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**DEPARTMENT OF THE AIR FORCE**
**27TH SPECIAL OPERATIONS MISSION SUPPORT GROUP (AFSOC)**
**CANNON AIR FORCE BASE NEW MEXICO**

RECEIVED MAY 2012 NMED Hazardous Waste Bureau

MAY 17 2012

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Ms. Lane Andress
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New Mexico Environment Department
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Dear Ms. Andress

Attached is the *Draft Work Plan for the Repair of Soil Covers for Landfill No. 3 (SWMU 105) and Landfill No. 4 (SWMU 104), Cannon AFB, New Mexico.* If you have any questions regarding this submittal, please contact Mr. Ronald Lancaster, Chief, Asset Management Flight at (575) 784-1146.

Sincerely

DAVID C. PIECH, Colonel, USAF
Commander

Attachment:
Draft Work Plan for the Repair of Soil Covers for Landfill No. 3 (SWMU 105) and Landfill No. 4 (SWMU 104), Cannon AFB, New Mexico

cc:
Environmental Protection Agency, Region VI, Ms. Wendy Jacques w/o Attachment

# Work Plan for the Repair of Soil Covers for Landfill No. 3 (SWMU 105) and Landfill No. 4 (SWMU 104) Cannon Air Force Base, New Mexico

**Draft**
**April 2012**

***Prepared for:***

27 SOCES/CEAN
Cannon Air Force Base, New Mexico

United States Army Corps of Engineers
Omaha District

***Prepared by:***

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# LIST OF ACRONYMS

| | |
|---|---|
| AFB | Air Force Base |
| AFCEE | Air Force Center for Environmental Excellence |
| CFR | Code of Federal Regulations |
| cu yd | cubic yard |
| DQCR | daily quality control report |
| ft | foot/feet |
| HASP | Health and Safety Plan |
| LF-03 | Landfill No. 3 |
| LF-04 | Landfill No. 4 |
| NMAC | New Mexico Administrative Code |
| NMED | New Mexico Environment Department |
| NPDES | National Pollutant Discharge Elimination System |
| QA | quality assurance |
| QC | quality control |
| RCP | Regulatory Compliance Plan |
| RCRA | Resource Conservation and Recovery Act |
| SSHP | Site-Specific Safety and Health Plan |
| SWMU | Solid Waste Management Unit |
| SWPPP | Stormwater Pollution Prevention Plan |
| TCLP | toxicity characteristic leaching procedure |
| USACE | U.S. Army Corps of Engineers |

# 1. INTRODUCTION

This document describes the work to be conducted for the soil covers at Solid Waste Management Units (SWMU) 104 – Landfill No. 4 (LF-04) and SWMU 105 – Landfill No. 3 (LF-03) at Cannon Air Force Base (AFB), New Mexico. Tetra Tech, Inc., at the direction of the U.S. Army Corps of Engineers (USACE) and Cannon AFB, developed this Work Plan for the repair and revegetation of the existing landfill soil covers at these sites. This Work Plan will be issued for construction upon approval by Cannon AFB and the New Mexico Environment Department (NMED). NMED is requiring repair of the soil covers at both landfills based on the results of inspection and monitoring activities conducted and observations made in 2010.

The Work Plan provides project objectives, descriptions, field procedures, and related plans which address all aspects of the proposed construction activities at LF-03 and LF-04. Detailed grading drawings, based on current survey data, are provided in Appendix D. Additionally, a Site-Specific Safety and Health Plan (SSHP) addendum to the Cannon AFB Basewide Health and Safety Plan (HASP) (Foster Wheeler, 2000) will be prepared for this project by the selected contractor and submitted for approval by Cannon AFB. All field activities will be performed in accordance with the Basewide HASP, the SSHP addendum, and applicable health and safety requirements.

## 1.1 Project Objective

This project is designed to repair the existing soil covers and thus, minimize the threat to human health and the environment by accomplishing the following activities:

- Fill in trench subsidence areas. Repair the existing soil covers over both LF-03 and LF-04 to minimize future subsidence and direct surface water runoff away from these former trenches.
- Grading and Erosion Control. Each backfilled area will be graded to prevent ponding. Additionally, temporary soil erosion and sediment control measures will be installed to prevent the migration of sediment to off-site areas during stormwater runoff events in accordance with the SWPPP.
- Site Revegetation. The disturbed areas of the site will be revegetated and mulched with native grasses.
- Final Survey. A topographic survey of the final site contours and features will be performed to develop record drawings to be provided with the Project Completion Report.

## 1.2 Document Organization

This Work Plan describes the methods that will be used to fill and repair the soil covers at LF-03 and LF-04, and revegetate the sites. All field 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 – Construction Quality Control Plan
- Section 6 – Project Management

# 2. SITE DESCRIPTION AND HISTORY

A description of Cannon AFB and brief discussions of LF-03 and LF-04, including site description, history, and results of previous investigations, are provided below. 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-03 Description and History

LF-03 is an inactive landfill formerly used for burn and disposal trenching operations. The approximately 12-acre site is located in the east-central portion of Cannon AFB and is bounded to the north by a road leading to the transmitter tower, to the south and east by barbed-wire fences and agricultural fields, and on the west by the Perimeter Road. The landfill is rectangular in shape, covers approximately 12 acres with dimensions approximately 300 feet (ft) by 1,800 ft. The ground surface in this area is slightly hummocky and is covered with prairie grasses. Playa Lake, which lies approximately 450 ft north of LF-03, is the closest surface water body to the former landfill. The location of the former landfill with respect to the surrounding facility is shown on Figure 2-2.

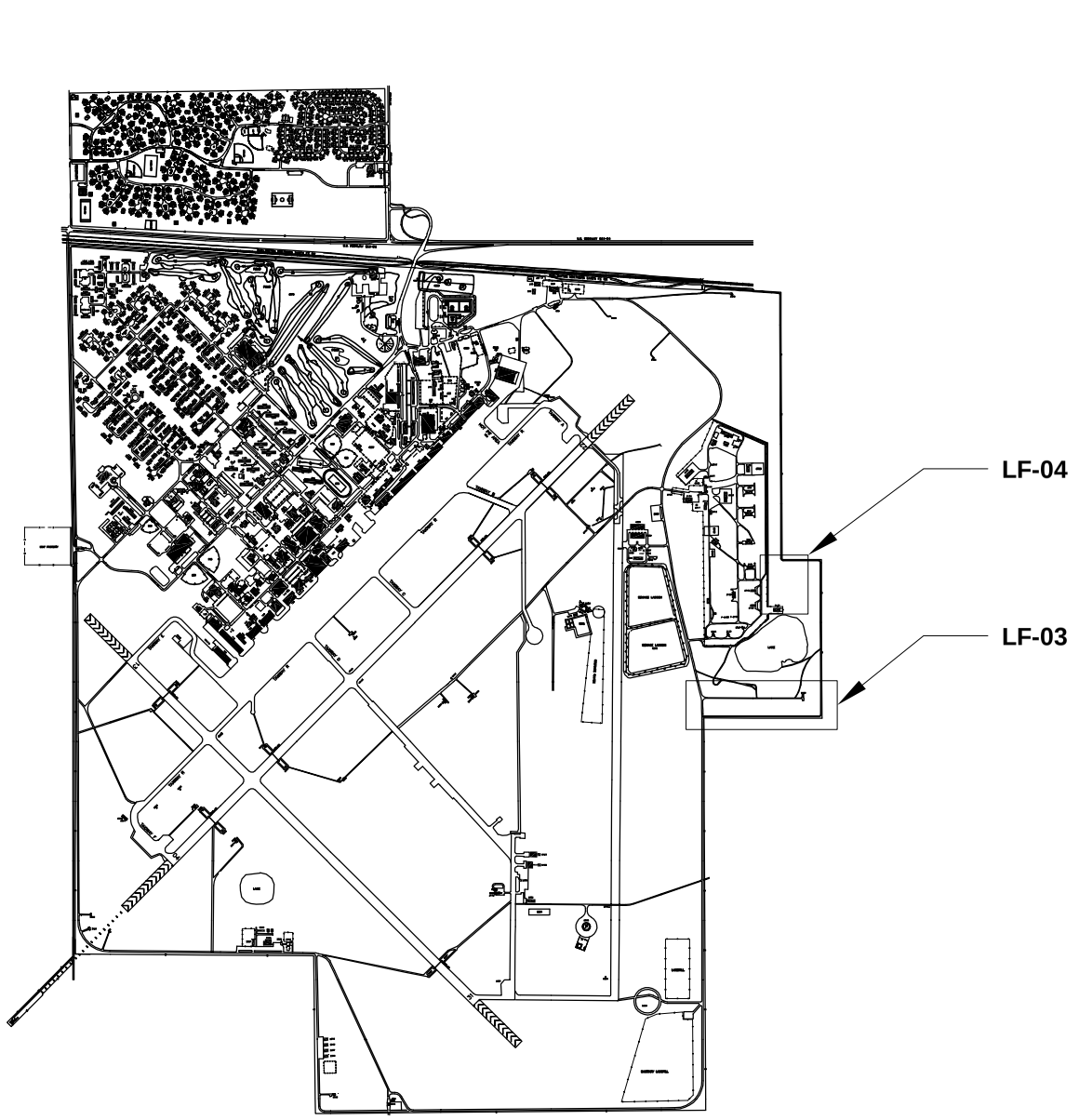
The landfill was operated from 1959 to 1967 and was reported to have received domestic and industrial wastes including solvents, paints, thinners, waste oils, and peroxide containers (Kearney 1987). Disposal activities consisted of placing collected waste material into a trench, burning the accumulated waste, and then covering the burned material with soil the following day. Disposal trenches were excavated to a maximum depth of approximately 16 ft and possibly extended 250 ft in length. The amount of waste material disposed within the landfill trenches has not been determined. No waste disposal activities are known to have occurred for over 40 years. Subsurface investigation activities encountered waste material such as soda and beer bottles, plastic sheeting and bags, clothing, synthetic rubber machinery belt, Styrofoam, scrap metal, insulated and non-insulated wiring, and a crushed 5-gallon can with no lid (Tetra Tech 2009). Some, but not all, of the uncovered material was burnt.

## 2.3 LF-04 Description and History

LF-04 is an inactive landfill formerly used for burn and disposal trenching operations. The 9-acre site is located in the east-central portion of Cannon AFB and lies approximately 800 ft west of the

ordnance area and is bounded to the north by Perimeter Road, to the west by a barbed-wire fence, and to the east and south by vacant fields. The site is an open field covered with prairie grasses. Generally, drainage from the area is to the north towards Playa Lake. The landfill is roughly square in shape, with dimensions of approximately 570 ft by 690 ft. Playa Lake, which lies approximately 1,000 ft south of LF-04, is the closest surface water body to the former landfill. The location of the former landfill with respect to the surrounding facility is shown on Figure 2-3.

The landfill was operated for 1 year from 1967 to 1968 (Kearney 1987). The landfill reportedly received domestic and industrial wastes including solvents, paints, thinners, waste oils, and peroxide containers. Disposal activities consisted of placing collected waste material into a trench, burning the accumulated waste, and then covering the burned material with soil the following day. Disposal trenches were excavated to a maximum depth of approximately 16ft and possibly extended 250 ft in length. The amount of waste material disposed within the landfill trenches is unknown. No waste disposal activities are known to have occurred for over 40 years. Subsurface investigation activities encountered waste material such as glass, soda and beer cans, clothing, plastic sheeting and bags, scrap metal, insulated and non-insulated wiring, and one crushed 5-gallon can (Tetra Tech 2009).




**REMEDIAL ACTION WORK PLAN**
**SWMUs 104 AND 105 - LANDFILLS NO. 03 AND 04**

**CANNON AIR FORCE BASE**

**FIGURE 2-1**
**BASE LOCATION MAP**

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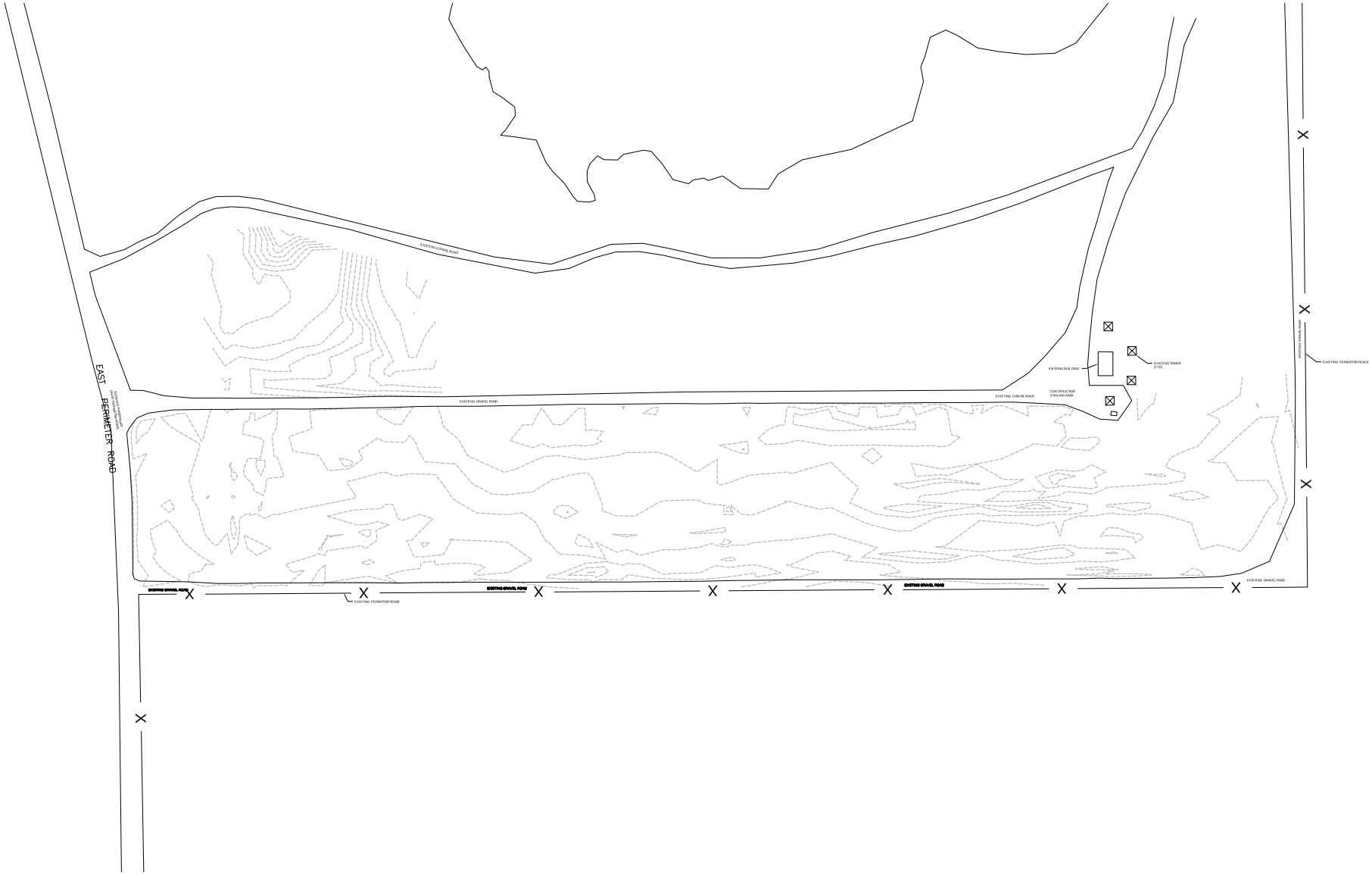


**REMEDIAL ACTION WORK PLAN**
**SWMUs 104 AND 105 - LANDFILLS NO. 03 AND 04**

**CANNON AIR FORCE BASE**

**FIGURE 2-2**
**LF-03 SITE LOCATION MAP**

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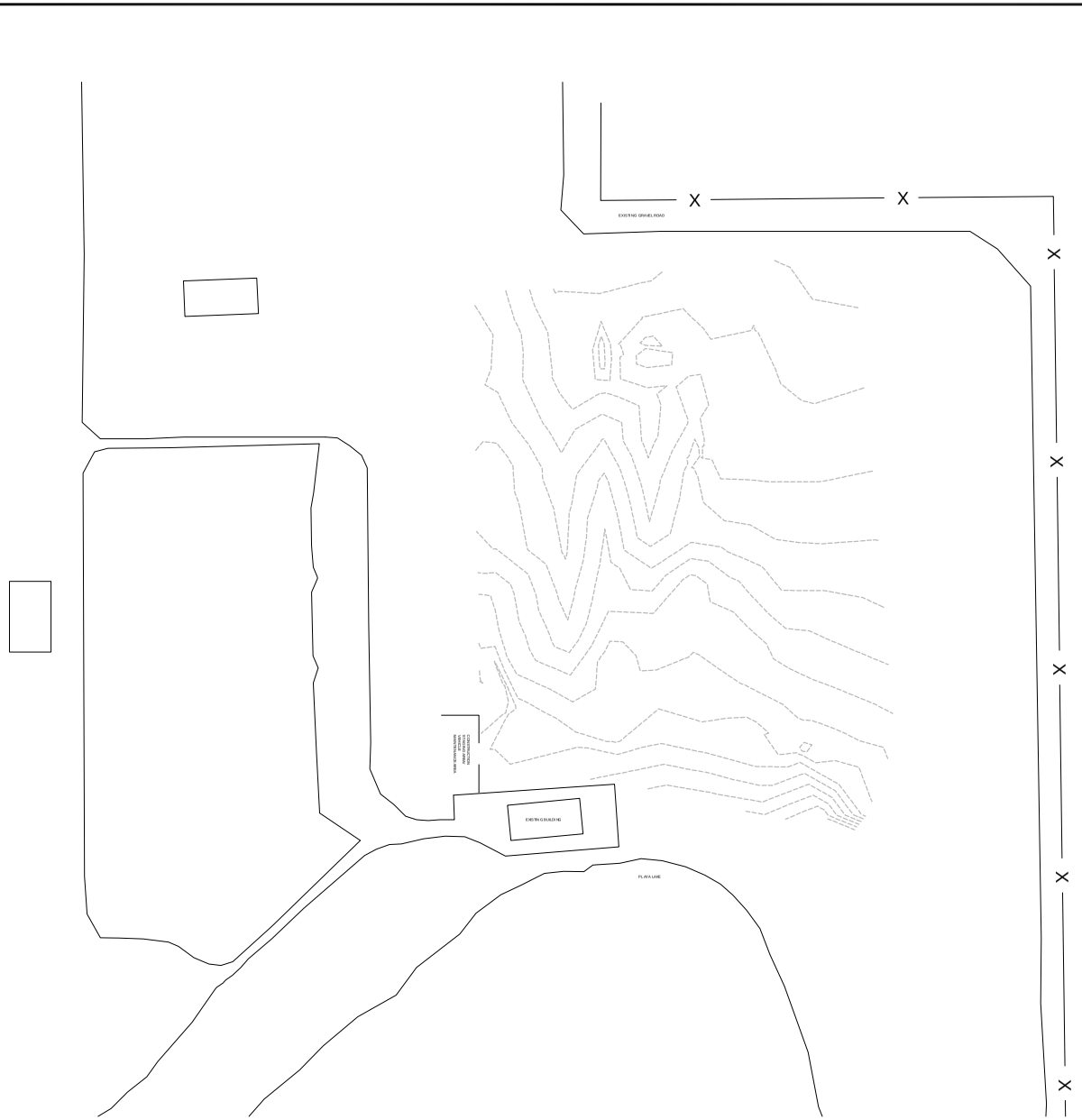


**REMEDIAL ACTION WORK PLAN**
**SWMUs 104 AND 105 - LANDFILLS NO. 03 AND 04**

**CANNON AIR FORCE BASE**

**FIGURE 2-3**
**LF-04 SITE LOCATION MAP**

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# 3. 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 Contractor 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 and layout
- Mobilization
- Grading and drainage construction
- Site revegetation
- Demobilization
- Field engineering
- Health and safety monitoring

### *3.2.1 Project Kickoff Meeting*

The Contractor will conduct a project kickoff meeting at the Base prior to initiation of construction with participation from on-site Contractor personnel, Cannon AFB, and any key subcontractor personnel. The conference agenda will include:

- Introductions, roles, and responsibilities
- Project scope
- Construction schedule
- Mobilization logistics
- Schedule coordination
- Quality assurance/quality control (QA/QC) requirements
- Review of the Basewide 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 and Layout

A preconstruction site survey will be performed to identify and demarcate specific locations of subsidence, 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 approved SSHP, and training in pollution prevention and waste minimization procedures. It will also include review of the SWPPP and applicable soil erosion and sediment control measures.

#### Utility Clearance

Cannon AFB will provide utility clearance for the landfill sites. The Contractor 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 and establish designated vehicle maintenance areas.

### 3.2.4 Construction Activities

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

#### Vegetation Removal

Existing surface vegetation will be removed and subsequently disposed of by burial on site. The removal of vegetation will be limited to the subsidence areas to be filled. The areas where subsidence equals or exceeds 6 inches are identified on the project drawings.

#### Erosion Control

Prior to any surface disturbance, 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.

#### Subgrade Proof-rolling

The subsidence areas that have been stripped of vegetation will be proof-rolled with suitable heavy equipment to compact the existing subgrade.

### Fill Material

Upon approval from Cannon AFB, available on-site soil material or clean material from an off-site borrow source will be placed and compacted within the subsidence areas. This material will be compacted in 6-inch lifts. The top 4 inches of backfill will be topsoil and will not be compacted.

### Site Revegetation

The disturbed areas will be revegetated (seeded) and mulched with native grasses using an approved seed mix. Compost from Cannon AFB, if available, can be used as mulch.

### Site Restoration Activities

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

## *3.2.5 Demobilization*

Demobilization activities will include site cleanup, trash disposal, removal of temporary soil erosion and sediment control measures, personnel and equipment demobilization, and field records organization. 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; Cannon AFB Basewide HASP (Foster Wheeler 2000); and USACE Safety and Health Requirements Manual (EM 385-1-1) (2008), if applicable. All site workers, including subcontractors, will review and comply with the project health and safety requirements and procedures.

The Contractor shall develop and implement a SSHP which incorporates in detail the following contents, as a minimum:

- Section 1 – Site Description
- Section 2 – Activity Hazard Analysis
- Section 3 – Health and Safety Staff Organization, Qualifications and Responsibilities
- Section 4 – Health and Safety Training Requirements
- Section 5 – Personal Protective Equipment
- Section 6 – Medical Surveillance Requirements

- Section 7 – Heat Stress/Cold Stress Prevention
- Section 8 – Elements of Subcontractor's Health and Safety Programs and Procedures edited to conform with the site-specific conditions and standard operations safety procedures
- Section 9 – Site Control Measures
- Section 10 – Personal Hygiene and Equipment Decontamination
- Section 11 – Emergency Response and Contingency Procedures
- Section 12 – Accident Prevention
- Section 13 – Logs, Reports, and Recordkeeping

Prior to the initiation of field activities, the Contractor's SSHP, including the activity hazard analysis, will be reviewed and approved by Cannon AFB and contract service center project management (i.e., USACE or the Air Force Center for Environmental Excellence [AFCEE]), as appropriate, for conformance with the established requirements.

## 3.3 Off-Site Support Activities

It is likely that he Project Manager will oversee the entire project from an off-site home 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 any Contractor-specific 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

During the project, Contractor personnel may be required to visit the site to provide routine inspection and technical assistance. Visits and inspections will be coordinated through the on-site Construction Manager or Project Manager according to project needs.

## 3.4 Field Sampling Activities

Soil samples will be collected in accordance with the standard operating procedures presented in Appendix A to verify that the borrow material is  not contaminated . 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

One composite soil sample, per 1,000 cubic yards (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:

- Toxicity characteristic leaching procedure (TCLP) Resource Conservation and Recovery Act (RCRA) Metals, Extraction Method 1311: Barium, cadmium, chromium, silver, arsenic, lead, and selenium (Method 6010B) and Mercury (Method 7470A)
- Volatile Organic Compounds (Methods 5035/8260B)
- Semivolatile Organic Compounds (Methods 3545/8270C)
- Pesticides (Methods 3550/8081A)
- Herbicides (Methods 3550/8151A)
- Total Recoverable Petroleum Hydrocarbons (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: C104CS01

C104 Cannon AFB SWMU 104
CS01 Composite sample 01

Representative environmental samples will be identified using the following codes:

01 Environmental soil sample
02 Field duplicate sample

From this protocol, the following provide examples of typical sample numbers:

C104CS0201 – Composite soil sample number 2 collected as Environmental soil sample.

C104CS0302 – Composite soil sample number 3 collected as a field duplicate soil sample.

### 3.4.3 Documentation

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

# 4. REGULATORY COMPLIANCE PLAN

An abbreviated RCP for this project is presented below to address the scope of this work plan which consists of the repair of existing landfill covers.

## 4.1 Regulatory Framework

During the 2010 Biennial Groundwater Monitoring and Annual Landfill Inspection at the Base, subsidence associated with linear waste burial trenches at LF-03 and LF-04 was noticed. The NMED, upon review of the subsequent inspection report, issued an approval letter on the condition that these subsidence areas are filled in and graded to prevent pooling and potential percolation of storm water. Upon completion of this work, Cannon AFB is required to present suitable documentation to the NMED.

### *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 ft) or more of surface area if the activity may result in transported material or particulate matter becoming airborne without having a valid 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. 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 disturbance area for this project is less than 5 acres; consequently, an NPDES construction permit may not be required. A Construction Rainfall Erosivity Waiver may apply depending on the field construction schedule, and this would allow permitting authorities to waive NPDES requirements. However, a Stormwater Pollution Prevention Plan (SWPPP) has been prepared and is provided as Appendix E to this Work Plan. The SWPPP addresses surface water discharges and run-on and run-off control resulting from project construction activities.

*Bulk Storage User Permit*—Section 7-16, A-8 of the New Mexico Special Fuels Supplier Tax Act requires a Bulk Storage User Permit in order to avoid excise tax if it is anticipated that a bulk fuel facility will be required on site by the Contractor. Fuel must be used for non-highway purposes only. A Bulk Storage User Permit will not be required if all equipment will be fueled by a mobile fuel truck and on-site bulk storage of fuel will not be necessary.

### 4.1.2 Regulated Site Activities

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

- Installing both temporary and permanent soil erosion and sediment controls
- Applying water for dust control
- Maintaining spill control materials
- Placing and compacting clean soil on top of the grubbed areas to create a final soil cover of a minimum of 4 to 6 inches
- Revegetating the final cover in the disturbed areas

### 4.1.3 Regulatory Requirements

Project activities are expected to generate nonhazardous solid waste (trash, grubbing and cleaning waste, and excess construction materials). New Mexico-regulated special waste in the form of possible petroleum-contaminated soil, resulting from equipment leaks, may 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 Parts 190–259, U.S. Environmental Protection Agency Regulations for Solid Waste
- New Mexico Solid Waste Management Regulations (SWMR)
- 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:

- Grubbed vegetation
- Demobilization debris
- Personal protective equipment
- Waste oils and equipment maintenance fluids, temp erosion control (i.e. silt fence)

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

### 4.2.1 Grubbed Vegetation

All vegetation removed during clearing and grubbing operations will be disposed of as directed by Cannon AFB personnel.

### 4.2.2 Demobilization Debris

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

### *4.2.3 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 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 by Cannon AFB personnel, will be followed.

## 4.4 Training/Certification Requirements

On-site Contractor employees will be trained in the applicable Cannon AFB compliance policies and procedures, as appropriate. The Occupational Safety and Health Administration training and certification requirements are contained in the Basewide HASP.

## 4.5 Updating the Regulatory Compliance Plan

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

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# 5. CONSTRUCTION QUALITY CONTROL PLAN

The QA project plan requirements for the repair of the landfill covers are addressed in the Construction Quality Control Plan (Appendix B). The Construction Quality Control Plan has been prepared to meet the requirements of Specification Section 01400 – Quality Requirements (Appendix C). The Construction Quality Control Plan discusses the QC organization and responsibilities, the construction inspection plan, testing requirements, document control, non-conformances, and submittals.

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# 6. PROJECT MANAGEMENT

## 6.1 Project Team

Figure 6-1 depicts proposed generalized project team for the work at LF-03 and LF-04. The key parties for this project are the Contractor, Cannon AFB, and the appropriate contract service center (i.e., USACE or AFCEE, if applicable). The Contractor Project Manager is responsible for the project direction. The Contractor will be required to specify a Project Engineer.

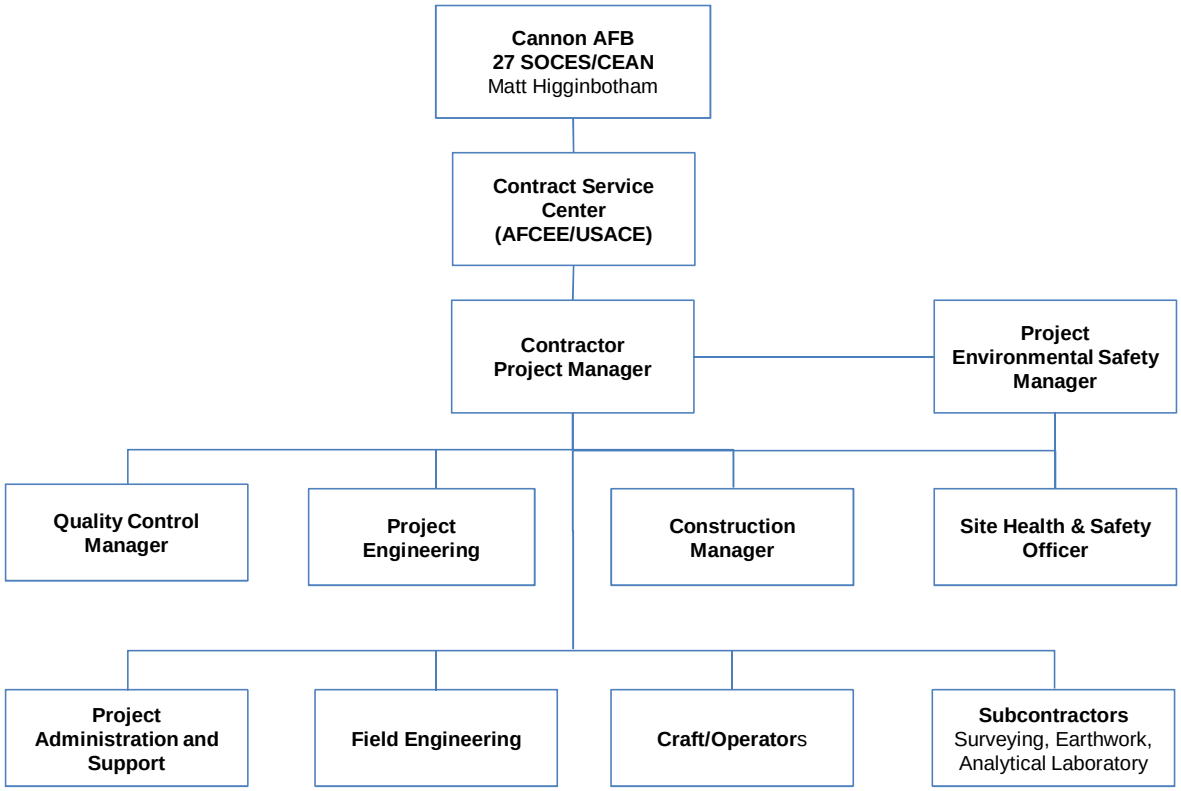
The Project Manager is the primary author of the Completion Report required to document the repair efforts at LF-03 and LF-04, with assistance from the Project Engineer and a multidisciplinary team comprising personnel from civil engineering, regulatory compliance, QA, and technical editing.

## 6.2 Project Schedule

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

| | |
|---|---|
| Submittal of Final Work Plan | June 2012 |
| Field Activities | Fall 2012 |
| Complete Revegetation | Fall 2012 |
| Development of Draft Project Completion Report | October 2012 |
| Submittal of Final Project Completion Report | December 2012 |

## Figure 6-1. Project Organization Chart



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

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USACE (U.S. Army Corps of Engineers)
2008. USACE Safety and Health Requirements Manual (EM 385-1-1), and updates.

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# Appendix A
# Standard Operating Procedures

# Appendix B
# Construction Quality Control Plan

# Appendix C
# Construction Specifications

# Appendix D
# Design Drawings

# Appendix E
# Stormwater Pollution Prevention Plan

# Appendix A
# Standard Operating Procedures

This appendix includes the standard operating procedures for certifying the clean soil fill material to be used during the repair work at Landfill No. 3 and Landfill No. 4, 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

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# LIST OF ACRONYMS AND ABBREVIATIONS

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

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# STANDARD OPERATING PROCEDURE A-1
# COMPOSITE SOIL SAMPLING

## Purpose

The following procedures apply to the collection of soil samples from the on-Base designated borrow area or from stockpiled soil at a facility contracted to provide clean fill material for use during this repair work at Cannon Air Force Base (AFB). The sample jar identification depends on the analyses being run and is detailed in Section 3.4 of the Work Plan.

## Procedure

Composite soil sampling will be accomplished as follows:

- Wear appropriate personal protective equipment as outlined in the Site-Specific Safety and Health Plan. 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 borrow 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 Work Plan. If a Cannon AFB 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 Construction Quality Control Plan, Appendix B 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. Appropriate sample containers should be used.

### *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. 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. 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 Cannon AFB for approval if any deviation from the procedures or specifications contained in the Work Plan occurs. Details on the completion and submittal of FCRs are provided in Appendix B of the Work Plan.

# Appendix B
# Construction Quality Control Plan for the Repair of Soil Covers at Landfills No. 3 (SWMU 105) and Landfill No. 4 (SWMU 104)

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# LIST OF ACRONYMS

| | |
|---|---|
| AFB | Air Force Base |
| AHA | activity hazard analysis |
| CQC | Construction Quality Control |
| DQCR | Daily Quality Control Report |
| FCR | Field Change Request |
| LF-03 | Landfill No. 03 |
| LF-04 | Landfill No. 4 |
| QA | quality assurance |
| QC | quality control |
| SHSO | Site Health and Safety Officer |
| SSHP | Site-Specific Safety and Health Plan |
| SWMU | Solid Waste Management Unit |

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# 1. CONSTRUCTION QUALITY CONTROL PLAN

This Construction Quality Control (CQC) Plan establishes the procedures and methods to be implemented during remedial action at Solid Waste Management Unit (SWMU) 105 – Landfill No. 3 (LF-03) and SWMU 104 – Landfill No. 4 (LF-04) on Cannon Air Force Base (AFB), New Mexico. This CQC Plan combines the quality assurance (QA)/quality control (QC) requirements from the previously-conducted U.S. Army Corps of Engineers projects and industry QC practices to form a set of common requirements commensurate with the scope and nature of services described in this Work Plan.

## 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 Work Plan and its respective appendices. This CQC Plan will be implemented for the following activities:

- Required project meetings/teleconferences
- Mobilization
- Grading and backfilling
- Site restoration and revegetation
- Inspection and testing
- Waste disposal
- Site surveys
- Demobilization

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# 2. 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 Work Plan.

## 2.2 Project Manager

The Contractor's Project Manager will oversee the entire project and is responsible for the direction, execution, and successful completion of project tasks. The Project 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 Contractor 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, invoicing, scheduling, and other requirements.
- Ensure adherence to the quality requirements of the contract, specifications, 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.
- Communicate as the primary contact between the Cannon AFB Construction Representative and the Contractor for actions and information related to the task.
- Communicate and interface with the CQC Systems Manager.

## 2.3 Project Engineer

The primary responsibility of the Contractor's Project Engineer is the completion of all field activities, including field engineering, survey control, and inspection and testing, on schedule and as directed by the Project Manager. The duties of the Project Engineer, as they apply to the project, include the following:

- Establish a field base for operations and mobilize subcontractors and Contractor personnel.

- Coordinate work activities of subcontractors and Contractor 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 Construction Quality Control Systems Manager

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

The duties of the CQC Systems Manager, 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.

## 2.5 Field Engineer

The Field Engineer reports to the on-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 technical specifications and contract drawings, 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 Stormwater Pollution Prevention Plan (Appendix E).
- Inspect the work performed each day for compliance with the 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 Construction Manager

The on-site Construction Manager will ensure the timely completion of all field activities as directed by the Project Manager. The Construction Manager project tasks include:

- Establish a field base for operations and mobilize subcontractors and Contractor 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 subcontractor(s).
- 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 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. The Contractor 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. CONSTRUCTION INSPECTION PLAN

Contractor QC is the means to ensure 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 prior to initiation of work described in the 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.
- Work with the Site Health and Safety Officer (SHSO) in 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 Cannon AFB.

The Cannon AFB Project Manager 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 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 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.
- Ensure review of safety requirements has been completed by the SHSO with site personnel to include compliance with and upgrading of the safety plan and AHA.

The Cannon AFB Project Manager will be notified at least 48 hours in advance of any initial-phase activity. During the initial inspection, the CQC Systems Manager 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.

## 3.3 Additional Inspections

The CQC Systems Manager 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 Cannon AFB Project Manager.
- Staff on-site supervision or work crews change.
- Work on a definable feature is resumed after a substantial period of inactivity.
- Other problems develop.

## Figure B-1. Inspection Checklist Example

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

**Figure B-1. Inspection Checklist Example**

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

## Figure B-2. Daily Quality Control Report Example

Daily Report No.: _____ Date:_____
Contract No.: _____
Project Title & Location: Cannon AFB: LF-
_____
Weather: _____ Precipitation: _____ In.: ___ Temp.: _____ Min.: _____ Max.:_____

**1. Contractor/Subcontractors and Area of Responsibility:**

| NUMBER | TRADE | HOURS | EMPLOYER | LOCATION/ DESCRIPTION OF WORK |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
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| | | | | |
| | | | | |
| | | | | |
| | | | | |

**2. 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 Example

**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 Example

**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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## 3.4 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 or designated Contractor 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 Cannon AFB Project Manager 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 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 Cannon AFB Project Manager, or designee, 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 Cannon AFB Project Manager will schedule and conduct the prefinal inspection. The Contractor QC inspection personnel, CQC Systems Manager, or other primary management representative, as applicable, will attend. The inspection will be conducted in response to notification from the CQC Systems Manager. The CQC Systems Manager is required to verify at this time that all specific items previously identified to the Contractor 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 Cannon AFB 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 the Contractor.

### 3.4.3 Final Acceptance Inspection

The Cannon AFB Project Manager will schedule the final acceptance inspection after notification from the CQC Systems Manager 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 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 the Contractor.

All inspection records will be made available to Cannon AFB through the Contractor's Project Manager.

# 4. 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 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 Cannon AFB Project Manager 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 and other appropriate personnel, including subcontractors responsible for completion of activities. The report from the CQC Systems Manager 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 Contractor's Project Manager is responsible for taking notes and preparing reports for all meetings and teleconferences. Notes will be typed and the original report furnished to Cannon AFB within 7 working days after the meeting/biweekly teleconference for concurrence and distribution. At a minimum, this report will include the following items:

- 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 Project Manager will also provide a weekly record of all discussions, verbal directions, telephone conversations, etc., in which Contractor personnel participated. These records, "Confirmation Notices," will be numbered sequentially and will identify participating personnel, subject discussed, and any conclusions reached. The Project Manager will forward a copy of the Confirmation Notice within 7 working days to the Cannon AFB Project Manager, or designee.

## 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, the Contractor will provide the Cannon AFB 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 Cannon AFB Project Manager 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 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. 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 Construction 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 Cannon AFB for review; the final report shall incorporate all comments received on the draft report.

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# 5. 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 Cannon AFB Project Manager, Nonconformance Reports for each item will be completed.

## 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 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 will monitor the corrective actions to verify that they were properly implemented and accepted and that the Nonconformance Report was resolved.

This page intentionally left blank.

**Figure B-3. Nonconformance Report Example**

QUALITY ASSURANCE REPORT

NO. (1) _____

NONCONFORMANCE REPORT

| | | |
|---|---|---|
| CLIENT OR PROJECT (2)<br>Cannon AFB: LF- | | 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)<br>*(Submit Sketch, If Applicable)* | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| NAME AND SIGNATURE OF PERSON RECOMMENDING DISPOSITION (11) | | TITLE/COMPANY | DATE (12) |
| III. EVALUATION OF DISPOSITION BY CONTRACTOR. REASON FOR DISPOSITION (13) | | | |
| | | | |
| | | | |
| IV. CORRECTIVE ACTION (14) ☐ Required ☐ Not Required | | | |
| | | | |
| | | | |

**Figure B-3. Nonconformance Report Example**

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<br>☐ REJECTED<br>☐ ACCEPTED WITH COMMENTS | ☐ ACCEPTED<br>☐ REJECTED<br>☐ ACCEPTED WITH COMMENTS | ☐ ACCEPTED<br>☐ REJECTED<br>☐ ACCEPTED WITH COMMENTS | ☐ACCEPTED<br>☐REJECTED<br>☐ACCEPTED WITH COMMENTS |

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

(17) BY _____ SIGNATURE _____

TITLE _____ DATE_____

**Figure B-4. Field Change Request Example**

| PROJECT<br><br>Cannon AFB: LF- | 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 Example (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*_____

_____

TETRA TECH EC, INC.

# CANNON AIR FORCE BASE
# REPAIR OF COVERS AT LANDFILLS NO. 3 AND NO. 4
## Draft Technical Specifications

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# SECTION 01100
# GENERAL DESCRIPTION OF WORK

## PART 1 - GENERAL

### 1.1 SCOPE

A. The Work to be performed under this contract consists of furnishing all material, labor, equipment, transportation, and supervision necessary to repair the existing landfill soil covers at LF-03 and LF-04 at Cannon Air Force Base (CAFB), New Mexico as detailed on the Drawings, Specifications, and Work Plan and as specified herein.

### 1.2 SITE DESCRIPTION AND LOCATION

A. 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. The area surrounding Cannon AFB is used mainly for farming and ranching.

### 1.3 PRINCIPAL FEATURES OF WORK

The Work includes, but is not necessarily limited to the following. Reference the Work Plan (Sections 2 and 4) and Attachment B of Section 01400, as well as the associated Drawings and Specifications for additional details regarding the projects and specific field tasks.

<u>PROJECT LF-03: LANDFILL NO. 3 (PROJECT NUMBER XXXXXX)</u>

This project involves the repair of landfill soil covers in the areas of former trenches where subsidence has occurred. These areas are to be cleared of existing vegetation, filled with soil and revegetated to prevent infiltration of surface water and enhance evapotranspiration.

Supporting work for this project includes the site preparation and earthwork, excavation, backfill, compaction, erosion controls, traffic controls, and seeding.

<u>PROJECT lf-04: LANDFILL NO. 4 (PROJECT NUMBER XXXXXX)</u>

This project involves the repair of landfill soil covers in the areas of former trenches where subsidence has occurred. These areas are to be cleared of existing vegetation, filled with soil and revegetated to prevent infiltration of surface water and enhance evapotranspiration.

Supporting work for this project includes the site preparation and earthwork, excavation, backfill, compaction, erosion controls, traffic controls, and seeding.

### 1.4 DEFINITIONS

The following words and phrases are used throughout the Specifications.

A. CONTRACTOR: Prime CONTRACTOR and Architect/Engineer Team. The CONTRACTOR will implement the contract, perform architect/engineer services, and administer the construction program for the United States Army Corps of Engineers (USACE) and its Client (Cannon AFB).

B. SUBCONTRACTOR: The individual, partnership firm, corporation, or joint venture, which is a sublet part of the contract by the CONTRACTOR.

C. BASE: Cannon Air Force Base (CAFB) and/or CAFB Project Management personnel.

D. THE USACE: The United States Army Corps of Engineers (USACE), who represent CAFB and are the primary authority for execution of the project.

E. Drawings: Architectural/Engineering plans, drawings, details, graphics, etc., used for visual representation and construction of the project.

F. Specifications: The project and design/engineering requirements and associated documents; including, but not necessarily limited to plans, profiles, details, notes, etc. shown on the Drawings.

G. Work: All operations and activities related to the completion of the Water Security Corrective Action Projects to be conducted by the ENGINEER, Subcontractor and lower-tier Subcontractors.

H. Provide: When referring to personnel; furnish qualified person, able to furnish proof of qualification upon demand, for work to be done. When referring to equipment and/or components; furnish complete, usable, specified item(s) or ENGINEER-approved equivalent, and install in the indicated/required place.

1.5 SCHEDULE

A. The project schedule will be provided at the bid stage. The SUBCONTRACTOR shall be prepared to work within these parameters and to comply with the established schedule.

**PART 2 - PRODUCTS** (Not Applicable)

**PART 3 - EXECUTION** (Not Applicable)

END OF SECTION

# SECTION 01200
# SPECIAL CONDITIONS

## PART 1 - GENERAL

1.1 ACCESS AND USE OF WORK SITES

A. All operations and project related activities of the SUBCONTRACTOR shall be confined within the designated Work area. Storage areas will be allocated by the CONTRACTOR and USACE. The activities of the SUBCONTRACTOR's personnel shall be limited to the immediate work and storage areas. All operations shall be coordinated with the CONTRACTOR.

B. Base operations shall not be interrupted except at the location of the installation. Interruptions shall be minimized and scheduled in advance with the ENGINEER, USACE and the BASE.

C. The CONTRACTOR and SUBCONTRACTOR shall be required to obtain Base access passes for the duration of the project prior to the start of work.

1.2 FIRE PROTECTION

The SUBCONTRACTOR shall be responsible for the fire protection of the Work, including protection devices, maintenance, and operations. Immediately report all fires to the CONTRACTOR. Existing fire protection shall not be used, unless authorized by USACE or the BASE.

1.3 UTILITIES

A. Utilities are available upon coordination with the CONTRACTOR, USACE, and the BASE. The SUBCONTRACTOR shall make his own connections for temporary water and power for construction purposes.

B. The SUBCONTRACTOR shall provide his own compressed air and compressor.

1.4 PERSONNEL PARKING

The SUBCONTRACTOR's personnel shall use only parking areas designated and assigned by USACE and the BASE.

1.5 SANITATION FACILITIES

The SUBCONTRACTOR shall provide temporary sanitation facilities for its employees. Location of services shall be coordinated with the CONTRACTOR and USACE.

1.6 SAFETY

A. The SUBCONTRACTOR shall comply with the requirements of the following documents and maintain copies at the Work site. The more stringent requirement(s) of each document shall apply.

1. Basewide Health and Safety Plan (HASP – USAF, 2000).

2. Site-specific Safety and Health Plan (SSHP) is to be prepared by the CONTRACTOR and submitted to the BASE for review in accordance with Section 01300.

3. Occupational Health and Safety Standards (OSHA) Part 1926 "Safety and Health Regulations for Construction".

4. Construction Industry Safety and Health Standards Digest (OSHA 2202, Occupational Safety and Health Administration, latest revision).

B. The SUBCONTRACTOR shall hold weekly safety meetings with their personnel to review all applicable safety requirements of the above referenced documents. The CONTRACTOR shall set the time and place for these meetings and notify the CONTRACTOR accordingly.

C. The SUBCONTRACTOR shall furnish to the CONTRACTOR Materials Safety Data Sheets on all chemicals prior to introduction onto Base property.

1.7 ADDITIONAL DRAWINGS AND SPECIFICATIONS

Given adequate notice, the CONTRACTOR will furnish to the SUBCONTRACTOR up to three additional sets of the Drawings and the Specifications for construction purposes.

1.8 COORDINATION

A. The SUBCONTRACTOR shall be held responsible for the necessary coordination to the extent that a complete installation is made in accordance with the Drawings and the Specifications.

1.9 AUTHORITY

A. The official authority for the surveillance and administration of the Contract for the Work rests solely with USACE-Omaha District and the USACE-Albuquerque District local personnel as described in the Work Plan.

B. All SUBCONTRACTOR inquiries shall be routed to the CONTRACTOR for disposition that may include USACE and the BASE as needed.

C. USACE-Albuquerque District will inspect and monitor the Work through the course of the Contract as well as the CONTRACTOR.

D. The SUBCONTRACTOR is advised that all Field Changes or Design Changes to the Work shall be made only upon receipt of a "Field Change Request" (FCR) or Design Change Notice (DCN) form signed by THE ENGINEER and USACE in accordance with the Construction Quality Control (CQC) Plan, which is an appendix of the Work Plan. Unauthorized changes shall be removed and/or corrected at the SUBCONTRACTOR's expense.

1.10 SECURITY

The SUBCONTRACTOR and CONTRACTOR personnel shall be properly cleared or escorted when entering the Base or other secured areas. The BASE "Standard Security Regulations" shall be enforced.

1.11 FIELD LAYOUT AND EXISTING STRUCTURES

A. The SUBCONTRACTOR shall furnish capable personnel to layout the field work as detailed on the Drawings.

B. Work will be performed within existing site(s) owned and occupied by the BASE. All Work that occurs within these site(s) shall be coordinated with the CONTRACTOR, USACE, and the BASE personnel responsible for the areas where the Work is to occur. The SUBCONTRACTOR's personnel shall not violate any restricted areas.

C. The SUBCONTRACTOR shall be responsible for obtaining and maintaining all applicable permits in accordance with Paragraph 1.18 of this specification prior to the start of work including the BASE Dig Permit(s). At the request of the SUBCONTRACTOR, BASE utility location personnel will locate all existing utility locations within the work area, or adjacent areas that may affect the work.

D. The SUBCONTRACTOR shall notify the CONTRACTOR in the event of finding previously unidentified underground utilities and shall indicate these found utility locations on as-built Record Documents to be submitted to the CONTRACTOR at the completion of the work.

E. The SUBCONTRACTOR shall monitor excavation work for the presence of unidentified underground utilities and excavate by hand when required.

F. If any underground utilities or other structures/features have to be undermined, the SUBCONTRACTOR must provide adequate support prior to continuing further excavation.

G. The SUBCONTRACTOR shall ensure that underground utilities that are exposed while work is being carried out are protected against damage.

H. If the SUBCONTRACTOR damages any underground utilities, the SUBCONTRACTOR must immediately inform the CONTRACTOR. The SUBCONTRACTOR shall correct any damage at the SUBCONTRACTOR’s own expense. The SUBCONTRACTOR shall not be compensated for any resulting standby time.

1.12 UTILITY OUTAGES

A. Any outages required by the SUBCONTRACTOR that will shut down any system (power, water, gas or sewer) shall be coordinated with the CONTRACTOR and USACE and shall be performed on a weekend, if required by the BASE.

B. Utility outages shall be held to a minimum necessary to complete the work. All planned utility outages shall be coordinated with the CONTRACTOR and

USACE. SUBCONTRACTOR shall coordinate electrical supply with the BASE or local utility such that SUBCONTRACTOR uses existing supply if possible or installs a separate supply panel/meter base, and the BASE or local utility is responsible for bringing power to the panel where a breaker isolates power to the installation.

1.13 WASTE

A. The SUBCONTRACTOR shall dispose of all the Work developed wastes, including asphalt, oil filters, surface vegetation, temporary erosion control measures, etc. at the appropriate off-site disposal facility at no additional expense to the CONTRACTOR.

B. All excavated earth materials must be deposited within the site boundary. Materials shall be compacted in place, conforming to the Specifications Section 02200.

1.14 TESTS

Testing of water or soils, etc. shall be paid for by the SUBCONTRACTOR. Testing operations shall not result in work stoppage during testing procedures.

1.15 TEMPORARY FENCING/BARRIERS

The SUBCONTRACTOR shall erect a temporary orange safety fence or other required barrier around the Work area, if required by the CONTRACTOR for regulation.

1.16 DOWNTIME DIRECTED BY USACE OR BASE

A. It is not expected that BASE operations will interfere with the SUBCONTRACTOR operations.

B. When possible to do so, the CONTRACTOR will notify the SUBCONTRACTOR 24 hours in advance of any proposed downtime of eight (8) hours duration or longer.

C. Any claims for lost time by the SUBCONTRACTOR shall be submitted to the CONTRACTOR in accordance with the SUBCONTRACT.

1.17 CONSTRUCTION SCHEDULING

The SUBCONTRACTOR shall sequence the delivery of materials to conform with the CONTRACTOR's Schedule of Construction. Deviations from the Schedule of Construction will not be permitted unless authorized in writing by THE CONTRACTOR.

1.18 PERMITS

A. All required BASE, State and other local governing authority permits, including Base Dig Permits, shall be obtained, purchased, and maintained by the SUBCONTRACTOR for the duration of the work.

B. SUBCONTRACTOR shall allow the CONTRACTOR to inspect all permits, exemptions, etc. granted by permitting agencies.

1.19 MATERIAL ENVIRONMENTAL SUBMITTALS

The SUBCONTRACTOR shall submit Material Safety Data Sheets (OSHA Form 20) or the equivalent to the CONTRACTOR for all chemical based compounds (grease, oils, cleaning compounds, sealants, etc.) that will be used on or incorporated into the Work, including material used on or in all equipment furnished and installed by the SUBCONTRACTOR and/or their lower-tier Subcontractors.

1.20 WAGES AND BENEFITS

To conform with current local, state, and federal laws and existing agreements, the SUBCONTRACTOR shall be responsible for the payment of Davis-Bacon prevailing wages and benefits to all personnel, including lower-tier Subcontractor personnel, employed on the project. Certified payroll records shall be submitted to the CONTRACTOR within 10 days of payment.

1.21 LOCKOUT/TAGOUT PROCEDURES

The SUBCONTRACTOR shall develop Energy Isolation Procedures for all equipment, in accordance with USACE EM 385-1-1 safety standards and the requirements of the Occupational Safety and Health Administration (OSHA) Standard 1910.147 "The Control of Hazardous Energy (Lockout/Tagout)". These procedures shall be included in the SUBCONTRACTOR's HASP to be submitted to the CONTRACTOR for review in accordance with Section 01300.

1.22 TRAFFIC AND ROAD SAFETY

A. Prior to performing any work in vehicle traffic areas, the SUBCONTRACTOR shall submit a Traffic Safety and Control Plan to the CONTRACTOR for approval in accordance with Section 01300 and this specification.

B. The Traffic Safety and Control Plan shall address the safety of personnel and equipment through the following:

1. Use of physical barriers as the preferred control method.

2. Alternate means of control if physical barriers are demonstrated not feasible.

3. Signage, use of traffic cones and/or barriers and Flagman (if necessary).

4. Responsibilities of involved parties.

C. General

1. While work is in progress, road traffic should be hindered or obstructed as little as possible while ensuring adequate worker and equipment protection.

2. All commercial vehicles must enter and exit from the Portales (South) Gate. Standard CONTRACTOR and SUBCONTRACTOR vehicles (e.g., trucks) can use the Main Gate.

3. Comply with CONTRACTOR-approved Traffic Safety and Control Plan.

D. Storage of Soil, Equipment and Ancillary Materials

1. Soil, equipment and ancillary materials must be placed or stored in such a way that they do not cause any danger to traffic.

E. Removal of contaminants on roads

1. Spillages that result from SUBCONTRACTOR activities shall be cleaned up as quickly as possible.

F. Protective clothing

1. SUBCONTRACTOR personnel who work outside any vehicle, in a traffic area, shall comply with Traffic Safety and Control Plan and wear High-visibility safety garments.

G. Accidents:

1. Notify CONTRACTOR immediately of all accidents, whatever their nature, that occur on site or that are related to work being carried out and to provide an accident report and any related information that the CONTRACTOR requests.

**PART 2 - PRODUCTS** (Not Applicable)

**PART 3 - EXECUTION** (Not Applicable)

END OF SECTION

# SECTION 01300
# SUBMITTALS

## PART 1 - GENERAL

1.1 INTENT

A. The intent of this section of the Specifications is to set forth requirements for submittals of shop drawings, product bulletins, brochures, data, substitutions, certificates, plans, test reports, and samples for the CONTRACTOR's review of products for compliance with the intent of design documents.

B. Requested submittals are specified in the individual specification sections. See Attachment A for a summary of the required submittals.

C. Testing and test reporting requirements are detailed in the individual specifications and summarized in Section 01400 – Quality Requirements.

1.2 SHOP DRAWINGS

A. When requested, submit original drawings, or reproducible drawing, prepared by Subcontractor, manufacturer, supplier or distributor, which illustrate some portion of the Work, showing fabrication, setting and/or erection details.

B. Shop drawings shall be prepared by qualified detailer.

C. Identify details by reference to sheet and detail numbers shown on the Drawings.

D. Reproductions for Submittals: Furnish reproducible or original drawings.

1.3 PRODUCT DATA

A. Manufacturer's Standard Schematic Drawings

1. Modify drawings to delete information that is not applicable to the Work.

2. Supplement standard information to provide additional information applicable to the Work.

B. Other data may include proposed SUBCONTRACTOR substitutions (for materials, processes, etc.), manufacturer's certificates, catalog sheets, brochures, diagrams, schedules, performance charts, illustrations and other standard descriptive data.

1. Clearly mark each copy to identify pertinent materials, products or models.

2. Show dimensions and clearances required.

3. Show performance characteristics and capacities.

4. Show wiring diagrams and controls.

5. Show product weight and support points.

1.4 SAMPLES

A. Submit, as required, physical examples to illustrate materials, equipment or workmanship, and to establish standards by which completed work is judged.

B. Field Samples and Mock-Ups

1. Erect at the Work site, at a location designated by the CONTRACTOR.

2. Construct each sample or mock-up complete, including work of all trades required in finished work.

3. Maintain matching approved samples in or near field office.

1.5 PLANS

A. Prepare and submit required SUBCONTRACTOR plans to the CONTRACTOR for review and approval as specified in the individual specifications.

B. CONTRACTOR approval of SUBCONTRACTOR plans is required prior to the start of work.

1.6 SUBCONTRACTOR'S RESPONSIBILITIES

A. Review and sign plans, shop drawings, product data and samples prior to submittal.

B. Verify:

1. Field measurements.

2. Field construction criteria.

3. Catalog numbers and similar data.

C. Coordinate each submittal with requirements of the Work and Contract documents.

D. The SUBCONTRACTOR's responsibility for errors and omissions in submittals is not relieved by the CONTRACTOR's review of submittals.

E. The SUBCONTRACTOR's responsibility for deviations in submittals from requirements of Contract documents is not relieved by the CONTRACTOR's review of submittals, unless the CONTRACTOR gives written acceptance of specific deviations.

F. Notify the CONTRACTOR, in writing at time of submittal, of deviations in submittals from requirements of Contract documents.

G. Work that requires submittals shall not begin until the return of the submittals with the CONTRACTOR's stamp and initials or signature of approver indicating review.

H. After the CONTRACTOR's review, distribute copies to the appropriate lower-tier Subcontractors, suppliers or manufacturers.

I. Only submittals marked "NO EXCEPTIONS TAKEN, or "MAKE CORRECTIONS NOTED" (with those corrections made on the submittals) shall be kept at the Work site.

1.7 SUBMITTAL REQUIREMENTS

A. SUBCONTRACTOR shall transmit submittals to the CONTRACTOR at least ten (10) working days (two weeks) before the date when the related work is to start for review and approval, unless otherwise shown in the individual Specification or in Attachment A.

B. Submit three (3) copies of drawings, product data, and brochures required for the project. One (1) copy will be returned to the SUBCONTRACTOR (for his use and distribution) and two (2) retained by the CONTRACTOR.

C. Submit samples and product literature specified, and/or called for, in each section of the Specifications.

D. Accompany submittals with transmittal letter, in triplicate, containing:

1. Data.

2. Project title.

3. SUBCONTRACTOR's name and address.

4. The number of each shop drawing, product data and sample submitted.

5. Notification of deviations from Contract documents.

6. Other pertinent data as required.

E. Submittals shall include:

1. Data and revision dates.

2. Project title.

3. The names of:

a. The CONTRACTOR.

b. SUBCONTRACTOR.

c. Lower-tier Subcontractor.

d. Supplier.

e. Manufacturer.

f. Separate detailer when pertinent.

4. Identification of product or material.

5. Relation to adjacent structure or materials.

6. Field dimensions, clearly identified as such.

7. The Specifications section number.

8. Applicable standards (ASTM, Federal Specification, etc.).

9. A 4" x 6" blank space shall be provided above title block, or on the cover of product submittals and brochures for the CONTRACTOR's stamp.

10. Identification of deviations from Contract documents.

11. The SUBCONTRACTOR's and Lower-tier Subcontractor's stamp, initialed or signed, certifying to review of submittal, verification of field measurements, and compliance with Contract documents.

F. The SUBCONTRACTOR shall not install/construct any work items until the related submittal has been approved by the CONTRACTOR.

1.8 RESUBMITTAL REQUIREMENTS

A. Revise initial drawings as required and resubmit as specified for initial submittal.

B. Drawings and Plans: Indicate on the Drawings or plans any changes that have been made other than those requested by the CONTRACTOR.

C. Product Data and Samples: Submit new data and samples as required for initial submittal.

1.9 CONTRACTOR'S DUTIES

A. The CONTRACTOR shall receive all submittals from Subcontractors and material suppliers and shall review same for sufficiency of submittal. If submittals are in order, the CONTRACTOR shall forward them to USACE for review.

B. If the submittals are not in order, the CONTRACTOR shall return them to the submitter for revision and resubmittal.

1.10 SUBMITTAL REVIEW

A. The CONTRACTOR will review all submittals to determine whether the Drawings and the Specifications have been properly interpreted and requirements fulfilled.

B. Submittals returned by the CONTRACTOR shall be marked with one (l) of the following notations:

| | |
|---|---|
| *NO EXCEPTIONS TAKEN* | *REJECTED* |
| *MAKE CORRECTIONS NOTED* | *REVISE AND RESUBMIT* |

C. "NO EXCEPTIONS TAKEN" mark on submittals does not constitute a waiver of detailed or specified requirements unless so stated in writing by the CONTRACTOR.

D. Submittals bearing the CONTRACTOR’s review comments of "MAKE CORRECTIONS NOTED" shall be corrected to comply with the requirements of the review comments and the design documents.

E. Submittals bearing the CONTRACTOR's review comments of "REJECTED", or "REVISE AND RESUBMIT" shall be corrected to comply with the requirements of the review comments and the design requirements, and resubmitted for review.

1.11 DISTRIBUTION OF SUBMITTALS AFTER REVIEW

A. The SUBCONTRACTOR shall distribute copies of approved plans, shop drawings, product data, brochures, and samples, which carry the CONTRACTOR's stamp to:

1. CONTRACTOR's file.

2. Subcontractor's file.

3. Work site file.

4. Record documents file.

5. Other prime subcontractors.

6. Supplier.

7. Fabricator.

B. Distribute samples as directed.

C. The CONTRACTOR shall insure that an approved copy of all pertinent shop drawings, product brochures and other required documentation are included in the data required for the Project Construction Completion Report.

**PART 2 - PRODUCTS** (Not Applicable)

**PART 3 - EXECUTION** (Not Applicable)

ATTACHMENT A

SUBCONTRACTOR SUBMITTAL REGISTER

(To be completed for the Final version of the Work Plan once all specifications have been reviewed by USACE and Cannon AFB)

| Specification Section | Subcontractor Submittal | Due | Contractor Review Period |
|---|---|---|---|
| 01200 | SUBCONTRACTOR HASP | PTC | 1 week |
| 01200 | Permit Schedule | WB | 1 week |
| 01200 | Traffic Safety Plans | PTC | 1 week |
| 01200 | Material Safety Data Sheets (if required) | PTS | 1 week |
| 01400 | Subcontractor Construction QC Plan | PTC | 2 weeks |
| 01400 | Testing and Inspection Services | PTP | 2 weeks |
| 01700 | Project Record Documents | FAP | 2 weeks |
| 02200 | Proposed Backfill Lab Tests (Moisture-Density and Particle Size) | PTP | 2 days |
| 02200 | Proposed Backfill Samples | PTP | 2 days |
| 02900 | Seed Certification – Pure Live Seed Content | PTP | 1 week |
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AT – After Test

BFR – Before Fabrication Release

FAP – Final Application for Payment

PPA – Prior to Performing Activity

PTC – Prior to start of Construction

PTP – Prior to Purchase

PTW – Prior to Welding

WS – With Shipment

PTS – Prior to Shipment

WB – With Bid

END OF SECTION

# SECTION 01400
# QUALITY REQUIREMENTS

## PART 1 GENERAL

1.1 SUMMARY

A. Section provides the basic quality criteria and quality requirements for the performance of the Work that are applicable to SUBCONTRACTOR, independent testing agencies, or laboratories. “Attachment A” presents the Testing Plan and Log for all testing required for Division 2 specifications. “Attachment B” provides the Definable Features of Work in tabular form for documentation of inspections.

1.2 SUBMITTALS

A. Submit a SUBCONTRACTOR Construction Quality Control Plan or other documentation of their Quality Program to CONTRACTOR for approval prior to start of construction.

B. Submit information for proposed testing and inspection services to the requirements outlined in paragraph 1.6. CONTRACTOR shall approve the testing laboratories, and inspection personnel prior to purchase.

1.3 SUMMARY OF SUBCONTRACTOR QUALITY PROGRAM

A. Provide a SUBCONTRACTOR Quality Control Plan or management System. SUBCONTRACTOR may base this plan on documents and guidance provided by CONTRACTOR. CONTRACTOR shall, at its own discretion, monitor SUBCONTRACTOR, its lower-tier subcontractors, suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply with the design documents to achieve successful completion of the project Work. Repair and patching of existing structures, components, and pavements will match the surrounding conditions and will be based on Federal, State, and local codes and standards as shown on the Drawings, Specifications, other project documents, and as agreed upon by CONTRACTOR and USACE.

C. Verify that all lower-tier subcontractors have management systems or Construction Quality Control Plans in place that controls their work process and ensures contract deliverables are provided that comply with the design documents and applicable local codes and standards requirements.

D. CONTRACTOR reserves the right to provide inspection and testing of any and all Work performed by SUBCONTRACTOR or its lower-tier subcontractors.

1.4 SUBCONTRACTOR QUALITY

A. Perform work with persons qualified to produce the level of required and specified quality.

B. When manufacturers' instructions conflict with the Specification, SUBCONTRACTOR shall request clarification from CONTRACTOR before proceeding.

C. Comply with manufacturers' tolerances and tolerances shown on design documents. When manufacturers' tolerances and drawing tolerances conflict with the design documents, SUBCONTRACTOR shall request clarification from CONTRACTOR before proceeding.

D. Verify that field measurements comply with design documents.

1.5 REFERENCES

A. Conform to the most recent revision of referenced standards, except where specific revision is established by code.

1.6 TESTING AND INSPECTION SERVICES

A. Employ and pay for services of qualified testing personnel, agencies or laboratories acceptable to CONTRACTOR to perform specified testing.

1. Fourteen (14) days prior to start of Work, submit materials testing laboratory name, address, and telephone number, and names of full time specialist and responsible officer for CONTRACTOR acceptance.

2. Submit a copy of applicable current laboratory certifications.

B. Tests, inspections, and other services will be performed by SUBCONTRACTOR as specified in individual specification sections. CONTRACTOR will monitor/oversee SUBCONTRACTOR for the following:

1. The testing and inspection personnel are certified for the work.

2. Laboratory has a specialist on staff to review testing services performed by SUBCONTRACTOR.

3. Testing and Inspections shall be performed using testing equipment calibrated to intervals in accordance with the U.S. National Bureau of Standards or other as approved by the CONTRACTOR.

C. Testing, inspections and source quality control may occur either on-site or off-site.

D. Notify CONTRACTOR at least 2 days prior to expected time of operation requiring testing or inspection.

E. Testing and employment of testing agency or laboratory shall not relieve SUBCONTRACTOR of obligation to perform Work in accordance with requirements of the Specification.

F. Typical Responsibilities of Testing Laboratory/Testing Agencies:

1. Test samples of products submitted by SUBCONTRACTOR.

2. Provide qualified personnel at site. Coordinate with CONTRACTOR and SUBCONTRACTOR in performance of services.

3. Perform specified sampling and testing of products in accordance with specified standards.

4. Ascertain compliance of materials and products with requirements of the design documents.

5. Promptly notify CONTRACTOR and/or SUBCONTRACTOR of observed irregularities or non-conformance of Work or products.

G. After each test, submit two copies of report to CONTRACTOR. Reports shall provide interpretation of test results and include the following:

1. Date issued.

2. Project title and number.

3. Name of inspector/tester.

4. Date and time of sampling or inspection.

5. Identification of product and the Specification section.

6. Location in Project.

7. Type of inspection or test.

8. Date of test.

9. Identification of test equipment and calibration date/due date or equipment.

10. Results of tests.

11. Conformance/Non-conformance with the Specification.

H. Limits on authority of testing and inspection agencies:

1. Agency or laboratory shall not release, revoke, alter, or revise requirements of the testing standards and acceptance criteria stated in Specification.

2. Agency or laboratory does not have authority to approve or accept any portion of the Work.

3. Agency or laboratory shall not assume authority of CONTRACTOR.

4. Agency or laboratory has no authority to stop the Work except to mitigate unsafe or hazardous condition.

## PART 2 PRODUCTS

Not Used.

## PART 3 EXECUTION

### 3.1 EXAMINATION

A. CONTRACTOR shall monitor/oversee SUBCONTRACTOR Work.

B. SUBCONTRACTOR shall verify existing site conditions are acceptable for subsequent work.

C. SUBCONTRACTOR, CONTRACTOR, and USACE shall field verify the layout of the proposed grading and fill work as shown on the Drawings and Specifications at the two project locations.

D. SUBCONTRACTOR shall verify construction area is of sufficient size to accommodate grading and filling activities.

E. SUBCONTRACTOR shall verify all materials, appurtenances, and accessories received on site meet the standards and quantity specified.

F. SUBCONTRACTOR shall verify that all lower-tier Subcontractors have the required equipment, qualified personnel, and material required to complete Work according to the Specification.

### 3.2 PREPARATION

A. SUBCONTRACTOR shall ensure areas where Work is to be performed are clear of unauthorized personnel and cordoned off.

B. SUBCONTRACTOR shall ensure site Work area is ready prior to performing work.

C. SUBCONTRACTOR shall ensure that traffic control is in place prior to commencing Work and is maintained in a safe condition at all times in accordance with the Specifications.

### 3.3 SUMMARY OF TESTING AND INSPECTIONS

A. CONTRACTOR will typically witness all SUBCONTRACTOR field testing and will monitor laboratory testing and batch plant operations.

B. SUBCONTRACTOR shall coordinate testing and inspection schedules with CONTRACTOR in accordance with Attachment A – Test Plan and Log and Attachment B – Definable Features of Work.

C. Laboratory and field testing is detailed in the subsections of the individual Specifications. Attachment A – Testing Plan and Log summarizes the required testing with scope and reporting requirements.

END OF SECTION

## Attachment A. Testing Plan and Log

(To be completed for the Final version of the Work Plan once all specifications have been reviewed by USACE and Cannon AFB)

**ERSC CONTRACT NUMBER:** _____ **PROJECT TITLE AND LOCATION:** LF-03 and LF-04 Landfill Cover Repair – Cannon AFB **CONTRACTOR:** _____

| Spec. Section & Para. No. | Item of Work | Test Required Method | Accredited/ Approved Lab | | Sampled | Tested By | Location of Test | | Frequency | Date Completed | Date Forwarded to Contractor Office | Criterion |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Yes | No | | | On Site | Off Site | | | | |
| **Division 1 - General Requirements** | | | | | | | | | | | | |
| **Section 01XXX** | | | | | | | | | | | | |
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| **Division 2 – Site Work** | | | | | | | | | | | | |
| **Section XXXXX** | | | | | | | | | | | | |
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| **Section XXXXX** | | | | | | | | | | | | |
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## Attachment B. Definable Features of Work

(To be completed for the Final version of the Work Plan once all specifications have been reviewed by USACE and Cannon AFB)

| Activity | Preparatory | Done | Initial | Done | Follow-Up | Done |
|---|---|---|---|---|---|---|
| **Preconstruction** | | | | | | |
| | | | | | | |
| **Facility Setup** | | | | | | |
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| **LF-03** | | | | | | |
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| **LF-04** | | | | | | |
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| **Demobilization** | | | | | | |
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# SECTION 01700
# PROJECT CLOSEOUT

## PART 1 GENERAL

1.1 SECTION INCLUDES

A. Closeout procedures.

B. Final cleaning.

C. Protecting installed construction.

D. Project record documents.

E. Maintenance service.

1.2 CLOSEOUT PROCEDURES

A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for CONTRACTOR review.

B. Provide submittals to CONTRACTOR required by authorities having jurisdiction.

C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

1.3 FINAL CLEANING

A. Execute final cleaning prior to final project assessment.

B. Remove waste and surplus materials, rubbish, temporary soil erosion and sediment controls, and construction facilities from site.

1.4 PROTECTING INSTALLED CONSTRUCTION

A. Protect installed Work and provide special protection where specified in individual specification sections.

B. Prohibit traffic from revegetated areas.

1.5 FINAL SITE SURVEY

SUBCONTRACTOR to perform a final site survey to document the final grading in all disturbed areas.

1.6 PROJECT RECORD DOCUMENTS

Subcontractor shall be responsible for the following during the RA activities at the Project sites:

A. Maintain on site one set of the following record documents; record actual revisions to the Work:
   1. Drawings.
   2. Specifications.
   3. Addenda.
   4. Change Orders and other modifications to the Contract.
   5. Reviewed Shop Drawings, Product Data, and Samples.
   6. Manufacturer's instruction for installation and maintenance.

B. Ensure entries are complete and accurate, enabling future reference by BASE.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress, not less than weekly.

E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
   1. Manufacturer's name and product model and number.
   2. Product substitutions or alternates utilized.
   3. Changes made by Addenda and modifications.

F. Record Drawings: Legibly mark each item on the Project Drawings to record actual construction including:
   1. Measured horizontal and vertical extent of revegetated surface improvements.
   2. Field changes of dimension and detail.
   3. Details not on original Contract drawings.
   4. Final site topography of disturbed areas in CADD format.

G. Submit documents to CONTRACTOR with claim for final Application for Payment.

1.7 MAINTENANCE SERVICE

A. Furnish service and maintenance of revegetated areas and erosion control measures indicated in specification Sections 02200 and 02900 until vegetation has been established.

B. Do not assign or transfer maintenance service to agent or Subcontractor without prior written consent of BASE.

**PART 2 PRODUCTS - Not Used**

**PART 3 EXECUTION - Not Used**

END OF SECTION

# SECTION 02110
# CLEARING AND GRUBBING

## PART 1 - GENERAL

### 1.1 SUMMARY

A. Section Includes:

1. Protecting existing vegetation to remain.
2. Removing existing vegetation.
3. Clearing and grubbing.
4. Stripping and stockpiling topsoil.
5. Locating site utilities.
6. Temporary erosion- and sedimentation-control measures.

### 1.2 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads and streets during site-clearing operations.

1. Do not close or obstruct adjacent streets without permission from CONTRACTOR and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed traffic ways if required by CONTRACTOR or authorities having jurisdiction.

B. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing. It is not anticipated that there are any active utilities in these areas.

C. Do not commence site clearing operations until temporary erosion- and sedimentation-control measures are in place.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Section 02200 "Earthwork."

1. Obtain approved borrow soil material off-site only when satisfactory soil material is not available on-site.

B. Provide erosion and sediment controls that may include, but are not limited to, the following:

1. Silt Fence (including stakes)
2. Stone
3. Mulch (weed free)

## PART 3 - EXECUTION

### 3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Locate and clearly identify shrubs and surface vegetation to be removed.

C. Protect existing site improvements from damage during construction.

1. Restore damaged improvements to their original condition, as acceptable to CONTRACTOR.

### 3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties, according to erosion- and sedimentation-control Drawings and requirements of the stormwater pollution prevention plan (SWPPP).

B. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction in accordance with the SWPPP until permanent vegetation has been established.

C. Remove temporary erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

### 3.3 TREE AND PLANT PROTECTION

A. General: Protect trees and plants remaining on-site, adjacent to the work area.

B. Repair or replace trees, shrubs, and other vegetation indicated to remain that are damaged by construction operations, in a manner approved by the CONTRACTOR.

### 3.4 EXISTING UTILITIES

A. It is not anticipated that existing utilities will be encountered during this remediation effort. However, if utilities are encountered contact the CONTRACTOR for further instruction.

## 3.5 CLEARING AND GRUBBING

A. Remove obstructions and surface vegetation to permit remediation effort in areas designated on the Drawings.

B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.

1. Place fill material in horizontal layers not exceeding a loose depth of 6 inches, and compact each layer to a density equal to adjacent original ground as approved by the CONTRACTOR .

C. Inorganic Materials within the Site: Remove all major surface debris materials, and dispose in accordance with CONTRACTOR's direction. Minor surface debris (≤ 6 inches) will be buried in low spots within the landfill boundaries per the direction of the CONTRACTOR.

## 3.6 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surface vegetation, obstructions, and incidental trash, and dispose of them on Base, per the CONTRACTOR's direction.

END OF SECTION

# SECTION 02200
# EARTHWORK

## PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes excavation, backfilling, compacting, and grading in accordance with the Drawings, other project documents, and the following unless otherwise approved by the CONTRACTOR.

B. Related Sections:

1. Section 01100: General Description of Work.

2. Section 01200: Special Conditions

3. Section 01400: Quality Requirements

4. Section 02900: Revegetation.

1.2 REFERENCES

A. American Society for Testing and Materials:

1. ASTM D2487 – Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System).

2. ASTM D2487 - Standard Test Method for Classification of Soils for Engineering Purposes.

1.3 DEFINITIONS

A. Utility: Any buried pipe, duct, conduit, or cable.

B. Caliche: Mixture of sand, gravel, or desert debris cemented by porous calcium carbonate or other salts.

1.4 SUBMITTALS

A. Conform to Section 01300, "Submittals".

B. Conform to Section 01400, “Quality Requirements”

C. Samples of offsite import fill materials and test data shall be submitted to CONTRACTOR for approval prior to use.

D. Backfill: When imported fill is used for backfill, SUBCONTRACTOR shall submit laboratory soil test results documenting fill properties. This test data shall include moisture-density relationship and particle size analysis.

## PART 2 - PRODUCTS

### 2.1 EXCAVATED SUITABLE FILL MATERIALS

A. At a minimum, excavated suitable fill material shall be:

1. Free of snow, ice, frozen soil, mud, wood, or other organic materials.

2. Free of visible or known contamination unless approved by the CONTRACTOR.

3. Containing enough sand and fine-grained material to fill voids in the fill.

4. Free of lumps and rocks larger than 3 inches and debris.

B. The excavated suitable fill material may be used in all fill areas to bring existing grade to the lines and grades indicated on the design drawings.

### 2.2 BACKFILL

A. Use on-site fill or imported fill materials that comply with this Section.

B. Backfill materials shall be fine, readily compactable soil or granular material that shall not contain lumps or rocks larger than 3 inches in diameter, concrete, asphalt, or other objectionable material.

C. Backfill classified as CL-ML, SC, SM, SC-SM, SW, SP, GP, GC, and GM as defined by ASTM D2487, are acceptable unless otherwise approved by the CONTRACTOR.

### 2.3 TOPSOIL MATERIALS

A. Stripped soil during excavation shall be salvaged and reused.

B. Use topsoil from on-Base stockpiles, as designated by the CONTRACTOR.

### 2.4 SOURCE QUALITY CONTROL

A. When tests indicate materials do not meet specified requirements, SUBCONTRACTOR shall change material and retest after notification of CONTRACTOR.

2.5 SOIL EROSION/CONTROL

A. Erosion bales shall be hay, straw, or other approved material containing approximately five cubic feet of material and weighing a minimum of 35 pounds. Bales shall be bound with wire. Anchor stakes shall be wood 2" x 2" x 4'-0" long.

B. Fencing

1. Fabric: Use 3'-0" high "Typar 3301W Silt Fence" by Reemay Inc., Old Hickory, TN; "Mirafi 100X Envirofence" by Mirafi/Nicolon Corp. Norcross, GA (770) 447-6272; "910SC SILTCHEK" by Synthetic Industries, Chattanooga, TN (800) 621-0444; or equal, as approved by ENGINEER.

2. Wood Post: Use 4'-0" minimum length 2" x 2" stakes.

**PART 3** - **EXECUTION**

3.1 PREPARATION

A. The SUBCONTRACTOR shall obtain and maintain all applicable Base, State and local governing authority permits required for the work in accordance with Section 01200.

B. SUBCONTRACTOR shall request utility locates from the Base. Base shall be responsible for locating and marking out all existing underground utilities within and surrounding the construction areas.

C. Identify required lines, levels, contours, and datum, as required.

D. Protect all utilities from damage during excavation and backfill operation.

E. Protect vegetation, rock outcroppings and other features which are to remain as portion of final landscaping.

F. Protect benchmarks, survey control points, existing structures, fences, sidewalks, paving, curbs, and railroad appurtenances from excavating equipment and vehicular traffic.

G. Identify potential for hazardous materials.

H. The SUBCONTRACTOR shall obtain backfill and topsoil from a Base stockpile or borrow area, as designated by the CONTRACTOR.

I. Work Method: Before starting work, the SUBCONTRACTOR shall obtain CONTRACTOR approval as to the method of placing and compaction.

J. Fill material shall not be placed upon frozen subgrade, nor placed, spread, or rolled while the material is frozen or thawing, nor during unfavorable weather conditions.

K. Existing Utility Lines: Any sewer, water, gas, electric, nitrogen, telecommunications fiber and copper, or other pipe lines or conduits uncovered during the course of the Work shall be protected from damage. If existing utility line is in direct interference with the proposed work, the SUBCONTRACTOR shall notify the CONTRACTOR for disposition of the matter.

L. The SUBCONTRACTOR shall be responsible for any damage done to existing underground utilities as shown on the Drawings or delineated by the Base during the utility locate process described above.

M. Surface Sealing: The SUBCONTRACTOR shall seal all surfaces, by rolling, at the completion of each days work.

3.2 STRIPPING TOPSOIL

A. Strip existing topsoil and stockpile at a location identified by the CONTRACTOR.

B. All Topsoil (3 inches min.) shall be stripped from the ground surface upon which fill is to be placed and stockpiled. Stripping of top soil shall be performed after removal of organic materials (surface vegetation). Obtain approval from the CONTRACTOR for location of stockpile, prior to beginning work.

3.3 STOCKPILING (AS NECESSARY)

A. Stockpile materials on site at locations indicated by CONTRACTOR.

B. Stockpile in sufficient quantities to meet Project schedule and volume requirements.

C. Maximum height of soil stockpile shall not exceed eight (8) feet for safety.

D. Stockpile different materials far enough from each other to prevent intermixing.

E. Direct storm water away from stockpile area to prevent erosion or deterioration of materials.

F. Stockpile hazardous materials in accordance with USACE regulations (e.g. on impervious material and cover to prevent erosion and leaching) until disposed of.

G. Provide barriers around, if required, to prevent soils getting to adjacent waters.

3.4 STOCKPILE CLEANUP/RESTORATION

A. Remove stockpile; leave area in clean and neat condition, grade site surface to its original contours, and restore the area to its original condition to prevent standing water.

B. If revegetation of the stockpile area is required, perform in accordance with Section 02900 - Revegetation.

## 3.5 EXAMINATION

A. Verify existing site conditions and inform CONTRACTOR if the site conditions deviate from the design documents.

## 3.6 BACKFILLING

A. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces. If material or subgrade surfaces of this nature are encountered, they will be over excavated and backfilled with a CONTRACTOR-approved backfill material as specified in this Section.

B. Areas to be backfilled, except rock excavations, shall be plowed or scarified to a minimum depth of four (4) inches until the surface is free from ruts, hummocks, or other uneven features, which would prevent uniform compaction, by the equipment to be used. The subgrade materials shall be proofrolled or stabilized, if necessary, in accordance with CONTRACTOR's recommendations in preparation for fill

C. The SUBCONTRACTOR may be required to add moisture to the excavation materials in the borrow area if, in the opinion of the CONTRACTOR, it is not possible to obtain uniform moisture content by adding water on the fill surface. The CONTRACTOR may be required to rake or disk the fill soils to provide uniform moisture content through the soils. The moisture addition can also be used to control dust.

D. The application of water to embankment materials shall be made with any type of watering equipment approved by the CONTRACTOR, which will give the desired results. Water jets from the spreader shall not be directed at the embankment with such force that fill materials are washed out.

E. If too much water is added to any part of the fill, such that the material is too wet to permit the desired compaction from being obtained, rolling and all work on that section of the fill shall be delayed until the material has been allowed to dry to a suitable moisture content. The Subcontractor will be permitted to rework wet material in an approved manner to hasten its drying.

F. Fill materials shall be placed and mixed in evenly spread layers. After each fill layer has been placed, it shall be uniformly compacted with a minimum of three (3) passes of the compaction equipment. Placement equipment used for compaction shall be preapproved by the CONTRACTOR.

G. Fill materials shall be placed such that the thickness of loose material does not exceed six (6) inches. Place and compact backfill to within four (4) inches of the proposed final grade.

H. Place topsoil to final elevation. Average thickness shall be four (4) inches thick.

I. Final grade will match the slope of the adjacent area and will prevent ponding of precipitation in the immediate area. Revegetate surface in accordance with Section 02900 - Revegetation.

## 3.7 COMPACTION

A. Following are minimum requirements for which the SUBCONTRACTOR is required to comply. SUBCONTRACTOR is responsible for full compliance with contract documents, and may perform additional testing at his expense.

B. Compaction, as specified above, shall be obtained by the use of sheepsfoot rollers, multiple-wheel pneumatic-tired rollers, or other equipment approved by the CONTRACTOR for backfill soils. Compaction of each layer shall be continuous over the entire area.

C. Proof-rolling: Perform, as directed by the CONTRACTOR, to determine location of unacceptable soft areas. Unacceptable areas shall be over-excavated and stabilized in accordance with this specification.

D. Scarify the top 4 inches (topsoil) of areas to be seeded and seed in accordance with Section 02900.

## 3.8 SOIL EROSION CONTROL

A. The installation of erosion control measures will be performed in accordance with the SWPPP and Project Drawings.

B. Install erosion bale barriers across ditches and swales as necessary to prevent eroded materials from leaving the site. Excavate a trench 4 inches deep and firmly anchor bales in the trench with wood stakes, two (2) per bale minimum.

C. Silt Fence: Installation shall be performed before starting any work. SUBCONTRACTOR installation procedures shall conform with the manufacturer's printed instructions and the following.

1. Wood posts shall be driven, at 6'-0" centers, into the soil at a $30^{o}$ incline towards the embankment or runoff source. The post shall be embedded approximately 1/3 the length of the post.

2. Excavate a trench approximately 6" deep along the uphill side of the fence line. Lay the bottom 6 inches of the fabric into the trench and backfill the trench and compact.

3. Erosion fence shall be removed after the seeding has been performed and a substantial stand of grass has occurred.

D. Erosion control installations shall be monitored on a weekly basis (minimum) and after every storm event and shall be maintained by the SUBCONTRACTOR in accordance with the SWPPP and Project Drawings.

## 3.9 TOLERANCE

A. Subcontractor shall perform Work in accordance with the following tolerances.

B. Finish Earthwork Grades: Variation from the specified finish grade plane shall not be more than 0.1 feet.

## 3.10 FIELD QUALITY CONTROL

A. Allow the CONTRACTOR to inspect and approve subgrades and fill layers before construction work is performed. Notify the CONTRACTOR a minimum of eight (8) working hours in advance.

B. All workmanship and materials specified in this section of the Specifications shall be performed at the direction of the CONTRACTOR.

C. The CONTRACTOR shall approve all material used for fill. Approval shall be obtained before use of material on the site by the SUBCONTRACTOR.

D. The CONTRACTOR shall be present to observe all fill placement and compaction operations.

E. Upon completion of the work, the CONTRACTOR and/or USACE may perform additional soil exploration to ascertain the fill, as placed, conforms to the intent of the Specifications. Unacceptable conditions shall be corrected by the SUBCONTRACTOR as directed with no additional cost to the CONTRACTOR.

F. Compaction of backfill and subgrade will be documented in the field on a daily basis by the CONTRACTOR (FIELD ENGINEER).

END OF SECTION

# SECTION 02900
# REVEGETATION

## PART 1 - GENERAL

1.1 GENERAL

A. The Subcontractor shall furnish all labor, materials and workmanship required for seeding and revegetation of all areas that are denuded of vegetation during construction activities in accordance with the Drawings, other project documents, and the following unless otherwise approved by the CONTRACTOR.

1. Seeding and fertilizing.

2. Mulching.

3. Maintenance.

B. Related Work Specified Elsewhere

1. Section 01100: General Description of Work.

2. Section 02200: Earthwork.

1.2 SUBMITTALS

A. The SUBCONTRACTOR shall furnish THE CONTRACTOR with documentation for origin and pure live seed content as determined by a certified testing laboratory within five months prior to the date of delivery for seed shipped interstate and no older than nine (9) months for seed shipped intrastate.

B. Pure live seed content shall be defined as percent purity times percent germination, including dormant seed, divided by 100.

1.3 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver grass seed in original containers showing analysis of seed mixture, percentage of pure seed, year of production, net weight, date of packaging and location of packaging.

B. Damaged packages are not acceptable and shall be replaced with new, undamaged packages.

C. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

1.4 JOB CONDITIONS

A. The SUBCONTRACTOR shall verify subgrade and topsoil are placed per the Drawings and Section 02200 of the Specifications prior to beginning the work of this section of the Specifications.

B. Beginning work means the acceptance of existing conditions.

**PART 2 - PRODUCTS**

2.1 SEED

A. Each bag of seed shall be sealed and labeled by the seed dealer in accordance with Federal Seed Laws and New Mexico Department of Agriculture Labeling Laws.

B. All seed shall be furnished in bags or containers clearly labeled to show the name and address of the supplier, the seed name, the lot number, net weight, origin, the percentage of weed seed content, the guaranteed percentage of purity and germination, and the pounds of Pure Live Seed of each seed species in the container. All brands furnished shall be free from noxious seeds; e.g., Russian or Canadian Thistle, European Bindweed, Johnson Grass, Leafy Spurge, etc.

C. Seed which has become wet, moldy, or other wise damaged in transit or in storage will not be acceptable.

D. Seed types and amount of pure live seed (PLS) required per acre shall be as follows.

1. For General Reclamation

a. 8.25 lbs. - Lincoln Smooth Broom

b. 5.25 lbs. - Pubescent Wheat grass

c. 5.25 lbs. - Intermediate Wheat grass

d. 5.25 lbs. - Perennial Rye grass

e. 3.50 lbs. - Annual Rye grass

f. 2.25 lbs. - Crested Wheat grass

g. 2.25 lbs. - Western Wheat grass

2.2 FERTILIZER

A. Commercial fertilizer shall conform to the applicable State fertilizer laws. Fertilizer shall be uniform in composition, dry, and free flowing, and shall be delivered to the site in the original, unopened containers, each bearing the

manufacturer's guaranteed analysis. Fertilizer which becomes caked or otherwise damaged, making it unsuitable for use, will not be accepted.

B. Fertilizer shall include: 18% nitrogen, 46% phosphorus, 0% potassium nutrient by weight.

2.3 SOIL AMENDMENTS

A. Granular:

1. MENEFEE GRANULAR HUMATE by Sundine Enterprises.

2. Or equal as approved by the CONTRACTOR.

B. Water Soluble:

1. GROW-PLEX SP by Sundine Enterprises.

2. Or equal as approved by the CONTRACTOR.

2.4 ACCESSORIES

A. Mulching Material:

Materials for mulching shall consist of Certified Weed Free field or marsh hay or straw of oats, barley, wheat, rye or triticale certified under the New Mexico Department of Agriculture. Wood chip mulch shall consist of fresh, moist pole peelings material having approximate dimensions:

Width: 1/4 to 1/2 inch
Length: 3 to 4 inches.

B. Tackifier: Material for mulch tackifier shall consist of a free-flowing, noncorrosive powder produced from the natural plant gum of Plantago Insularis (Desert Indianwheat), applied in a slurry with water and wood fiber. The powder shall possess the following properties:

1. Protein content 1.6% + 0.2%

2. Ash content 2.7% + 0.2%

3. Fiber 4.0% + 0.4%

4. pH 1% solution 6.5% - 8.0%

The material used for mulch tackifier shall not contain any mineral filler, recycled cellulose fiber, clays, or other substances which may inhibit germination or growth of plants.

## PART 3 - EXECUTION

### 3.1 PREPARATION

A. Protect existing ground improvements from damage.

B. Remove all foreign materials, plants, stumps, roots, large rocks (greater than 3 inches), and debris, from site. Do not bury foreign material.

C. Cultivate, to depth of 3", area to receive seeding. Repeat cultivation in areas where equipment has compacted subgrade.

### 3.2 SPREADING TOPSOIL

A. Spread topsoil, to a depth of 4", over area to be seeded. Place during dry weather, and on dry unfrozen subgrade.

B. Apply fertilizer at an application rate of 250 lbs./acre (pre-plant incorporate), or per manufacturer's recommendation.

C. Cultivate topsoil to depth of 4" with mechanical tiller. Cultivate inaccessible areas by hand. Rake until surface is smooth.

D. Remove from site, foreign materials collected during cultivation.

E. Grade to eliminate rough spots and low areas where ponding may occur.

F. Ensure positive drainage.

G. Finish ground level firm and sufficient to prevent sinkage pockets when irrigation is applied.

### 3.3 SOIL AMENDMENTS

A. Apply both of the following at the specified rates, or per manufacturer's recommendation:

1. Apply 1 lb. water soluble humates with 25 gallons of water per acre.

2. Apply 200 lbs. per acre of granular humate.

### 3.4 SEEDING

A. After the surface is raked and rolled, the seed shall be drilled or sown with approximately 1/4 inch of topsoil cover. Seeding shall be accomplished by mechanical landscape type drills. All loose exposed rock larger than 3 inches shall be removed from areas that are to be seeded.

B. Apply seed at the rate of 32 lbs./acre in two intersecting directions, or per supplier's recommendation. Rake lightly.

C. Do not sow immediately following rain, when ground is too dry, or during windy periods.

D. Apply water with fine spray immediately after each area is sown.

E. Broadcast type seeders or hydraulic seeding will be permitted only on small areas not accessible to drills.

F. Hydromulch slurry blower shall be set at the highest pressure and smallest nozzle opening that will accommodate the seed.

G. Seed may also be distributed by hand at twice the specified seeding rate.

H. Broadcast or Hydraulic seeding application shall begin from the toe of the slope and proceed up the slope.

I. Slope harrowing or hand raking shall follow to loosen the soil and cover the broadcast or hydraulic seed. This work may be done with two (2) or three (3) passes of a chain borrow.

3.5 MULCHED AREAS

A. All natural terrain areas disturbed by construction shall be seeded. All seeded areas shall receive mulch.

B. The area to be covered with mulch shall be properly prepared, fertilized, and seeded before the mulch is placed.

C. After seeding and fertilizing has been completed, mulch shall be uniformly applied to completely cover all newly seeded areas. Mulch shall be crimped-in with a crimper. Hand-crimping shall be allowed only in areas where mechanical methods cannot be used. Tackifier shall then be applied immediately upon completion of mulching and crimping.

3.6 MAINTENANCE

A. The CONTRACTOR shall provide a temporary water delivery system to ensure uniform seed germination and to keep surface of soil damp.

B. This temporary watering system may be a water truck with a spray boom or any other method that satisfactorily distributes a uniform coverage of clean water to previously seeded areas.

C. The water distributed shall be free of oil, acid, salt, or other substances harmful to plants. The water source shall be approved by the CONTRACTOR prior to use.

D. Trucks with spray systems shall not be driven on seeded areas. The water force shall not move the seed on the ground.

E. Apply water slowly so that surface soil will not puddle and crust. No more than one half (1/2) inch of water per hour shall be applied.

F. Replant damaged grass areas showing root growth failure, deterioration, bare or thin spots and eroded areas.

G. Additional applications of water may be made as designated by the CONTRACTOR.

3.7 RESTORATION

A. Restore roadways, grassed areas, planted areas, structures, and any other damage during execution of work of this section of the Specifications.

3.8 ACCEPTANCE

A. Maintain seeded areas until final acceptance of the Work by THE CONTRACTOR.

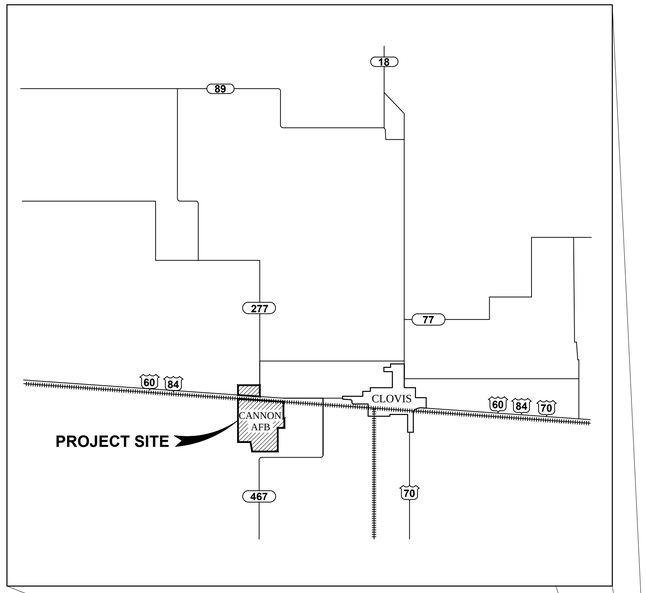
B. Maintain surfaces and supply additional top soil and seeding where necessary, including areas affected by erosion.

END OF SECTION

# REPAIR OF LANDFILL COVERS LF03 AND LF04

# CANNON AIR FORCE BASE

## NEW MEXICO




**VICINITY MAP**
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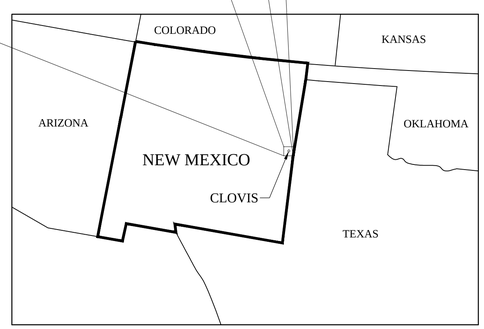


**LOCATION MAP**
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***PREPARED FOR*:**
**CANNON AIR FORCE BASE**

***PREPARED BY*:**
**TETRA TECH, INC.**

| DRAWING NUMBER | TITLE | REVISION |
|---|---|---|
| G-100 | TITLE AND COVER SHEET | B |
| G-101 | SYMBOLS & ABBREVIATIONS | B |
| C-101 | GENERAL AND CONSTRUCTION NOTES | B |
| C-102 | EXISTING SITE PLAN | B |
| C-103 | CLEARING & GRUBBING PLAN, LF-03 (PART 1 OF 2) | B |
| C-104 | CLEARING & GRUBBING PLAN, LF-03 (PART 2 OF 2) | B |
| C-105 | CLEARING & GRUBBING PLAN, LF-04 | B |
| C-106 | SITE GRADING PLAN, LF-03 (PART 1 OF 2) | B |
| C-107 | SITE GRADING PLAN, LF-03 (PART 2 OF 2) | B |
| C-108 | SITE GRADING PLAN, LF-04 | B |
| C-109 | SOIL EROSION & SEDIMENT CONTROL PLAN | B |
| C-110 | SOIL EROSION & SEDIMENT CONTROL DETAILS | B |
| C-111 | SOIL EROSION & SEDIMENT CONTROL NOTES | B |

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**REPAIR OF LANDFILL COVERS LF03 AND LF04**

**CANNON AIR FORCE BASE**

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**TITLE AND COVER SHEET**

DRAWING
**G-100**

SHEET **1** OF **13**

REVISION **B**

## ABBREVIATIONS

| ABBV | DESCRIPTION |
|---|---|
| @ | AT |
| AB | ANCHOR BOLT |
| ABAN | ABANDON |
| ACI | AMERICAN CONCRETE INSTITUTE |
| AISC | AMERICAN INSTITUTE OF STEEL CONSTRUCTION |
| AITC | AMERICAN INSTITUTE OF TIMBER CONSTRUCTION |
| ANSI | AMERICAN NATIONAL STANDARD INSTITUTE |
| APPROX | APPROXIMATE |
| AR | AS REQUIRED |
| ARCH | ARCHITECTURAL |
| ASHTO | AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS |
| ASTM | AMERICAN SOCIETY FOR TESTING AND MATERIALS |
| AWS | AMERICAN WELDING SOCIETY |
| BETW | BETWEEN |
| BLDG | BUILDING |
| BOT | BOTTOM |
| BP | BASE PLATE |
| BR | BRICK |
| BRG | BEARING |
| CF | CUBIC FEET |
| CL, ℄ | CENTER LINE |
| CLR | CLEARANCE, CLEAR |
| CMP | CORRUGATED METAL PIPE |
| CONC | CONCRETE |
| CONST JT | CONSTRUCTION JOINT |
| CY | CUBIC YARD |
| DEG, ° | DEGREES |
| DI | DUCTILE IRON |
| DIA | DIAMETER |
| DIM | DIMENSION |
| DIP | DUCTILE IRON PIPE |
| DWG | DRAWING |
| E | EAST |
| E/P | EDGE OF PAVEMENT |
| EA | EACH |
| EL | ELEVATION |
| EQ | EQUAL |
| ETC | ET CETERA |
| EW | EACH WAY |
| EXST, EXIST | EXISTING |
| FDN | FOUNDATION |
| FG | FINISH GRADE |
| FLR | FLOOR |
| FS | FAR SIDE |
| FT OR ' | FOOT, FEET, |
| FTG | FOOTING |
| GALV | GALVANIZED |
| GWT | GROUND WATER TABLE |
| HORIZ OR H | HORIZONTAL |
| HT | HEIGHT |
| IBC | INTERNATIONAL BUILDING CODE |
| IE | INVERT ELEVATION |
| ID | INSIDE DIAMETER |
| IN OR " | INCH |
| INV | INVERT |

| ABBV | DESCRIPTION |
|---|---|
| L | LENGTH |
| LBS | POUNDS |
| LF | LINEAR FEET |
| LONGIT | LONGITUDINAL |
| MAX | MAXIMUM |
| MFR | MANUFACTURER |
| MIN | MINIMUM |
| MISC | MISCELLANEOUS |
| N | NORTH |
| N/A | NOT APPLICABLE |
| NIC | NOT IN CONTRACT |
| NO OR # | NUMBER |
| NOM | NOMINAL |
| NS | NEAR SIDE |
| NTS | NOT TO SCALE |
| OC | ON CENTER |
| OD | OUTSIDE DIAMETER |
| OH | OUTSIDE FACE OF OVERHEAD |
| PC | POINT OF CURVATURE |
| PCF | POUNDS PER CUBIC FOOT |
| PL | PLATE |
| PSF | POUNDS PER SQUARE FOOT |
| PSI | POUNDS PER SQUARE INCH |
| PT | POINT OF TANGENCY, |
| PVC | POLYVINYL CHLORIDE |
| PWD | PLYWOOD |
| R | RADIUS |
| RC | REINFORCED CONCRETE |
| RCP | REINFORCED CONCRETE PIPE |
| REF | REFERENCE |
| REQ'D | REQUIRED |
| S | SOUTH |
| SCHED | SCHEDULE |
| SF | SQUARE FEET |
| SHT | SHEET |
| SIM | SIMILAR |
| SL | SLOPE |
| SPEC'S | SPECIFICATIONS |
| SQ | SQUARE |
| SQ IN | SQUARE INCH |
| STA | STATION |
| STD | STANDARD |
| STL | STEEL |
| T&B | TOP AND BOTTOM |
| T/ | TOP OF |
| T/PIPE, TOP | TOP OF PIPE |
| TEMP | TEMPORARY |
| TOC | TOP OF CONCRETE |
| TRANS | TRANSVERSE |
| TYP | TYPICAL |
| UNO OTHERWISE | UNLESS NOTED |
| V | VERTICAL |
| VAR | VARIES |
| VERT | VERTICAL |
| W | WEST |
| W/ | WITH |
| W/O | WITHOUT |
| WP | WORK POINT |
| WWF | WELDED WIRE FABRIC |

## SYMBOLS AND LINETYPES

TOWER

EXISTING FEATURE
EXISTING DIRT ROAD
EXISTING MAJOR CONTOUR
EXISTING MINOR CONTOUR
DEPRESSION CONTOUR
8268.05 ELEVATION
CLEARING AND GRUBBING AREA
LF3-021 REPAIR SURVEY POINT
LIMITS OF GRADING
x FENCE LINE
SILT FENCE

## DRAWING NUMBERING CONVENTION

D - 8605DK02 - G - 101

- SHEET NUMBER
- DISCIPLINE IDENTIFIER
- PROJECT NUMBER
- OVERALL DESIGN

### DISCIPLINE IDENTIFIER

| | |
|---|---|
| G | GENERAL |
| C | CIVIL |
| E | ELECTRICAL |
| I | INSTRUMENTATION/CONTROL/COMMUNICATIONS |
| P | PROCESS |

## DRAWING REFERENCE

NOTE:
THE SYMBOLS LISTED ON THIS SHEET ARE TYPICAL SYMBOLS THAT MAY OR MAY NOT BE USED IN THIS SET OF PLANS. SPECIAL SYMBOLS WILL BE NOTED ON THE SHEETS THAT THEY APPLY TO.

1. DRAWINGS ARE CROSS REFERENCED IN THE FOLLOWING MANNER:

(a) SECTION CUT ON DRAWING C–100:

A / C–105
- SECTION IDENTIFICATION
- DRAWING ON WHICH SECTION APPEARS

(b) ON DRAWING C–105 THE SECTION IS IDENTIFIED AS:

A / C–100
- SECTION IDENTIFICATION
- DRAWING FROM WHICH THE SECTION WAS TAKEN

(c) SECTION CUT AND SECTION SHOWN ON SAME DRAWING:

A / –
- SECTION IDENTIFICATION
- SAME DRAWING

2. PLANS, DETAILS AND ELEVATIONS ARE CROSS REFERENCED IN A SIMILIAR MANNER.

3. SECTION OR DETAIL REFERENCED BY ANNOTATION, "SEE 5/C–100" MEANS SEE SECTION 5 OR DETAIL 5 ON DRAWING NUMBER C–100.

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CHECKED BY: D SHEA
DESIGNED BY: P PATTON
DESIGN FILE:
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DRAWING INDEX AND SYMBOLS & ABBREVIATIONS

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G-101

SHEET 2 OF 13

REVISION B

SURVEY NOTES

1. SURVEY PROVIDED BY ATKINS ENGINEERING ASSOCIATES DATED JUNE 2011.
2. HORIZONTAL DATUM IS NEW MEXICO EAST STATE PLANE COORDINATE SYSTEM, NAD 83, US FEET.
3. VERTICAL DATUM IS NAVD 88.
4. EXISTING FEATURES IDENTIFIED ON DRAWINGS ARE APPROXIMATE IN LOCATION.

CONSTRUCTION DRAWING NOTES

1. THE SUBCONTRACTOR SHALL HAVE KNOWLEDGE OF, AND WILL WORK IN COMPLIANCE WITH, THE TERMS AND CONDITIONS STATED IN THE PROJECT PLANS, SPECIFICATIONS AND DRAWINGS ISSUED, AND IS SUBJECT TO THE SAME SANCTIONS FOR VIOLATIONS OF SUCH PERMITS.
2. ALL ACTIVITIES AUTHORIZED UNDER THE PROJECT PLANS ISSUED MUST BE IN STRICT CONFORMANCE WITH THE SPECIFICATIONS AND DETAILS DEPICTED BY THE PROJECT PLANS.
3. LOCAL FIRE DEPARTMENTS AND EMERGENCY MANAGEMENT TEAMS SHALL BE MADE AWARE OF ANY HAZARDOUS CHEMICALS AND WASTE ON-SITE.
4. REPRESENTATIVES FROM CANNON AFB AND THE NEW MEXICO ENVIRONMENTAL DEPARTMENT (NMED)/ UNITED STATES ARMY CORPS OF ENGINEERS (USACE) SHALL BE PERMITTED TO INSPECT THE WORK AREA (INCLUDING RELEVANT RECORDS) AT ANY TIME DEEMED NECESSARY, TO ENSURE THAT ALL ACTIVITIES ARE IN ACCORDANCE WITH THE TERMS AND CONDITIONS SPECIFIED.
5. ALL CONSTRUCTION ACTIVITY, INCLUDING OPERATION OF MACHINERY, EXCAVATION, FILLING, GRADING, CLEARING OF VEGETATION, DISPOSAL OF WASTE, AND STOCKPILING OF MATERIAL MUST TAKE PLACE WITHIN THE APPROVED WORK AREA AS DEPICTED ON THE CONSTRUCTION DRAWINGS. CONSTRUCTION ACTIVITY IS PROHIBITED WITHIN AREAS TO BE LEFT IN A NATURAL CONDITION OR AREAS NOT PERMITTED BY THE ISSUED PERMITS.
6. EQUIPMENT SHALL UTILIZE THE SUPPORT ZONE AREA TO BE DELINEATED BY THE USACE FOR EQUIPMENT STORAGE, TRAILER PARKING, PERSONNEL PARKING, AND SANITARY FACILITIES.
7. FUGITIVE DUST RESULTING FROM CONSTRUCTION ACTIVITIES SHALL BE MINIMIZED TO THE MAXIMUM EXTENT PRACTICABLE BY IMPLEMENTING APPROPRIATE CONTROL MEASURES. A WATERING VEHICLE SHALL BE AVAILABLE FOR THE DURATION OF PROJECT ACTIVITIES, INCLUDING RESTORATION.
8. NOISE IMPACTS SHALL BE MINIMIZED AND MITIGATED TO THE EXTENT PRACTICABLE. SUBCONTRACTOR SHALL MAINTAIN ALL EQUIPMENT IN GOOD OPERATING CONDITIONS AND ALL MOTORS AND ENGINES WILL BE MUFFLED ACCORDING TO MANUFACTURER'S SPECIFICATIONS AND WILL COMPLY WITH STATE ENVIRONMENTAL LAW. ANY FAULTY NOISE SUPPRESSOR WILL BE REPAIRED OR REPLACED, AND EQUIPMENT WILL NOT BE LEFT RUNNING UNNECESSARILY.
9. SUBCONTRACTOR SHALL REMOVE AND DISPOSE OF BRUSH AND OTHER VEGETATION AS REQUIRED FOR THE PROJECT AS OUTLINED IN THE PROJECT SPECIFICATIONS. THE DISPOSAL OF BRUSH OR OTHER VEGETATION IN ANY STREAM CORRIDOR, WETLAND, OR SURFACE WATER IS PROHIBITED.
10. THE USE OF EQUIPMENT IN ANY STREAM OR WETLAND AREA IS STRICTLY PROHIBITED.
11. ALL NECESSARY PRECAUTIONS SHALL BE TAKEN TO PRECLUDE CONTAMINATION OF ANY WETLAND OR WATERWAY BY SUSPENDED SOLIDS, SEDIMENTS, FUELS, SOLVENTS, LUBRICANTS, OR ANY OTHER ENVIRONMENTALLY DELETERIOUS MATERIALS ASSOCIATED WITH THE PROJECT. THESE MATERIALS SHALL BE STORED IN THE SUPPORT ZONE. EQUIPMENT RE-FUELING SHALL OCCUR IN THE SUPPORT ZONE.
12. STREAMS AND WETLANDS WILL BE PROTECTED FROM INDIRECT IMPACTS DURING CONSTRUCTION BY UTILIZING VARIOUS EROSION AND SEDIMENT CONTROL MEASURES INDICATED IN THE EROSION AND SEDIMENT CONTROL DETAILS AND IN ACCORDANCE WITH THE PROJECT STORMWATER POLLUTION PREVENTION PLAN (SWPPP). SILT FENCES SHALL BE PLACED BETWEEN WATER RESOURCE BOUNDARIES AND CONSTRUCTION AREAS. EXPOSED SOIL WILL BE SEEDED AND/OR MULCHED, AS SOON AS PRACTICABLE, TO ASSURE THAT EROSION AND SILTATION IS KEPT TO A MINIMUM ALONG STREAM AND WETLAND BOUNDARIES.
13. TEMPORARY EROSION CONTROL DEVICES SHALL BE INSTALLED AS SOON AS PRACTICABLE AND APPROPRIATE, AS INDICATED IN THE EROSION AND SEDIMENT CONTROL PLAN, NOTES, AND DETAILS, AND IN ACCORDANCE WITH THE PROJECT SWPPP. EROSION CONTROL DEVICES SHALL BE INSTALLED PRIOR TO ANY GRADING OR FILLING OPERATIONS AND INSTALLATION OF PROPOSED STRUCTURES OR UTILITIES. THEY SHALL REMAIN IN PLACE UNTIL CONSTRUCTION IS COMPLETED AND THE AREA IS STABILIZED AND/OR REVEGETATED. ADDITIONALLY, NO SITE PREPARATION WORK SHALL BE UNDERTAKEN UNTIL ALL REQUIRED EROSION CONTROL MEASURES HAVE BEEN INSTALLED.
14. IN THE EVENT THAT ARCHAEOLOGICAL MATERIALS, HUMAN REMAINS, OR EVIDENCE OF HUMAN BURIALS ARE ENCOUNTERED DURING CONSTRUCTION, ALL WORK IN THE VICINITY OF THE FIND SHALL BE IMMEDIATELY HALTED, THE FIND PROTECTED FROM FURTHER DAMAGE, AND USACE NOTIFIED. THE PERMITTEE IS ALSO REQUIRED TO NOTIFY THE LOCAL POLICE AND THE STATE HISTORIC PRESERVATION OFFICE IMMEDIATELY FOLLOWING SUCH A DISCOVERY.

SPILL PREVENTION, CONTAINMENT, AND COUNTERMEASURES NOTES

GENERAL

PERSONNEL LISTED BELOW ARE RESPONSIBLE FOR THE OVERSIGHT OF THE PETROLEUM PRODUCTS AND HAZARDOUS OR CONTROLLED SUBSTANCES. A CONTACT TELEPHONE LIST IS MAINTAINED ON SITE, WHICH INCLUDES:
1. PROJECT MANAGER = SUBCONTRACTOR
2. CONSTRUCTION MANAGER = SUBCONTRACTOR
3. COR = CONTRACTING OFFICER'S REPRESENTATIVE

SPILLS WILL BE IMMEDIATELY REPORTED TO CANNON AFB.
IN THE EVENT THAT A SPILL OCCURS ON THE SITE, THE FOLLOWING NOTIFICATION PROCEDURE WILL BE FOLLOWED:
1. SUBCONTRACTOR NOTIFIES THE CONSTRUCTION MANAGER.
2. THE CONSTRUCTION MANAGER NOTIFIES THE PROJECT MANAGER AND THE COR.

SPILL PREVENTION AND CONTROL

1. STORE SPILL CLEANUP MATERIALS ONSITE AND NEAR POTENTIAL SPILL AREAS (E.G. MATERIAL STORAGE AREA AND VEHICLE FUELING AREAS IN THE SUPPORT ZONE).
2. NOTIFY ALL CONSTRUCTION WORKERS OF THE LOCATION OF MATERIALS USED TO CLEAN UP SPILLS.
3. KEEP COMMERCIALLY AVAILABLE SPILL KITS FOR CONSTRUCTION EQUIPMENT ON SITE.
4. KEEP DRUMS, BARRELS AND TEMPORARY STORAGE BAGS FOR CONTAINMENT AND TRANSPORTATION ONSITE.
5. KEEP ABSORBENT PADS, OIL BOOMS, MAT, OR EQUIVALENT MATERIALS ON SITE.
6. KEEP WASHABLE, REUSABLE RAGS FOR CLEANING UP SMALL LUBRICANT LEAKS ON SITE.
7. IN THE EVENT OF A SPILL, PROTECT SURFACE WATER BODIES AND PROMPTLY CLEAN UP AND PROPERLY DISPOSE OF SPILL MATERIALS.
8. TRAIN EMPLOYEES AND SUBCONTRACTORS ON PROPER SPILL PREVENTION, NOTIFICATION, AND CONTROL METHODS.
9. DESIGNATE RESPONSIBLE INDIVIDUALS.
10. NEVER HOSE DOWN OR BURY DRY MATERIAL SPILLS. CLEAN UP AS MUCH AS POSSIBLE AND DISPOSE OF PROPERLY.

POLLUTION PREVENTION

VEHICLE/EQUIPMENT MAINTENANCE

1. DO NOT DISCHARGE VEHICLE/MACHINERY WASH WATERS OR SOLVENTS TO STORM DRAIN SYSTEM OR TO SURFACE WATER BODIES.
2. ANY EQUIPMENT WHICH MUST BE REFUELED IN THE FIELD WILL BE REFUELED FROM TANKS CARRIED TO THE WORK SITE BY TRUCK.
3. PREVENT SPILLS AND LEAKS DURING FUELING AND MAINTENANCE OPERATIONS.
4. INSPECT AND MAINTAIN VEHICLES REGULARLY TO MINIMIZE LEAKS AND DRIPS; PLACE DRIP PANS OR ABSORBENT MATERIALS UNDER LEAK-PRONE MACHINERY WHEN IDLE.
5. COMPLY WITH FEDERAL, STATE, AND LOCAL REQUIREMENTS FOR FUEL STORAGE TANKS.

SANITARY/SEPTIC WASTE MANAGEMENT

1. LOCATE SANITARY FACILITIES INSIDE THE SUPPORT ZONE.
2. UNTREATED RAW WASTEWATER SHALL NOT BE DISCHARGED TO LAND, THE STORM DRAIN SYSTEM OR TO SURFACE WATER BODIES.
3. SANITARY/SEPTIC FACILITIES SHOULD BE MAINTAINED IN GOOD WORKING ORDER BY A LICENSED SERVICE PROVIDER.
4. ARRANGE REGULAR WASTE COLLECTION BY A LICENSED HAULER BEFORE FACILITIES OVERFLOW.
5. IF WASHING OUT OF THE INTERIOR OF PORTABLE TOILETS IS NEEDED, INSURE THAT WASH WATER IS DISCHARGED TO LAND AND DOES NOT FLOW ONTO ROADWAYS, THE STORM DRAIN SYSTEM OR SURFACE WATER BODIES.

SITE NOTES

ALL INTERNAL ACCESS ROADS ARE DIRT OR GRAVEL.

EARTHWORK NOTES

1. ALL EXCAVATIONS SHALL COMPLY WITH OSHA 29CFR1926.650 – SUBPART – EXCAVATIONS.
2. GRADE THE TOP PERIMETER OF THE EXCAVATION AREAS TO PREVENT SURFACE WATER FROM DRAINING INTO EXCAVATED AREAS, OR UNPROTECTED SLOPES.
3. MAINTAIN STABLE SLOPES AT ALL TIMES
4. NOTIFY USACE OF UNEXPECTED SUBSURFACE CONDITIONS (I.E., PRESENCE OF WATER TABLE AND/OR EXTENT OF WASTE) AND DISCONTINUE AFFECTED WORK IN THE AREA UNTIL NOTIFIED BY THE USACE TO RESUME WORK.

EARTHWORK AND GRADING NOTES

1. REFER TO SPECIFICATION SECTION 02200 FOR BACKFILL, COMPACTION AND GRADING REQUIREMENTS.
2. EXCAVATE BACKFILL FROM AN APPROVED ON-BASE SOURCE. SOIL WILL BE FREE OF CONTAMINANTS, ORGANIC MATERIAL, OR ROCKS GREATER THAN 3 INCHES IN DIAMETER. STOCKPILE BACKFILL IN AN AREA APPROVED BY THE COR.
3. STAKE OUT BOUNDARIES OF ALL SUSPECTED SUBSIDENCE AREAS AS IDENTIFIED ON THE PROJECT DRAWINGS.
4. REMOVE EXISTING VEGETATION FROM THE SOIL COVER IN AREAS TO BE DISTURBED.
5. FILL IN LOW SPOT AND SHAPE SURFACE TO SLOPE AWAY FROM THE CENTER OF THE LANDFILL COVER. PLACE SOIL IN A 6" TO 8" LIFT.
6. COMPACT BY PROOF-ROLLING WITH ADEQUATELY CHOSEN HEAVY EQUIPMENT.
7. REVEGETATE. REFER TO SPECIFICATION SECTION 02900 FOR REVEGETATION REQUIREMENTS.

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REPAIR OF LANDFILL COVERS
LF03 AND LF04

CANNON AIR FORCE BASE

TETRA TECH
143 UNION BLVD., SUITE 1010
LAKEWOOD, CO 80228
TEL: (303) 988-2202 FAX: (303) 980-3539

APPROVED BY: R VERSAW
DRAWN BY: A LINTZ
CHECKED BY: D SHEA
DESIGNED BY: P PATTON

DESIGN FILE:
DATE: 04/26/2012
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GENERAL AND CONSTRUCTION NOTES

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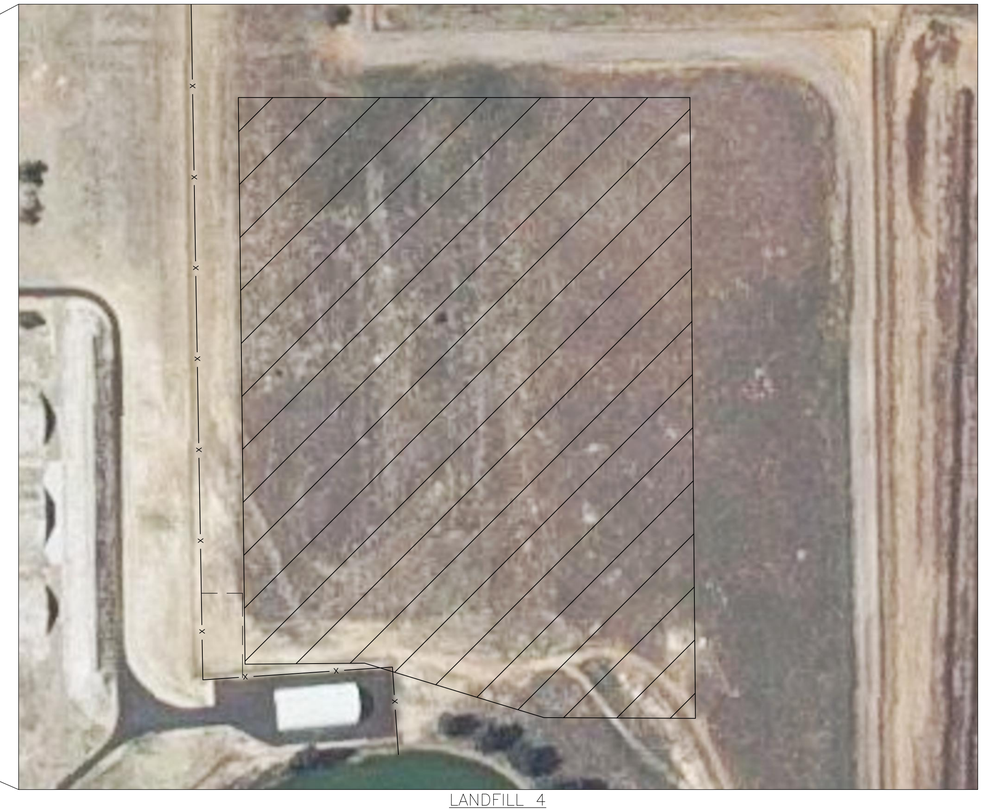
DRAWING
C-101

SHEET 3 OF 13

REVISION B

CANNON AFB OVERALL LAYOUT
N.T.S.



LANDFILL 4
SCALE: 1" = 100'

LANDFILL 3
SCALE: 1" = 100'

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**REPAIR OF LANDFILL COVERS LF03 AND LF04**

**CANNON AIR FORCE BASE**


**TETRA TECH**
143 UNION BLVD., SUITE 1010
LAKEWOOD, CO 80228
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APPROVED BY: R VERSAW
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CHECKED BY: D SHEA
DESIGNED BY: P PATTON

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**EXISTING SITE PLAN**

DRAWING
**C-102**

SHEET **4** OF **13**

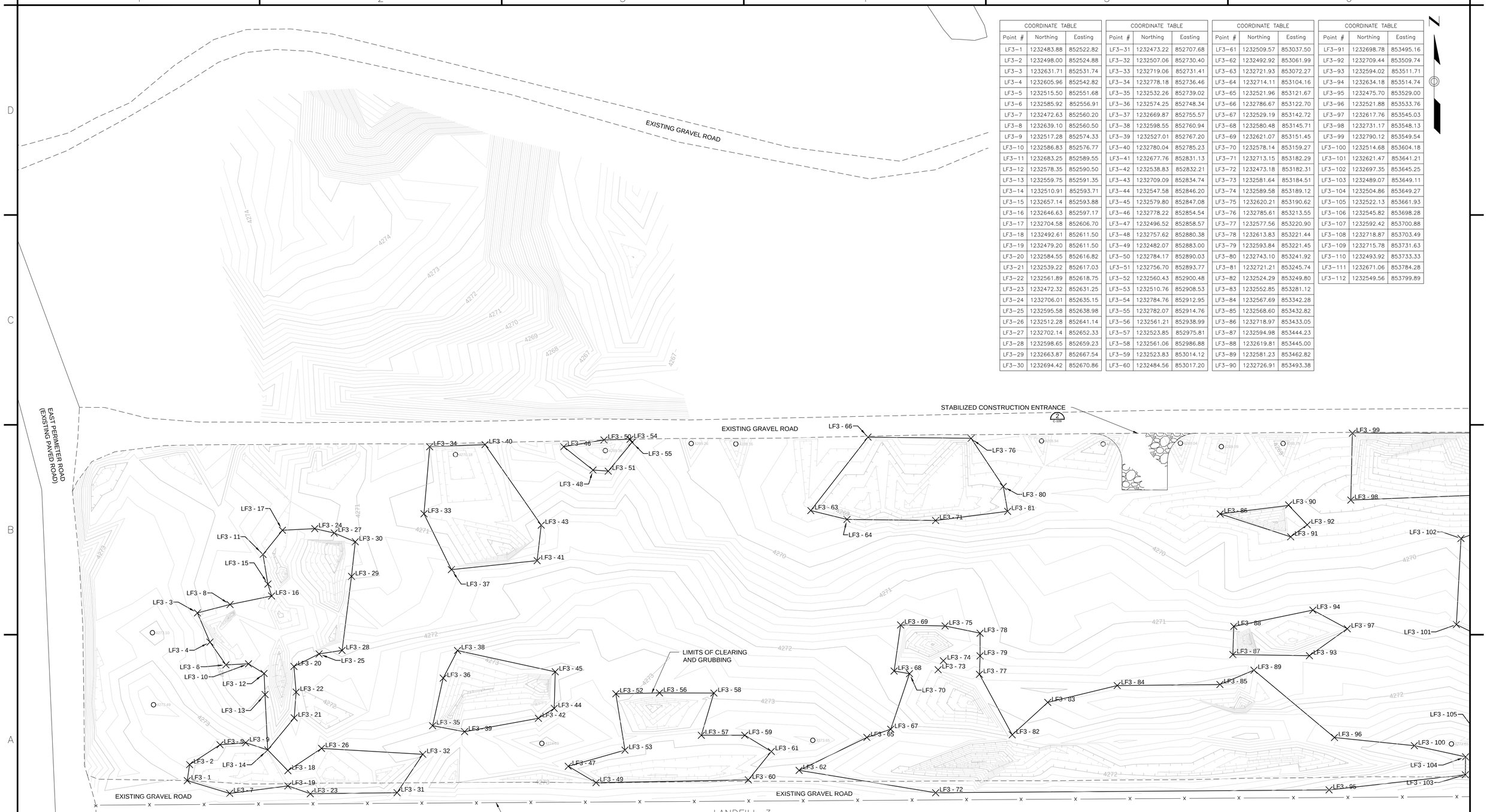
REVISION **B**

| COORDINATE TABLE | | |
|---|---|---|
| Point # | Northing | Easting |
| LF3-1 | 1232483.88 | 852522.82 |
| LF3-2 | 1232498.00 | 852524.88 |
| LF3-3 | 1232631.71 | 852531.74 |
| LF3-4 | 1232605.96 | 852542.82 |
| LF3-5 | 1232515.50 | 852551.68 |
| LF3-6 | 1232585.92 | 852556.91 |
| LF3-7 | 1232472.63 | 852560.20 |
| LF3-8 | 1232639.10 | 852560.50 |
| LF3-9 | 1232517.28 | 852574.33 |
| LF3-10 | 1232586.83 | 852576.77 |
| LF3-11 | 1232683.25 | 852589.55 |
| LF3-12 | 1232578.35 | 852590.50 |
| LF3-13 | 1232559.75 | 852591.35 |
| LF3-14 | 1232510.91 | 852593.71 |
| LF3-15 | 1232657.14 | 852593.88 |
| LF3-16 | 1232646.63 | 852597.17 |
| LF3-17 | 1232704.58 | 852606.70 |
| LF3-18 | 1232492.61 | 852611.50 |
| LF3-19 | 1232479.20 | 852611.50 |
| LF3-20 | 1232584.55 | 852616.82 |
| LF3-21 | 1232539.22 | 852617.03 |
| LF3-22 | 1232561.89 | 852618.75 |
| LF3-23 | 1232472.32 | 852631.25 |
| LF3-24 | 1232706.01 | 852635.15 |
| LF3-25 | 1232595.58 | 852638.98 |
| LF3-26 | 1232512.28 | 852641.14 |
| LF3-27 | 1232702.14 | 852652.33 |
| LF3-28 | 1232598.65 | 852659.23 |
| LF3-29 | 1232663.87 | 852667.54 |
| LF3-30 | 1232694.42 | 852670.86 |

| COORDINATE TABLE | | |
|---|---|---|
| Point # | Northing | Easting |
| LF3-31 | 1232473.22 | 852707.68 |
| LF3-32 | 1232507.06 | 852730.40 |
| LF3-33 | 1232719.06 | 852731.41 |
| LF3-34 | 1232778.18 | 852736.46 |
| LF3-35 | 1232532.26 | 852739.02 |
| LF3-36 | 1232574.25 | 852748.34 |
| LF3-37 | 1232669.87 | 852755.57 |
| LF3-38 | 1232598.55 | 852760.94 |
| LF3-39 | 1232527.01 | 852767.20 |
| LF3-40 | 1232780.04 | 852785.23 |
| LF3-41 | 1232677.76 | 852831.13 |
| LF3-42 | 1232538.83 | 852832.21 |
| LF3-43 | 1232709.09 | 852834.74 |
| LF3-44 | 1232547.58 | 852846.20 |
| LF3-45 | 1232579.80 | 852847.08 |
| LF3-46 | 1232778.22 | 852854.54 |
| LF3-47 | 1232496.52 | 852858.57 |
| LF3-48 | 1232757.62 | 852880.38 |
| LF3-49 | 1232482.07 | 852883.00 |
| LF3-50 | 1232784.17 | 852890.03 |
| LF3-51 | 1232756.70 | 852893.77 |
| LF3-52 | 1232560.43 | 852900.48 |
| LF3-53 | 1232510.76 | 852908.53 |
| LF3-54 | 1232784.76 | 852912.95 |
| LF3-55 | 1232782.07 | 852914.76 |
| LF3-56 | 1232561.21 | 852938.99 |
| LF3-57 | 1232523.85 | 852975.81 |
| LF3-58 | 1232561.06 | 852986.88 |
| LF3-59 | 1232523.83 | 853014.12 |
| LF3-60 | 1232484.56 | 853017.20 |

| COORDINATE TABLE | | |
|---|---|---|
| Point # | Northing | Easting |
| LF3-61 | 1232509.57 | 853037.50 |
| LF3-62 | 1232492.92 | 853061.99 |
| LF3-63 | 1232721.93 | 853072.27 |
| LF3-64 | 1232714.11 | 853104.16 |
| LF3-65 | 1232521.96 | 853121.67 |
| LF3-66 | 1232786.67 | 853122.70 |
| LF3-67 | 1232529.19 | 853142.72 |
| LF3-68 | 1232580.48 | 853145.71 |
| LF3-69 | 1232621.07 | 853151.45 |
| LF3-70 | 1232578.14 | 853159.27 |
| LF3-71 | 1232713.15 | 853182.29 |
| LF3-72 | 1232473.18 | 853182.31 |
| LF3-73 | 1232581.64 | 853184.51 |
| LF3-74 | 1232589.58 | 853189.12 |
| LF3-75 | 1232620.21 | 853190.62 |
| LF3-76 | 1232785.61 | 853213.55 |
| LF3-77 | 1232577.56 | 853220.90 |
| LF3-78 | 1232613.83 | 853221.44 |
| LF3-79 | 1232593.84 | 853221.45 |
| LF3-80 | 1232743.10 | 853241.92 |
| LF3-81 | 1232721.21 | 853245.74 |
| LF3-82 | 1232524.29 | 853249.80 |
| LF3-83 | 1232552.85 | 853281.12 |
| LF3-84 | 1232567.69 | 853342.28 |
| LF3-85 | 1232568.60 | 853432.82 |
| LF3-86 | 1232718.97 | 853433.05 |
| LF3-87 | 1232594.98 | 853444.23 |
| LF3-88 | 1232619.81 | 853445.00 |
| LF3-89 | 1232581.23 | 853462.82 |
| LF3-90 | 1232726.91 | 853493.38 |

| COORDINATE TABLE | | |
|---|---|---|
| Point # | Northing | Easting |
| LF3-91 | 1232698.78 | 853495.16 |
| LF3-92 | 1232709.44 | 853509.74 |
| LF3-93 | 1232594.02 | 853511.71 |
| LF3-94 | 1232634.18 | 853514.74 |
| LF3-95 | 1232475.70 | 853529.00 |
| LF3-96 | 1232521.88 | 853533.76 |
| LF3-97 | 1232617.76 | 853545.03 |
| LF3-98 | 1232731.17 | 853548.13 |
| LF3-99 | 1232790.12 | 853549.54 |
| LF3-100 | 1232514.68 | 853604.18 |
| LF3-101 | 1232621.47 | 853641.21 |
| LF3-102 | 1232697.35 | 853645.25 |
| LF3-103 | 1232489.07 | 853649.11 |
| LF3-104 | 1232504.86 | 853649.27 |
| LF3-105 | 1232522.13 | 853661.93 |
| LF3-106 | 1232545.82 | 853698.28 |
| LF3-107 | 1232592.42 | 853700.88 |
| LF3-108 | 1232718.87 | 853703.49 |
| LF3-109 | 1232715.78 | 853731.63 |
| LF3-110 | 1232493.92 | 853733.33 |
| LF3-111 | 1232671.06 | 853784.28 |
| LF3-112 | 1232549.56 | 853799.89 |

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**REPAIR OF LANDFILL COVERS LF03 AND LF04**

**CANNON AIR FORCE BASE**

**TETRA TECH**
143 UNION BLVD. SUITE 1010
LAKEWOOD, CO 80228
TEL: (303) 988-2202 FAX: (303) 980-3539

APPROVED BY: R VERSAW
DRAWN BY: A LINTZ
CHECKED BY: D SHEA
DESIGNED BY: P PATTON

DESIGN FILE:
DATE: 04/26/2012
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SHEET SIZE: D

**CLEARING AND GRUBBING PLAN, LF 03 (PART 1 OF 2)**

**DRAFT**
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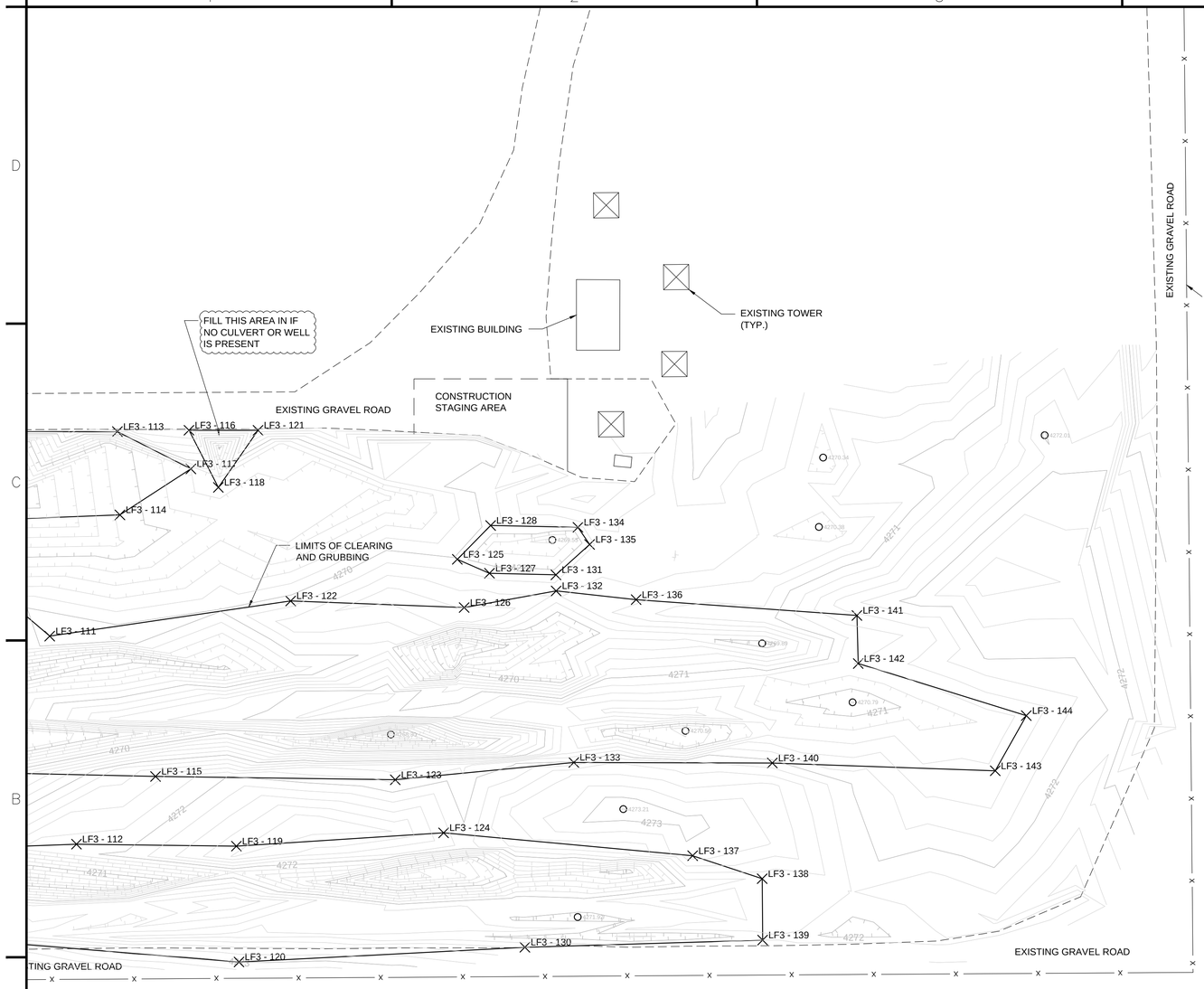
DRAWING
**C-103**

SHEET **5** OF **13**

REVISION **B**




| COORDINATE TABLE | | |
|---|---|---|
| Point # | Northing | Easting |
| LF3–113 | 1232790.48 | 853823.78 |
| LF3–114 | 1232741.84 | 853825.27 |
| LF3–115 | 1232589.12 | 853846.07 |
| LF3–116 | 1232791.26 | 853865.61 |
| LF3–117 | 1232768.71 | 853866.72 |
| LF3–118 | 1232757.87 | 853882.77 |
| LF3–119 | 1232548.41 | 853893.30 |
| LF3–120 | 1232480.79 | 853894.83 |
| LF3–121 | 1232791.24 | 853905.93 |
| LF3–122 | 1232691.58 | 853924.98 |
| LF3–123 | 1232587.18 | 853986.10 |
| LF3–124 | 1232556.21 | 854014.32 |
| LF3–125 | 1232715.89 | 854022.35 |
| LF3–126 | 1232687.73 | 854026.36 |
| LF3–127 | 1232707.75 | 854041.12 |
| LF3–128 | 1232735.66 | 854041.78 |
| LF3–130 | 1232489.37 | 854061.81 |
| LF3–131 | 1232706.84 | 854079.93 |
| LF3–132 | 1232697.45 | 854080.07 |
| LF3–133 | 1232597.28 | 854090.38 |

| COORDINATE TABLE | | |
|---|---|---|
| Point # | Northing | Easting |
| LF3–134 | 1232734.59 | 854092.79 |
| LF3–135 | 1232724.58 | 854099.60 |
| LF3–137 | 1232542.84 | 854159.78 |
| LF3–138 | 1232529.42 | 854200.40 |
| LF3–139 | 1232493.57 | 854200.69 |
| LF3–140 | 1232596.95 | 854206.35 |
| LF3–141 | 1232683.11 | 854255.75 |
| LF3–142 | 1232655.07 | 854256.50 |
| LF3–143 | 1232592.44 | 854336.50 |
| LF3–144 | 1232624.64 | 854354.68 |

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LANDFILL 3
SCALE: 1" = 40'

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LAKEWOOD, CO 80228
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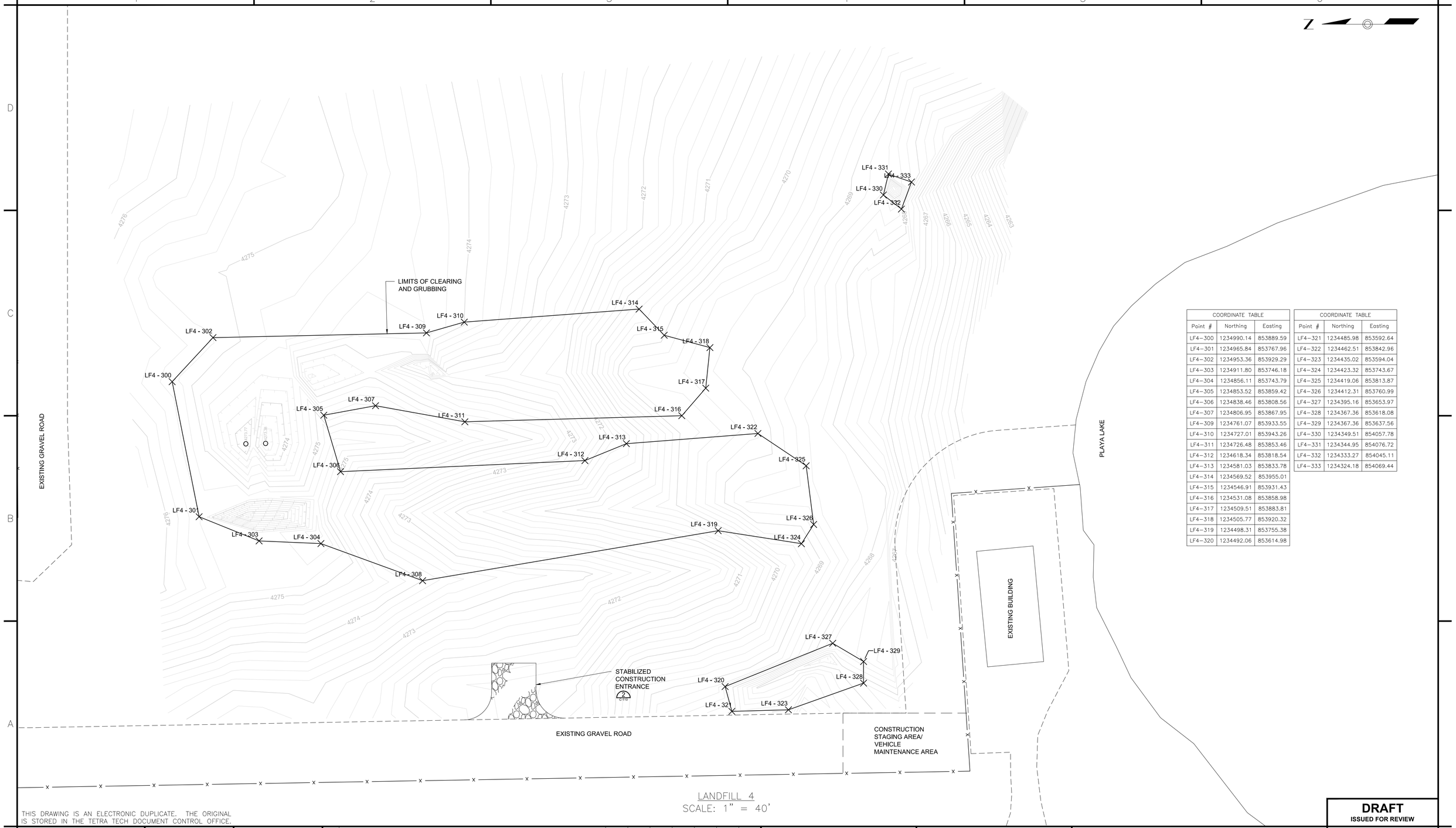
APPROVED BY: R VERSAW
DRAWN BY: A LINTZ
CHECKED BY: D SHEA
DESIGNED BY: P PATTON
DESIGN FILE:
DATE: 04/26/2012
SCALE: NONE
SHEET SIZE: D

**CLEARING AND GRUBBING PLAN, LF 03 (PART 2 OF 2)**

DRAWING
**C-104**

SHEET **6** OF **13**

REVISION **B**




| COORDINATE TABLE | | |
|---|---|---|
| Point # | Northing | Easting |
| LF4–300 | 1234990.14 | 853889.59 |
| LF4–301 | 1234965.84 | 853767.96 |
| LF4–302 | 1234953.36 | 853929.29 |
| LF4–303 | 1234911.80 | 853746.18 |
| LF4–304 | 1234856.11 | 853743.79 |
| LF4–305 | 1234853.52 | 853859.42 |
| LF4–306 | 1234838.46 | 853808.56 |
| LF4–307 | 1234806.95 | 853867.95 |
| LF4–309 | 1234761.07 | 853933.55 |
| LF4–310 | 1234727.01 | 853943.26 |
| LF4–311 | 1234726.48 | 853853.46 |
| LF4–312 | 1234618.34 | 853818.54 |
| LF4–313 | 1234581.03 | 853833.78 |
| LF4–314 | 1234569.52 | 853955.01 |
| LF4–315 | 1234546.91 | 853931.43 |
| LF4–316 | 1234531.08 | 853858.98 |
| LF4–317 | 1234509.51 | 853883.81 |
| LF4–318 | 1234505.77 | 853920.32 |
| LF4–319 | 1234498.31 | 853755.38 |
| LF4–320 | 1234492.06 | 853614.98 |

| COORDINATE TABLE | | |
|---|---|---|
| Point # | Northing | Easting |
| LF4–321 | 1234485.98 | 853592.64 |
| LF4–322 | 1234462.51 | 853842.96 |
| LF4–323 | 1234435.02 | 853594.04 |
| LF4–324 | 1234423.32 | 853743.67 |
| LF4–325 | 1234419.06 | 853813.87 |
| LF4–326 | 1234412.31 | 853760.99 |
| LF4–327 | 1234395.16 | 853653.97 |
| LF4–328 | 1234367.36 | 853618.08 |
| LF4–329 | 1234367.36 | 853637.56 |
| LF4–330 | 1234349.51 | 854057.78 |
| LF4–331 | 1234344.95 | 854076.72 |
| LF4–332 | 1234333.27 | 854045.11 |
| LF4–333 | 1234324.18 | 854069.44 |

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**REPAIR OF LANDFILL COVERS LF03 AND LF04**

**CANNON AIR FORCE BASE**

TETRA TECH
143 UNION BLVD., SUITE 1010
LAKEWOOD, CO 80228
TEL: (303) 988–2202 FAX: (303) 980–3539

APPROVED BY: R VERSAW
DRAWN BY: A LINTZ
CHECKED BY: D SHEA
DESIGNED BY: P PATTON

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SHEET SIZE: D

**CLEARING AND GRUBBING PLAN, LF 04**

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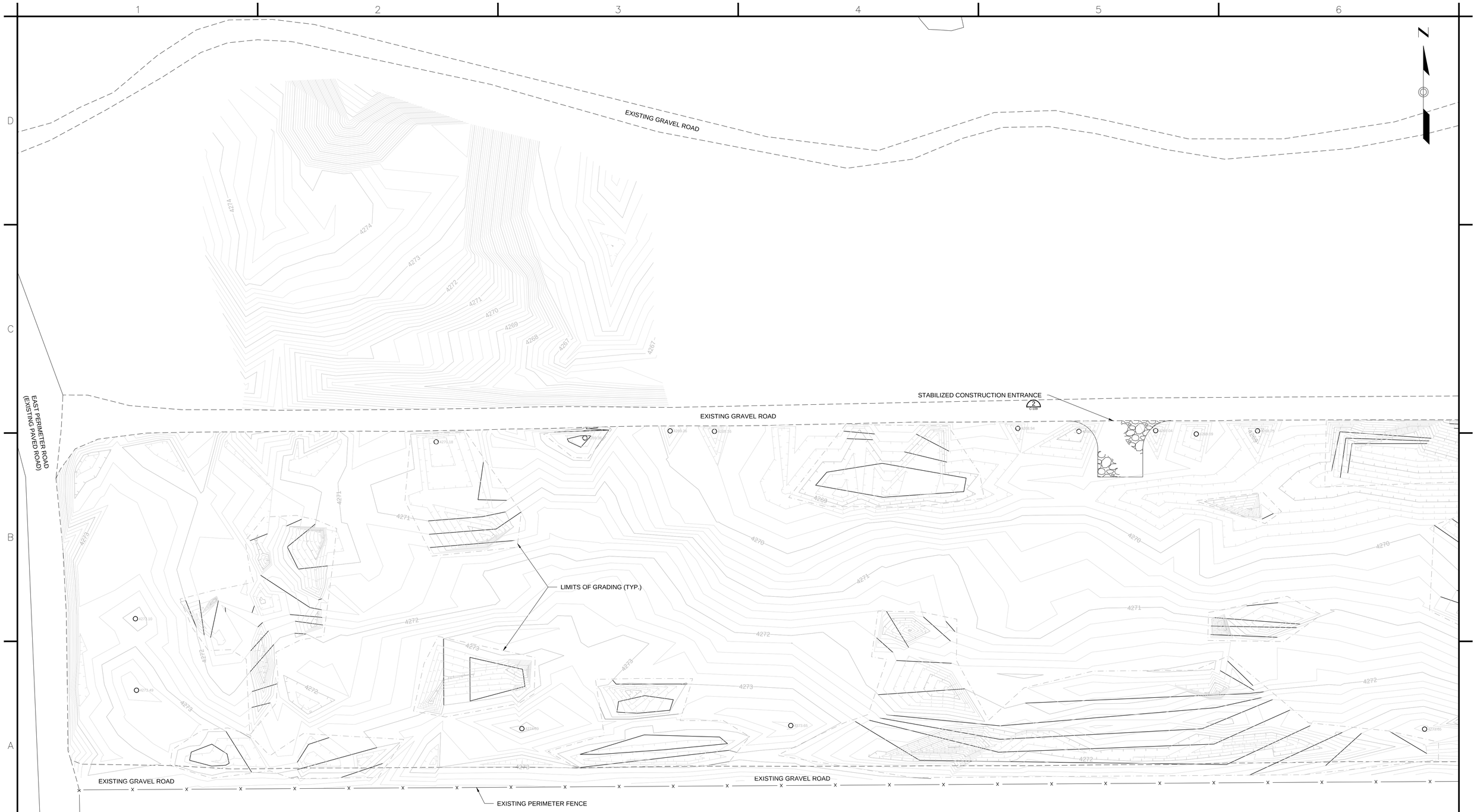
DRAWING
**C-105**

SHEET **7** OF **13**

REVISION **B**




LANDFILL 3
SCALE: 1" = 40'

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**LF03 AND LF04**

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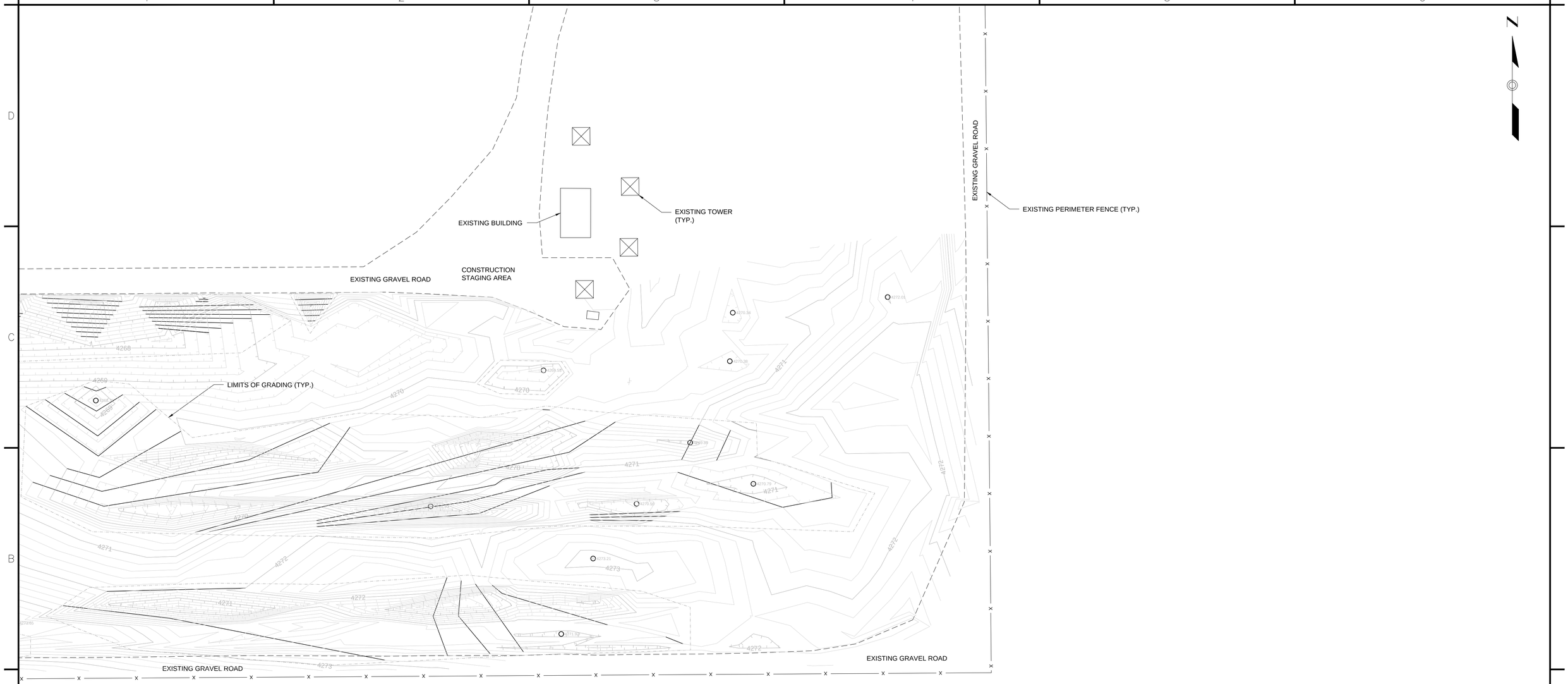
**SITE GRADING PLAN, LF 03**
**(PART 1 OF 2)**

DRAWING
**C-106**

SHEET **8** OF **13**

REVISION **B**

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**SITE GRADING PLAN, LF 03 (PART 2 OF 2)**

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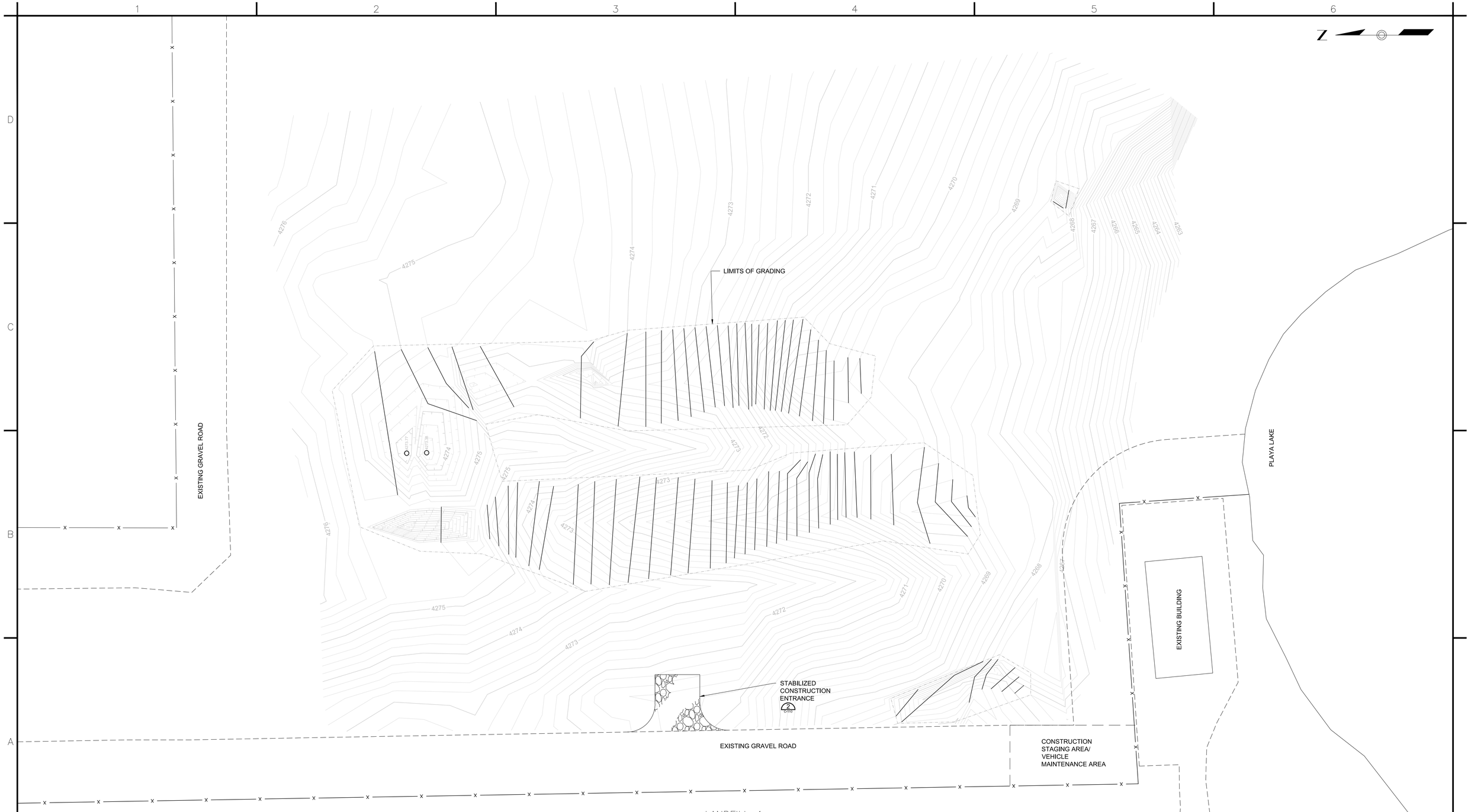
DRAWING
**C-107**

SHEET **9** OF **13**

REVISION **B**

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**SITE GRADING PLAN, LF 04**

DRAWING
**C-108**

SHEET **10** OF **13**

REVISION **B**

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**SOIL EROSION AND SEDIMENT CONTROL PLAN**

**DRAFT**
**ISSUED FOR REVIEW**

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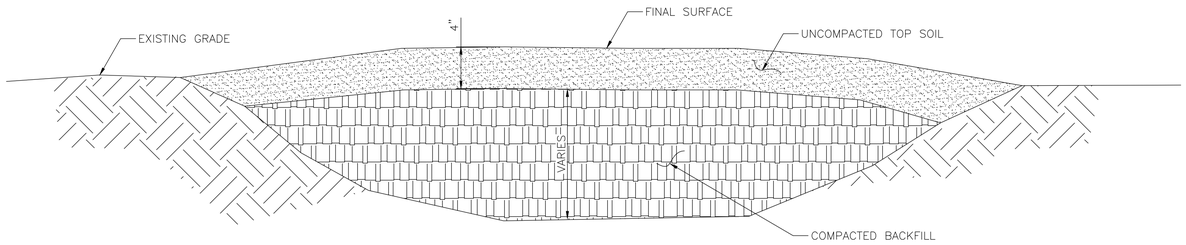
**C-109**

SHEET **11** OF **13**

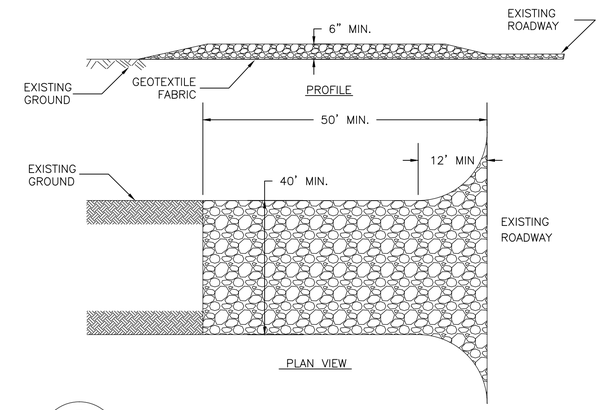
REVISION **B**




1 / — TYPICAL BACKFILL AREA

NOTES:

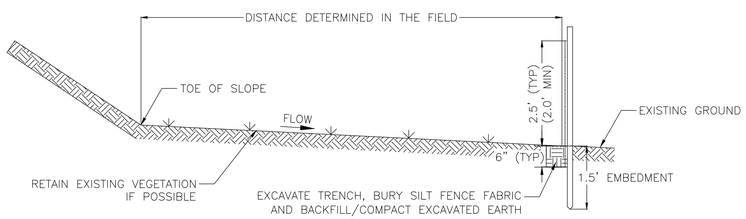
1. SLOPE FINAL SURFACE AWAY FROM BACKFILL AREA.
2. COMPACT BACKFILL IN ACCORDANCE WITH SPECIFICATION 02200.
3. REVEGETATE ALL DISTURBED AREAS IN ACCORDANCE WITH SPECIFICATION SECTION 02900.




2 / C109 STABILIZED CONSTRUCTION ENTRANCE

NOTES:

1. STONE SIZE – USE 2"–3" STONE, OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
2. LENGTH – NOT LESS THAN 50 FT.
3. THICKNESS – NOT LESS THAN 6 INCHES.
4. WIDTH – NOT LESS THAN 40FT.
5. GEOTEXTILE FABRIC – WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
6. MAINTENANCE – THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PAVED ROADS. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PAVED ROADS MUST BE REMOVED IMMEDIATELY.
7. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.
8. A STABILIZED CONSTRUCTION ENTRANCE SHALL BE LOCATED AT EVERY POINT WHERE CONSTRUCTION TRAFFIC ENTERS OR LEAVES A CONSTRUCTION SITE. VEHICLES LEAVING THE SITE MUST TRAVEL OVER THE ENTIRE LENGTH OF THE STABILIZED CONSTRUCTION ENTRANCE.
9. PERIODICALLY ADD STONE TO ENTRANCE TO MAINTAIN EFFECTIVENESS.




3 / C109 SILT FENCE

SILT FENCE INSTALLATION AND MAINTENANCE NOTES:

A. THE PRIMARY PURPOSE OF A SILT FENCE IS TO REDUCE RUNOFF VELOCITY AND TRAP SEDIMENT. VELOCITY IS REDUCED, WATER IS IMPOUNDED BEHIND THE MEASURE, AND SEDIMENT FALLS OUT OF SUSPENSION.
B. SILT FENCE SHALL BE INSTALLED ON A LINE OF EQUAL ELEVATION (CONTOUR) AS POSSIBLE.
C. SILT FENCE SHALL NOT BE USED IN OR ACROSS A FLOWING NATURAL CHANNEL.
D. SILT FENCE SHALL BE PLACED AWAY FROM TOE OF SLOPE, 15 FEET PREFERRED, TO PROVIDE ADEQUATE AREA FOR SEDIMENT STORAGE AND FACILITATE MAINTENANCE OF SEDIMENT CONTAINMENT AREA. ACTUAL DISTANCE FROM TOE OF SLOPE TO BE DETERMINED IN THE FIELD.
E. ASSEMBLIES MAY HAVE UP TO 8 FEET POST SPACING, TO BE DETERMINED IN THE FIELD.
F. THE BOTTOM EDGE OF SILT FENCE SHALL BE BURIED A MINIMUM OF 6 INCHES BELOW GROUND. THE FENCE SHALL BE INSTALLED WITH THE POSTS ON THE DOWNSTREAM SIDE OF THE FABRIC.
G. MEASURES SHALL BE INSPECTED EVERY 7 CALENDAR DAYS, WITHIN 24 HOURS OF THE END OF A STORM EVENT, OR TWICE A WEEK DURING PROLONGED RAINFALL. MEASURES SHALL BE CLEANED AND REPAIRED AS REQUIRED. SEDIMENT SHALL BE REMOVED WHEN ACCUMULATION REACHES 9 INCHES (MAXIMUM).
H. LOCATIONS FOR SILT FENCES TO BE DETERMINED IN FIELD BY THE ENVIRONMENTAL SITE MANAGER WITH CONCURRENCE BY THE USACE.

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SOIL EROSION AND CIVIL CONSTRUCTION DETAILS

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C-110

SHEET 12 OF 13

REVISION B

EROSION AND SEDIMENT CONTROL PRACTICES

THE SUBCONTRACTOR SHALL PERFORM THE CONSTRUCTION IN COMPLIANCE WITH THE NMED-APPROVED SWPPP FOR THE PROJECT AND IN ACCORDANCE WITH THE CONSTRUCTION DRAWINGS.

STORMWATER POLLUTION PREVENTION PLAN

1. THE SUBCONTRACTOR SHALL COMPLY WITH THE NMED APPROVED SWPPP, ITEMS LISTED BELOW AND SHEETS C-102 TO C-111.

2. SUBCONTRACTOR SHALL REMOVE AND DISPOSE OF BRUSH, AND OTHER VEGETATION AS REQUIRED FOR THE PROJECT. THE DISPOSAL OF BRUSH, OR OTHER VEGETATION IN ANY STREAM CORRIDOR, WETLAND, OR SURFACE WATER IS PROHIBITED.

3. THE USE OF EQUIPMENT IN ANY LAKE OR WETLAND AREA, EXCEPT DURING INSTALLATION OF AUTHORIZED ROAD OR INTERCONNECT CROSSINGS DEPICTED ON THE CONSTRUCTION DRAWINGS, IS STRICTLY PROHIBITED.

4. ALL NECESSARY PRECAUTIONS SHALL BE TAKEN TO PRECLUDE CONTAMINATION OF ANY WETLAND OR WATERWAY BY SUSPENDED SOLIDS, SEDIMENTS, FUELS, SOLVENTS, LUBRICANTS, EPOXY COATINGS, PAINTS, CONCRETE, LEACHATE, OR ANY OTHER ENVIRONMENTALLY DELETERIOUS MATERIALS ASSOCIATED WITH THE PROJECT. THESE MATERIALS SHALL BE STORED A MINIMUM OF 100 FEET FROM ANY WETLAND, STREAM, DITCH, WATERCOURSE, OR DRAINAGE. NO EQUIPMENT RE-FUELING SHALL OCCUR WITHIN THE SAME 100-FOOT AREA.

5. LAKES AND WETLANDS WILL BE PROTECTED FROM INDIRECT IMPACTS DURING CONSTRUCTION BY UTILIZING VARIOUS EROSION AND SEDIMENT CONTROL MEASURES INDICATED IN THE EROSION AND SEDIMENT CONTROL NOTES AND DETAIL SHEETS, INCLUDING SILT FENCES (PLACED BETWEEN WATER RESOURCE BOUNDARIES AND CONSTRUCTION AREAS) AND VEGETATED BUFFER AREAS. EXPOSED SOIL WILL BE SEEDED AND/OR MULCHED, AS SOON AS PRACTICABLE,

6. TEMPORARY EROSION CONTROL DEVICES SHALL BE INSTALLED AS SOON AS PRACTICABLE AND APPROPRIATE, AS INDICATED IN THESE EROSION AND SEDIMENT CONTROL DETAILS. EROSION CONTROL DEVICES SHALL BE INSTALLED PRIOR TO ANY GRADING OR FILLING OPERATIONS. THEY SHALL REMAIN IN PLACE UNTIL CONSTRUCTION IS COMPLETED AND THE AREA IS STABILIZED AND/OR REVEGETATED. ADDITIONALLY, NO SITE PREPARATION WORK SHALL BE UNDERTAKEN UNTIL ALL REQUIRED EROSION CONTROL MEASURES HAVE BEEN INSTALLED.

7. SILTATION PREVENTION MEASURES, SUCH AS SILT FENCING, SHALL BE INSTALLED AND MAINTAINED THROUGHOUT THE DURATION OF THE PROJECT, TO PREVENT MOVEMENT OF SILT AND TURBID WATERS FROM THE GENERATING SITE AND INTO ANY WATERCOURSE, WATER BODY, OR WETLAND. THEY SHALL REMAIN IN PLACE UNTIL CONSTRUCTION IS COMPLETED AND THE AREA IS STABILIZED AND/OR REVEGETATED.

8. ALL DISTURBED AREAS WHERE SOIL WILL BE TEMPORARILY EXPOSED OR STOCKPILED FOR LONGER THAN ONE WEEK SHALL BE CONTAINED BY A CONTINUOUS LINE OF SILT FENCE (AND/OR MULCH, IF APPROVED BY THE ENVIRONMENTAL SITE MANAGER IN CONCURRENCE WITH USACE) PLACED ON THE DOWN SLOPE SIDE BETWEEN THE FILL AND WETLAND/WATER BODY. TARPS ARE AUTHORIZED TO SUPPLEMENT THESE APPROVED METHODS AS NECESSARY.

9. ALL AREAS OF SOIL DISTURBANCE RESULTING FROM THIS PROJECT SHALL BE STABILIZED IMMEDIATELY FOLLOWING PROJECT COMPLETION. THE APPROVED METHODOLOGIES ARE AS FOLLOWS:
   - STABILIZATION OF THE ENTIRE DISTURBED AREA WITH APPROPRIATE VEGETATION THAT MEETS NMED REQUIREMENTS (SEE VEGETATIVE PLAN ON THIS SHEET).
   - STABILIZATION AS PER SPECIFICATIONS IDENTIFIED ON APPROVED PLANS.
   - TEMPORARILY STABILIZATION WITH STRAW, SITE CREATED MULCH, OR OTHER SIMILAR NATURAL FIBER WITHIN ONE TO THREE WEEKS OF FINAL GRADING. TEMPORARY STABILIZATION SHALL BE MAINTAINED UNTIL A MATURE VEGETATIVE COVER IS ESTABLISHED.

10. VISIBLE TURBID DISCHARGES FROM LAND CLEARING, GRADING OR EXCAVATING ACTIVITIES, OR DE-WATERING OPERATIONS SHALL NOT ENTER A BODY OF WATER, OR WETLAND. PRIOR TO ENTRY INTO A BODY OF WATER, NAVIGABLE WATER, OR WETLAND. ANY SUCH DISCHARGE SHALL BE:
    - FILTERED THROUGH CRUSHED STONE, SAND, STRAW BALES, SILT SCREENING (MAXIMUM OPENING SIZE OF U.S. SIEVE NUMBER 20), ETC.

11. SUBCONTRACTOR SHALL GRADE REPAIR AREAS TO ALLOW STORMWATER RUNOFF TO DRAIN AWAY FROM THESE AREAS.

THE CONTROL MEASURES TO BE USED DURING THE PROJECT ARE SUMMARIZED AS FOLLOWS:

1. MULCHING: MULCHING WILL BE USED AS IDENTIFIED ON THE CONSTRUCTION DRAWINGS OR BY THE ENVIRONMENTAL SITE MANAGER WITH CONCURRENCE BY THE COR. TYPICALLY, MULCHING IS USED AS A TEMPORARY EROSION CONTROL MEASURE IN AREAS OF DISTURBANCES AND IN CONJUNCTION WITH SEEDING.

2. SILT FENCE: SILT FENCE WILL BE INSTALLED AROUND SOIL STOCKPILES, DOWN SLOPE FROM FILL SLOPES GREATER THAN OR EQUAL TO 4' IN HEIGHT, CULVERT INSTALLATIONS, BETWEEN WETLAND BOUNDARIES AND CONSTRUCTION AREAS AS SHOWN ON THE CONSTRUCTION DRAWINGS; IF DEEMED NECESSARY BY THE ENVIRONMENTAL SITE MANAGER WITH CONCURRENCE BY THE USACE.

3. SEEDING: SEEDING IS USED FOR BOTH TEMPORARY AND PERMANENT MEASURES TO STABILIZE DISTURBED AREAS.

4. WATERING VEHICLE: THE WATERING VEHICLE WILL BE USED TO PREVENT SURFACE AND AIR MOVEMENT OF DUST FROM DISTURBED SOIL SURFACES THAT MAY CAUSE OFF-SITE DAMAGE, HEALTH HAZARDS, AND TRAFFIC SAFETY PROBLEMS. WATER WILL BE USED TO SPRAY THE SURFACE ON CONSTRUCTION ROADS, ACCESS POINTS, AND OTHER DISTURBED AREAS WHERE OFF-SITE DAMAGE MAY OCCUR IF DUST IS NOT CONTROLLED.

CONSTRUCTION SPECIFICATIONS

CONSTRUCTION SCHEDULE FOR EROSION AND SEDIMENT CONTROL MEASURES

REPAIR AREAS:

1. INSTALL EROSION AND SEDIMENT CONTROLS AS IDENTIFIED ON THE CONSTRUCTION DRAWINGS AS DIRECTED BY THE ENVIRONMENTAL SITE MANAGER WITH CONCURRENCE BY THE COR.
2. COMPLETE SITE CLEARING AND GRUBBING.
3. ROUGH GRADE SITE AND BACKFILL SUBGRADE AREAS
4. COMPLETE THE FINAL GRADING OF THE SITE, TOPSOIL, AND STABILIZE ACCORDING TO SPECIFICATIONS.
5. AFTER SITE HAS BEEN STABILIZED, REMOVE EROSION AND SEDIMENT CONTROLS.

MULCH:
MULCH WILL BE USED AS A TEMPORARY EROSION CONTROL MEASURE IN AREAS OF DISTURBANCE AND ALSO IN CONJUNCTION WITH SEEDING (SEE VEGETATIVE PLAN ON THIS SHEET FOR ADDITIONAL DETAILS). MULCH SHALL BE COMPRISED OF SHREDDED VEGETATION REMOVED FROM THE SITE DURING CLEARING AND GRUBBING OPERATIONS. WHEN MULCH IS USED FOR TEMPORARY STABILIZATION, THE MULCH WILL BE APPLIED AT A RATE OF APPROXIMATELY 2 TONS PER ACRE (90 LBS PER 1,000 SF).

SILT FENCE:
FILTER FABRIC FENCE SHOULD BE INSTALLED AT LEVEL GRADE. BOTH ENDS OF EACH FENCE SECTION SHOULD BE EXTENDED AT LEAST 8 FEET UPSLOPE AT 45 DEGREES TO THE MAIN FENCE ALIGNMENT TO ALLOW FOR POOLING OF WATER.

A 6 INCH DEEP TRENCH SHOULD BE EXCAVATED, MINIMIZING THE DISTURBANCE ON THE DOWN SLOPE SIDE. THE BOTTOM OF THE TRENCH SHOULD BE AT LEVEL GRADE. MAXIMUM DEVIATION FROM LEVEL GRADE SHOULD BE 1 PERCENT AND NOT EXTEND MORE THAN 25 FEET. THE BOTTOM OF THE FENCE SHOULD BE ANCHORED BY PLACING FABRIC IN THE BOTTOM OF THE TRENCH, AND BACKFILLING AND COMPACTING THE FILL MATERIAL IN THE TRENCH.

SUPPORT STAKES SHOULD BE DRIVEN 18" BELOW (OR AS FAR AS NECESSARY TO SECURE FENCE) THE EXISTING GROUND SURFACE AT 8 FOOT (MAX) INTERVALS. FILTER FABRIC SHOULD BE STRETCHED AND FASTENED TO THE UPSLOPE SIDE OF THE SUPPORT STAKES. AT FABRIC ENDS, BOTH ENDS SHOULD BE WRAPPED AROUND THE SUPPORT STAKE AND STAPLED. IF THE FABRIC COMES ALREADY ATTACHED TO THE STAKES, THE END STAKES SHOULD BE HELD TOGETHER WHILE THE FABRIC IS WRAPPED AROUND THE STAKES AT LEAST ONE REVOLUTION PRIOR TO DRIVING THE STAKES.

VEGETATIVE PLAN:

SUBCONTRACTOR SHALL INITIATE STABILIZATION MEASURES IN PORTIONS OF THE SITE WHERE CONSTRUCTION ACTIVITIES HAVE PERMANENTLY CEASED.

VEGETATIVE STABILIZATION WILL BE COMPLETED AS IDENTIFIED IN SPECIFICATION 02900.

MAINTENANCE PLAN:

ALL EROSION AND SEDIMENT CONTROL DEVICES WILL BE IN PLACE AT THE END OF EACH WORKING DAY. THE CONTROL DEVICES WILL BE INSPECTED AND MAINTAINED AS PRESCRIBED BELOW.

1. ALL EROSION AND SEDIMENT CONTROL PRACTICES WILL BE CHECKED FOR STABILITY AND OPERATION WITHIN 24 HOURS OF A STORM EVEN OF 0.5 INCH OR GREATER, AND NO LESS THAN ONCE EVERY 14 DAYS. ANY NECESSARY REPAIRS WILL BE MADE WITHIN 48 HOURS TO MAINTAIN ALL PRACTICES AS DESIGNED.

2. SEDIMENT ACCUMULATIONS AT THE SILT FENCE WILL BE REMOVED WHEN THE DEPTH OF THE SEDIMENT AT THE SILT FENCE REACHES 9 INCHES. REPAIRS WILL BE MADE WITHIN 48 HOURS TO THE FENCE TO MAINTAIN IT AS A BARRIER.

3. SEEDED AREAS WILL BE CHECKED FOR GERMINATION AND DAMAGE FROM STORMS. AREAS WILL BE RESEEDED AS NECESSARY TO REPAIR DAMAGE.

4. ALL TEMPORARY AND PERMANENT EROSION AND SEDIMENT CONTROL BMPS WILL BE MAINTAINED AND REPAIRED AS NEEDED TO ASSURE CONTINUED PERFORMANCE OF THEIR INTENDED FUNCTION. ALL MAINTENANCE AND REPAIR WILL BE CONDUCTED IN ACCORDANCE WITH BMPS.

5. ALL TEMPORARY EROSION AND SEDIMENT CONTROL BMPS WILL BE REMOVED WITHIN 30 DAYS AFTER FINAL SITE STABILIZATION IS ACHIEVED OR AFTER THE TEMPORARY BMPS ARE NO LONGER NEEDED. TRAPPED SEDIMENT WILL BE REMOVED OR STABILIZED ON SITE. DISTURBED SOIL AREAS RESULTING FROM REMOVAL OF BMPS OR VEGETATION WILL BE PERMANENTLY STABILIZED AS SOON AS POSSIBLE.

INSPECTIONS:

1. SUBCONTRACTOR WILL HAVE A QUALIFIED PROFESSIONAL CONDUCT AN ASSESSMENT OF THE SITE PRIOR TO THE COMMENCEMENT OF CONSTRUCTION AND CERTIFY IN AN INSPECTION REPORT THAT THE APPROPRIATE EROSION AND SEDIMENT CONTROLS HAVE BEEN ADEQUATELY INSTALLED OR IMPLEMENTED.

2. ENSURE OVERALL PREPAREDNESS OF THE SITE FOR THE COMMENCEMENT OF CONSTRUCTION. FOLLOWING THE COMMENCEMENT OF CONSTRUCTION, SITE INSPECTIONS SHALL BE CONDUCTED AND DOCUMENTED BY A QUALIFIED PROFESSIONAL AT LEAST EVERY 7-CALENDAR DAYS AND WITHIN 24 HOURS OF THE END OF A STORM EVENT. A CORRECTIVE ACTION LOG WILL BE FILLED OUT DESCRIBING ACTIONS TAKEN, DATE COMPLETED, AND NOTE THE PERSON WHO COMPLETED THE WORK.

4. INSPECTION RECORDS WILL BE MAINTAINED FOR A MINIMUM OF 2 YEARS AFTER THE PERMIT IS TERMINATED.

PRE-CONSTRUCTION CONFERENCE:

1. ONE OR MORE PRE-CONSTRUCTION MEETINGS WILL BE HELD WITH AN EXPLICIT AGENDA ITEM ADDRESSING THE SWPPP AND OTHER PERMIT REQUIREMENTS.

COORDINATION WITH UTILITIES AND OTHER SUBCONTRACTORS:

1. ALL SUBCONTRACTORS PROVIDING SERVICES ON THE PROJECT WHICH MAY CAUSE STORMWATER POLLUTION WILL BE PROVIDED A COPY OF THE SWPPP AND APPROPRIATE TRAINING REGARDING STORMWATER POLLUTION PREVENTION.

SUBCONTRACTOR OVERSIGHT:

1. SUBCONTRACTOR OVERSIGHT TO ENSURE COMPLIANCE.

2. SWPPP TRAINING WILL BE PROVIDED BY THE PROJECT SUPERINTENDENT OR PROJECT MANAGER OR DESIGNEE. INFORMAL, ON-THE-JOB TAILGATE TRAINING WILL BE THE FIRST LEVEL OF COMMUNICATION FOLLOWED BY ONSITE OBSERVATION OF TRAINING COMPLIANCE.

3. NON-COMPLIANCE WITH SWPPP POLICIES WILL TRIGGER A MORE INTENSIVE TRANING SESSION TO CORRECT THE PROBLEM(S).

4. SUBCONTRACTOR WILL HAVE AN ON-SITE PERSON (ENVIRONMENTAL SITE MANAGER) ASSIGNED TO MAINTAIN SWPPP COMPLIANCE. THIS INDIVIDUAL WILL MONITOR SWPPP COMPLIANCE AND WILL HAVE STOP WORK AUTHORITY IF A SEVERE SWPPP NON-COMPLIANCE IS IDENTIFIED.

TRAINING

1. SUBCONTRACTOR WILL PROVIDE ONSITE TRAINING TO KEY PERSONNEL RESPONSIBLE FOR SOIL EROSION AND SEDIMENT CONTROL.

2. THE CONSTRUCTION MANAGER, PROJECT MANAGER, FIELD ENGINEER, AND ENVIRONMENTAL SITE MANAGER WILL ALL BE FAMILIARIZED WITH THE MAJOR ELEMENTS OF THE PLAN.

3. CONSTRUCTION WORKERS AND OTHERS AT THE SITE WILL BE GIVEN APPROPRIATE TRAINING INFORMATION AT THE CONCLUSION OF SITE SAFETY MEETINGS OR ON AN AS-NEEDED BASIS.

4. RECORDS OF EMPLOYEE TRAINING MUST BE DOCUMENTED ACCORDING TO THE SWPPP.

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REPAIR OF LANDFILL COVERS
LF03 AND LF04

CANNON AIR FORCE BASE

TETRA TECH
143 UNION BLVD., SUITE 1010
LAKEWOOD, CO 80228
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APPROVED BY: R VERSAW
DRAWN BY: A LINTZ
CHECKED BY: D SHEA
DESIGNED BY: P PATTON
DESIGN FILE:
DATE: 04/26/2012
SCALE: NONE
SHEET SIZE: D

SOIL EROSION AND SEDIMENT CONTROL NOTES AND DETAILS

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C-111

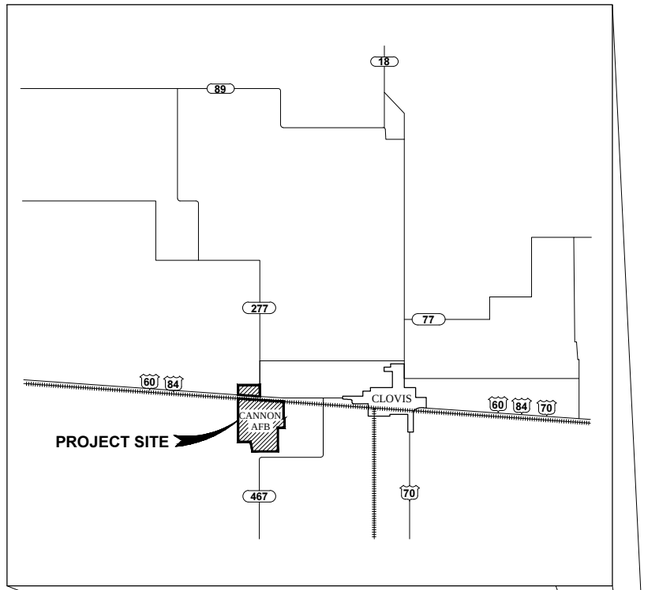
SHEET 13 OF 13

REVISION B

# REPAIR OF LANDFILL COVERS LF03 AND LF04

# CANNON AIR FORCE BASE

## NEW MEXICO




**VICINITY MAP**
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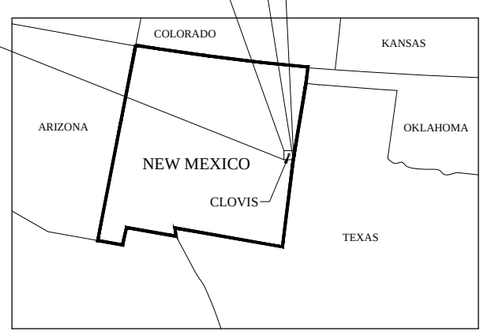


**LOCATION MAP**
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***PREPARED FOR*:**
**CANNON AIR FORCE BASE**

***PREPARED BY*:**
**TETRA TECH, INC.**

| DRAWING NUMBER | TITLE | REVISION |
|---|---|---|
| G-100 | TITLE AND COVER SHEET | B |
| G-101 | SYMBOLS & ABBREVIATIONS | B |
| C-101 | GENERAL AND CONSTRUCTION NOTES | B |
| C-102 | EXISTING SITE PLAN | B |
| C-103 | CLEARING & GRUBBING PLAN, LF-03 (PART 1 OF 2) | B |
| C-104 | CLEARING & GRUBBING PLAN, LF-03 (PART 2 OF 2) | B |
| C-105 | CLEARING & GRUBBING PLAN, LF-04 | B |
| C-106 | SITE GRADING PLAN, LF-03 (PART 1 OF 2) | B |
| C-107 | SITE GRADING PLAN, LF-03 (PART 2 OF 2) | B |
| C-108 | SITE GRADING PLAN, LF-04 | B |
| C-109 | SOIL EROSION & SEDIMENT CONTROL PLAN | B |
| C-110 | SOIL EROSION & SEDIMENT CONTROL DETAILS | B |
| C-111 | SOIL EROSION & SEDIMENT CONTROL NOTES | B |

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**TITLE AND COVER SHEET**

DRAWING
**G-100**

SHEET **1** OF **13**

REVISION **B**

## ABBREVIATIONS

| ABBV | DESCRIPTION |
|---|---|
| @ | AT |
| AB | ANCHOR BOLT |
| ABAN | ABANDON |
| ACI | AMERICAN CONCRETE INSTITUTE |
| AISC | AMERICAN INSTITUTE OF STEEL CONSTRUCTION |
| AITC | AMERICAN INSTITUTE OF TIMBER CONSTRUCTION |
| ANSI | AMERICAN NATIONAL STANDARD INSTITUTE |
| APPROX | APPROXIMATE |
| AR | AS REQUIRED |
| ARCH | ARCHITECTURAL |
| ASHTO | AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS |
| ASTM | AMERICAN SOCIETY FOR TESTING AND MATERIALS |
| AWS | AMERICAN WELDING SOCIETY |
| BETW | BETWEEN |
| BLDG | BUILDING |
| BOT | BOTTOM |
| BP | BASE PLATE |
| BR | BRICK |
| BRG | BEARING |
| CF | CUBIC FEET |
| CL, ℄ | CENTER LINE |
| CLR | CLEARANCE, CLEAR |
| CMP | CORRUGATED METAL PIPE |
| CONC | CONCRETE |
| CONST JT | CONSTRUCTION JOINT |
| CY | CUBIC YARD |
| DEG, ° | DEGREES |
| DI | DUCTILE IRON |
| DIA | DIAMETER |
| DIM | DIMENSION |
| DIP | DUCTILE IRON PIPE |
| DWG | DRAWING |
| E | EAST |
| E/P | EDGE OF PAVEMENT |
| EA | EACH |
| EL | ELEVATION |
| EQ | EQUAL |
| ETC | ET CETERA |
| EW | EACH WAY |
| EXST, EXIST | EXISTING |
| FDN | FOUNDATION |
| FG | FINISH GRADE |
| FLR | FLOOR |
| FS | FAR SIDE |
| FT OR ' | FOOT, FEET, |
| FTG | FOOTING |
| GALV | GALVANIZED |
| GWT | GROUND WATER TABLE |
| HORIZ OR H | HORIZONTAL |
| HT | HEIGHT |
| IBC | INTERNATIONAL BUILDING CODE |
| IE | INVERT ELEVATION |
| ID | INSIDE DIAMETER |
| IN OR " | INCH |
| INV | INVERT |

| ABBV | DESCRIPTION |
|---|---|
| L | LENGTH |
| LBS | POUNDS |
| LF | LINEAR FEET |
| LONGIT | LONGITUDINAL |
| MAX | MAXIMUM |
| MFR | MANUFACTURER |
| MIN | MINIMUM |
| MISC | MISCELLANEOUS |
| N | NORTH |
| N/A | NOT APPLICABLE |
| NIC | NOT IN CONTRACT |
| NO OR # | NUMBER |
| NOM | NOMINAL |
| NS | NEAR SIDE |
| NTS | NOT TO SCALE |
| OC | ON CENTER |
| OD | OUTSIDE DIAMETER |
| OH | OUTSIDE FACE OF OVERHEAD |
| PC | POINT OF CURVATURE |
| PCF | POUNDS PER CUBIC FOOT |
| PL | PLATE |
| PSF | POUNDS PER SQUARE FOOT |
| PSI | POUNDS PER SQUARE INCH |
| PT | POINT OF TANGENCY, |
| PVC | POLYVINYL CHLORIDE |
| PWD | PLYWOOD |
| R | RADIUS |
| RC | REINFORCED CONCRETE |
| RCP | REINFORCED CONCRETE PIPE |
| REF | REFERENCE |
| REQ'D | REQUIRED |
| S | SOUTH |
| SCHED | SCHEDULE |
| SF | SQUARE FEET |
| SHT | SHEET |
| SIM | SIMILAR |
| SL | SLOPE |
| SPEC'S | SPECIFICATIONS |
| SQ | SQUARE |
| SQ IN | SQUARE INCH |
| STA | STATION |
| STD | STANDARD |
| STL | STEEL |
| T&B | TOP AND BOTTOM |
| T/ | TOP OF |
| T/PIPE, TOP | TOP OF PIPE |
| TEMP | TEMPORARY |
| TOC | TOP OF CONCRETE |
| TRANS | TRANSVERSE |
| TYP | TYPICAL |
| UNO OTHERWISE | UNLESS NOTED |
| V | VERTICAL |
| VAR | VARIES |
| VERT | VERTICAL |
| W | WEST |
| W/ | WITH |
| W/O | WITHOUT |
| WP | WORK POINT |
| WWF | WELDED WIRE FABRIC |

## SYMBOLS AND LINETYPES

TOWER

EXISTING FEATURE
EXISTING DIRT ROAD
EXISTING MAJOR CONTOUR
EXISTING MINOR CONTOUR
DEPRESSION CONTOUR
ELEVATION
CLEARING AND GRUBBING AREA
REPAIR SURVEY POINT
LIMITS OF GRADING
FENCE LINE
SILT FENCE

## DRAWING NUMBERING CONVENTION

D - 8605DK02 - G - 101

- SHEET NUMBER
- DISCIPLINE IDENTIFIER
- PROJECT NUMBER
- OVERALL DESIGN

### DISCIPLINE IDENTIFIER

| | |
|---|---|
| G | GENERAL |
| C | CIVIL |
| E | ELECTRICAL |
| I | INSTRUMENTATION/CONTROL/COMMUNICATIONS |
| P | PROCESS |

## DRAWING REFERENCE

NOTE:
THE SYMBOLS LISTED ON THIS SHEET ARE TYPICAL SYMBOLS THAT MAY OR MAY NOT BE USED IN THIS SET OF PLANS. SPECIAL SYMBOLS WILL BE NOTED ON THE SHEETS THAT THEY APPLY TO.

1. DRAWINGS ARE CROSS REFERENCED IN THE FOLLOWING MANNER:

(a) SECTION CUT ON DRAWING C–100:

A / C–105
- SECTION IDENTIFICATION
- DRAWING ON WHICH SECTION APPEARS

(b) ON DRAWING C–105 THE SECTION IS IDENTIFIED AS:

A / C–100
- SECTION IDENTIFICATION
- DRAWING FROM WHICH THE SECTION WAS TAKEN

(c) SECTION CUT AND SECTION SHOWN ON SAME DRAWING:

A / –
- SECTION IDENTIFICATION
- SAME DRAWING

2. PLANS, DETAILS AND ELEVATIONS ARE CROSS REFERENCED IN A SIMILIAR MANNER.

3. SECTION OR DETAIL REFERENCED BY ANNOTATION, "SEE 5/C–100" MEANS SEE SECTION 5 OR DETAIL 5 ON DRAWING NUMBER C–100.

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DRAWING INDEX AND SYMBOLS & ABBREVIATIONS

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G-101

SHEET 2 OF 13

REVISION B

SURVEY NOTES

1. SURVEY PROVIDED BY ATKINS ENGINEERING ASSOCIATES DATED JUNE 2011.
2. HORIZONTAL DATUM IS NEW MEXICO EAST STATE PLANE COORDINATE SYSTEM, NAD 83, US FEET.
3. VERTICAL DATUM IS NAVD 88.
4. EXISTING FEATURES IDENTIFIED ON DRAWINGS ARE APPROXIMATE IN LOCATION.

CONSTRUCTION DRAWING NOTES

1. THE SUBCONTRACTOR SHALL HAVE KNOWLEDGE OF, AND WILL WORK IN COMPLIANCE WITH, THE TERMS AND CONDITIONS STATED IN THE PROJECT PLANS, SPECIFICATIONS AND DRAWINGS ISSUED, AND IS SUBJECT TO THE SAME SANCTIONS FOR VIOLATIONS OF SUCH PERMITS.
2. ALL ACTIVITIES AUTHORIZED UNDER THE PROJECT PLANS ISSUED MUST BE IN STRICT CONFORMANCE WITH THE SPECIFICATIONS AND DETAILS DEPICTED BY THE PROJECT PLANS.
3. LOCAL FIRE DEPARTMENTS AND EMERGENCY MANAGEMENT TEAMS SHALL BE MADE AWARE OF ANY HAZARDOUS CHEMICALS AND WASTE ON–SITE.
4. REPRESENTATIVES FROM CANNON AFB AND THE NEW MEXICO ENVIRONMENTAL DEPARTMENT (NMED)/ UNITED STATES ARMY CORPS OF ENGINEERS (USACE) SHALL BE PERMITTED TO INSPECT THE WORK AREA (INCLUDING RELEVANT RECORDS) AT ANY TIME DEEMED NECESSARY, TO ENSURE THAT ALL ACTIVITIES ARE IN ACCORDANCE WITH THE TERMS AND CONDITIONS SPECIFIED.
5. ALL CONSTRUCTION ACTIVITY, INCLUDING OPERATION OF MACHINERY, EXCAVATION, FILLING, GRADING, CLEARING OF VEGETATION, DISPOSAL OF WASTE, AND STOCKPILING OF MATERIAL MUST TAKE PLACE WITHIN THE APPROVED WORK AREA AS DEPICTED ON THE CONSTRUCTION DRAWINGS. CONSTRUCTION ACTIVITY IS PROHIBITED WITHIN AREAS TO BE LEFT IN A NATURAL CONDITION OR AREAS NOT PERMITTED BY THE ISSUED PERMITS.
6. EQUIPMENT SHALL UTILIZE THE SUPPORT ZONE AREA TO BE DELINEATED BY THE USACE FOR EQUIPMENT STORAGE, TRAILER PARKING, PERSONNEL PARKING, AND SANITARY FACILITIES.
7. FUGITIVE DUST RESULTING FROM CONSTRUCTION ACTIVITIES SHALL BE MINIMIZED TO THE MAXIMUM EXTENT PRACTICABLE BY IMPLEMENTING APPROPRIATE CONTROL MEASURES. A WATERING VEHICLE SHALL BE AVAILABLE FOR THE DURATION OF PROJECT ACTIVITIES, INCLUDING RESTORATION.
8. NOISE IMPACTS SHALL BE MINIMIZED AND MITIGATED TO THE EXTENT PRACTICABLE. SUBCONTRACTOR SHALL MAINTAIN ALL EQUIPMENT IN GOOD OPERATING CONDITIONS AND ALL MOTORS AND ENGINES WILL BE MUFFLED ACCORDING TO MANUFACTURER'S SPECIFICATIONS AND WILL COMPLY WITH STATE ENVIRONMENTAL LAW. ANY FAULTY NOISE SUPPRESSOR WILL BE REPAIRED OR REPLACED, AND EQUIPMENT WILL NOT BE LEFT RUNNING UNNECESSARILY.
9. SUBCONTRACTOR SHALL REMOVE AND DISPOSE OF BRUSH AND OTHER VEGETATION AS REQUIRED FOR THE PROJECT AS OUTLINED IN THE PROJECT SPECIFICATIONS. THE DISPOSAL OF BRUSH OR OTHER VEGETATION IN ANY STREAM CORRIDOR, WETLAND, OR SURFACE WATER IS PROHIBITED.
10. THE USE OF EQUIPMENT IN ANY STREAM OR WETLAND AREA IS STRICTLY PROHIBITED.
11. ALL NECESSARY PRECAUTIONS SHALL BE TAKEN TO PRECLUDE CONTAMINATION OF ANY WETLAND OR WATERWAY BY SUSPENDED SOLIDS, SEDIMENTS, FUELS, SOLVENTS, LUBRICANTS, OR ANY OTHER ENVIRONMENTALLY DELETERIOUS MATERIALS ASSOCIATED WITH THE PROJECT. THESE MATERIALS SHALL BE STORED IN THE SUPPORT ZONE. EQUIPMENT RE–FUELING SHALL OCCUR IN THE SUPPORT ZONE.
12. STREAMS AND WETLANDS WILL BE PROTECTED FROM INDIRECT IMPACTS DURING CONSTRUCTION BY UTILIZING VARIOUS EROSION AND SEDIMENT CONTROL MEASURES INDICATED IN THE EROSION AND SEDIMENT CONTROL DETAILS AND IN ACCORDANCE WITH THE PROJECT STORMWATER POLLUTION PREVENTION PLAN (SWPPP). SILT FENCES SHALL BE PLACED BETWEEN WATER RESOURCE BOUNDARIES AND CONSTRUCTION AREAS. EXPOSED SOIL WILL BE SEEDED AND/OR MULCHED, AS SOON AS PRACTICABLE, TO ASSURE THAT EROSION AND SILTATION IS KEPT TO A MINIMUM ALONG STREAM AND WETLAND BOUNDARIES.
13. TEMPORARY EROSION CONTROL DEVICES SHALL BE INSTALLED AS SOON AS PRACTICABLE AND APPROPRIATE, AS INDICATED IN THE EROSION AND SEDIMENT CONTROL PLAN, NOTES, AND DETAILS, AND IN ACCORDANCE WITH THE PROJECT SWPPP. EROSION CONTROL DEVICES SHALL BE INSTALLED PRIOR TO ANY GRADING OR FILLING OPERATIONS AND INSTALLATION OF PROPOSED STRUCTURES OR UTILITIES. THEY SHALL REMAIN IN PLACE UNTIL CONSTRUCTION IS COMPLETED AND THE AREA IS STABILIZED AND/OR REVEGETATED. ADDITIONALLY, NO SITE PREPARATION WORK SHALL BE UNDERTAKEN UNTIL ALL REQUIRED EROSION CONTROL MEASURES HAVE BEEN INSTALLED.
14. IN THE EVENT THAT ARCHAEOLOGICAL MATERIALS, HUMAN REMAINS, OR EVIDENCE OF HUMAN BURIALS ARE ENCOUNTERED DURING CONSTRUCTION, ALL WORK IN THE VICINITY OF THE FIND SHALL BE IMMEDIATELY HALTED, THE FIND PROTECTED FROM FURTHER DAMAGE, AND USACE NOTIFIED. THE PERMITTEE IS ALSO REQUIRED TO NOTIFY THE LOCAL POLICE AND THE STATE HISTORIC PRESERVATION OFFICE IMMEDIATELY FOLLOWING SUCH A DISCOVERY.

SPILL PREVENTION, CONTAINMENT, AND COUNTERMEASURES NOTES

GENERAL

PERSONNEL LISTED BELOW ARE RESPONSIBLE FOR THE OVERSIGHT OF THE PETROLEUM PRODUCTS AND HAZARDOUS OR CONTROLLED SUBSTANCES. A CONTACT TELEPHONE LIST IS MAINTAINED ON SITE, WHICH INCLUDES:
1. PROJECT MANAGER = SUBCONTRACTOR
2. CONSTRUCTION MANAGER = SUBCONTRACTOR
3. COR = CONTRACTING OFFICER'S REPRESENTATIVE

SPILLS WILL BE IMMEDIATELY REPORTED TO CANNON AFB.
IN THE EVENT THAT A SPILL OCCURS ON THE SITE, THE FOLLOWING NOTIFICATION PROCEDURE WILL BE FOLLOWED:
1. SUBCONTRACTOR NOTIFIES THE CONSTRUCTION MANAGER.
2. THE CONSTRUCTION MANAGER NOTIFIES THE PROJECT MANAGER AND THE COR.

SPILL PREVENTION AND CONTROL

1. STORE SPILL CLEANUP MATERIALS ONSITE AND NEAR POTENTIAL SPILL AREAS (E.G. MATERIAL STORAGE AREA AND VEHICLE FUELING AREAS IN THE SUPPORT ZONE).
2. NOTIFY ALL CONSTRUCTION WORKERS OF THE LOCATION OF MATERIALS USED TO CLEAN UP SPILLS.
3. KEEP COMMERCIALLY AVAILABLE SPILL KITS FOR CONSTRUCTION EQUIPMENT ON SITE.
4. KEEP DRUMS, BARRELS AND TEMPORARY STORAGE BAGS FOR CONTAINMENT AND TRANSPORTATION ONSITE.
5. KEEP ABSORBENT PADS, OIL BOOMS, MAT, OR EQUIVALENT MATERIALS ON SITE.
6. KEEP WASHABLE, REUSABLE RAGS FOR CLEANING UP SMALL LUBRICANT LEAKS ON SITE.
7. IN THE EVENT OF A SPILL, PROTECT SURFACE WATER BODIES AND PROMPTLY CLEAN UP AND PROPERLY DISPOSE OF SPILL MATERIALS.
8. TRAIN EMPLOYEES AND SUBCONTRACTORS ON PROPER SPILL PREVENTION, NOTIFICATION, AND CONTROL METHODS.
9. DESIGNATE RESPONSIBLE INDIVIDUALS.
10. NEVER HOSE DOWN OR BURY DRY MATERIAL SPILLS. CLEAN UP AS MUCH AS POSSIBLE AND DISPOSE OF PROPERLY.

POLLUTION PREVENTION

VEHICLE/EQUIPMENT MAINTENANCE

1. DO NOT DISCHARGE VEHICLE/MACHINERY WASH WATERS OR SOLVENTS TO STORM DRAIN SYSTEM OR TO SURFACE WATER BODIES.
2. ANY EQUIPMENT WHICH MUST BE REFUELED IN THE FIELD WILL BE REFUELED FROM TANKS CARRIED TO THE WORK SITE BY TRUCK.
3. PREVENT SPILLS AND LEAKS DURING FUELING AND MAINTENANCE OPERATIONS.
4. INSPECT AND MAINTAIN VEHICLES REGULARLY TO MINIMIZE LEAKS AND DRIPS; PLACE DRIP PANS OR ABSORBENT MATERIALS UNDER LEAK–PRONE MACHINERY WHEN IDLE.
5. COMPLY WITH FEDERAL, STATE, AND LOCAL REQUIREMENTS FOR FUEL STORAGE TANKS.

SANITARY/SEPTIC WASTE MANAGEMENT

1. LOCATE SANITARY FACILITIES INSIDE THE SUPPORT ZONE.
2. UNTREATED RAW WASTEWATER SHALL NOT BE DISCHARGED TO LAND, THE STORM DRAIN SYSTEM OR TO SURFACE WATER BODIES.
3. SANITARY/SEPTIC FACILITIES SHOULD BE MAINTAINED IN GOOD WORKING ORDER BY A LICENSED SERVICE PROVIDER.
4. ARRANGE REGULAR WASTE COLLECTION BY A LICENSED HAULER BEFORE FACILITIES OVERFLOW.
5. IF WASHING OUT OF THE INTERIOR OF PORTABLE TOILETS IS NEEDED, INSURE THAT WASH WATER IS DISCHARGED TO LAND AND DOES NOT FLOW ONTO ROADWAYS, THE STORM DRAIN SYSTEM OR SURFACE WATER BODIES.

SITE NOTES

ALL INTERNAL ACCESS ROADS ARE DIRT OR GRAVEL.

EARTHWORK NOTES

1. ALL EXCAVATIONS SHALL COMPLY WITH OSHA 29CFR1926.650 – SUBPART – EXCAVATIONS.
2. GRADE THE TOP PERIMETER OF THE EXCAVATION AREAS TO PREVENT SURFACE WATER FROM DRAINING INTO EXCAVATED AREAS, OR UNPROTECTED SLOPES.
3. MAINTAIN STABLE SLOPES AT ALL TIMES
4. NOTIFY USACE OF UNEXPECTED SUBSURFACE CONDITIONS (I.E., PRESENCE OF WATER TABLE AND/OR EXTENT OF WASTE) AND DISCONTINUE AFFECTED WORK IN THE AREA UNTIL NOTIFIED BY THE USACE TO RESUME WORK.

EARTHWORK AND GRADING NOTES

1. REFER TO SPECIFICATION SECTION 02200 FOR BACKFILL, COMPACTION AND GRADING REQUIREMENTS.
2. EXCAVATE BACKFILL FROM AN APPROVED ON–BASE SOURCE. SOIL WILL BE FREE OF CONTAMINANTS, ORGANIC MATERIAL, OR ROCKS GREATER THAN 3 INCHES IN DIAMETER. STOCKPILE BACKFILL IN AN AREA APPROVED BY THE COR.
3. STAKE OUT BOUNDARIES OF ALL SUSPECTED SUBSIDENCE AREAS AS IDENTIFIED ON THE PROJECT DRAWINGS.
4. REMOVE EXISTING VEGETATION FROM THE SOIL COVER IN AREAS TO BE DISTURBED.
5. FILL IN LOW SPOT AND SHAPE SURFACE TO SLOPE AWAY FROM THE CENTER OF THE LANDFILL COVER. PLACE SOIL IN A 6" TO 8" LIFT.
6. COMPACT BY PROOF–ROLLING WITH ADEQUATELY CHOSEN HEAVY EQUIPMENT.
7. REVEGETATE. REFER TO SPECIFICATION SECTION 02900 FOR REVEGETATION REQUIREMENTS.

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GENERAL AND CONSTRUCTION NOTES

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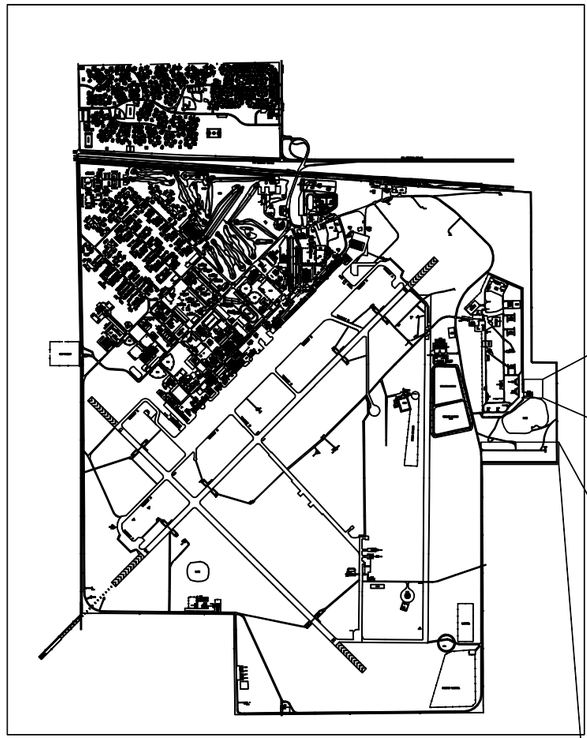
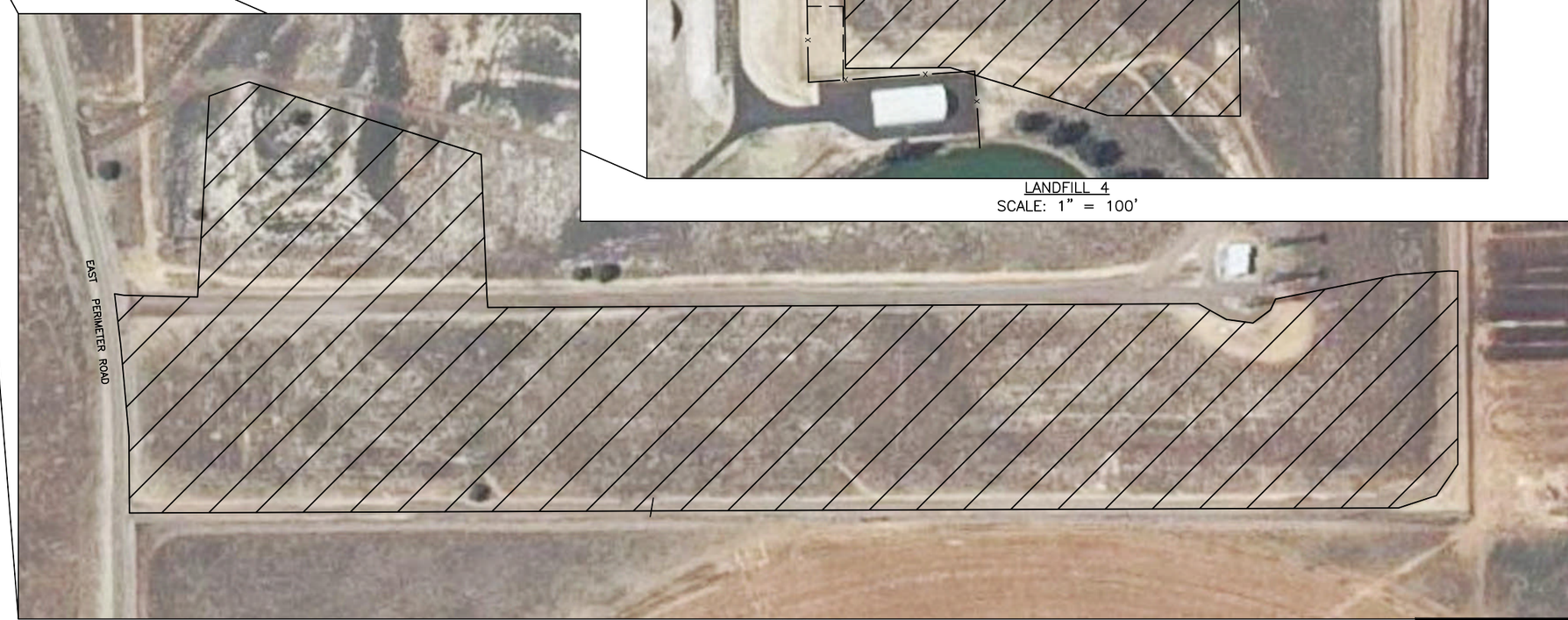
SHEET 3 OF 13

REVISION B



CANNON AFB OVERALL LAYOUT
N.T.S.

LANDFILL 4
SCALE: 1" = 100'




LANDFILL 3
SCALE: 1" = 100'

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CHECKED BY: D SHEA
DESIGNED BY: P PATTON

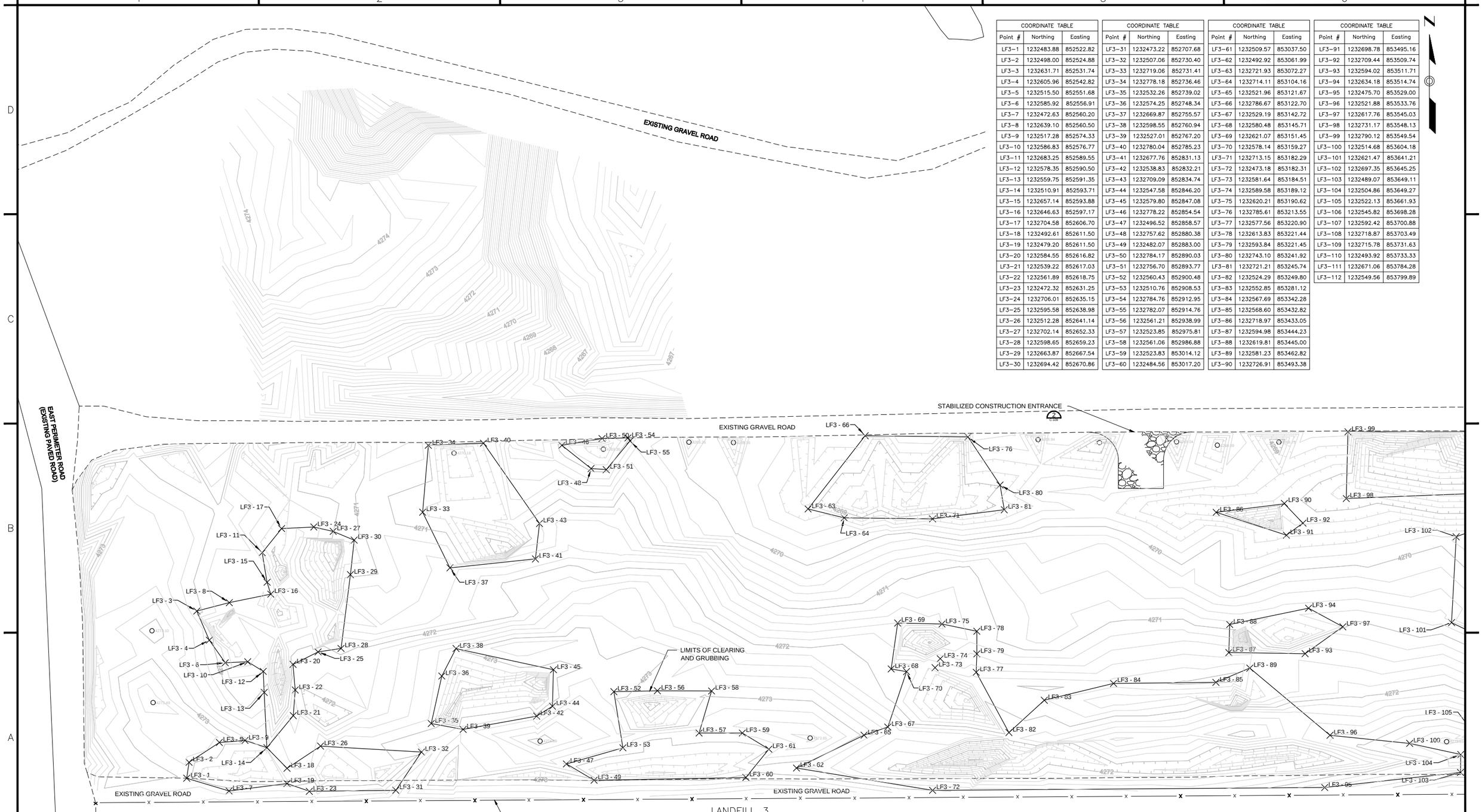
DESIGN FILE:
DATE: 04/26/2012
SCALE: NONE
SHEET SIZE: D

**EXISTING SITE PLAN**

DRAWING
C-102

SHEET 4 OF 13

REVISION B




LANDFILL 3
SCALE: 1" = 40'

| COORDINATE TABLE | | |
|---|---|---|
| Point # | Northing | Easting |
| LF3–1 | 1232483.88 | 852522.82 |
| LF3–2 | 1232498.00 | 852524.88 |
| LF3–3 | 1232631.71 | 852531.74 |
| LF3–4 | 1232605.96 | 852542.82 |
| LF3–5 | 1232515.50 | 852551.68 |
| LF3–6 | 1232585.92 | 852556.91 |
| LF3–7 | 1232472.63 | 852560.20 |
| LF3–8 | 1232639.10 | 852560.50 |
| LF3–9 | 1232517.28 | 852574.33 |
| LF3–10 | 1232586.83 | 852576.77 |
| LF3–11 | 1232683.25 | 852589.55 |
| LF3–12 | 1232578.35 | 852590.50 |
| LF3–13 | 1232559.75 | 852591.35 |
| LF3–14 | 1232510.91 | 852593.71 |
| LF3–15 | 1232657.14 | 852593.88 |
| LF3–16 | 1232646.63 | 852597.17 |
| LF3–17 | 1232704.58 | 852606.70 |
| LF3–18 | 1232492.61 | 852611.50 |
| LF3–19 | 1232479.20 | 852611.50 |
| LF3–20 | 1232584.55 | 852616.82 |
| LF3–21 | 1232539.22 | 852617.03 |
| LF3–22 | 1232561.89 | 852618.75 |
| LF3–23 | 1232472.32 | 852631.25 |
| LF3–24 | 1232706.01 | 852635.15 |
| LF3–25 | 1232595.58 | 852638.98 |
| LF3–26 | 1232512.28 | 852641.14 |
| LF3–27 | 1232702.14 | 852652.33 |
| LF3–28 | 1232598.65 | 852659.23 |
| LF3–29 | 1232663.87 | 852667.54 |
| LF3–30 | 1232694.42 | 852670.86 |

| COORDINATE TABLE | | |
|---|---|---|
| Point # | Northing | Easting |
| LF3–31 | 1232473.22 | 852707.68 |
| LF3–32 | 1232507.06 | 852730.40 |
| LF3–33 | 1232719.06 | 852731.41 |
| LF3–34 | 1232778.18 | 852736.46 |
| LF3–35 | 1232532.26 | 852739.02 |
| LF3–36 | 1232574.25 | 852748.34 |
| LF3–37 | 1232669.87 | 852755.57 |
| LF3–38 | 1232598.55 | 852760.94 |
| LF3–39 | 1232527.01 | 852767.20 |
| LF3–40 | 1232780.04 | 852785.23 |
| LF3–41 | 1232677.76 | 852831.13 |
| LF3–42 | 1232538.83 | 852832.21 |
| LF3–43 | 1232709.09 | 852834.74 |
| LF3–44 | 1232547.58 | 852846.20 |
| LF3–45 | 1232579.80 | 852847.08 |
| LF3–46 | 1232778.22 | 852854.54 |
| LF3–47 | 1232496.52 | 852858.57 |
| LF3–48 | 1232757.62 | 852880.38 |
| LF3–49 | 1232482.07 | 852883.00 |
| LF3–50 | 1232784.17 | 852890.03 |
| LF3–51 | 1232756.70 | 852893.77 |
| LF3–52 | 1232560.43 | 852900.48 |
| LF3–53 | 1232510.76 | 852908.53 |
| LF3–54 | 1232784.76 | 852912.95 |
| LF3–55 | 1232782.07 | 852914.76 |
| LF3–56 | 1232561.21 | 852938.99 |
| LF3–57 | 1232523.85 | 852975.81 |
| LF3–58 | 1232561.06 | 852986.88 |
| LF3–59 | 1232523.83 | 853014.12 |
| LF3–60 | 1232484.56 | 853017.20 |

| COORDINATE TABLE | | |
|---|---|---|
| Point # | Northing | Easting |
| LF3–61 | 1232509.57 | 853037.50 |
| LF3–62 | 1232492.92 | 853061.99 |
| LF3–63 | 1232721.93 | 853072.27 |
| LF3–64 | 1232714.11 | 853104.16 |
| LF3–65 | 1232521.96 | 853121.67 |
| LF3–66 | 1232786.67 | 853122.70 |
| LF3–67 | 1232529.19 | 853142.72 |
| LF3–68 | 1232580.48 | 853145.71 |
| LF3–69 | 1232621.07 | 853151.45 |
| LF3–70 | 1232578.14 | 853159.27 |
| LF3–71 | 1232713.15 | 853182.29 |
| LF3–72 | 1232473.18 | 853182.31 |
| LF3–73 | 1232581.64 | 853184.51 |
| LF3–74 | 1232589.58 | 853189.12 |
| LF3–75 | 1232620.21 | 853190.62 |
| LF3–76 | 1232785.61 | 853213.55 |
| LF3–77 | 1232577.56 | 853220.90 |
| LF3–78 | 1232613.83 | 853221.44 |
| LF3–79 | 1232593.84 | 853221.45 |
| LF3–80 | 1232743.10 | 853241.92 |
| LF3–81 | 1232721.21 | 853245.74 |
| LF3–82 | 1232524.29 | 853249.80 |
| LF3–83 | 1232552.85 | 853281.12 |
| LF3–84 | 1232567.69 | 853342.28 |
| LF3–85 | 1232568.60 | 853432.82 |
| LF3–86 | 1232718.97 | 853433.05 |
| LF3–87 | 1232594.98 | 853444.23 |
| LF3–88 | 1232619.81 | 853445.00 |
| LF3–89 | 1232581.23 | 853462.82 |
| LF3–90 | 1232726.91 | 853493.38 |

| COORDINATE TABLE | | |
|---|---|---|
| Point # | Northing | Easting |
| LF3–91 | 1232698.78 | 853495.16 |
| LF3–92 | 1232709.44 | 853509.74 |
| LF3–93 | 1232594.02 | 853511.71 |
| LF3–94 | 1232634.18 | 853514.74 |
| LF3–95 | 1232475.70 | 853529.00 |
| LF3–96 | 1232521.88 | 853533.76 |
| LF3–97 | 1232617.76 | 853545.03 |
| LF3–98 | 1232731.17 | 853548.13 |
| LF3–99 | 1232790.12 | 853549.54 |
| LF3–100 | 1232514.68 | 853604.18 |
| LF3–101 | 1232621.47 | 853641.21 |
| LF3–102 | 1232697.35 | 853645.25 |
| LF3–103 | 1232489.07 | 853649.11 |
| LF3–104 | 1232504.86 | 853649.27 |
| LF3–105 | 1232522.13 | 853661.93 |
| LF3–106 | 1232545.82 | 853698.28 |
| LF3–107 | 1232592.42 | 853700.88 |
| LF3–108 | 1232718.87 | 853703.49 |
| LF3–109 | 1232715.78 | 853731.63 |
| LF3–110 | 1232493.92 | 853733.33 |
| LF3–111 | 1232671.06 | 853784.28 |
| LF3–112 | 1232549.56 | 853799.89 |

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SCALE VERIFICATION

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**REPAIR OF LANDFILL COVERS LF03 AND LF04**

**CANNON AIR FORCE BASE**

TETRA TECH
143 UNION BLVD., SUITE 1010
LAKEWOOD, CO 80228
TEL: (303) 988–2202 FAX: (303) 980–3539

APPROVED BY: R VERSAW
DRAWN BY: A LINTZ
CHECKED BY: D SHEA
DESIGNED BY: P PATTON

DESIGN FILE:
DATE: 04/26/2012
SCALE: NONE
SHEET SIZE: D

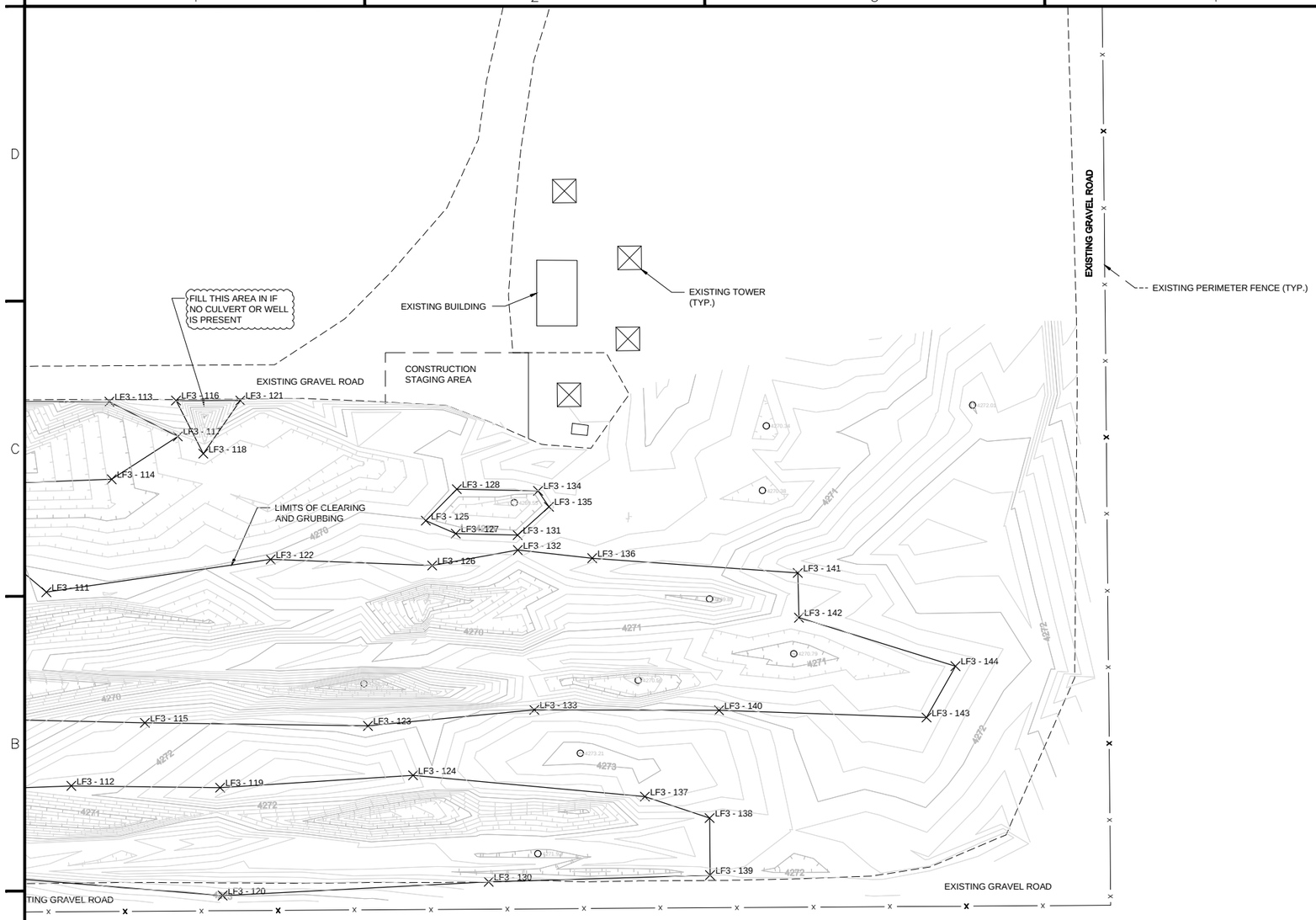
**CLEARING AND GRUBBING PLAN, LF 03 (PART 1 OF 2)**

**DRAFT**
**ISSUED FOR REVIEW**

DRAWING
**C-103**

SHEET
**5** OF **13**

REVISION
**B**




| COORDINATE TABLE | | |
|---|---|---|
| Point # | Northing | Easting |
| LF3–113 | 1232790.48 | 853823.78 |
| LF3–114 | 1232741.84 | 853825.27 |
| LF3–115 | 1232589.12 | 853846.07 |
| LF3–116 | 1232791.26 | 853865.61 |
| LF3–117 | 1232768.71 | 853866.72 |
| LF3–118 | 1232757.87 | 853882.77 |
| LF3–119 | 1232548.41 | 853893.30 |
| LF3–120 | 1232480.79 | 853894.83 |
| LF3–121 | 1232791.24 | 853905.93 |
| LF3–122 | 1232691.58 | 853924.98 |
| LF3–123 | 1232587.18 | 853986.10 |
| LF3–124 | 1232556.21 | 854014.32 |
| LF3–125 | 1232715.89 | 854022.35 |
| LF3–126 | 1232687.73 | 854026.36 |
| LF3–127 | 1232707.75 | 854041.12 |
| LF3–128 | 1232735.66 | 854041.78 |
| LF3–130 | 1232489.37 | 854061.81 |
| LF3–131 | 1232706.84 | 854079.93 |
| LF3–132 | 1232697.45 | 854080.07 |
| LF3–133 | 1232597.28 | 854090.38 |

| COORDINATE TABLE | | |
|---|---|---|
| Point # | Northing | Easting |
| LF3–134 | 1232734.59 | 854092.79 |
| LF3–135 | 1232724.58 | 854099.60 |
| LF3–137 | 1232542.84 | 854159.78 |
| LF3–138 | 1232529.42 | 854200.40 |
| LF3–139 | 1232493.57 | 854200.69 |
| LF3–140 | 1232596.95 | 854206.35 |
| LF3–141 | 1232683.11 | 854255.75 |
| LF3–142 | 1232655.07 | 854256.50 |
| LF3–143 | 1232592.44 | 854336.50 |
| LF3–144 | 1232624.64 | 854354.68 |

LANDFILL 3
SCALE: 1" = 40'

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**REPAIR OF LANDFILL COVERS LF03 AND LF04**

**CANNON AIR FORCE BASE**

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143 UNION BLVD., SUITE 1010
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APPROVED BY: R VERSAW
DRAWN BY: A LINTZ
CHECKED BY: D SHEA
DESIGNED BY: P PATTON
DESIGN FILE:
DATE: 04/26/2012
SCALE: NONE
SHEET SIZE: D

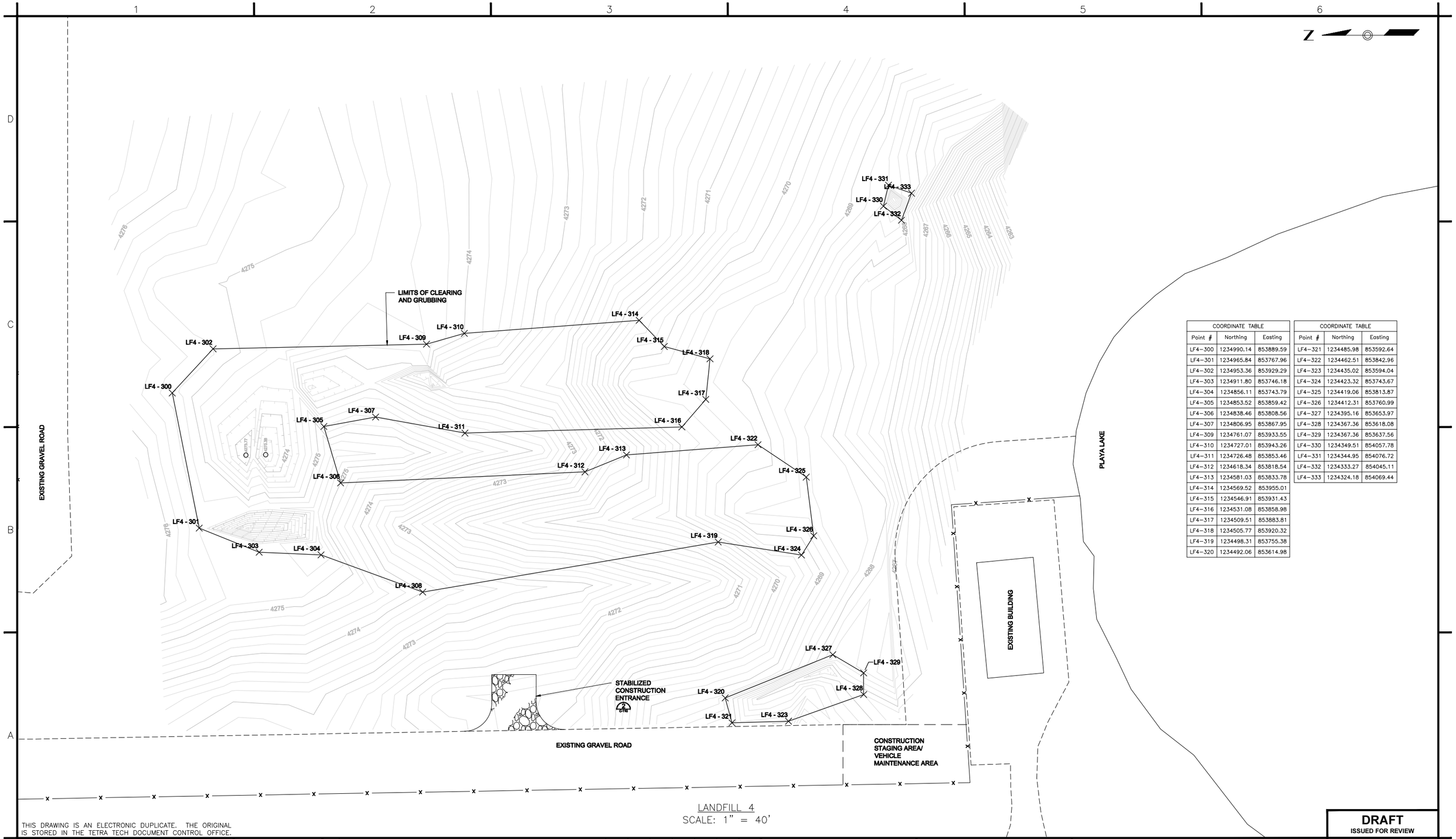
**CLEARING AND GRUBBING PLAN, LF 03 (PART 2 OF 2)**

**DRAFT**
**ISSUED FOR REVIEW**

DRAWING
**C-104**

SHEET **6** OF **13**

REVISION **B**




| COORDINATE TABLE | | |
|---|---|---|
| Point # | Northing | Easting |
| LF4–300 | 1234990.14 | 853889.59 |
| LF4–301 | 1234965.84 | 853767.96 |
| LF4–302 | 1234953.36 | 853929.29 |
| LF4–303 | 1234911.80 | 853746.18 |
| LF4–304 | 1234856.11 | 853743.79 |
| LF4–305 | 1234853.52 | 853859.42 |
| LF4–306 | 1234838.46 | 853808.56 |
| LF4–307 | 1234806.95 | 853867.95 |
| LF4–309 | 1234761.07 | 853933.55 |
| LF4–310 | 1234727.01 | 853943.26 |
| LF4–311 | 1234726.48 | 853853.46 |
| LF4–312 | 1234618.34 | 853818.54 |
| LF4–313 | 1234581.03 | 853833.78 |
| LF4–314 | 1234569.52 | 853955.01 |
| LF4–315 | 1234546.91 | 853931.43 |
| LF4–316 | 1234531.08 | 853858.98 |
| LF4–317 | 1234509.51 | 853883.81 |
| LF4–318 | 1234505.77 | 853920.32 |
| LF4–319 | 1234498.31 | 853755.38 |
| LF4–320 | 1234492.06 | 853614.98 |

| COORDINATE TABLE | | |
|---|---|---|
| Point # | Northing | Easting |
| LF4–321 | 1234485.98 | 853592.64 |
| LF4–322 | 1234462.51 | 853842.96 |
| LF4–323 | 1234435.02 | 853594.04 |
| LF4–324 | 1234423.32 | 853743.67 |
| LF4–325 | 1234419.06 | 853813.87 |
| LF4–326 | 1234412.31 | 853760.99 |
| LF4–327 | 1234395.16 | 853653.97 |
| LF4–328 | 1234367.36 | 853618.08 |
| LF4–329 | 1234367.36 | 853637.56 |
| LF4–330 | 1234349.51 | 854057.78 |
| LF4–331 | 1234344.95 | 854076.72 |
| LF4–332 | 1234333.27 | 854045.11 |
| LF4–333 | 1234324.18 | 854069.44 |

LANDFILL 4
SCALE: 1" = 40'

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REPAIR OF LANDFILL COVERS
LF03 AND LF04

CANNON AIR FORCE BASE

TETRA TECH
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APPROVED BY: R VERSAW
DRAWN BY: A LINTZ
CHECKED BY: D SHEA
DESIGNED BY: P PATTON

DESIGN FILE:
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SHEET SIZE: D

**CLEARING AND GRUBBING PLAN, LF 04**

DRAWING
**C-105**

SHEET
**7** OF **13**

REVISION
**B**

EXISTING GRAVEL ROAD

EAST PERIMETER ROAD (EXISTING PAVED ROAD)

STABILIZED CONSTRUCTION ENTRANCE

EXISTING GRAVEL ROAD

LIMITS OF GRADING (TYP.)

EXISTING GRAVEL ROAD

EXISTING GRAVEL ROAD

EXISTING PERIMETER FENCE

LANDFILL 3
SCALE: 1" = 40'

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**REPAIR OF LANDFILL COVERS LF03 AND LF04**

**CANNON AIR FORCE BASE**

TETRA TECH
143 UNION BLVD., SUITE 1010
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APPROVED BY: R VERSAW
DRAWN BY: A LINTZ
CHECKED BY: D SHEA
DESIGNED BY: P PATTON

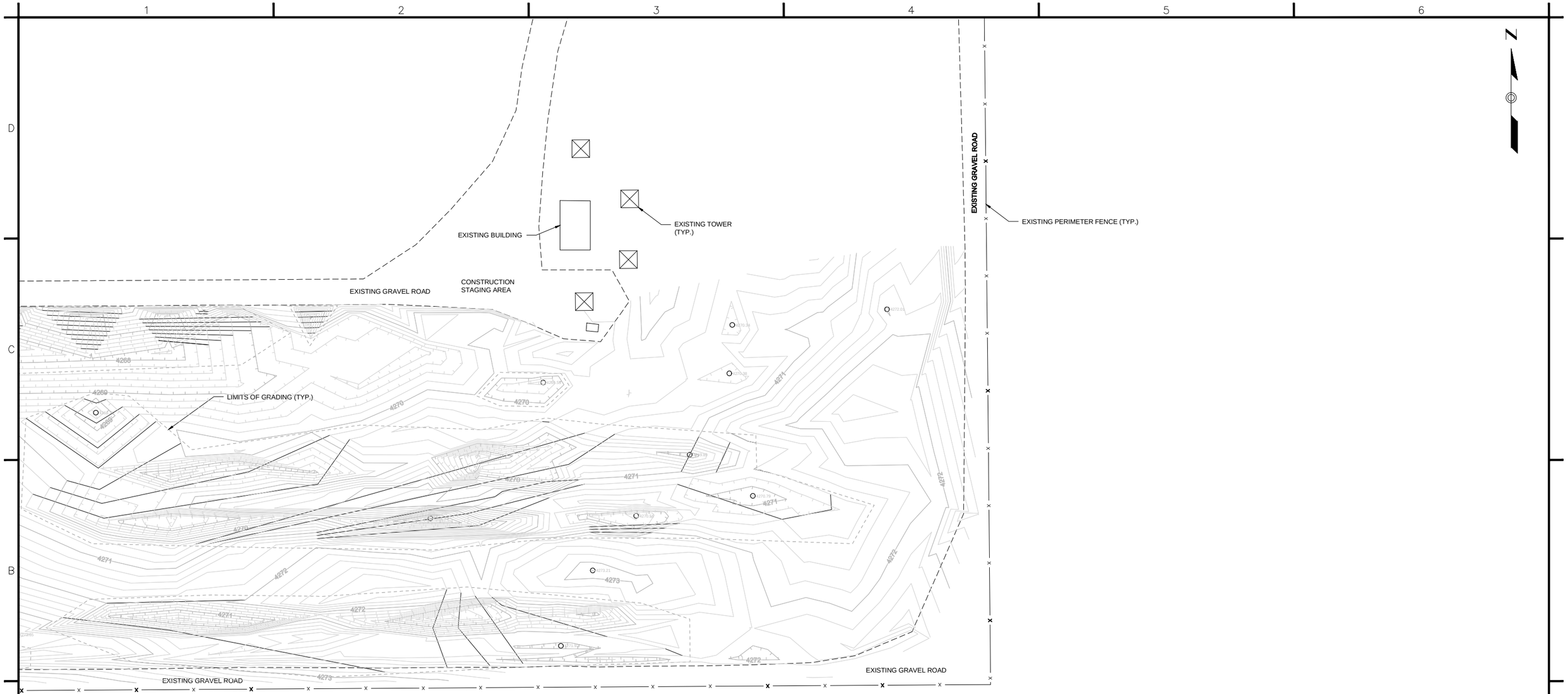
DESIGN FILE:
DATE: 04/26/2012
SCALE: NONE
SHEET SIZE: D

**SITE GRADING PLAN, LF 03 (PART 1 OF 2)**

DRAWING
**C-106**

SHEET **8** OF **13**

REVISION **B**




LANDFILL 3
SCALE: 1" = 40'

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**REPAIR OF LANDFILL COVERS LF03 AND LF04**

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DESIGNED BY: P PATTON

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**SITE GRADING PLAN, LF 03 (PART 2 OF 2)**

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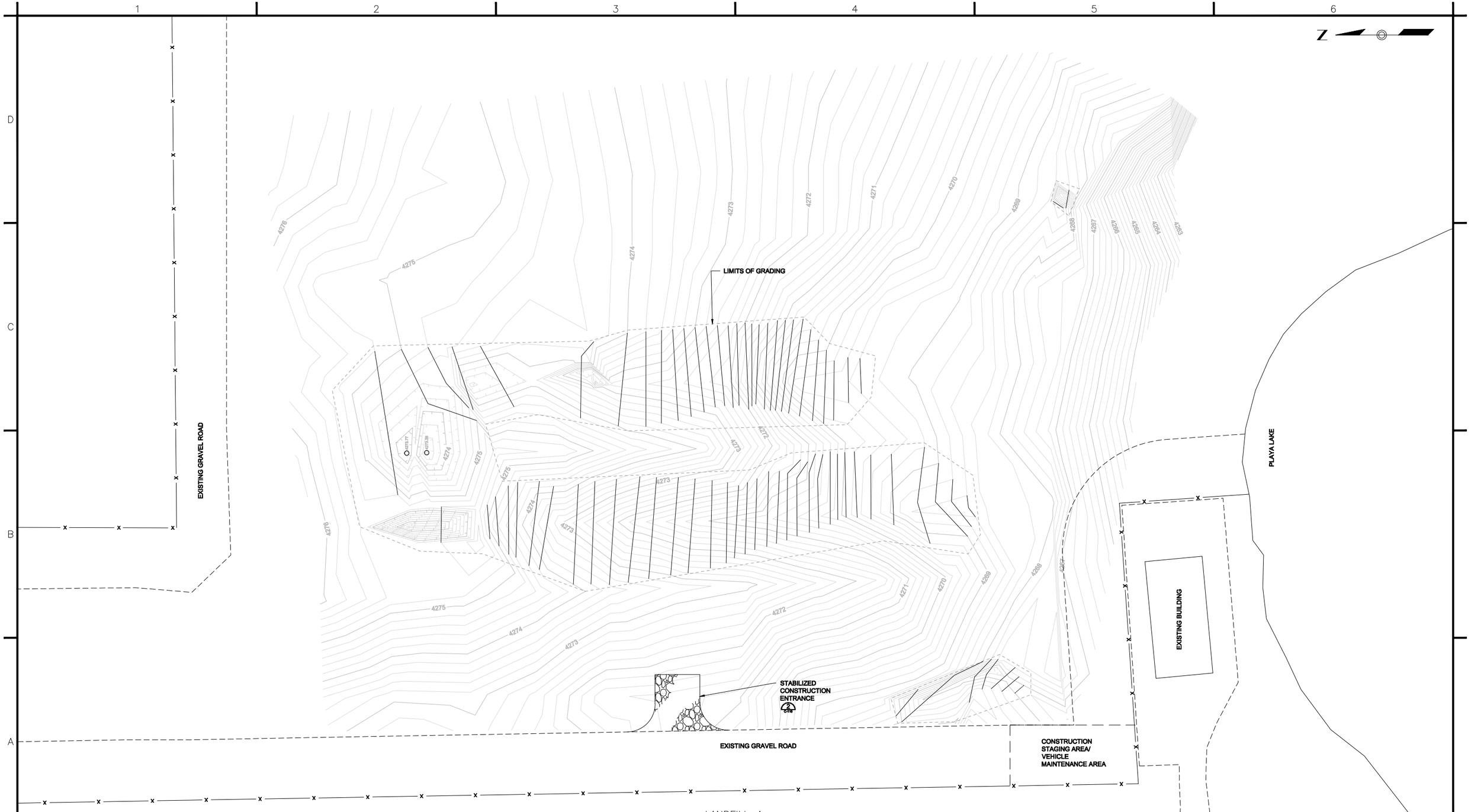
DRAWING
**C-107**

SHEET **9** OF **13**

REVISION **B**




LANDFILL 4
SCALE: 1" = 40'

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**REPAIR OF LANDFILL COVERS**
**LF03 AND LF04**

**CANNON AIR FORCE BASE**

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143 UNION BLVD., SUITE 1010
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TEL: (303) 988-2202 FAX: (303) 980-3539

APPROVED BY: R VERSAW
DRAWN BY: A LINTZ
CHECKED BY: D SHEA
DESIGNED BY: P PATTON

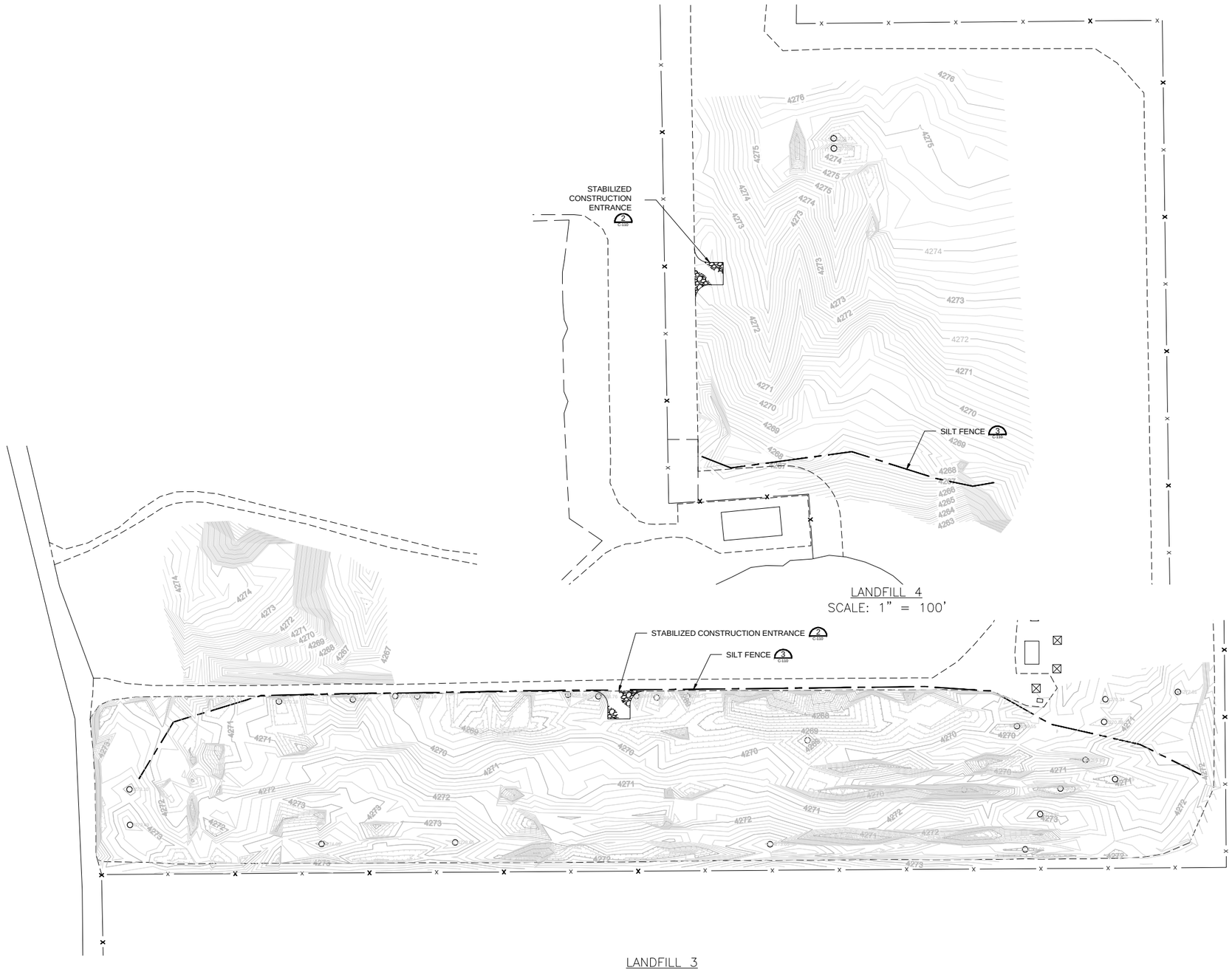
DESIGN FILE:
DATE: 04/26/2012
SCALE: NONE
SHEET SIZE: D

**SITE GRADING PLAN, LF 04**

DRAWING
**C-108**

SHEET **10** OF **13**

REVISION **B**

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SCALE VERIFICATION

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**REPAIR OF LANDFILL COVERS LF03 AND LF04**

**CANNON AIR FORCE BASE**

**TETRA TECH**
143 UNION BLVD., SUITE 1010
LAKEWOOD, CO 80228
TEL: (303) 988-2202 FAX: (303) 980-3539

APPROVED BY: R VERSAW
DRAWN BY: A LINTZ
CHECKED BY: D SHEA
DESIGNED BY: P PATTON

DESIGN FILE:
DATE: 04/26/2012
SCALE: NONE
SHEET SIZE: D

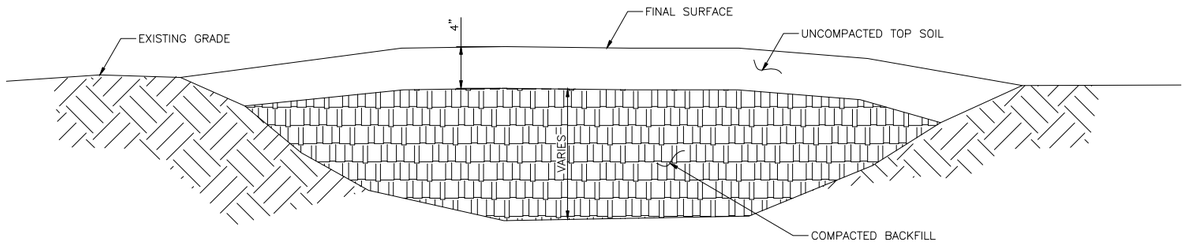
**SOIL EROSION AND SEDIMENT CONTROL PLAN**

**DRAFT**
**ISSUED FOR REVIEW**

DRAWING
**C-109**

SHEET **11** OF **13**

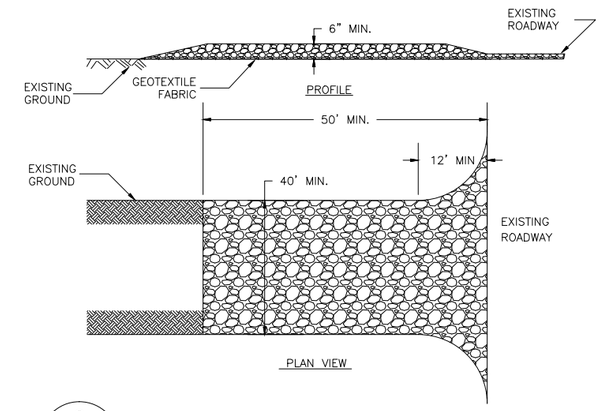
REVISION **B**




1 / — TYPICAL BACKFILL AREA

NOTES:

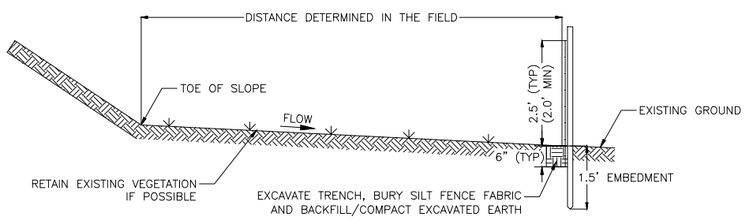
1. SLOPE FINAL SURFACE AWAY FROM BACKFILL AREA.
2. COMPACT BACKFILL IN ACCORDANCE WITH SPECIFICATION 02200.
3. REVEGETATE ALL DISTURBED AREAS IN ACCORDANCE WITH SPECIFICATION SECTION 02900.




2 / C109 STABILIZED CONSTRUCTION ENTRANCE

NOTES:

1. STONE SIZE – USE 2"–3" STONE, OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
2. LENGTH – NOT LESS THAN 50 FT.
3. THICKNESS – NOT LESS THAN 6 INCHES.
4. WIDTH – NOT LESS THAN 40FT.
5. GEOTEXTILE FABRIC – WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
6. MAINTENANCE – THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PAVED ROADS. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PAVED ROADS MUST BE REMOVED IMMEDIATELY.
7. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.
8. A STABILIZED CONSTRUCTION ENTRANCE SHALL BE LOCATED AT EVERY POINT WHERE CONSTRUCTION TRAFFIC ENTERS OR LEAVES A CONSTRUCTION SITE. VEHICLES LEAVING THE SITE MUST TRAVEL OVER THE ENTIRE LENGTH OF THE STABILIZED CONSTRUCTION ENTRANCE.
9. PERIODICALLY ADD STONE TO ENTRANCE TO MAINTAIN EFFECTIVENESS.




3 / C109 SILT FENCE

SILT FENCE INSTALLATION AND MAINTENANCE NOTES:

A. THE PRIMARY PURPOSE OF A SILT FENCE IS TO REDUCE RUNOFF VELOCITY AND TRAP SEDIMENT. VELOCITY IS REDUCED, WATER IS IMPOUNDED BEHIND THE MEASURE, AND SEDIMENT FALLS OUT OF SUSPENSION.
B. SILT FENCE SHALL BE INSTALLED ON A LINE OF EQUAL ELEVATION (CONTOUR) AS POSSIBLE.
C. SILT FENCE SHALL NOT BE USED IN OR ACROSS A FLOWING NATURAL CHANNEL.
D. SILT FENCE SHALL BE PLACED AWAY FROM TOE OF SLOPE, 15 FEET PREFERRED, TO PROVIDE ADEQUATE AREA FOR SEDIMENT STORAGE AND FACILITATE MAINTENANCE OF SEDIMENT CONTAINMENT AREA. ACTUAL DISTANCE FROM TOE OF SLOPE TO BE DETERMINED IN THE FIELD.
E. ASSEMBLIES MAY HAVE UP TO 8 FEET POST SPACING, TO BE DETERMINED IN THE FIELD.
F. THE BOTTOM EDGE OF SILT FENCE SHALL BE BURIED A MINIMUM OF 6 INCHES BELOW GROUND. THE FENCE SHALL BE INSTALLED WITH THE POSTS ON THE DOWNSTREAM SIDE OF THE FABRIC.
G. MEASURES SHALL BE INSPECTED EVERY 7 CALENDAR DAYS, WITHIN 24 HOURS OF THE END OF A STORM EVENT, OR TWICE A WEEK DURING PROLONGED RAINFALL. MEASURES SHALL BE CLEANED AND REPAIRED AS REQUIRED. SEDIMENT SHALL BE REMOVED WHEN ACCUMULATION REACHES 9 INCHES (MAXIMUM).
H. LOCATIONS FOR SILT FENCES TO BE DETERMINED IN FIELD BY THE ENVIRONMENTAL SITE MANAGER WITH CONCURRENCE BY THE USACE.

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REPAIR OF LANDFILL COVERS
LF03 AND LF04

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SOIL EROSION AND CIVIL CONSTRUCTION DETAILS

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REVISION B

EROSION AND SEDIMENT CONTROL PRACTICES

THE SUBCONTRACTOR SHALL PERFORM THE CONSTRUCTION IN COMPLIANCE WITH THE NMED-APPROVED SWPPP FOR THE PROJECT AND IN ACCORDANCE WITH THE CONSTRUCTION DRAWINGS.

STORMWATER POLLUTION PREVENTION PLAN

1. THE SUBCONTRACTOR SHALL COMPLY WITH THE NMED APPROVED SWPPP, ITEMS LISTED BELOW AND SHEETS C-102 TO C-111.

2. SUBCONTRACTOR SHALL REMOVE AND DISPOSE OF BRUSH, AND OTHER VEGETATION AS REQUIRED FOR THE PROJECT. THE DISPOSAL OF BRUSH, OR OTHER VEGETATION IN ANY STREAM CORRIDOR, WETLAND, OR SURFACE WATER IS PROHIBITED.

3. THE USE OF EQUIPMENT IN ANY LAKE OR WETLAND AREA, EXCEPT DURING INSTALLATION OF AUTHORIZED ROAD OR INTERCONNECT CROSSINGS DEPICTED ON THE CONSTRUCTION DRAWINGS, IS STRICTLY PROHIBITED.

4. ALL NECESSARY PRECAUTIONS SHALL BE TAKEN TO PRECLUDE CONTAMINATION OF ANY WETLAND OR WATERWAY BY SUSPENDED SOLIDS, SEDIMENTS, FUELS, SOLVENTS, LUBRICANTS, EPOXY COATINGS, PAINTS, CONCRETE, LEACHATE, OR ANY OTHER ENVIRONMENTALLY DELETERIOUS MATERIALS ASSOCIATED WITH THE PROJECT. THESE MATERIALS SHALL BE STORED A MINIMUM OF 100 FEET FROM ANY WETLAND, STREAM, DITCH, WATERCOURSE, OR DRAINAGE. NO EQUIPMENT RE-FUELING SHALL OCCUR WITHIN THE SAME 100-FOOT AREA.

5. LAKES AND WETLANDS WILL BE PROTECTED FROM INDIRECT IMPACTS DURING CONSTRUCTION BY UTILIZING VARIOUS EROSION AND SEDIMENT CONTROL MEASURES INDICATED IN THE EROSION AND SEDIMENT CONTROL NOTES AND DETAIL SHEETS, INCLUDING SILT FENCES (PLACED BETWEEN WATER RESOURCE BOUNDARIES AND CONSTRUCTION AREAS) AND VEGETATED BUFFER AREAS. EXPOSED SOIL WILL BE SEEDED AND/OR MULCHED, AS SOON AS PRACTICABLE,

6. TEMPORARY EROSION CONTROL DEVICES SHALL BE INSTALLED AS SOON AS PRACTICABLE AND APPROPRIATE, AS INDICATED IN THESE EROSION AND SEDIMENT CONTROL DETAILS. EROSION CONTROL DEVICES SHALL BE INSTALLED PRIOR TO ANY GRADING OR FILLING OPERATIONS. THEY SHALL REMAIN IN PLACE UNTIL CONSTRUCTION IS COMPLETED AND THE AREA IS STABILIZED AND/OR REVEGETATED. ADDITIONALLY, NO SITE PREPARATION WORK SHALL BE UNDERTAKEN UNTIL ALL REQUIRED EROSION CONTROL MEASURES HAVE BEEN INSTALLED.

7. SILTATION PREVENTION MEASURES, SUCH AS SILT FENCING, SHALL BE INSTALLED AND MAINTAINED THROUGHOUT THE DURATION OF THE PROJECT, TO PREVENT MOVEMENT OF SILT AND TURBID WATERS FROM THE GENERATING SITE AND INTO ANY WATERCOURSE, WATER BODY, OR WETLAND. THEY SHALL REMAIN IN PLACE UNTIL CONSTRUCTION IS COMPLETED AND THE AREA IS STABILIZED AND/OR REVEGETATED.

8. ALL DISTURBED AREAS WHERE SOIL WILL BE TEMPORARILY EXPOSED OR STOCKPILED FOR LONGER THAN ONE WEEK SHALL BE CONTAINED BY A CONTINUOUS LINE OF SILT FENCE (AND/OR MULCH, IF APPROVED BY THE ENVIRONMENTAL SITE MANAGER IN CONCURRENCE WITH USACE) PLACED ON THE DOWN SLOPE SIDE BETWEEN THE FILL AND WETLAND/WATER BODY. TARPS ARE AUTHORIZED TO SUPPLEMENT THESE APPROVED METHODS AS NECESSARY.

9. ALL AREAS OF SOIL DISTURBANCE RESULTING FROM THIS PROJECT SHALL BE STABILIZED IMMEDIATELY FOLLOWING PROJECT COMPLETION. THE APPROVED METHODOLOGIES ARE AS FOLLOWS:
   - STABILIZATION OF THE ENTIRE DISTURBED AREA WITH APPROPRIATE VEGETATION THAT MEETS NMED REQUIREMENTS (SEE VEGETATIVE PLAN ON THIS SHEET).
   - STABILIZATION AS PER SPECIFICATIONS IDENTIFIED ON APPROVED PLANS.
   - TEMPORARILY STABILIZATION WITH STRAW, SITE CREATED MULCH, OR OTHER SIMILAR NATURAL FIBER WITHIN ONE TO THREE WEEKS OF FINAL GRADING. TEMPORARY STABILIZATION SHALL BE MAINTAINED UNTIL A MATURE VEGETATIVE COVER IS ESTABLISHED.

10. VISIBLE TURBID DISCHARGES FROM LAND CLEARING, GRADING OR EXCAVATING ACTIVITIES, OR DE-WATERING OPERATIONS SHALL NOT ENTER A BODY OF WATER, OR WETLAND. PRIOR TO ENTRY INTO A BODY OF WATER, NAVIGABLE WATER, OR WETLAND. ANY SUCH DISCHARGE SHALL BE:
    - FILTERED THROUGH CRUSHED STONE, SAND, STRAW BALES, SILT SCREENING (MAXIMUM OPENING SIZE OF U.S. SIEVE NUMBER 20), ETC.

11. SUBCONTRACTOR SHALL GRADE REPAIR AREAS TO ALLOW STORMWATER RUNOFF TO DRAIN AWAY FROM THESE AREAS.

THE CONTROL MEASURES TO BE USED DURING THE PROJECT ARE SUMMARIZED AS FOLLOWS:

1. MULCHING: MULCHING WILL BE USED AS IDENTIFIED ON THE CONSTRUCTION DRAWINGS OR BY THE ENVIRONMENTAL SITE MANAGER WITH CONCURRENCE BY THE COR. TYPICALLY, MULCHING IS USED AS A TEMPORARY EROSION CONTROL MEASURE IN AREAS OF DISTURBANCES AND IN CONJUNCTION WITH SEEDING.

2. SILT FENCE: SILT FENCE WILL BE INSTALLED AROUND SOIL STOCKPILES, DOWN SLOPE FROM FILL SLOPES GREATER THAN OR EQUAL TO 4' IN HEIGHT, CULVERT INSTALLATIONS, BETWEEN WETLAND BOUNDARIES AND CONSTRUCTION AREAS AS SHOWN ON THE CONSTRUCTION DRAWINGS; IF DEEMED NECESSARY BY THE ENVIRONMENTAL SITE MANAGER WITH CONCURRENCE BY THE USACE.

3. SEEDING: SEEDING IS USED FOR BOTH TEMPORARY AND PERMANENT MEASURES TO STABILIZE DISTURBED AREAS.

4. WATERING VEHICLE: THE WATERING VEHICLE WILL BE USED TO PREVENT SURFACE AND AIR MOVEMENT OF DUST FROM DISTURBED SOIL SURFACES THAT MAY CAUSE OFF-SITE DAMAGE, HEALTH HAZARDS, AND TRAFFIC SAFETY PROBLEMS. WATER WILL BE USED TO SPRAY THE SURFACE ON CONSTRUCTION ROADS, ACCESS POINTS, AND OTHER DISTURBED AREAS WHERE OFF-SITE DAMAGE MAY OCCUR IF DUST IS NOT CONTROLLED.

CONSTRUCTION SPECIFICATIONS

CONSTRUCTION SCHEDULE FOR EROSION AND SEDIMENT CONTROL MEASURES

REPAIR AREAS:

1. INSTALL EROSION AND SEDIMENT CONTROLS AS IDENTIFIED ON THE CONSTRUCTION DRAWINGS AS DIRECTED BY THE ENVIRONMENTAL SITE MANAGER WITH CONCURRENCE BY THE COR.
2. COMPLETE SITE CLEARING AND GRUBBING.
3. ROUGH GRADE SITE AND BACKFILL SUBGRADE AREAS
4. COMPLETE THE FINAL GRADING OF THE SITE, TOPSOIL, AND STABILIZE ACCORDING TO SPECIFICATIONS.
5. AFTER SITE HAS BEEN STABILIZED, REMOVE EROSION AND SEDIMENT CONTROLS.

MULCH:
MULCH WILL BE USED AS A TEMPORARY EROSION CONTROL MEASURE IN AREAS OF DISTURBANCE AND ALSO IN CONJUNCTION WITH SEEDING (SEE VEGETATIVE PLAN ON THIS SHEET FOR ADDITIONAL DETAILS). MULCH SHALL BE COMPRISED OF SHREDDED VEGETATION REMOVED FROM THE SITE DURING CLEARING AND GRUBBING OPERATIONS. WHEN MULCH IS USED FOR TEMPORARY STABILIZATION, THE MULCH WILL BE APPLIED AT A RATE OF APPROXIMATELY 2 TONS PER ACRE (90 LBS PER 1,000 SF).

SILT FENCE:
FILTER FABRIC FENCE SHOULD BE INSTALLED AT LEVEL GRADE. BOTH ENDS OF EACH FENCE SECTION SHOULD BE EXTENDED AT LEAST 8 FEET UPSLOPE AT 45 DEGREES TO THE MAIN FENCE ALIGNMENT TO ALLOW FOR POOLING OF WATER.

A 6 INCH DEEP TRENCH SHOULD BE EXCAVATED, MINIMIZING THE DISTURBANCE ON THE DOWN SLOPE SIDE. THE BOTTOM OF THE TRENCH SHOULD BE AT LEVEL GRADE. MAXIMUM DEVIATION FROM LEVEL GRADE SHOULD BE 1 PERCENT AND NOT EXTEND MORE THAN 25 FEET. THE BOTTOM OF THE FENCE SHOULD BE ANCHORED BY PLACING FABRIC IN THE BOTTOM OF THE TRENCH, AND BACKFILLING AND COMPACTING THE FILL MATERIAL IN THE TRENCH.

SUPPORT STAKES SHOULD BE DRIVEN 18" BELOW (OR AS FAR AS NECESSARY TO SECURE FENCE) THE EXISTING GROUND SURFACE AT 8 FOOT (MAX) INTERVALS. FILTER FABRIC SHOULD BE STRETCHED AND FASTENED TO THE UPSLOPE SIDE OF THE SUPPORT STAKES. AT FABRIC ENDS, BOTH ENDS SHOULD BE WRAPPED AROUND THE SUPPORT STAKE AND STAPLED. IF THE FABRIC COMES ALREADY ATTACHED TO THE STAKES, THE END STAKES SHOULD BE HELD TOGETHER WHILE THE FABRIC IS WRAPPED AROUND THE STAKES AT LEAST ONE REVOLUTION PRIOR TO DRIVING THE STAKES.

VEGETATIVE PLAN:

SUBCONTRACTOR SHALL INITIATE STABILIZATION MEASURES IN PORTIONS OF THE SITE WHERE CONSTRUCTION ACTIVITIES HAVE PERMANENTLY CEASED.

VEGETATIVE STABILIZATION WILL BE COMPLETED AS IDENTIFIED IN SPECIFICATION 02900.

MAINTENANCE PLAN:

ALL EROSION AND SEDIMENT CONTROL DEVICES WILL BE IN PLACE AT THE END OF EACH WORKING DAY. THE CONTROL DEVICES WILL BE INSPECTED AND MAINTAINED AS PRESCRIBED BELOW.

1. ALL EROSION AND SEDIMENT CONTROL PRACTICES WILL BE CHECKED FOR STABILITY AND OPERATION WITHIN 24 HOURS OF A STORM EVEN OF 0.5 INCH OR GREATER, AND NO LESS THAN ONCE EVERY 14 DAYS. ANY NECESSARY REPAIRS WILL BE MADE WITHIN 48 HOURS TO MAINTAIN ALL PRACTICES AS DESIGNED.

2. SEDIMENT ACCUMULATIONS AT THE SILT FENCE WILL BE REMOVED WHEN THE DEPTH OF THE SEDIMENT AT THE SILT FENCE REACHES 9 INCHES. REPAIRS WILL BE MADE WITHIN 48 HOURS TO THE FENCE TO MAINTAIN IT AS A BARRIER.

3. SEEDED AREAS WILL BE CHECKED FOR GERMINATION AND DAMAGE FROM STORMS. AREAS WILL BE RESEEDED AS NECESSARY TO REPAIR DAMAGE.

4. ALL TEMPORARY AND PERMANENT EROSION AND SEDIMENT CONTROL BMPS WILL BE MAINTAINED AND REPAIRED AS NEEDED TO ASSURE CONTINUED PERFORMANCE OF THEIR INTENDED FUNCTION. ALL MAINTENANCE AND REPAIR WILL BE CONDUCTED IN ACCORDANCE WITH BMPS.

5. ALL TEMPORARY EROSION AND SEDIMENT CONTROL BMPS WILL BE REMOVED WITHIN 30 DAYS AFTER FINAL SITE STABILIZATION IS ACHIEVED OR AFTER THE TEMPORARY BMPS ARE NO LONGER NEEDED. TRAPPED SEDIMENT WILL BE REMOVED OR STABILIZED ON SITE. DISTURBED SOIL AREAS RESULTING FROM REMOVAL OF BMPS OR VEGETATION WILL BE PERMANENTLY STABILIZED AS SOON AS POSSIBLE.

INSPECTIONS:

1. SUBCONTRACTOR WILL HAVE A QUALIFIED PROFESSIONAL CONDUCT AN ASSESSMENT OF THE SITE PRIOR TO THE COMMENCEMENT OF CONSTRUCTION AND CERTIFY IN AN INSPECTION REPORT THAT THE APPROPRIATE EROSION AND SEDIMENT CONTROLS HAVE BEEN ADEQUATELY INSTALLED OR IMPLEMENTED.

2. ENSURE OVERALL PREPAREDNESS OF THE SITE FOR THE COMMENCEMENT OF CONSTRUCTION. FOLLOWING THE COMMENCEMENT OF CONSTRUCTION, SITE INSPECTIONS SHALL BE CONDUCTED AND DOCUMENTED BY A QUALIFIED PROFESSIONAL AT LEAST EVERY 7-CALENDAR DAYS AND WITHIN 24 HOURS OF THE END OF A STORM EVENT. A CORRECTIVE ACTION LOG WILL BE FILLED OUT DESCRIBING ACTIONS TAKEN, DATE COMPLETED, AND NOTE THE PERSON WHO COMPLETED THE WORK.

4. INSPECTION RECORDS WILL BE MAINTAINED FOR A MINIMUM OF 2 YEARS AFTER THE PERMIT IS TERMINATED.

PRE-CONSTRUCTION CONFERENCE:

1. ONE OR MORE PRE-CONSTRUCTION MEETINGS WILL BE HELD WITH AN EXPLICIT AGENDA ITEM ADDRESSING THE SWPPP AND OTHER PERMIT REQUIREMENTS.

COORDINATION WITH UTILITIES AND OTHER SUBCONTRACTORS:

1. ALL SUBCONTRACTORS PROVIDING SERVICES ON THE PROJECT WHICH MAY CAUSE STORMWATER POLLUTION WILL BE PROVIDED A COPY OF THE SWPPP AND APPROPRIATE TRAINING REGARDING STORMWATER POLLUTION PREVENTION.

SUBCONTRACTOR OVERSIGHT:

1. SUBCONTRACTOR OVERSIGHT TO ENSURE COMPLIANCE.

2. SWPPP TRAINING WILL BE PROVIDED BY THE PROJECT SUPERINTENDENT OR PROJECT MANAGER OR DESIGNEE. INFORMAL, ON-THE-JOB TAILGATE TRAINING WILL BE THE FIRST LEVEL OF COMMUNICATION FOLLOWED BY ONSITE OBSERVATION OF TRAINING COMPLIANCE.

3. NON-COMPLIANCE WITH SWPPP POLICIES WILL TRIGGER A MORE INTENSIVE TRANING SESSION TO CORRECT THE PROBLEM(S).

4. SUBCONTRACTOR WILL HAVE AN ON-SITE PERSON (ENVIRONMENTAL SITE MANAGER) ASSIGNED TO MAINTAIN SWPPP COMPLIANCE. THIS INDIVIDUAL WILL MONITOR SWPPP COMPLIANCE AND WILL HAVE STOP WORK AUTHORITY IF A SEVERE SWPPP NON-COMPLIANCE IS IDENTIFIED.

TRAINING

1. SUBCONTRACTOR WILL PROVIDE ONSITE TRAINING TO KEY PERSONNEL RESPONSIBLE FOR SOIL EROSION AND SEDIMENT CONTROL.

2. THE CONSTRUCTION MANAGER, PROJECT MANAGER, FIELD ENGINEER, AND ENVIRONMENTAL SITE MANAGER WILL ALL BE FAMILIARIZED WITH THE MAJOR ELEMENTS OF THE PLAN.

3. CONSTRUCTION WORKERS AND OTHERS AT THE SITE WILL BE GIVEN APPROPRIATE TRAINING INFORMATION AT THE CONCLUSION OF SITE SAFETY MEETINGS OR ON AN AS-NEEDED BASIS.

4. RECORDS OF EMPLOYEE TRAINING MUST BE DOCUMENTED ACCORDING TO THE SWPPP.

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REPAIR OF LANDFILL COVERS
LF03 AND LF04

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SOIL EROSION AND SEDIMENT CONTROL NOTES AND DETAILS

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REVISION B

# Appendix E
# Stormwater Pollution Prevention Plan

# PREFACE

"We, the undersigned, 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 gathered and evaluated the information submitted. Based upon 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."

Carol Rieger
Tetra Tech, Inc.
Project Manager

Perry Patton, PE
Tetra Tech, Inc.
Project Engineer

*TBD*
*Title*
*Cannon AFB Mission Support Group Designation*

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# LIST OF ACRONYMS

| | |
|---|---|
| AFB | Air Force Base |
| BMP | Best Management Practice |
| CFR | Code of Federal Regulations |
| CGP | Construction General Permit |
| CWA | Clean Water Act |
| EPA | U.S. Environmental Protection Agency |
| ERP | Environmental Restoration Program |
| ft | foot/feet |
| LF-03 | Landfill No. 3 |
| LF-04 | Landfill No. 4 |
| NOI | Notice of Intent |
| NPDES | National Pollutant Discharge Elimination System |
| POL | petroleum, oil, lubricants |
| RCP | Regulatory Compliance Plan |
| SWMU | Solid Waste Management Unit |
| SWPPP | Stormwater Pollution Prevention Plan |
| TSS | total suspended solids |
| USAF | U.S. Air Force |

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# 1. INTRODUCTION

This SWPPP addresses construction services for the repair of existing soil covers at Solid Waste Management Unit (SWMU) 105 – Landfill No. 3 (LF-03) and SWMU 104 – No. 4 (LF-04) at Cannon Air Force Base (AFB), New Mexico. The repair work at LF-03 and LF-04 is being conducted in response to a New Mexico Environment Department letter regarding observations made during a site inspection in 2010. 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 planned construction activities is to repair the existing soil cover at each landfill in order 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

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. The area surrounding Cannon AFB is used mainly for farming and ranching. Figure E-1 depicts the locations of LF-03 and LF-04 at Cannon AFB.

### *1.1.1 LF-03 Description/Background*

LF-03 is an inactive landfill formerly used for burn and disposal trenching operations. The approximately 12-acre site is located in the east-central portion of Cannon AFB and is bounded to the north by a road leading to the transmitter tower, to the south and east by barbed-wire fences and agricultural fields, and on the west by the Perimeter Road. The landfill is rectangular in shape, measuring approximately 12 acres, with dimensions approximately 300 feet (ft) by 1,800 ft. The ground surface in this area is slightly hummocky and is covered with prairie grasses. Playa Lake, which lies approximately 450 ft north of LF-03, is the closest surface water body to the former landfill. The location of the former landfill with respect to the surrounding facility is shown on Figure E-2.

The landfill was operated from 1959 to 1967 and was reported to have received domestic and industrial wastes including solvents, paints, thinners, waste oils, and peroxide containers (Kearney 1987). Disposal activities consisted of placing collected waste material into a trench, burning the accumulated waste, and then covering the burned material with soil the following day. Disposal trenches were excavated to a maximum depth of 16.5 ft and possibly extended 250 ft in length. The amount of waste material disposed within the landfill trenches has not been determined. No waste disposal activities are known to have occurred for over 40 years. Subsurface investigation activities encountered waste material such as soda and beer bottles, plastic sheeting and bags, clothing,

synthetic rubber machinery belt, Styrofoam, scrap metal, insulated and non-insulated wiring, and a crushed 5-gallon can with no lid (Tetra Tech 2009). Some material uncovered during the investigation was burnt.

### 1.1.2 LF-04 Description/Background

LF-04 is an inactive landfill formerly used for burn and disposal trenching operations. The 9-acre site is located in the east-central portion of Cannon AFB and lies approximately 800 ft west of the ordnance area and is bounded to the north by Perimeter Road, to the west by a barbed-wire fence, and to the east and south by vacant fields. The site is an open field covered with prairie grasses. Generally, drainage from the area is to the north towards Playa Lake. The landfill is roughly square in shape, measuring approximately 9 acres, with dimensions approximately 570 ft by 690 ft. Playa Lake, which lies approximately 1,000 ft south of LF-04, is the closest surface water body to the former landfill. The location of the former landfill with respect to the surrounding facility is shown on Figure E-3.

The landfill was operated for 1 year from 1967 to 1968 (Kearney 1987). The landfill reportedly received domestic and industrial wastes including solvents, paints, thinners, waste oils, and peroxide containers. Disposal activities consisted of placing collected waste material into a trench, burning the accumulated waste, and then covering the burned material with soil the following day. Disposal trenches were excavated to a maximum depth of 16.5 ft and possibly extended 250 ft in length. The amount of waste material disposed within the landfill trenches has not been determined. No waste disposal activities are known to have occurred for over 40 years. Subsurface investigation activities encountered waste material such as glass, soda and beer cans, clothing, plastic sheeting and bags, scrap metal, insulated and non-insulated wiring, and one crushed 5-gallon can (Tetra Tech 2009).

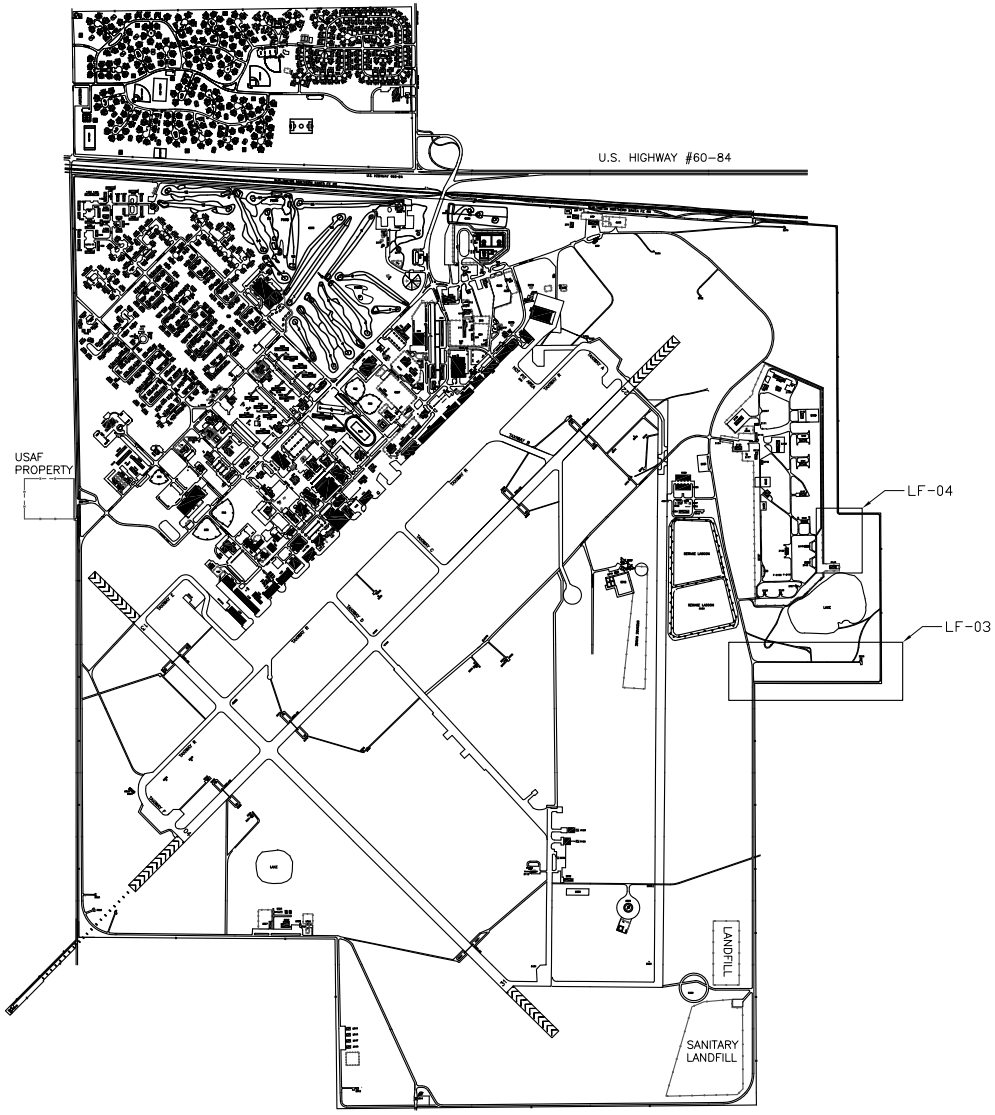
## 1.2 Project Description

The project involves removing existing vegetation in subsidence areas, backfilling the same areas, revegetating disturbed areas, and installing the appropriate erosion control measures at the site. Borrow material will be imported as the primary source for both general backfill and topsoil.

Initially, selected areas of the site will be grubbed and cleared of all vegetation prior to earthwork activities. The cleared subsidence surfaces will be proofrolled prior to backfilling. The areas of subsidence will be backfilled using the imported borrow material. Suitable heavy equipment will be used to compact the backfill, and then a 4-inch layer of uncompacted topsoil will be placed at the surface. The final surface of these areas will be seeded and mulched to revegetate the disturbed areas.

The following major construction activities will be performed at the LF-03 and LF-04 sites:

- Construction staking/site surveying
- Temporary erosion and sediment control
- Utility clearance, if necessary
- Clearing and grubbing
- Earthworks
- Site restoration
- Required inspections and testing




SCALE: 1"=3000'

**WORK PLAN FOR REPAIR OF SOIL COVERS**
**LANDFILLS NO. 03 (SWMU 105)**
**AND NO. 04 (SWMU 104)**

**CANNON AIR FORCE BASE**

**FIGURE E-1**
**LOCATION MAP - LF-03 & LF-04**

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## 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-03 and LF-04 during the construction activities. The SWPPP has been prepared in accordance with appropriate regulations and will incorporate Best Management Practices (BMP) 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 Construction General Permits (CGP) for Stormwater Discharges from Activities in Region 6 (Attachment 2). The draft Notice of Intent (NOI) for Stormwater Discharges Associated with Construction Activity under a NPDES CGP is provided as Attachment 3. The EPA now requires that NOIs be submitted electronically for approval. The construction contractor will submit a completed Notice of Termination (Attachment 3) when construction activities are complete.

Due to the limited area of the soil disturbance, less than 5 acres, a waiver to the NPDES CGP may be submitted. This waiver (Rainfall Erosivity Waiver) is determined by computing an "R-factor" for the construction project which is dependent on the location and construction schedule (Attachment 4). All waiver certifications must be submitted prior to commencement of construction activities.

### *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 Contractor 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 will be 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
- 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. Contractor Points of Contact**

| Name | Title | Phone | Responsibilities |
|---|---|---|---|
| *TBD* | Project Manager | *TBD* | 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 |
| *TBD* | Health & Safety Officer/Construction Quality Control Manager | TBD | Oversee spill prevention, preventative maintenance, and material inventory |
| *TBD* | Site Superintendent | TBD | Perform housekeeping and maintenance |

# 2. 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. Figures E-2 and E-3, the site plan maps for LF-03 and LF-04, 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-03 and LF-04 is summarized in a Preliminary Review/Visual Site Inspection Report (Kearney 1987).

LF-03 and LF-04 have undulating terrain with ground surfaces composed of primarily silty-sand and sandy-silt soil cover. The ground surface in these areas is slightly hummocky and is covered with prairie grasses.

## 2.2 Endangered Species and Historic Preservation Information

The U.S. Air Force has determined that construction activities at Environmental Restoration Program (ERP) sites are exempt from environmental assessments and other National Environmental Policy Act requirements because of public participation inherent to the ERP. 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 that may possibly be used on site that have a potential for contributing pollutants to stormwater runoff. Due to the expected short duration of the site work, on-site storage of materials will not be necessary. 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 Possible Significant Materials Used**

| Material | Purpose | Location | Quantity Stored | Likelihood of Contact With Stormwater | Material Management Practice |
|---|---|---|---|---|---|
| Motor oil | Engine lubrication | Vehicle maintenance area | One 55-gallon drums | Low, during maintenance only | Stored outside, in lined/bermed area |
| Diesel fuel | Fuel for earth-moving equipment | Mobile tanker | 1,000 to 2,000-gallon tank | Low, during equipment fueling only | Stored outside, in lined/bermed area |
| Hydraulic fluid | Earth-moving equipment lubrication | Vehicle maintenance area | One 55-gallon drums | Low, during maintenance only | Stored outside, in lined/bermed area |
| Transmission fluid | Transmission lubrication | Vehicle maintenance area | One 55-gallon drums | Low, during maintenance only | Stored outside, in lined/bermed area |
| Antifreeze | Engine coolant | Vehicle maintenance area | One 55-gallon drum | Low, during maintenance only | Stored outside, in lined/bermed area |
| Used oil | Recycling | Vehicle maintenance area | One 55-gallon drums | Low, during maintenance only | Stored outside, in lined/bermed area |
| Trash/solid waste | Waste for disposal | Construction staging area | 10-yard roll-off | Low | Stored outside, with cover |
| Used oil filters | Recycling | Vehicle maintenance area | One 55-gallon drum | Low, during maintenance only | Stored outside, in roll-off with cover |

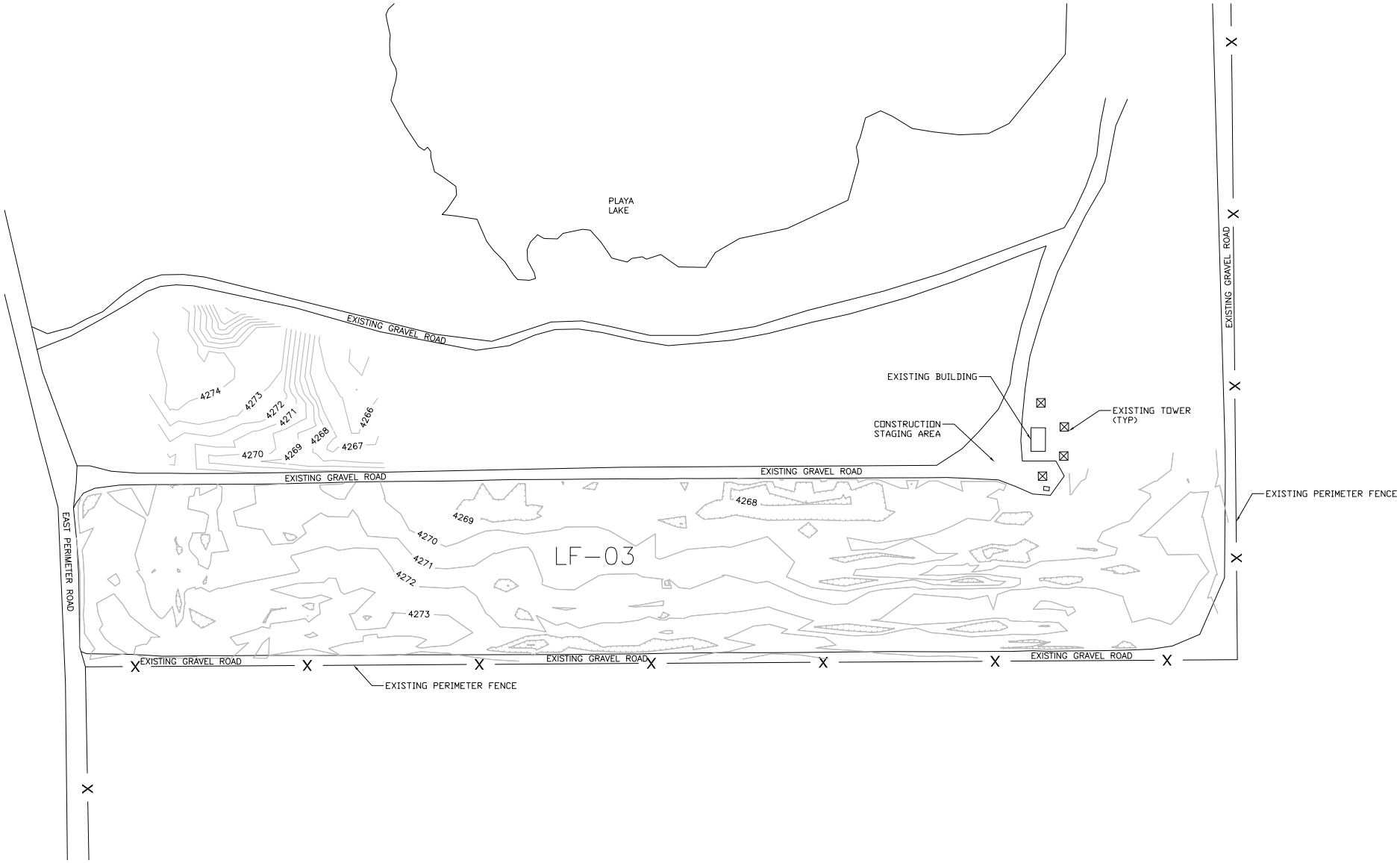
Note: The listed materials should all to be recycled to the maximum extent possible.

This table will be updated whenever new materials are used 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.

All of the contained materials will be located within lined, bermed areas located within the construction staging area. Hazardous waste is not expected to be generated during construction activities. Nonhazardous waste possibly 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.




SCALE: 1"=250'

**WORK PLAN FOR REPAIR OF SOIL COVERS**
**LANDFILLS NO. 03 (SWMU 105)**
**AND NO. 04 (SWMU 104)**

**CANNON AIR FORCE BASE**

**FIGURE E-2**
**SITE PLAN MAP - LF-03**

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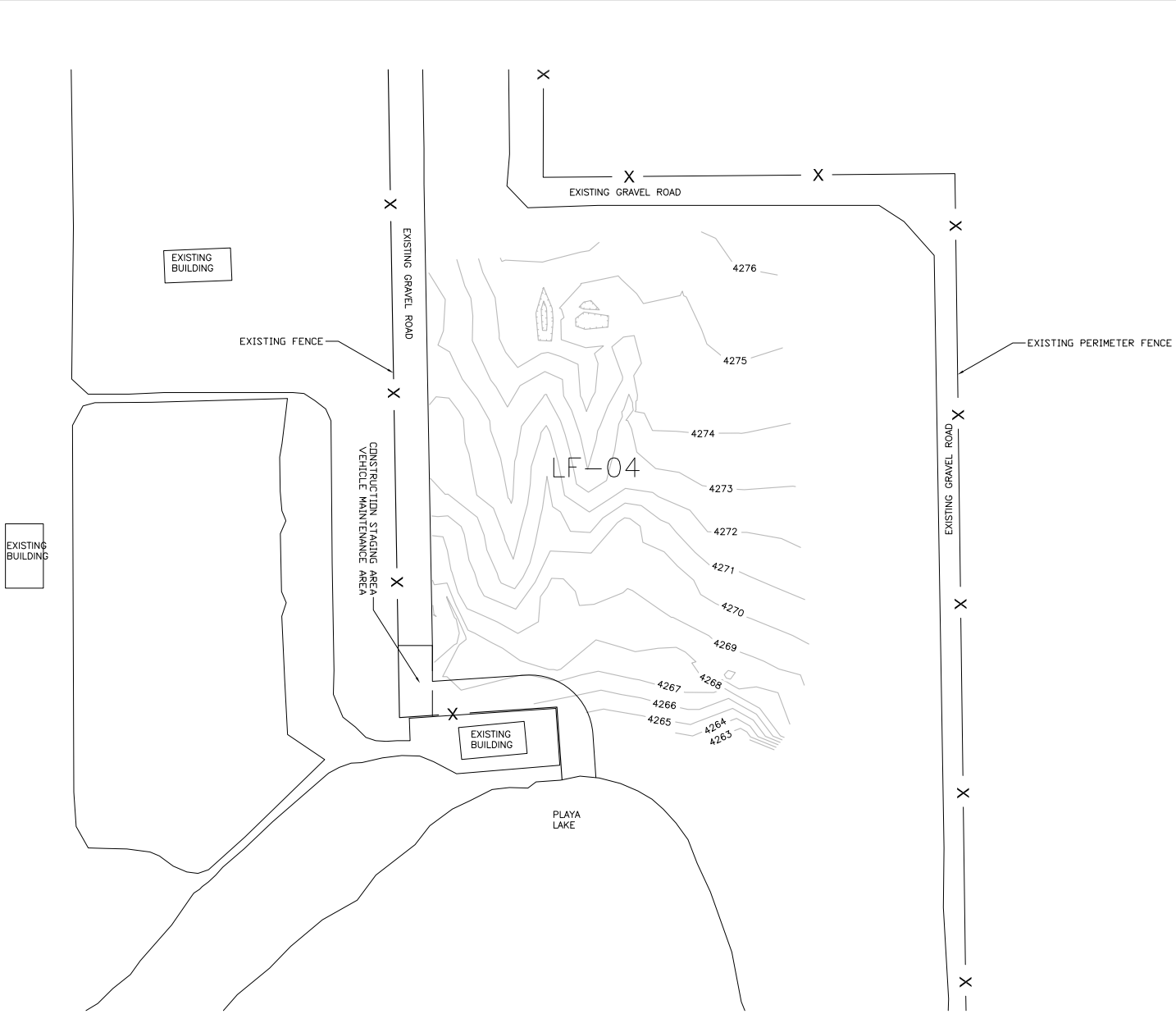


SCALE: 1"=250'

**WORK PLAN FOR REPAIR OF SOIL COVERS**
**LANDFILLS NO. 03 (SWMU 105)**
**AND NO. 04 (SWMU 104)**

**CANNON AIR FORCE BASE**

**FIGURE E-3**
**SITE PLAN MAP - LF-04**

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### 2.3.2 Construction Staging Areas

If equipment is to be fueled directly from a mobile diesel fuel tanker truck within the construction staging area, or where possible, BMPs (e.g., catch pans and other spill prevention measures) will be employed to minimize the chances of a release of petroleum during vehicle fueling.

### 2.3.3 Construction Areas

Construction activities will involve the clearing and grubbing of existing vegetation, backfilling subsidence areas, revegetating disturbed areas, 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 Petroleum, Oil or Lubricants (POL) during vehicle servicing. Waste material from equipment maintenance will be placed in 55-gallon drums, and these drums will be stored in a portable liner and berm within the vehicle maintenance area.

## 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-03 and LF-04**

| Source of Pollutant | Pollutant of Concern |
|---|---|
| Used POL drums/oil filters | Waste oil, grease, ethylene glycol, and other POL |
| Diesel fuel (refueling operations) | Naphthalene |
| Earthwork | Total suspended solids (TSS) |
| Stormwater runon | TSS |

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

### 2.5.1 Diesel Fuel

Diesel fuel will be delivered to the site and dispensed from a 2,000-gallon mobile tanker truck within the construction staging area. This tanker truck will only be on-site occasionally and does not pose a risk for release unless the tank ruptures or a spill occurs during dispensing. Fueling operations can be scheduled during times of no precipitation and will therefore not pose a risk for fuel release and resulting stormwater pollution.

### 2.5.2 Petroleum, Oil, and Lubricants

No POL in the form of equipment oils, hydraulic fluids, transmission fluid, antifreeze, and greases will be stored on-site. Used POL from vehicle maintenance will be stored in containers (55-gallon drums) 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. 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 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 used POL storage drum(s) will be located within a secondary containment area large enough to hold, at a minimum, 110 percent of the volume of the drum(s).

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

**Table E-4. Summary of Nonstructural Best Management Practices**

| 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. |
| • Used POL will be stored in covered drums on pallets. |
| • Material safety data sheets will be maintained on site by the Contractor. |
| • 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. |

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

| Brief Description of Activities |
|---|
| ***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*** |
| • Drums will be inspected weekly, 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 areas will be inspected for proper implementation of control measures. |
| ***Response*** |
| • 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. |
| • Sediment and Erosion Control |
| • Native vegetation will be disturbed to the least extent possible during project activities. |
| • Where appropriate, disturbed areas will be revegetated as soon as feasible after construction. |
| • Install temporary sediment and erosion control devices (i.e. silt fence). |
| ***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 Contractor's field office and become part of the project files. |

## 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 drums and secondary containment | Weekly |
| Inspect construction equipment | 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 |

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

### 3.1.4 Spill Prevention and Response

A possible contributor to stormwater pollution is suspended solids in stormwater runoff from spills and leaks. Because of facility drainage and site activities, spills are most likely to occur at the maintenance area and the refueling area. Spills can occur from overfilling of the diesel tanks on equipment, 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.
- Equipment fuel filling safety 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 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 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 Work Plan and associated plans contained within its appendices (i.e., the SWPPP)
- 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 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 in accordance with Contractor-specific and Cannon AFB requirements. 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 Contractor's field office and become part of the project files.

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## Figure E-4. 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.

❒ Used Oil

❒ Spilled Diesel Fuel

❒ 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:

- ❒ Hay bales in anticipated drainage paths
- ❒ Silt fence along all sideslope and downslope boundaries

Observed Conditions

_____

Changes required to the SWPPP _____

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## Figure E-5. Inspector Report

**Stormwater Pollution Prevention Plan**

**SWMU 105 – LF-03 and SWMU 104 – LF-04**

**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**

**SWMU 105 – LF-03 and SWMU 104 – LF-04**

**Cannon Air Force Base, Curry County, New Mexico**

| |
|---|
| Changes required to the Stormwater Pollution Prevention Plan (provide reason for each required change): |

Inspector's Name

Inspector's Signature

Date

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### 3.1.7 Sediment and Erosion Control (Applicable BMPs—ESC2, 10, 11, 21, 50, and 51—Attachment 1)

As previously indicated, less than 5 acres will be disturbed during construction. The preconstruction runoff coefficient is estimated 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. Post construction runoff coefficient is estimated to be 0.4 while the vegetation reestablishes and will be 0.3 upon establishment of revegetated cover in disturbed areas.

During construction activities, a temporary clean soil stockpiling area may be used to stockpile backfill material prior to use on-site. The soil will be stockpiled in a generally uncompacted condition prior to placement and will be subject to erosion. BMPs will include diversion of drainage around the stockpile area; the use of temporary berms around the stockpile, and/or swales to divert site runoff around the stockpile; 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 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:

- Used POL storage area
- Vehicle maintenance area
- Construction areas and temporary soil stockpiling area (if used)
- Dust and particulates

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

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

Used POL materials from vehicle and equipment maintenance will be stored on site within a lined and bermed area (minimum 110 percent storage volume capacity), adjacent to or within the vehicle maintenance area, to prevent any uncontrolled discharges or spills. All used 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 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 as indicated on the Drawings. 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.

### 3.2.3 Construction Areas (Applicable BMPs—ESC2, 10, 11, 21, 24 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 will be used as a sediment trapping and/or a filtering device for the north side of the site at LF-03 and south side of the site at LF-04.

- 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 at each landfill cover.

### 3.2.4 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 (if used)

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. 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 Work Plan.

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# 5. 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.

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# 6. 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: Ron Versaw

Signature of Registered Professional Engineer: _____

Registration Number: _____

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: Carol Rieger _____

Project Manager's Signature: _____

Title: _____

Date: _____

# 7. REFERENCES

Kearney (A. T. Kearney, Inc.)
1987. Preliminary Review/VSI Report RCRA Facility Assessment, Cannon Air Force Base, Clovis, New Mexico. July.

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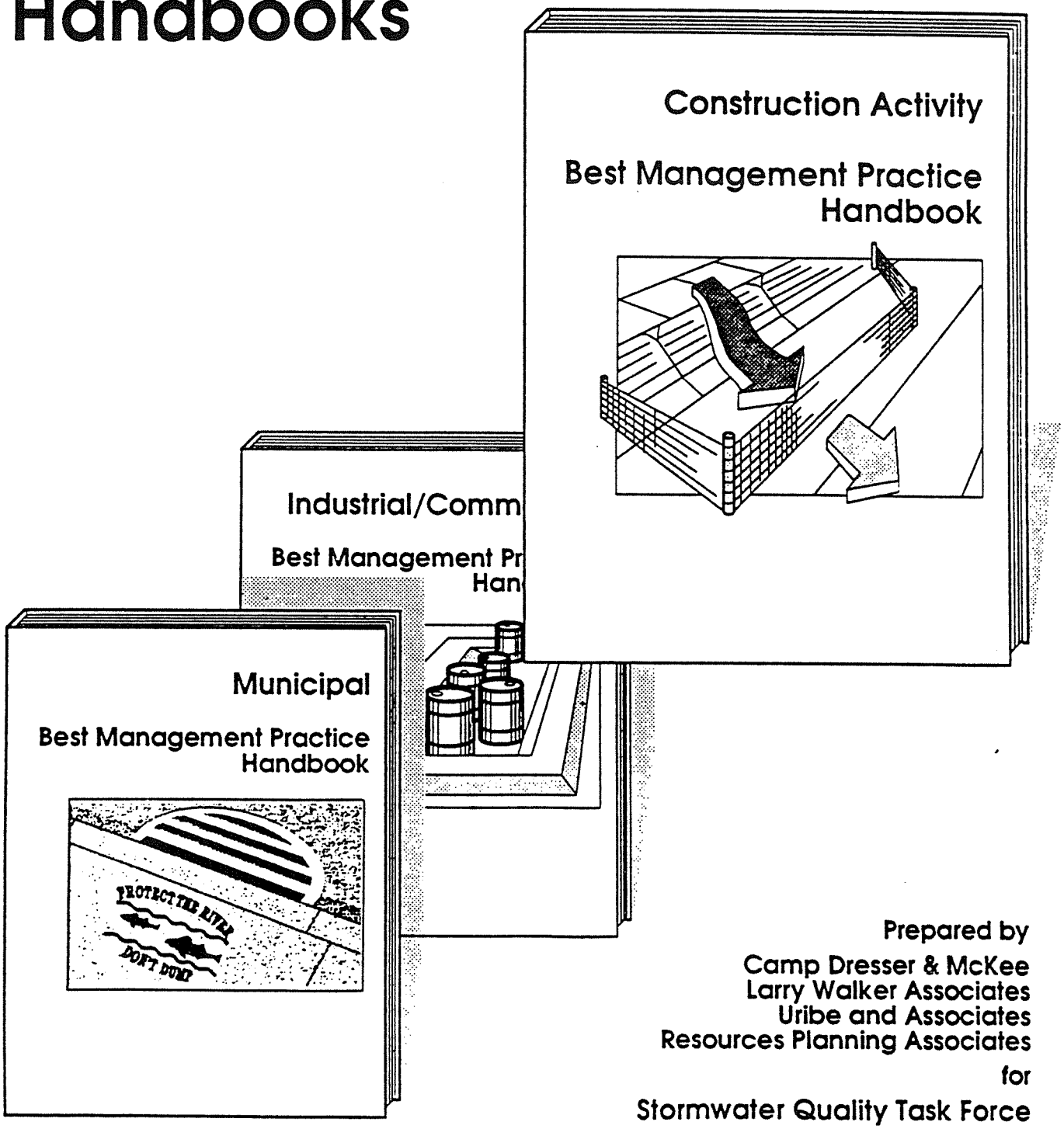
# Attachment 1
# Best Management Practices

March, 1993

# California Storm Water Best Management Practice Handbooks




Prepared by
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for
Stormwater Quality Task Force

# 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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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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# CONSTRUCTION HANDBOOK

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B SAMPLE STORM WATER POLLUTION PREVENTION PLAN
C GLOSSARY
D LIST OF ACRONYMS

# 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).

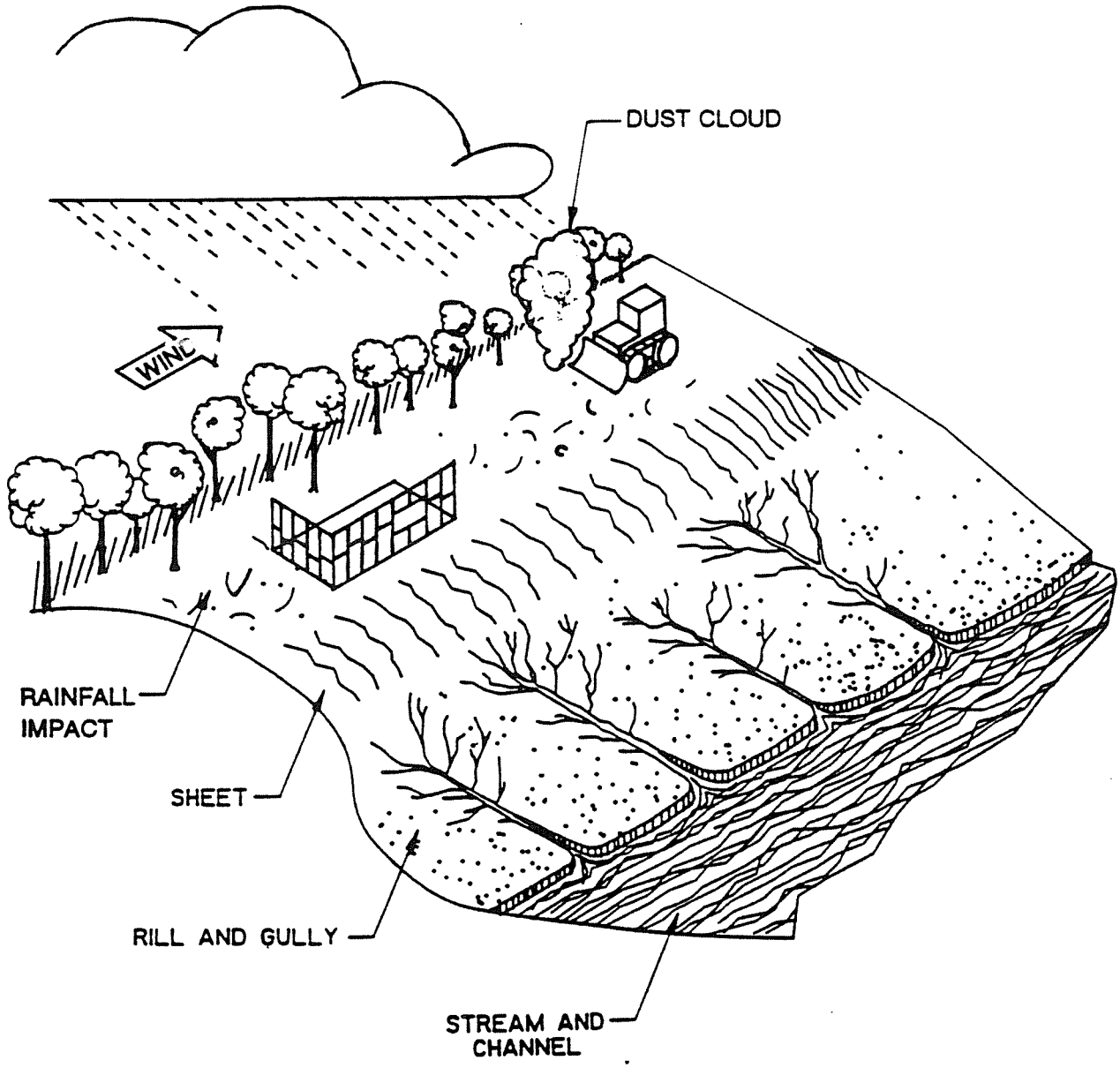


**FIGURE 1.1 TYPES OF EROSION OCCURRING AT A CONSTRUCTION SITE**

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

## REFERENCES


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Berman, L., C. Hartline, N. Ryan, and J. Thorne, (1991), "Urban Runoff: Water Quality Solutions," American Public Works Association, Special Report #61.

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Schueler, T.R., (1987), "Controlling Urban Runoff: A Practical Manual for Planning and Designing Urban BMPs," Metropolitan Washington Council of Governments.

State Water Resources Control Board, (1992), "General Construction Storm Water Permit," September 8.

United States Environmental Protection Agency, (1976), "Guide for Nonpoint Source Pollution Control," Office of Water.

United States Environmental Protection Agency, (1992), "Draft Storm Water Pollution Prevention for Industrial Activities," Office of Wastewater Enforcement and Compliance.

# 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

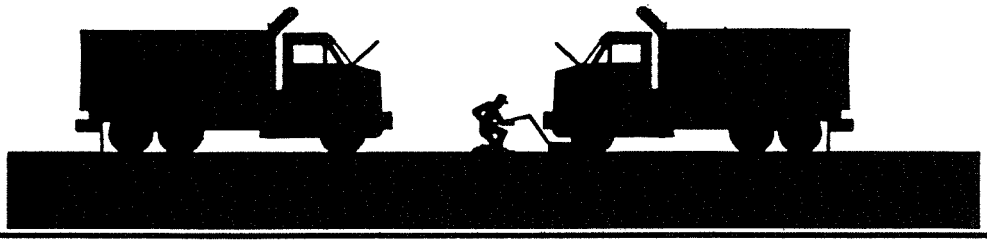
These BMP fact sheets are suitable for inclusion in many storm water pollution prevention plans for typical contractor activities. The BMPs listed are not an exhaustive list, nor will every BMP be appropriate for every situation. Therefore, suggested BMPs which are inappropriate may be deleted and additional 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: 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*

## 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.

**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

## 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

Best Management Practices

# 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.

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

**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

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.

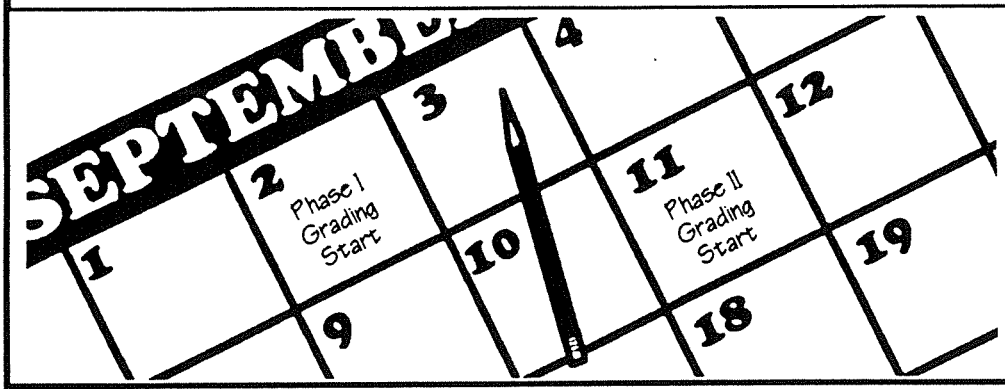
BMPs fact sheets are provided for each of the following BMP categories, and are consistent with Worksheet 5 in Chapter 2.

## 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

**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

**ESC1**

Best Management Practices

## 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.

**LIMITATIONS**

There are no significant limitations to the use of this BMP.

**REFERENCES**

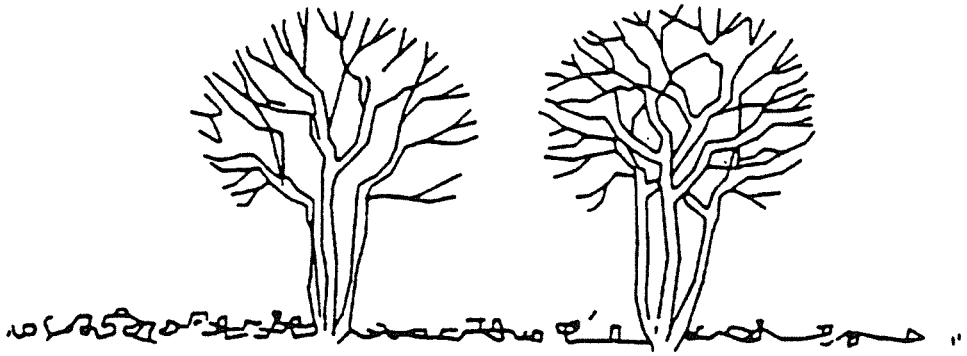
Best Management Practices and Erosion Control Manual for Construction Sites, Flood Control District of Maricopa County, Arizona - 1992.

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.

# BMP: PRESERVATION OF EXISTING VEGETATION



**Objectives**

- Housekeeping Practices
- Contain Waste
- (Minimize Disturbed Areas)
- (Stabilize Disturbed Areas)
- (Protect Slopes/Channels)
- (Control Site Perimeter)
- Control Internal Erosion

## 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.

**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.

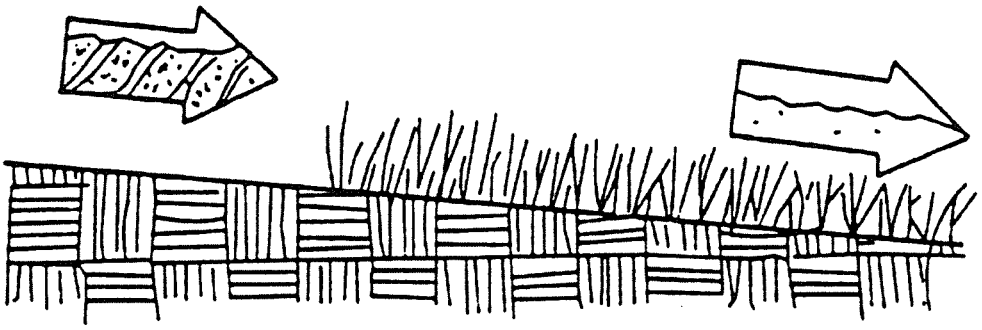
Stormwater Management Water for the Puget Sound Basin, Washington State Department of Ecology, The Technical Manual - February 1992, Publication # 91-75.

Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency - November 1988.

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

Best Management Practices

# 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

Best Management Practices

# 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.

"Draft - Sedimentation and Erosion Control, An Inventory of Current Practices", U.S.E.P.A., April, 1990.

Guides for Erosion and Sediment Controls in California, USDA Soils Conservation Service - January 1991.

Kiowa Engineering, Interim Erosion and Sedimentation Control for Construction Activities, Urban Drainage and Flood Control District, Denver, Colorado.

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.

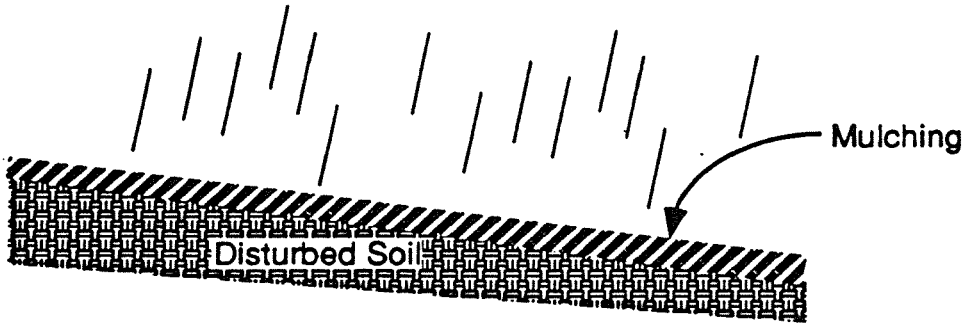
Stormwater Management Water for the Puget Sound Basin, Washington State Department of Ecology, The Technical Manual - February 1992, Publication # 91-75.

Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency - November 1988.


ESC10

Best Management Practices

# 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.

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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).

**REFERENCES**


Best Management Practices and Erosion Control Manual for Construction Sites, Flood Control District of Maricopa County, September 1992.

Controlling Erosion of Construction Sites, U.S. Department of Agriculture, Soil Conservation Service, Agriculture Information # 347.

"Draft - Sedimentation and Erosion Control, An Inventory of Current Practices", U.S.E.P.A., April, 1990.

"Environmental Criteria Manual", City of Austin, Texas.

Guides for Erosion & Sediment Control in California, USDA Soils Conservation Service - January 1991.

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.

Soil Erosion by Water, U.S. Department of Agriculture, Soil Conservation District, Agriculture Information Bulletin #513.

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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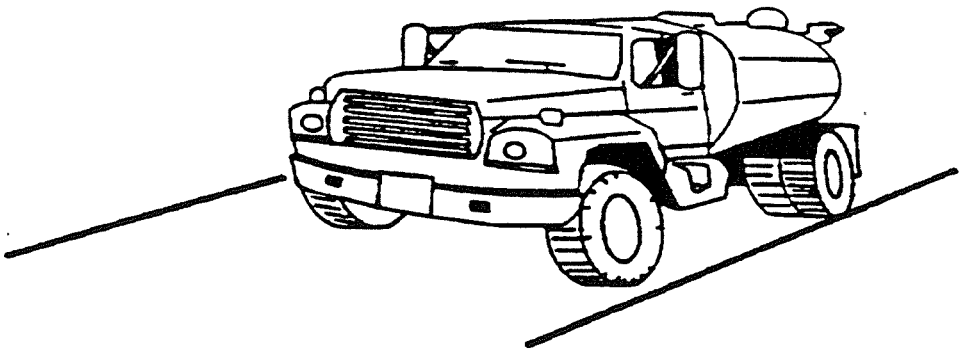
ESC11

Best Management Practices

# BMP: DUST CONTROLS



**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

**ESC21**

Best Management Practices

## 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.

# 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.

ESC21

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 | | |

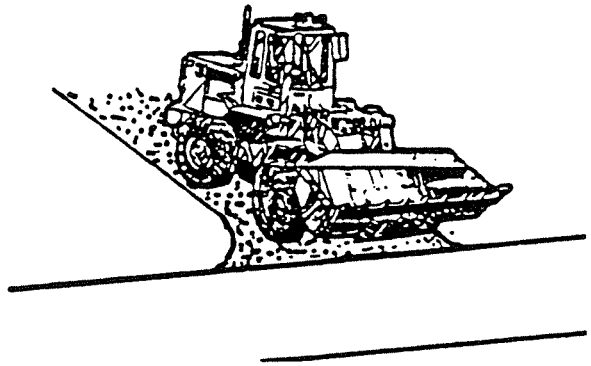
## TABLE ESC 21.2 COMMONLY USED CHEMICALS FOR DUST CONTROL

| | SALTS | ORGANIC, NON PETROLEUM-BASED | PETROLEUM BASED PRODUCTS[1] |
|---|---|---|---|
| CHEMICAL TYPES | • Calcium Chloride[2]<br>• Magnesium Chloride<br>• Natural Brines | • Calcium Lignosulfonate<br>• Sodium Lignosulfonate<br>• Ammonium Lignosulfonate | • Bunker Oil<br>• Asphalt Primer<br>• Emulsified Asphalt |
| LIMITATIONS | Can lose effectiveness in dry periods with low humidity. Leaches from road in heavy rain<br><br>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.<br><br>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.<br><br>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: 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.

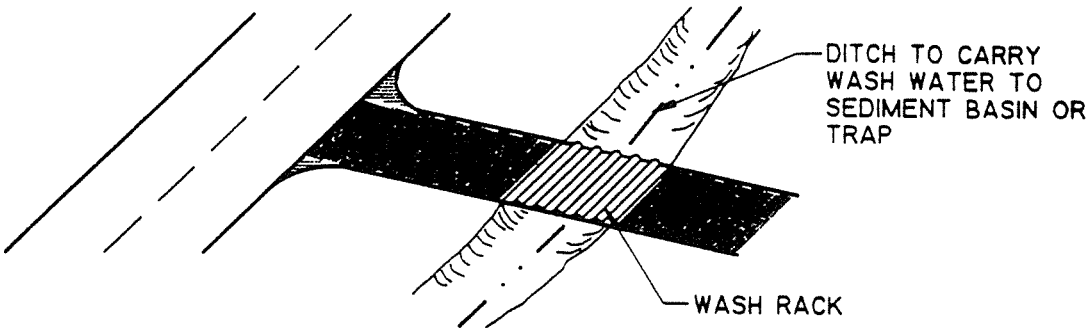
Virginia Erosion and Sedimentation Control Handbook, Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation, 1991.

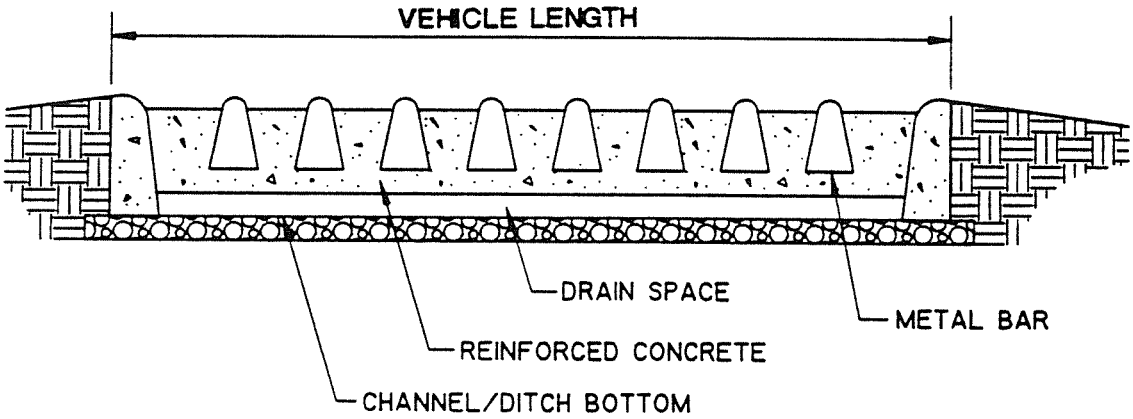
Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency - November 1988.


ESC24

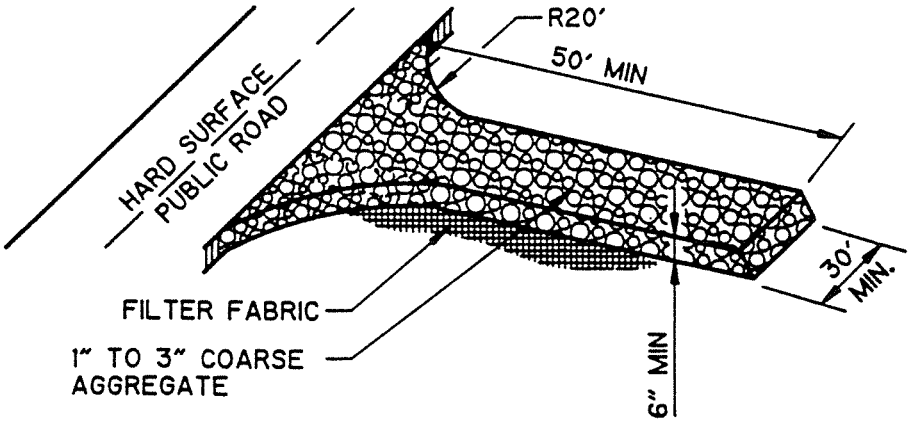
Best Management Practices

# Additional Information — Stabilized Construction Entrance



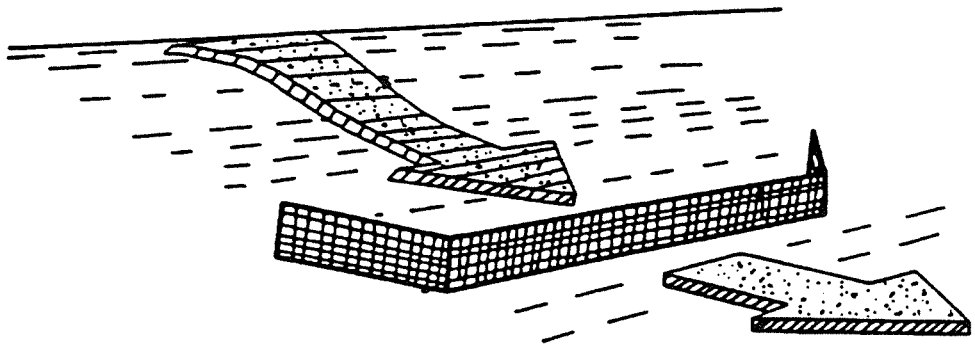

**WASH RACK** (SCHEMATIC)




**STABILIZED CONSTRUCTION ENTRANCE**

ESC24

# 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, September1992.

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.

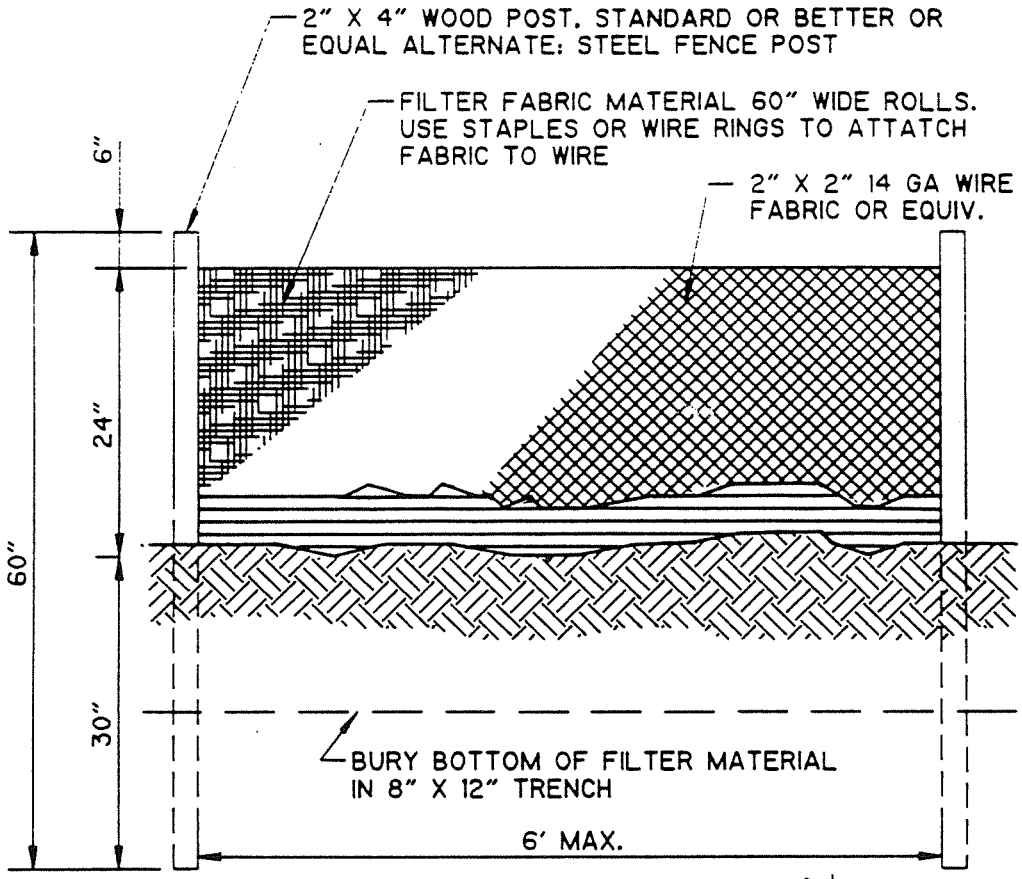
Stormwater Management Manual for The Puget Sound Basin, Washington State Department of Ecology, Public Review Draft, 1991.

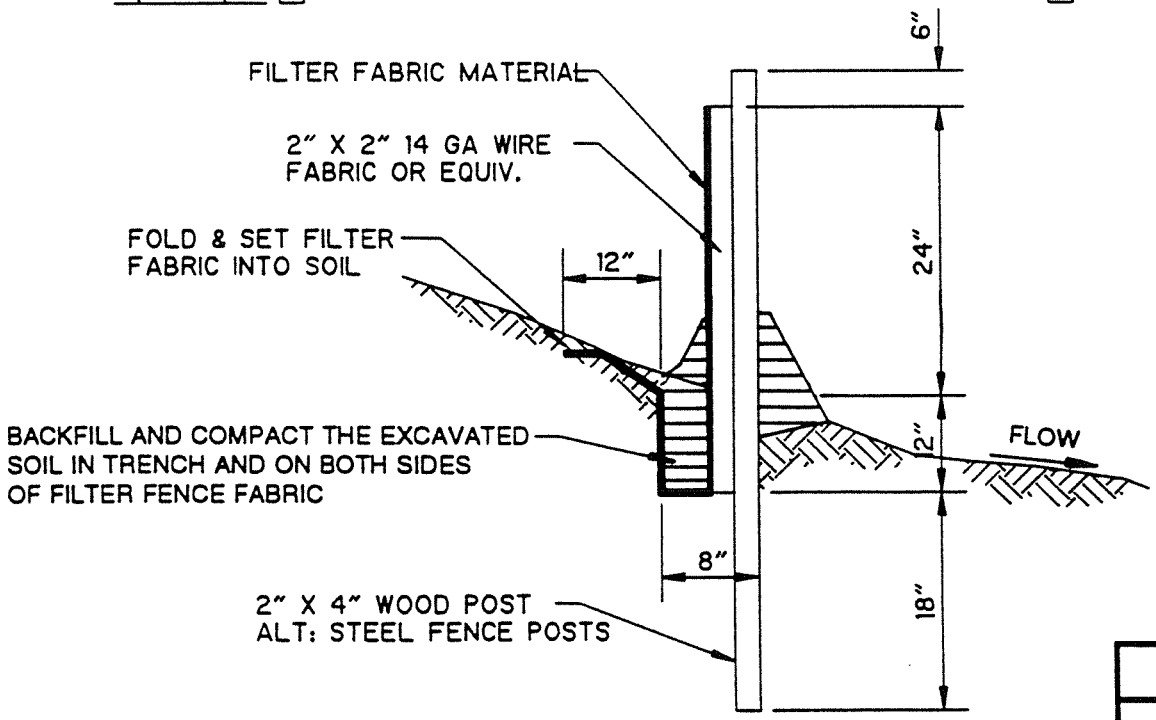
Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency - November 1988.

ESC50

Best Management Practices

# Additional Information — Silt Fence



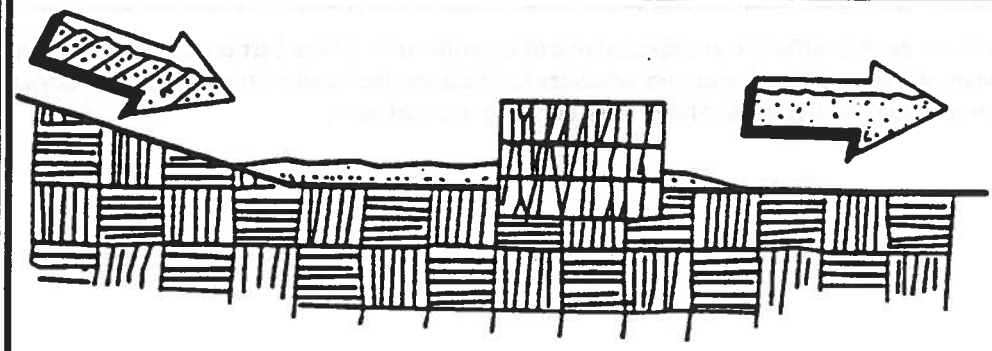




SILT FENCE

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

- 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.

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Best Management Practices

# 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.

"Draft - Sedimentation and Erosion Control, An Inventory of Current Practices", U.S.E.P.A., April, 1990.

"Environmental Criteria Manual", City of Austin, Texas.

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.

Stormwater Management Water for the Puget Sound Basin, Washington State Department of Ecology, The Technical Manual - February 1992, Publication # 91-75.

Water Quality for Construction Businesses, City of Bellevue, Washington.

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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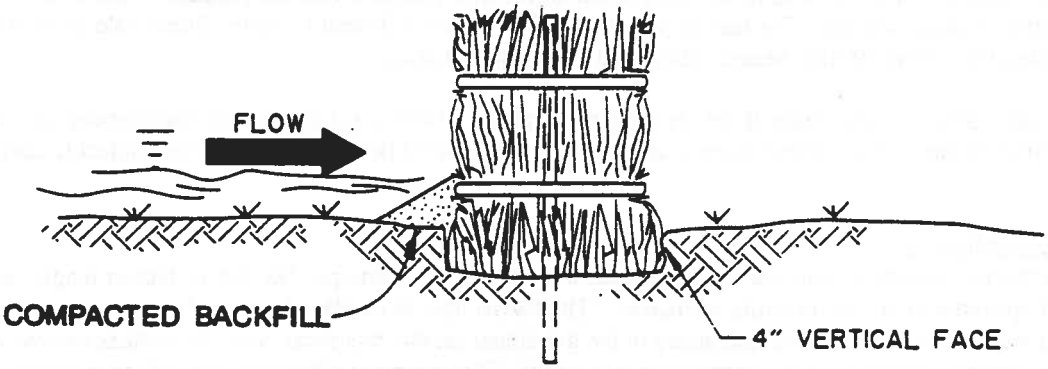
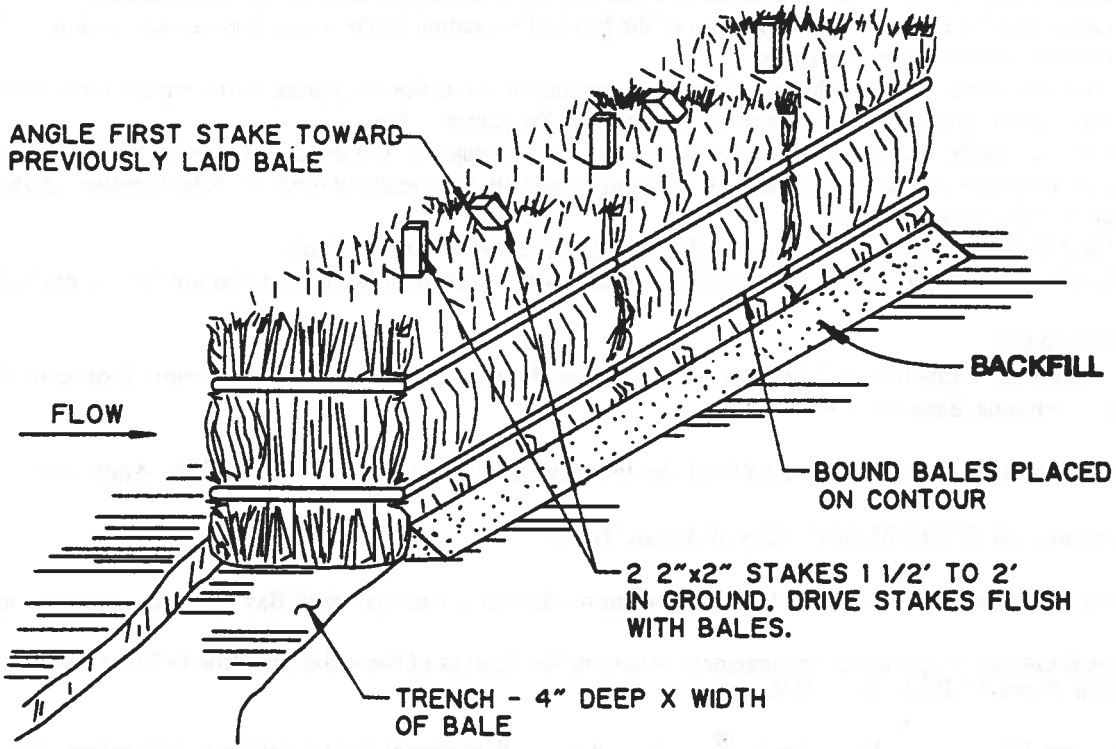
# Additional Information — Straw Bale Barrier




• 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

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Best Management Practices

# 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 and Notice of Termination for Stormwater Discharges Associated with Construction Activity

## Appendix J - Notice of Intent (NOI) Form and Instructions

Part 1.7.1 requires you to use the electronic NOI system, or "eNOI" system, to prepare and submit your NOI. However, if you are given approval by the EPA Regional Office to use a paper NOI form, and you elect to use it, you must complete and submit the following form.

| NPDES FORM 3510-9 | EPA | UNITED STATES ENVIRONMENTAL PROTECTION AGENCY<br>WASHINGTON, DC 20460<br>NOTICE OF INTENT (NOI) FOR STORMWATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITY UNDER AN NPDES GENERAL PERMIT | Form Approved.<br>OMB No. 2040-0004 |
|---|---|---|---|

Submission of this Notice of Intent (NOI) constitutes notice that the operator identified in Section II of this form requests authorization to discharge pursuant to the NPDES Construction General Permit (CGP) permit number identified in Section I of this form. Submission of this NOI also constitutes notice that the operator identified in Section II of this form meets the eligibility requirements of Parts 1.1 and 1.2 of the CGP for the project identified in Section III of this form. Permit coverage is required prior to commencement of construction activity until you are eligible to terminate coverage as detailed in Part 8 of the CGP. To obtain authorization, you must submit a complete and accurate NOI form. Discharges are not authorized if your NOI is incomplete or inaccurate or if you were never eligible for permit coverage. Refer to the instructions at the end of this form.

## I. Approval to Use Paper NOI Form

Have you been given approval from the Regional Office to use this paper NOI form*? ☐ YES ☐ NO

If yes, provide the reason you need to use this paper form, the name of the EPA Regional Office staff person who approved your use of this form, and the date of approval:

Reason for using paper form: _____

Name of EPA staff person: _____

Date approval obtained: _____

*** Note: You are required to obtain approval from the applicable Regional Office prior to using this paper NOI form.**

## II. Permit Information

**Tracking Number** (EPA Use Only): ☐☐☐☐☐☐☐☐☐

Permit Number: ☐☐☐☐☐☐☐☐☐ (see Appendix B of the CGP for the list of eligible permit numbers)

## III. Operator Information

Name: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Phone: ☐☐☐ - ☐☐☐ - ☐☐☐☐ Ext. ☐☐☐☐ Fax (optional): ☐☐☐ - ☐☐☐ - ☐☐☐☐

E-mail: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

IRS Employer Identification Number (EIN): ☐☐ – ☐☐☐☐☐☐☐

Point of Contact:

First Name, Middle Initial, Last Name: ☐☐☐☐☐☐☐☐☐☐☐☐ ☐ ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Mailing Address:

Street: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

City: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ State: ☐☐ Zip Code: ☐☐☐☐☐ - ☐☐☐☐

**NOI Preparer (Complete if NOI was prepared by someone other than the certifier):**

Prepared by:

First Name, Middle Initial, Last Name: ☐☐☐☐☐☐☐☐☐☐☐☐ ☐ ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Organization: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Phone: ☐☐☐ - ☐☐☐ - ☐☐☐☐ Ext. ☐☐☐☐ Fax (optional): ☐☐☐ - ☐☐☐ - ☐☐☐☐

E-mail: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

## IV. Project/Site Information

Project/Site Name: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

**Project/Site Address:**

Street/Location: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

City: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ State: ☐☐ Zip Code: ☐☐☐☐☐ - ☐☐☐☐

County or similar government subdivision: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

For the project/site for you are seeking permit coverage, provide the following information:

Latitude/Longitude (Use one of three possible formats, and specify method):

Latitude
1. __ __° __ __' __ __" N (degrees, minutes, seconds)
2. __ __° __ __. __ __' N (degrees, minutes, decimal)
3. __ __. __ __ __ __° N ( degrees decimal)

Longitude
1. __ __ __° __ __' __ __" W (degrees, minutes, seconds)
2. __ __ __° __ __. __ __' W (degrees, minutes, decimal)
3. __ __ __. __ __ __ __° W (degrees decimal)

Latitude/Longitude Data Source: ☐ U.S.G.S. topographic map ☐ EPA web site ☐ GPS ☐ Other: _____

If you used a U.S.G.S. topographic map, what was the scale? _____

Horizontal Reference Datum: ☐ NAD 27 ☐ NAD 83 or WGS 84 ☐ Unknown

Is your project/site located in Indian Country lands, or located on a property of religious or cultural significance to an Indian tribe? ☐ YES ☐ NO

If yes, provide the name of the Indian tribe associated with the area of Indian country (including name of Indian reservation, if applicable), or if not in Indian country, provide the name of the Indian tribe associated with the property: _____

Are you requesting coverage under this NOI as a "federal operator" as defined in Appendix A? ☐ YES ☐ NO

Estimated Project Start Date: ☐☐/☐☐/☐☐☐☐ Estimated Project Completion Date: ☐☐/☐☐/☐☐☐☐

Estimated Area to be Disturbed (to the nearest quarter acre): ☐☐☐☐.☐☐

Have earth-disturbing activities commenced on your project/site? ☐ YES ☐ NO

If yes, is your project an "emergency-related project? ☐ YES ☐ NO

Have stormwater discharges from your project/site been covered previously under an NPDES permit? ☐ YES ☐ NO

If yes, provide the Tracking Number if you had coverage under EPA's CGP or the NPDES permit number if you had coverage under an EPA individual permit: ☐☐☐☐☐☐☐☐☐

## V. Discharge Information

Does your project/site discharge stormwater into a Municipal Separate Storm Sewer System (MS4)? ☐ YES ☐ NO

Are there any surface waters within 50 feet of your project's earth disturbances? ☐ YES ☐ NO

**Receiving Waters and Wetlands Information: (Attach a separate list if necessary)**

| Provide the name(s) of the first surface water that received stormwater directly from your site and/or from the MS4: |
|---|
| |
| |
| |
| |
| |
| |
| |

| Provide the names of any impaired waters to which you discharge and the pollutant(s) for which they are impaired | |
|---|---|
| Surface water name: | Pollutant(s) causing the impairment: |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

| Provide the names of any waters to which you discharge for which there is an EPA approved or established TMDL, the name of the TMDL, and the pollutant(s) for which there is a TMDL | | |
|---|---|---|
| Surface water name: | TMDL name: | Pollutant(s) for which there is a TMDL: |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

**Impaired Waters**

Describe the methods you used to complete the above table:

_____

_____

Are any of the surface waters to which you discharge designated by the state or tribal authority under its antidegradation policy as a Tier 2 (or Tier 2.5) water (water quality exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water) or as a Tier 3 water (Outstanding Natural Resource Water)? (See Appendix F).

☐ YES ☐ NO

If yes, name(s) of receiving water(s) and its designation (Tier 2, Tier 2.5 or Tier 3): _____

## VI. Chemical Treatment Information

Will you use polymers, flocculants, or other treatment chemicals at your construction site? ☐ YES ☐ NO

If yes, will you use cationic treatment chemicals at your construction site*? ☐ YES ☐ NO

If yes, have you been authorized to use cationic treatment chemicals by your applicable EPA Regional Office in advance of filing your NOI*? ☐ YES ☐ NO

If you have been authorized to use cationic treatment chemicals by your applicable EPA Regional Office, attach a copy of your authorization letter and include documentation of the appropriate controls and implementation procedures designed to ensure that your use of cationic treatment chemicals will not lead to a violation of water quality standards.

Please indicate the treatment chemicals that you will use: _____

_____

* Note: You are ineligible for coverage under this permit unless you notify your applicable EPA Regional Office in advance and the EPA office authorizes coverage under this permit after you have included appropriate controls and implementation procedures designed to ensure that your use of cationic treatment chemicals will not lead to a violation of water quality standards.

## VII. Stormwater Pollution Prevention Plan (SWPPP) Information

Has the SWPPP been prepared in advance of filing this NOI? ☐ YES ☐ NO

**SWPPP Contact Information:**

First Name, Middle Initial Last Name: _____ _____ _____

Organization Name: _____

Phone: ___ - ___ - ____ Ext. ____ Fax (optional): ___ - ___ - ____

E-mail: _____

## VIII. Endangered Species Protection

Using the instructions in Appendix D of the CGP, under which criterion listed in Appendix D are you eligible for coverage under this permit (only check 1 box)?

☐ A ☐ B ☐ C ☐ D ☐ E ☐ F

Provide a brief summary of the basis for criterion selection listed in Appendix D (e.g., communication with U.S. Fish and Wildlife Service or National Marine Fisheries Service, specific study): _____

_____

If you select criterion B, provide the Tracking Number from the other operator's notification of authorization under this permit: _____

If you select criterion C, you must attach a copy of your site map (see Part 7.2.6 of the permit), and you must answer the following questions:

What federally-listed species or federally-designated critical habitat are located in your "action area": _____

_____

What is the distance between your site and the listed species or critical habitat (miles): _____

_____

If you select criterion D, E, or F, attach copies of any letters or other communications between you and the U.S. Fish and Wildlife Service or National Marine Fisheries Service.

## IX. Historic Preservation

Are you installing any stormwater controls as described in Appendix E that require subsurface earth disturbance? (Appendix E, Step 1) ☐ YES ☐ NO

If yes, have prior surveys or evaluations conducted on the site have already determined historic properties do not exist, or that prior disturbances have precluded the existence of historic properties? (Appendix E, Step 2) ☐ YES ☐ NO

If no, have you determined that your installation of subsurface earth-disturbing stormwater controls will have no effect on historic properties? (Appendix E, Step 3) ☐ YES ☐ NO

If no, did the SHPO, THPO, or other tribal representative (whichever applies) respond to you within the 15 calendar days to indicate whether the subsurface earth disturbances caused by the installation of stormwater controls affect historic properties? (Appendix E, Step 4) ☐ YES ☐ NO

If yes, describe the nature of their response:

☐ Written indication that adverse effects to historic properties from the installation of stormwater controls can be mitigated by agreed upon actions

☐ No agreement has been reached regarding measures to mitigate effects to historic properties from the installation of stormwater controls

☐ Other: _____

_____

## X. Certification Information

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.

First Name, Middle Initial, Last Name: _____ _____

Title: _____

Signature: _____ Date: __ / __ / ____

Email: _____

Instructions for Completing EPA Form 3510-9

**Notice of Intent (NOI) for Storm Water Discharges Associated with Construction Activity Under an NPDES General Permit**

NPDES Form Date (2/16) This Form Replaces Form 3510-9 (11/08) Form Approved OMB No. 2040-0004

**Who Must File an NOI Form**

Under the provisions of the Clean Water Act, as amended (33 U.S.C. 1251 et. seq.; the Act), federal law prohibits stormwater discharges from certain construction activities to waters of the U.S. unless that discharge is covered under a National Pollutant Discharge Elimination System (NPDES) permit. Operator of construction sites where one 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 one acre, or any other site specifically designated by the Director, must submit an NOI to obtain coverage under an NPDES general permit. Each person, firm, public organization, or any other entity that meets either of the following criteria must file this form: (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 day-to-day operational control of those activities at the project necessary to ensure compliance with the permit conditions. If you have questions about whether you need a NPDES stormwater permit, or if you need information to determine whether EPA or your state agency is the permitting authority, refer to www.epa.gov/npdes/stormwater/cgp or telephone EPA's NOI Processing Center at (866) 352-7755.

**Completing the Form**

Obtain and read a copy of the 2012 Construction General Permit, viewable at www.epa.gov/npdes/stormwater/cgp. To complete this form, type or print 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, refer to www.epa.gov/npdes/stormwater/cgp or telephone EPA's NOI Processing Center at (866) 352-7755. Please submit the original document with signature in ink - do not send a photocopied signature.

**Section I. Approval to Use Paper NOI Form**

You must indicate whether you have been given approval by the EPA Regional Office to use a paper NOI. Note that you are not authorized to use this paper NOI form unless the Regional Office has approved its use. Verbal approval from the Regional Office is sufficient. Where you have obtained approval to use this form, indicate the reason you need to use this form, the name of the EPA Regional Office staff person who provided approval for use of this form, and the date that approval was provided. See www.epa.gov/npdes/stormwater/contacts for a list of EPA Regional Office contacts.

**Section II. Permit Number**

Provide the number of the permit under which you are applying for coverage (see Appendix B of the general permit for the list of eligible permit numbers).

**Section III. Operator Information**

Provide the legal name of the person, firm, public organization, or any other entity that operates the project described in this application. Refer to Appendix A of the permit for the definition of "operator". Provide the employer identification number (EIN from the Internal Revenue Service; IRS), also commonly referred to as your taxpayer ID. If the applicant does not have an EIN enter "NA" in the space provided. Also provide a point of contact, the operator's mailing address, telephone number, fax number (optional) and e-mail address (to be notified via e-mail of NOI approval when available). Correspondence for the NOI will be sent to this address.

If the NOI was prepared by someone other than the certifier (for example, if the NOI was prepared by the facility SWPPP contact or a consultant for the certifier's signature), include the full name, organization, phone number and email address of the NOI preparer.

**Section IV. Project/Site Information**

Enter the official or legal name and complete street address, including city, state, zip code, and county or similar government subdivision of the project or site. If the project or site lacks a street address, indicate the general 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.

Provide the latitude and longitude of your facility either in degrees, minutes, seconds; degrees, minutes, decimal; or degrees decimal format. The latitude and longitude of your facility can be determined in several different ways, including through the use of global positioning system (GPS) receivers, U.S. Geological Survey (U.S.G.S.) topographic or quadrangle maps, and EPA's web-based siting tools, among others. Refer to www.epa.gov/npdes/stormwater/cgp for further guidance on the use of these methodologies. For consistency, EPA requests that measurements be taken from the approximate center of the construction site. Applicants must specify which method they used to determine latitude and longitude. If a U.S.G.S. topographic map is used, applicants are required to specify the scale of the map used. If known, enter the horizontal reference datum for your latitude and longitude. The horizontal reference datum used on USGS topographic maps is shown on the bottom left corner of USGS topographic maps; it is also available for GPS receivers. If you use EPA's web siting tool, or if you are unsure of the horizontal reference datum for your site, please check the "unknown" box.

Indicate whether the project is in Indian country lands or located on a property of religious or cultural significance to an Indian tribe, and if so, provide the name of the Indian tribe associated with the area of Indian country (including name of Indian reservation, if applicable), or if not in Indian country, provide the name of the Indian tribe associated with the property.

Indicate whether you are seeking coverage under this permit as a "federal operator" as defined in Appendix A.

Enter the estimated construction start and completion dates using four digits for the year (i.e., 10/06/2012). Indicate to the nearest quarter acre the estimated area to be disturbed.

Indicate whether earth-disturbing activities have already commenced on your project/site. If earth-disturbing activities have commenced on your site because stormwater discharges from the site have been previously covered under a NPDES permit, you must provide the CGP Tracking Number or the NPDES permit number if coverage was under an individual permit.

**Notice of Intent (NOI) for Storm Water Discharges Associated with Construction Activity Under an NPDES General Permit**

NPDES Form Date (2/16) This Form Replaces Form 3510-9 (11/08) Form Approved OMB No. 2040-0004

**Section V. Discharge Information**

Indicate whether discharges from the site will enter into a municipal separate storm sewer system (MS4), as defined in Appendix A.

Also, indicate whether any surface waters (as defined in Appendix A) exist either on or within 50 feet from your site. Note that if "yes", you are required to comply with the requirement in Part 2.1.2.1 of the permit to provide natural buffers or equivalent sediment controls.

You must specify the names of any surface waters that receive stormwater directly from your site and/or from the MS4 to which you discharge. You must also specify the names of any surface waters that you discharge to that are listed as "impaired" as defined in Appendix A, including any waters for which there is an approved or established TMDL, and the pollutants for which the water is impaired or for which there is a TMDL. This information will be used to determine if the site discharges to an impaired waterbody, which triggers additional requirements in Part 3.2.2 of the permit. Applicants must specify which method they used to determine whether or not their site discharges to impaired waters. Also, if a TMDL has been approved or established, identify the title or reference of the TMDL document.

Indicate whether discharges from the site will enter into a surface water that is designated as a Tier 2, Tier 2.5, or Tier 3 water. A list of Tier 2, 2.5, and 3 waters is provided as Appendix F. If the answer is "yes", name all waters designated as Tier 2, Tier 2.5, or Tier 3 to which the site will discharge.

**Section VI. Chemical Treatment Information**

Indicate whether the site will use polymers, flocculants, or other treatment chemicals. Indicate whether the site will employ cationic treatment chemicals. If the answer is "yes" to either question, indicate which chemical(s) you will use. Note that you are not eligible for coverage under this permit to use cationic treatment chemicals unless you notify your applicable EPA Regional Office in advance and the EPA office authorizes coverage under this permit after you have included appropriate controls and implementation procedures designed to ensure that your use of cationic treatment chemicals will not lead to a violation of water quality standards. If you have been authorized to use cationic treatment chemicals by your applicable EPA Regional Office, attach a copy of your authorization letter and include documentation of the appropriate controls and implementation procedures designed to ensure that your use of cationic treatment chemicals will not lead to a violation of water quality standards. Examples of cationic treatment chemicals include, but are not limited to, cationic polyacrylamide (C-PAM), PolyDADMAC (POLYDIALLYLDIMETHYLAMMONIUM CHLORIDE), and chitosan.

**Section VII. Stormwater Pollution Prevention Plan (SWPPP) Information**

All sites eligible for coverage under this permit are required to prepare a SWPPP in advance of filing the NOI, in accordance with Part 7. Indicate whether the SWPPP has been prepared in advance of filing the NOI.

Indicate the street, city, state, and zip code where the SWPPP can be found. Indicate the contact information (name, organization, phone, fax (optional), and email) for the person who developed the SWPPP for this project.

**Section VIII. Endangered Species Information**

Using the instructions in Appendix D, indicate under which criterion (i.e., A, B, C, D, E, or F) of the permit the applicant is eligible with regard to protection of federally listed endangered and threatened species and designated critical habitat. A description of the basis for the criterion selected must also be provided.

If criterion B is selected, provide the Tracking Number for the other operator who had previously certified their eligibility under criterion A, C, D, E, or F. The Tracking Number was assigned when the operator received coverage under this permit, and is included in the notice of authorization.

If criterion C is selected, you must attach copies of your site map. See Part 7.2.6 of the permit for information about what is required to be in your site map. You must also specify the federally-listed species or federally-designated critical habitat that are located in the "action area" of the project, and provide the distance between the construction site and any listed endangered species or their critical habitat.

If criterion D, E, or F is selected, attach copies of any communications between you and the U.S. Fish and Wildlife Service and National Marine Fisheries Service.

**Section IX. Historic Preservation**

Use the instructions in Appendix E to complete the questions on the NOI form regarding historic preservation.

**Section X. Certification Information**

All applications, including NOIs, must be signed as follows:

*For a corporation:* By a responsible corporate officer. For the purpose of this Section, a responsible corporate officer means:

(i) 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 (ii) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long-term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where 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, respectively; or

*For a municipality, state, federal, or other public agency:* By either a principal executive officer or ranking elected official. For purposes of this Part, a principal executive officer of a federal agency includes (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrator of EPA). Include the name and title of the person signing the form and the date of signing. An unsigned or undated NOI form will not be considered eligible for permit coverage.

**Notice of Intent (NOI) for Storm Water Discharges Associated with Construction Activity Under an NPDES General Permit**

NPDES Form Date (2/16) This Form Replaces Form 3510-9 (11/08) Form Approved OMB No. 2040-0004

**Modifying Your NOI**

If after submitting your NOI you need to correct or update any fields on this NOI form, you may do so by submitting a paper modification form, which you can obtain at the following link: http://www.epa.gov/npdes/pubs/cgp_modify.pdf

**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: Chief, Information Policy Branch 2136, U.S. Environmental Protection, Agency, 1200 Pennsylvania Avenue, NW, Washington, D.C. 20460. Include the OMB control number on any correspondence. Do not send the completed form to this address.

**Submitting Your Form**

Submit your NOI form by mail to one of the following addresses:

**For Regular U.S. Mail Delivery:**
Stormwater Notice Processing Center
Mail Code 4203M
U.S. EPA
1200 Pennsylvania Avenue, NW
Washington, DC 20460

**For Overnight/Express Mail Delivery:**
Stormwater Notice Processing Center
EPA East Building - Room 7420
U.S. EPA
1201 Constitution Avenue, NW
Washington, DC 20004

Visit this website for instructions on how to submit electronically:
www.epa.gov/npdes/stormwater/cgpenoi

## Appendix K - Notice of Termination (NOT) Form and Instructions

Part 8.3 requires you to use the electronic NOI system, or "eNOI" system, to prepare and submit your NOT. However, where your EPA Regional Office specifically authorizes you to use a paper NOT form, you are required to complete and submit the following form.

| NPDES FORM 3510-13 | EPA | UNITED STATES ENVIRONMENTAL PROTECTION AGENCY<br>WASHINGTON, DC 20460<br>NOTICE OF TERMINATION (NOT) FOR STORMWATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITY UNDER AN NPDES GENERAL PERMIT | Form Approved.<br>OMB No. 2040-0004 |
|---|---|---|---|

Submission of this Notice of Termination constitutes notice that the operator identified in Section II of this form is no longer authorized discharge pursuant to the NPDES Construction General Permit (CGP) from the site identified in Section III of this form. All necessary information must be included on this form. Refer to the instructions at the end of this form.

## I. Approval to Use Paper NOT Form

Have you been given approval from the Regional Office to use this paper NOT form*? ☐ YES ☐ NO

*** Note: You must have been given approval by the Regional Office prior to using this paper NOT form.**

## II. Permit Information

NPDES Stormwater General Permit Tracking Number: ☐☐☐☐☐☐☐☐☐

Reason for Termination (Check only one):

- ☐ You have completed earth-disturbing activities at your site, and you have met all other requirements in Part 8.2.1.
- ☐ Another operator has assumed control over all areas of the site and that operator has submitted an NOI and obtained coverage under the CGP.
- ☐ You have obtained coverage under an individual permit or another general NPDES permit addressing stormwater discharges from the construction site.

## III. Operator Information

Name: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

IRS Employer Identification Number (EIN): ☐☐ – ☐☐☐☐☐☐☐

Mailing Address:

Street: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

City: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ State: ☐☐ Zip Code: ☐☐☐☐☐-☐☐☐☐

Phone: ☐☐☐-☐☐☐-☐☐☐☐ Ext. ☐☐☐☐ Fax (optional): ☐☐☐-☐☐☐-☐☐☐☐

E-mail: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

## IV. Project/Site Information

Project/Site Name: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Project/Site Address:

Street/Location: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

City: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ State: ☐☐ Zip Code: ☐☐☐☐☐-☐☐☐☐

County or similar government subdivision: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

## V. Certification Information

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.

First Name, Middle Initial, Last Name: ☐☐☐☐☐☐☐☐☐☐☐☐ ☐ ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Instructions for Completing EPA Form 3510-13

**Notice of Termination (NOT) of Coverage Under an NPDES General Permit for Stormwater Discharges Associated with Construction Activity**

NPDES Form Date (2/16) This Form Replaces Form 3510-13 (12/08) Form Approved OMB No. 2040-0004

**Who May File an NOT Form**

Permittees who are presently covered under the EPA-issued 2012 Construction General Permit (CGP) for Stormwater Discharges Associated with Construction Activity may submit an NOT form when: (1) earth-disturbing activities at the site are completed and the conditions in Parts 8.2.1.1 thru 8.2.1.5 are met; or (2) the permittee has transferred all areas under its control to another operator, and that operator has submitted and obtained coverage under this permit; or (3) the permittee has obtained coverage under a different NPDES permit for the same discharges.

**Completing the 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 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, refer to www.epa.gov/npdes/stormwater/cgp or telephone EPA's NOI Processing Center at (866) 352-7755. Please submit original document with signature in ink - do not send a photocopied signature.

**Section I. Approval to Use Paper NOT Form**

You must indicate whether you have been given approval by the EPA Regional Office to use a paper NOT. Note that you are not authorized to use this paper NOT form unless the Regional Office has approved its use.

**Section II. Permit Number**

Enter the existing NPDES Stormwater General Permit Tracking Number assigned to the project by EPA's Stormwater Notice Processing Center. If you do not know the permit tracking number, refer to http://www.epa.gov/npdes/stormwater/cgp or contact EPA's NOI Processing Center at (866) 352-7755.

Indicate your reason for submitting this Notice of Termination by checking the appropriate box. Check only one:

*You have completed earth-disturbing activities at your site and, if applicable, construction support activities covered by this permit (see Part 1.6.3) and you have met all other requirements in Part 8.2.1.*

*Another operator has assumed control over all areas of the site and that operator has submitted an NOI and obtained coverage under the CGP.*

*You have obtained coverage under an individual permit or another general NPDES permit addressing stormwater discharges from the construction site.*

**Section III. Operator Information**

Provide the legal name of the person, firm, public organization, or any other entity that operates the project described in this application and is covered by the permit tracking number identified in Section I. Refer to Appendix A of the permit for the definition of "operator". Provide the employer identification number (EIN from the Internal Revenue Service; IRS). If the applicant does not have an EIN enter "NA" in the space provided. Enter the complete mailing address, telephone number, and email address of the operator. Optional: enter the fax number of the operator.

**Section IV. Project/Site Information**

Enter the official or legal name and complete street address, including city, state, zip code, and county or similar government subdivision of the project or site. If the project or site lacks a street address, indicate the general location of the site (e.g., Intersection of State Highways 61 and 34). Complete site information must be provided for termination of permit coverage to be valid.

**Section V. Certification Information**

All applications, including NOIs, must be signed as follows:

*For a corporation*: By a responsible corporate officer. For the purpose of this Part, a responsible corporate officer means: (i) 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 (ii) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long-term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where 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, respectively; or

*For a municipality, state, federal, or other public agency*: By either a principal executive officer or ranking elected official. For purposes of this Part, a principal executive officer of a federal agency includes (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrator of EPA).

Include the name, title, and email address of the person signing the form and the date of signing. An unsigned or undated NOT form will not be considered valid termination of permit coverage.

**Paperwork Reduction Act Notice**

Public reporting burden for this application is estimated to average 0.5 hours per notice, including 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: Chief, Information Policy Branch, 2136, U.S. Environmental Protection Agency, 1200 Pennsylvania Avenue, NW, Washington, DC 20460. Include the OMB number on any correspondence. Do not send the completed form to this address.

Instructions for Completing EPA Form 3510-13

**Notice of Termination (NOT) of Coverage Under an NPDES General Permit for Stormwater Discharges Associated with Construction Activity**

NPDES Form Date (2/16) This Form Replaces Form 3510-13 (12/08) Form Approved OMB No. 2040-0004

**Submitting Your Form:**
Submit your NOI form by mail to one of the following addresses:

**For Regular U.S. Mail Delivery:**
Stormwater Notice Processing Center
Mail Code 4203M
U.S. EPA
1200 Pennsylvania Avenue, NW
Washington, DC 20460

**For Overnight/Express Mail Delivery:**
Stormwater Notice Processing Center
EPA East Building - Room 7420
U.S. EPA
1201 Constitution Avenue, NW
Washington, DC 20004

Visit this website for instructions on how to submit electronically:
www.epa.gov/npdes/stormwater/cgpenoi

# Attachment 4
# Small Construction Waivers and Instructions - CGP

# Appendix C - Small Construction Waivers and Instructions

These waivers are only available to stormwater discharges associated with small construction activities (i.e., 1-5 acres). As the operator of a small construction activity, you may be able to qualify for a waiver in lieu of needing to obtain coverage under this general permit based on: (A) a low rainfall erosivity factor, (B) a TMDL analysis, or (C) an equivalent analysis that determines allocations for small construction sites are not needed. Each operator, otherwise needing permit coverage, must notify EPA of its intention for a waiver. It is the responsibility of those individuals wishing to obtain a waiver from coverage under this general permit to submit a complete and accurate waiver certification as described below. Where the operator changes or another is added during the construction project, the new operator must also submit a waiver certification to be waived.

## C.1 Rainfall Erosivity Waiver

Under this scenario the small construction project's rainfall erosivity factor calculation ("R" in the Revised Universal Soil Loss Equation) is less than 5 during the period of construction activity. The operator must certify to EPA that construction activity will occur only when the rainfall erosivity factor is less than 5. The period of construction activity begins at initial earth disturbance and ends with final stabilization. Where vegetation will be used for final stabilization, the date of installation of a stabilization practice that will provide interim non-vegetative stabilization can be used for the end of the construction period, provided the operator commits (as a condition of waiver eligibility) to periodically inspect and properly maintain the area until the criteria for final stabilization as defined in the construction general permit have been met. If use of this interim stabilization eligibility condition was relied on to qualify for the waiver, signature on the waiver with its certification statement constitutes acceptance of and commitment to complete the final stabilization process. The operator must submit a waiver certification to EPA prior to commencing construction activities.

> *Note: The rainfall erosivity factor "R" is determined in accordance with Chapter 2 of Agriculture Handbook Number 703, Predicting Soil Erosion by Water: A Guide to Conservation Planning With the Revised Universal Soil Loss Equation (RUSLE), pages 21–64, dated January 1997; United States Department of Agriculture (USDA), Agricultural Research Service.*

EPA has developed an online rainfall erosivity calculator to help small construction sites determine potential eligibility for the rainfall erosivity waiver. You can access the calculator from EPA's website at:www.epa.gov/npdes/stormwater/lew. The R factor can easily be calculated by using the construction site latitude/longitude or address and estimated start and end dates of construction. This calculator may also be useful in determining the time periods during which construction activity could be waived from permit coverage. You may find that moving your construction activity by a few weeks or expediting site stabilization will allow you to qualify for the waiver. Use this online calculator or the Construction Rainfall Erosivity Waiver Fact Sheet (www.epa.gov/npdes/pubs/fact3-1.pdf) to assist in determining the R Factor for your small construction site.

If you are the operator of the construction activity and eligible for a waiver based on low erosivity potential, you can submit a rainfall erosivity waiver electronically via EPA's eNOI system (www.epa.gov/npdes/cgpenoi) or provide the following information on the waiver certification form in order to be waived from permitting requirements:

1. Name, address and telephone number of the construction site operator(s);
2. Name (or other identifier), address, county or similar governmental subdivision, and latitude/longitude of the construction project or site;
3. Estimated construction start and completion (i.e., final stabilization) dates, and total acreage (to the nearest quarter acre) to be disturbed;
4. The rainfall erosivity factor calculation that applies to the active construction phase at your project site; and
5. A statement, signed and dated by an authorized representative as provided in Appendix I, Subsection I.11, which certifies that the construction activity will take place during a period when the value of the rainfall erosivity factor is less than five.

You can access the waiver certification form from EPA's website at: (http://www.epa.gov/npdes/pubs/construction_waiver_form.pdf). Paper copies of the form must be sent to one of the addresses listed in Part C.4 of this section.

*Note: If the R factor is 5 or greater, you cannot apply for the rainfall erosivity waiver, and must apply for NPDES permit coverage, unless you qualify for the Water Quality Waiver as described in section B below.*

If your small construction project continues beyond the projected completion date given on the waiver certification, you must recalculate the rainfall erosivity factor for the new project duration. If the R factor is below five (5), you must update all applicable information on the waiver certification and retain a copy of the revised waiver as part of your records. The new waiver certification must be submitted prior to the projected completion date listed on the original waiver form to assure your exemption from permitting requirements is uninterrupted. If the new R factor is 5 or above, you must obtain NPDES permit coverage.

### C.2 TMDL Waiver

This waiver is available if EPA has established or approved a TMDL that addresses the pollutant(s) of concern for the impaired water and has determined that controls on stormwater discharges from small construction activity are not needed to protect water quality. The pollutant(s) of concern include sediment (such as total suspended solids, turbidity or siltation) and any other pollutant that has been identified as a cause of impairment of any water body that will receive a discharge from the construction activity. Information on TMDLs that have been established or approved by EPA is available from EPA online at http://www.epa.gov/owow/tmdl/ and from state and tribal water quality agencies.

If you are the operator of the construction activity and eligible for a waiver based on compliance with an EPA-established or approved TMDL, you must provide the following information on the Waiver Certification form in order to be waived from permitting requirements:

1. Name, address and telephone number of the construction site operator(s);
2. Name (or other identifier), address, county or similar governmental subdivision, and latitude/longitude of the construction project or site;

3. Estimated construction start and completion (i.e., final stabilization) dates, and total acreage (to the nearest quarter acre) to be disturbed;
4. The name of the waterbody(s) that would be receiving stormwater discharges from your construction project;
5. The name and approval date of the TMDL;
6. A statement, signed and dated by an authorized representative as provided in Appendix I, Subsection I.11, that certifies that the construction activity will take place and that the stormwater discharges will occur, within the drainage area addressed by the TMDL.

### C.3 Equivalent Analysis Waiver

This waiver is available for non-impaired waters only. The operator can develop an equivalent analysis that determines allocations for his/her small construction site for the pollutant(s) of concern or determines that such allocations are not needed to protect water quality. This waiver requires a small construction operator to develop an equivalent analysis based on existing in-stream concentrations, expected growth in pollutant concentrations from all sources, and a margin of safety.

If you are a construction operator who wants to use this waiver, you must develop your equivalent analysis and provide the following information to be waived from permitting requirements:

1. Name, address and telephone number of the construction site operator(s);
2. Name (or other identifier), address, county or similar governmental subdivision, and latitude/longitude of the construction project or site;
3. Estimated construction start and completion (i.e., final stabilization) dates, and total acreage (to the nearest quarter acre) to be disturbed;
4. The name of the waterbody(s) that would be receiving stormwater discharges from your construction project;
5. Your equivalent analysis;
6. A statement, signed and dated by an authorized representative as provided in Appendix I, Subsection I.11, that certifies that the construction activity will take place and that the stormwater discharges will occur, within the drainage area addressed by the equivalent analysis.

### C.4 Waiver Deadlines and Submissions

1. Waiver certifications must be submitted prior to commencement of construction activities.
2. If you submit a TMDL or equivalent analysis waiver request, you are not waived until EPA approves your request. As such, you may not commence construction activities until receipt of approval from EPA.
3. Late Notifications: Operators are not prohibited from submitting waiver certifications after initiating clearing, grading, excavation activities, or other construction activities. The Agency reserves the right to take enforcement for any unpermitted discharges that occur between the time construction commenced and waiver authorization is granted.

Submittal of a waiver certification is an optional alternative to obtaining permit coverage for discharges of stormwater associated with small construction activity, provided you qualify for the waiver. Any discharge of stormwater associated with small construction activity not covered by either a permit or a waiver may be considered an unpermitted discharge under the Clean Water Act. As mentioned above, EPA reserves the right to take enforcement for any unpermitted discharges that occur between the time construction commenced and either discharge authorization is granted or a complete and accurate waiver certification is submitted. EPA may notify any operator covered by a waiver that they must apply for a permit. EPA may notify any operator who has been in non-compliance with a waiver that they may no longer use the waiver for future projects. Any member of the public may petition EPA to take action under this provision by submitting written notice along with supporting justification.

Complete and accurate Rainfall Erosivity waiver certifications not otherwise submitted electronically via EPA's eNOI system (www.epa.gov/npdes/cgpenoi) must be sent to one of the following addresses:

Regular U.S. Mail Delivery
EPA Stormwater Notice Processing Center
Mail Code 4203M
U.S. EPA
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Overnight/Express Mail Delivery
EPA Stormwater Notice Processing Center
Room 7420
U.S. EPA
1201Constitution Avenue, NW
Washington, DC 20004

Complete and accurate TMDL or equivalent analysis waiver requests must be sent to the applicable EPA Region office specified in Appendix B.

United States
Environmental Protection
Agency

Office of Water
(4203)

EPA 833-F-00-014
Revised March 2012
Fact Sheet 3.1[1]

# Stormwater Phase II Final Rule

# Construction Rainfall Erosivity Waiver

**Stormwater Phase II Final Rule Fact Sheet Series**

**Overview**

1.0 – Stormwater Phase II Proposed Rule Overview

**Small MS4 Program**

2.0 – Small MS4 Stormwater Program Overview

2.1 – Who's Covered? Designation and Waivers of Regulated Small MS4s

2.2 – Urbanized Areas: Definition and Description

***Minimum Control Measures***

2.3 – Public Education and Outreach

2.4 – Public Participation/ Involvement

2.5 – Illicit Discharge Detection and Elimination

2.6 – Construction Site Runoff Control

2.7 – Post-Construction Runoff Control

2.8 – Pollution Prevention/Good Housekeeping

2.9 – Permitting and Reporting: The Process and Requirements

2.10 – Federal and State-Operated MS4s: Program Implementation

**Construction Program**

3.0 – Construction Program Overview

3.1 – Construction Rainfall Erosivity Waiver

**Industrial "No Exposure"**

4.0 – Conditional No Exposure Exclusion for Industrial Activity

The 1972 amendments to the Federal Water Pollution Control Act, later referred to as the Clean Water Act (CWA), prohibit the discharge of any pollutant to navigable waters of the United States unless the discharge is authorized by a National Pollutant Discharge Elimination System (NPDES) permit. Because construction site stormwwater runoff can contribute significantly to water quality problems, the Phase I Stormwater Rule imposed a requirement that all construction sites with a planned land disturbance of 5 acres or more obtain an NPDES permit and implement stormwater runoff control plans. Phase II extends the requirements of the stormwater program to sites of between 1 and 5 acres. The Rainfall erosivity waiver allows permitting authorities to waive those sites that do not have adverse water quality impacts.

## What is Erosivity?

Erosivity is the term used to describe the potential for soil to wash off disturbed, devegetated earth during storms. The potential for erosion is in part determined by the soil type and geology of the site. For instance, dense, clay-like soils on a glacial plain will erode less readily when it rains than will sandy soils on the side of a hill. Another important factor is the amount and force of precipitation expected during the time the earth will be exposed. While it is impossible to predict the weather several months in advance of construction, for many areas of the country, there are definite optimal periods, such as a dry season when rain tends to fall less frequently and with less force. When feasible, this is the time to disturb the earth, so that the site can be stabilized by the time the seasonal wet weather returns. There are many other important factors to consider in determining erosivity, such as freeze/thaw cycles and snow pack.

## How Is Site Erosivity Determined?

The Universal Soil Loss Equation (USLE) was developed by the U.S. Department of Agriculture (USDA) in the 1950s to help farmers conserve their valuable topsoil. The methodology for determining if a site qualifies for the erosivity waiver provided in this guide is based on the *USDA Handbook 703 - Predicting Soil Erosion by Water: A Guide to Conservation Planning With the Revised Universal Soil Loss Equation (RUSLE)*, dated January 1997. (Note that a more updated version of USLE, the Revised USLE, Version 2 (RUSLE2), is available and can be used as an alternative method for determining if a site qualifies for the erosivity waiver. Information about the RUSLE2 computer program is provided later in this fact sheet.)

Using a computer model supported by decades' worth of soil and rainfall data, USDA established estimates of annual erosivity values (R factors) for sites throughout the country. These R factors are used as surrogate measures of the impact that rainfall had on erosion from a particular site. They have been mapped using isoerodent contours, as shown in Figures 2 through 5.

USDA developed the Erosivity Index Table (EI Table, provided here in Table 1), to show how the annual erosivity factor is distributed throughout the year in two-week increments. Table 1 is based on 120 rainfall distribution zones for the continental U.S. Detailed instructions for calculating a project R factor are provided later in this fact sheet.

[1] This revised fact sheet corrects errors identified in calculating the R factor from the 2001 version, and includes updated information about the USLE.

The Stormwater Phase II rule allows permitting authorities to waive NPDES requirements for small construction sites if the value of the rainfall erosivity factor is less than 5 during the period of construction activity (see § 122.26(b)(15)(i)(A)). Note that the permitting authority has the option to not allow waivers for small construction activity.

If the R factor for the period of construction calculates to less than 5, and the permitting authority allows the use of the waiver, the site owner may apply for a waiver under the low rainfall erosivity provision of the applicable EPA or State NPDES regulations. When applying, owners are encouraged to consider other site-specific factors, such as proximity to water resources and the sensitivity of receiving waters to sedimentation impacts. The small construction operator must certify to the permitting authority that the construction activity will take place during a period when the rainfall erosivity factor is less than 5.

The start and end dates used for the construction activity will be the initial date of disturbance and the anticipated date when the site will have achieved final stabilization as defined by the permit, respectively. If the construction continues beyond this period, the operator will need to recalculate the Erosivity Index for the site based on this new ending date (but keeping the old start date) and either resubmit the certification form or apply for NPDES permit coverage.

## What Other Factors Can Affect Waiver Availability and Eligibility?

EPA has established the R factor of less than 5 as the criteria for determining waiver eligibility. However, since the intent is to waive only those construction activities that will not adversely impact water quality, State and Tribal permitting authorities have considerable discretion in determining where, when, and how to offer it. They can establish an R factor threshold lower than 5, or they can suspend the waiver within an area where watersheds are known to be heavily impacted by, or sensitive to, sedimentation. They can also suspend the waiver during certain periods of the year. They may opt not to offer the waiver at all. NOTE: This waiver is not available to sites that will disturb more than 5 acres of land (large construction).

## What if My Site Is Not Eligible?

If your site is not eligible for a waiver, you must submit a Notice of Intent, or whichever type of application is required, to obtain coverage under the applicable NPDES construction stormwater permit, and comply with its requirements. For information about EPA's Construction General Permit (CGP), see http://www.epa.gov/npdes/stormwater/cgp. State program information is available at http://cfpub.epa.gov/npdes/contacts.cfm?program_id=6&type=STATE.

## Examples

### 1. Construction started and completed in one calendar year.

*Find the R factor value of a construction site in Denver, Colorado. Assume the site will be disturbed from March 10 to May 10 of the same year.*

The EI distribution zone is 84 (Figure 1). Referring to Table 1, the project period will span from March 1 (from Table 1, the closest date prior to the actual March 10 start date) to May 15 (from Table 1, the closest date after the actual May 10 end date). The difference in values between these two dates is 9.7% (9.9 - 0.2 = 9.7). Since the annual erosion index for this location is about 45 (interpolated from Figure 2), the R factor for the scheduled construction project is 9.7% of 45, or 4.4.

Because 4.4 is less than 5, the operator of this site would be able to seek a waiver under the low rainfall erosivity provision.

### 2. Construction spanning two calendar years.

*Find the R factor value for a construction site in Pittsburgh, Pennsylvania. Assume the site will be disturbed from August 1 to April 15.*

The EI distribution zone is 111 (Figure 1). Referring to Table 1, the project period will span from July 29 (from Table 1, the closest date prior to the actual August 1 start date) to April 15. The difference in values between July 29 and December 31 is 35% (100 - 65.0 = 35.0). The difference between January 1 and April 15 is 8%. The total percentage EI for this project is 43% (35 + 8 = 43). Since the annual erosion index for this location is 112 (interpolated from Figure 2), the R factor for the scheduled construction is 43% of 112, or 48.

Since 48 is greater than 5, the operator of this site would not be able to seek a waiver under the low rainfall erosivity provision.

## How Do I Compute the R factor for My Project?

1. Estimate the construction start date. This is the day you expect to begin disturbing soils, including grubbing, stockpiling, excavating, and grading activities.
2. Estimate the day you expect to achieve final stabilization, as defined by your permitting authority's regulations or NPDES construction stormwater permit, over all previous disturbed areas. This is your construction end date.
3. Refer to Figure 1 to find your Erosivity Index (EI) Zone based on your geographic location.

4. Refer to Table 1, the Erosivity Index (EI) Table. Find the number of your EI Zone in the left column. Locate the EI values for the dates that correspond to the project start and end dates you identified in Steps 1 and 2. If your specific date is not on the table, either interpolate between dates to obtain your %EI value, or use the closest date prior to your proposed start date and the closest date after your proposed end date. Subtract the start value from the end value to find the % EI for your site. The maximum annual EI value for a project is 100%. NOTE: If your project lasts for one year or more, your EI value is 100%.
5. Refer to the appropriate Isoerodent Map (Figures 2 through 5). Interpolate the annual isoerodent value for your area. This is the annual R factor for your site.
6. Multiply the percent value obtained in Step 4 by the annual isoerodent value obtained in Step 5. This is the R factor for your scheduled project.

## Can I Use a Personal Computer to Calculate the R factor?

The computer program used by USDA to evaluate erosion potential is called the Revised Universal Soil Loss Equation, or RUSLE. The current version of RUSLE (RUSLE2) is a Windows-based model that uses extensive databases that are geographically-linked. RUSLE2 can be used to calculate the R factor for a proposed construction site; however, RUSLE2 can require a large investment of time to set up. RUSLE2 can be downloaded free of charge from the Internet at http://fargo.nserl.purdue.edu/rusle2_dataweb/RUSLE2_Index.htm. Note that RUSLE2 is an upgrade of RUSLE, and contains more detailed data. Therefore, your calculated R factor may differ based on whether you calculate your R factor using the methods specified above, which utilizes data from *USDA Handbook 703 - Predicting Soil Erosion by Water: A Guide to Conservation Planning With the Revised Universal Soil Loss Equation (RUSLE)*, January 1997, or whether you calculate your R factor using the more updated RUSLE2. EPA notes that either method of calculation is acceptable for determining eligibility for the construction rainfall erosivity waiver.

## Where Can I Get Help?

- A copy of "Chapter 2, Rainfall-Runoff Erosivity Factor (R)" from the *USDA Handbook 703 - Predicting Soil Erosion by Water: A Guide to Conservation Planning With the Revised Universal Soil Loss Equation (RUSLE)*, January 1997, is available on EPA's web site at http://www.epa.gov/npdes/pubs/ruslech2.pdf.
- Information about RUSLE2, and a download of the program, is available at http://fargo.nserl.purdue.edu/rusle2_dataweb/.
- Your local USDA Service Center may be able to provide assistance with calculating R factors and other conservation-related issues. To find the office nearest you, go to http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/contact/local.

**For Additional Information**

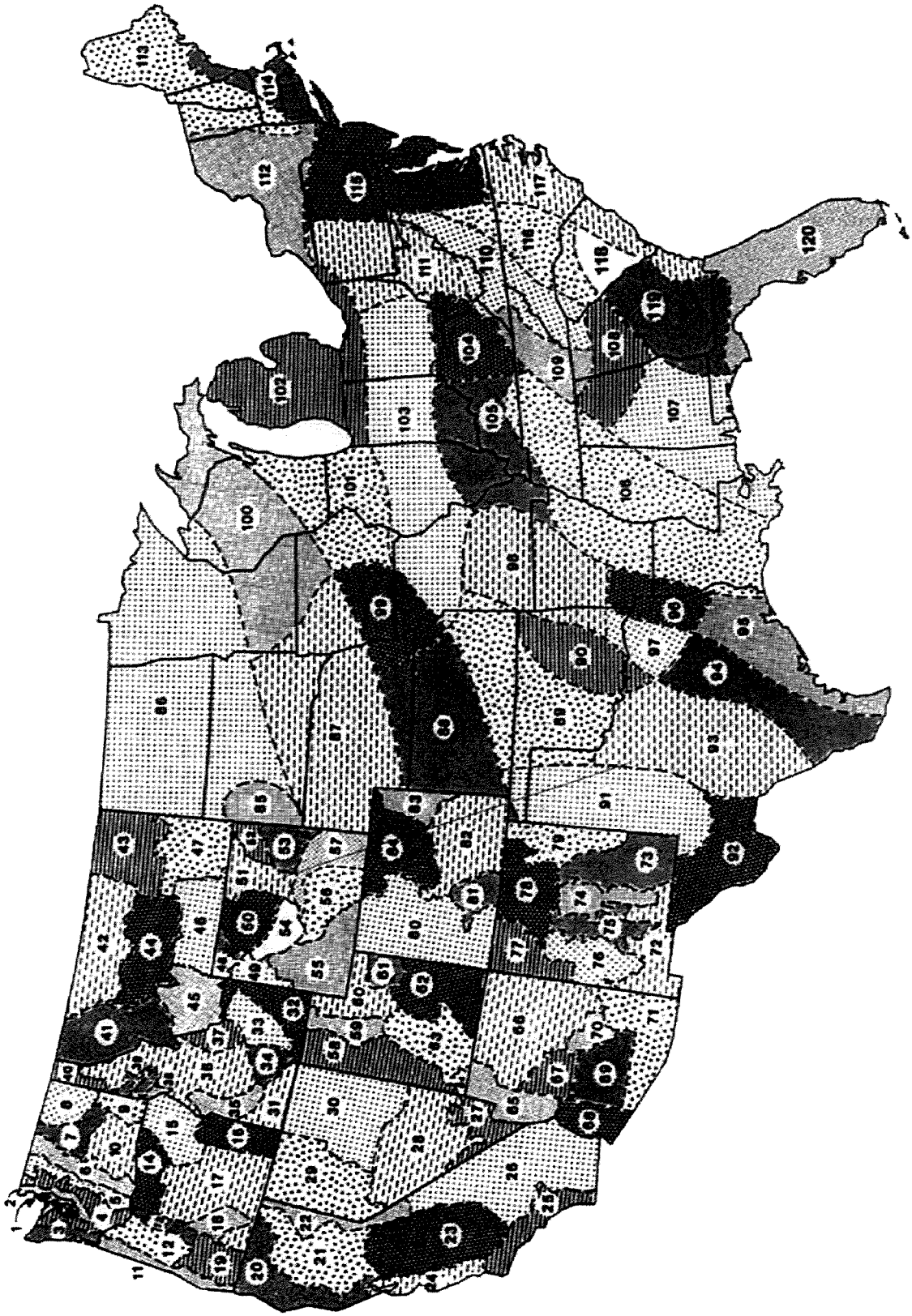
***Reference Documents***

Stormwater Phase II Final Rule Fact Sheet Series
- Internet: cfpub.epa.gov/npdes/stormwater/swfinal.cfm

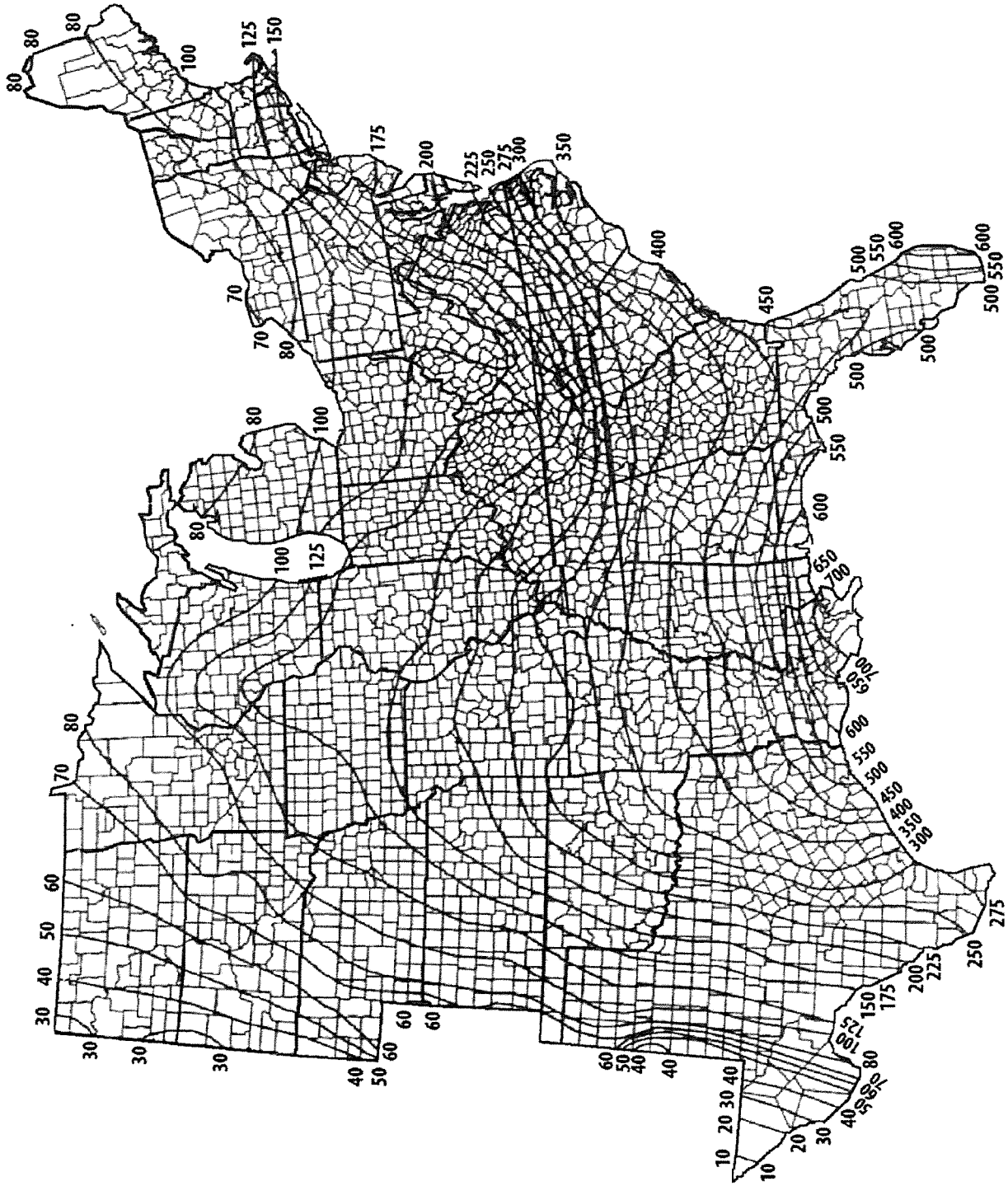
Stormwater Phase II Final Rule (64 *FR* 68722)
- Internet: www.epa.gov/npdes/regulations/phase2.pdf
- Contact the U.S. EPA Water Resource Center (Phone: (202) 564-9545)

*Agricultural Handbook Number 703, Predicting Soil Erosion by Water: A Guide to Conservation Planning With the Revised Universal Soil Loss Equation (RUSLE)*, Chapter 2, pp. 21-64, January 1997.
- Internet: www.epa.gov/npdes/pubs/ruslech2.pdf

# Figure 1. Erosivity Index Zone Map



# Figure 2. Isoerodent Map of the Eastern U.S.

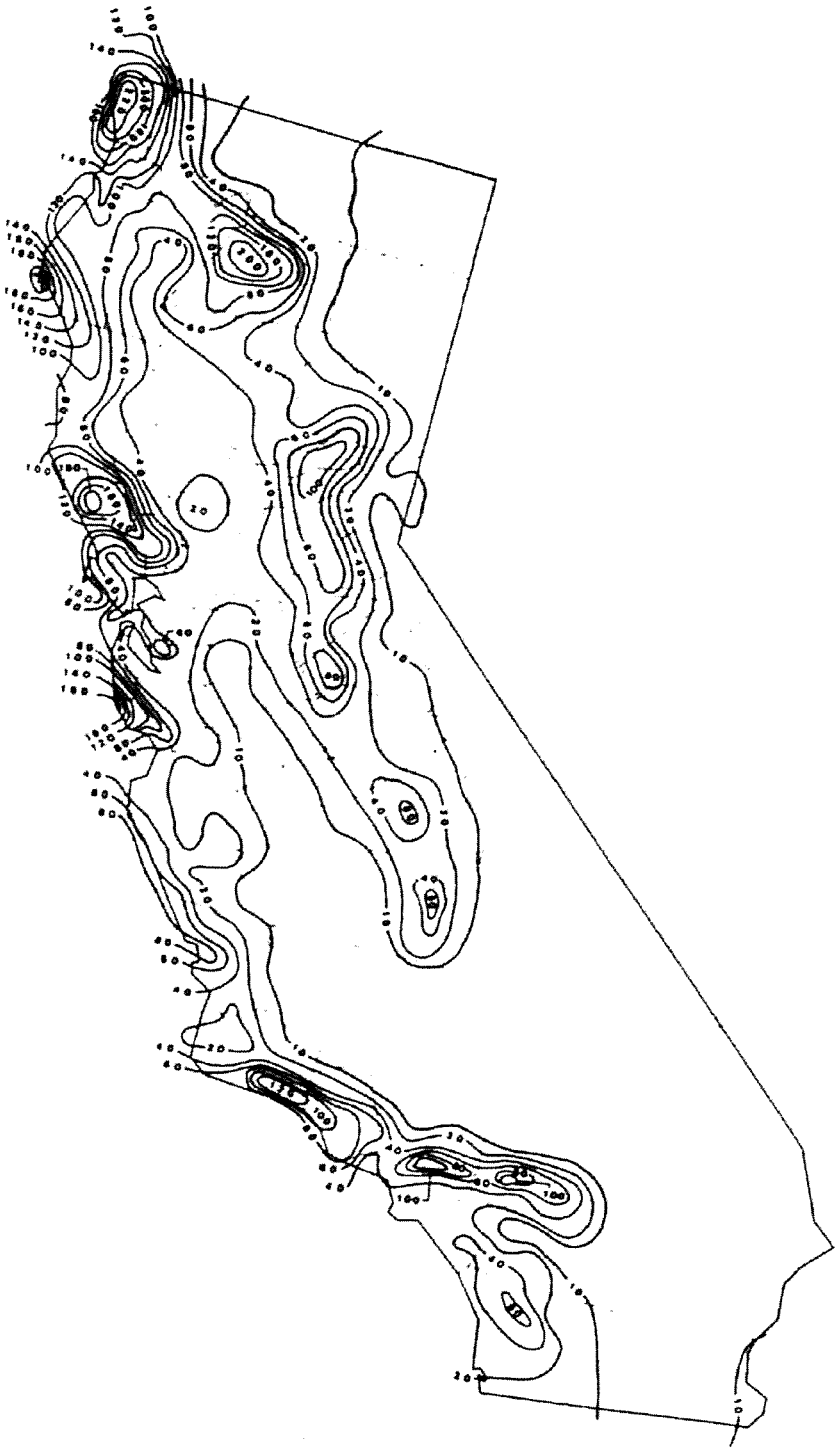


Note: Units for all maps on this page are hundreds ft•tonf•in(ac•h•yr)$^{-1}$

# Figure 3. Isoerodent Map of the Western U.S.

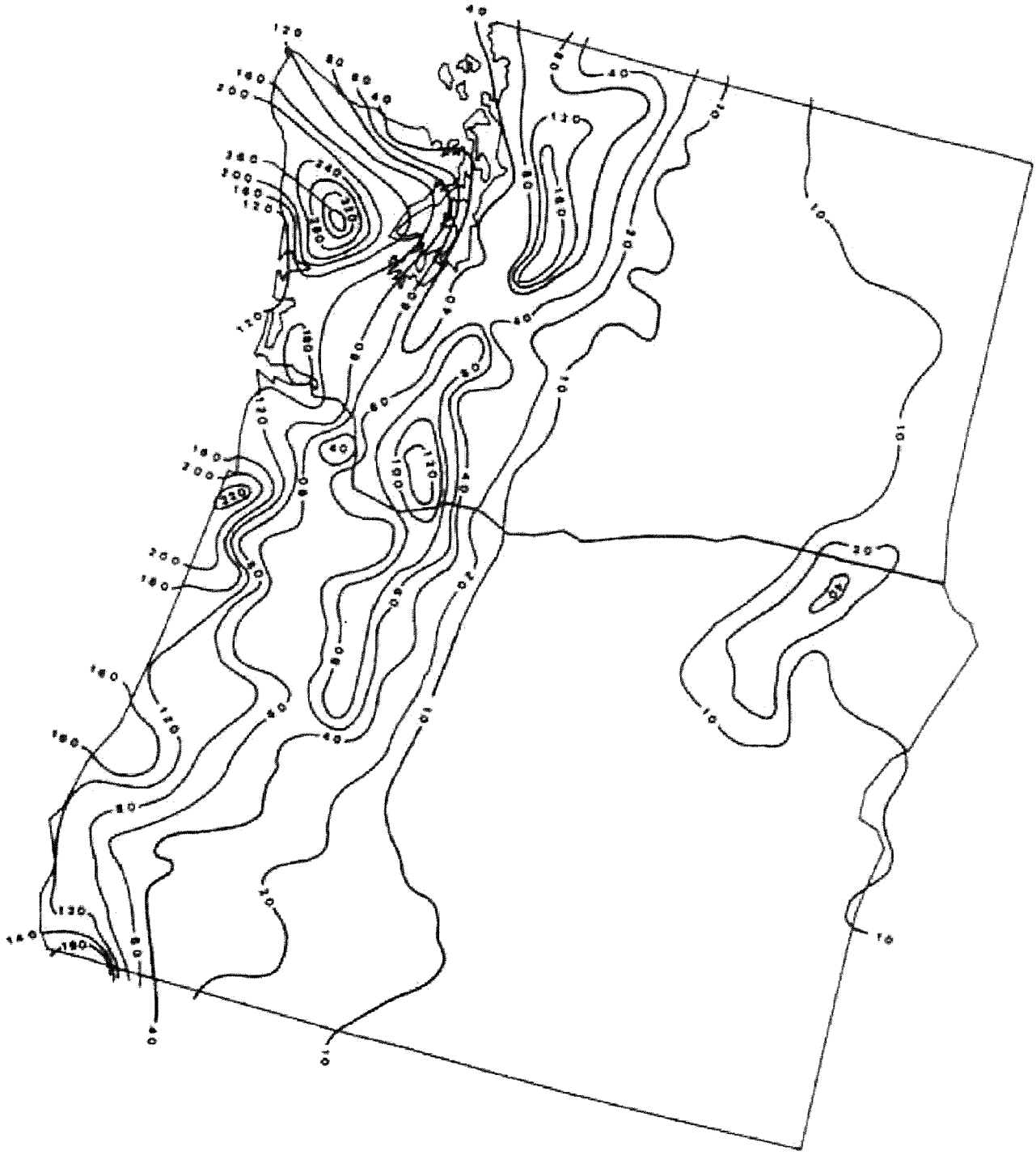
Note: Units for all maps on this page are hundreds ft•tonf•in(ac•h•yr)$^{-1}$

# Figure 4. Isoerodent Map of California



Note: Units for all maps on this page are hundreds ft•tonf•in(ac•h•yr)$^{-1}$

# Figure 5. Isoerodent Map of Oregon and Washington



Note: Units for all maps on this page are hundreds ft•tonf•in(ac•h•yr)$^{-1}$

# Table 1. Erosivity Index (%EI Values extracted from USDA Manual 703)

All values are at the end of the day listed below - Linear interpolation between dates is acceptable.
EI as a percentage of Average Annual R Value Computed for Geographic Areas Shown in Figure 1

| Month | Jan | Jan | Jan | Feb | Mar | Mar | Mar | Apr | Apr | May | May | Jun | Jun | Jul | Jul | Aug | Aug | Sept | Sept | Oct | Oct | Nov | Nov | Dec | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Day | 1 | 16 | 31 | 15 | 1 | 16 | 31 | 15 | 30 | 15 | 30 | 14 | 29 | 14 | 29 | 13 | 28 | 12 | 27 | 12 | 27 | 11 | 26 | 11 | 31 |
| EI Zone | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 0 | 4.3 | 8.3 | 12.8 | 17.3 | 21.6 | 25.1 | 28 | 30.9 | 34.9 | 39.1 | 42.6 | 45.4 | 48.2 | 50.8 | 53 | 56 | 60.8 | 66.8 | 71 | 75.7 | 82 | 89.1 | 95.2 | 100 |
| 2 | 0 | 4.3 | 8.3 | 12.8 | 17.3 | 21.6 | 25.1 | 28.0 | 30.9 | 34.9 | 39.1 | 42.6 | 45.4 | 48.2 | 50.8 | 53.0 | 56.0 | 60.8 | 66.8 | 71.0 | 75.7 | 82.0 | 89.1 | 95.2 | 100 |
| 3 | 0 | 7.4 | 13.8 | 20.9 | 26.5 | 31.8 | 35.3 | 38.5 | 40.2 | 41.6 | 42.5 | 43.6 | 44.5 | 45.1 | 45.7 | 46.4 | 47.7 | 49.4 | 52.8 | 57.0 | 64.5 | 73.1 | 83.3 | 92.3 | 100 |
| 4 | 0 | 3.9 | 7.9 | 12.6 | 17.4 | 21.6 | 25.2 | 28.7 | 31.9 | 35.1 | 38.2 | 42.0 | 44.9 | 46.7 | 48.2 | 50.1 | 53.1 | 56.6 | 62.2 | 67.9 | 75.2 | 83.5 | 90.5 | 96.0 | 100 |
| 5 | 0 | 2.3 | 3.6 | 4.7 | 6.0 | 7.7 | 10.7 | 13.9 | 17.8 | 21.2 | 24.5 | 28.1 | 31.1 | 33.1 | 35.3 | 38.2 | 43.2 | 48.7 | 57.3 | 67.8 | 77.9 | 86.0 | 91.3 | 96.9 | 100 |
| 6 | 0 | 0.0 | 0.0 | 0.5 | 2.0 | 4.1 | 8.1 | 12.6 | 17.6 | 21.6 | 25.5 | 29.6 | 34.5 | 40.0 | 45.7 | 50.7 | 55.6 | 60.2 | 66.5 | 75.5 | 85.6 | 95.9 | 99.5 | 99.9 | 100 |
| 7 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.2 | 4.9 | 8.5 | 13.9 | 19.0 | 26.0 | 35.4 | 43.9 | 48.8 | 53.9 | 64.5 | 73.4 | 77.5 | 80.4 | 84.8 | 89.9 | 96.6 | 99.2 | 99.7 | 100 |
| 8 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.9 | 3.6 | 7.8 | 15.0 | 20.2 | 27.4 | 38.1 | 49.8 | 57.9 | 65.0 | 75.6 | 82.7 | 86.8 | 89.4 | 93.4 | 96.3 | 99.1 | 100.0 | 100.0 | 100 |
| 9 | 0 | 0.8 | 3.1 | 4.7 | 7.4 | 11.7 | 17.8 | 22.5 | 27.0 | 31.4 | 36.0 | 41.6 | 46.4 | 50.1 | 53.4 | 57.4 | 61.7 | 64.9 | 69.7 | 79.0 | 89.6 | 97.4 | 100.0 | 100.0 | 100 |
| 10 | 0 | 0.3 | 0.5 | 0.9 | 2.0 | 4.3 | 9.2 | 13.1 | 18.0 | 22.7 | 29.2 | 39.5 | 46.3 | 48.8 | 51.1 | 57.2 | 64.4 | 67.7 | 71.1 | 77.2 | 85.1 | 92.5 | 96.5 | 99.0 | 100 |
| 11 | 0 | 5.4 | 11.3 | 18.8 | 26.3 | 33.2 | 37.4 | 40.7 | 42.5 | 44.3 | 45.4 | 46.5 | 47.1 | 47.4 | 47.8 | 48.3 | 49.4 | 50.7 | 53.6 | 57.5 | 65.5 | 76.2 | 87.4 | 94.8 | 100 |
| 12 | 0 | 3.5 | 7.8 | 14.0 | 21.1 | 27.4 | 31.5 | 35.0 | 37.3 | 39.8 | 41.9 | 44.3 | 45.6 | 46.3 | 46.8 | 47.9 | 50.0 | 52.9 | 57.9 | 62.3 | 69.3 | 81.3 | 91.5 | 96.7 | 100 |
| 13 | 0 | 0.0 | 0.0 | 1.8 | 7.2 | 11.9 | 16.7 | 19.7 | 24.0 | 31.2 | 42.4 | 55.0 | 60.0 | 60.8 | 61.2 | 62.6 | 65.3 | 67.6 | 71.6 | 76.1 | 83.1 | 93.3 | 98.2 | 99.6 | 100 |
| 14 | 0 | 0.7 | 1.8 | 3.3 | 6.9 | 16.5 | 26.6 | 29.9 | 32.0 | 35.4 | 40.2 | 45.1 | 51.9 | 61.1 | 67.5 | 70.7 | 72.8 | 75.4 | 78.6 | 81.9 | 86.4 | 93.6 | 97.7 | 99.3 | 100 |
| 15 | 0 | 0.0 | 0.0 | 0.5 | 2.0 | 4.4 | 8.7 | 12.0 | 16.6 | 21.4 | 29.7 | 44.5 | 56.0 | 60.8 | 63.9 | 69.1 | 74.5 | 79.1 | 83.1 | 87.0 | 90.9 | 96.6 | 99.1 | 99.8 | 100 |
| 16 | 0 | 0.0 | 0.0 | 0.5 | 2.0 | 5.5 | 12.3 | 16.2 | 20.9 | 26.4 | 35.2 | 48.1 | 58.1 | 63.1 | 66.5 | 71.9 | 77.0 | 81.6 | 85.1 | 88.4 | 91.5 | 96.3 | 98.7 | 99.6 | 100 |
| 17 | 0 | 0.0 | 0.0 | 0.7 | 2.8 | 6.1 | 10.7 | 12.9 | 16.1 | 21.9 | 32.8 | 45.9 | 55.5 | 60.3 | 64.0 | 71.2 | 77.2 | 80.3 | 83.1 | 87.7 | 92.6 | 97.2 | 99.1 | 99.8 | 100 |
| 18 | 0 | 0.0 | 0.0 | 0.6 | 2.5 | 6.2 | 12.4 | 16.4 | 20.2 | 23.9 | 29.3 | 37.7 | 45.6 | 49.8 | 53.3 | 58.4 | 64.3 | 69.0 | 75.0 | 86.6 | 93.9 | 96.6 | 98.0 | 100.0 | 100 |
| 19 | 0 | 1.0 | 2.6 | 7.4 | 16.4 | 23.5 | 28.0 | 31.0 | 33.5 | 37.0 | 41.7 | 48.1 | 51.1 | 52.0 | 52.5 | 53.6 | 55.7 | 57.6 | 61.1 | 65.8 | 74.7 | 88.0 | 95.8 | 98.7 | 100 |
| 20 | 0 | 9.8 | 18.5 | 25.4 | 30.2 | 35.6 | 38.9 | 41.5 | 42.9 | 44.0 | 45.2 | 48.2 | 50.8 | 51.7 | 52.5 | 54.6 | 57.4 | 58.5 | 60.1 | 63.2 | 69.6 | 76.7 | 85.4 | 92.4 | 100 |
| 21 | 0 | 7.5 | 13.6 | 18.1 | 21.1 | 24.4 | 27.0 | 29.4 | 31.7 | 34.6 | 37.3 | 39.6 | 41.6 | 43.4 | 45.4 | 48.1 | 51.3 | 53.3 | 56.6 | 62.4 | 72.4 | 81.3 | 88.9 | 94.7 | 100 |
| 22 | 0 | 1.2 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 2.2 | 3.9 | 4.6 | 6.4 | 14.2 | 32.8 | 47.2 | 58.8 | 69.1 | 76.0 | 82.0 | 87.1 | 96.7 | 99.9 | 99.9 | 99.9 | 99.9 | 100 |
| 23 | 0 | 7.9 | 15.0 | 20.9 | 25.7 | 31.1 | 35.7 | 40.2 | 43.2 | 46.2 | 47.7 | 48.8 | 49.4 | 49.9 | 50.7 | 51.8 | 54.1 | 57.7 | 62.8 | 65.9 | 70.1 | 77.3 | 86.8 | 93.5 | 100 |
| 24 | 0 | 12.2 | 23.6 | 33.0 | 39.7 | 47.1 | 51.7 | 55.9 | 57.7 | 58.6 | 58.9 | 59.1 | 59.1 | 59.2 | 59.2 | 59.3 | 59.5 | 60.0 | 61.4 | 63.0 | 66.5 | 71.8 | 81.3 | 89.6 | 100 |
| 25 | 0 | 9.8 | 20.8 | 30.2 | 37.6 | 45.8 | 50.6 | 54.4 | 56.0 | 56.8 | 57.1 | 57.1 | 57.2 | 57.6 | 58.5 | 59.8 | 62.2 | 65.3 | 67.5 | 68.2 | 69.4 | 74.8 | 86.6 | 93.0 | 100 |
| 26 | 0 | 2.0 | 5.4 | 9.8 | 15.6 | 21.5 | 24.7 | 26.6 | 27.4 | 28.0 | 28.7 | 29.8 | 32.5 | 36.6 | 44.9 | 55.4 | 65.7 | 72.6 | 77.8 | 84.4 | 89.5 | 93.9 | 96.5 | 98.4 | 100 |
| 27 | 0 | 0.0 | 0.0 | 1.0 | 4.0 | 5.9 | 8.0 | 11.1 | 13.0 | 14.0 | 14.6 | 15.3 | 17.0 | 23.2 | 39.1 | 60.0 | 76.3 | 86.1 | 89.7 | 90.4 | 90.9 | 93.1 | 96.6 | 99.1 | 100 |
| 28 | 0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.5 | 1.5 | 3.3 | 7.2 | 11.9 | 17.7 | 21.4 | 27.0 | 37.1 | 51.4 | 62.3 | 70.6 | 78.8 | 84.6 | 90.6 | 94.4 | 97.9 | 99.3 | 100.0 | 100 |
| 29 | 0 | 0.6 | 0.7 | 0.7 | 0.7 | 1.5 | 3.9 | 6.0 | 10.5 | 17.9 | 28.8 | 36.6 | 43.8 | 51.5 | 59.3 | 68.0 | 74.8 | 80.3 | 84.3 | 88.8 | 92.7 | 98.0 | 99.8 | 99.9 | 100 |
| 30 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.8 | 2.8 | 7.9 | 14.2 | 24.7 | 35.6 | 45.4 | 52.2 | 58.7 | 68.5 | 77.6 | 84.5 | 88.9 | 93.7 | 96.2 | 97.6 | 98.3 | 99.6 | 100 |
| 31 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 1.0 | 3.5 | 9.9 | 15.7 | 26.4 | 47.2 | 61.4 | 65.9 | 69.0 | 77.2 | 86.0 | 91.6 | 94.8 | 98.7 | 100.0 | 100.0 | 100.0 | 100.0 | 100 |
| 32 | 0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.6 | 2.2 | 4.3 | 9.0 | 14.2 | 23.3 | 34.6 | 46.3 | 54.2 | 61.7 | 72.9 | 82.5 | 89.6 | 93.7 | 98.2 | 99.7 | 99.9 | 99.9 | 99.9 | 100 |
| 33 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.6 | 2.3 | 4.2 | 8.8 | 16.1 | 30.0 | 46.9 | 57.9 | 62.8 | 66.2 | 72.1 | 79.1 | 85.9 | 91.1 | 97.0 | 98.9 | 98.9 | 98.9 | 98.9 | 100 |
| 34 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.8 | 7.3 | 10.7 | 15.5 | 22.0 | 29.9 | 35.9 | 42.0 | 48.5 | 56.9 | 67.0 | 76.9 | 85.8 | 91.2 | 95.7 | 97.8 | 99.6 | 100.0 | 100.0 | 100 |
| 35 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.5 | 10.2 | 15.9 | 22.2 | 27.9 | 34.7 | 43.9 | 51.9 | 56.9 | 61.3 | 67.3 | 73.9 | 80.1 | 85.1 | 89.6 | 93.2 | 98.2 | 99.8 | 99.8 | 100 |

| Month | Jan | Jan | Jan | Feb | Mar | Mar | Mar | Apr | Apr | May | May | Jun | Jun | Jul | Jul | Aug | Aug | Sept | Sept | Oct | Oct | Nov | Nov | Dec | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Day | 1 | 16 | 31 | 15 | 1 | 16 | 31 | 15 | 30 | 15 | 30 | 14 | 29 | 14 | 29 | 13 | 28 | 12 | 27 | 12 | 27 | 11 | 26 | 11 | 31 |
| El Zone | | | | | | | | | | | | | | | | | | | | | | | | | |
| 36 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.9 | 3.4 | 6.7 | 12.7 | 18.5 | 26.6 | 36.3 | 46.0 | 53.5 | 60.2 | 68.3 | 75.8 | 82.6 | 88.3 | 96.3 | 99.3 | 99.9 | 100.0 | 100.0 | 100 |
| 37 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 3.9 | 9.1 | 19.1 | 26.7 | 36.3 | 47.9 | 61.4 | 75.1 | 84.5 | 92.3 | 96.0 | 99.1 | 100.0 | 100.0 | 100.0 | 100.0 | 100 |
| 38 | 0 | 0.0 | 0.0 | 1.1 | 4.3 | 7.2 | 11.0 | 13.9 | 17.9 | 22.3 | 30.3 | 43.1 | 55.1 | 61.3 | 65.7 | 72.1 | 77.9 | 82.6 | 86.3 | 90.3 | 93.8 | 98.4 | 100.0 | 100.0 | 100 |
| 39 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.6 | 6.5 | 11.0 | 17.8 | 24.7 | 33.1 | 42.8 | 50.3 | 54.9 | 59.7 | 68.9 | 78.1 | 83.6 | 87.5 | 93.0 | 96.5 | 99.2 | 100.0 | 100.0 | 100 |
| 40 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.5 | 6.2 | 10.1 | 16.3 | 23.3 | 32.5 | 42.2 | 50.1 | 55.6 | 60.5 | 67.5 | 74.3 | 79.4 | 84.1 | 91.1 | 95.8 | 99.1 | 100.0 | 100.0 | 100 |
| 41 | 0 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.4 | 1.1 | 6.8 | 22.9 | 40.1 | 54.9 | 63.8 | 70.7 | 81.5 | 89.8 | 96.3 | 98.7 | 99.2 | 99.3 | 99.4 | 99.4 | 99.7 | 100 |
| 42 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.9 | 5.2 | 17.3 | 33.8 | 53.2 | 66.5 | 75.9 | 87.6 | 93.7 | 97.5 | 99.0 | 99.7 | 100.0 | 100.0 | 100.0 | 100.0 | 100 |
| 43 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.4 | 2.7 | 9.5 | 21.9 | 42.7 | 58.6 | 71.1 | 84.6 | 91.9 | 97.1 | 99.0 | 99.8 | 100.0 | 100.0 | 100.0 | 100.0 | 100 |
| 44 | 0 | 1.7 | 2.3 | 2.4 | 2.4 | 2.4 | 2.4 | 2.7 | 3.5 | 7.6 | 18.5 | 34.3 | 52.5 | 64.0 | 72.3 | 83.3 | 90.0 | 95.1 | 97.3 | 98.5 | 98.9 | 98.9 | 98.9 | 99.2 | 100 |
| 45 | 0 | 0.2 | 0.2 | 0.3 | 0.3 | 0.4 | 0.6 | 0.8 | 1.4 | 3.7 | 10.2 | 22.6 | 41.8 | 54.0 | 64.5 | 78.7 | 88.4 | 96.0 | 98.7 | 99.4 | 99.7 | 99.7 | 99.8 | 99.9 | 100 |
| 46 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.6 | 2.6 | 7.5 | 19.6 | 32.9 | 48.9 | 63.0 | 73.5 | 83.3 | 89.5 | 95.6 | 98.3 | 99.6 | 100.0 | 100.0 | 100.0 | 100.0 | 100 |
| 47 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | 1.6 | 5.8 | 17.0 | 33.0 | 52.5 | 66.4 | 75.7 | 85.5 | 91.3 | 96.5 | 98.8 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100 |
| 48 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 8.1 | 15.4 | 27.8 | 40.7 | 52.6 | 61.1 | 69.3 | 82.6 | 92.0 | 98.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100 |
| 49 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.7 | 2.7 | 8.3 | 20.0 | 27.5 | 35.6 | 44.6 | 46.0 | 70.2 | 81.3 | 89.2 | 93.6 | 98.5 | 100.0 | 100.0 | 100.0 | 100.0 | 100 |
| 50 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.4 | 2.4 | 8.2 | 13.7 | 23.8 | 38.8 | 55.1 | 66.1 | 73.6 | 81.8 | 87.7 | 93.8 | 97.0 | 99.4 | 100.0 | 100.0 | 100.0 | 100.0 | 100 |
| 51 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 1.0 | 3.1 | 8.7 | 18.8 | 35.8 | 49.6 | 60.4 | 70.2 | 77.0 | 84.0 | 88.8 | 93.8 | 96.6 | 99.1 | 100.0 | 100.0 | 100.0 | 100.0 | 100 |
| 52 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.6 | 2.5 | 6.8 | 17.5 | 29.8 | 46.1 | 60.5 | 72.7 | 86.0 | 92.8 | 96.8 | 98.4 | 99.7 | 100.0 | 100.0 | 100.0 | 100.0 | 100 |
| 53 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.8 | 3.0 | 9.5 | 24.2 | 35.3 | 48.0 | 63.1 | 76.1 | 87.7 | 93.5 | 97.2 | 98.6 | 99.5 | 99.8 | 99.9 | 100.0 | 100.0 | 100 |
| 54 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.7 | 2.4 | 7.2 | 14.7 | 27.2 | 37.2 | 47.3 | 58.8 | 67.6 | 74.0 | 79.2 | 86.7 | 92.6 | 97.9 | 99.8 | 99.9 | 100.0 | 100.0 | 100 |
| 55 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.3 | 5.4 | 13.3 | 25.5 | 31.6 | 38.8 | 52.5 | 66.8 | 75.5 | 81.2 | 87.9 | 92.8 | 98.3 | 100.0 | 100.0 | 100.0 | 100.0 | 100 |
| 56 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.3 | 5.1 | 11.4 | 22.3 | 29.5 | 38.5 | 51.1 | 65.2 | 77.8 | 85.6 | 91.7 | 95.0 | 98.7 | 100.0 | 100.0 | 100.0 | 100.0 | 100 |
| 57 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 1.0 | 3.5 | 9.2 | 21.5 | 31.0 | 43.5 | 60.4 | 75.1 | 86.1 | 91.6 | 96.2 | 98.1 | 99.4 | 99.9 | 99.9 | 100.0 | 100.0 | 100 |
| 58 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.9 | 2.9 | 8.0 | 13.2 | 21.0 | 29.1 | 38.0 | 45.9 | 54.5 | 65.4 | 74.8 | 82.1 | 87.5 | 95.4 | 98.8 | 99.7 | 100.0 | 100.0 | 100 |
| 59 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.2 | 8.9 | 15.6 | 24.2 | 31.1 | 38.3 | 46.0 | 54.9 | 64.2 | 73.2 | 81.9 | 88.5 | 95.7 | 98.6 | 99.4 | 99.7 | 99.7 | 100 |
| 60 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | 1.5 | 4.0 | 9.5 | 13.3 | 20.5 | 33.6 | 52.8 | 66.5 | 76.7 | 88.1 | 94.2 | 98.6 | 100.0 | 100.0 | 100.0 | 100.0 | 100 |
| 61 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.3 | 5.0 | 8.5 | 15.5 | 29.8 | 41.8 | 46.0 | 49.2 | 56.0 | 65.1 | 71.6 | 78.6 | 91.1 | 97.3 | 99.3 | 100.0 | 100.0 | 100 |
| 62 | 0 | 0.0 | 0.0 | 0.1 | 0.3 | 0.8 | 2.1 | 3.6 | 6.5 | 9.7 | 13.7 | 16.5 | 20.8 | 27.3 | 40.1 | 56.9 | 72.6 | 83.4 | 89.4 | 95.5 | 98.1 | 99.6 | 100.0 | 100.0 | 100 |
| 63 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.9 | 3.7 | 7.8 | 13.3 | 15.8 | 19.9 | 29.0 | 46.8 | 64.7 | 78.3 | 88.8 | 93.9 | 98.5 | 100.0 | 100.0 | 100.0 | 100.0 | 100 |
| 64 | 0 | 0.0 | 0.0 | 0.7 | 2.8 | 7.4 | 12.4 | 14.4 | 15.6 | 17.3 | 19.4 | 21.0 | 24.4 | 32.3 | 48.0 | 61.4 | 72.1 | 81.9 | 87.0 | 90.1 | 92.4 | 98.1 | 100.0 | 100.0 | 100 |
| 65 | 0 | 3.6 | 7.0 | 9.6 | 11.4 | 13.0 | 14.4 | 16.3 | 17.7 | 18.4 | 19.3 | 20.5 | 23.6 | 32.0 | 50.0 | 66.2 | 77.2 | 85.4 | 88.8 | 90.4 | 91.3 | 92.7 | 94.8 | 97.0 | 100 |
| 66 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.5 | 1.1 | 2.2 | 3.6 | 6.0 | 7.6 | 11.1 | 19.8 | 38.9 | 59.7 | 74.4 | 83.2 | 88.1 | 94.6 | 97.7 | 99.4 | 100.0 | 100.0 | 100 |
| 67 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.4 | 0.9 | 1.6 | 1.9 | 2.4 | 5.0 | 12.1 | 24.8 | 48.3 | 73.6 | 86.5 | 92.0 | 94.3 | 96.6 | 97.9 | 99.5 | 100.0 | 100.0 | 100 |
| 68 | 0 | 2.3 | 4.5 | 7.8 | 10.4 | 12.0 | 13.3 | 16.3 | 17.7 | 18.1 | 18.2 | 18.3 | 18.4 | 19.9 | 24.5 | 35.0 | 54.4 | 69.4 | 78.6 | 85.7 | 89.2 | 91.9 | 93.9 | 97.0 | 100 |
| 69 | 0 | 2.0 | 3.7 | 5.7 | 7.8 | 10.5 | 12.4 | 13.7 | 14.3 | 14.7 | 15.1 | 15.7 | 17.1 | 22.7 | 36.7 | 50.4 | 63.6 | 75.0 | 81.8 | 87.8 | 90.8 | 93.2 | 94.9 | 97.5 | 100 |
| 70 | 0 | 0.5 | 0.7 | 1.0 | 1.3 | 1.7 | 2.2 | 2.8 | 3.4 | 3.9 | 4.7 | 5.4 | 7.4 | 15.7 | 36.5 | 55.8 | 70.3 | 80.9 | 86.4 | 90.9 | 93.4 | 96.4 | 98.1 | 99.4 | 100 |
| 71 | 0 | 0.7 | 1.2 | 1.6 | 2.1 | 2.8 | 3.3 | 3.6 | 4.0 | 4.5 | 5.6 | 6.5 | 9.1 | 18.5 | 40.6 | 59.7 | 74.0 | 86.3 | 91.7 | 94.7 | 96.0 | 96.7 | 97.3 | 98.8 | 100 |
| 72 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.2 | 0.7 | 0.8 | 1.3 | 3.5 | 9.9 | 24.7 | 51.4 | 71.5 | 83.6 | 93.8 | 97.7 | 99.2 | 99.8 | 99.9 | 99.9 | 100.0 | 100 |
| 73 | 0 | 0.0 | 0.1 | 0.1 | 0.2 | 0.2 | 0.3 | 0.6 | 1.3 | 4.1 | 11.5 | 18.1 | 28.3 | 40.2 | 54.1 | 67.0 | 77.2 | 87.7 | 93.3 | 97.5 | 99.1 | 99.6 | 99.8 | 100.0 | 100 |
| 74 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.2 | 0.5 | 1.2 | 2.7 | 6.4 | 10.2 | 18.4 | 31.0 | 50.7 | 68.7 | 81.2 | 91.6 | 96.1 | 98.4 | 99.2 | 99.8 | 100.0 | 100.0 | 100 |
| 75 | 0 | 0.1 | 0.1 | 0.1 | 0.2 | 0.5 | 1.3 | 1.9 | 3.0 | 4.1 | 6.6 | 10.0 | 17.6 | 28.3 | 44.7 | 59.4 | 71.6 | 83.9 | 90.3 | 94.7 | 96.7 | 98.8 | 99.6 | 99.9 | 100 |

| Month | Jan | Jan | Jan | Feb | Mar | Mar | Mar | Apr | Apr | May | May | Jun | Jun | Jul | Jul | Aug | Aug | Sept | Sept | Oct | Oct | Nov | Nov | Dec | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Day | 1 | 16 | 31 | 15 | 1 | 16 | 31 | 15 | 30 | 15 | 30 | 14 | 29 | 14 | 29 | 13 | 28 | 12 | 27 | 12 | 27 | 11 | 26 | 11 | 31 |
| El Zone | | | | | | | | | | | | | | | | | | | | | | | | | |
| 76 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.2 | 0.6 | 1.3 | 2.0 | 3.5 | 4.9 | 8.4 | 17.4 | 37.3 | 57.5 | 72.9 | 83.7 | 89.5 | 95.8 | 98.4 | 99.6 | 100.0 | 100.0 | 100 |
| 77 | 0 | 0.2 | 0.3 | 0.3 | 0.4 | 0.8 | 1.5 | 2.0 | 2.8 | 3.9 | 5.9 | 7.2 | 10.3 | 21.5 | 46.5 | 66.3 | 78.3 | 86.5 | 90.8 | 96.0 | 98.2 | 99.1 | 99.5 | 99.8 | 100 |
| 78 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.5 | 1.6 | 3.8 | 8.9 | 13.2 | 21.8 | 35.8 | 56.6 | 75.4 | 86.0 | 92.9 | 95.9 | 98.2 | 99.2 | 99.8 | 100.0 | 100.0 | 100 |
| 79 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.7 | 1.3 | 2.7 | 5.8 | 12.7 | 18.8 | 28.8 | 41.6 | 58.4 | 75.7 | 86.5 | 94.2 | 97.3 | 98.9 | 99.5 | 99.9 | 100.0 | 100.0 | 100 |
| 80 | 0 | 0.6 | 1.2 | 1.6 | 2.1 | 2.5 | 3.3 | 4.5 | 6.9 | 10.1 | 15.5 | 19.7 | 26.6 | 36.4 | 51.7 | 67.5 | 79.4 | 88.8 | 93.2 | 96.1 | 97.3 | 98.2 | 98.7 | 99.3 | 100 |
| 81 | 0 | 0.1 | 0.1 | 0.2 | 0.4 | 0.5 | 0.8 | 0.9 | 1.5 | 3.9 | 9.9 | 12.8 | 18.2 | 30.7 | 54.1 | 77.1 | 89.0 | 94.9 | 97.2 | 98.7 | 99.3 | 99.6 | 99.7 | 99.9 | 100 |
| 82 | 0 | 0.0 | 0.1 | 0.1 | 0.2 | 0.2 | 0.5 | 1.2 | 3.1 | 6.7 | 14.4 | 20.1 | 29.8 | 44.5 | 64.2 | 83.1 | 92.2 | 96.4 | 98.1 | 99.3 | 99.7 | 99.8 | 99.8 | 99.9 | 100 |
| 83 | 0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.3 | 0.9 | 1.6 | 3.5 | 8.3 | 19.4 | 30.0 | 44.0 | 59.2 | 72.4 | 84.6 | 91.2 | 96.5 | 98.6 | 99.5 | 99.8 | 99.9 | 100.0 | 100.0 | 100 |
| 84 | 0 | 0.0 | 0.1 | 0.1 | 0.2 | 0.3 | 0.6 | 1.7 | 4.9 | 9.9 | 19.5 | 27.2 | 38.3 | 52.8 | 68.8 | 83.9 | 91.6 | 96.4 | 98.2 | 99.2 | 99.6 | 99.8 | 99.8 | 99.9 | 100 |
| 85 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 2.0 | 3.0 | 6.0 | 11.0 | 23.0 | 36.0 | 49.0 | 63.0 | 77.0 | 90.0 | 95.0 | 98.0 | 99.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100 |
| 86 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 2.0 | 3.0 | 6.0 | 11.0 | 23.0 | 36.0 | 49.0 | 63.0 | 77.0 | 90.0 | 95.0 | 98.0 | 99.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100 |
| 87 | 0 | 0.0 | 0.0 | 0.0 | 1.0 | 1.0 | 2.0 | 3.0 | 6.0 | 10.0 | 17.0 | 29.0 | 43.0 | 55.0 | 67.0 | 77.0 | 85.0 | 91.0 | 96.0 | 98.0 | 99.0 | 100.0 | 100.0 | 100.0 | 100 |
| 88 | 0 | 0.0 | 0.0 | 0.0 | 1.0 | 1.0 | 2.0 | 3.0 | 6.0 | 13.0 | 23.0 | 37.0 | 51.0 | 61.0 | 69.0 | 78.0 | 85.0 | 91.0 | 94.0 | 96.0 | 98.0 | 99.0 | 99.0 | 100.0 | 100 |
| 89 | 0 | 1.0 | 1.0 | 2.0 | 3.0 | 4.0 | 7.0 | 12.0 | 18.0 | 27.0 | 38.0 | 48.0 | 55.0 | 62.0 | 69.0 | 76.0 | 83.0 | 90.0 | 94.0 | 97.0 | 98.0 | 99.0 | 100.0 | 100.0 | 100 |
| 90 | 0 | 1.0 | 2.0 | 3.0 | 4.0 | 6.0 | 8.0 | 13.0 | 21.0 | 29.0 | 37.0 | 46.0 | 54.0 | 60.0 | 65.0 | 69.0 | 74.0 | 81.0 | 87.0 | 92.0 | 95.0 | 97.0 | 98.0 | 99.0 | 100 |
| 91 | 0 | 0.0 | 0.0 | 0.0 | 1.0 | 1.0 | 1.0 | 2.0 | 6.0 | 16.0 | 29.0 | 39.0 | 46.0 | 53.0 | 60.0 | 67.0 | 74.0 | 81.0 | 88.0 | 95.0 | 99.0 | 99.0 | 100.0 | 100.0 | 100 |
| 92 | 0 | 0.0 | 0.0 | 0.0 | 1.0 | 1.0 | 1.0 | 2.0 | 6.0 | 16.0 | 29.0 | 39.0 | 46.0 | 53.0 | 60.0 | 67.0 | 74.0 | 81.0 | 88.0 | 95.0 | 99.0 | 99.0 | 100.0 | 100.0 | 100 |
| 93 | 0 | 1.0 | 1.0 | 2.0 | 3.0 | 4.0 | 6.0 | 8.0 | 13.0 | 25.0 | 40.0 | 49.0 | 56.0 | 62.0 | 67.0 | 72.0 | 76.0 | 80.0 | 85.0 | 91.0 | 97.0 | 98.0 | 99.0 | 99.0 | 100 |
| 94 | 0 | 1.0 | 2.0 | 4.0 | 6.0 | 8.0 | 10.0 | 15.0 | 21.0 | 29.0 | 38.0 | 47.0 | 53.0 | 57.0 | 61.0 | 65.0 | 70.0 | 76.0 | 83.0 | 88.0 | 91.0 | 94.0 | 96.0 | 98.0 | 100 |
| 95 | 0 | 1.0 | 3.0 | 5.0 | 7.0 | 9.0 | 11.0 | 14.0 | 18.0 | 27.0 | 35.0 | 41.0 | 46.0 | 51.0 | 57.0 | 62.0 | 68.0 | 73.0 | 79.0 | 84.0 | 89.0 | 93.0 | 96.0 | 98.0 | 100 |
| 96 | 0 | 2.0 | 4.0 | 6.0 | 9.0 | 12.0 | 17.0 | 23.0 | 30.0 | 37.0 | 43.0 | 49.0 | 54.0 | 58.0 | 62.0 | 66.0 | 70.0 | 74.0 | 78.0 | 82.0 | 86.0 | 90.0 | 94.0 | 97.0 | 100 |
| 97 | 0 | 1.0 | 3.0 | 5.0 | 7.0 | 10.0 | 14.0 | 20.0 | 28.0 | 37.0 | 48.0 | 56.0 | 61.0 | 64.0 | 68.0 | 72.0 | 77.0 | 81.0 | 86.0 | 89.0 | 92.0 | 95.0 | 98.0 | 99.0 | 100 |
| 98 | 0 | 1.0 | 2.0 | 4.0 | 6.0 | 8.0 | 10.0 | 13.0 | 19.0 | 26.0 | 34.0 | 42.0 | 50.0 | 58.0 | 63.0 | 68.0 | 74.0 | 79.0 | 84.0 | 89.0 | 93.0 | 95.0 | 97.0 | 99.0 | 100 |
| 99 | 0 | 0.0 | 0.0 | 1.0 | 1.0 | 2.0 | 3.0 | 5.0 | 7.0 | 12.0 | 19.0 | 33.0 | 48.0 | 57.0 | 65.0 | 72.0 | 82.0 | 88.0 | 93.0 | 96.0 | 98.0 | 99.0 | 100.0 | 100.0 | 100 |
| 100 | 0 | 0.0 | 0.0 | 0.0 | 1.0 | 1.0 | 2.0 | 3.0 | 5.0 | 9.0 | 15.0 | 27.0 | 38.0 | 50.0 | 62.0 | 74.0 | 84.0 | 91.0 | 95.0 | 97.0 | 98.0 | 99.0 | 99.0 | 100.0 | 100 |
| 101 | 0 | 0.0 | 0.0 | 1.0 | 2.0 | 3.0 | 4.0 | 6.0 | 9.0 | 14.0 | 20.0 | 28.0 | 39.0 | 52.0 | 63.0 | 72.0 | 80.0 | 87.0 | 91.0 | 94.0 | 97.0 | 98.0 | 99.0 | 100.0 | 100 |
| 102 | 0 | 0.0 | 1.0 | 2.0 | 3.0 | 4.0 | 6.0 | 8.0 | 11.0 | 15.0 | 22.0 | 31.0 | 40.0 | 49.0 | 59.0 | 69.0 | 78.0 | 85.0 | 91.0 | 94.0 | 96.0 | 98.0 | 99.0 | 100.0 | 100 |
| 103 | 0 | 1.0 | 2.0 | 3.0 | 4.0 | 6.0 | 8.0 | 10.0 | 14.0 | 18.0 | 25.0 | 34.0 | 45.0 | 56.0 | 64.0 | 72.0 | 79.0 | 84.0 | 89.0 | 92.0 | 95.0 | 97.0 | 98.0 | 99.0 | 100 |
| 104 | 0 | 2.0 | 3.0 | 5.0 | 7.0 | 10.0 | 13.0 | 16.0 | 19.0 | 23.0 | 27.0 | 34.0 | 44.0 | 54.0 | 63.0 | 72.0 | 80.0 | 85.0 | 89.0 | 91.0 | 93.0 | 95.0 | 96.0 | 98.0 | 100 |
| 105 | 0 | 1.0 | 3.0 | 6.0 | 9.0 | 12.0 | 16.0 | 21.0 | 26.0 | 31.0 | 37.0 | 43.0 | 50.0 | 57.0 | 64.0 | 71.0 | 77.0 | 81.0 | 85.0 | 88.0 | 91.0 | 93.0 | 95.0 | 97.0 | 100 |
| 106 | 0 | 3.0 | 6.0 | 9.0 | 13.0 | 17.0 | 21.0 | 27.0 | 33.0 | 38.0 | 44.0 | 49.0 | 55.0 | 61.0 | 67.0 | 71.0 | 75.0 | 78.0 | 81.0 | 84.0 | 86.0 | 90.0 | 94.0 | 97.0 | 100 |
| 107 | 0 | 3.0 | 5.0 | 7.0 | 10.0 | 14.0 | 18.0 | 23.0 | 27.0 | 31.0 | 35.0 | 39.0 | 45.0 | 53.0 | 60.0 | 67.0 | 74.0 | 80.0 | 84.0 | 86.0 | 88.0 | 90.0 | 93.0 | 95.0 | 100 |
| 108 | 0 | 3.0 | 6.0 | 9.0 | 12.0 | 16.0 | 20.0 | 24.0 | 28.0 | 33.0 | 38.0 | 43.0 | 50.0 | 59.0 | 69.0 | 75.0 | 80.0 | 84.0 | 87.0 | 90.0 | 92.0 | 94.0 | 96.0 | 98.0 | 100 |
| 109 | 0 | 3.0 | 6.0 | 10.0 | 13.0 | 16.0 | 19.0 | 23.0 | 26.0 | 29.0 | 33.0 | 39.0 | 47.0 | 58.0 | 68.0 | 75.0 | 80.0 | 83.0 | 86.0 | 88.0 | 90.0 | 92.0 | 95.0 | 97.0 | 100 |
| 110 | 0 | 1.0 | 3.0 | 5.0 | 7.0 | 9.0 | 12.0 | 15.0 | 18.0 | 21.0 | 25.0 | 29.0 | 36.0 | 45.0 | 56.0 | 68.0 | 77.0 | 83.0 | 88.0 | 91.0 | 93.0 | 95.0 | 97.0 | 99.0 | 100 |
| 111 | 0 | 1.0 | 2.0 | 3.0 | 4.0 | 5.0 | 6.0 | 8.0 | 11.0 | 15.0 | 20.0 | 28.0 | 41.0 | 54.0 | 65.0 | 74.0 | 82.0 | 87.0 | 92.0 | 94.0 | 96.0 | 97.0 | 98.0 | 99.0 | 100 |
| 112 | 0 | 0.0 | 0.0 | 1.0 | 2.0 | 3.0 | 4.0 | 5.0 | 7.0 | 12.0 | 17.0 | 24.0 | 33.0 | 42.0 | 55.0 | 67.0 | 76.0 | 83.0 | 89.0 | 92.0 | 94.0 | 96.0 | 98.0 | 99.0 | 100 |
| 113 | 0 | 1.0 | 2.0 | 3.0 | 4.0 | 5.0 | 6.0 | 8.0 | 10.0 | 13.0 | 17.0 | 22.0 | 31.0 | 42.0 | 52.0 | 60.0 | 68.0 | 75.0 | 80.0 | 85.0 | 89.0 | 92.0 | 96.0 | 98.0 | 100 |
| 114 | 0 | 1.0 | 2.0 | 4.0 | 6.0 | 8.0 | 11.0 | 13.0 | 15.0 | 18.0 | 21.0 | 26.0 | 32.0 | 38.0 | 46.0 | 55.0 | 64.0 | 71.0 | 77.0 | 81.0 | 85.0 | 89.0 | 93.0 | 97.0 | 100 |
| 115 | 0 | 1.0 | 2.0 | 3.0 | 4.0 | 5.0 | 6.0 | 8.0 | 10.0 | 14.0 | 19.0 | 26.0 | 34.0 | 45.0 | 56.0 | 66.0 | 76.0 | 82.0 | 86.0 | 90.0 | 93.0 | 95.0 | 97.0 | 99.0 | 100 |

| Month | Jan | Jan | Jan | Feb | Mar | Mar | Mar | Apr | Apr | May | May | Jun | Jun | Jul | Jul | Aug | Aug | Sept | Sept | Oct | Oct | Nov | Nov | Dec | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Day | 1 | 16 | 31 | 15 | 1 | 16 | 31 | 15 | 30 | 15 | 30 | 14 | 29 | 14 | 29 | 13 | 28 | 12 | 27 | 12 | 27 | 11 | 26 | 11 | 31 |
| El Zone | | | | | | | | | | | | | | | | | | | | | | | | | |
| 116 | 0 | 1.0 | 3.0 | 5.0 | 7.0 | 9.0 | 12.0 | 15.0 | 18.0 | 21.0 | 25.0 | 29.0 | 36.0 | 45.0 | 56.0 | 68.0 | 77.0 | 83.0 | 88.0 | 91.0 | 93.0 | 95.0 | 97.0 | 99.0 | 100 |
| 117 | 0 | 1.0 | 2.0 | 3.0 | 4.0 | 5.0 | 7.0 | 9.0 | 11.0 | 14.0 | 17.0 | 22.0 | 31.0 | 42.0 | 54.0 | 65.0 | 74.0 | 83.0 | 89.0 | 92.0 | 95.0 | 97.0 | 98.0 | 99.0 | 100 |
| 118 | 0 | 1.0 | 2.0 | 3.0 | 5.0 | 7.0 | 10.0 | 14.0 | 18.0 | 22.0 | 27.0 | 32.0 | 37.0 | 46.0 | 58.0 | 69.0 | 80.0 | 89.0 | 93.0 | 94.0 | 95.0 | 96.0 | 97.0 | 97.0 | 100 |
| 119 | 0 | 2.0 | 4.0 | 6.0 | 8.0 | 12.0 | 16.0 | 20.0 | 25.0 | 30.0 | 35.0 | 41.0 | 47.0 | 56.0 | 67.0 | 75.0 | 81.0 | 85.0 | 87.0 | 89.0 | 91.0 | 93.0 | 95.0 | 97.0 | 100 |
| 120 | 0 | 1.0 | 2.0 | 4.0 | 6.0 | 7.0 | 9.0 | 12.0 | 15.0 | 18.0 | 23.0 | 31.0 | 40.0 | 48.0 | 57.0 | 63.0 | 72.0 | 78.0 | 88.0 | 92.0 | 96.0 | 97.0 | 98.0 | 99.0 | 100 |
| 121 | 0 | 8.0 | 16.0 | 25.0 | 33.0 | 41.0 | 46.0 | 50.0 | 53.0 | 54.0 | 55.0 | 56.0 | 56.5 | 57.0 | 57.8 | 58.0 | 58.8 | 60.0 | 61.0 | 63.0 | 66.5 | 72.0 | 80.0 | 90.0 | 100 |
| 122 | 0 | 7.0 | 14.0 | 20.0 | 25.5 | 33.5 | 38.0 | 43.0 | 46.0 | 50.0 | 52.5 | 54.5 | 56.0 | 58.0 | 59.0 | 60.0 | 61.5 | 63.0 | 65.0 | 68.0 | 72.0 | 79.0 | 86.0 | 93.0 | 100 |
| 123 | 0 | 4.0 | 8.0 | 12.0 | 17.0 | 23.0 | 29.0 | 34.0 | 38.0 | 44.0 | 49.0 | 53.0 | 56.0 | 59.0 | 62.0 | 65.0 | 69.0 | 72.0 | 75.0 | 79.0 | 83.0 | 88.0 | 93.0 | 96.0 | 100 |
| 124 | 0 | 4.0 | 9.0 | 15.0 | 23.0 | 29.0 | 34.0 | 40.0 | 44.0 | 48.0 | 50.0 | 51.0 | 52.0 | 53.0 | 55.0 | 57.0 | 60.0 | 62.0 | 64.0 | 67.0 | 72.0 | 80.0 | 88.0 | 95.0 | 100 |
| 125 | 0 | 7.0 | 12.0 | 17.0 | 24.0 | 30.0 | 39.0 | 45.0 | 50.0 | 53.0 | 55.0 | 56.0 | 57.0 | 58.0 | 59.0 | 61.0 | 62.0 | 63.0 | 64.0 | 66.0 | 70.0 | 77.0 | 84.0 | 92.0 | 100 |
| 126 | 0 | 9.0 | 16.0 | 23.0 | 30.0 | 37.0 | 43.0 | 47.0 | 50.0 | 52.0 | 54.0 | 55.0 | 56.0 | 57.0 | 58.0 | 59.0 | 60.0 | 62.0 | 64.0 | 67.0 | 71.0 | 77.0 | 86.0 | 93.0 | 100 |
| 127 | 0 | 8.0 | 15.0 | 22.0 | 28.0 | 33.0 | 38.0 | 42.0 | 46.0 | 50.0 | 52.0 | 53.0 | 53.0 | 53.0 | 53.0 | 54.0 | 55.0 | 57.0 | 59.0 | 63.0 | 68.0 | 75.0 | 83.0 | 92.0 | 100 |
| 128 | 0 | 8.0 | 15.0 | 22.0 | 29.0 | 34.0 | 40.0 | 45.0 | 48.0 | 51.0 | 54.0 | 57.0 | 59.0 | 62.0 | 63.0 | 64.0 | 65.0 | 66.0 | 67.0 | 69.0 | 72.0 | 76.0 | 83.0 | 91.0 | 100 |
| 129 | 0 | 9.0 | 16.0 | 22.0 | 27.0 | 32.0 | 37.0 | 41.0 | 45.0 | 48.0 | 51.0 | 53.0 | 55.0 | 56.0 | 57.0 | 57.0 | 58.0 | 59.0 | 61.0 | 64.0 | 68.0 | 73.0 | 79.0 | 89.0 | 100 |
| 130 | 0 | 10.0 | 20.0 | 28.0 | 35.0 | 41.0 | 46.0 | 49.0 | 51.0 | 53.0 | 55.0 | 56.0 | 56.0 | 57.0 | 58.0 | 59.0 | 60.0 | 61.0 | 62.0 | 65.0 | 69.0 | 74.0 | 81.0 | 90.0 | 100 |
| 131 | 0 | 8.0 | 15.0 | 22.0 | 28.0 | 33.0 | 38.0 | 41.0 | 44.0 | 47.0 | 49.0 | 51.0 | 53.0 | 55.0 | 56.0 | 58.0 | 59.0 | 60.0 | 63.0 | 65.0 | 69.0 | 75.0 | 84.0 | 92.0 | 100 |
| 132 | 0 | 10.0 | 18.0 | 25.0 | 29.0 | 33.0 | 36.0 | 39.0 | 41.0 | 42.0 | 44.0 | 45.0 | 46.0 | 47.0 | 48.0 | 49.0 | 51.0 | 53.0 | 56.0 | 59.0 | 64.0 | 70.0 | 80.0 | 90.0 | 100 |
| 133 | 0 | 8.0 | 16.0 | 24.0 | 32.0 | 40.0 | 46.0 | 51.0 | 54.0 | 56.0 | 57.0 | 58.0 | 58.0 | 59.0 | 59.0 | 60.0 | 60.0 | 61.0 | 62.0 | 64.0 | 68.0 | 74.0 | 83.0 | 91.0 | 100 |
| 134 | 0 | 12.0 | 22.0 | 31.0 | 39.0 | 45.0 | 49.0 | 52.0 | 54.0 | 55.0 | 56.0 | 56.0 | 56.0 | 56.0 | 57.0 | 57.0 | 57.0 | 57.0 | 58.0 | 59.0 | 62.0 | 68.0 | 77.0 | 88.0 | 100 |
| 135 | 0 | 7.0 | 15.0 | 22.0 | 30.0 | 37.0 | 43.0 | 49.0 | 53.0 | 55.0 | 57.0 | 58.0 | 59.0 | 60.0 | 61.0 | 62.0 | 63.0 | 65.0 | 67.0 | 70.0 | 74.0 | 79.0 | 85.0 | 92.0 | 100 |
| 136 | 0 | 11.0 | 21.0 | 29.0 | 37.0 | 44.0 | 50.0 | 55.0 | 57.0 | 59.0 | 60.0 | 60.0 | 60.0 | 60.0 | 61.0 | 61.0 | 61.0 | 62.0 | 63.0 | 64.0 | 67.0 | 71.0 | 78.0 | 89.0 | 100 |
| 137 | 0 | 10.0 | 18.0 | 25.0 | 30.0 | 39.0 | 46.0 | 51.0 | 54.0 | 57.0 | 58.0 | 59.0 | 59.0 | 60.0 | 60.0 | 60.0 | 61.0 | 62.0 | 63.0 | 64.0 | 67.0 | 72.0 | 80.0 | 90.0 | 100 |
| 138 | 0 | 11.0 | 22.0 | 31.0 | 39.0 | 46.0 | 52.0 | 56.0 | 58.0 | 59.0 | 60.0 | 61.0 | 61.0 | 61.0 | 61.0 | 62.0 | 62.0 | 62.0 | 63.0 | 64.0 | 66.0 | 71.0 | 78.0 | 89.0 | 100 |
| 139 | 0 | 8.0 | 14.0 | 20.0 | 25.0 | 32.0 | 37.0 | 42.0 | 47.0 | 50.0 | 53.0 | 55.0 | 56.0 | 58.0 | 59.0 | 61.0 | 63.0 | 64.0 | 66.0 | 68.0 | 71.0 | 76.0 | 85.0 | 93.0 | 100 |
| 140 | 0 | 13.0 | 18.0 | 43.0 | 56.0 | 65.0 | 69.0 | 69.4 | 69.7 | 70.1 | 70.4 | 70.8 | 71.1 | 71.5 | 71.9 | 72.2 | 72.6 | 73.0 | 73.3 | 73.6 | 74.0 | 76.0 | 81.0 | 89.0 | 100 |