarding the burden estimate, any other aspect of the collection of information, or suggestions for improving this form, including any suggestions which may increase or reduce this burden to: Director, OPPE Regulatory Information Division (2137), U.S. Environmental Protection Agency, 401 M Street, SW, Washington, D.C. 20460. Include the OMB control number on any correspondence. Do not send the completed form to this address.

Addendum D—Notice of Termination Form

From the effective date of this permit, permittees are to use the existing Notice of Termination form (EPA Form 3510-7) contained in this Addendum until they are instructed by the Director (EPA) to use a revised version. Permittees are to complete, sign and submit the form in accordance with Part VIII of the permit when terminating permit coverage at a construction project when one or more or the conditions contained in Part I.D.2 have been met.

THIS FORM REPLACES PREVIOUS FORM 3510-7 (8-92)
Please See Instructions Before Completing This Form

Form Approved. OMB No. 2040-0086
Approval expires: 8-31-98

NPDES FORM

EPA

United States Environmental Protection Agency
Washington, DC 20460

Notice of Termination (NOT) of Coverage Under a NPDES General Permit for Storm Water Discharges Associated with Industrial Activity

Submission of this Notice of Termination constitutes notice that the party identified in Section II of this form is no longer authorized to discharge storm water associated with industrial activity under the NPDES program. ALL NECESSARY INFORMATION MUST BE PROVIDED ON THIS FORM.

I. Permit Information

NPDES Storm Water General Permit Number: ☐☐☐☐☐☐☐☐☐☐

Check Here if You are No Longer the Operator of the Facility: ☐

Check Here if the Storm Water Discharge is Being Terminated: ☐

II. Facility Operator Information

Name: ☐☐ Phone: ☐☐☐ ☐☐☐ ☐☐☐☐

Address: ☐☐

City: ☐☐ State: ☐☐ ZIP Code: ☐☐☐☐☐-☐☐☐☐

III. Facility/Site Location Information

Name: ☐☐

Address: ☐☐

City: ☐☐ State: ☐☐ ZIP Code: ☐☐☐☐☐-☐☐☐☐

Latitude: ☐☐☐☐☐ Longitude: ☐☐☐☐☐☐ Quarter: ☐☐ Section: ☐☐ Township: ☐☐☐☐ Range: ☐☐☐☐

IV. Certification: I certify under penalty of law that all storm water discharges associated with industrial activity from the identified facility that are authorized by a NPDES general permit have been eliminated or that I am no longer the operator of the facility or construction site. I understand that by submitting this Notice of Termination, I am no longer authorized to discharge storm water associated with industrial activity under this general permit, and that discharging pollutants in storm water associated with industrial activity to waters of the United States is unlawful under the Clean Water Act where the discharge is not authorized by a NPDES permit. I also understand that the submittal of this Notice of Termination does not release an operator from liability for any violations of this permit or the Clean Water Act.

Print Name: ☐☐ Date: ☐☐ ☐☐ ☐☐

Signature: _____

Instructions for Completing Notice of Termination (NOT) Form

Who May File a Notice of Termination (NOT) Form

Permittees who are presently covered under an EPA-issued National Pollutant Discharge Elimination System (NPDES) General Permit (including the 1995 Multi-Sector Permit) for Storm Water Dicharges Associated with Industrial Activity may submit a Notice of Termination (NOT) form when their facilities no longer have any storm water dischargee associated with industrial activity as defined in the storm water regulations at 40 CFR 122.26(b)(14), or when they are no longer the operator of the facilities.

For construction activities, elimination of all storm water discharges associated with industrial activity occurs when disturbed soils at the construction site have been finally stabilized and temporary erosion and sediment control measures have been removed or will be removed at an appropriate time, or that all storm water discharges associated with industrial activity from the construction site that are authorized by a NPDES general permit have otherwise been eliminated. Final stabilization means that all soil-disturbing activities at the site have been completed, and that a uniform perennial vegetative cover with a density of 70% of the cover for unpaved areas and areas not covered by permanent structures has been established, or equivalent permanent stabilization measures (such as the use of riprap, gabions, or geotextiles) have been employed.

Where to File NOT Form

Send this form to the the following address:

Storm Water Notice of Termination (4203)
401 M Street, S.W.
Washington, DC 20460

Completing the Form

Type or print, using upper-case letters, in the appropriate areas only. Please place each character between the marks. Abbreviate if necessary to stay within the number of characters allowed for each item. Use only one space for breaks between words, but not for punctuation marks unless they are needed to clarify your response. If you have any questions about this form, telephone or write the Notice of Intent Processing Center at (703) 931-3230.

EPA Form 3510-7 (8-96)

Instructions - EPA Form 3510-7
Notice of Termination (NOT) of Coverage Under The NPDES General Permit for Storm Water Discharges Associated With Industrial Activity

Section I Permit Information

Enter the existing NPDES Storm Water General Permit number assigned to the facility or site identified in Section III. If you do not know the permit number, telephone or write your EPA Regional storm water contact person.

Indicate your reason for submitting this Notice of Termination by checking the appropriate box:

If there has been a change of operator and you are no longer the operator of the facility or site identified in Section III, check the corresponding box.

If all storm water discharges at the facility or site identified in Section III have been terminated, check the corresponding box.

Section II Facility Operator Information

Give the legal name of the person, firm, public organization, or any other entity that operates the facility or site described in this application. The name of the operator may or may not be the same name as the facility. The operator of the facility is the legal entity which controls the facility's operation, rather than the plant or site manager. Do not use a colloquial name. Enter the complete address and telephone number of the operator.

Section III Facility/Site Location Information

Enter the facility's or site's official or legal name and complete address, including city, state and ZIP code. If the facility lacks a street address, indicate the state, the latitude and longitude of the facility to the nearest 15 seconds, or the quarter, section, township, and range (to the nearest quarter section) of the approximate center of the site.

Section IV Certification

Federal statutes provide for severe penalties for submitting false information on this application form. Federal regulations require this application to be signed as follows:

For a corporation: by a responsible corporate officer, which means: (i) president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision making functions, or (ii) the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

For a partnership or sole proprietorship: by a general partner or the proprietor; or

For a municipality, State, Federal, or other public facility: by either a principal executive officer or ranking elected official.

Paperwork Reduction Act Notice

Public reporting burden for this application is estimated to average 0.5 hours per application, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate, an other aspect of the collection of information, or suggestions for improving this form, including any suggestions which may increase or reduce this burden to: Chief, Information Policy Branch, 2136, U.S. Environmental Protection Agency, 401 M Street, SW, Washington, DC 20460, or Director, Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503.

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