DEPARTMENT OF THE AIR FORCE
AIR FORCE REAL PROPERTY AGENCY

RECEIVED
BUREAU OF EASTERN REMEDIAL ACTION

DATE: June 7, 2004

MEMORANDUM FOR SEE DISTRIBUTION LIST

FROM: AFRPA/DA-Griffiss
Environmental Section
153 Brooks Road
Rome, NY 13441

SUBJECT: Remedial Action Work Plans for the Remediation and Restoration of Three Mile Creek

1. Attached please find the contractor's Remedial Action Work Plans dated June 2004 for the remediation and restoration of Three Mile Creek. The remedial action work plans include the following items:

a. Project Work Plan
b. Environmental Protection Plan
c. Contractors Quality Control Plan
d. Site Safety and Health Plan
e. Erosion and Sediment Control Plan
f. Sampling and Analysis Plan

Please note that the Final Design Basis Report and Technical Specifications for Three Mile Creek dated May 2004 was used to develop the above plans.

2. The Three Mile Creek remedial action contract should be issued within the next few weeks with a projected start of construction scheduled for the end of June 2004.

3. If you have any questions, please contact Mike Wojnas at (315) 330-2275.

MICHAEL F. MCDERMOTT
BRAC Environmental Coordinator

Attachments:

Remedial Action Work Plans, TMC RA dated June 2004

FINAL

WORK PLAN

**REMEDIAL ACTION AT THREE MILE CREEK
FORMER GRIFFISS AIR FORCE BASE
ROME, NEW YORK**

**Preplaced Remedial Action Contract Number DACA41-01-D-0003
Task Order 0004**

Prepared for:

**U.S. ARMY CORPS OF ENGINEERS
KANSAS CITY DISTRICT
Federal Building 601 E. 12th Street
Kansas City, Missouri 64106-2896**

Prepared by:

**CAPE ENVIRONMENTAL
91 Noll Street
Waukegan, Illinois 60085**

**CAPE Project Number 10303.004
June 2004**

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LIST OF ABBREVIATIONS AND ACRONYMS

°F	degree Fahrenheit
µg/kg	micrograms per kilogram
ACGIH	American Conference of Governmental Industrial Hygienists
AFB	Air Force Base
AFRPA	Air Force Real Property Agency
AHA	Activity Hazard Analysis
ANSI	American National Standards Institute
AOC	Areas of Concern
APR	air-purifying respirator
bpm	beats per minute
BRAC	Base Closure and Realignment Act
BWMP	Basewide Wetlands Management Plan
CAPE	Cape Environmental
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CGI	combustible gas indicator
CHSM	Certified Health and Safety Manager
CIH	Certified Industrial Hygienist
CPR	cardiopulmonary resuscitation
CQC	Contractor Quality Control
CQCSM	Contractor Quality Control System Manager
CRZ	Contaminant Reduction Zone
CY	cubic yard
dBA	decibels on the A-weighted scale
DBR	Design Basis Report
DERP	Defense Environmental Restoration Program
DFW	definable feature of work
DOD	U.S. Department of Defense
DOT	U.S. Department of Transportation
DQCR	Daily Quality Control Report
E&E	Ecology and Environmental Engineering, Inc.
ECM	erosion control matting
EPA	U.S. Environmental Protection Agency
EPP	Environmental Protection Plan
ESCP	Erosion and Sediment Control Plan
eV	electron volts

EZ	Exclusion Zone
FAR	Federal Acquisition Regulations
FFA	Federal Facilities Agreement
FSP	Field Sampling Plan
FVR	Field Variance Report
GFCI	ground fault circuit interrupter
HazCom	Hazard Communication
HazWOPER	Hazardous Waste Operations and Emergency Response
HEPA	high-efficiency particulate air (filter)
HR	heart rate
IRP	Installation Restoration Program
LEL	lower explosivity limit
mg/kg	milligrams per kilogram
mg/kg	milligrams per kilogram
mg/m^3	milligrams per cubic meter
MSDS	material safety data sheets
NCR	Nonconformance Report
NDE	nondestructive examination
ng/kg	nanograms per kilogram
NYCRR	New York Sate Code of Rules and Regulations
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OSHA	Occupational Safety and Health Administration
OV	organic vapor
PAH	polyaromatic hydrocarbons
PCB	polychlorinated byphenyls
PE	Professional Engineer
PEL	permissible exposure limits
PG	Professional Geologist
PGM	Program Manager
PID	photoionization detector
PM	Project Manager
PPE	personal protective equipment
ppm	parts per million
PRAC	Preplaced Remedial Action Contract
psi	pounds per square inch

PVC	polyvinyl chloride
QA	quality assurance
QC	quality control
RCRA	Resource Conservation and Recovery Act
S&H	safety and health
SAP	Sampling and Analysis Plan
SARA	Superfund Amendments and Reauthorization Act
SCBA	Self-Contained Breathing Apparatus
SHM	Safety and Health Manager
SOP	standard operating procedure
SOW	scope of work
SSHO	Site Safety and Health Officer
SSHP	Site Safety and Health Plan
STEL	short-term exposure limit
SVOC	semivolatile organic compound
TCLP	toxicity characteristic leaching procedure
TLV	threshold limit values
TMC	Three Mile Creek
TSCA	Toxic Substances Control Act
TSDF	treatment, storage, and disposal facility
TWA	time-weighted average
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
VOC	volatile organic compound
WAD	Work Authorization Document
WVN	Work Variation Notification

1.0 INTRODUCTION

This work plan provides overall guidance for the successful completion of the remedial action at Three Mile Creek (TMC) at the former Griffiss Air Force Base (AFB) in Rome, New York. Activities described herein are in accordance with the requirements of the U.S. Army Corps of Engineers (USACE), Kansas City District, Contract Number DACA41-01-D-0003, Task Order 0004. This work plan applies only to activities performed by Cape Environmental (CAPE) and its subcontractors under the above-referenced contract and task order.

A Design Basis Report (DBR), prepared by Ecology and Environment Engineering, Inc. (E&E) under contract to the USACE, Kansas City District, describes the engineering design for excavation of contaminated sediments from TMC and creation of a mitigation wetland in the TMC floodplain. E&E's design was based on the combined analyses documented in the *Final Three Mile Creek Feasibility Study Addendum* (E&E, 2002a) and the *Basewide Wetlands Management Plan* (BWMP) (E&E, 2002b).

CAPE's scope of work (SOW) includes implementation of the engineering design in accordance with the *Final Design Basis Report for Three Mile Creek, Former Griffiss Air Force* Base (E&E, 2004). This work plan has been prepared by CAPE to provide overall guidance for the successful completion of fieldwork described in the SOW. It also describes the coordination activities and sequence of events necessary to ensure the proper and timely completion of work.

1.1 Objectives

The primary objective of the proposed remedial action is to remediate sediments located within TMC by means of excavation. Areas of excavation will include the entire length of the on-base portion of the creek channel (including the North Channel and the Landfill 5 Tributary), berms that are adjacent to the on-base portion of TMC, 16 silt deposits that are located in the off-base portion of the creek, and an off-base pond that receives flow from the creek.

A concurrent ecological objective is to construct a mitigation wetland on the TMC floodplain, as established in the BWMP. The mitigation goal is to restore, enhance, and create at least 5 acres of wetlands within the historic floodplain wetland of TMC and to restore the TMC channel.

1.2 Regulatory Framework

In 1987, the U.S. Environmental Protection Agency (EPA) added Griffiss AFB to the National Priorities List, a list of hazardous waste sites in the nation slated for cleanup. In 1990, the Air Force, the New York State Department of Environmental Conservation (NYSDEC), and the EPA entered into a Federal Facilities Agreement (FFA). In 1993, Griffiss AFB was designated for realignment under the federal Base Closure and Realignment Act (BRAC) and was subsequently deactivated.

This remedial action is being conducted under the U.S. Department of Defense (DOD) Defense Environmental Restoration Program (DERP). The DERP was established under the Superfund Amendments and Reauthorization Act (SARA), and its activities must be consistent with Section 120 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Within the DERP, DOD created an Installation Restoration Program (IRP), which involves identifying, investigating, and remediating sites impacted by hazardous substances.

Through the IRP, 62 potentially contaminated sites were identified at Griffiss AFB. Of these 62 sites, 31 are designated as areas of concern (AOCs) and are being investigated and remediated under the FFA. TMC is considered one of the 31 AOCs.

2.0 BACKGROUND

2.1 Site Location and Description

Griffiss AFB is a former U.S. Air Force installation that encompasses 3,552 acres in the lowlands of the Mohawk River Valley in Rome, Oneida County, New York (see Figure 1). Griffiss AFB is located approximately 2 miles northeast of Rome, Oneida County, New York, and TMC is located in the southern portion of the base. TMC is approximately 10,000 feet in length from its headwaters to its outfall. The headwaters of TMC originate at two stormwater discharge points (two 60-inch culverts) near the electrical power substation on the south side of Ellsworth Road, just east of the former Wright Drive. Along this length, the creek is up to 10 feet wide in some areas, with water depths ranging from 2 inches to 2 feet. The creek flows toward the southeast across the base, continues off base through pastureland and then wetland, then crosses under New York State (NYS) Route 365 and flows into a pond located just north of NYS Route 49. TMC eventually crosses under NYS Route 49 and empties into the New York State Barge Canal approximately 1 mile downstream of the installation boundary. The general location of TMC in relation to the base is also shown in Figure 1.

2.2 Site History and Conditions

The TMC AOC was a natural stream before the construction of Griffiss AFB. TMC was dredged and straightened in 1942 during the initial stages of base construction and again at least once in 1962 to accommodate discharges from the base stormwater collection system. Significant portions of the dredged material were sidecast along the banks during the construction of the creek channel, which resulted in the berms that are present today.

TMC receives both surface water runoff and groundwater from the surrounding watershed, including the electrical power substation, Hardfill Areas 49c and 49d, former Landfill 4, Landfills 5 and 6, and stormwater drainage that reportedly contains discharges from floor drains. A drainage ditch adjacent to Hardfill Area 49d, northeast of Landfill 5, forms a tributary to TMC.

2.3 Current Site Conditions and Projected Future Use

TMC is classified as a Class C stream according to the New York Code of Rules and Regulations (NYCRR) Part 701. The best usage for Class C streams is fishing, where waters are suitable for fish propagation and survival. Based on an Aquatic Habitat Assessment performed in 1993, at least 12 species of fish are found in TMC. Due to the presence of polychlorinated biphenyls (PCBs) in fish tissue, the New York State

Department of Health (NYSDOH) posted a fish consumption advisory for TMC in 1990. NYSDOH recommends that people eat no more than one meal per month of white sucker from this creek.

Before the development of Griffiss AFB, the TMC floodplain was typical of marsh and wetland headwater drainages. During and after development of the base, the floodplain was modified to improve drainage. Future use will continue as a drainage area and floodplain.

3.0 GENERAL REQUIREMENTS

3.1 Facility Access

There is no site security at Griffiss AFB; therefore, workers will not need to obtain site access permits to enter the former base. Delivery personnel will also be able to freely enter support areas of the site. Main roads near the site include NYS Routes 49 and 365. NYS Route 365 runs just north of the pond, and Route 49 runs south of the pond. Ellsworth Road provides access to the upstream portions of TMC, and the other portions of the creek can be accessed by new and existing site roads. CAPE's access routes into the facility will be confirmed at the start of construction work.

3.2 Site Controls

CAPE will erect temporary construction barriers (i.e., high-visibility fencing) around active work sites to deter entry by unauthorized personnel. Fences will be constructed of orange construction safety fence fabric hung on steel posts set at 10-foot intervals using electrical ties. Fencing will be used in circumstances where heavy or moving equipment is in close proximity to public roads or high-traffic areas, and to prevent inadvertent entry to sites where equipment is being used. Safety fences may also be erected around any open excavations in areas where there is potential for vehicular or foot traffic.

CAPE will keep at least one person at the job site at all times during work hours for site surveillance. Heavy equipment will be parked in designated areas each night and the keys will be removed. All tools and equipment will be properly stored and work areas will be maintained in an organized manner.

3.3 Protection of Existing Structures and Utility Clearances

CAPE will take necessary measures to protect existing structures, appurtenances, and utilities that may be affected by removal and cleanup activities. CAPE will submit a Base Digging Permit Request to the USACE onsite representative at least 2 weeks before beginning any intrusive work so that all base utilities are marked. Before intrusive work is initiated at each work area, a site inspection will be performed to identify potential site hazards, such as overhead power lines and structures or other features that require special attention. At least 2 days before intrusive field activities, CAPE will also contact Dig Safely New York (800-962-7962) to schedule utility locating services. Utility markings will be maintained throughout construction activities. CAPE will avoid all utilities and protect any utilities that may be impacted by the corrective measures.

3.4 Site Conditions Verification

Before initiating onsite construction activities at each of the work sites, CAPE and the onsite USACE representative may perform a walk-through survey to verify site conditions, including conditions of trees, shrubs, and grassed areas adjacent to the work site, storage areas, and access routes. If the walk-through is conducted, CAPE will prepare a brief report with photographs detailing the findings. CAPE and the onsite USACE representative will both sign the report upon mutual agreement as to its accuracy and completeness.

3.5 Safety Requirements

CAPE will take necessary preventive measures for the safe handling of contaminated soil. CAPE's Emergency Response Plan is contained in the Site Safety and Health Plan (SSHP), Section 8 of this work plan. The SSHP explains the operations necessary to ensure compliance with federal Occupational Safety and Health Administration (OSHA), American National Standards Institute (ANSI), and USACE safety regulations.

3.6 Decontamination Procedures

Decontamination of personnel and/or equipment will be completed in accordance with requirements stated in 29 Code of Federal Regulations (CFR) 1910.120 and other applicable state, local, or federal requirements as detailed in the SSHP (see Section 8.6).

3.6.1 Decontamination Requirements

Decontamination will be required of all personnel, equipment, instrumentation, and heavy equipment before exiting from an Exclusion Zone (EZ). The EZ will be established for each site by the Site Safety and Health Officer (SSHO), based on baseline monitoring, extent of contamination, weather conditions, and other factors that may influence work conditions. Thorough decontamination of heavy equipment used in the EZ will be required before its departure off site. Equipment will be inspected and determined "clean" by an authorized inspector before removal from the Contamination Reduction Zone (CRZ). The inspection will be documented by the SSHO or Quality Control (QC) Officer on an inspection form and filed at the site.

3.6.2 Means of Decontamination

Decontamination facilities will be located in the CRZ. Site, physical, weather, and other conditions will determine exact locations. The SSHO will select and determine the exact location of each CRZ after mobilization to the site but before construction activities begin. Decontamination procedures will be an organized process, with a series of stations to provide the maximum level of decontamination. The decontamination area will be clearly defined and equipped with necessary equipment (e.g., tubs, brushes, and cleansing solutions for adequate decontamination), instrumentation, and air monitoring equipment to ensure proper decontamination is completed.

Heavy equipment will be decontaminated by dry means (e.g., brushes, shovels) and/or with a power washer and water-soap solution. If dry decontamination measures are implemented, soil will be collected at the point of decontamination and handled along with contaminated sediments for testing and onsite disposal, if appropriate. Decontamination pads will be constructed at various locations along the EZ and used whenever wet decontamination procedures are required. Construction of the decontamination pads will consist of grading of the ground surface (an area approximately 25 feet by 25 feet in dimension) followed by construction of earthen berms. A 20-mil plastic liner will be installed within the 25- by 25-foot area and anchored outside the berms with sand bags or other acceptable means. The surface of the decontamination pad(s) will be covered with coarse gravel and sloped to a low point for the collection of decontamination water. Water accumulated within the decontamination pad(s) will be pumped on an as-needed basis to an onsite storage tank, then sampled in accordance with the Sampling and Analysis Plan (SAP) to determine appropriate disposal options. The decontamination pad(s) will be covered at the end of each work shift to prevent the accumulation of rainwater.

Field equipment, such as probes, tools, etc., will be decontaminated with dry methods or with a solution of biodegradable detergent and water and rinsed with tap water from the base water supply. Distilled water will be used to rinse reusable sampling equipment such as trowels, scoops, and bailers. Rinsate will be placed in drums or tanks and staged for disposal.

Heavy equipment will be decontaminated adjacent to the EZ and CRZ for each area using the following procedures:

- Dry decontamination:
  - Using shovels and brooms, remove large dirt clods and debris. If possible, lift and spin tracks to loosen material
- Wet pressure-washing decontamination:
  - Using a pressure washer, direct-spray all areas that have been exposed to contaminated soils including tires, tracks, and buckets. Make sure all visible dirt is removed
  - Rinse all areas thoroughly
  - Visually inspect all areas
  - Collect and containerize decontamination waste.

Personnel assigned to the decontamination process will decontaminate equipment and reusable protective gear. Decontamination personnel will be dressed in the same level of personal protective equipment (PPE) as the workers in the EZ. After equipment has been decontaminated, and before it leaves the work site, PCB wipe tests will be analyzed from all rental equipment that comes into contact with PCB-contaminated sediments. Analytical results will be reviewed before equipment is released from the site.

3.6.2.1 Temporary Exit from the Exclusion Zone. Personnel, who temporarily exit the EZ for breaks, lunches, etc., will be required to perform the following procedures within the CRZ:

- Remove PPE before entering the Support Zone
- Rinse gloves with soap and water to remove excess contamination
- Remove gloves, protective suits, and booties, as appropriate
- Thoroughly wash hands and face
- Store protective clothing in a way to avoid potentially contaminating inner surfaces.

3.6.2.2 Permanent Exit from the Exclusion Zone. Permanent exit from the EZ to leave the site requires personnel to perform the following procedures within the CRZ:

- Rinse gloves with soap and water to remove excess contamination
- All gloves, protective suits, and booties will be cleaned, removed, and stored or disposed of if not reusable
- Hands and face will be thoroughly washed as soon as possible after removing protective outer garments and before putting on street clothes.

In an emergency, if personnel need to be transported off site for medical attention, the employee will be decontaminated before leaving the site. If the emergency is life threatening, measures will be taken to contain contamination on the employee, and the paramedics and receiving medical facility will be alerted to the situation.

3.6.3 Disposal of Decontamination Materials

Contaminated materials (e.g., liquid rinsate and PPE) resulting from the decontamination process will be placed in drums or tanks for staging before disposal. Refer to Section 6.4 for specific details.

3.7 Permits and Licenses

Under non-CERCLA remedial actions, various permits are required for a project of this nature. Typical requirements include, but are not limited to, the issuance of permits under Sections 401, 402, and 404 of the Clean Water Act, the submittal of a Notice of Intent and Stormwater Pollution Prevention Plan under the Stormwater General Permit, and a Protection of Waters Permit in accordance with Title 5 of Article 15 of the Environmental Conservation Law and 6 NYCRR Part 608. Because remedial actions at this site are being conducted under CERCLA, specific permits are not required. Instead, the intent of each of the typical permits will be satisfied during implementation of the project.

4.0 PROJECT ORGANIZATION

This section identifies key project personnel and their specific roles and responsibilities for each activity. It identifies and defines responsibilities of the principal decision-makers and all persons responsible for implementing the work (see Appendix A, Organizational Chart).

4.1 Air Force Real Property Agency

Mike Wojnas is the Air Force Real Property Agency (AFRPA) point of contact.

4.2 USACE, New York District

Joe Wojnas is the USACE New York District Project Engineer.

4.3 USACE, Kansas City District

Nancy Higginbotham, the USACE Project Manager (PM), will oversee all aspects of the work.

The USACE Project Engineer, Jean Schumacher, is responsible for project quality, as well as budget and schedule control.

4.4 NYSDEC

NYSDEC has overall responsibility to ensure the environmental program at the former Griffiss AFB is in compliance with the New York environmental program.

4.5 U.S. EPA

The U.S. EPA will be involved in the review and approval process since this is an FFA site.

4.6 U.S. Fish and Wildlife Service

Because the remedial actions are occurring within the channel of a creek that supports fish propagation, the U.S. Fish and Wildlife Service (USFWS) has been involved in approval of the design activities. USFWS does not have approval authority, but they will be involved in the review process and will provide technical assistance to the EPA.

4.7 Cape Environmental

The following subsections describe CAPE personnel involved with this project and their responsibilities.

4.7.1 Program Manager

Michael Healy, Professional Geologist (PG), will serve as the Program Manager (PGM) and is the ultimate channel of communication between the USACE and the project team on contractual matters. He is responsible for ensuring success on the Kansas City Preplaced Remedial Action Contract (PRAC) Program. The PGM's duties include, but are not limited to, the following:

- Establishing and interpreting program policies
- Responsible for overall contract management including cost, schedule, and technical quality
- Ensuring timely submittals
- Ensuring the availability of resources (personnel, equipment, subcontractors, and services)
- Preparing long-range program plans
- Identifying and avoiding potential problems or conflicts
- Ensuring safety and quality of all work.

The PGM has ultimate authority and responsibility to establish and maintain program administration, control programs, and procedures.

4.7.2 Project Manager

Charles Williams will serve as the PM and will have overall responsibility, authority, and accountability for the project. The PM will be responsible for meeting all contractual requirements, ensuring that all work is executed in conformance with approved plans, and informing the onsite USACE representative of cost and schedule variances. The Project Controls Team will support the PM in tracking and producing progress and earned value reports. A Project Controls Specialist will support the PM. The PM will serve as the primary point of contact with the USACE PM for this project on project-specific issues, and will work directly with the management and technical staff to maintain safety, technical quality, and the budget and schedule. The PM will notify the USACE in writing when 75 percent of the overall task order budget is nearly reached. The PM reports to the PGM. The PM's duties include, but are not limited to, the following:

- Managing all project work assignments, technical staff performance, cost control, schedule control, and technical quality of the work
- Tracking and reporting cost information, including any potential individual Work Authorization Document (WAD) overrun(s) before the overrun(s) occurring
- Interacting with state and local governments and federal agencies on regulatory compliance and related issues, as directed by USACE
- Ensuring chemical data quality objectives are met

- Ensuring construction QC is implemented

- Managing all dedicated and competitively procured subcontract activities through completion

- Coordinating the development, implementation, and enforcement of all plans

- Coordinating report writing

- Ensuring the necessary resources are available for this project to be completed safely and in compliance with the SSHP, USACE requirements, and OSHA regulations

- Ensuring that project activities are planned and executed in accordance with the applicable environmental protection requirements as stated in this work plan

- Providing additional management or technical support when needed

- Serving as final reviewer on all technical documents produced as a result of this project.

4.7.3 Site Superintendent

The Site Superintendent and will be responsible for coordinating and managing all site-related labor, materials, supplies, equipment, and subcontract services. He will work closely with the SSHO and the Contractor Quality Control System Manager (CQCSM). The Site Superintendent reports to the PM. The Site Superintendent's duties include, but are not limited to, the following:

- Directing all construction efforts associated with the remedial actions including, but not limited to, excavation, soil segregation, load-out, transportation, stockpiling, waste characterization, and directing the disposal of soils, debris, and wastewater

- Ensuring that CAPE and its subcontractors conduct their activities in conformance with contract requirements, site-specific plans and procedures, applicable environmental laws and regulations, and applicable U.S. Department of Transportation (DOT) regulations for transporting wastes.

4.7.4 Project Engineer

Amanda Easley will serve as the Project Engineer and will ensure that all engineering methods prescribed in this work plan are in compliance with local, state, federal, and CAPE requirements. The Project Engineer will work closely with the Site Superintendent, the CQCSM, and the SSHO. The Project Engineer will report to the PM. The Project Engineer's duties include, but are not limited to, the following:

- Writing the project plans
- Providing technical direction during construction activities
- Acting as the liaison between onsite and offsite engineering personnel
- Providing timely response to construction needs, allowing adherence to the schedule.

4.7.5 Quality Assurance Director

Chris Caviness, Professional Engineer (PE), CAPE's Quality Assurance (QA) Director, is responsible for providing direction on all quality matters. He is responsible for planning, developing, implementing, and ensuring the effectiveness of the Corporate QA/QC program. The effectiveness of the program at the project level is measured by audits, surveillance, document reviews, and other QA monitoring activities as defined in the Corporate QA/QC Program. The QA Director reports directly to the President. The QA Director's duties include, but are not limited to, the following:

- Reviewing and approving the project-specific Contractor Quality Control (CQC) Plan
- Reviewing and approving supporting QC procedures
- Evaluating the effectiveness of the quality program
- Assigning qualified QC personnel to projects
- Directing and supporting project QC management staff
- Overseeing training and qualifications
- Overseeing audits, inspections, and surveys.

4.7.6 Contractor Quality Control System Manager

Jim Caird will serve as CAPE's CQCSM. The CQCSM reports administratively directly to the QA Director and is assigned to the PM on project execution regarding the CQC Plan and all aspects of the field QC requirements. The CQCSM is responsible for the overall management of the day-to-day QC program on site and will be responsible for implementing QC activities in the field. The CQCSM has stop-work authority if QC issues are being compromised. Duties of the CQCSM include, but are not limited to, the following:

- Implementing the project CQC Plan
- Reviewing and approving recommended remedial actions
- Verifying implementation of remedial actions

- Preparing QC reports, as required by contract requirements
- Reviewing submittals to determine that all submittals meet contract requirements
- Notifying the QA Director of conditions adverse to quality that cannot be resolved at the project level
- Identifying and reporting nonconforming items or activities
- Reviewing and approving all confirmation sampling activities
- Monitoring laboratory testing activities.
- Performing daily inspections of CAPE and subcontractor work activities
- Reading and understanding all QC requirements for specific tasks being performed by CAPE and subcontractors, and monitoring for compliance with the specifications
- Ensuring the quality standards in the project plans are met
- Performing and documenting construction inspection activities including area clearances
- Inspecting and documenting (including photographs and a written description) the condition of rental equipment upon delivery to the site and before equipment leaves the site. If possible, these inspections will be performed jointly with a USACE representative and a representative from the rental equipment company.
- Monitoring operation activities for compliance with contract requirements
- Performing or monitoring sampling activities
- Providing acceptable documentation of daily CQC activities that will be incorporated into the Daily Quality Control Report (DQCR)
- Implementing changes, as appropriate, to the work plan
- Ensuring compliance with the requirements of the work plan
- Maintaining complete, accurate, legible, permanent, and defensible QC records that document QC activities work and overall work performed.

4.7.7 Sampling Technician

Mr. Caird will also act as the Sampling Technician. He will be responsible for field screening and collecting samples. He will ensure sampling procedures are followed. The

Sampling Technician reports directly to the Project Chemist. Duties of the Sampling Technician include, but are not limited to, the following:

- Implementing field sampling procedures
- Coordinating with the subcontractor laboratory
- Obtaining sample containers and sampling equipment
- Reviewing the sampling activities and decontamination procedures
- Performing all sample collection activities
- Labeling, shipping, and tracking samples
- Notifying the Project Chemist and PM of field sampling variances that may impact project objectives.

4.7.8 Safety and Health Manager

Glen Mayekawa, Certified Industrial Hygienist (CIH), will act as the Safety and Health (S&H) Manager (SHM) and is responsible for overseeing project safety performance. He will authorize all aspects of the SSHP. Any proposed deviations from the approved SSHP or changes in expected site conditions are immediately presented to the SHM for consideration/approval. The SHM receives data directly from the SSHO. The SHM coordinates with the PM. Duties of the SHM include, but are not limited to, the following:

- Ensuring that the appropriate training occurs and that appropriate training and medical records are kept current and on site
- Overseeing the administration of the S&H program
- Serving as the liaison between Corporate S&H and the PGM
- Determining what resources are required to adequately address S&H issues, and communicating those resource requirements to the PGM.

4.7.9 Site Safety and Health Officer

Jim Caird will also serve as the SSHO. The SSHO advises the PM on all S&H aspects on site. The SSHO will conduct inspections to determine whether operations are being performed in accordance with the SSHP, USACE requirements, and OSHA regulations. The SSHO is assigned to the PM during execution of project activities, but reports directly to the SHM with functional safety issues. An open dialogue is kept between the SSHO and project supervisory personnel to ensure that safety issues are quickly addressed and corrective actions are taken. The SSHO has the authority to suspend operations at the site as a result of nonconformance to the SSHP. The SSHO's duties include, but are not limited to, the following:

- Reviewing and providing guidance for S&H orientation and implementation during start-up of field projects
- Implementing the SSHP and addressing site hazards and controls necessary to safeguard construction personnel and visitors
- Upgrading or downgrading levels of protection, as described in the SSHP
- Ensuring the procurement and distribution of PPE, inspecting PPE, and maintaining documentation of PPE
- Ensuring procurement of required air monitoring instrumentation, and performing air monitoring including calibration and documentation
- Ensuring that subcontract personnel performing work are properly trained and certified, and are knowledgeable of the SSHP and its requirements
- Conducting tailgate safety meetings
- Conducting random S&H audits in the field
- Reporting to accident review boards, if necessary.

Specifics to be provided to construction personnel for this project include:

- Environmental training and certification
- A Hazard Communication (HazCom) program including Material Safety Data Sheets (MSDSs) with corresponding inventory of all hazardous substances used at the site
- Waste management procedures for handling waste
- Procedures for spill response and cleanup of hazardous substances used and encountered at the site
- Instructions on where PPE is stored, how it is maintained, and how it will be used for the various construction tasks
- Instructions on safeguards for heavy equipment
- Current spill and emergency response contact list.

4.7.10 Project Administrator/QC Technician

The Project Administrator/QC Technician will report directly to the Site Superintendent. The Project Administrator will be responsible for schedule updates and cost reporting, and will support the CQCSM and SSHO functions. The Project Administrator will also be responsible for various administrative activities.

4.7.11 Project Chemist

Christelle Newsome will serve as the Project Chemist. She will ensure that chemical-specific goals of the project are attained. The Project Chemist will coordinate with the PM, CQCSM, and Sampling Technician, as necessary, to establish quality data. The Project Chemist's duties may include, but are not limited to, the following:

- Coordinating the laboratory services
- Overseeing the validation of the sampling and laboratory analytical data
- Notifying the PM about any data or laboratory issue that would impact project objectives
- Classifying hazardous and nonhazardous materials
- The Project Chemist will delegate the field sampling activities to the Sampling Technician.

4.8 <u>Subcontractors</u>

CAPE will direct and control all subcontractors for this project. Contractual agreements between CAPE and its subcontractors contain flow-down clauses that require subcontractors to meet all appropriate USACE, federal, and state requirements. Onsite subcontractors will coordinate their activities through the Site Superintendent and will be required to submit daily logs documenting their activities. Specific subcontracted activities and major procurement items will include:

- Land Surveyor - Provide survey services to establish and to document excavation limits (horizontal and vertical)
- Trucking Services - Provide transportation services for waste
- Chemical Analytical Laboratory - Provide chemical analytical testing services for soil characterization
- Geotechnical Analytical Laboratory - Provide geotechnical analytical testing services for soil characterization
- Equipment Provider - Provide field construction equipment including: excavators, front-end loaders, dozers, offroad dump trucks, compactor, pumps, tanks, chipper, street sweeper
- Landfill - Hazardous Waste (Resource Conservation and Recovery Act [RCRA] Subtitle C) - Disposal of hazardous waste
  Special Waste (RCRA Subtitle D) - Disposal of nonhazardous waste

- Materials Providers
  - Backfill materials, including soil, aggregate, cobbles, etc.
  - Safety equipment (safety fencing, clothing, instruments)
  - Decon supplies (8-mil polyethylene lining for staging areas)
  - Landscaping (fertilizer, seed, mulch)
  - Erosion control (straw bales, silt fence).

5.0 PROJECT ACTIVITIES

This section describes field activities that will be completed as part of the remedial action project.

5.1 Excavation and Disposal Plan

This excavation and disposal plan describes field activities that will be performed in conjunction with this project. Field activities will include mobilization, site preparation, temporary diversion, excavation and material handling, transportation and disposal, and site restoration.

The following provides a brief summary of the main components of the corrective measures at each site:

- Clear utilities
- Construct erosion controls
- Establish equipment access routes/points
- Establish staging area
- Clear and grub
- Construct earthen dams for creek diversion
- Excavate and stage contaminated media in the streambed
- Mix excavated materials with drying agents to improve physical characteristics
- Load out and stage stabilized streambed material
- Backfill and restore the creek
- Reestablish grade and grass
- Characterize staged materials to determine appropriate disposal requirements
- Transport characterized material to the appropriate onsite or offsite location for disposal.

The following subsections provide specific details for accomplishment of the above-listed components.

5.1.1 Mobilization

CAPE will mobilize all resources (i.e., personnel, subcontractors, equipment, materials, and supplies) to Griffiss AFB. Specific mobilization activities will include:

- Establishing CAPE site presence
- Conducting Griffiss AFB site-specific training in accordance with work plans
- Acquisition of equipment, materials, and supplies
- Establishing administrative procedures.

CAPE personnel and subcontractors will receive initial site orientation and training before starting field activities. Initial orientation and training will cover the requirements of the work plan including personnel responsibilities, potential hazards, hazard recognition, and site-specific procedures.

5.1.2 Site Preparation

Site preparation includes preconstruction surveying to establish excavation limits, implementing erosion-control measures, clearing and grubbing, constructing haul roads and stabilized construction entrances/exits, and establishing staging areas. The Station Data Table (Appendix B) (see also Design Drawing GR-8 in the predraft submittal) will be used to establish the excavation boundaries. Excavation limits are shown in Figure 2 and on the engineering drawings (Design Drawings GR-4 through GR-7 in the predraft submittal). EPA and NYSDEC representatives will be notified by the AFRPA upon the start of field surveying and staking of the new channel before construction of the restored TMC. The EPA and NYSDEC can provide input on the new alignment, and, if necessary, the alignment can be adjusted. Erosion-control measures will be installed and modified throughout construction. Specific measures will be implemented to control erosion during clearing and grubbing, construction of haul roads, and establishment of staging areas. Haul roads and the stabilized construction entrances/exits will be constructed as described in Section 5.1.2.6. Staging areas will be prepared as described in Section 5.1.2.7. Details of the erosion-control measures are provided in Figure 3 and in Figure 3 and in Appendix C, the *Erosion and Sediment Control Plan* (CAPE, 2004).

5.1.2.1 Utility Clearance. Before intrusive work is initiated at each work area, a site inspection will be performed to identify potential site hazards, such as overhead power lines and structures or other features that require special attention. CAPE will submit a Base Digging Permit Request to the USACE onsite representative at least 2 weeks before beginning any intrusive work so that all base utilities are marked. CAPE will also contact Dig Safely New York (1-800-962-7962) to schedule utility locating services in advance of intrusive field activities. If uncharted or incorrectly charted utilities are encountered, the onsite USACE representative will be contacted immediately for direction. Utility markings will be maintained throughout construction activities.

5.1.2.2 Monitoring Well Removal. Four monitoring wells (MW12R, MW12RBR, MW13BR, and MW14) will be abandoned (removed) by a subcontractor during site preparation. Well abandonment materials will be decontaminated and staged for disposal as construction debris.

5.1.2.3 Power Transmission Line Removal. Power transmission lines adjacent to the main channel of TMC and those that may interfere with construction activities will be permanently de-energized and removed. CAPE will contact the local utility provider to ensure that all power transmission lines have been de-energized before removal. Permanent removal will include the transmission lines and the poles upon which they are mounted. Removal activities will be subcontracted to Griffiss Utility Corporation.

5.1.2.4 Erosion-Control Measures. CAPE will use erosion-control measures (i.e., straw bales, silt fence, sediment traps, and outlet stabilization structures) as discussed in the *Erosion and Sediment Control Plan* (CAPE, 2004). Erosion controls will be established in advance of intrusive activities and will be maintained for the duration of the construction activities on site.

5.1.2.5 Clearing and Grubbing Plan. The site is covered with numerous trees and vegetation that require selective clearing and grubbing. Clearing and grubbing will be minimized to avoid impacting existing wetlands. Whenever possible, trees will be left standing in areas such as the proposed vernal pool and emergent wetland areas and creek banks for habitat purposes. The total area estimated for clearing and grubbing is approximately 8 acres, including access roads and staging areas. Trees will be cleared with a dozer and other heavy equipment to improve access to excavation areas, then will be stockpiled in a staging area. Some of the larger trees may be used directly in the restoration to enhance the habitat and stabilize the stream channel. Chainsaws will be used to reduce the size of the remaining trees; smaller trees and branches will be fed through a chipper. Stumps will be excavated (grubbed), shaken to remove soil, and staged of along with trees and wood chips not used in site restoration. These materials will be transported to the Air Force's NYSDEC-permitted Land Clearing Debris Landfill located near Landfill 1 for disposal. Stumps may also be ground down to the existing ground surface in lieu of excavation. CAPE plans to grub only where stump removal is necessary for removal of contaminated soils and construction of wetlands and access roads.

5.1.2.6 Construction Road Stabilization. To provide improved access to excavation, material staging, and disposal areas, CAPE will construct new haul roads and improve existing access roads, wherever necessary. CAPE will limit, to the greatest extent possible, the amount of clearing required for construction of new access roads.

Before construction of a new access road, topsoil and/or other organic material will be stripped and stockpiled for reuse during site restoration. The construction or upgrade of site access roads will consist of the installation of woven geotextile fabric overlain by 8 inches to 12 inches of crushed aggregate. The aggregate will provide a stable surface for construction equipment and will be NYSDOT #4 crushed stone (75 mm) or an equivalent base course. Geotextile will be a woven fabric suitable for temporary construction road stabilization. Stabilization will occur in areas where existing roads are uneven, potholed, eroded, excessively soft, containing ponded water, or otherwise unstable for construction traffic. Where new access roads are developed, stabilization materials will likely be used over the entire new road. Upon project completion, aggregate and geotextile fabric from new access roads will be removed; final disposition of construction-derived wastes and restoration is described in Section 5.1.7.

CAPE assumes that topsoil stripped during access road construction is clean and intends to stockpile the topsoil in areas adjacent to where it originated. Topsoil stockpiles will be maintained similarly to clean fill stockpiles. CAPE will use a front-end loader and/or an excavator to maintain the stockpiles. Silt fence and/or straw bales will be used around the perimeter of the stockpiles to minimize erosion. Provided the topsoil is clean, it will be reused during site restoration.

5.1.2.7 Material Staging Area Construction. The natural earth will be mounded to create berms for staging excavated soils. The berms will be created to eliminate runoff from potentially contaminated stockpile materials. Polyethylene sheeting (8-mil nylon-reinforced) will be used to line the inside of the bermed areas, which will help prevent contaminants from migrating into clean soil. The excavated soils will be piled on top of the liner within the bermed area.

Excavated soils will be stockpiled in staging areas in 300- to 500-cubic yard (CY) piles. To the extent possible, contaminated soils will be segregated from "cleaner" soils for characterization and disposal purposes. At the end of each day and/or after the 300- to 500-CY capacity has been reached, the pile will be covered with a tarp, which will come down over the outside of the berm. Sandbags will be used to secure the tarp. The purpose of the tarp is to keep rain out of the pile and to eliminate erosion concerns from wind and rain. CAPE will use 8-mil nylon-reinforced polyethylene sheeting for the cover tarps. The tarp sizes will vary depending on the size of the stockpiles and will be appropriately sized to securely fit outside of the berms. Refer to Figure 4 for more detail.

CAPE will maintain a front-end loader and/or an excavator at the staging area for maintenance of stockpiled materials. Piles will be covered with tarps if precipitation begins and at the end of each workday.

5.1.3 Temporary Creek Diversion

Upon completion of site preparation, CAPE will begin construction of earthen dams to divide the creek into manageable sections, and will divert the stream flow around each construction/excavation area. Temporary dams will be constructed upstream and downstream of each active excavation area using existing creekbed materials, which will subsequently be excavated and transferred to a material staging area for additional handling. A typical detail of an earthen dam is provided in Figure 4. Three dams will be constructed for each excavation area to eliminate the potential for downstream migration of excavated sediments. The two uppermost (of the three) dams will isolate the active excavation area; the two lowermost (of the three) dams will serve as a sedimentation basin for excavation water.

CAPE will use a 6-inch diesel pump with a rated capacity of approximately 1,000 gallons per minute to transfer surface water around the active excavation area. One pump will be used and a second pump will be available on standby as a backup. The pumps will not be capable of handling storm event flowrates; therefore, CAPE will not pump around during high flow periods. If a storm event is expected, CAPE will complete the active excavation area and will remove the earthen dams to allow unimpeded creek flow. During periods of creek diversion, the pump(s) will be operated continuously to avoid excessive hydraulic loading to the upstream earthen dam. A typical detail of the pump-around system is shown in Figure 5.

The interval between dams will be determined based on daily production rates. Figure 3 indicates typical sections based on excavation and stabilization of approximately 300 CY to 500 CY per day. The upstream earthen dams will be systematically removed at the completion of excavation.

5.1.4 Excavation and Material Handling

Following construction of the earth dams and installation/activation of the pump-around system, soil will be removed from the area between the two upstream dams with an excavator and/or bulldozer to predetermined depths specified in the DBR (i.e., from 2.5 feet to 4.0 feet). Excavated soil/sediment will be stockpiled in the creekbed to allow free drainage. Stockpiled material will then be mixed with a drying agent (e.g., Calciment) to improve physical characteristics. Based on the availability of granular Calciment at the supplier's location, a mixture of granular and powdered Calciment may be used. Once the soil/sediment is sufficiently stabilized, it will be loaded with an excavator into an offroad dump truck for transfer to a material staging area. Due to groundwater influence on TMC, groundwater will likely recharge into the excavation. Excavation water, pumped with an appropriately sized trash pump, will be discharged between the two downstream dams. The area between these dams will be used as a temporary sediment trap. Pumping will only be required when a bulldozer is used in the creekbed during excavation. If the groundwater recharge rate is too high and excavation water cannot be efficiently managed, soil/sediment will be removed with an excavator positioned outside of the channel.

After the initial section of the North Channel has been excavated and stabilized material has been removed from the creekbed, additional dams will be constructed downstream toward the confluence with the Main Channel. Backfill and surface stabilization (revegetation) of the excavated sections will occur following excavation. After completing removal activities in the North Channel, excavation activities will begin at Station 1+00 in the Main Channel and will progress downstream to the base boundary. The Landfill 5 tributary will also be excavated from upstream to downstream to minimize the potential for recontamination of the excavated channel. Approximately 13,050 CY of contaminated sediments will be removed from the on-base portion of TMC. An additional 11,640 CY of material will be removed from on base including the following: 7,500 CY from the berms adjacent to TMC, 1,000 CY from constructed meanders, 840 CY from emergent wetlands, and 2,300 CY from the TMC vernal pool complex. Details related to each of the areas are described in the DBR (E&E, 2004). The DBR also references another 3,700 CY that will be excavated from the Landfill 6 vernal pool complex, which is not part of CAPE's contracted scope.

Excavation from the off-base portion of TMC will be limited to approximately 80 CY of silt deposits located in 16 locations (see Figure 3). Before silt deposits are excavated, EPA and NYSDEC representatives will be notified by AFRPA to verify locations. Because of the limited amount of material that will be removed from the off-base portion of TMC, erosion-control measures will be limited to the installation of straw bales downstream from Silt Deposit 16. Silt deposits will be excavated with smaller excavation equipment (e.g., mini-excavator or rubber-tired backhoe) and directly transferred via offroad dump trucks to the material staging area. Stabilization of these materials will be completed at the staging area, if required. The TMC pond will be dewatered, then stabilized *in situ* with Calciment before loading into offroad dump trucks for transfer to the material staging area. Approximately 4,720 CY of material will be removed from the pond. For all work performed off base, CAPE will verify the requirements for working in right-of-ways, easements, and private property with the onsite AFRPA representative. CAPE will complete work only in approved areas, then will restore each area to the original conditions unless otherwise stated in the DBR.

Stabilized material stockpiled at the material staging areas will be sampled for geotechnical and chemical properties in accordance with the approved work plan. Materials satisfying requirements for onsite disposal at Landfill 6 will be transferred as soon as possible to allow reuse of the contained staging area. Materials not meeting onsite disposal requirements will be loaded into dump trucks and transported to an approved offsite landfill for disposal.

5.1.5 Transportation and Disposal

Characterization samples will be collected from stockpiled soil to determine the appropriate disposal requirements. Sampling requirements and procedures are described in the Field Sampling Plan (FSP) section of the SAP (Appendix D). Beyond the requirements set forth in the FSP, excavated soil will be sampled and analyzed in accordance with the requirements of the offsite disposal facility. Analytical results will ultimately dictate how the stockpiled soil will be handled. Soil will be classified in one of the following categories: meets onsite requirements for disposal into Landfill 6; nonhazardous requiring offsite disposal at a Subtitle D facility; characteristically hazardous requiring disposal at a Subtitle C facility; or Toxic Substances Control Act (TSCA) waste based on PCB concentrations exceeding 50 milligrams per kilogram (mg/kg).

Soil determined to be unacceptable for onsite disposal will be transported by a licensed waste hauler to a NYSDEC-approved licensed landfill, specific to the classification of waste being transported and disposed. Excavation and loading will be scheduled and sequenced to maximize the number of loads that can be transported to the landfill and disposed daily. Details of CAPE's transportation plan for transportation of waste from the site to the disposal facilities are presented in the Transportation Plan (Section 5.2). The following waste disposal facilities have been preselected for disposition of solid wastes.

Nonhazardous Solid Waste RCRA Subtitle D Landfill
Oneida-Herkimer Solid Waste Authority High Acres Landfill in Fairport, New York or Mill Seat Landfill in Bergen, New York

TSCA and Hazardous Solid Waste RCRA Subtitle C Landfill
Waste Management of New York CWM Chemical Services, L.L.C. 1550 Balmer Road Model City Landfill in Model City, New York

Note: These waste disposal facilities have been tentatively identified, and may change if agreeable contractual terms cannot be reached during the procurement process.

5.1.6 Aquatic/Wildlife Habitat Restoration and Enhancement

To accomplish the objective of restoring and enhancing the habitat in and along TMC, CAPE will reconstruct the stream to incorporate step pool drop structures, riffle/pool complexes, meanders, and backwaters. Details of the step pool drop structures and riffle/pool complexes are provided in Design Drawings GR-15 and GR-16 (in the predraft submittal). Aquatic habitat will be increased by incorporating a range of substrates, depths, and water velocities as well as providing natural cover for fish and invertebrates. Wetland mitigation and stream restoration will be completed concurrently with backfilling and site restoration activities and are therefore discussed in Section 5.1.7. Additional details of restoration and enhancement of TMC as well as construction of the mitigated wetlands are provided in Section 4 of the DBR (E&E, 2004).

5.1.7 Site Restoration

After remediation activities have been completed, CAPE will remove all temporary features constructed during site preparation (i.e., new access roads, staging pads, construction fencing, etc.) and will transport construction-derived wastes to an approved facility for disposal. Materials from new access roads, including geotextile fabric and crushed rock, will be disposed on site at Landfill 6 and will be placed under the landfill cap (see Figure 6). Existing access roads that were upgraded during site preparation will be left in place following remediation.

TMC areas (outside of the channel) disturbed during construction will be backfilled and/or graded to match the surrounding area, then will be restored with a vegetative cover. Backfill material, taken from onsite and offsite sources, will be sampled and analyzed in accordance with the methods and frequencies listed in Table 3 of the SAP. An AFRPA representative will evaluate backfill results and compare them to the criteria listed in Table 1 of the SAP and provide a recommendation to the regulators, who will make the ultimate decision regarding acceptability of a borrow source. Materials excavated from the constructed wetland areas will be used as backfill behind diversion structures and creek banks because these areas will most benefit from the existing seedbank. Imported backfill from a NYSDEC-approved source is required to have less than 7 percent organics and have one of the following classifications: ML, SM, SW-SM, or SP-SM. Topsoil that is stripped from wetland or upland areas during site preparation will be reused in these respective areas. Topsoil removed from creek remediation areas will not be reused.

Backfilled and/or graded areas will be revegetated with a variety of seed mixtures and other plantings. Wetland and upland conservation seed mixes and shrub resource islands will be planted in all restored areas. A specialized seed mixture will be used within the existing wetland delineation, except for along and on access roads. The predominant species in this seed mix will include: fox sedge, Virginia wild rye, eastern burr reed, soft rush, and sensitive fern. A wildlife food and shelter shrub/sedge mix will be used along and on restored access roads within the existing wetland delineation. The predominant species in this seed mix will include: silky dogwood, grey dogwood, riverbank wild rye, winterberry, fox sedge, and elderberry. All disturbed areas outside of the existing wetland delineation will be seeded with a showy northeast native wildflower mix with the following predominant species: little bluestem camper, side oats grama, silky wild rye, Indian grass tomahawk, partridge pea, big bluestem Niagra, common milkweed, ox eye sunflower, and black-eyed Susan. Unless otherwise approved by the onsite USACE representative and by a restoration specialist (designated by USACE), final seeding and plantings must be performed from April 15 through June 1. If final seeding and plantings are not completed during this period, temporary seeding for erosion control purposes will be completed from September 1 to October 1. A ryegrass mixture will be used for erosion control purposes. Specific seed mixtures for all areas are provided in Section 02950 of the specifications. Additionally, shrub resource islands will be planted intermittently throughout the floodplain to encourage visual screening and line-of-sight obstruction. Based on the DBR, it is anticipated that 10 to 12 islands will be planted, divided between the floodplain and upland areas. The size of each shrub island will be approximately 60 feet by 120 feet. The composition of islands will be approximately 30 percent trees and 70 percent shrub species, using 1- to 5-gallon planting containers. Tree spacing will be approximately 20 feet on centers, with shrubs at 5 feet on centers. Species to be incorporated into the shrub islands may include winterberry, red maple, speckled alder, red chokecherry, buttonbush, silky dogwood, red osier dogwood, witch hazel, spicebush, northern bayberry, swamp white oak, pin oak, and black willow. All revegetated areas will be fertilized and watered in accordance with Section 02950 of the specifications.

Restoration of the channel varies by subreach, as defined in Section 4.2.3 of the DBR. Subreach 1 begins at the downstream base boundary and runs approximately 1,650 feet upstream. In this subreach the stream will be restored to create a channel that is an average of 1-foot deep during base flow (i.e., 12 inches deep from the top of the channel bank to the restored bottom elevation of the creek). Also within this subreach, the berm that parallels the north side of the stream will be removed. The berm will be excavated in conjunction with the adjacent creek excavation. The portion of the creek that is dammed off and pumped around will serve as an erosion-control measure for the berm removal. If the berm is excavated separately from the adjacent creek area, additional erosion controls, such as silt fence or straw bales, will be required before berm excavation can begin. Berm material will be staged, sampled, and disposed of at either Landfill 6 or an offsite landfill, depending on sampling results. Additionally, two large meanders with wavelengths of 300 feet and amplitudes of 25 feet and 35 feet will be constructed as shown on Design Drawing GR-11 in the DBR. Live willow stakes will be placed in the floodplain between the abandoned channel and the new channel to stabilize the bank and accelerate revegetation (see Section 02950 of the specifications). At the downstream end of this subreach at the 48-inch culvert at the base boundary, a step pool drop structure will be constructed. The step pool drop structure will be comprised of two 7.5-inch drops across a span of 35 feet to dissipate energy from a 2-foot drop in grade and will also create habitat. The drops will be constructed to include a layer of cobbles at the base followed by large boulders placed with an upstream facing arch to concentrate flow, protect banks, and create riffle habitat. Pools between the drops will be 15 feet long and 18 inches deep for habitat diversity. The pools will be backfilled with cobbles. The location of the step pool drop structure is shown on Design Drawing GR-11 in the DBR; material requirements are listed in Section 02950 of the specifications. Also as part of site restoration in Subreach 1, CAPE will replace the existing 48-inch culvert at the base boundary with a new 48-inch culvert. Details related to construction and inlet/outlet protection of the new culvert are shown on Design Drawing GR-15.

Existing conditions at Subreach 2, which runs upstream from Subreach 1 for approximately 550 feet (see Figure 4-1c in the DBR), consist of meanders with natural riffle/pool complexes. These riffle/pool complexes will be recreated and two additional meanders with similar geometries will be constructed at locations shown on Design Drawing GR-10. Details of the riffle/pool complexes are shown on Design Drawing GR-16. This subreach will be backfilled with soil, except for riffles at meander inflection points, which will be backfilled with small round cobbles. Additionally, large round stones (up to 16 inches in diameter) will be randomly placed within each riffle.

The length of Subreach 3 is approximately 900 feet (see Figure 4-1c in the DBR) and is located immediately upstream of Subreach 2. This reach will be backfilled to pre-remediation elevations. Just downstream from the steam lines, the restored channel will be realigned into a single sinuous channel, with a 400-foot wavelength and a 40-foot amplitude. Live willow and buttonbush stakes will be placed in the floodplain between the abandoned channel and the new channel to accelerate revegetation. This portion of the creek originally had significant treefall (i.e., overhanging vegetative cover, generally from downed trees); therefore, treefall from timber salvaged during clearing activities will be placed in this subreach to provide in-stream habitat and shade for fish.

Subreach 4, which extends upstream from Subreach 3 approximately 1,200 feet to the twin 60-inch culverts at the TMC headwater, includes the Landfill 5 tributary and the North Channel. This subreach will be backfilled to pre-remediation elevations to recreate existing conditions. Treefall will also be placed in this subreach.

The TMC pond will be restored with 1.5 feet of clean backfill to create habitat and accelerate natural revegetation.

The creek banks within each subreach and the pond banks will be seeded, fertilized, and watered in accordance to Section 02950 of the specifications. Although the DBR states that erosion control matting (ECM) will be installed over the banks and bed of the creek and pond, CAPE does not intend to install ECM over the creek bed. ECM will only be installed over the banks of the creek and pond in accordance with manufacturer's recommendations. ECM will be selected to fit site conditions (e.g., slope, flow velocity) and will be placed from the top of one bank to the toe of that bank, and from the top of the opposite bank to the toe of that bank. ECM will not be placed across the bottom of the channel. ECM will be laid so it is in continuous contact with the soil and so that the upslope or upstream matting overlaps the lower matting. The uppermost edge of the upper matting will be tucked into a slit trench, backfilled, and then tamped down. ECM will be anchored as specified by the manufacturer, typically by driving wooden staples and/or stakes into the ground (Figure 7). CAPE will periodically inspect below the matting for signs of erosion. If any area shows erosion, that portion of matting will be pulled back, and damaged, bare, or sparse areas will be repaired by filling any gullies, refertilizing, overseeding, and relaying and stapling the matting.

At completion of the project, CAPE will perform limited maintenance of the restored areas, including reseeding areas where plant growth was not established, replacing plant material that is dead or not growing satisfactorily, and repairing areas that have washed out. A long-term maintenance plan will also be developed for maintenance (by others) of the restored areas.

5.2 Transportation Plan

This section describes permitting procedures and approval authorities, staging of wastes and materials, interim storage and packaging requirements, labeling waste, profiling, acceptance criteria, manifesting and transporting of wastes, as well as documentation and recordkeeping associated with field activities.

Waste materials requiring offsite disposal will be loaded from the material staging pads into trucks and transported to the appropriate facility. Shipments will be transported on major thoroughfares, whenever possible. Actual transportation routes will be determined jointly with the onsite USACE representative during the preconstruction meeting.

5.2.1 Permitting Procedures and Approval Authorities

If waste characterization analyses indicate that material removed from the creekbed is hazardous, the material will be transported off site in accordance with the requirements of 49 CFR Sections 171, 172, 173, 178, and 179. All transportation activities will be conducted in accordance with these regulations as well as the specific requirements of this plan. Excavated soils not exhibiting hazardous characteristics and meeting the geotechnical and chemical requirements will be transported to Landfill 6 for final disposal. Nonhazardous soils that contain between 10 parts per million (ppm) and 50 ppm PCBs will be disposed at an approved off site landfill. Soils with greater than 50 ppm PCBs will be disposed at a TSCA landfill, and soils that are characterized as hazardous will be disposed at a RCRA Subtitle C landfill.

5.2.2 Interim Storage Requirements

Excavated material determined to be hazardous will be marked with a hazardous waste label identifying the material description, hazard class, generator, generator's address, and accumulation start date. **Final disposal of material determined to be hazardous will be performed as soon as practicable during the remedial action efforts.**

5.2.3 Packaging Requirements

Hazardous waste removed during excavation will be placed into dump trucks and/or roll-off boxes and covered. All trucks transporting wastes to an offsite landfill via public roads will be lined to prevent water and sediments from leaking out. Covered roll-off boxes will be placed onto roll-off trucks and DOT-approved containers will be placed onto covered semi-tractor trailers for the removal of hazardous waste as required. Lined containers will prevent loss of materials from the trucks during transport to a permitted hazardous waste landfill. The transporters will be registered as hazardous waste transporters and will meet DOT requirements under 49 CFR 173.24.

5.2.4 Labeling and Manifesting

During onsite storage, containerized hazardous waste will be labeled "Hazardous Waste" with the date of generation. Depending on analytical results, it is anticipated that the trucks transporting hazardous wastes will have Hazard Class 9 placards and will be labeled "Hazardous Waste, Solid, N.O.S." and "ID # NA 3077." Shipping paperwork will comply with the requirements of 49 CFR. Manifests will contain information described in 49 CFR 172.205. An authorized representative from the generator (AFRPA) will sign special waste and/or hazardous waste manifests.

5.2.5 Documentation and Recordkeeping Procedures

Documentation required by 49 CFR, including shipping papers and labels, will be created for waste that will be shipped off site. In addition to the documentation generated by the requirements of Section 5.2.4 (Labeling and Manifesting), the following information will be maintained in the CAPE office for each load that is shipped off site:

- A complete and accurate manifest
- Documentation that a proper DOT-approved shipping container is used
- Appropriate label on container with date of generation
- Validation that all waste shipment containers are in good condition and not leaking
- A statement that the driver is physically fit to perform his/her duties

- Validation that the driver has written documentation in his/her possession of completion of required DOT safety training and health monitoring

- A statement that the driver's logbook is current

- Validation that a certificate of insurance is current

- Disposal facility acceptance documentation

- Transporter's hazardous waste EPA identification number

- Return copies of all manifests. If a returned copy is not received within 35 days of shipment date, the disposal facility will be contacted and follow-up notifications made if not received within 45 days.

5.2.6 Transporting Materials Off Site

Transportation of hazardous waste and/or contaminated materials to offsite treatment or disposal facilities will comply with the following requirements:

- Waste transporters maintain insurance coverage, as required by Federal Acquisition Regulations (FAR) 28.307-2 (a)-(d), for the transportation of hazardous or asbestos waste as described by all federal, state, and/or local regulations and statutes

- Waste transport contractors provide documentation with a copy of their completed transporter application and a notarized copy of their EPA waste transport identification number

- Waste transport contractors provide documentation with notarized statements describing the status and background of any civil or criminal lawsuits filed against them within the last 10 years

- Only trucks certified by the manufacturer as meeting applicable DOT specifications are used to transport bulk liquid waste

- Waste materials transported off site have waste manifests signed by an AFRPA representative accompanying the shipments

- Waste materials transported on public roads have bills of lading accompanying the shipments in addition to waste manifests, as required

- Waste transport vehicle operators comply with the minimum S&H training requirements specified by EPA, DOT, and OSHA for hazardous waste vehicle operators.

Specific requirements for disposal facilities will be obtained following the selection of the disposal facility or facilities.

5.3 Emission Control Plan

Dust may be generated by construction activities during dry weather. If visible dust appears to be generated within the breathing zone of workers or capable of migrating beyond the construction limits, dust-control measures will be implemented. Dust-control measures are used to prevent surface and air migration of dust, which can create offsite damage, health hazards and traffic safety/visibility problems, from disturbed surfaces in construction areas.

Dust-control measures may be implemented during construction road stabilization and stabilized construction entrance activities, as well as during any other activities that could potentially create a dust problem, such as stockpiling soils. The measures may include covering stockpiled soils, reducing vehicle speeds, or spraying water on the soils.

6.0 ENVIRONMENTAL PROTECTION PLAN

CAPE, as the prime contractor, is responsible for ensuring adherence to the Environmental Protection Plan (EPP). The Site Superintendent and the CQCSM will work together to implement the EPP while on site. The Site Superintendent reports directly to CAPE's PM, and the CQCSM reports to CAPE's QA Director.

6.1 Protection of Features

Site features will be protected and repaired, as necessary. CAPE will confine construction activities to areas defined in the plans or to areas specifically assigned for CAPE's use. Storage and related areas and access routes required temporarily by CAPE will be assigned by the onsite USACE representative. No other areas on government premises will be used by CAPE without consent of the onsite USACE representative.

CAPE will not deface, injure, or destroy trees and shrubs, nor remove or cut them without authorization. Ropes and cables will not be fastened or attached to trees for anchorage. Existing trees that are to remain in place shall be protected if there is a possibility they could be injured, bruised, or otherwise damaged by construction operations. Any root structures exposed during excavation activities will be protected from drying and covered as soon as possible with moist backfill. Trees more than 4 inches in diameter, turfed areas, and other landscape features outside of authorized removal areas that are damaged by CAPE will be restored to a condition satisfactory to the onsite USACE representative.

CAPE will only clear and grub those areas that have been approved. Stumps will be cut off within 12 inches of ground surface in contaminated areas and flush with or below ground surface in noncontaminated areas. To the greatest extent possible, clearing will be conducted in such a way that soil and soil-like materials are not collected with the cleared material. Loose soil will be shaken from grubbed materials and the stumps will be transported to the Air Force's NYSDEC-permitted Land Clearing Debris Landfill located near Landfill 1 for disposal.

All streams, waterways, and storm drainage systems will be protected from sedimentation in accordance with the Erosion and Sediment Control Plan (ESCP). Impact to fish and wildlife will be minimized. The pond may be restocked, most likely as a warm-water fishery, upon completion of the remedial action and restoration. AFRPA will solicit NYSDEC to assist in developing a restocking plan. If items having possible historical or archaeological interest are discovered in the course of the work, they will be preserved and reported to the onsite USACE representative immediately.

6.2 Traffic Plans

Traffic from site activities will be limited as much as possible. Periodic traffic is expected during pickup and delivery of materials and wastes at the site. If significant traffic impact is anticipated, a member of the field crew will direct traffic, and if necessary, escort vehicles. If construction-related traffic interferes with the usual traffic flow, flagmen will be used to direct traffic around construction sites or traffic may be rerouted. There will be two-way traffic on the haul roads and access roads. Potential roads and turnarounds are depicted in Figure 2, and arrows on the roads show potential traffic patterns.

6.3 Spill Control Plan

CAPE will be responsible for any spills or leaks caused by its operations during the performance of this contract. CAPE will provide contingency measures for potential onsite spills of any potentially hazardous or other regulated materials. CAPE will provide the following:

- Identification of potential spill pathways and receptors
- Methods, means, and facilities to prevent contamination of soil, water, air, structures, equipment, or material from a release due to CAPE's operations
- Equipment and personnel to perform emergency measures to mitigate spills and control their migration
- A decontamination program to minimize potential for contamination of adjacent areas.

The methods employed on this project to prevent and control spills will include lining soil stockpile areas with polyethylene sheeting; testing pumps and hoses to ensure no leaks; lining sample collection areas with polyethylene sheeting; carefully loading soil into trucks to avoid spillage; and always using good work practices to avoid spillage.

6.3.1 Spill Response

According to USACE's instructions, the following requirements will be met for a spill of a hazardous material:

- Take immediate measures to control and contain the spill to prevent release into sewers or surface waters

- Notify the onsite USACE representative immediately
- Notify the Rome Fire Department immediately at 9-1-1
- Notify the Griffiss AFB point of contact
- Notify Federal Emergency Spill Hotline at 1-800-424-8802 within 2 hours if the amount is above a reportable quantity or any amount enters a waterway or storm sewer
- Notify New York State Spill Response Hotline at 1-800-457-7362
- Isolate and contain hazardous spill areas with absorbent pads, booms, and pillows
- Use spill kits to absorb liquids
- For larger spills, dispatch vacuum tanker and/or emergency response team
- Deny entry to unauthorized personnel
- Do not allow anyone to touch the spilled material
- Stay upwind and keep out of low areas
- Keep combustibles away from the spilled material
- Collect samples for analysis to determine that cleanup is adequate
- Take other appropriate actions, as needed.

6.3.2 Notification of Spills and Discharges

CAPE will comply with the *USACE Spill Reporting Procedures for USACE Personnel Involved in HTRW Projects* (USACE, 1995). Refer to Appendix E for the Emergency Contact List. In the event of a spill, the onsite USACE representative and the Rome Fire Department will be notified immediately at 9-1-1. The National Response Center Spill Reporting Hotline will be notified at 1-800-424-8802 within 2 hours if the amount is above a reportable quantity or any amount enters a waterway or storm sewer and the New York State Spill Response Hotline at 1-800-457-7362 will be notified within 2 hours. CAPE will submit a spill and/or discharge report within 7 days of a release. The report will include the following items:

- Description of material spilled including identity, quantity, and a copy of the waste disposal manifest
- Exact time and location of the spill, and a description of the area involved
- Containment procedures used

- Description of cleanup procedures used at the site including disposal of spill residue

- Summary of CAPE communications with other agencies.

6.3.3 Spill Response Resources

CAPE will have a representative available on call 24 hours a day during this project to handle emergencies at the site. Refer to Appendix E for the Emergency Contact List. Charles Williams, CAPE PM, is available via cellular telephone at 1-865-548-6059. CAPE's Site Superintendent will also be available via cellular telephone. An established local work force having OSHA 1910.120 training will be used for emergency response. CAPE will have spill kits, absorbent pads, and a decontamination pad on site during the course of the project.

6.4 Waste Disposal Plan

The primary objectives of the Waste Disposal Plan are the safe handling, transportation, and disposal of material generated during construction activities. These objectives will be achieved through compliance with federal, state, and local regulations. The plan details CAPE's waste management responsibilities and potential waste streams.

6.4.1 Regulatory Requirements

Waste generated during the removal actions will be handled, staged, labeled, transported, and disposed in full compliance with federal, state, and local regulations. Applicable federal, state, and local regulations governing the treatment, storage, transportation, and disposal of wastes include, but are not limited to, the following:

- 40 CFR 262: RCRA Standards Applicable to Generators of Hazardous Waste

- 40 CFR 263: RCRA Standards Applicable to Hazardous Waste Transporter

- 40 CFR 268: RCRA Land Disposal Restrictions

- 49 CFR 171-179: DOT regulations on the packaging, handling, labeling, marking, manifesting, placarding, and transportation of hazardous materials

- 6 NYCRR Part 372: Hazardous Waste Manifest System and Related Standards for Generators, Transporters, and Facilities

- 6 NYCRR Part 364: Waste Transportation Permits.

6.4.2 Anticipated Waste Streams

Solid waste may be disposed either on site or off site, depending upon the characteristics of the waste to be disposed. The following waste streams will likely be generated during completion of the remedial actions:

- Wastewater generated from dewatering soils and sediments and the decontamination of field sampling apparatus, heavy equipment, and contaminated construction debris will be temporarily stored in tanks. Drums or portable tanks may be used to collect the wastewater from areas of generation. The contents of the drums or portable tanks will be transferred to a larger storage tank located in a designated staging area (see Figure 3). Wastewater will be sampled in accordance with the SAP and, depending on whether it meets discharge criteria, will either be discharged to the sanitary sewer system with permission from the treatment facility or transported to a licensed offsite facility for treatment

- Excavated soils will be stockpiled and characterized to determine the appropriate method of disposal. Based upon the extent of contamination of the soils, they will either be disposed on site in Landfill 6 or off site at an approved RCRA Subtitle C or D landfill, or at a TSCA facility

- PPE such as overalls, gloves, and boot covers will be collected in plastic garbage bags and disposed off site in an approved landfill

- Noncontaminated general construction debris will be disposed off site in an approved landfill. Crushed rock and geotextile fabric from the new access roads will be removed and placed under the cap at Landfill 6

- Cleared debris not used during site restoration will be transported to the Air Force's NYSDEC-permitted Land Clearing Debris Landfill located near Landfill 1 for disposal. Loose soil will be shaken from grubbed materials and stumps before disposal. Other trees and wood chips may be used during site restoration to enhance the habitat and stabilize the stream channel.

6.4.3 Waste Handling, Testing, and Characterization

Waste collection containers will be provided in sizes adequate to handle construction-related wastes. Hazardous, dangerous, or unsanitary wastes will be clearly labeled and containerized separately from other waste. Waste materials will be staged in a clearly delineated waste materials staging area. Excavated soils will be stockpiled in lined, bermed containment areas. Construction related wastes, such as PPE and construction and demolition debris, will be staged in designated staging areas adjacent to contaminated soil stockpile areas.

Aqueous and solid wastes will be sampled and fully characterized in accordance with EPA SW-846. Samples will be collected from the solid waste streams for laboratory analysis in accordance with the SAP (see Appendix D) and in accordance with the treatment and disposal facilities sampling requirements. Analytical results for the samples will be used to determine appropriate disposal of the containerized waste. Manifests and Bills of Lading will accompany all wastes transported off site.

6.4.4 Disposal Requirements

After sediments are excavated, they will likely be wet. In order for the soils to be accepted on site at Landfill 6, they will have to be reduced to a specified moisture content. If possible, and if time permits, the soils will be allowed to dry by gravity draining and evaporation. However, if the soils do not dry sufficiently, they will be amended with Calciment, which reacts with water and generates heat through an exothermic reaction. Soil stockpiles will remain uncovered to the greatest extent possible to help expedite the drying process. Vendor information on Calciment is included as Appendix F.

All disposal activities will be coordinated with the AFRPA. Landfill 6 will accept all materials that pass the toxicity characteristic leaching procedure (TCLP) test and have PCB concentrations less than 10 ppm. Soils that fail the TCLP criteria must be disposed off site at a hazardous waste landfill. Additional criteria concerning PCB concentrations follow:

- Landfill 6 may be used for soils with less than 10 ppm PCBs
- Soils with greater than or equal to 10 ppm and less than 50 ppm PCBs must be disposed off site at an approved landfill as a nonhazardous waste
- Soils with greater than or equal to 50 ppm PCBs must be disposed off site at an approved TSCA landfill.

Offsite disposal facilities must have valid state and/or federal permits as appropriate and must be in good legal standing. The chosen offsite landfills will be requested to submit written confirmation that they are authorized, have the capacity, and will assure that the ultimate disposal method is followed for the particular waste being disposed.

6.4.5 Waste Records

CAPE will retain copies of written confirmation of acceptance of waste by the treatment, storage, and disposal facilities (TSDFs). CAPE will also retain characterization sampling results, manifests, certificates of disposal, and bills of lading. These records will be submitted to the AFRPA representative and will be incorporated into the final completion report.

6.5 Dust Control Plan

Dust may be generated by construction activities during dry weather. If visible dust appears to be generated within the breathing zone of workers or capable of migrating beyond the construction limits at any of the sites, dust-control measures will be implemented. The measures may include covering stockpiled soils, reducing vehicle speeds, or spraying water on the soils.

6.6 Contaminant Prevention Plan

All activities will be performed in a manner to minimize risk for accidental release to the environment, minimize unsafe worker conditions, and minimize complications and delays to project completion. CAPE will minimize the number of times contaminated sediments and soils are handled. Onsite handling of soils will occur during excavation, loading, and sampling activities. Soils stockpiled on site will be stored on top of a polyethylene liner to prevent contaminants from migrating into clean soil.

EZs and CRZs will be established within the work areas by the SSHO. High visibility construction fencing will be used with appropriate warning signs around active work areas. All heavy equipment, machinery, vehicles, instrumentation, and personnel will be decontaminated before exiting these zones in an effort to minimize migration of contaminants. For more details, refer to the SSHP, Section 8 of this work plan.

6.7 Wastewater Management Plan

CAPE anticipates the potential for two wastewater streams for this project: decontamination water and water collected from dewatering soil and sediments. Wastewater from dewatering will be limited to water collected at the staging areas and from the pond (after initial dewatering and after the pump-around system is operational) since water from dewatering in the creek will be allowed to flow back into the creek and will not be collected. Water will be collected and stored in a tank or drums and will be sampled before disposal. Depending on analytical results, the water will either be discharged to the sanitary sewer system or transported off site for disposal.

6.8 Site Restoration

CAPE will maintain a clean site by disposing of all construction-derived wastes generated during remediation. Trees, stumps, and wood chips not used during site restoration will be transported to the Air Force's NYSDEC-permitted Land Clearing Debris Landfill located near Landfill 1. Other construction-derived wastes will be transported off site for disposal at an approved landfill. Housekeeping activities will be performed on an ongoing basis to ensure a safe work environment. Once project activities are completed, CAPE will perform a final site clean up and will restore all areas disturbed during remediation. Restoration activities will include backfilling and/or grading, revegetation of disturbed areas with seed and other plantings, installation of ECM along the creek banks, and construction of riffle pool complexes and other wetland features. Additionally, ECM will be installed along the creek banks. Site restoration activities are described in detail in Section 5.1.7.

7.0 CONTRACTOR QUALITY CONTROL PLAN

The following section outlines the use of operational procedures to ensure CQC from the preparatory stages of vendor material inspections and project plan reviews to delivery of a final product to the USACE Kansas City District and New York District for the remedial actions to be performed at TMC. This section also covers actual procedure selection, control, monitoring, change, and application to remedial measures and construction activities outlined in the project SOW.

7.1 QC Coordination

The PM will effectively communicate the content and intentions of the contract documents to all members of the project team to ensure consistency of project understanding and planned implementation. Coordination will be based upon the concept of the three-phase QC inspection process (preparatory, initial, and follow-up). Scheduled coordination activities will be detailed on the project's field schedule to integrate the QC process into all aspects of the project. CAPE will provide at least 3 days' advance notification to USACE personnel for coordination of meetings, inspections, testing, and start-up activities at the job site. CAPE will provide required engineering and other support services throughout the construction process, accurate test results, and field reports.

7.2 Meetings

7.2.1 Preconstruction Quality Management Coordination Meeting

QC will be discussed during the preconstruction meeting and during the QC Coordination Meeting. During the preconstruction meeting between CAPE's staff and the appropriate USACE personnel, a mutual understanding of the QC System details (on site and off site) will be established, including procedures and documentation for CQC operations, control activities, and testing.

Relevant QC topics discussed in this meeting will include, but are not limited to:

- QC documentation and each organization's role relative to design criteria, plans, and specifications, and the QC process
- QC staff, responsibilities, authorities, and communication procedures
- Submittal requirements
- Methods for modifying the CQC Plan
- Definable features of work (DFWs)
- Three-phase control system
- Procedures for observation, testing, and sampling
- Procedures for nonconformance identification, documentation, and resolution
- DQCRs
- Document control
- Construction schedule.

This meeting will be conducted by the onsite USACE representative and attended by the PM and QC staff and other team members including, but not limited to, the Site Superintendent, the CQCSM (or designated representative), the SHM, and the SSHO, as required. Minutes of this meeting will be recorded by a USACE representative and distributed to all participants. From that point on, the CQC Plan will be used to inspect and document the delivery of a quality product and service. Ongoing QC meetings, coordination of construction activities, and maintaining accurate field records will be the means used to maintain effective follow-up QC. All appropriate members of the project team, including subcontractors, will be required to participate.

7.2.2 Progress Meetings

During fieldwork, progress meetings will be scheduled weekly or as established by the onsite USACE representative to address significant questions, establish new guidelines, introduce a new aspect to the project, or to address issues that affect the progress of the work. The Site Superintendent and other appropriate CAPE staff such as the SSHO will attend these meetings and record and distribute the meeting minutes.

Topics that typically will be addressed at the progress meetings include:

- Review and approval of minutes of previous meeting
- Review of S&H requirements and procedures
- Review of QC requirements and procedures
- Review of cost reports
- Review of work progress
- Field observations, problems, and conflicts
- Problems that may impede the schedule, and proposed corrective actions
- Revisions to project schedule
- Coordination of scheduled activities
- Review of submittal schedules
- Pending changes and substitutions
- Review proposed changes for effect on construction and on completion date, and effect on other contracts of the project.

7.2.3 Monthly Supervisor Safety Meetings

Worker safety meetings will be held monthly for site supervisory personnel, including onsite subcontractor supervisors. Meetings will be conducted by the SSHO and will be documented, and attending personnel will sign a “Safety Meeting Record” form. Safety meeting forms will be maintained by the SSHO and copies will be furnished to the onsite

USACE representative upon request. Topics to be reviewed during the weekly safety meetings include:

- Review of previous month's safety incidents
- Anticipated site hazards
- Anticipated engineering controls and equipment on site
- Anticipated work practices to minimize hazards
- Anticipated PPE selection
- Anticipated site decontamination procedures
- Upcoming activities.

7.2.4 Daily Safety Meetings

The Site Superintendent and the SSHO will assess each work area for potential hazards before beginning work in that area and will hold daily safety meetings with all site personnel at the beginning of every work shift. These daily safety meetings will be brief and meaningful. A serious discussion will occur on the following issues as they pertain to each day's work:

- Review of previous shift safety concerns (near misses, accidents, etc.)
- Work planned for the current shift
- Safety hazards associated with this shift's work
- Tools and equipment to be used, and special safety and maintenance procedures/requirements to be used with the equipment
- Prework inspections to be performed
- Emergency plan
- End-of-day work area condition including cleanup, placement of equipment and materials, and preparation for next day.

7.3 Selection, Approval, and Monitoring

The USACE representative, PM, Site Superintendent, and CQCSM will approve all detailed QC procedures incorporated into the CQC Plan. The same parties will approve subsequent changes following initiation of work. QC monitoring, observation, and surveillance systems will be coordinated with key construction steps under each DFW, testing, and three-phase QC inspection point.

The CQCSM will keep a daily logbook to document observations of construction activities and will report on the status of ongoing testing and analytical results and any other data relevant to the QC effort. The daily logbook will be used to support the DCQR and will be archived as part of project records. The CQCSM will closely monitor the actual field testing, verifying proper procedure technique, sample handling, and chain of custody, if required. The CQCSM will report the results of testing to provide timely authorization to proceed with work sequence or initiate nonconformance action.

7.4 Change and Control Procedures

CAPE will identify, document, and track the status of changes in project activities. A Field Variance Report (FVR) will document changes in procedures or conditions that are inconsistent with the stated SOW and could have a cost impact on the project. Proposed changes that have not physically occurred will also be documented on an FVR. In instances where the physical work has been completed, the FVR will be used to provide the as-built information and allow the opportunity to review the impact of those potential changes on other components of the work.

The Site Superintendent and the CQCSM, as required, will prepare the FVR and submit it to the PM for review. The PM will discuss potential changes with the appropriate USACE representative and CAPE's technical staff. Before routing the FVR, the Site Superintendent will assign an FVR number using the document control system, retain a copy for the FVR log and contract files, and then forward a copy of the FVR to the PM. The CQCSM will monitor the documentation and provide support. The responsible engineer, Site Superintendent, and PM will review the change request. Upon resolution, each will sign the FVR and forward the FVR to the USACE representative for review and processing.

CAPE's PM will also use the Work Variation Notification (WVN) process to document variances to the project scope and contract requirements. The WVN will include a description of the original requirement versus the proposed change, the technical justification for the proposed change, and the cost and schedule impacts. The government will review the WVN and will issue direction to move forward with the deviation or to stop work.

7.5 Construction Activities and Definable Features of Work

This section identifies the construction activities as DFWs that will require QC monitoring, testing, and observation. A DFW is an activity that is separate and distinct from other activities and that requires separate QC activities. In general, each discipline or work item is considered a DFW. Subactivities within a discipline or work item can be considered a DFW if separate and distinct control requirements exist. QC is accomplished for each of these DFWs using the USACE three-phase process.

Surveillance during the execution of these activities will be noted on the appropriate forms contained in Appendix G. For each task assignment, specific charts, checklists, etc., will be prepared to assist the CQCSM in ensuring that the work elements are properly performed. A detailed schedule of QC observations and testing by DFW is presented in Table 1.

7.5.1 Project Planning and Submittals

Project planning will include locating and clearing utility locations, securing site access, and conducting a preconstruction meeting. CAPE will also be responsible for coordinating project submittals. Submittals are typically categorized as one of the following: preconstruction submittals, shop drawings, product data, samples, design data, test reports, certificates, operation and maintenance data, and closeout submittals. Submittals are classified as government approved/accepted, government approved, government accepted, or information only. CAPE will coordinate submittals listed in the Submittal Register, which is included in Section 01330 of the specifications. Each submittal will be complete and in sufficient detail to allow ready determination of compliance with the contract requirements. Before submittal, all items will be checked and approved by CAPE's CQCSM and each item will be stamped, signed, and dated by the CQCSM indicating actions taken. Proposed deviations to the contract requirements will be clearly identified. Submittals requiring government approval will be scheduled and made before the acquisition of the material or equipment covered thereby.

7.5.2 Mobilization

Mobilization is the actual movement of personnel and equipment onto the site to establish a presence for project implementation and will include the following activities:

- Mobilize equipment and personnel
- Locate and establish equipment and material staging areas.

7.5.3 Site Preparation

CAPE will perform the following site preparation activities:

- Establish support area
- Establish initial site controls and zones
- Monitoring well abandonment
- Construct necessary erosion controls
- Clear vegetation and establish access routes
- Establish stabilized construction entrances/exits
- Construct safety fence.

7.5.4 Contaminated Creekbed Sediment and Berm Excavation and Staging

CAPE will remove contaminated materials from the defined areas, including the entire length of the on-base portion of the creek channel, berms that are adjacent to the on-base portion of TMC, 16 silt deposits that are located in the off-base portion of the creek, and an off-base pond that receives flow from the creek. Excavated materials will be stockpiled in designated staging areas.

7.5.5 Backfill of Excavations and Placement

As described in Section 5.1.7, TMC areas (outside of the channel) disturbed during construction will be backfilled and/or graded to match the surrounding area, then will be restored with a vegetative cover. Backfill material will be taken from onsite and offsite sources. Materials excavated from the constructed wetland areas will be used as backfill behind diversion structures and creek banks because these areas will most benefit from the existing seedbank. Imported backfill from a NYSDEC-approved source is required to have less than 7 percent organics and have one of the following classifications: ML, SM, SW-SM, or SP-SM. Topsoil that is stripped from wetland or upland areas during site preparation will be reused in these respective areas. Topsoil removed from creek remediation areas will not be reused.

7.5.6 Establishment of Vegetation

Backfilled and/or graded areas will be revegetated with a variety of seed mixtures and other plantings. Wetland and upland conservation seed mixes and shrub resource islands will be planted in all restored areas as described in Section 5.1.7. All backfilled and graded areas will be seeded, fertilized, and watered in accordance to Section 02950 of the specifications. ECM will be installed over the entire length of creek bank in accordance with manufacturer's recommendations.

7.5.7 Waste Characterization

Soil samples will be collected from each of the soil stockpiles to characterize the soil and to prepare the shipping manifests and other paperwork required for disposal. Complete sampling protocols are defined in the FSP section of the SAP, which is included as Appendix D of this work plan.

7.5.8 Transportation and Disposal of Debris

CAPE will transport and appropriately dispose of all debris resulting from the soil removal actions.

7.5.9 Contaminated Soil Loadout, Transportation, and Disposal

CAPE will self-perform soil loadout and onsite transportation to Landfill 6. CAPE will supervise the transportation and offsite disposal of all contaminated soil and debris removed from the sites.

7.5.10 Equipment Decontamination

Equipment will be decontaminated in accordance with Section 3.6 of this work plan.

7.5.11 Sampling and Disposal of Wastewater

CAPE will sample and appropriately dispose of wastewater generated from the cleaning and decontamination of equipment and debris.

7.5.12 Demobilization

Once site restoration activities are complete, CAPE will:

- Clean all affected areas of the site

- Remove support facilities, temporary stormwater and erosion-control measures, temporary construction roads, ramps, and decontamination facilities
- Disconnect and remove temporary utilities
- Remove unnecessary locks
- Prepare and submit final documentation of completed work and project areas
- Notify all applicable parties that the remediation activities are complete.

The USACE and CAPE will then perform a final inspection of the areas to ensure compliance with the work plan and the contract documents.

7.6 Inspections

To ensure that all construction activities comply with the requirements of the contract, CAPE's CQCSM or another designated member of the QC Team will perform QC inspections. The types of QC inspections will include preparatory, initial, follow-up, and completion inspections for all DFWs. For each preparatory and initial inspection, the CQCSM will develop a narrative description that presents the detailed QC procedures to be used. This documentation will be finalized and approved at the QC meeting held for each distinct inspection and will become part of the minutes to the meeting that are attached to the DQCR. The QC inspection will be scheduled and conducted by the CQCSM or another designated member of the QC Team. The CQCSM or another designated member of the QC Team will document all QC meetings with meeting minutes. Compliance with all QC requirements is accomplished by using this three-phase process for all DFWs.

7.6.1 Preparatory Phase

The CQCSM or another designated member of the QC Team will review construction drawings, submittal status, material requirements and onsite availability, worker qualifications, and equipment requirements before beginning work on each DFW. This review will be performed with all subcontractors involved in the DFW. During this phase, qualified staff will be assigned, testing controls prepared, and safety concerns addressed. This phase will include:

- Review of the particular activity in the work plan
- Verification that all required submittals have been completed and approved
- Review to ensure that all materials and equipment have been delivered, tested, and approved
- Review of provisions to provide required control inspection and testing
- Examination of the work area to ensure that all required preliminary work has been completed and is in compliance with the contract

- Physical examination of required materials and equipment to ensure that they are on hand; conform to approved plans, drawings, or other submitted data; and are properly stored

- Review of the appropriate activity hazard analysis (AHA) to ensure safety requirements are met

- Discussion of procedures for controlling quality of the work including repetitive deficiencies

- A check to ensure that the plan for the work to be performed has been accepted by the USACE

- Discussion of the initial control phase

- Documentation of the QC process including narrative description of detailed QC inspection procedures, meeting minutes, inspection results, corrective measures, etc., using forms presented in Appendix G.

CAPE will notify the onsite USACE representative at least 48 hours in advance of beginning the preparatory phase. This phase will also include a meeting conducted by the CQCSM or another designated member of the QC Team and attended by the Site Superintendent and other appropriate staff responsible for the DFW. The results of the preparatory phase actions will be documented by separate minutes prepared by the CQCSM or another designated member of the QC Team and attached to the DQCR. The CQCSM or another designated member of the QC Team will also instruct applicable subcontractor staff as to the acceptable level of workmanship required to meet contract specifications and familiarize all workers with the safety precautions developed in the AHA.

7.6.2 Initial Phase

The initial phase of inspection will occur when a sufficient amount of work has been accomplished so that a representative sample has been completed. The initial phase will verify that control for the work developed in the "preparatory meeting" is implemented and work is performed to the level of workmanship mutually agreed upon. CAPE will ensure that subcontractor and CAPE workers understand, through immediate inspection, the contract standards and the standards of workmanship desired. If there is a difference of opinion in the interpretation of contract requirements, the issue will be settled at this time. The initial inspection phase is a practical method of performing preventive inspection and resolving conflicts. The following will be accomplished during this phase:

- A check of work to ensure that it is in full compliance with the contract requirements. Minutes of the preparatory meeting will be reviewed by the onsite USACE representative

- Verify adequacy of controls to ensure full contract compliance. Verify required control inspection and testing

- Establish level of workmanship and verify that it meets the desired acceptable workmanship standards

- Resolve all differences

- Check safety to include compliance with and upgrading (if necessary) of the safety plan and AHA. Review the AHA with each worker

- Documentation of QC process, including narrative description of detailed QC inspection procedures, minutes of meetings, inspection results, corrective measures, etc., using forms presented in Appendix G.

CAPE's CQCSM or another designated member of the QC Team will notify the USACE representative at least 48 hours in advance of beginning the initial phase. Separate minutes of this phase will be prepared by the CQCSM or another designated member of the QC Team and attached to the DQCR. Exact location of the initial phase will be indicated for future reference and comparison with the follow-up phase.

The initial phase will be repeated for each new crew working on site, any time after an extended work stoppage (greater than a week), or any time acceptable specified quality standards are not being met.

7.6.3 Follow-Up Phase

Follow-up inspection and testing will be geared to a level of effort sufficient to verify the continuation of contract compliance and standards of workmanship established during the previous two phases. Daily checks will be made a matter of record in the CQC documentation for each DFW. Final follow-up checks will be conducted, and all deficiencies will be corrected before the start of additional DFWs that may be affected by any deficient work.

7.6.4 Additional Preparatory and Initial Phases

Additional preparatory and initial phase inspections will be conducted of the same DFWs if the quality of ongoing work is unacceptable, if there are changes in the CQC staff or work crew, if work on a DFW is resumed after a substantial period of inactivity, or if other problems develop.

7.6.5 Completion Phase

At the completion of the DFW, the CQCSM or another designated member of the QC Team will conduct a completion inspection to verify that all work items are complete and in conformance with the project plans and specifications.

7.6.5.1 Prefinal Inspection. Upon completion of all work, the CQCSM will conduct an inspection of the work and develop a "punch list" of items that do not conform to the approved drawings and work plan. Such a list of deficiencies will be included in the

CQC documentation and will include the estimated date by which the deficiencies will be corrected. These inspections and any deficiency corrections required following prefinal and final inspections will be accomplished within the time slated for completion of the project.

7.6.5.2 Final Acceptance Inspection. CAPE's CQCSM or other designated member of the QC Team, representatives from applicable subcontractors, and the USACE representative will be in attendance at this inspection. The USACE representative will formally schedule the final acceptance inspection. Notice will be given to the USACE representative at least 14 days before the planned final acceptance inspection date.

7.7 Nonconformance and Corrective Action

All identified nonconforming construction methods, procedures, and materials will be corrected through systematic actions. Any time a condition exists that does not comply with the project plans, applicable codes, workmanship standards, or USACE requirements, the nonconformity will be resolved. The CQCSM will take the following actions:

- If at any time materials or workmanship are observed that do not comply with project plans, codes, or acceptable construction practices, the CQCSM will notify the CAPE Site Superintendent and subcontractor (if appropriate) to initiate prompt corrective action
- The discrepancies, if they cannot be verbally communicated and corrected immediately, will be documented on a Nonconformance Report (NCR) form (see Appendix G). A detailed description will be given of the item or condition that has failed to meet the project plan or other requirements with an explanation of conditions at the time of failure and its probable cause
- The CQCSM, subcontractor, and Site Superintendent will evaluate discrepancies, coordinate the problem resolution, and determine methods of correction that will prevent recurrence of the problem
- When corrective action is complete, the item will again undergo a final inspection
- The CQCSM will note on the Final Acceptance Report any retest required and performed, nondestructive examination (NDE) required and performed, or changes in identification of any replacement parts used in correcting the problem
- A distribution list for discrepancy reports will be determined at the initial project-planning meeting. At a minimum, distribution will include the USACE representative, PM, Site Superintendent, CQCSM, and CAPE's QA Director.

7.8 Documentation

QC records are the primary means of documenting and reporting construction quality and conformance with contract documents. This section outlines the general procedures that will be followed for the identification, use, handling, filing, storage, and disposition of QC records.

7.8.1 Responsibility

The CQCSM will verify that required records are prepared as work is performed to provide documented evidence of the quality of items, services, and activities. Records will be consistent with applicable codes, work plans, and contracts, and will be adequate for use in management of the project. Inspection and test records will identify the inspector or data recorder, the type of observation, the results, and the acceptability or action taken in connection with any deficiency.

7.8.2 Requirements

Individual inspections, tests, and observations will be scheduled at predetermined points in the project. The proper documentation to record these activities will be compiled by the CQCSM or another designated QC Team member and discussed with the testing personnel before execution. The CQCSM or another designated QC Team member will monitor the inspection process and document progress and observations in the QC logbook. This information will be summarized in the DQCRs provided to the onsite USACE representative, Site Superintendent, and CQCSM.

7.8.2.1 Reports and Records. The CQCSM will maintain current records providing factual evidence that required QC activities and/or tests have been performed. These records will also address the work of subcontractors and suppliers and will be on an acceptable form that includes, at a minimum, the following information:

- Contractor/Subcontractor and their area of responsibility
- Description of equipment used and number of hours used, idle, or repaired
- Work performed, including a description and a sketch, if necessary
- Test and/or control activities performed with results and references to work plan requirements. The control phase will be identified (preparatory, initial, or follow-up). Any deficiencies will be noted along with corrective actions
- Quantity of materials received at the site with statement as to acceptability and storage
- Submittals reviewed and action taken
- Offsite surveillance activities and actions taken
- Job safety evaluations stating what was checked, instructions, corrective actions, and results
- Contractor's statement verifying compliance with contract documents.

These records will cover both conforming and deficient features and will include a statement that the equipment and materials incorporated in the work as well as the workmanship comply with the contract requirements. The reports will be signed and dated by the CQCSM. The report from the CQCSM will include copies of test reports and copies of reports prepared by all QC personnel.

7.8.2.2 Forms. Construction QC forms will be used for visual observations, inspections, and testing. The CQCSM or another designated QC Team member will witness all required field-testing and sign the appropriate forms for the work to be accepted. Inspection and testing forms will identify the equipment, materials, and installations involved, and checklists will be marked where applicable. Locations, orientations, elevations, test parameters, test results, and other comments will be included on the forms, as appropriate. Forms will be dated and signed by the person performing the observation, inspection, or test. Forms will also be signed and dated by the CQCSM and submitted to the Site Superintendent for approval.

The CQCSM will document all QC activity on the appropriate forms. Appendix G contains the formats for the DQCR, FVR, List of Outstanding Deficiencies, NCR, Submittal Register and Transmittal Forms, CQC Test Report List, Record of Preparatory and Initial Inspections, Preparatory Inspection Outline, Initial and Follow-up Phase Checklist, and Field Inspection Report. Additional forms may be used as necessary.

7.8.2.3 Control. A standard records management and document control system will be used. The PM will be responsible for implementing the system for the entire project and the Site Superintendent will be responsible for implementing these practices in the field.

Elements of the records management system include:

- Master index system
- Logging and issuing of document numbers
- Method to determine status of documents in progress
- Standardized procedures/forms
- Proper storage of documents
- Retrieval
- Archiving.

Elements of the document control system include:

- Logging and issuing of control numbers
- Assignment of a central control person
- Controlled access.

Project records will be maintained in a safe and retrievable manner until project closeout. Physical and electromagnetic protection will be provided until records are delivered to the client or archived. Archived records will be protected from loss or damage for 5 years or as specified by the government.

8.0 SITE SAFETY AND HEALTH PLAN

8.1 Background Documents

The purpose of the SSHP is to identify and evaluate S&H hazards at the project worksite and to prescribe safety control measures to be implemented. This SSHP has been prepared to meet the requirements of: OSHA standards, 29 CFR Part 1910 and 29 CFR Part 1926, including the "Hazardous Waste Operations and Emergency Response" regulation (29 CFR 1910.120; 29 CFR 1926.65); USACE *Safety and Health Requirements Manual* (EM 385-1-1); and the USACE Kansas City SOW entitled *The Former Griffiss Air Force Base, Rome, Oneida County, New York. Three Mile Creek Area of Concern Remedial Action Work Plan Scope of Work*.

Appendices to this SSHP include, AHAs located in Appendix H of this plan, and SSHP forms located in Appendix I.

This SSHP will serve as the primary S&H guidance for work on the project. This SSHP:

- Provides general background information related to the project
- Assigns responsibilities for SSHP implementation
- Identifies site hazards and hazard-control measures
- Describes the exposure monitoring program
- Establishes requirements for site control and PPE
- Discusses S&H procedures and designates emergency response plans
- Reviews training, medical surveillance, and recordkeeping programs to be implemented at the site.

The CAPE PM, Site Superintendent, SSHO, and SHM will primarily implement the SSHP in coordination with the onsite USACE representative. Compliance with the SSHP is required of all CAPE personnel, subcontractors, and associated third parties on site. A copy of the SSHP will be maintained on site during work activities and will be available for inspection and review by site or agency personnel. Field personnel will review applicable aspects of the SSHP before site work and will sign an acknowledgment form indicating that they have reviewed the pertinent aspects of the plan.

The contents of the SSHP may be revised and/or amended should additional information become available regarding the hazards present at the site and/or should significant changes occur in the SOW, operational procedures, site hazards, and/or hazard-control measures. The SSHP may be modified by the SSHO upon review and approval of the onsite USACE representative, PM, and SHM. Field personnel are informed of changes to the SSHP through safety meetings and written addenda or revision to the SSHP.

8.1.1 CAPE Project Fieldwork Activities

For the purposes of this plan, CAPE has organized the project into the following primary fieldwork activities:

- Mobilization and site preparation
- Contaminated soil and debris excavation, staging, and onsite disposal
- Waste characterization and confirmation sampling
- Construction of natural earthwork controls
- Backfill, site restoration, and demobilization.

8.2 Site Hazards

Site hazards and hazard-control measures for chemical, physical, and biological hazards, and AHAs are reviewed in this section of the SSHP.

8.2.1 Chemical Hazards

Chemical contaminant information associated with the project was obtained from the *Final Three Mile Creek Feasibility Study Addendum, Former Griffiss Air Force Base, Rome, New York,* (E&E 2002a). This document discusses findings and conclusions of a sampling program conducted at the site in 2001. Contaminants detected (at concentrations exceeding ecological and/or human health risk levels) during the on-base portion of the TMC channel and its Landfill 5 tributary are indicated below.

PCBs: Arochlor 1242 PCB was detected in one sample at 71.4 micrograms per kilogram (µg/kg). This is slightly higher than its ecological screening level of 70 µg/kg. Arochlor 1260 PCB levels ranged from nondetect in 12 samples to a high of 45,300 µg/kg in one sample.

Pesticides: Eighteen pesticides were detected. Sixteen were found at concentrations exceeding ecological screening criteria in at least one sample. None of these compounds exceeded human health risk levels.

Dioxins: Dioxins were detected in 33 of the 49 samples tested (including duplicates) at concentrations ranging from 0.02 nanograms per kilogram (ng/kg) to 72,076. Dioxins were detected at levels exceeding the ecological screening criteria of 10 ng/kg and 1 ng/kg, respectively, in 12 of the sediment samples analyzed. Dioxins were detected above ecological criteria in only one of the native soil samples. Dioxins were not detected above human health risk levels.

Volatile Organic Compounds (VOCs): Twenty-one VOCs were detected. VOCs detected at concentrations higher than ecological screening criteria are 1,2-dichlorobenzene, 1-4-dichlorobenzene, benzene, and chlorobenzene. VOCs were not detected above human health risk levels.

Semivolatile Organic Compounds (SVOCs): Thirty-one SVOCs were detected; 26 of these were found at concentrations exceeding the screening criteria in one sample. Two polyaromatic hydrocarbons (PAHs), benzo(a)pyrene and dibenzo(a,h)anthracene, exceeded human health risk levels in four samples.

Metals: Twenty metals were detected, including 10 that were detected at concentrations exceeding their ecological screening criteria. The metals detected at concentrations higher than ecological screening criteria included: arsenic, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, and zinc. Only one metal (arsenic) exceeded the human health risk level in one sample.

Based on the above site contaminant data, the potential for exposure to chemical contaminants during site work is expected to be minimal. There should be minimal potential for exposure to VOCs during site work and a limited potential for exposure to contaminants as airborne particulates.

Table 2 provides chemical hazard information for site contaminants that were detected during the 2001 sampling program in concentrations exceeding human health risk criteria. The table includes a summary of the health effects, potential routes of entry, and the OSHA permissible exposure limits (PELs) or American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit values (TLVs) for these hazardous substances (lowest value).

8.2.1.1 Hazardous Substances with Anticipated Use at the Site. A listing of hazardous substances with anticipated use during site fieldwork is provided below. A Hazardous Substances Inventory List will be prepared by the SSHO. The SSHO will maintain MSDSs for hazardous substances to be used during site work including:

- Fuels and lubricants: diesel and gasoline fuel for vehicles and equipment
- Lubricants: oil, grease, and other lubricants for equipment
- Fire extinguisher, dry chemical powder: dry chemical for fire extinguishers.

8.2.2 Physical Hazards

The primary physical hazards anticipated for site work are listed below. Also indicated is a review of these physical hazards and their application to site work (also see Table 3). Information following this describes safety control measures for these physical hazards.

Fire Protection and Hot Work (see Section 8.2.2.1): Gasoline and/or diesel fuel will be used for vehicles, heavy equipment, and machinery operation. Fire extinguishers will be available on site. Hot work (work that uses a flame or creates sparks) may be needed during site work. Hot work permit procedures will be implemented should hot work be needed.

Underground and Overhead Utilities (see Section 8.2.2.2): Underground and/or overhead utility lines may be present at the site. Subsurface work will require that a utility clearance survey be conducted before initiation of excavation. The presence of overhead utilities will be surveyed before bringing equipment with high extensions (e.g., heavy equipment, dump trucks) into a work area.

Heavy Equipment Operation (see Section 8.2.2.3): Heavy equipment will be used to excavate and load contaminated soil, backfill excavated areas, and to perform other earthmoving activities. Ground personnel will at times be working in the general vicinity of equipment operation. Heavy equipment will be inspected daily and documented. Ground personnel will position themselves out of the swing radius of operating heavy equipment whenever possible. Persons will not be allowed to walk underneath loaded buckets. Ground personnel will wear high-visibility safety vests and be required to maintain visual contact with equipment operators. Hand signals will be established.

Excavation and Trench Safety (see Section 8.2.2.4): Excavation activities requiring personnel entry into excavations 4 feet or more in depth will require strict implementation of excavation safety procedures. Operations involving personnel entry into trenches 4 feet or more in depth or excavations 5 feet or more in depth will require protective systems for excavation operations (sloping, benching, shielding, and/or shoring) and compliance with the OSHA "Excavation" standard. For these operations, a "Competent Person" will supervise operations, conduct daily inspections, and implement protective systems for excavation operations.

Vehicle and Equipment Traffic Control (see Section 8.2.2.5): Concurrent heavy equipment, dump truck, and the presence of ground personnel may occur during site work. Traffic patterns will be established at the site for truck traffic, as needed. Personnel will wear high-visibility safety vests when working near traffic areas. Spotters will be used if needed for backing of vehicles into tight work areas.

Driver Safety (see Section 8.2.2.6): Trucks may be used to haul materials to and from the site. Designated truck traffic haul routes, driver safety procedures, and measures for compliance with DOT requirements, as applicable, will be followed.

Material Handling (see Section 8.2.2.7): Material handling involving lifting and carrying of materials will be required. Personnel will review proper lifting techniques during safety meetings.

Tools, Machinery, and Equipment Use (see Section 8.2.2.8): Hand and power tools such as drills, saws, and wrenches will be used. Tools will be used according to design. Power tools requiring electrical cords will use ground fault circuit interrupters (GFCIs).

Electrical Equipment and Lockout/Tagout (see Section 8.2.2.9): Electrical power on site may be provided using generators. GFCIs will be used and electrical extension cords inspected should portable electrical equipment be needed. Lockout/Tagout of electrical equipment for maintenance and servicing is not expected but will be completed if needed.

Noise Exposure (see Section 8.2.2.10): Noise exposure above 85 decibels on the A-weighted scale (dBA) is expected when working near or operating machinery and equipment (e.g., heavy equipment, generators). Earplugs will be used for worker protection.

Heat Stress (see Section 8.2.2.11): Heat stress conditions may occur from elevated ambient temperatures, heavy workloads, and impermeable protective clothing use.

Provisions will be made to establish break areas, provide fluids, and adjust work-rest schedules, as needed.

Cold Stress (see Section 8.2.2.12): Cold stress conditions may occur during the winter months. Provisions will be made to protect personnel from cold stress conditions.

Permit-Required Confined Spaces (see Section 8.2.2.13): Personnel entry into confined spaces may occur during site work (work inside excavations and/or entry into Frac tank for cleaning). Personnel are prohibited from entering a confined space unless: the space has been tested, a qualified "Entry Supervisor" has approved the space for entry, and a confined space entry permit has been issued. Confined space entries must be performed in accordance with OSHA "Permit-Required Confined Space" regulations.

Compressed Gas Cylinder Safety (see Section 8.2.2.14): Gas cylinders may be used if hot work is needed. Compressed gas cylinders will be moved with caps installed and stored upright and secured with rope or chain.

Pressure Washer/Steam Cleaner Operation (see Section 8.2.2.15): Pressure washer/steam cleaner equipment may be used for cleaning and equipment decontamination activities. Face and eye protection will be provided for splash protection.

Chain Saw Operation (see Section 8.2.2.16): Chain saws may be used for tree removal. Safety procedures will be used when operating chain saws.

Tree Removal Operation (see Section 8.2.2.17): Tree removal operations may occur in construction areas. Measures will be taken to protect personnel from exposure to tree removal hazards.

Wood Chipper Operation (see Section 8.2.2.18): A chipper may be used during tree removal operations. Measures will be taken to protect personnel from exposure to tree removal hazards.

Power Saw Operation (see Section 8.2.2.19): Power saws may be used and safety procedures will be used when operating sawzalls, chop saws, or similar equipment.

Inclement Weather and Adverse Environmental Conditions (see Section 8.2.2.20): Heavy rain, lightning, snow, and strong winds could occur during outside work operations and provisions will be made to shut down outdoor operations should this occur.

Miscellaneous Physical Hazards (see Section 8.2.2.21): General safety hazards will be present during all project tasks. Poor housekeeping, uneven or slippery walking surfaces, and other slip, trip, and fall hazards, poor illumination, and overhead obstructions are primary hazards. General safety information will be communicated during safety meetings.

8.2.2.1 Fire Protection and Hot Work. Procedures for fire hazards, fire protection, and hot work include:

- Smoking is not allowed in areas where flammable or combustible materials are present
- Fires and open flame devices must not be left unattended
- Portable multipurpose fire extinguishers must be maintained on site at all times, kept fully charged, inspected monthly, and serviced annually. Fire extinguishers are to be placed within 75 feet of active work areas where flammable or combustible materials are present
- OSHA-approved metal safety cans, painted red with a yellow stripe, that have self-closing lids and flame arrestors should be used to store small quantities of flammable liquids
- Static electricity-generating equipment requires bonding and grounding whenever transferring flammable or combustible liquids or when working in areas where these materials are present
- Use of equipment that uses open flames or creates sparks (i.e., torch cutting, grinding) requires implementation of hot work procedures. No hot work is allowed without approval by the SSHO and completion of a "Hot Work Permit" form. A combustible gas indicator is used to determine if combustible vapors or gases exceed 10 percent of the lower explosivity limit (LEL) before hot work in areas where flammable or combustible materials may be present. Hot work must be conducted under a fire watch with a dry chemical fire extinguisher, or equivalent. Hot work personnel should wear protective clothing (i.e., leather chaps, jacket) for protection from metal slag and sparks
- Where potential exposure to injurious radiant energy from torch cutting or welding operations exists, protective lenses shall be used.

8.2.2.2 Underground and Overhead Utilities. Underground and overhead utility safety precautions include:

- The work area must be surveyed to identify underground utilities before subsurface work activity. Utility clearance procedures are implemented for drilling, excavation, and/or other subsurface work activity by contacting the local utility locating organization before subsurface activity is conducted
- The work area must be surveyed for overhead utilities and safety measures established before bringing equipment with high extensions on site (e.g., heavy equipment, dump trucks). Equipment that has high-overhead projections is not allowed to operate within a 10-foot radius (minimum distance) of overhead power lines. Overhead high-voltage power lines more than 50,000 volts require additional distance

- Emergency procedures must be established before excavation in areas where underground and overhead utilities are known to be present. Emergency contact information for applicable utilities (i.e., electrical, natural gas, water, telephone, cable) must be determined

- In the event of contact with a utility line: Remove personnel from the area and control access to the affected area. Contact the utility company for immediate service.

8.2.2.3 Heavy Equipment Operation. Heavy equipment operation safety procedures include:

- Only experienced personnel will operate excavation equipment on site

- Heavy equipment will have rollover protection, seat belts, good functioning brakes, fire extinguisher, and operating backup alarms and horns. Equipment will be checked daily at the beginning of each work shift and recorded by the equipment operator on a "Heavy Equipment Inspection Report" form so that the following systems and parts are in good working order:

  - Service, emergency , and parking brakes
  - Tires/Tracks
  - Horn
  - Steering mechanism
  - Coupling devices
  - Seat belts
  - Operating controls
  - Safety devices
  - Fire extinguisher
  - Backup alarms

- Excavation work areas will be properly marked and guarded with barriers and/or fencing to prevent unauthorized personnel entry and to prevent personnel from falling into open holes

- Workers will be required to wear high-visibility safety vests with reflective striping when working around heavy equipment

- Workers will be cautioned to look carefully where they walk to avoid moving equipment. Concurrent operations will be curtailed to prevent workers from being placed in dangerous proximity to moving heavy equipment

- Before entering the swing radius of operated heavy equipment, ground personnel must gain unobstructed eye contact with the equipment operator. Unobstructed eye contact with the equipment operator must be maintained at all times while working within the swing radius of the equipment. As a courtesy, ground personnel should "signal" the equipment operator when they are exiting the swing radius of the heavy equipment

- Personnel are not permitted to ride as passengers on heavy equipment

- Whenever equipment is parked, the parking brake will be set, and wheels will be chocked when on inclines. Bulldozer blades, hoe buckets, truck beds and the like will be fully lowered or blocked when not in use. Parts of machinery held aloft, such as hoe buckets or truck beds, will be blocked or cribbed before employees are allowed to work under or between them

- Dust-control measures (i.e., water application) will be used as needed to minimize airborne dust during heavy equipment operation.

8.2.2.4 Excavation and Trench Safety. Excavation and trenching requirements include those contained in the OSHA 29 CFR Subpart P 1926.650-652 standard "Excavations." Compliance with these requirements must be maintained when installing trenches 4 feet or more in depth and/or excavations 5 feet or more in depth into which personnel are required to descend. Standard excavation and trenching safety procedures include the following:

- Conduct and/or review utility clearance information and determine the location of overhead and underground utilities before excavation

- Contact the local utility locating organization within 48 hours before excavation operations, obtain a permit (as required), and renotify them if an extended excavation period is required

- Delineate the areas to be excavated with white paint or other suitable markings. Before excavating, check for the local utility location markings with the following color code:

  <u>RED</u>: Electric Power
  <u>YELLOW</u>: Gas Distribution
  <u>ORANGE</u>: Telephone and Communications
  <u>BLUE</u>: Water Installation
  <u>GREEN</u>: Sewer

- Find the exact location of substructures by hand excavation methods if sensitive underground substructures are present. It is recommended that a 24-inch excavation zone on exterior walls of subsurface installations be maintained, as required by the SSHO or Competent Person

- See that no construction equipment or personnel come closer than 10 feet from an energized overhead high-voltage line. Overhead high-voltage power lines greater than 50,000 volts require additional distance

- Properly mark and guard excavations to prevent personnel from falling into an open hole. Fence, barricade, tape off, or otherwise secure open trenches during nonwork periods

- Surface encumbrances near the excavation (e.g., trees, boulders, poles) must be removed

- A designated OSHA "Competent Person" must provide onsite supervision during excavation activities and must be present at all times when personnel are in the excavation. The Competent Person must examine the excavation before work in the excavation, must make daily inspections of excavations, adjacent areas, and protective systems where employee exposures exist, and must inspect the excavation after a rainstorm or other hazard-increasing occurrence. Daily inspections are to be recorded by the Competent Person on the “Excavation Safety Checklist” and “Excavation Safety Soil Analysis Checklists”

- Use of protective systems such as shoring, sloping, benching, or shielding, is required for personnel entry into trenches 4 feet or more in depth and/or excavations 5 feet or more in depth

- Access to an excavation is required within 25 feet of lateral travel for trenches 4 feet or more in depth into which persons will descend. Stairways, ladders, or ramps must be provided for excavation access

- Persons exposed to equipment and vehicle traffic are required to wear high-visibility safety vests with reflective striping

- Mobile equipment warning systems are required when equipment operators do not have a clear and direct view of the edge of the excavation

- Spoil must not be placed closer than 2 feet from the edge of trenches and excavations

- Trenches shall be crossed only if safe crossing is provided and for excavations greater than 7.5 feet deep, standard guardrails and toe boards are required on walkways or bridges

- Persons are not permitted underneath loads handled by digging equipment and employee protection from falling into the vicinity of operating excavation equipment is required

- Water accumulation in or adjacent to excavations must be prevented through diversion ditches or dikes

- Excavation work is not allowed to be conducted at the base of foundations, retaining walls or other structures until inspected by a Competent Person and found that no hazard of undermining exists

- Existing walls or other structures are not to be used as retaining walls to hold part of an excavation or backfill unless it will safely withstand all expected loads

- Braces or other supports are required for excavations adjacent to streets, railroads, or other sources of vibration or superimposed loads

- Operations of tractors, backhoes, bulldozers, and excavators must be operated cautiously where there is a possibility of overturning in dangerous areas such as edges of deep fills, cut banks, and steep slopes. Cuts below banks and cliffs are not allowed when excavating equipment is operating near the top of them

- Atmospheric testing is required in excavations where oxygen-deficient or hazardous atmospheres exist or could reasonably be expected to exist. If hazardous atmospheres are present, ventilation, respiratory protection, and atmospheric testing must be used and emergency equipment must be readily available (e.g., self-contained breathing apparatus [SCBA], safety harness and line, basket stretcher)

- The Competent Person must classify each soil and rock deposit as stable rock, Type A soil, Type B soil, or Type C soil. Soil classification is made based on the results of at least one visual test and one manual test to identify the properties, factors, and conditions affecting the classification of the soil

- Layered systems are classified per its weakest layer or by each layer individually where a more stable layer lies under a less stable layer

- Changes in the properties, factors, or conditions of a deposit must be evaluated by a Competent Person and reclassified, as necessary

- A Competent Person shall complete a visual soil classification test by observing the excavated soil, estimating the particle size range and relative amounts, and checking the excavation and the area adjacent to the excavation for:

  - Soil cohesion
  - Tension cracks that could indicate fissured material
  - Chunks of soil that spall off a vertical side that could indicate fissures
  - Existing utility and other underground structures
  - Previously disturbed soil
  - Layered systems that slope toward the excavation
  - Evidence of surface water or water seeping from sides of the excavation
  - Sources of vibration

- A Competent Person shall complete at least one of the following manual soil classification tests to determine qualitative and quantitative information for soil and rock deposit classification:

  - Plasticity test
  - Dry strength test
  - Thumb penetration test
  - Pocket penetrometer test
  - Hand-operated shear vane test
  - Drying test

- Visual and manual soil classification tests will be recorded on the "Excavation Safety Soil Analysis Checklist" form

- A Registered PE is required to design sloping, benching, or other protective systems for excavations greater than 20 feet deep

- Maximum allowable sloping when used as an excavation protection system is classified according to the soil or rock type below:

  - Stable rock: Maximum allowable slope of * vertical (90º)
  - Type A soil: Maximum allowable slope of * ¾ to 1 (53º)
  - Type B soil: Maximum allowable slope of * 1 to 1 (45º)
  - Type C soil: Maximum allowable slope of * 1-1/2 to 1 (34º)

  * (Horizontal to vertical) for excavations greater than 20 feet deep.

8.2.2.5 Vehicle and Equipment Traffic Control. Vehicle and equipment traffic control procedures are required due to the presence of concurrent vehicle, equipment, and/or pedestrian traffic and require the following:

- Personnel are required to wear high-visibility safety vests with reflective striping where exposure to vehicle or equipment traffic exists

- Workers will be cautioned to look carefully where they walk to avoid vehicles and moving equipment and to maintain eye contact with equipment operators

- Use of traffic signs, barricades, flashers, delineators, traffic cones, and/or flagmen (as needed) around work areas with vehicle or equipment traffic

- The PM, Site Superintendent, and/or SSHO will establish vehicle and equipment traffic patterns to be used. Traffic haul routes will be identified during daily safety meetings and will take into account times and locations of concern for vehicle, equipment, and pedestrian traffic exposures in the work area.

8.2.2.6 Driver Safety.

- Drivers will obey all traffic laws and rules of the road with emphasis on following distance and speed appropriate to conditions

- Only properly licensed and permitted drivers will be allowed to transport hazardous materials. Drivers will have had a current DOT medical exam and are subject to DOT drug and alcohol testing, as required. Drivers will observe all DOT requirements for transport of hazardous materials and/or hazardous waste including requirements for: driver training; shipping papers (i.e., bill of lading, hazardous waste manifest); proper containers (approved container, adequate closure, compatible material); labeling and marking of containers; loading and placarding of vehicles; securing the load; and hours of service

- Drivers will see that areas are clear before backing vehicles and will use a single spotter, if needed

- Drivers will watch for overhead utility line clearance

- Truck drivers will leave the cab while the vehicle is being loaded when they are exposed to danger from suspended loads or overhead loading equipment unless the cab is adequately protected. When outside of vehicles, drivers will wear hard hats and other prescribed PPE, as directed. Truck drivers operating in an EZ need to be Hazardous Waste Operations and Emergency Response (HazWOPER) trained and current with their medical surveillance.

- As required, drivers will use truck bed liners and tarp truckloads of contaminated waste before transport. Personnel assisting with the tarping of vehicle loads will place wheel chocks, use ladders and/or scaffolding, and wear fall protection equipment, as required by the SSHO, to minimize fall hazards. Workers are not to step on wheels or tires to climb onto truck siding

- Vehicles exiting a site EZ will have tires and affected exteriors decontaminated using methods directed by the SSHO

- Drivers will keep vehicle windshields and mirrors clean. Drivers will keep vehicle steps clean and drivers will watch their step when exiting vehicles to avoid ankle sprains.

8.2.2.7 Material Handling. Procedures for material handling, storage, and disposal include:

- Material handling devices should be used for handling heavy or bulky items whenever possible over manual material handling. Whenever handling heavy or bulky items, the material handling needs should be evaluated in terms of weight, size, distance, and path of movement. The following hierarchy for selection of material handling means should be used: elimination of material handling needs by engineering; movement of material by mechanical device (i.e., lift truck, overhead crane, conveyor); movement by manual means with handling aid (i.e., dolly, cart); and movement using safe lifting techniques

- Personnel must be trained in safe lifting procedures including:

  - Size up the load first
  - Get help if the load is bulky, heavy, or of unwieldy length
  - Be sure of footing
  - Lift with your legs while keeping your back straight
  - Keep your balance
  - Do not twist under strain or jerk the load
  - Keep the load close to your body

- When two or more persons are carrying long material together, all persons must carry the material on the same shoulder and lift or lower the material in unison.

8.2.2.8 Tools, Machinery, and Equipment Use. Tools, machinery, and equipment use safety procedures include:

- Equipment and tool inspection and maintenance is required to promote safe condition for the intended use. Tools and equipment should be inspected daily or before each use for defects. Tools that are burred, broomed, mushroomed, have split or loose handles, worn or sprung jaws, or are generally unsafe should be turned in to the SSHO

- Motor vehicles, including contracted and rented trucks, will be inspected by the operator daily or before each use for defects. Vehicles that are deemed unsafe will not be used until repaired and re-inspected.

- Defective or unsafe equipment must be tagged with "Do Not Use" or "Defective Do Not Use" tags until repaired or otherwise made acceptable. Defective or unsafe equipment must be removed to a secure place to prevent inadvertent use until repaired. Repaired items must be reinspected by the SSHO before being placed back into service

- Equipment must be used only for the purpose for which it was designed. Use tools properly (do not use a wrench for a hammer, screwdriver for a chisel, pliers for a wrench, pipe or Stillson wrenches as a substitute for other wrenches, a pipe handle-extension or a "cheater" on a wrench). All modifications, extensions, replacement parts, or repairs of equipment must maintain at least the same factor of safety as the original equipment

- Equipment containing liquid systems (i.e., fuel, hydraulic, lubrication) are to be inspected daily so that liquid-containing systems (e.g., hoses, tubing, hydraulic lines) are in good operating condition and that plugs, stoppers, valves, etc., are properly seated

- Tools, equipment, or material should not be thrown up or down from one working level to another. A hand line should always be used to lift or lower tools

- Nails or spikes should not be left protruding from planks, boards, or other timbers. Nails or spikes should be pulled out or clinched (bent over) into the wood
- Machinery or equipment must not be operated without proper training and special permission unless it is a regularly assigned duty

- Loose or frayed clothing, dangling ties, rings, etc., must not be worn around moving machinery or other mechanical sources of entanglement

- Work should not be performed under vehicles supported by jacks or chain hoists, without protective blocking that will prevent injury if jacks or hoists fail

- Air hoses should not be disconnected from compressors until the air within the hoses has been bled off

- Electrical power tools, lighting equipment, etc., to be used must be properly grounded by using three-wire receptacles and extension cords rated for the amperage required. GFCIs should be used with temporary electrical systems or other proper grounding system. An assured equipment grounding conductor program should be implemented if GFCIs are not exclusively used

- Portable electric tools must not be lifted or lowered by means of a power cord. Electrical equipment cords should be kept coiled when not in use. When electrical equipment is in use, cords should be protected and positioned to avoid being run over by vehicles or equipment

- Machinery must not be repaired or adjusted while in operation. Oiling of moving parts must not be attempted except on equipment that is designed or fitted with safeguards to protect the person performing the work.

8.2.2.9 Electrical Equipment and Lockout/Tagout. Electrical equipment use on site requires positive control of hazardous energy during servicing and maintenance of equipment where unexpected energization, start-up of equipment, or release of stored energy could occur. Electrical equipment and lockout/tagout procedures include:

- Personnel working on site must ensure that electrical power tools, lighting equipment, etc., that are to be used have ground plugs and are plugged into ground outlets or extension cords. The plugs are not to be altered or used incorrectly (such as the addition of nongrounded plug adapters)

- Personnel must use GFCIs in conjunction with extension cords

- Energy sources for equipment must be turned off or disconnected and switches locked out and tagged out before servicing of equipment. Standardized locks and tags are to be used to indicate the identity of the individual using them. Each lockout/tagout device is required to be removed by the individual who applied the device.

8.2.2.10 Noise Exposure. The operation of equipment and machinery at the site may generate excessive noise levels and requires:

- Site personnel working in the immediate area of operating equipment are required to use hearing protection (e.g., foam ear plugs) whenever noise exposures exceed 85 dBA

- Noise exposures in excess of 85 dBA are assumed to be present whenever voices must be raised to be heard in normal conversation at 3 feet apart and also whenever working in the immediate areas of operating generators, compressors, and similar equipment.

8.2.2.11 Heat Stress. Heat stress precautions and prevention measures include:

- Personnel must be made aware that heat stress can occur during periods of elevated ambient temperatures, moderate to heavy workloads, and when impermeable protective clothing is in use

- Personnel will be informed about the various forms of heat stress (e.g., heat cramps, heat exhaustion, heat stroke) and the symptoms of exposure which are:

  Heat Cramps and Heat Exhaustion: Heat cramp and heat exhaustion initial symptoms are cramps, faintness, dizziness or disorientation, and pale, clammy skin

  Heat Stroke: Heat stroke is an extremely serious medical emergency with sudden onset and symptoms that include dilated pupils, dry and hot skin, loss of consciousness, and convulsions

- Initial phases of work activity must be closely monitored by the SSHO because workers may not be acclimatized to hot conditions. The SSHO will try to identify personnel who are more susceptible to heat exposure

- Workers are responsible for observing each other and themselves for development of heat stress symptoms. Personnel will be encouraged to drink generous amounts of water and electrolyte replacement fluids (even if not thirsty) to prevent dehydration. Adequate shelter will be provided to protect personnel from direct sun exposure. Sufficient breaks will be provided so that personnel can remove protective clothing and cool down. Work/Rest regimens will be adjusted as required to avoid heat stress

- A monitoring program for heat stress will be implemented should elevated ambient temperatures (greater than 70 degrees Fahrenheit [°F]) and concurrent use of impermeable protective garments occur.

8.2.2.12 Cold Stress. Cold stress can occur upon exposure to cold environments where there is heat loss to the body, feet, hands, and/or head. Considerations include:

- Personnel will be informed about the various forms of cold stress (e.g., hypothermia, frostbite) and the symptoms of exposure, which are:

  Cold Stress: Cold stress can occur upon exposure to cold environments where there is heat loss to the body, feet, hands, and/or head. Primary cold stress injuries are hypothermia and frostbite. Cold can also adversely affect mental capabilities resulting in accidents or injuries. The body's initial response to cold is shivering, vasoconstriction, increased oxygen consumption, accelerated respiration and pulse, and increased heart output and blood pressure

  Hypothermia: Hypothermia occurs when the body core temperature falls below 96.8ºF. Symptoms include intense uncontrollable shivering, sluggish thinking, difficulty speaking, muscular rigidity, blue puffy skin, poor coordination, cessation of shivering, irrational stupor, unconsciousness, erratic heartbeat, slowed respiration, cardiac and/or respiratory failure, lung edema, and death.

Treatment for hypothermia is to rewarm the body trunk, immerse in warm water (105ºF) or use heat packs, and in field conditions, provide body-to-body contact for heat transfer

Frostbite: Frostbite occurs due to freezing of fluid that surrounds tissues. It occurs at less than 30ºF, and more rapidly with wind exposure. Frostbite affects the ears, chin, nose, fingers, and toes. Frostbite first appears as blanched skin or waxy or white skin that is firm to the touch with resilient tissue beneath. With deep frostbite, tissues are cold, pale, solid, and may turn black. Treatment for frostbite is to rewarm with warm water (105ºF) and prevent refreezing of affected body parts

- Cold stress prevention measures include:

  Recognize cold stress conditions and exposure symptoms. Use personal protection by dressing for warmth, wind, and wet conditions. Wear layered clothing (i.e., wear thinner, lighter clothing next to the body with heavier clothing layered outside the inner clothing). Stay active as activity generates heat. Provide a warm break area when working in cold environments. Have first-aid equipment available. At temperatures lower than 25ºF, do not permit continuous cold exposure to exposed skin. At temperatures lower than 45ºF, wear warm clothing to include as needed: Boots; heavy socks (e.g., wool or polypropylene); mittens, insulated gloves; insulated head covers; thermal underwear; and insulated coveralls. Workers that get immersed in water or whose clothing becomes wet will be immediately provided with a change of clothing and be treated for hypothermia.

8.2.2.13 Permit-Required Confined Space. Permit-required confined space requirements include those contained in the OSHA 29 CFR 1910.146 standard and USACE document EM 385-1-1 (06)(I) "Hazardous Substances, Agents, and Environments - Confined Space." Personnel are prohibited from entering any confined space unless the space has been tested and approved for entry by a qualified "Entry Supervisor." Confined space entries must additionally be performed in accordance with the CAPE confined space program procedure. These confined spaces include excavations and pits more than 5 feet deep until monitoring indicates no contaminants are present in that area. Before any potential confined space entry activity, the PM, Site Superintendent, and/or SSHO will see that the following precautions are taken:

- Air monitoring must be completed inside the confined space before entry to determine concentrations of oxygen, combustible gas, and suspected toxic contaminants (monitor for oxygen first followed by combustible gas and toxic contaminant monitoring). Continuous monitoring must be conducted while personnel are inside the confined space so action levels are not exceeded

- Personnel are not allowed, under any circumstance, to enter a space containing an oxygen deficient or oxygen enriched atmosphere (less than 19.5 percent or greater than 23.5 percent) or a potentially flammable atmosphere (greater than 10 percent of the LEL)

- Confined spaces entries are supervised by a qualified "Entry Supervisor" who is trained and experienced in confined space entry procedures. Procedures are the subject of an individual safety meeting conducted by the Entry Supervisor with personnel involved before entry into a confined space

- A "Confined Space Entry Permit" must be completed by the Entry Supervisor before each entry and is valid for one work shift

- PPE requirements in the SSHP will be followed and respirators required if air concentrations exceed action levels or PELs for airborne contaminants. Any person entering a space of unknown hazard must wear a supplied-air respirator, retrieval equipment, and be backed up by a rescue person dressed in a similar level of protection

- A safety standby "Attendant" must be used to monitor the person inside the confined space at all times and an additional person must be within sight or call of the Attendant. An attendant cannot enter the confined space under any circumstances unless relieved of duty by another qualified attendant

- Emergency rescue equipment must be immediately available on site (i.e., SCBA, retrieval lifelines, harnesses) and emergency procedures established

- Mechanical ventilators are used, as required, to purge confined spaces and reduce hazardous air concentrations to an acceptable level

- Explosion-proof blowers and bonding and grounding are required when working with flammable or combustible materials. Only explosion-proof or intrinsically safe electrical equipment is allowed within 25 feet of a confined space potentially containing flammable vapors or gases

- Matches, lighters, or other spark-producing items are not allowed inside a confined space.

8.2.2.14 Compressed Gas Cylinder Safety. Compressed gas cylinder safety requirements include:

- Compressed gas cylinders (i.e., oxygen, acetylene) must be protected from physical damage, electric current, and temperature extremes (storage below 130° F required). Smoking is prohibited is areas of compressed gas cylinder storage or use. Compressed gas cylinders must not be stored or used in confined spaces or other poorly ventilated areas

- Compressed gas cylinders must be stored in well-ventilated areas; segregated by type of gas; area placarded and/or with signage; empty/full cylinders separated; upright position; valve closed and valve cap installed (unless regulator in place); substantially secured by chain or rope; separated from flammable or combustible materials by a 40-foot distance or 1-hour fire-rated partition; and with oxygen and/or oxidizing gases separated from fuel gas cylinders by a 20-foot distance or a 1-hour fire-rated partition (except for tanks in use with regulators on and attached to a cart or vehicle made for the purpose of moving cylinders while in use and separate form storage areas)

- Ground movement of compressed gas cylinders will be completed with the valve closed, valve cap installed (except for tanks in use with regulators on and attached to a cart or vehicle made for the purpose of moving cylinders while in use and separate from storage areas), by upright cylinder rolling technique, and by a hand truck with securing chain in place for longer distance travel

- Vehicle transport of compressed gas cylinders will require cylinders to be substantially secured by rope, chain with come-a-long, or equivalent. Drivers will carry shipping papers and vehicles will be placarded as required by the U.S. DOT.

8.2.2.15 Pressure Washer/Steam Cleaner Operation. The use of pressure washer equipment requires:

- Only trained and experienced personnel will operate pressure-washing equipment

- All electrical equipment will be shut off and locked out/tagged out before application of water in affected work areas

- Pressure washing equipment operators will barricade/tape off around work areas as needed

- Pressure washing equipment operators will wear protective boots, protective clothing, hearing protection, face shields, goggles and/or safety glasses, and other appropriate PPE

- Metatarsal foot guards will be used when using high-pressure water (greater than 1,200 pounds per square inch [psi])

- A fire extinguisher will be maintained on each pressure washer unit.

8.2.2.16 Chain Saw Operation. The use of chain saws can be dangerous unless proper procedures are used to include:

- Chain saws will have an automatic chain brake anti-kickback device

- The idle speed of chain saws will be adjusted so that the chain does not move when the engine is idling

- Chain saw operators will wear PPE to include eye, ear, hand, foot, and leg protective equipment

- Chain saws will not be fueled while running, while hot, or near an open flame. Chain saws will not be started within 10 feet of a fuel container. Gasoline and mixed gas fuels for chain saws will be stored in OSHA-approved metal cans with self-closing lids and flame arrestor

- Chain saw operators will hold the saw with both hands during cutting operations

- A chain saw must never be used to cut above the operator's shoulder height.

8.2.2.17 Tree Removal Operation. Tree removal operations must be completed in a safe manner taking into account the following safety procedures:

- Only experienced and qualified tree removal personnel will be used for tree removal work

- Inspections will be made for tree removal work to see if electrical line hazards exist and workers will maintain a minimum 10-foot clearance from lines whenever possible. Roping techniques and/or pole pruners/pole saws directed away from electrical lines must be used when removing tree limbs and branches near lines

- Before tree felling operations, the following observations and considerations will be made:

    - Survey the tree and surrounding area for items that may be impacted when the tree falls
    - Consider the tree shape, the lean of the tree, and decayed or weak spots
    - Observe wind force and direction
    - Determine the location of other people in the area
    - Locate any equipment on the ground in the area
    - Identify any electrical or other utilities in the area

- Before tree felling, the work area will be cleared to permit safe working conditions and an escape route will be planned

- Demarcate the area within which the tree may fall with barrier tape

- Each worker in the area will be instructed as to specific duties and workers not directly involved in the tree felling will keep clear of the demarcated area

- Brush, fallen trees, and other materials that might interfere with cutting operations will be removed from the area before tree felling

- Tree limbs and branches will be removed to a height and width sufficient to allow the tree to fall clear of any utility lines and other objects in the vicinity of the fall location

- If there is the danger that the tree being felled may fall in the wrong direction or damage property, then wedges, block and tackle, rope, or wire cable (except when an electrical hazard exists) will be used

- Cutting methods for tree felling include:

  - A notch and back cut will be used to fell trees over 5 inches in diameter (measured at chest height) and trees will not be felled by slicing or ripping cuts

  - The depth or penetration of the notch will be about one-third of the diameter of the tree and the opening or height of the notch will be about 2.5 inches for each foot of the tree's diameter

  - The back cut will be made higher (approximately 2 inches) than the base of the notch to prevent kickback

- The operator will maintain sure footing and work from the uphill side whenever possible

- Just before the tree or limb is ready to fall, an audible warning will be given to those in the area to stay safely out of range when the tree falls

- Persons will stand well back of the butt of the tree that is starting to fall.

8.2.2.18 Wood Chipper Operation. Wood chipping equipment safety procedures include:

- Rotary drum and disk-type wood chippers not equipped with a mechanical in-feed system will:

  - Be equipped with an in-feed hopper not less than 85 inches (the sum of the horizontal distance from the chipper blade out along the center of the chute to the end of the chute and the vertical from the chute down to the ground) and will have sufficient height on its side members to prevent personnel from contacting machine blades during normal operation

  - Have a flexible anti-kickback device installed in the in-feed hopper to protect the operator and other personnel in the machine area from flying chips and debris

- Disk-type wood chippers equipped with a mechanical in-feed system will have a quick stop and reversing device on the in-feed. The activating mechanism for the quick stop and reversing device will be located across from the top, along each side, and as close as possible to the feed end of the in-feed hopper and within easy reach of the operator

- Wood chipping equipment will:

  - Have a feed chute or feed table with sufficient height on side members to prevent operator contact with blades during normal operation

  - Have a swinging baffle mounted in front of blades to prevent throwback of material

  - Have an exhaust chute of sufficient length or design to prevent contact with blades

  - Have a locking device on the ignition system to prevent unauthorized starting of equipment

  - Have cutting bars and blades sharpened, properly adjusted, and maintained in accordance with manufacturer recommendations

- Trailer-mounted wood chippers detached from trucks will be chocked and secured when parked

- Wood chipper workers will be instructed in the safe operation of the equipment and the chipper machine will be operated according to manufacturer instructions

- Workers feeding brush into wood chippers will wear eye protection and will not wear loose clothing, long-gauntlet gloves, rings, watches, or other items that could get caught on debris or parts of the machine

- Workers will be instructed to never place any part of their body on the feed table when the wood chipper is in operation or the rotor is turning (sticks of brush can be used to push/poke material as needed)

- Materials will be fed into wood chippers from the side of the hopper centerline and operators will immediately turn away from the feed table when brush is taken into the rotor of the machine

- Materials such as stones, nails, and other hard/sharp debris will not be fed into wood chippers

- Wood chipper chutes will not be raised while machine rotors are turning

- When servicing or maintaining wood chipping equipment, lockout/tagout procedures will be used to prevent accidental start-up of machinery during servicing.

8.2.2.19 Power Saw Operation. Power saw (i.e., chop saw, cut-off saw, sawzall) use is dangerous if proper procedures are not used:

- Power saw operators will wear PPE to include eye, ear, hand, foot, and leg protective equipment

- Power saws will not be fueled while running, while hot, or near an open flame. Power saws will not be started within 10 feet of a fuel container. Gasoline and mixed gas fuels for power saws will be stored in OSHA-approved metal cans with self-closing lids and flame arrestor

- Power saw operators will hold the saw with both hands during cutting operations
- A power saw must never be used to cut above the operator's shoulder height.

8.2.2.20 Inclement Weather and Adverse Environmental Conditions. In cases of inclement weather for outside work locations or other adverse environmental conditions (i.e., strong winds, rain, snow, lightning, hurricane, tornado, earthquake) the following safety instructions are required:

- Presence of strong winds requires stoppage of affected work activities at elevated work locations (e.g., towers, roofs, ladders, scaffolds, platforms) and stoppage of use of equipment whose safe operation can be affected by high winds (i.e., drill rigs, man lifts, scissor lifts, cranes)
- Presence of heavy rain or snow requires stoppage of affected work activities where the heavy rain or snow can create safety hazards due to limited visibility, wet work surfaces, slippery equipment controls, increased electrical hazards, cold stress, etc.
- Presence of lightning requires stoppage of affected work activities where lightning presents an increased safety hazard of electrocution (e.g., cranes, heavy equipment, drill rigs, tanks, towers)
- Occurrence of a hurricane, tornado, or earthquake requires stoppage of affected work activities and evacuation of personnel from excavations and trenches, confined spaces, and buildings of questionable stability
- In case of work stoppage due to inclement weather conditions or other adverse environmental conditions, work will not resume until an all clear signal has been communicated by the SSHO to affected personnel. In case of work stoppage due to lightning, an all clear will not be given until no lightning has appeared in the area for a period of 10 minutes.

8.2.2.21 Miscellaneous Physical Hazards. Miscellaneous physical hazards and safety procedures to be followed are reviewed with personnel in safety meetings and may include discussion of the following topics:

- Poor housekeeping
- Poor illumination
- Overhead obstructions
- Sharp objects
- Uneven walking surfaces
- Slippery work surfaces
- Tripping hazards
- Fall hazards.

8.2.3 Biological Hazards

Biological hazards that may potentially be encountered during site work include:

- Poisonous plants
- Poisonous snakes
- Poisonous spiders
- Rodents
- Ants and bees
- Ticks
- Mosquitoes.

8.2.3.1 Poisonous Plants. Contact with poisonous plants such as poison oak, poison ivy, or poison sumac can result in dermatitis. Poison oak, a plant common to the western United States, is a biological hazard that causes reaction in more than 50 percent of the population. Poison oak has green leaves in the spring and summer, and red and yellow leaves in the fall that are found in sets of three. This trait is easily remembered by an old rhyme "leaves of three, let them be." Black dots of dried sap (resin) on the leaves are also characteristic of the plant. It is the resin called "urushiol," derived from the Japanese word for "sap," that poses a threat to sensitive individuals. The skin reacts to the resin upon contact causing dermatitis characterized by linear streaks and red bumps where the plant has brushed against the skin. Contact with the smoke from burning poison oak also causes severe reactions in the respiratory tract and exposed skin in sensitive individuals. Signs and symptoms of exposure are redness, swelling, blisters, and intense itching. Blisters form within 24 hours, weeping, crusting and scaling of the blisters within a few days, and complete healing occurs in about 10 days.

Poison oak first-aid procedures are: Washing, without scrubbing, of the affected area with mild soap and water, application of a paste of baking soda and water on the area several times a day, or application of an anti-cortical cream or lotion, such as Calamine or Caladryl, to help soothe the area. Antihistamines, such as Benadryl, may also help dry up the sores. If the condition worsens or persists and affects large areas of the body or the face, see a doctor. It may be necessary to give anti-inflammatory drugs, such as corticosteroids, or other medications to relieve discomfort.

8.2.3.2 Poisonous Snakes. Poisonous snakes may be encountered during site work. Poisonous snake bite signs and symptoms of envenomation include: fang marks; metallic or rubbery taste in mouth; tingling of the tongue; numbness; swelling within 10 minutes of bite; nausea, weakness, temperature change; and discoloration within 3 hours to 6 hours.

Poisonous snake precautions include: Avoid walking in areas known to be populated with snakes; avoid traveling on foot at night; avoid traveling off trails or paths in grassy or brush-laden areas; do not climb into rocky areas without visual inspection for snakes; be alert when moving debris as snakes seek shelter in shaded areas; wear high-top boots and long pants when walking in grassy areas; clear brush from around buildings, check/repair leaky faucets, and keep trash in containers with secure lids. If a snake is encountered, look around, there may be others, then turn around and walk away on the same path traveled.

Poisonous snake bite first-aid procedures are: Summon emergency medical help immediately; have victim stay calm and remain motionless, if possible; position victim so that bite is kept below heart level, if possible; do not use ice, cold packs, sprays, alcohol, or any drugs; do not use tight tourniquet, apply light constricting band above bite (be able to insert finger under band) and do not release band, unless too tight from swelling; do not make incision across bite to suck out venom unless help is at least a few hours away; and do not wait to see if symptoms develop, seek medical attention as soon as possible.

8.2.3.3 Poisonous Spiders. Poisonous spiders, such as the black widow spider or the brown recluse spider, may be encountered during site work. Spiders are usually found in dark, cool, protected areas and such areas should be inspected before placing hands or feet in these areas. Poisonous spiders are commonly found in woodpiles, sheds, basements, garages, and privies.

The primary species of black widow spider encountered has a glossy black appearance with an orange-red hourglass shape on the underside of the body. Black widow spider bite signs and symptoms are: Initial pain followed by dull, occasionally numbing pain in the affected extremity; pain and cramps in one or several of the large body muscles; abdominal pain and cramping; sweating, increased salivation, anxiety, weakness, headache, and dizziness; and severe cases can result in uncontrollable muscle spasms, coma, and respiratory failure. Black widow spider bite first-aid procedures are: wash wound; apply a cold pack; and get medical care (e.g., muscle relaxants; antivenin).

The brown recluse spider is also known as the "violin or fiddle back" spider and is light brown in color with a darker brown violin-like marking on the top of the body. The brown recluse spider is nonaggressive, and most bites occur when the spider is trapped in clothing being put on, stepped on, and when areas where the spider resides are disturbed. Brown recluse spider bite signs and symptoms are: Localized burning sensation within 2 hours to 8 hours with itching and redness; small blanched area around immediate bite area appears; reddened area enlarges and becomes purple during subsequent 1 hour to 8 hours; and fever, malaise, stomach cramps, nausea, vomiting, and some cases have resulted in death. Brown recluse spider bite first-aid procedures are: wash wound; apply a cold pack; and seek immediate medical care.

8.2.3.4 Rodents. Rodents include rats, mice, squirrels, and other related mammals and are characterized by gnawing and nibbling traits. Rodents can act as a vector for many diseases that may be transmitted directly or through other vectors such as fleas or ticks. Diseases that can be transmitted include plague, typhus, Leptospirosis, relapsing fever, and others including Hantavirus pulmonary syndrome. A discussion of Hantavirus pulmonary syndrome is presented below, as it is a relatively recent disease transmitted by rodents.

Hantavirus Pulmonary Syndrome

Hantavirus pulmonary syndrome is a serious, often deadly, respiratory disease that has been found mostly in rural areas of the western United States. The disease is caused by a Hantavirus that is carried by rodents and passed on to humans through infected rodent urine, saliva, or droppings. The deer mouse is the primary carrier of the virus that causes

Hantavirus pulmonary syndrome. This type of rodent is found throughout the United States, except in the Southeast and East Coast. In the Southeast, the cotton rat is known to carry Hantavirus. A deer mouse is 4 inches to 9 inches long from head to tip of tail. It is pale gray to reddish brown; has white fur on its belly, feet, and underside of the tail; and has oversized ears. A mouse nest (burrow) is usually a pile of material under which the mouse lives. This pile can contain many different materials, such as twigs, insulation, Styrofoam, and grass.

Hantavirus is spread from wild rodents to people. The virus gets in the air as mist from urine and saliva or dust from feces. Breathing in the virus is the most common way of becoming infected; however, infection can also occur by touching the mouth or nose after handling contaminated materials. A rodent's bite can also spread the virus. Hantavirus is not spread from person to person. Infection will not occur from being near a person who has Hantavirus pulmonary syndrome. The virus, which is able to survive in the environment (e.g., contaminated dirt and dust), can be killed by most household disinfectants, such as bleach or alcohol.

Symptoms of Hantavirus pulmonary syndrome usually appear within 2 weeks of infection but can appear as early as 3 days to as late as 6 weeks after infection. First symptoms are general and flu-like: Fever (101-104ºF); headache; abdominal, joint, and lower back pain; sometimes nausea, and vomiting. However, the primary symptom of this disease is difficulty in breathing, which is caused by fluid build-up in the lungs and quickly progresses to an inability to breathe.

Precautionary measures to avoid exposure to Hantavirus include: avoid and/or be cautious when working near wood piles, inside sheds, or other known deer mouse habitats; when evidence of deer mice is observed, stop work and notify supervisor immediately; establish specific work procedures, protective clothing, respiratory protection, and decontamination protocol for work in the area, and review hazards and control measures with workers; spray a concentrated solution of bleach (10 percent minimum) on areas where rodent feces or nesting materials are present and let the disinfectant sit for a period of time before working in the area; wear protective clothing (i.e., disposable coveralls, gloves, boots, or booties) and respirator (air-purifying respirator [APR] with high-efficiency particulate air [HEPA] filter); remove contaminated materials carefully; minimize dust generation; use HEPA filter vacuum equipment as needed; collect contaminated materials and place in plastic bags/seal for disposal as directed by the SSHO; upon exit from the work area; wash gloved hands in 1 percent bleach solution; remove clothing being careful not to contact potentially contaminated surfaces; and thoroughly wash with soap and water immediately following removal of PPE.

8.2.3.5 Ants and Bees. Ant bites and bee, wasp, and hornet stings can be deadly to those who are hypersensitive. Anaphylactic shock can occur to sensitized individuals upon repeated stinging. Signs and symptoms of envenomation are usually local pain, redness, itching, and swelling. Sensitive individuals may have more serious symptoms such as welts, itching palms and feet, headache, nausea, vomiting, labored breathing, and in severe cases respiratory paralysis or heart failure. Individuals who are hypersensitive should carry a kit containing an antihistamine and epinephrine.

8.2.3.6 Ticks. Infected wood ticks and dog ticks can act as a vector for many diseases including Rocky Mountain spotted fever, Q fever, relapsing fever, Lyme disease, and tularemia. Adult ticks are reddish brown in color and may have white markings on the back. They are usually 1/4-inch long, are oblong or seed-shaped, and have eight legs. The adult wood tick appears during the spring and early summer months in the northwestern states, and the dog tick appears throughout the summer in the eastern and southern states. The disease-carrying organism is transmitted to humans through the bite of the tick or by contact with crushed tick blood or feces through a scratch or wound.

Cases of Lyme disease have been on the increase in recent years. While the disease is spread to people through the bite of an infected tick, it is not communicable person to person or by a household pet. Risk of exposure is increased if working in wooded, brushy, or grassy areas. Infection can occur throughout the year, however, spring through summer marks the seasons that correspond with the ticks lifecycle and people's increased outdoor activity, thus increasing the risk of exposure.

The early signs and symptoms of Lyme disease are a bull's eye rash, fever or chills, and fatigue or body aching. Later skin lesions may develop as well as heart, neurological or muscle complications. It is often difficult to diagnose since people often do not notice the tick bite, rashes may not appear, or symptoms imitate other diseases or infections.

To avoid contact with ticks, wear clothing that fully covers the legs, arms and hands. Avoid walking in wooded or brush-laden areas whenever possible. Inspect the body and clothing during rest periods and immediately remove any ticks found, being careful not to crush them. Have someone else help to inspect the neck, back, head, and other hard-to-see areas of the body. If ticks are found on the body, try to remove the tick without crushing or leaving any part of the tick in the wound. Use fine-pointed tweezers for tick removal by insertion under the tick. Do not crush the tick on your body or between the fingers. Apply gentle but firm traction on the tick, being careful not to leave the mouthparts in the skin. Do not use force; a slow steady pull is required. Wash hands thoroughly with soap and warm water after handling ticks, apply antiseptic to the wound with iodine, Mercurochrome, or Merthiolate and apply a corticosteroid lotion.

8.2.3.7 Mosquitoes. Mosquitoes present health hazards primarily due to their potential for transmitting diseases, including Dengue fever and several forms of encephalitis, including St. Louis Encephalitis and West Nile Encephalitis. Recently, mosquitoes have posed an increased risk due to their transmittal of West Nile Virus.

All of the mosquito-borne diseases can cause flu-like symptoms, including fever, headache, and fatigue. Dengue fever can also cause blood hemorrhaging. Encephalitis is an infection of the brain, causing inflammation, swelling, and destruction of nerve cells. Symptoms include high fever, headache, neck stiffness, stupor, disorientation, and tremors; and can lead to convulsions, coma, paralysis, and death. Anyone experiencing several of these symptoms after being bitten by mosquitoes should seek medical attention immediately. There is no vaccine for West Nile Virus.

The best protection from mosquito-borne diseases includes wearing long-sleeved shirts and pants, applying a mosquito repellent containing 20 percent to 30 percent DEET (N,N diethyl-m-toluamide), and avoiding perfumes and colognes when outdoors for any prolonged time.

8.2.4 Radiological Hazards

No radiological hazards are expected for site work.

8.2.5 Ordnance and Explosives Hazards

No ordnance and explosive materials are expected for site work.

8.2.6 Dust Control

Airborne dust will be controlled using water spray application.

8.2.7 Activity Hazard Analyses

AHAs are prepared before beginning each major phase of work operations. The AHA reviews hazards and control measures for primary site tasks (each DFW). The AHA defines the activities to be performed and identifies the sequence of work, specific hazards anticipated, and control measures to be implemented to eliminate or reduce hazards to an acceptable level. Work does not proceed on that phase of work until the AHA has been accepted and the AHA has been reviewed with personnel involved with the activity. The AHA is reviewed and modified to address changing site conditions or operations. AHA modification occurs with the concurrence of the SHM, PM, Site Superintendent, SSHO, and the onsite USACE representative.

AHAs for the following major project tasks are provided in Appendix H:

- Mobilization and site preparation
- Waste characterization and confirmation sampling
- Contaminated soil and debris excavation, staging, and onsite disposal
- Construction of natural earthwork controls
- Backfill, site restoration, and demobilization.

8.3 Exposure Monitoring

Air monitoring is necessary to determine personnel exposures to chemical contaminants and/or physical agents during various project activities. The SSHO, or designee, is responsible for completing air monitoring activities during field operations where there is potential exposure to combustible gases, oxygen deficiency, and/or airborne contaminants above OSHA 8-hour time-weighted average (TWA) and 15-minute short-term exposure limit (STEL) PELs or ACGIH TLVs. A description of the plan for exposure monitoring to be implemented during the project is provided in this section of the SSHP (see Table 4).

8.3.1 Air Contaminants

Air contaminants of potential concern during project fieldwork operations are VOCs.

8.3.2 Exposure Monitoring Plan

Exposure monitoring will need to be conducted during the project SOW (see Table 4). Combustible gases and oxygen, VOCs, and dust/nuisance monitoring will be conducted using real-time monitoring instruments (see Section 8.3.3). Exposure monitoring is to be completed by the SSHO, or designee. Should action level concentrations be exceeded, response actions will be initiated to implement engineering controls, safe work practices, upgrade or downgrade in PPE, work stoppage, emergency evacuation, and notification and evaluation by the PM and SSHO.

Monitoring program data is recorded and maintained by the SSHO on the forms indicated and use described below, as applicable:

- Air Monitoring Log: used to record direct-reading air monitoring instrument results
- Calibration Log: Direct-Reading Monitoring Instrument: used to log instrument calibrations
- Hot Work Permit: used to authorize hot work and record hot work monitoring**.**

8.3.3 Direct-Reading (Real Time) Instrument Air Monitoring

The SSHO provides monitoring results for specific air contaminant monitoring to individuals monitored within 5 days of receipt of results. The SSHO is responsible for maintaining copies of applicable monitoring records at the site for the duration of the project. Upon completion of the project, the exposure monitoring records are maintained similarly to medical records and placed in each applicable employee's exposure monitoring record files for the duration of employment plus 30 years.

8.3.3.1 Combustible Gases and Oxygen. A combination combustible gas indicator (CGI) and oxygen indicator will be used during permit-required confined space entry (i.e., entry into a Frac tank for cleaning) and other operations where the presence of combustible vapors, oxygen-deficient, and/or oxygen-enriched atmospheres is suspected.

Monitoring is conducted before and periodically during hot work (if conducted in an area where combustible or flammable liquids or gases may be present or are stored) and confined space entry. Oxygen measurements are conducted before combustible gas measurements to ensure that adequate oxygen is present for proper combustible gas sensor operation. Work will not be allowed, or if in progress, stopped, if combustible gas concentrations exceed 10 percent of the LEL or if oxygen concentrations are below 19.5 percent or above 23.5 percent oxygen by volume.

Combustible gases and oxygen are measured with a combination CGI and oxygen indicator. The CGI and oxygen indicator (ThermoGastech GT, RAE Systems MultiRAE, or equivalent multi-gas monitor) is capable of detecting and indicating combustible vapor and gas concentrations of 0 to 100 percent of the LEL. Oxygen can be measured within a range of 0 to 25 percent by volume. The combination CGI and oxygen indicator is calibrated before use to a known concentration of combustible gas and nitrogen according to instrument manufacturer instructions.

Combustible Gas Monitoring Action Level:

- Combustible gas concentrations exceed 10 percent LEL. ACTION: Stop work. Isolate ignition sources. Ventilate area. Contact the SSHO to evaluate.

Oxygen Monitoring Action Levels:

- Oxygen concentrations are below 19.5 percent or are above 23.5 percent. ACTION: Stop work. Ventilate area. Contact the SSHO to evaluate.

8.3.3.2 Volatile Organic Compounds. Monitoring for VOCs is conducted during contaminated soil excavation and other operations where the presence of VOCs is suspected. If VOCs are detected or suspected to be present in an area, sampling of the work area and breathing zone of workers is conducted periodically during work. VOC measurements that are below 5 ppm will be considered acceptable for Level D protection work.

VOCs will be measured with a photoionization detector (PID). The PID (Thermo Environmental Instruments OVM 580B or equivalent) uses photoionization to detect compounds that have an ionization potential below the energy of the lamp installed in the instrument. Lamp energy is measured in electron volts (eV) and the OVM-580B PID has a standard 10.6 eV lamp installed. The PID measures VOCs within a range of 0.1 ppm to 2,000 ppm. The PID is calibrated before use to a known concentration of isobutylene calibration gas (or equivalent).

VOC Monitoring Action Levels:

- VOC concentrations in the workers breathing zone are greater than, or equal to, 5 ppm (sustained over a 1-minute period in the breathing zone), and less than 50 ppm. ACTION: Use Level C protection. Contact the SSHO to evaluate
- VOC concentrations in the workers breathing zone are greater than, or equal to, 50 ppm. ACTION: Stop work. Contact the SSHO to evaluate.

8.3.3.3 Airborne Dust

The primary activity that will generate airborne dust is the soil loading and soil drying activities. The soil in the creek is anticipated to be sufficiently wet that airborne dust should not be significant during soil excavation and loading. Area monitoring for airborne dust will be conducted periodically along the perimeter of the work area. A water spray will be applied during the operation for dust control if work area perimeter airborne dust concentrations exceed 5 miligrams per cubic meter (mg/m^3).

Airborne dust monitoring will be conducted to measure worker exposures when Level C protection is not being used during contaminated soil handling and if dust control measures do not appear to be sufficient.

An action level of 5 mg/m^3 will be used for a Level C protection requirement as this represents one-half of the TLV for inhalable insoluble particulates not otherwise specified (10 mg/m^3).

An MIE PDM-3 Miniram aerosol monitor or PDr-1000 is used during dust-generating activities to measure airborne dust. The instrument can provide instantaneous data as well as time-weighted average information. The instrument is zeroed before use per manufacturer instructions.

Airborne Dust Monitoring Action Levels:

- Airborne nuisance dust concentrations in the workers breathing zone are greater than, or equal to, 5 mg/m^3. ACTION: Use Level C protection. Contact the SSHO to evaluate.

8.3.4 Heat Stress Monitoring

A monitoring program for heat stress will be implemented for work in elevated ambient temperatures and are wearing impermeable protective garments. Work/Rest regimens will be established and adjusted as required to avoid heat stress. Heat stress monitoring will be completed for site personnel using impermeable protective clothing when ambient temperatures exceed 70°F.

Heat stress monitoring and establishment of work-rest regimens for heat stress prevention will be completed through physiological monitoring of workers heart rate. Heart rate is determined by measuring the worker's radial pulse rate. Monitoring will be completed at the beginning of work and following each work period.

Heart Rate Monitoring:

Complete baseline measurements at the start of work before entering the EZ. Measure the heart rate (HR) by counting the radial pulse for a 30-second period and multiply the value by 2 to determine the number of beats per minute (bpm). Following the first work period, measure the HR as early as possible in the resting period. If the HR exceeds 110 bpm, then reduce the next work period by one-third while keeping the length of the rest period the same. Following the next work period, if the HR still exceeds 110 bpm, then again shorten the following work cycle by one-third while keeping the length of the rest period the same. Watch for signs and symptoms of heat stress throughout the work process. Contact the SSHO for an evaluation when a worker's HR exceeds 110 bpm.

Heat Stress Monitoring Action Levels: Heart Rate:

- HR baseline measurement is greater than, or equal to, 110 bpm. ACTION: Advise the SSHO. Reduce the work cycle by one-third without changing the duration of the rest period. Advise site personnel to continuously observe the condition of the individual and to immediately report signs of heat stress to the SSHO

- HR measurement following the first work period exceeds 110 bpm. ACTION: Reduce the next work cycle by one-third without changing the duration of the rest period

- HR measurement following the next work period still exceeds 110 bpm. ACTION: Again reduce the next work cycle by one-third while keeping the length of the rest period the same.

8.3.5 Cold Stress Monitoring

Cold stress monitoring will be conducted at times when decreased ambient temperatures are below 45° F. Cold stress monitoring is completed by measuring the air temperature in the work environment (dry bulb temperature). Requirements for use of warm clothing for prevention of cold injury to body extremities are primary requirements.

A cold stress monitoring program will be implemented should decreased ambient temperatures (less than 45°F) occur. When air temperatures are below 45°F, air temperature monitoring will be initiated and if the temperature drops below 30°F, the air temperature will be measured every 4 hours. At temperatures lower than 45°F, personnel will wear warm clothing including, as needed, boots; heavy socks (e.g., wool or polypropylene); mittens, insulated gloves; insulated head covers; thermal underwear; and insulated coveralls. At temperatures lower than 25°F, personnel will avoid continuous cold exposure to their skin.

8.4 Site Control

Site control procedures are established to: restrict access to controlled areas of the worksite, identify means for site communication, and establish measures for site security.

8.4.1 Site Work Zones

Site work zones are established based on the type of operations to be conducted in the work zone, potential for exposure to contaminants, and potential for contact with other safety hazards. The establishment of controlled work zones (i.e., EZ, CRZ, and Support Zone) may be required to limit access to work areas to authorized personnel, prevent the spread of contamination from the work area, establish site communication, and site security measures. Work zone demarcation will be established through use of construction fencing or other means (e.g., barricades, signs, etc.) as approved by the SSHO.

8.4.1.1 Exclusion or Hot Zone. The EZ is the work zone that represents the area of highest contamination at the site. The EZ will be identified by the SSHO for each work area. The level of protection used within the EZ may vary dependent upon the various work tasks to be conducted and is determined by the SSHO.

8.4.1.2 Contamination Reduction Zone. The CRZ is the work zone that represents the transition area between the EZ and the Support Zone at the site. Entry to/exit from the EZ will be through a designated location in the CRZ. Upon exit from the EZ, workers will be required to pass through the CRZ before entering the Support Zone. Personnel decontamination will occur within the decontamination station in the CRZ.

8.4.1.3 Support Zone. The Support Zone is the work zone outside of the CRZ that represents the clean areas established at the site. The command post, medical station, equipment and supplies, and other support facilities will be located in the Support Zone. All breaks, lunch, and meetings will take place in the Support Zone. Whenever possible, Support Zone activities will be located upwind of the EZ to reduce the possibility of vapor and/or dust exposures.

8.4.1.4 Location of Site Work Zones. The EZ generally coincides with the extent of contamination/excavation. The CRZ is located between the EZ and the support zone. The CRZ comprises the personnel and equipment decontamination area.

8.4.2 Site Control Log

A log of personnel visiting, entering, or working at the site will be maintained. A "Site Control Log" form will be completed daily. This log includes entries for the date, name, organization, and time entering and exiting the site. The Site Control Log is maintained by the SSHO in the CAPE field office. All personnel are required to report and sign in at the CAPE field office upon arrival at the site. Personnel who wish to enter a CRZ or EZ at the site must provide to the SSHO copies of required training, medical fitness for duty, and respirator fit testing documentation before site entry is authorized.

8.4.3 Site Communications

Site communications are critical to allow for expedient communication of operational instructions, safety information, and emergency communications, and include:

- A telephone will be maintained on site with the CAPE Site Superintendent and/or SSHO

- Emergency communication instructions are found in the emergency response plan section of the SSHP.

8.4.4 Site Security

Site security measures are required to prevent unauthorized access to controlled areas of the site. Site security measures include:

- Personnel are required to check-in at the project office and sign in on the "Site Control Log" before entering controlled areas of the site. Unauthorized persons are not allowed into the controlled areas of the site

- Temporary fencing, barricades, and/or signs will be used for delineation of controlled areas, if needed

- Protection is required around open holes during off hours (e.g., temporary fencing, barricades with flashing lights and signs)
- Site personnel are required to comply with military base security measures when working on these facilities.

8.5 Personal Protective Equipment

PPE will be required for certain field operations based on the potential for contaminant exposures. The SSHO and SHM will establish appropriate levels of protection for each work activity based on review of historical site information, existing contaminant data, and evaluation of the potential for exposure. The SSHO and SHM will establish action levels for upgrade or downgrade in the initial minimum levels of protection.

PPE requirements will be referenced to the EPA levels of protection system that consists of four levels of protection (A-D) as described below:

Level A Protection: Level A protection is worn when the highest level of respiratory, eye, and skin protection is needed. Level A protection is used for initial entry into confined spaces, entry into areas with extensive skin and respiratory hazards, and entry into areas where the hazard of significant exposure to unknown contaminant concentrations exists.

Level B Protection: Level B protection is worn when the highest level of respiratory and eye protection is needed, but a lesser level of skin protection is needed than for Level A. Level B protection is used for initial entry into confined spaces, entry into areas with significant skin and respiratory hazards, and entry into areas where the hazard of significant exposure to unknown contaminant concentrations exists.

Level C Protection: Level C protection is worn when a similar level of skin protection as Level B is needed, but a lower level of respiratory protection is needed. Level C protection is used when limited skin hazards exist and concentrations of contaminants are within the protection factor of an APR

Level D Protection: Level D protection is worn when minimal protection is needed and activities are not likely to involve direct contact with contaminated materials. Modified Level D protection is used when some skin protection is desired for protection against accidental skin contact with contaminants.

8.5.1 PPE Requirements

It is anticipated that Modified Level D and Level D protection use will be required for project activities. No work involving Level A or B protection is expected. Use of Level C protection is not expected, however, may potentially be needed during site work. Levels of protection to be used for the following major project activities are listed below.

8.5.1.1 Mobilization and Site Preparation. Level D protection will be used during mobilization and site preparation work tasks (i.e., office setup, work zone delineation, clearing and grubbing, utility clearance, excavation area marking, silt fence placement, work area preparation). Level D protection will be used for mobilization of personnel, equipment and materials to the site and for site preparation activities that do not involve contact with contaminated soil.

8.5.1.2 Contaminated Sediment Debris Excavation, Staging, and Onsite Disposal. Modified Level D and Level D protection will be used for contaminated soil excavation. Modified Level D protection will be used during this task if VOC monitoring results are below SSHP Exposure Monitoring Plan action levels and airborne dust exposure is minimal. Level C protection will be used if elevated VOCs or contaminated airborne dust are present. Level D protection will be used for transportation and disposal of contaminated soil.

8.5.1.3 Waste Characterization Sampling. Modified Level D or Level D protection will be used for characterization and confirmation sampling. Level D protection will be used for sampling tasks that do not involve worker contact with contaminated soils. Modified Level D protection will be used for sampling activities where there may be worker contact with contaminated soil.

8.5.1.4 Construction of Natural Earthwork Controls. Modified Level D or Level D protection will be used during earthwork construction (i.e., installing sediment dams, creek diversion). Level D protection will be used for earthwork construction operations that do not involve worker contact with contaminated soils. Modified Level D protection will be used for earthwork construction activities where there may be worker contact with contaminated soil.

8.5.1.5 Backfill, Site Restoration, and Demobilization. Level C, Modified Level D, and Level D protection will be used for backfill, compaction, site restoration (i.e., compacting, grading), and demobilization (i.e., equipment decontamination, Frac tank cleaning). Level D protection will be used for backfilling, compaction, and site restoration work. Modified Level D protection will be used for equipment decontamination before demobilization from the site. Level C and/or Modified Level D protection will be used for Frac tank cleaning (if applicable).

8.5.2 Levels of Protection Description

8.5.2.1 Level C Protection. Level C protection consists of:

- APR, full-face, or half-face with appropriate cartridge/filter (organic vapor [OV]/HEPA P-100 for OV and dust exposure)
- Disposable coveralls, chemical-resistant (Kleenguard® or Tyvek® for dust exposure; Polyethylene Tyvek® for incidental splash protection; polyvinyl chloride [PVC] or Saranex® for liquid contact protection)
- Boots, steel-toed/shank, chemical-resistant (PVC, neoprene, or nitrile blend) with optional boot covers (PVC or latex)
- Gloves, inner, chemical-resistant (surgical nitrile or latex) and outer gloves, chemical-resistant (nitrile for dexterity; PVC or neoprene for heavy work)

- Hard hat; safety glasses with side shields (for use with half-face respirator); goggles (for use with half-face respirator when liquid splash hazard present); ear protection (if noise levels more than 85 dBA); high-visibility safety vest with reflective striping (if vehicle or equipment traffic); and two-way radio communication (optional).

8.5.2.2 Modified Level D Protection. Modified Level D protection consists of:

- Disposable coveralls (Kleenguard® or Tyvek® for dust exposure; Polyethylene Tyvek® for incidental splash protection; PVC or Saranex® for liquid contact protection)

- Boots, steel-toed/shank, chemical-resistant (PVC, neoprene, or nitrile blend) or steel-toed work boots (leather) with boot covers (PVC or latex)

- Gloves, inner, chemical-resistant (surgical nitrile or latex) and outer gloves, chemical-resistant (nitrile for dexterity; PVC or neoprene for heavy work)

- Hard hat; safety glasses with side shields; goggles (if liquid splash hazard); face shield (polycarbonate for pressure washing); ear plugs (if noise levels more than 85 dBA); high-visibility safety vest with reflective striping (if vehicle or equipment traffic); and two-way radio communication (optional).

8.5.2.3 Level D Protection. Level D protection consists of:

- Coveralls or standard work clothing
- Steel-toed work boots (leather)
- Hard hat
- Safety glasses with side shields
- Goggles (if liquid splash hazard)
- Face shield (polycarbonate for pressure washing)
- Gloves (if material handling-cotton or leather)
- Ear plugs (if noise levels more than 85 dBA)
- High-visibility safety vest with reflective striping (if vehicle or equipment traffic)
- Two-way radio communication (optional).

8.5.3 Respiratory Protection

Respiratory protection will be selected, used, and maintained in accordance with the CAPE Safety and Health Program Respiratory Protection standard operating procedure (SOP). Respiratory protection requirements include:

- The SSHO is responsible for ensuring that workers have had required medical examinations, respirator training, and respirator fit testing current within the past year. Facial hair is not allowed that interferes with respirator fit. A positive and negative pressure respirator user seal check will be completed each time a respirator is put on

- Personnel using APRs must have passed a qualitative fit-test within the past year. Qualitative fit testing will be conducted by the SSHO as needed and will be documented

- A licensed physician must evaluate respirator users and provide a written fitness for duty statement that the worker may safely use a respirator. The SSHO is responsible for ensuring that workers have required medical exams and that copies of medical certifications are maintained and available according to OSHA recordkeeping requirements

- Whenever respirators are required, no person will remove a respirator in the EZ or CRZ, or enter these work zones without a respirator

- Visitors will be required to provide documentation of respiratory protection instruction and fit testing for entry into controlled work zones that require respirator use.

8.5.4 PPE Maintenance

- PPE is required as directed by the SSHP or the SSHO

- Personnel are responsible for proper use of required PPE

- Torn protective clothing or damaged PPE will be immediately repaired or replaced

- Contaminated PPE will be disposed of properly (as contaminated waste)

- Maintenance of reusable personal issue PPE (e.g., hard hats, safety glasses, steel-toed PVC boots) is the responsibility of each worker for individually assigned equipment

- Personnel are responsible for proper maintenance, cleaning, storage, and use of individually assigned respirators. Respirators will be cleaned after each use, placed in a plastic bag, and inspected before using again.

8.6 Decontamination

Personnel and equipment decontamination measures will be required for site work.

8.6.1 Personnel Decontamination

The SSHO will determine the procedures to be used for personnel decontamination. A dry decontamination method will be used when there is limited contact with contaminants (i.e., soil grading, contaminated soil excavation). A wet decontamination method will be used when there is significant contact with contaminants due to contact with liquid contaminants, muddy surface contamination, other heavy contamination (i.e., debris steam cleaning). General personnel decontamination requirements include:

- The SSHO must review specific decontamination procedures with personnel required to enter controlled work zones of the site and will monitor and ensure use of prescribed decontamination procedures

- Personnel will be instructed to minimize contact with contaminants, to the extent feasible, to reduce the potential for personal or equipment contamination

- Personnel decontamination occurs at the decontamination station established within the CRZ for each work location. Decontamination activities occur in the CRZ after working in the EZ and before entrance into the Support Zone

- Personnel must clean, remove, and place contaminated disposable protective clothing in marked containers before leaving the CRZ

- Workers will be instructed to practice good personal hygiene by washing the face, hands and forearms before eating, drinking, smoking, etc.

8.6.1.1 Decontamination Procedures – Dry Method. A dry decontamination method will be used when there is limited contact with contaminants and when the SSHO has determined that a wet decontamination method is not necessary. The decontamination sequence should be completed as follows:

<u>Station 1 - Equipment Drop</u>: Deposit used equipment on sheet plastic or in container with plastic liner.

<u>Station 2 - Outer Boot Covers and Outer Gloves Removal</u>: Remove outer boot covers and outer gloves. Deposit in container with plastic liner.

<u>Station 3 - Boots and Outer Garment Removal</u>: Remove boots and suit and deposit in containers with plastic liners.

<u>Station 4 - Respirator Facepiece and Inner Gloves Removal</u>: Remove respirator facepiece (avoid touching face with fingers) and deposit on sheet plastic or in plastic bag. Remove inner gloves.

<u>Station 5 - Field Wash</u>: Wash hands and face thoroughly.

8.6.1.2 Decontamination Procedures – Wet Method. A wet decontamination method will be used when there is significant contact with contaminants (i.e., contact with liquid contaminants, muddy surface contamination, other heavy contamination) and when the SSHO has determined that it is necessary. The decontamination sequence should be completed as follows:

<u>Station 1 - Equipment Drop</u>: Deposit used equipment on sheet plastic or in container with plastic liner.

<u>Station 2 - Boots and Outer Garments Wash/Rinse</u>: Scrub outer boots, outer gloves, and suit with detergent/water solution. Rinse off with water.

Station 3 - Outer Boot Covers and Outer Gloves Removal: Remove outer boot covers and outer gloves. Deposit in container with plastic liner.

Station 4 - Cartridge/Canister or Mask Change-Out: Change-out APR cartridges/canister or facepiece as needed, don new outer gloves and boot covers, tape at joints, and return to EZ (Note: Last step in decontamination sequence for respirator change-out; continue decontamination sequence if entering the Support Zone).

Station 5 - Boots and Outer Garment Removal: Remove boots and suit and deposit in containers with plastic liners.

Station 6 - Respirator Facepiece and Inner Gloves Removal: Remove respirator facepiece (avoid touching face with fingers) and deposit on sheet plastic or in plastic bag. Remove inner gloves.

Station 7 - Field Wash: Wash hands and face thoroughly.

8.6.2 Equipment Decontamination

Procedures are required to prevent the spread of contamination from vehicles and equipment used in the EZ into Support Zone and offsite areas. Equipment will be decontaminated by procedures established by the SSHO.

8.6.2.1 Equipment Decontamination Facilities and Procedures. A decontamination facility (decontamination pad) will be established for decontamination of vehicles and equipment. Equipment will be decontaminated by procedures established by the SSHO and include:

- Vehicle and equipment use in the EZ and/or contact of vehicle and equipment tires with contaminated surfaces will be minimized to the extent possible
- Dirt will be brushed or scraped off of vehicles and heavy equipment and pressure washed to remove visible materials before moving from the CRZ off site
- Following decontamination, the equipment will be inspected and an "Equipment Decontamination Release Authorization" form prepared by the SSHO to document decontamination before equipment will be allowed to move off site.

8.7 Safety Policy and Procedures

8.7.1 Safety Policy

It is the policy of CAPE to create and maintain a safe and healthful working environment for the benefit of our employees and other affected persons. We strive to perform our work in a manner that protects and promotes S&H. Our safety goal at CAPE is to have no accidents or injuries. This goal can only be achieved through total and demonstrated commitment to safety from each individual CAPE staff member.

CAPE staff is continuously reminded that accidents are preventable. Safety training is provided to CAPE staff members so that they have the necessary knowledge to identify potential safety hazards and necessary measures and tools to mitigate identified hazards.

We stress that each CAPE staff member understands that we are each accountable for maintaining our own S&H and the safety of our co-workers, at all times and in all situations.

The CAPE Safety and Health Program: Defines procedures and responsibilities necessary to effectively implement safety policies; establishes a basis for safety training, medical monitoring and recordkeeping; provides rewards for outstanding field safety performance via project specific safety incentive programs; defines safety practices for performance of our work; and establishes programs for compliance with governmental safety regulations.

8.7.2 Accident Prevention Goals, Objectives and Measures

Goals, objectives, and measures for accident prevention are:

- Familiarize employees and supervisors with accident prevention goals, objectives, and measures and seek their support in implementation
- Provide a safety program that promotes safe working conditions and safe work practices and creates and reinforces safety conscious attitudes amongst employees
- Identify persons with authority and responsibility for safety program implementation
- Provide continuing S&H training for staff so that they are able to recognize hazards, implement safe work procedures, and use safe work practices
- Anticipate, recognize, evaluate, and control potential accident-producing situations through preplanning of S&H considerations into work activities
- Use engineering and administrative safety controls and supplement with necessary PPE for worker protection
- Establish a system for ensuring employee compliance with S&H rules
- Identify and evaluate workplace hazards through implementation of a safety inspection program that identifies and corrects unsafe workplace conditions and unsafe work practices
- Implement procedures for reporting and investigation of incidents such that they can be promptly reviewed and evaluated and corrective actions can be taken to prevent recurrence.

8.7.3 Company Accident Experience Record

One of CAPE's goals for accident prevention is to maintain its excellent accident experience record. For 2003, CAPE's Experience Modification Rate (EMR) was 0.82, lost workday case rate was 1.17, and recordable injury case rate was 2.34.

A summary of CAPE's accident experience over the past 3 years is provided in Appendix J.

8.7.4 District Safety Specifications

CAPE will follow the USACE New York District Standard Specifications section for safety.

8.7.5 Safety Coordination Meetings

Safety will be a topic of discussion during the project preconstruction meeting between the USACE and CAPE.

A safety coordination meeting will be held before any fieldwork beginning so that a mutual understanding is achieved on safety between USACE and CAPE. The meeting attendance will be documented by CAPE on a "Safety Meeting Attendance Record" form. Meeting minutes will be recorded by CAPE and distributed to attendees subsequent to the meeting.

8.7.6 Standard Work Procedures

Site personnel must work in a safe manner. Standard work procedures for site work include, but are not limited to, the following:

- Drugs and/or alcohol are not allowed on site
- Personnel must report to work in a ready-to-work state
- Firearms are not allowed on site
- Horseplay is not allowed on work sites
- Gambling is prohibited
- Personnel must report to work in suitable work clothing.

8.7.1.1 Hazard Communication.

- The SSHO will maintain copies of MSDSs for hazardous substances that are to be used during project work

- Site personnel are informed of the hazardous substances that they will be working with through SSHP review and attendance at daily safety meetings

- The CAPE "Hazard Communication Program" SOP is referred to for additional guidance and requirements

8.7.1.2 Reporting of Hazards and Safety Inspections.

- Site personnel are encouraged to immediately report unsafe work conditions or unsafe work practices observed to their supervisor and/or the SSHO without fear of reprisal

- Site supervisors and/or the SSHO will complete periodic safety inspections at the site to identify and correct hazards.

8.7.1.3 Visitors.

- Visitors must have approval from the onsite USACE representative and PM before entering controlled areas of the site
- Visitors must meet medical and training requirements and review pertinent aspects of the SSHP.

8.7.1.4 Illumination. Illumination requirements include those contained the OSHA 29 CFR 1910.120 and 29 CFR 1926.65 “Hazardous Waste Operations and Emergency Response” standards and in EM 385-1-1 (07) “Lighting.” In the absence of adequate lighting (5 to 10 foot-candles) at outdoor construction locations, portable lights, and/or light stands will be used to illuminate work areas.

8.7.1.5 Sanitation. Sanitation requirements include those contained in EM 385-1-1 (02) “Sanitation.” Sanitation procedures include:

- Food, beverages, tobacco products, or cosmetics are not allowed in contaminated areas or potentially contaminated areas and eating, drinking, chewing gum or tobacco, and smoking are not allowed except in designated areas
- Good personal hygiene and decontamination practices will be followed at all times
- Site washing facilities will be provided at the job location and personnel will be required to wash their hands and face when exiting the EZ (field wash station) and before breaks and lunch
- Drinking water will be provided to workers in portable drinking water dispensers with lids and a tap. Dispensers will be clearly marked “Drinking Water” and will not be used for other purposes. Individual disposable cups will be used and use of a common cup or dipping from the container is prohibited. Disposable cups will be stored in a sanitary container and a waste receptacle will be available for used cups
- A portable toilet service will be used to provide sanitary toilet facilities for personnel. Portable toilets will be readily available at the job location or a vehicle (not the emergency vehicle) will be available to transport workers to nearby toilet facilities.

8.7.1.6 Safety Inspections. Requirements for safety inspections are contained in EM 385-1-1 (01) “Program Management.” Safety inspection procedures include:

- The SSHO will complete daily safety inspections of work sites to identify and correct hazards. Contractor QC personnel, as part of their QC responsibilities, also conduct and document daily safety inspections

- The SSHO will record identified safety and health issues and deficiencies and will indicate the actions, timetable, and responsibility for correction of deficiencies on the CAPE "Safety Inspection Report" form, or equivalent. The SSHO will conduct follow-up inspections to correct identified deficiencies and will document these inspections in a like manner.

8.7.7 Accident Reporting and Investigation

USACE accident reporting requirements must be followed. The onsite USACE representative will receive immediate verbal notification and written notification within 24 hours for incidents that involve a serious injury, explosion, fire, or a spill or release of toxic materials. The USACE Accident Report form (see Appendix I) will be completed by the SSHO for lost workday injuries and property damage incidents that involve costs in excess of $2,500.

Important requirements for accident reporting and follow up are described below:

- Employees must immediately report all incidents, injuries and illnesses, property damage and liability exposure cases, spills and fires, and serious near miss incidents to their supervisor and/or the SSHO

- In the event of a serious incident, supervisors are responsible for notifying the Site Superintendent, SSHO, and SHM who in turn are responsible for notifying the CAPE PM, Corporate Risk Manager, and Corporate Health and Safety Manager (CHSM). The CHSM should be contacted immediately in injury or illness cases to assist with coordination of required medical assistance and related workers' compensation case management follow-up

- Should a serious injury occur during the project, the Site Superintendent and SSHO will immediately report the incident to the PM, SHM, onsite USACE representative, and the appropriate government agencies. The onsite USACE representative will receive verbal notification immediately following a lost workday injury and receive a written notification within 24 hours

- The SSHO and affected employee supervisor will make a complete investigation of all incidents and inspect the area or equipment involved (as applicable). This includes completing and filing a "Incident Report by Supervisor," "Incident Statement by Employee," "Incident Statement by Witness," "Injury and Illness Report," "Property Damage, Loss, and General Liability Report," and/or "Vehicle Accident Report" form, as applicable with the SHM within 24 hours of the injury (immediately for serious injury or fatality)

- All incidents involving hospitalization of three employees or a fatality require immediate notification and investigation by the SHM and the CHSM. The CHSM and the SHM are responsible for OSHA reporting of the incident and will act as the agency interface upon their investigation. The CHSM and the SHM are responsible for notifying the jurisdictional OSHA office as soon as possible and no later than 8 hours of the accident. (Note: This notification includes weekend days as 24-hour emergency reporting access is available.) The report to OSHA must include:

- Time and date of accident
- Employer's name, address, and telephone number
- Name and job title of person reporting the accident
- Address of the site of the accident
- Name of person to contact at the site of the accident
- Name and address of the injured employee
- Nature of injury
- Location where the injured employee was moved to
- List and identity of other law enforcement agencies present at the site of the accident
- Description of the accident and whether the accident scene has been altered

- The SSHO, with the assistance of the PM and Site Superintendent, will obtain a doctor's first report of injury for every injury or illness requiring medical treatment and will immediately forward to the CHSM

- An injured worker is not allowed back to work until a return-to-work notice issued by the treating physician and negative drug and/or alcohol test documentation (as applicable) are presented to the SSHO. Injured workers issued a work restriction shall be under the direct supervision of the SSHO who shall assign work activities until a full-duty status clearance has been received

- The CHSM will make a telephone report for all claims covered under the CAPE Workers' Compensation Policy. Reports are made to the workers' compensation insurance claim-reporting center where an employer's first report of injury or illness form is completed over the phone. After reporting a claim to the reporting center, the information is faxed by the reporting center to the claims service office to handle the claim. Any subsequent medical bills and reports received for the claim are forwarded to the CHSM who will subsequently mail them to the claims service office

- When a worker returns to work after an injury or illness, the CHSM will contact the claims servicing office to advise them of the actual date of return to work. Questions or inquires are to be directed to the CHSM who will contact the claims service office or the CAPE insurance company, as needed

- The CHSM records each injury or illness on the OSHA Form No. 300 "Log of Work Related Injuries and Illnesses" and the OSHA Form 300A "Summary of Work-Related Injuries and Illnesses." The OSHA 300 form is posted annually no later than February 1 (of the following year) and is kept posted for 3 months (until April 30).

8.7.2.1 Safety Rule Enforcement. Workers must obey directives from the SSHO and personnel who do not comply with safety requirements may be immediately dismissed from the site as required by the PM and SSHO. Site personnel must strictly adhere to established safe work practices and work procedures. Violation of a safety procedure or rule may result in disciplinary action according to the severity of the infraction. Unsafe work performance exhibited by an employee will be cause for discipline by the PM, Site Superintendent, SSHO, and company management. Disciplinary action may include the following, depending upon the severity of the safety infraction:

- Verbal warning
- Written warning notice
- Termination of employment
- Other disciplinary action.

8.7.8 Standard Operating Procedures

The CAPE Safety and Health Program presents written health and safety procedures that establish protocol for implementation of specific safety programs. Compliance with these procedures is mandatory and include:

I. Introduction
II. Safety Responsibilities
III. Employee Training
IV. Safety Meetings
V. Accident and Injury Investigation Program
VI. Emergency Action Plan
VII. Hazard Communication Program
VIII. Medical Monitoring
IX. Respiratory Protection Program
X. Site Safety and Health Plan
XI. Air Monitoring
XII. Safety Equipment
XIII. Lockout/Tagout Procedure
XIV. Electrical Hazards
XV. Excavation
XVI. Temperature Stress Program
XVII. Bloodborne Pathogens Exposure Control Plan
XVIII. Hearing Conservation Program
XIX. Fleet Safety
XX. Heavy Equipment Safety
XXI. Water Safety Program
XXII. Recordkeeping.

8.8 Emergency Response Plan

Emergency/Contingency plans will be established to address possible site emergencies. For major emergency events (e.g., large fires, gas line or electrical line breaks) personnel will be evacuated to a designated refuge area and local fire, police, and/or emergency medical service personnel notified. The onsite USACE representative, PM, and SSHO will work cooperatively to resolve emergency events. All site personnel are required to immediately notify the SSHO and/or PM immediately in the event of any type of site emergency.

8.8.1 Site and Emergency Communications

- Cellular telephones will be used for site and emergency communications. If not available, the closest land line telephone will be located before work being initiated

- The CAPE SSHO will maintain an Emergency Contact List (Appendix E). The SSHO is responsible for designating an emergency hospital and determining the route to the emergency hospital before the start of field operations

- The SSHO will establish emergency communications procedures before site work and will communicate this information to site personnel during site orientation briefings and safety meetings.

8.8.2 Emergency Supplies

Emergency supplies will be immediately available at the site and will include:

- First-aid kit
- Fire extinguisher
- Supply of potable clean water
- Spill kit supplies.

8.8.3 Emergency Hospital and Route Information

The SSHO will select an emergency hospital and determine the route to the emergency hospital before site work. The designated emergency hospital, location and route map (Appendix E) will remain on site during field operations.

8.8.4 Response to Medical Emergency

In the event of a medical emergency, the following procedures will be implemented:

- The exposed or injured person will be removed from immediate danger, first aid and/or cardiopulmonary resuscitation (CPR) will be administered by trained site personnel (a minimum of two trained and certified first aid/CPR personnel are required to be present on site at all times)

- Emergency medical assistance will be called and will be informed of the following:
  - Name and location of person reporting
  - Location of accident or incident
  - Specific directions to the emergency location, as needed
  - Phone number from which the person is calling
  - Number persons needing help

  - What is currently being done for the victim
  - For life-threatening injuries, request instructions from emergency services dispatcher
  - Name and affiliation of injured party
  - Description of injuries
  - Details of any chemical involved
  - Summary of the accident, including suspected causes and time of occurrence
  - Temporary control measures taken to minimize further risk

- Nonessential personnel will be evacuated from the work area until the SSHO determines that it is safe for work to resume

- A medical emergency involving chemical exposure will require communication between the SSHO and emergency hospital personnel regarding chemicals involved

- The SSHO will designate an individual to accompany or follow the victim to the emergency hospital to assist with any needs that arise and to report back regarding the victim's status.

8.8.5 Response to Fire

The SSHO will consult with the local fire department before initiating site activities regarding response to fire incidents associated with site work. In the event of a fire, the following will be implemented:

- Large fire (beyond the immediate control of a small onsite fire extinguisher): The site alarm will be sounded; personnel will immediately evacuate and assemble at a predetermined upwind site location; the fire department will be called; and personnel will not reenter the fire area and will wait for fire department arrival

- Small fire (within the immediate control of a small onsite fire extinguisher): The site alarm will be sounded; trained personnel will use an onsite fire extinguisher to put out the fire.

8.8.6 Response to Chemical Spill Incident

A spill kit will be available on site (located in designated area by CAPE field office) with supplies for spill containment and control and includes: sandbags; absorbent pads; solid absorbent; 55-gallon drums; fire extinguisher; PPE; eyewash supplies; and a first-aid kit.

In the event of a small chemical spill incident, the PM and SSHO will be immediately notified. Containment will be implemented if it can be done safely without exposure to personnel. Containment of liquid chemical spills is accomplished through prompt application of absorbents (e.g., absorbent pads or solid absorbent). Containment of solid material chemical spills is accomplished by using a sheet plastic covering (or by equivalent methods). Spilled material is collected in bags, drums, or other suitable containers and disposed of as required.

In the event of a large uncontrolled chemical spill incident, the PM, SSHO, and onsite USACE representative will be immediately notified. The SSHO will obtain information regarding the spill and will respond immediately to the spill location.

8.8.7 Spill Prevention and Control

CAPE will be responsible for any spills or leaks caused by its operations during the performance of this contract. CAPE will provide contingency measures for potential onsite spills of any potentially hazardous materials. CAPE will provide the following:

- Methods, means, and facilities to prevent contamination of soil, water, air, structures, equipment, or material from a release due to CAPE operations
- Equipment and personnel to perform emergency measures to mitigate spills and control their spreading
- A decontamination program to minimize potential for contamination of adjacent areas.

8.8.7.1 Spill Response. According to USACE instructions, the following requirements will be met during a spill response action:

- Notify the onsite USACE representative immediately
- Notify the local fire department immediately
- Notify the city of Rome Fire Department immediately. Notify the New York Spill Hotline and EPA Emergency Spill Hotline within 2 hours of a spill
- Take immediate measures to control and contain the spill to prevent release into sewers or surface waters
- Isolate and contain hazardous spill areas with absorbent pads, booms, and pillows
- Use spill kits to absorb liquids
- For larger spills dispatch vacuum truck and/or emergency response team
- Deny entry to unauthorized personnel
- Do not allow anyone to touch the spilled material
- Stay upwind and keep out of low areas
- Keep combustibles away from the spilled material
- Collect samples for analysis to determine that cleanup is adequate
- Complete other actions, as needed.

8.8.7.2 Notification of Spills and Discharges. Should an incident such as a spill or discharge of toxic materials occur during the project, the Site Superintendent and SSHO will immediately report the incident to the PM, SHM, onsite USACE representative, and the appropriate government agencies. CAPE will comply with the *USACE Spill Reporting Procedures* (USACE, 1995). Refer to Appendix E for the Emergency Contact List. The onsite USACE representative and the city of Rome Fire Department will be notified immediately, and the New York Spill Hotline within 2 hours of a spill. In addition, the EPA FFA PM for former Griffiss AFB will be notified and CAPE will submit a spill and/or discharge report within 7 days of a release. The spill and/or discharge report will include the following items:

- Description of material spilled including identity, quantity, and a copy of the waste disposal manifest
- Exact time and location of the spill and a description of the area involved
- Containment procedures used
- Description of cleanup procedures used at the site including disposal of spill residue
- Summary of CAPE communications with other agencies.

8.9 Training

Copies of health and safety training certificates will be reviewed and maintained by the SSHO. Site personnel, government representatives, and visitors will not be allowed to complete fieldwork until such documentation has been presented to the SSHO.

8.9.1 HazWOPER Training

Personnel involved in hazardous waste activities at the site must have completed HazWOPER training as required by the OSHA "Hazardous Waste Operations and Emergency Response" standard. Certificates of HazWOPER training will be maintained by the SSHO at the site. Copies of current training certification statements will be submitted before initial entry onto the work site. Required HazWOPER training includes the following:

- Worker Training: 40 hours of initial training and 3 days of supervised field experience
- Manager and Supervisor Training: 8 hours of additional specialized manager/supervisor training
- Refresher Training: 8 hours of refresher training annually.

8.9.2 Site Orientation Briefing

- New workers must receive a site orientation briefing and review the SSHP before start of work. Personnel will sign a form documenting that they have reviewed the plan, understand the SSHP requirements, and agree to follow the plan

- Personnel will provide training and medical fitness for duty documentation to the SSHO if required for site work activities.

- Before start of work, the SSHO will provide a site orientation briefing to workers related to project operations and SSHP requirements. The briefing will include review of (as applicable):

  - Temporary control measures taken to minimize further risk
  - Provisions of the SSHP
  - Facility background and SOW
  - Key personnel and health and safety responsibilities
  - Site hazards anticipated
  - Exposure monitoring program
  - Site control procedures
  - PPE requirements
  - Procedures for reporting unsafe conditions or unsafe work practices
  - Procedures for reporting an injury/illness
  - Emergency procedures including warning signals and evacuation procedures
  - Location/Route to the emergency hospital
  - Training requirements
  - Medical surveillance requirements
  - Recordkeeping procedures.

8.9.3 Daily Safety Meetings

Daily safety meetings will be conducted at the beginning of each work shift to discuss operational tasks to be completed and pertinent site safety topics. Meetings will be documented and those in attendance will be required to sign the "Tailgate Safety Meeting Record," "Toolbox Safety Meeting Record," or equivalent form.

8.9.4 First Aid/CPR Training

Selected site personnel will have current certification in first-aid and CPR training to assist in initial handling of emergency medical incidents. At least two persons who are currently certified in first aid and CPR by the American Red Cross or other approved agency must be on site at all times during site operations where site work is not located within 5 minutes of an emergency medical facility. These individuals may perform other duties at the site but must be immediately available to render first aid or CPR when needed.

8.10 Medical Surveillance

Medical surveillance requirements exist for site personnel, government representatives, and visitors who will be entering the site's EZs. Medical surveillance requirements include baseline, annual, reassignment, and termination (exit) medical examinations. Required medical qualification documentation consists of a written physician opinion regarding any detected medical conditions that may limit work hazardous waste remediation activities and an opinion regarding protective clothing and respirator use. Copies of medical surveillance examination reports for site personnel, government representatives, and visitors will be reviewed by the SHM and SSHO and maintained by the SSHO and will be made available to the onsite USACE representative as required.

8.10.1 Medical Examinations

CAPE medical examinations for field personnel are completed before job assignment and annually thereafter. CAPE uses WorkCare for medical service outsourcing. WorkCare physicians, that are American Board of Preventive Medicine, Board-Certified (or Board-Eligible) provide occupational physician support services to CAPE.

The CAPE standard medical examination protocol consists of the following:

- Medical and occupational history
- Comprehensive physical examination
- Vision test
- Audiometric testing
- Pulmonary function tests (FVC and FEV 1.0)
- Complete blood count with differential
- Urinalysis with microscopic examination
- Blood chemistry panel
- Chest X-ray (every 3 years for persons 40 years and younger; yearly for persons over 40 years old)
- Electrocardiogram (yearly for persons over 40 years old).

8.10.2 Medical Examination Reports

Medical examination reports personnel are presented in the form of work status reports. These reports indicate any detected medical conditions that would increase an individual's risk of material health impairment from occupational exposure or if the individual has limitations in the use of PPE such as protective clothing or respirator use. Copies of medical examination reports for site personnel will be maintained by the SSHO and will be provided to the onsite USACE representative as required.

8.10.3 Biological Monitoring

Project-related biological monitoring medical surveillance for exposure to specific site contaminants is not planned for site work. Exposure to site contaminants are expected to be minimal. As needed, biological monitoring components of the CAPE medical surveillance program is coordinated through WorkCare with involvement from the SHM and SSHO.

8.10.4 Drug and Alcohol Testing Program

CAPE has a substance abuse policy that establishes requirements for a drug-free workplace and preemployment drug testing. CAPE requires that post-accident drug and/or alcohol testing be conducted when employees have caused or contributed to an on-the-job injury resulting in loss of work time or damage to property occurs. Post-accident drug and/or alcohol testing must be conducted immediately following a job-related injury or accident, or as soon as conditions allow, but no later than 8 hours after the incident. If there are extenuating circumstances preventing an employee from going for immediate drug and/or alcohol testing, the testing must be conducted within 24 hours of the incident. Workers are not allowed back to work until documentation has been provided to the SSHO in the form of a negative drug and/or alcohol test report.

8.11 Recordkeeping

S&H documentation records associated with implementation of SSHP requirements will be maintained by the SSHO.

8.11.1 Safety and Health Documentation

S&H documentation records, as applicable, include the following:

- MSDSs
- S&H training documentation
- Medical surveillance examination documentation
- Respirator fit testing forms
- SSHP review and safety meeting records
- Safety inspection reports
- Equipment inspection forms
- Hot work permits
- Exposure monitoring records and employee notifications
- Accident reporting and investigation records
- Other health and safety documents.

8.11.2 SSHP Forms

Completed SSHP forms are maintained on site by the SSHO for the duration of the project. SSHP forms (Appendix I) that may be used during the project are indicated below:

- SSHP Signature Page
- Activity Hazard Analysis Preparatory Phase Training Log
- Air Monitoring Log
- Calibration Log: Direct-Reading Monitoring Instrument
- Certificate of Worker/Visitor Acknowledgement
- Emergency Drill Attendance Roster

- Emergency Eyewash Inspection Log
- Emergency Medical Notification Form
- Equipment Decontamination Release Authorization
- Excavation Safety Checklist
- Fire Extinguisher Inspection Log
- First-Aid Kit Inspection Log
- First-Aid Kit Treatment Log
- Hazardous Substance Inventory List
- Heavy Equipment Inspection Report
- Hot Work Permit
- Incident Report by Supervisor
- Incident Statement by Employee
- Incident Statement by Witness
- Injury and Illness Report
- Property Damage, Loss, and General Liability Report
- Respirator Fit-Test Completion Form
- Safety Inspection Report
- Safety Meeting Attendance Roster
- Safety Violation Disciplinary Action Report
- Site Control Log
- Site Safety and Health Plan Change Approval Form
- Site Safety and Health Plan Distribution to Subcontractor
- Site Safety and Health Plan Review
- Tailgate Safety Meeting Record
- Toolbox Safety Meeting Record
- Training Attendance Roster
- USACE Accident Investigation Report (ENG Form 3394)
- Vehicle Accident Report.

9.0 DOCUMENTATION AND REPORTING

9.1 Construction Completion Report

Following the completion of all construction work, CAPE will prepare a construction completion report. This closure report will address site-specific information including the following:

- A cover letter signed by the PGM certifying that all services were performed according to the project requirements

- A synopsis/written narrative report describing site activities including quantities of materials removed, sample collection data, and certification that the work was completed in accordance with the work plan, which includes the CQC Plan, SAP, and SSHP

- Explanation and description of any modifications to the work plan or any other plans and why the modifications were necessary

- Results of field screening
- Summary of significant activities that occurred during construction, including problems that were encountered and how they were addressed
- Copies of all analyses performed including QC data and sample validation
- Information on who sampled, analyzed, transported, and accepted all wastes encountered and copies of manifests, as applicable
- A CQC summary
- Summary of total project costs
- Preconstruction, progress and postconstruction photographs
- Lessons learned.

9.2 Daily Quality Control Reports and Quality Control Summary Report

A DQCR will be completed to document all project activities. The report will cover both conforming and nonconforming work and materials and, where applicable, will include a statement of certification that all materials, supplies, and work accepted that day comply with the contract requirements. The CQCSM or authorized designee will sign the DQCR to validate the certification.

The DQCR will include, but not be limited to:

- Type and number of control activities
- Results of inspections and tests
- Types of defects/causes for rejection, if any
- Corrective actions proposed/taken, if any
- Number of personnel working on project by trade
- Weather conditions/long-term forecast
- Delays and their causes, if any
- Verbal instructions
- Samples collected
- Visitors to the site such as regulators, politicians, reporters, etc.
- Health and safety activities.

9.3 Construction Contingency Procedures

Changes to the work plan may be required during construction to address unforeseen situations encountered in the field. The CQC Plan specifies the procedures that will be used to address these circumstances as well as the internal management of changes to the design and planning documents.

In the event that a change is necessary to the approved plans, field personnel will stop work and notify the PM of the change, the nature of the change, and the need for the change via the Site Superintendent. The PM will immediately provide oral notification to the onsite USACE representative followed by formal written notification. Written formal notifications and authorizations may be sent electronically by fax or e-mail. Upon approval of the change, construction activities will continue for the affected portion of work.

In the event that an emergency condition such as a fire or earthwork failure arises, notifications will be completed orally via telephone and will be documented later. Emergency notifications to all concerned parties may be made simultaneously, if necessary. The written notification will indicate what happened, what response action is being taken or is planned, and potential impacts on human health or the environment.

10.0 REFERENCES

Cape Environmental (CAPE), 2004. *Erosion and Sediment Control Plan, Three Mile Creek Area of Concern, Former Griffiss Air Force Base, Rome, New York.* May.

Ecology and Environmental Engineering, Inc. (E&E), 2004. *Final Design Basis Report for Three Mile Creek, Former Griffiss Air Force Base.*

E&E, 2002a. *Final Three Mile Creek Feasibility Study Addendum, Former Griffiss Air Force Base.*

E&E, 2002b. *Basewide Wetlands Management Plan, Former Griffiss Air Force Base.*

Soil and Water Conservation Society, Empire State Chapter, _____. New York Standards and Specifications for Erosion and Sediment Control:

- Standard and Specifications for Topsoiling
- Standard and Specifications for Vegetating Waterways
- Standard and Specification for Stabilized Construction Entrance.

United States Army Corps of Engineers (USACE), 1996. *Safety and Health Requirements Manual. EM 385-1-1*. September 3.

USACE, 1995. *Spill Reporting Procedures for USACE Personnel Involved in HTRW Projects* (CEMP-RT 200-1a). July 20.

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TABLES

Table 1

SCHEDULE OF QC OBSERVATIONS AND TESTING BY DEFINABLE FEATURE OF WORK

QC TASK	INSPECTION ACTIVITY	TEST FREQUENCY OR OBSERVATION	ACCEPTANCE CRITERIA
DEFINABLE FEATURE OF WORK: ***Project Planning and Submittals***			
PREPARATORY PHASE			
Prepare Planning Documents	Client and regulatory review of Draft Work Plan and associated field guidance documents	One Time	
Review approved planning documents	Review project requirements in work plan and determine necessary level of support needed from subcontractors and suppliers	Ongoing	
Preconstruction Meeting	Review remedial activities to be performed, including associated safety and QC issues	One time, before preconstruction meeting	
Secure Site Access	Prepare and submit list of personnel and subcontractors that will be on site supporting fieldwork.	One time, before preconstruction meeting	
Ensure Utilities have been contacted and cleared.	Submit a Base Digging Permit Request to the on site USACE rep 2 weeks prior to intrusive work; contact the state utility locator "Call Before You Dig" or equivalent to have utilities cleared	One time	
INITIAL PHASE			
Prepare Planning Documents	Client and regulatory review of Draft Work Plan and associated field guidance documents	One time	

QC TASK	INSPECTION ACTIVITY	TEST FREQUENCY OR OBSERVATION	ACCEPTANCE CRITERIA
Review approved planning documents	Review project requirements in work plan and establish subcontracts and purchase requisitions with vendors	Ongoing	
Preconstruction Meeting	Discuss remedial activities to be performed, including associated safety and QC issues. Prepare and submit meeting minutes	One time, before mobilization	
Secure Site Access	Coordinate with GAFB	One time, during preconstruction meeting	
Ensure Utilities have been contacted and cleared.	Submit request and follow up with site visit to confirm utility location completed	One time per site.	
FOLLOW-UP PHASE			
Prepare Planning Documents	Review, discuss, and incorporate comments into Work Plan and associated field guidance documents	One Time	USACE and Regulatory (U.S. EPA, NYSDEC) Approval
Review approved planning documents	Ensure subcontractors, equipment, materials, and supplies are ordered and available before mobilization.	Ongoing, as needed	
Preconstruction Meeting	Review, discuss, and incorporate comments into meeting minutes	One time, following preconstruction meeting and before mobilization	
Secure Site Access	Coordinate changes in access needs with GAFB	Ongoing	
Ensure Utilities have been contacted and cleared.	Verify utilities located and map utilities on scaled site diagram for future reference.	One time at each site	

QC TASK	INSPECTION ACTIVITY	TEST FREQUENCY OR OBSERVATION	ACCEPTANCE CRITERIA
DEFINABLE FEATURE OF WORK: ***Mobilization***			
PREPARATORY PHASE			
Review approved plans	Review and discussion	Review all testing and inspection requirements.	Client approval
Review approved submittals Mobilize personnel Mobilize equipment Review SSHP and AHA to ensure all safety requirements will be met Discussion of specific QC inspection points, required level of workmanship, and initial control phase operations	Review and discussion Verify OSHA training and medical monitoring is current Physical examination of equipment to ensure compliance with project requirements and in good working order Review and discussion Review and discussion	Ensure all submittals have been submitted and approved by the required approving authority before work is allowed to start Each individual Each piece Ongoing Ongoing	Client approval
INITIAL PHASE			
Review approved plans Mobilize personnel Mobilize equipment Review SSHP and AHA and determine if revision of safety procedures is required	Review and discussion Maintain copies of training records onsite Observe all equipment and ensure it is in proper working condition and can be operated safely Review and discussion	Verify the desired standards of workmanship are met at the start of work. Ongoing Each piece Ongoing	

QC TASK	INSPECTION ACTIVITY	TEST FREQUENCY OR OBSERVATION	ACCEPTANCE CRITERIA
FOLLOW-UP PHASE			
Mobilize personnel	Observation	Ongoing	
Mobilize equipment	Observation	Ongoing	
Review SSHP and AHA and determine if revision of safety procedures is required	Observation	Ongoing	
DEFINABLE FEATURE OF WORK: ***Site Preparation***			
PREPARATORY PHASE			
Review approved plans	Review and discussion	Review all testing and inspection requirements.	Client approval
Review approved submittals	Review and discussion	Ensure all submittals have been submitted and approved by the required approving authority before work is allowed to start	Client approval
Mobilize equipment	Physical examination of equipment to ensure compliance with project requirements and in good working order	Each piece	
Ensure utilities and work areas are clearly marked	Review and discussion	As needed	
Locate four monitoring wells to be abandoned and mobilize monitoring well subcontractor	Observation	One time	Reference design drawings to ascertain location of monitoring wells
Ensure areas are accessible and identify areas to clear and grub	Observation	As needed	
Review work areas to ensure all required preliminary layout work is completed and in compliance with contract requirements	Observation	As needed	
Review SSHP and AHA to ensure all safety requirements will be met	Review and discussion	Ongoing	

QC TASK	INSPECTION ACTIVITY	TEST FREQUENCY OR OBSERVATION	ACCEPTANCE CRITERIA
Discussion of specific QC inspection points, required level of workmanship, and initial control phase operations	Review and discussion	Ongoing	
INITIAL PHASE			
Review approved plans	Review and discussion	Verify the desired standards of workmanship are met at the start of work.	
Mobilize equipment	Observe all equipment and ensure it is in proper working condition and can be operated safely	Each piece	
Ensure correct monitoring wells are flagged for abandonment	Observation	One time	
Review SSHP and AHA and determine if revision of safety procedures is required	Review and discussion	Ongoing	
FOLLOW-UP PHASE			
Mobilize equipment	Observation	Ongoing	
Observe operation of all equipment	Observation	Observe that all equipment functions properly	
Observe monitoring well abandonment	Observation	Ongoing	Monitoring wells are abandoned in accordance with project specifications
Review SSHP and AHA and determine if revision of safety procedures is required	Observation	Ongoing	
DEFINABLE FEATURE OF WORK: ***Contaminated Creekbed Sediment and Berm Excavation and Staging***			
PREPARATORY PHASE			
Review all approved plans	Review and discussion	Review all testing and inspection requirements and ensure all submittals have been submitted and approved by the required approving authority before work is allowed to start	

QC TASK	INSPECTION ACTIVITY	TEST FREQUENCY OR OBSERVATION	ACCEPTANCE CRITERIA
Review SSHP and AHA to ensure all safety requirements will be met	Review and discussion	Ongoing	
Discussion of specific QC inspection points, required level of workmanship, and initial control phase operations	Review and discussion	Ongoing	
INITIAL PHASE			
Observe excavation and staging of contaminated soil	Observation	Verify the desired standards of workmanship are met at the start of work.	Observe that soil is properly staged in 500-cubic yard piles
Verify Soils and water are contained	Observation	Verify the desired standards of workmanship are met at the start of work.	
FOLLOW UP PHASE			
Verify that agreed upon level of workmanship is achieved	Observation	Ongoing	
Observe that all contaminated soil has been removed and properly staged	Observation	One time	
DEFINABLE FEATURE OF WORK: ***Backfill of Excavations and Placement***			
PREPARATORY PHASE			
Review all approved plans	Review and discussion	Review all testing and inspection requirements and ensure all submittals have been submitted and approved by the required approving authority before work is allowed to start	
Ensure that offsite soil source material meets the "Recommended Soil Cleanup Objectives" in TAGM 4046 for use as backfill in the streambed	Review analytical results	Ongoing	

QC TASK	INSPECTION ACTIVITY	TEST FREQUENCY OR OBSERVATION	ACCEPTANCE CRITERIA
Ensure backfill material submittals have been approved	Review and discussion	As needed	
Review SSHP and AHA to ensure all safety requirements will be met	Review and discussion	Ongoing	
Discussion of specific QC inspection points, required level of workmanship, and initial control phase operations	Review and discussion	Ongoing	
INITIAL PHASE			
Ensure that offsite soil source material meets the "Recommended Soil Cleanup Objectives" in TAGM 4046 for use as backfill in the streambed	Review analytical results		
Ensure materials brought onsite meet the specifications	Observation	Ongoing	
Ensure materials are properly placed and graded	Observation	Ongoing	
Review SSHP and AHA to ensure all safety requirements will be met	Review and discussion	Ongoing	
FOLLOW UP PHASE			
Verify that agreed upon level of workmanship is achieved	Observation	Ongoing	
Verify materials being placed and installation meet the specifications	Observation	Ongoing	
Review SSHP and AHA and determine if revision of safety procedures is required	Review and discussion	Ongoing	

QC TASK	INSPECTION ACTIVITY	TEST FREQUENCY OR OBSERVATION	ACCEPTANCE CRITERIA
DEFINABLE FEATURE OF WORK: ***Establishment of Vegetation***			
PREPARATORY PHASE			
Review all approved plans and seeding specification Review SSHP and AHA to ensure all safety requirements will be met	Review and discussion Review and discussion	Review all testing and inspection requirements and ensure all submittals have been submitted and approved by the required approving authority before work is allowed to start Ongoing	
Discussion of specific QC inspection points, required level of workmanship, and initial control phase operations	Review and discussion	Ongoing	
INITIAL PHASE			
Ensure the proper seeding mixture is provided Verify that agreed upon level of workmanship is achieved Review SSHP and AHA to ensure all safety requirements will be met	Review and discussion Observation Review and discussion	One time, verify seed mixture with specifications Spreader settings and spatial coverage per volume of seed Ongoing	
FOLLOW-UP PHASE			
Ensure the proper seeding mixture is provided for each site Verify that agreed upon level of workmanship is achieved Ensure saturation and germination of seed Review SSHP and AHA and determine if revision of safety procedures is required	Review and discussion Observation Observation Review and discussion	One time, verify seed mixture with specifications Spreader settings and spatial coverage per volume of seed Verify germination of seed and watering if necessary Ongoing	

QC TASK	INSPECTION ACTIVITY	TEST FREQUENCY OR OBSERVATION	ACCEPTANCE CRITERIA
DEFINABLE FEATURE OF WORK: ***Waste Characterization***			
PREPARATORY PHASE			
Review all approved plans	Review and discussion	Review all testing and inspection requirements and ensure all submittals have been submitted and approved by the required approving authority before work is allowed to start	
Review sampling procedures	Review and discussion	As needed	
Ensure proper sampling equipment, sample containers, chain-of-custody forms, and coolers in stock	Observation	On going	
Review SSHP and AHA to ensure all safety requirements will be met	Review and discussion	Ongoing	
Discussion of specific QC inspection points, required level of workmanship, and initial control phase operations	Review and discussion	Ongoing	
INITIAL PHASE			
Observe characterization sampling activities	Observation	Verify the desired standards of workmanship are met at the start of work.	Follow FSP and QAPP
Review sampling documentation	Observation	Ongoing	
Review SSHP and AHA to ensure all safety requirements will be met	Review and discussion	Ongoing	
FOLLOW-UP PHASE			
Review sample packaging	Observation	Ongoing	

QC TASK	INSPECTION ACTIVITY	TEST FREQUENCY OR OBSERVATION	ACCEPTANCE CRITERIA
Verify that soil sampling (staged piles) is completed per proper volume and agreed upon level of workmanship is achieved and that all sampling activities were conducted properly, including documentation, shipping, and reviewing analytical results from laboratory	Observation and measurement	Ongoing, verify workmanship compared to agreed upon levels	
Review SSHP and AHA and determine if revision of safety procedures is required	Review and discussion	Ongoing	
DEFINABLE FEATURE OF WORK: ***Transportation and Disposal of Debris***			
<u>PREPARATORY PHASE</u>			
Review all approved plans	Review and discussion	As needed	
Physical examination of equipment	Observation	As needed	
Ensure landfill permit is in place	Review and discussion	As needed	
Review manifest requirements and make sure trucking subcontractor has site ingress/egress map	Review and discussion	Ongoing	
Review Driver's documentation (physicals, licenses, insurance, etc.)	Review	Ongoing	
Review SSHP and AHA to ensure all safety requirements will be met	Review and discussion	Ongoing	
Discussion of specific QC inspection points, required level of workmanship, and initial control phase operations	Review and discussion	Ongoing	

QC TASK	INSPECTION ACTIVITY	TEST FREQUENCY OR OBSERVATION	ACCEPTANCE CRITERIA
INITIAL PHASE			
Verify drivers have documentation and are physically fit	Observation	Ongoing	
Verify drivers are following prescribed routes	Review and discussion	Ongoing	
Observe debris as it is loaded into trucks	Observation	Verify the desired standards of workmanship are met at the start of work.	No potential for shifting or spill, load covered
Ensure manifests are accurate	Observation	Verify the desired standards of workmanship are met at the start of work.	Signed by Generator or Generator's Representative
Review SSHP and AHA to ensure all safety requirements will be met	Review and discussion	Ongoing	
FOLLOW-UP PHASE			
Observe debris as it is loaded into trucks	Observation	Ongoing	No potential for shifting or spill, load covered
Verify drivers have documentation and are physically fit	Observation	Ongoing	
Ensure manifests are accurate	Observation	Ongoing	Signed by Generator or Generator's Representative
Verify drivers are following prescribed routes	Review and discussion	Ongoing	
Get tonnage report from landfill	Review and discussion	One time, per load	Tonnage report received from landfill
Review SSHP and AHA and determine if revision of safety procedures is required	Review and discussion	Ongoing	

QC TASK	INSPECTION ACTIVITY	TEST FREQUENCY OR OBSERVATION	ACCEPTANCE CRITERIA
DEFINABLE FEATURE OF WORK: ***Contaminated Soil Loadout, Transportation, and Disposal***			
PREPARATORY PHASE			
Review all approved plans	Review and discussion	As needed	
Ensure landfill permit is in place	Review and discussion	As needed	
Review labeling, placarding, and paperwork requirements and match waste characterization results	Review and discussion	As needed	
Review manifest requirements and ensure trucking subcontractor has site ingress/egress map	Review and discussion	Ongoing	
Review Driver's documentation (physicals, licenses, insurance, etc.)	Review	Ongoing	
Review SSHP and AHA to ensure all safety requirements will be met	Review and discussion	Ongoing	
Review characterization sampling results	Review and discussion	Ongoing	
Verify who will sign manifests	Review and discussion	Ongoing	
INITIAL PHASE			
Verify drivers have documentation and are physically fit	Observation	Ongoing	
Verify drivers are following prescribed routes	Review and discussion	Ongoing	
Observe soil as it is loaded into trucks	Observation	Verify the desired standards of workmanship are met at the start of work.	No potential for shifting or spill, load covered

QC TASK	INSPECTION ACTIVITY	TEST FREQUENCY OR OBSERVATION	ACCEPTANCE CRITERIA
Ensure manifests are accurate and signed by generator	Observation	Verify the desired standards of workmanship are met at the start of work.	Signed by Generator or Generator's Representative
FOLLOW-UP PHASE			
Verify drivers have documentation and are physically fit	Observation	Ongoing	
Ensure manifests are accurate	Observation	Ongoing	Signed by Generator or Generator's Representative
Verify drivers are following prescribed routes	Review and discussion	Ongoing	
Get tonnage report from landfill	Review and discussion	One time, per load	Tonnage report received from landfill
Review SSHP and AHA and determine if revision of safety procedures is required	Review and discussion	Ongoing	
DEFINABLE FEATURE OF WORK: ***Equipment Decontamination***			
PREPARATORY PHASE			
Review all approved plans	Review and discussion	As needed	
Physical examination of equipment	Observation	As needed	
Review SSHP and AHA to ensure all safety requirements will be met	Review and discussion	Ongoing	
Discussion of specific QC inspection points, required level of workmanship, and initial control phase operations	Review and discussion	Ongoing	
INITIAL PHASE			
Observe dry and pressure washing operations	Observation	Verify the desired standards of workmanship are met at the start of work.	Cleaning is in accordance with WP

QC TASK	INSPECTION ACTIVITY	TEST FREQUENCY OR OBSERVATION	ACCEPTANCE CRITERIA
Review SSHP and AHA to ensure all safety requirements will be met	Review and discussion	Ongoing	
FOLLOW-UP PHASE			
Observe cleaned equipment	Observation	Ongoing	All soil and residue have been removed
Review SSHP and AHA and determine if revision of safety procedures is required	Review and discussion	Ongoing	
DEFINABLE FEATURE OF WORK: ***Sampling and Disposal of Wastewater***			
PREPARATORY PHASE			
Review all approved plans / sampling requirements of the receiving facility	Review and discussion	As needed	
Ensure treatment facility permit is in place	Review and discussion	As needed	
Review manifest requirements and ensure trucking subcontractor has site ingress/egress map	Review and discussion	Ongoing	
Review Driver's documentation (physicals, licenses, insurance, etc.)	Review	Ongoing	
Review SSHP and AHA to ensure all safety requirements will be met	Review and discussion	Ongoing	
Review characterization sampling results	Review and discussion	Ongoing	Meets receiving facility's requirements
Verify who will sign manifests	Review and discussion	Ongoing	
INITIAL PHASE			
Verify drivers have documentation and are physically fit	Observation	Ongoing	

QC TASK	INSPECTION ACTIVITY	TEST FREQUENCY OR OBSERVATION	ACCEPTANCE CRITERIA
Verify drivers are following prescribed routes	Review and discussion	Ongoing	
Ensure each load has a manifest signed by generator	Observation	Each load	
Review SSHP and AHA to ensure all safety requirements will be met	Review and discussion	Ongoing	
FOLLOW-UP PHASE			
Verify drivers have documentation and are physically fit	Observation	Ongoing	
Ensure manifests are accurate	Observation	Ongoing	Signed by Generator or Generator's Representative
Verify drivers are following prescribed routes	Review and discussion	Ongoing	
Get tonnage report from landfill	Review and discussion	One time, per load	Tonnage report received from landfill
Review SSHP and AHA and determine if revision of safety procedures is required	Review and discussion	Ongoing	
DEFINABLE FEATURE OF WORK: ***Demobilization***			
PREPARATORY PHASE			
Review all approved plans	Review and discussion	Ongoing	
Notify USACE of planned demobilization	Notification	One time	
Review SSHP and AHA to ensure all safety requirements will be met	Review and discussion	Ongoing	

QC TASK	INSPECTION ACTIVITY	TEST FREQUENCY OR OBSERVATION	ACCEPTANCE CRITERIA
INITIAL PHASE			
Review work area to ensure all required cleanup work, temporary facilities, etc., are completed and/or removed in compliance with the WP	Observation	Ongoing	
Remove equipment and personnel			
Review SSHP and AHA to ensure all safety requirements will be met	Review and discussion	Ongoing	
Prepare final documentation of completed work	Observation	Ongoing	
Schedule final inspection with USACE	Review and discussion	One time	
Review submittals for final documentation	Observation	Ongoing	
FOLLOW-UP PHASE			
Notify all applicable parties that the remediation activities are complete	Notification	As needed	
Remove equipment and personnel			
Review SSHP and AHA and determine if revision of safety procedures is required	Review and discussion	Ongoing	
Prepare final documentation of completed work	Observation	Ongoing	
Schedule final inspection with USACE	Review and discussion	One time	

QC TASK	INSPECTION ACTIVITY	TEST FREQUENCY OR OBSERVATION	ACCEPTANCE CRITERIA
Review submittals for final documentation	Observation	Ongoing	
Perform final inspection with USACE	Observation	One time	

Table 2

CHEMICAL HAZARD INFORMATION

Compound	Exposure Limits	Primary Health Effects / Other Comments
Polychlorinated biphenyl (PCB), 42 percent and 54 percent chlorine	1 mg/m^3 (TLV-TWA) (SKIN) – 42 percent chlorine PCB; 0.5 mg/m^3 (TLV-TWA) (SKIN) – 54 percent chlorine PCB	Inhalation, ingestion and dermal routes of exposure. Eye, skin, and respiratory irritation; chloracne dermatitis; possible liver damage; suspected carcinogen
Polycyclic Aromatic Hydrocarbons (PAHs), as coal tar pitch volatiles (as benzene soluble aerosol)	0.2 mg/m^3 (TLV-TWA)	Inhalation, ingestion and dermal routes of exposure. Eye, skin, and respiratory irritation; headache, nausea, and confusion; blood system effects; liver and kidney damage; cataracts and other eye damage; dermatitis; and suspected carcinogen. Seven of the higher molecular weight PAHs are considered to be suspected carcinogens and include: benz[a]anthracene, benzo[b]fluoranthene, benzo[k]fluoranthene, benzo[a]pyrene, chrysene, dibenz[a,h]anthracene, and indeno[1,2,3-cd]pyrene
Arsenic and inorganic compounds	0.01 mg/m^3 (TLV-TWA)	Inhalation, ingestion and dermal routes of exposure. Eye, skin, gastrointestinal, and respiratory system irritation; Nausea, vomiting, diarrhea, visual disturbances, nasal ulcerations, and dermatitis; Central nervous system and peripheral nervous system effects; Liver and blood forming organ damage; Skin, lung, and other carcinomas

LEGEND:

ppm:	Parts per million
mg/m^3	Milligrams per cubic meter
TLV-TWA:	American Conference of Governmental Industrial Hygienists (ACGIH) 8-hour time-weighted average (TWA) Threshold Limit Value (TLV)
SKIN:	Skin notation (may be absorbed into the bloodstream through the skin, mucous membranes and/or eye, and contribute to the overall exposure.)

Table 3

PHYSICAL HAZARD INFORMATION

Physical Hazard	Site Work Application and Discussion
Fire Protection and Hot Work (see Section 9.2.2.1)	Gasoline and/or diesel fuel will be used for vehicles, heavy equipment, and machinery operation. Fire extinguishers will be available on site. Hot work (work that uses a flame or creates sparks) may be needed for site work. Hot work permit procedures will be implemented should hot work be needed.
Underground and Overhead Utilities (see Section 9.2.2.2)	Underground and/or overhead utility lines may be present at the site. Subsurface work will require that a utility clearance survey be conducted before initiation of excavation. The presence of overhead utilities will be surveyed before bringing equipment with high extensions (e.g., heavy equipment, dump trucks, cranes, Frac tanks) into a work area.
Heavy Equipment Operation (see Section 9.2.2.3)	Heavy equipment will be used to excavate and load contaminated soil, backfill excavated areas, and to perform other earthmoving activities. Ground personnel will at times be working in the general vicinity of equipment operation. Heavy equipment will be inspected daily and documented. Ground personnel will position themselves out of the swing radius of operating heavy equipment whenever possible. Persons will not be allowed to walk underneath loaded buckets. Ground personnel will wear high-visibility safety vests and be required to maintain visual contact with equipment operators. Hand signals will be established.
Excavation and Trench Safety (see Section 9.2.2.4)	Excavation activities requiring personnel entry into excavations 4 feet or more in depth will require strict implementation of excavation safety procedures. Operations involving personnel entry into trenches 4 feet or more in depth or excavations 5 feet or more in depth will require protective systems for excavation operations (sloping, benching, shielding, and/or shoring) and compliance with the OSHA "Excavation" standard. For these operations, a "Competent Person" will supervise operations, conduct daily inspections, and implement protective systems for excavation operations. Access to site excavation areas will be controlled and limited to authorized personnel only.
Vehicle and Equipment Traffic (see Section 9.2.2.5)	Concurrent heavy equipment, dump truck, and the presence of ground personnel may occur during site work. Traffic patterns will be established at the site for truck traffic as needed. Personnel will wear high-visibility safety vests when working near traffic areas. Spotters will be used if needed for backing of vehicles into tight work areas.
Driver Safety (see Section 9.2.2.6)	Trucks may be used to haul materials to and from the site. Designated truck traffic haul routes, driver safety procedures, and measures for compliance with DOT requirements, as applicable, will be followed.
Material Handling (see Section 9.2.2.7)	Material handling involving lifting, carrying, and drum handling will be required during site work. Personnel will review proper lifting techniques during safety meetings.
Tools, Machinery, and Equipment Use (see Section 9.2.2.8)	Hand and power tools such as drills, saws, and wrenches may be used. Tools will be used according to design. Power tools requiring electrical cords will use GFCIs.
Electrical Equipment and Lockout/Tagout (see Section 9.2.2.9)	Generators may be used to provide electrical power on site. GFCIs will be used and electrical extension cords inspected should portable electrical equipment be needed. Lockout/tagout of electrical equipment for maintenance and servicing is not expected but will be completed if needed.
Noise Exposure (see Section 9.2.2.10)	Noise exposure above 85 dBA is expected when working near or operating machinery and equipment (i.e., heavy equipment, generators). Earplugs will be used for protection.
Heat Stress (see Section 9.2.2.11)	Heat stress may occur when elevated ambient temperatures, moderate to heavy workloads, and/or use of impermeable protective clothing occur. Provisions will be made to establish break areas, provide fluids, and adjust work-rest schedules as needed.
Cold Stress (see Section 9.2.2.12)	Cold stress conditions may occur when ambient temperatures are below 45ºF. Workers will be informed on cold stress hazards and protection measures.
Permit-Required Confined Space (see Section 9.2.2.13)	Entries into a Frac tank or trenches that are 4-feet or deeper are considered to be permit-required confined space entry activities. Personnel are prohibited from entering a confined space unless: the space has been tested, a qualified "Entry Supervisor" has approved the space for entry, and a confined space entry permit has been issued. Confined space entries must be performed in compliance with OSHA "Permit-Required Confined Space" regulations

Table 3

PHYSICAL HAZARD INFORMATION

Physical Hazard	Site Work Application and Discussion
Compressed Gas Cylinder Safety (see Section 9.2.2.14)	Compressed gas cylinders will be used for hot work (if needed). Gas cylinders will be moved with caps installed, and stored upright and secured with rope of chain.
Pressure Washer/Steam Cleaner Operation (see Section 9.2.2.15)	Pressure washer/steam cleaner equipment will be used for debris decontamination, Frac tank cleaning, and for equipment decontamination. Pressure washer/steam cleaner equipment may be operated at high pressures. Cleaning with high-pressure water will require use of metatarsal guards for foot protection. Face and eye protection will be provided for splash protection.
Chain Saw Operations (see Section 9.2.2.16)	Chain saws may be used during site work. Safety procedures for proper use of this equipment will be required
Tree Removal Operations (see Section 9.2.2.17)	Tree removal operations may be conducted during site work. Tree felling requires strict safety procedures. Survey the work area, surrounding area, tree characteristics, and look for utilities, equipment, or people in the area. Clear the work area before tree felling. Cut using a notch and back cut method for large trees. Give an audible warning when the tree is ready to fall
Wood Chipper Operation (see Section 9.2.2.18)	Wood chipper equipment may be used during site work. Wood chipper equipment safety procedures include use of eye and hearing protection. Do not place any part of your body into the feed table when the chipper is in operation. Do not wear loose clothing that could get caught in equipment
Power Saw Operation (see Section 9.2.2.19)	Power saws may be used and safety procedures will be used when operating sawzalls, chop saws, or similar equipment.
Inclement Weather and Adverse Environmental Conditions (see Section 9.2.2.20)	Strong wind, heavy rain or lightning provisions will be made to suspend outdoor operations during inclement weather conditions.
Miscellaneous Physical Hazards (see Section 9.2.2.21)	General safety hazards will be present during all site tasks. Use of hand tools, power tools, and material handling/lifting of materials are primary hazards. General safety information will be communicated during daily safety meetings.

Table 4

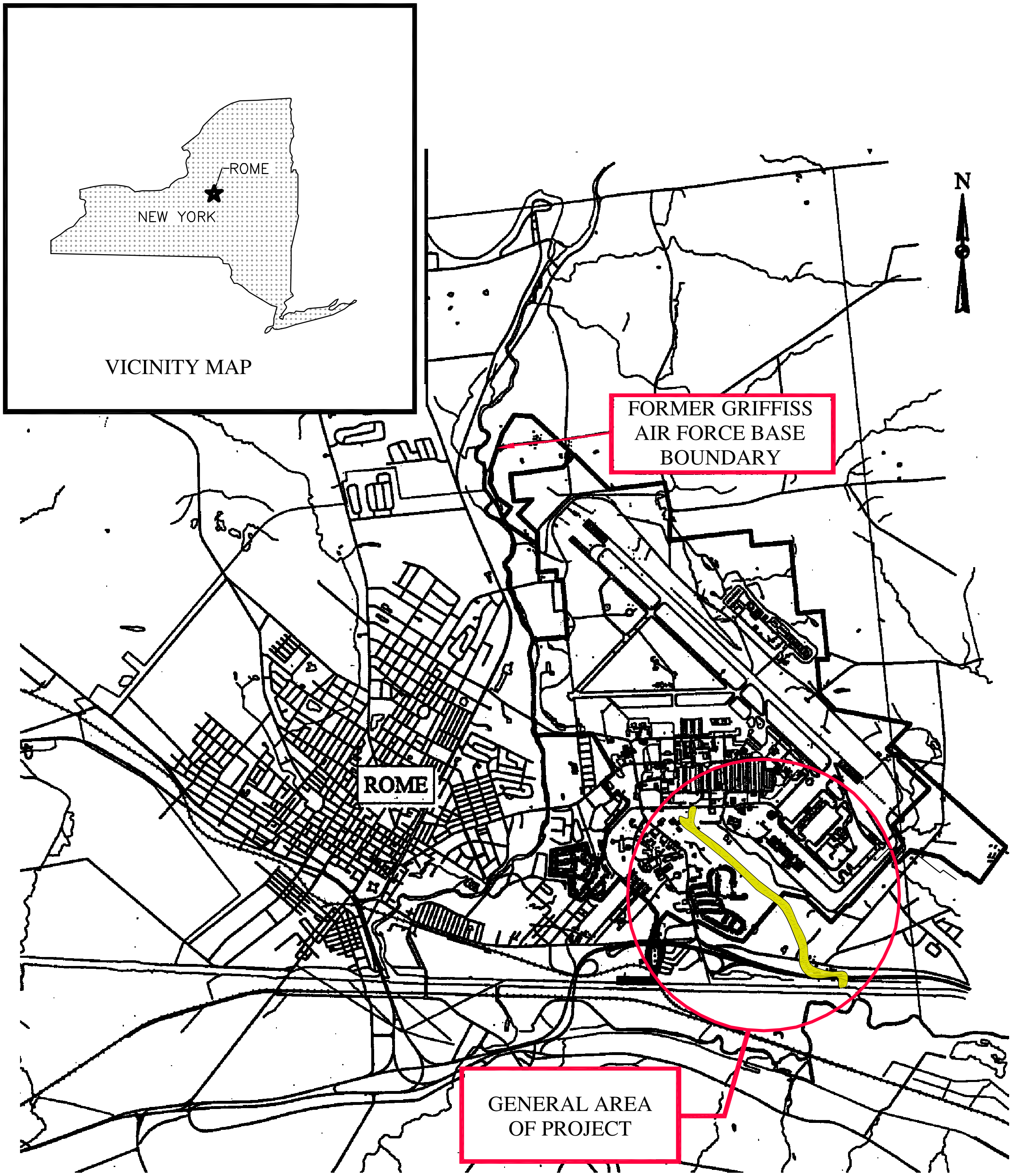
EXPOSURE MONITORING PLAN

Exposure Element	Method	Tasks	Frequency	Action Levels	Action
Combustible gases and oxygen	ThermoGastech GT, RAE Systems MultiRAE, or equivalent multi-gas monitor	Tasks where combustible gases, oxygen-deficient, or oxygen-enriched atmospheres may be present (Frac tank cleaning; hot work in areas where combustible materials are present)	Initial and continuous monitoring for confined space entry. Initial and periodic monitoring for hot work in areas where combustible materials may be present	Greater than 10 percent LEL; Less than 19.5 percent oxygen; or greater than 23.5 percent oxygen	Stop work; isolate ignition sources; ventilate the area; contact the SSHO to evaluate
Volatile Organic Compounds	PID (RAE Systems MiniRAE 2000, 580B OVM, or equivalent	Tasks where VOCs may be present (contaminated soil excavation and Frac tank cleaning)	Initial and periodic monitoring of work areas and worker breathing zone	Less than 5 ppm VOCs; Greater than 5 ppm to less than, or equal to, 50 ppm VOCs Greater than 50 ppm VOCs	Use Level D protection Use Level C protection; contact the SSHO to evaluate Stop work; contact the SSHO to evaluate
Airborne dust	MIE Miniram PDM-3, PDr-1000, or equivalent	Loading and drying of contaminated soil	Representative monitoring of worker breathing zone	Greater than, or equal to, 5 mg/m^3 (one-half of TLV for inhalable insoluble particulates not otherwise specified)	Level C PPE; Use dust control measures; Contact the SSHO to evaluate
Heat stress	Radial pulse for heart rate monitoring	Work in impermeable protective clothing where the ambient temperature is more than 70ºF and heavy work rate where the ambient temperature is more than 80°F	Initial baseline before first entry into Exclusion Zone. Periodic monitoring at beginning and end of each work period in the Exclusion Zone	Baseline / Next work period: HR greater than 110 bpm HR slow recovery to less than 110 bpm	Reduce next work period by one-third Alert SSHO to evaluate condition of the individual
Cold Stress – Dry Bulb Temperature Monitoring	Dry bulb thermometer	Work where ambient temperature is less than 45ºF	Periodic monitoring	Less than 45ºF Less than 40ºF Less than 30ºF Less than 20ºF	Monitor air temperature; dress in warm clothing Thermal gloves required for light work Monitor air temperature every 4 hours Use thermal gloves for moderate to heavy work

LEGEND:

VOC:	Volatile Organic Compound	HR:	Heart Rate
PID:	Photoionization Detector	bpm:	Beats per Minute
LEL:	Lower Explosive Limit	ºF:	Degrees Fahrenheit
ppm:	Parts Per Million	SSHO:	Site Safety and Health Officer.

FIGURES



BASE LOCATION MAP

SCALE: 1" = 5800'

GRAPHIC SCALE

0 1/2 1

0.91" = 1 MILE

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Waukegan, IL 60085
(847) 336-4341

REVISIONS:

No.	Date	Remarks

UNITED STATES ARMY CORPS OF ENGINEERS
FORMER GRIFFISS AIR FORCE BASE
ROME, NEW YORK

PROJECT NAME
THREE MILE CREEK

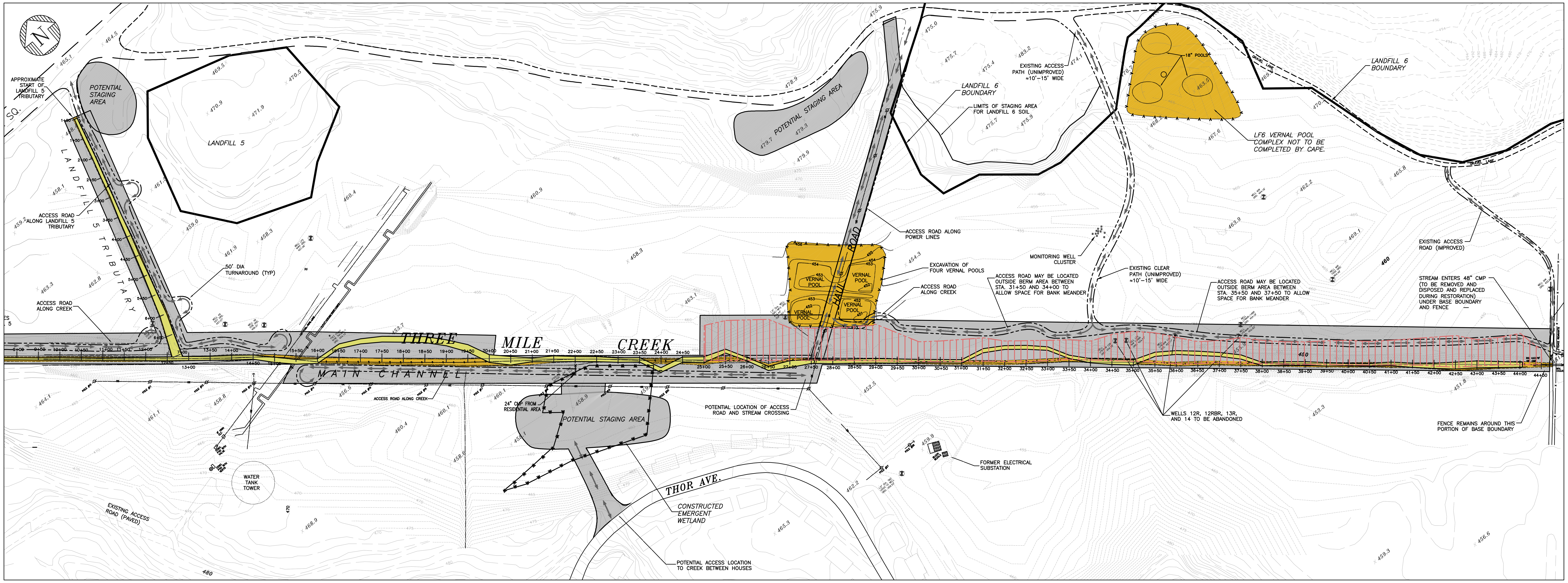
SHEET TITLE
BASE LOCATION MAP

CONTRACT NO:
DACA41-01-D-0003

JOB NO:
10303.003.001

CHECKED BY:	DRAWN BY:
C.W.	C.R.
DATE:	FILE NAME:
MAY 04	3MGRIFFIG-1

FIGURE:
FIGURE 1
SHEET 1 OF 7



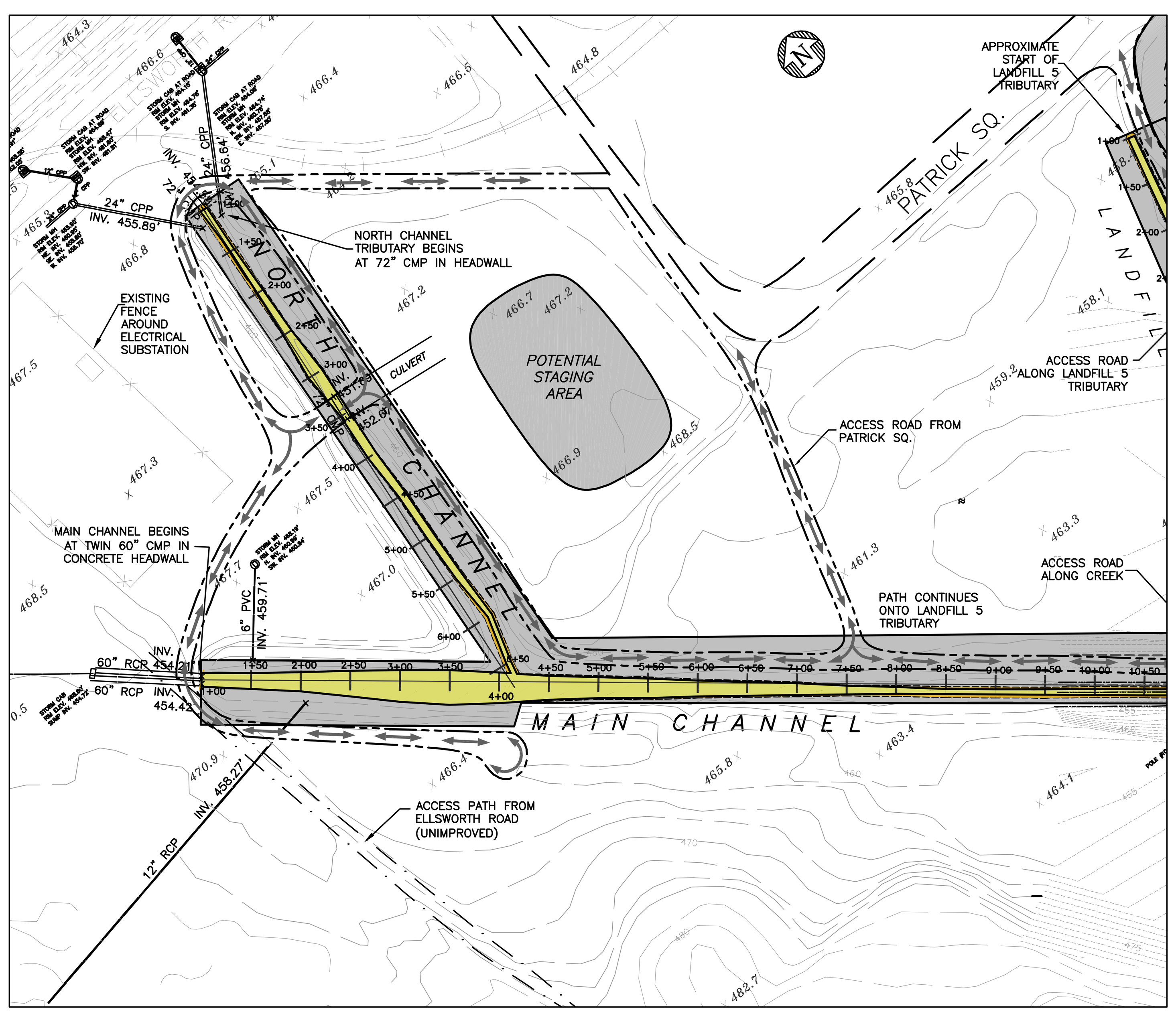
NOTE
LOCATIONS OF RIFFLE POOL COMPLEXES, SHRUB RESOURCE ISLANDS, STEP POOL DROP STRUCTURES, ETC. ARE SHOWN ON THE DESIGN DRAWINGS.

GRAPHIC SCALE
100' 0 100' 200'

ON–BASE PORTION OF THREE MILE CREEK

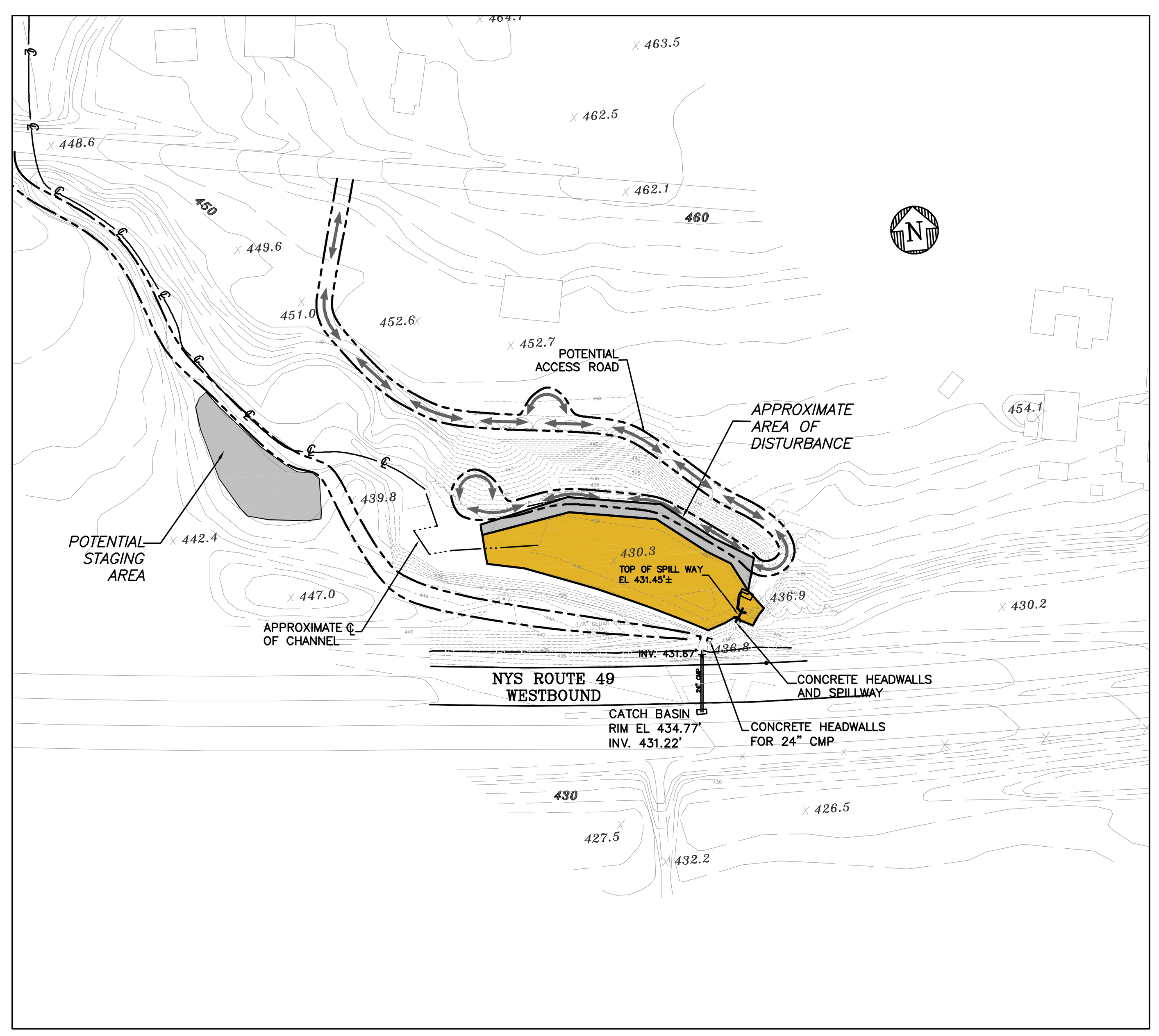
LEGEND

APPROXIMATE AREAS OF EXCAVATION	APPROXIMATE AREA OF CONSTRUCTED EMERGENT WETLAND
APPROXIMATE AREAS OF RESTORATION	
APPROXIMATE AREAS OF DISTURBANCE	
BERMS – APPROXIMATE AREA OF EXCAVATION	
TRAFFIC ROUTES	



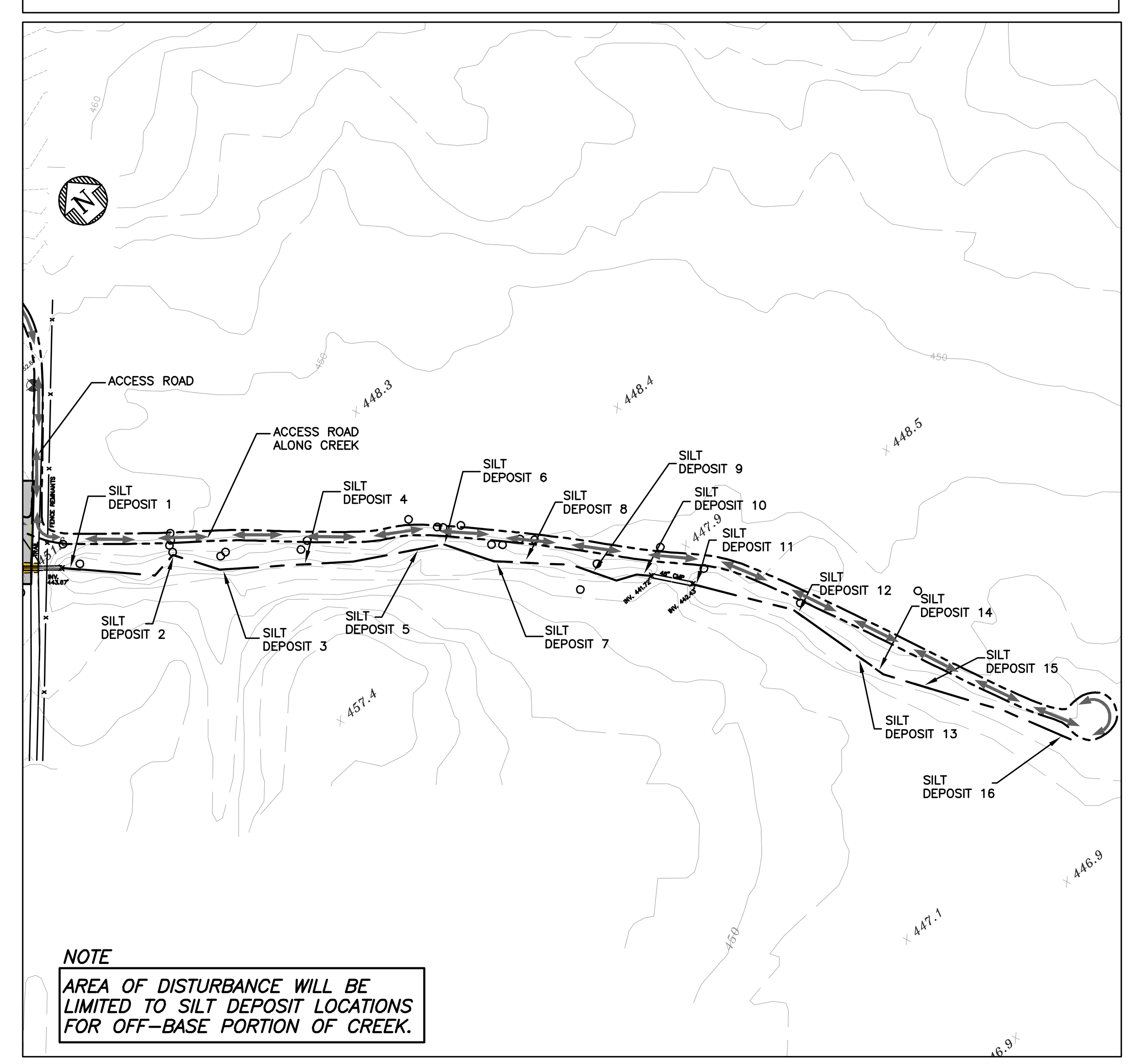
GRAPHIC SCALE
100' 0 100' 200'

UPSTREAM PORTIONS OF THREE MILE CREEK (ON–BASE)



GRAPHIC SCALE
100' 0 100' 200'

POND AREA (OFF–BASE)



NOTE
AREA OF DISTURBANCE WILL BE LIMITED TO SILT DEPOSIT LOCATIONS FOR OFF–BASE PORTION OF CREEK.

GRAPHIC SCALE
100' 0 100' 200'

OFF–BASE PORTION OF THREE MILE CREEK

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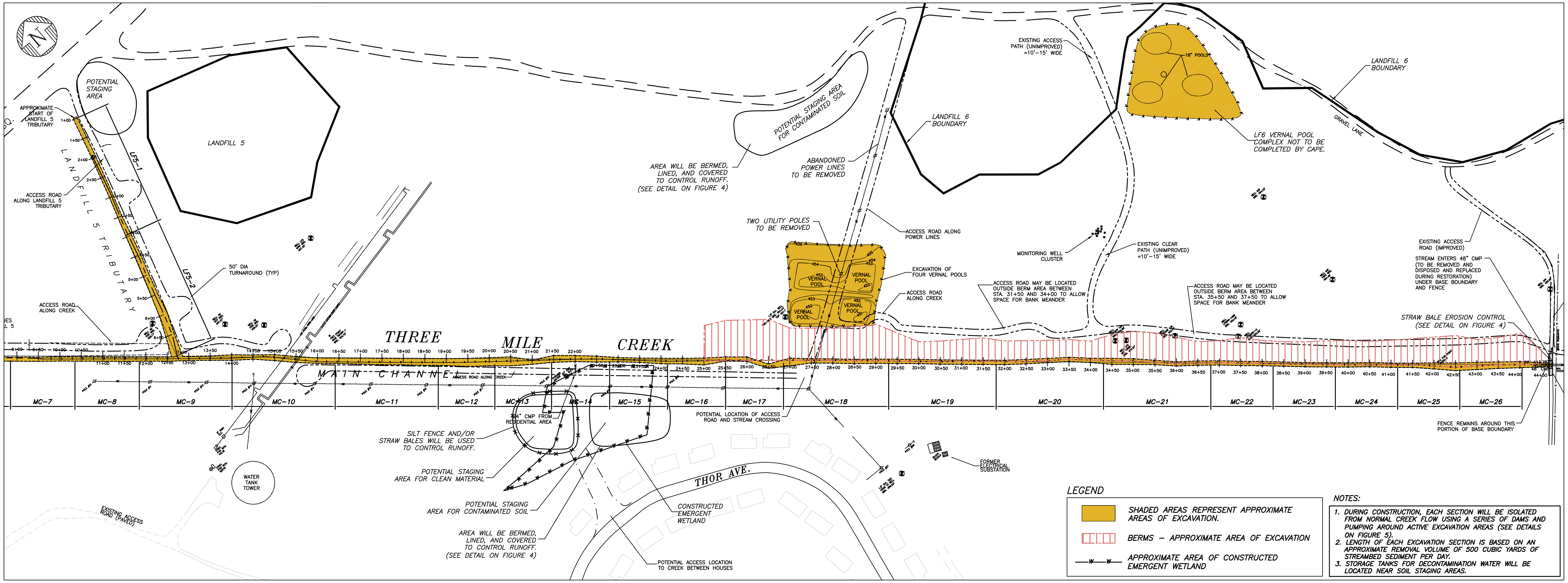
PROJECT NAME
THREE MILE CREEK

SHEET TITLE
EXISTING TOPOGRAPHY AND APPROXIMATE AREA OF DISTURBANCE

JOB NO: 10303.004.002.001
CONTRACT NO: DACA41–01–D–0004

SHEET NAME:	DRAWN BY: C.R.
FIGURE–2	DESIGNED BY: C.W.
SHEET 2 OF 7	CHECKED BY: A.E./S.S.
FILE NAME: 3MGRIFFIG–2	DATE: MAY 04



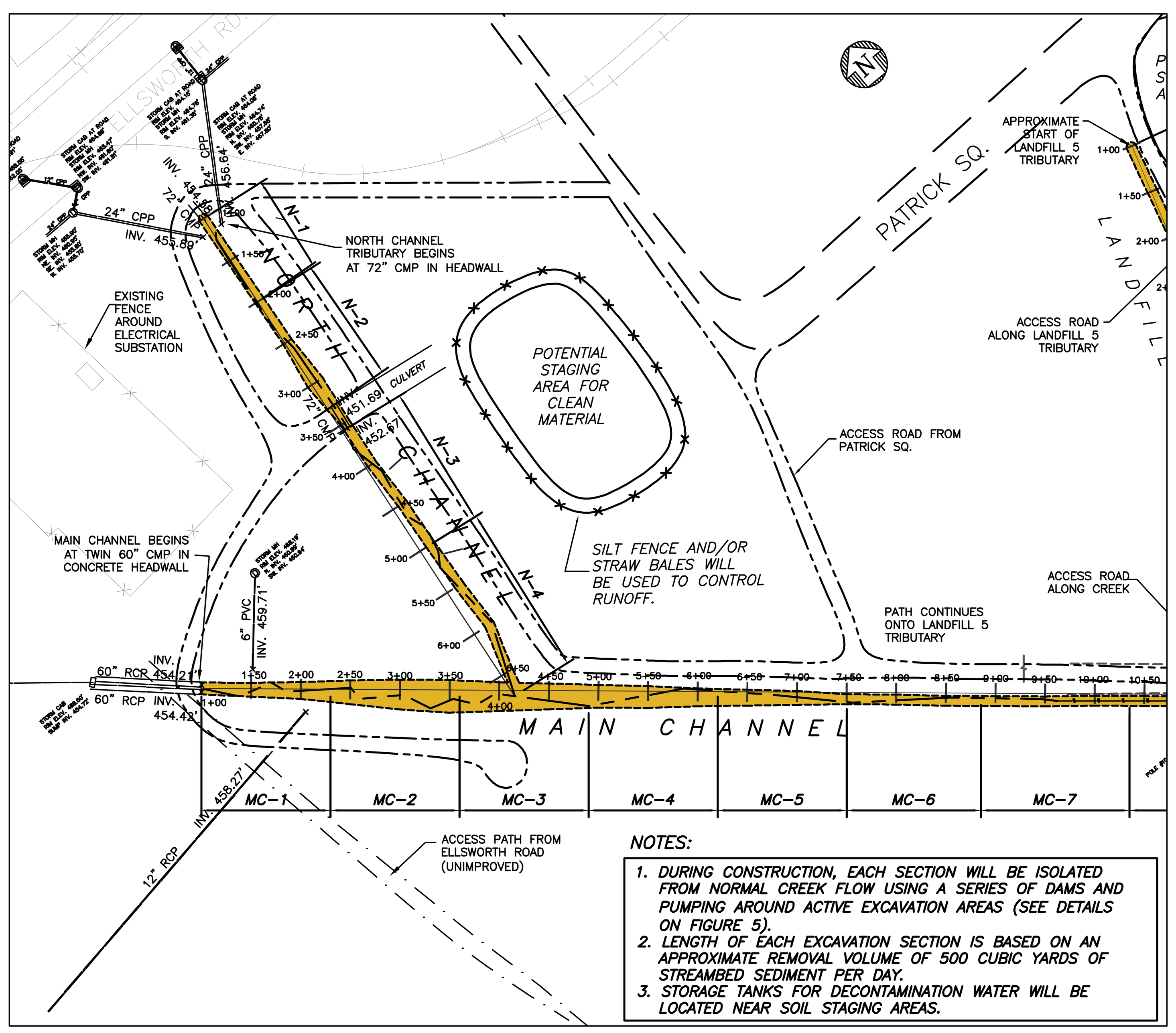
GRAPHIC SCALE 100' 0 100' 200'

ON–BASE PORTION OF THREE MILE CREEK

Channel Section	Excavation Section Number	Depth of Excavation		Channel Section	Excavation Section Number	Depth of Excavation
North Channel	N-1	4'		Main Channel	MC-9	2.5'
North Channel	N-2	4'		Main Channel	MC-10	2.5'
North Channel	N-3	4'		Main Channel	MC-11	2.5'
North Channel	N-4	4'		Main Channel	MC-12	4'
				Main Channel	MC-13	4'
				Main Channel	MC-14	4'
Landfill 5 Tributary	LF5-1	4'		Main Channel	MC-15	4'
Landfill 5 Tributary	LF5-2	4' / 2.5'		Main Channel	MC-16	4'
				Main Channel	MC-17	4'
				Main Channel	MC-18	2.5'
Main Channel	MC-1	4'		Main Channel	MC-19	2.5'
Main Channel	MC-2	4'		Main Channel	MC-20	2.5'
Main Channel	MC-3	4'		Main Channel	MC-21	2.5'
Main Channel	MC-4	4'		Main Channel	MC-22	4'
Main Channel	MC-5	4'		Main Channel	MC-23	4'
Main Channel	MC-6	4'		Main Channel	MC-24	4'
Main Channel	MC-7	4'		Main Channel	MC-25	4'
Main Channel	MC-8	4'		Main Channel	MC-26	4'

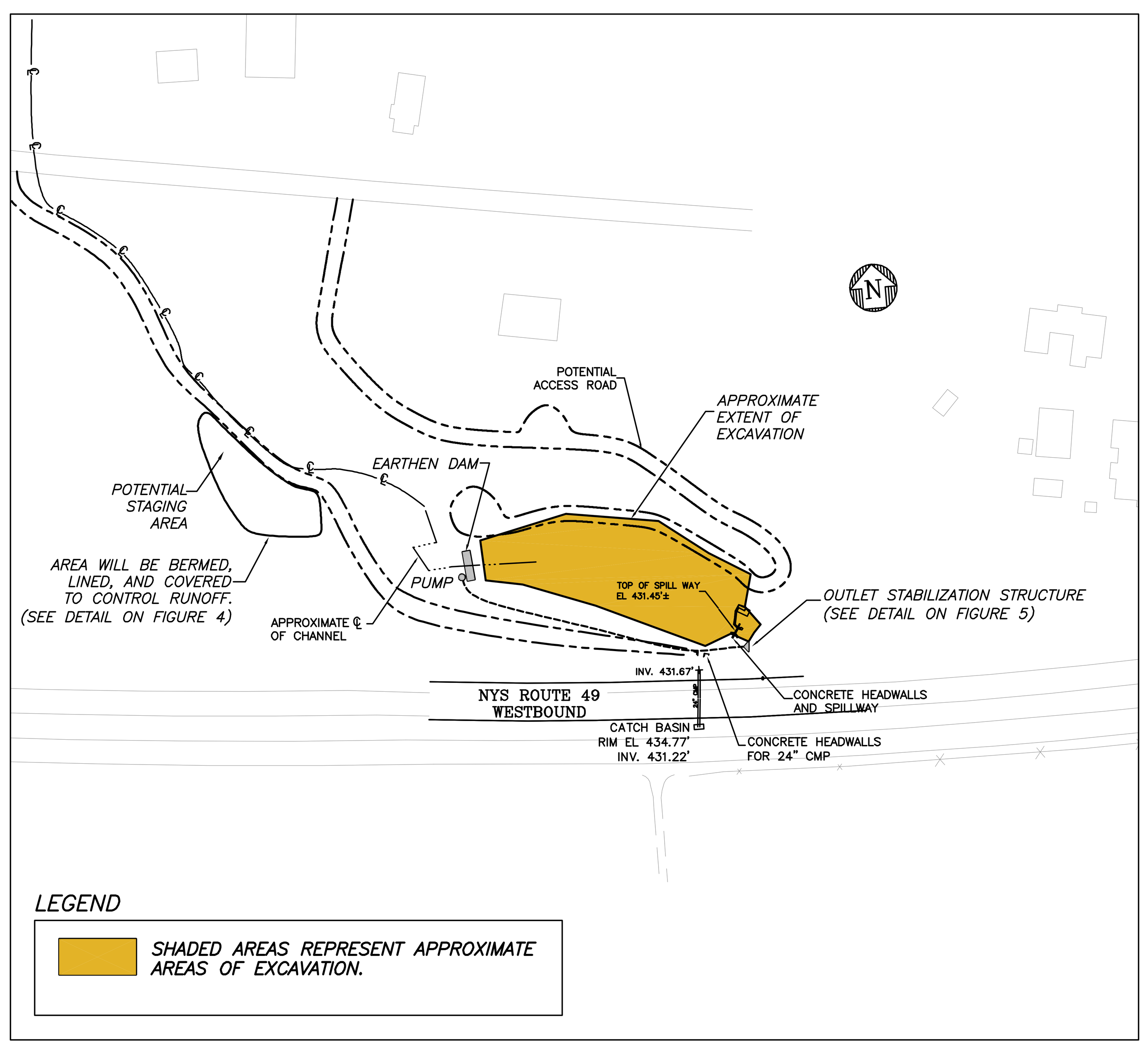
NOTE:

1. ACTUAL LIMITS OF EXCAVATION AND DAILY PRODUCTION BY EXCAVATION SECTION WILL BE ADJUSTED UPON FINALIZATION OF THE DESIGN BASIS REPORT.



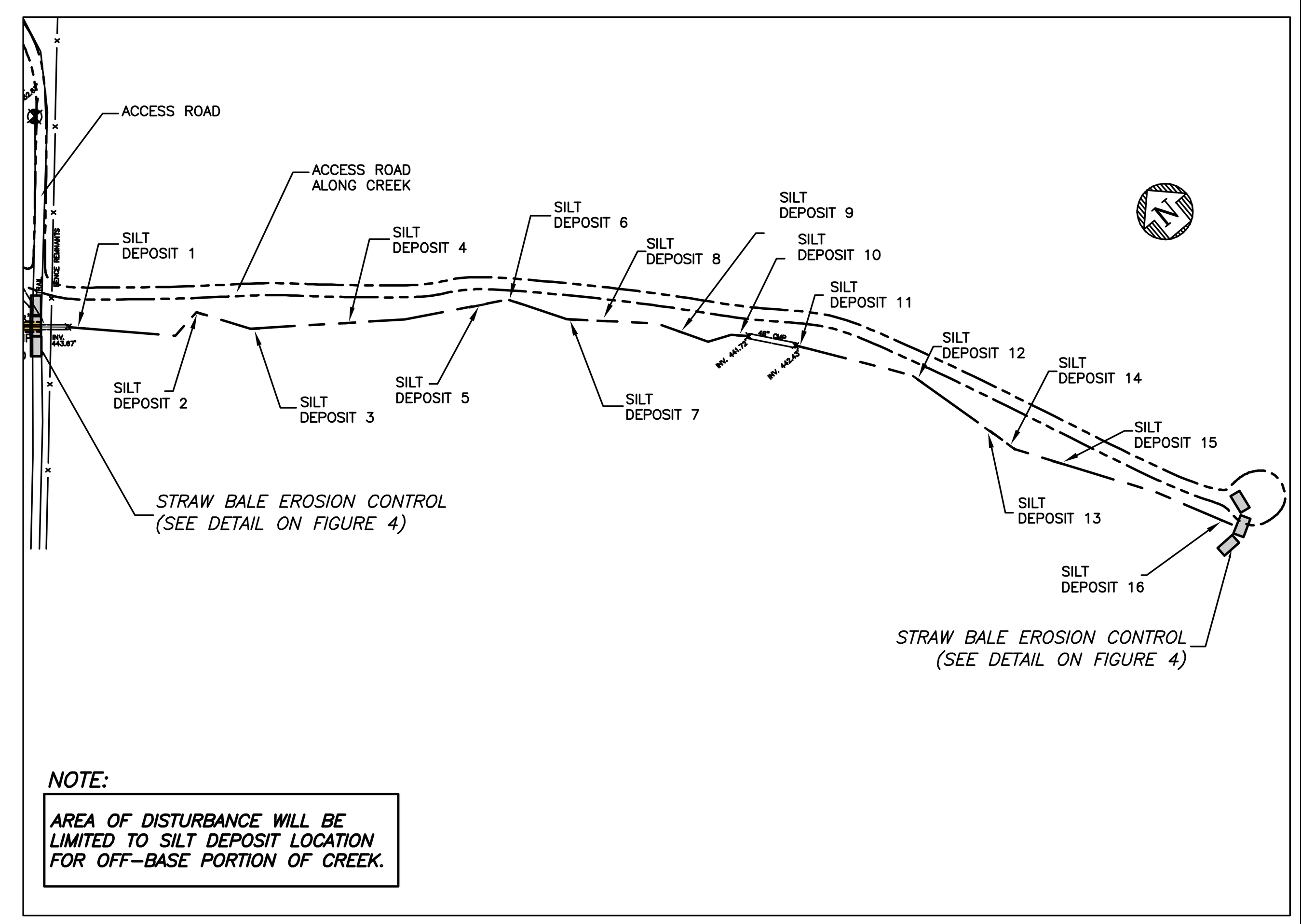
GRAPHIC SCALE 100' 0 100' 200'

UPSTREAM PORTIONS OF THREE MILE CREEK (ON–BASE)



GRAPHIC SCALE 100' 0 100' 200'

POND AREA (OFF–BASE)



GRAPHIC SCALE 100' 0 100' 200'

OFF–BASE PORTION OF THREE MILE CREEK

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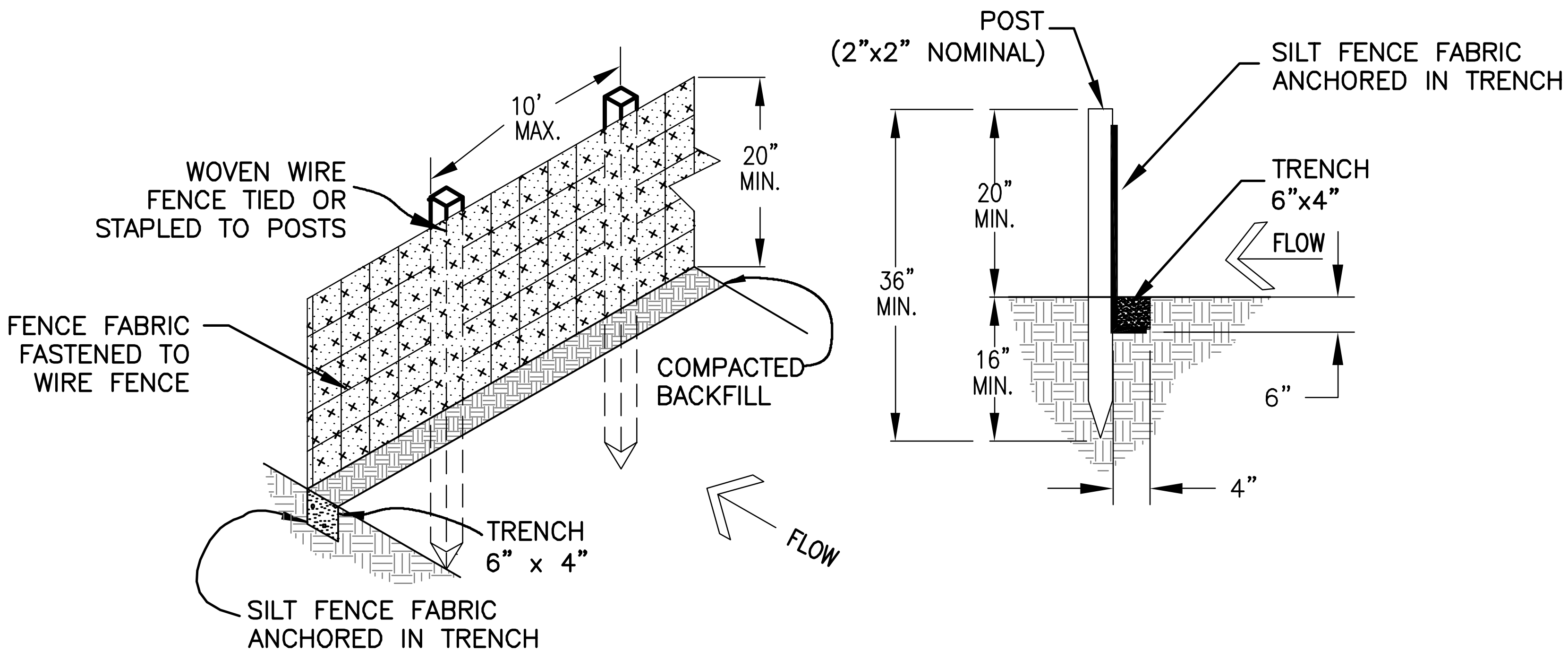
ROME, NEW YORK

PROJECT NAME: THREE MILE CREEK

SHEET TITLE: EXCAVATION AND EROSION CONTROL PLAN

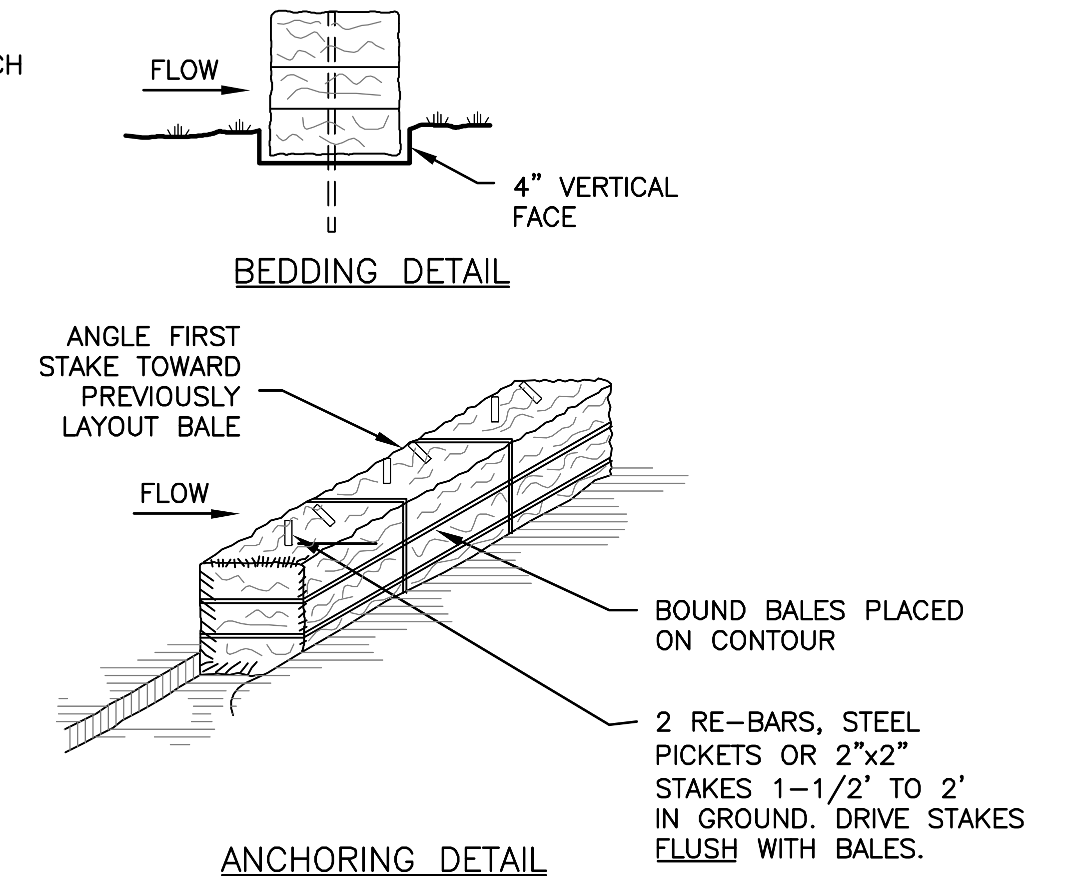
JOB NO: 10303.004.002.001
CONTRACT NO: DACA41-01-D-0004
SHEET NAME: FIGURE–3
SHEET 3 OF 7
DRAWN BY: C.R.
DESIGNED BY: C.W.
CHECKED BY: A.E./S.S.
FILE NAME: 3MGRIFFIG-3
DATE: MAY 04



SILT FENCE

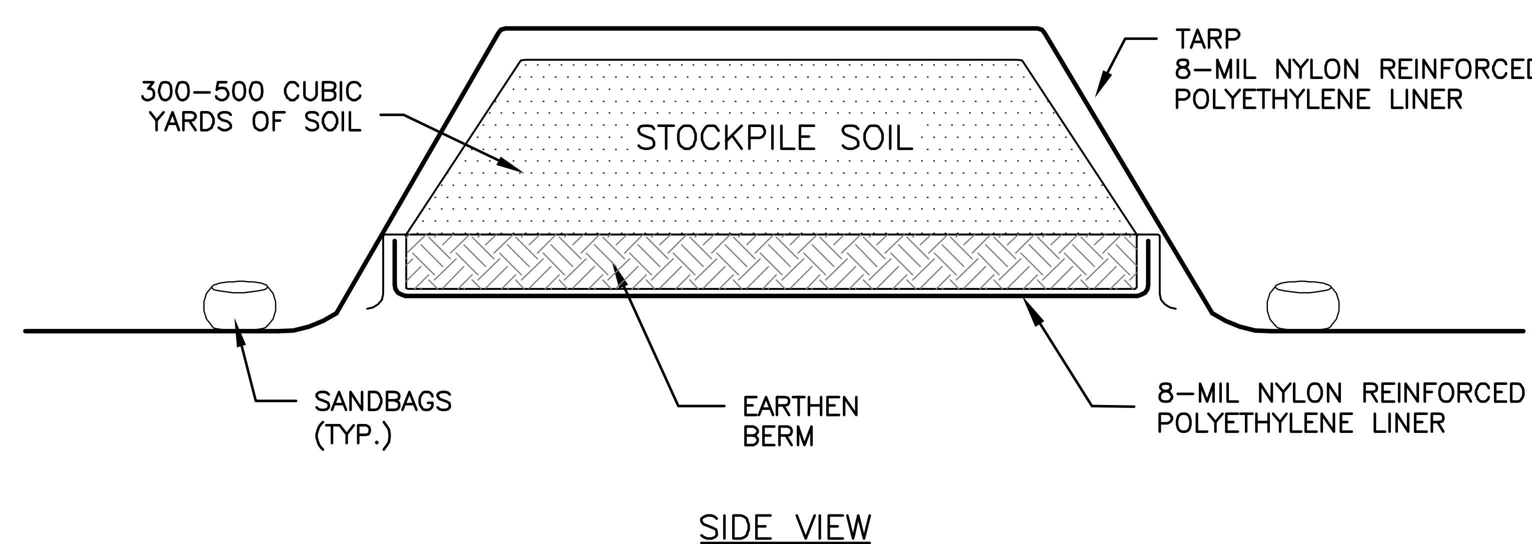
NOT TO SCALE

Fabric Properties	Minimum Acceptable Value	Test Method
Grab Tensile Strength (lbs)	90	ASTM D1682
Elongation at Failure (%)	50	ASTM D1682
Mullen Burst Strength (PSI)	190	ASTM D3786
Puncture Strength (lbs)	40	ASTM D751 (modified)
Slurry Flow Rate (gal/min/sf)	0.3	
Equivalent Opening Size	40-80	US Std Sieve CW-02215
Ultraviolet Radiation Stability (%)	90	ASTM G-26



STRAW BALE DIKE DETAILS

NOT TO SCALE



CONTAMINATED SOIL STOCKPILE CONTAINMENT

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SHEET TITLE: EROSION AND SEDIMENT CONTROL DETAILS

CONTRACT NO: DACA41-01-D-0004
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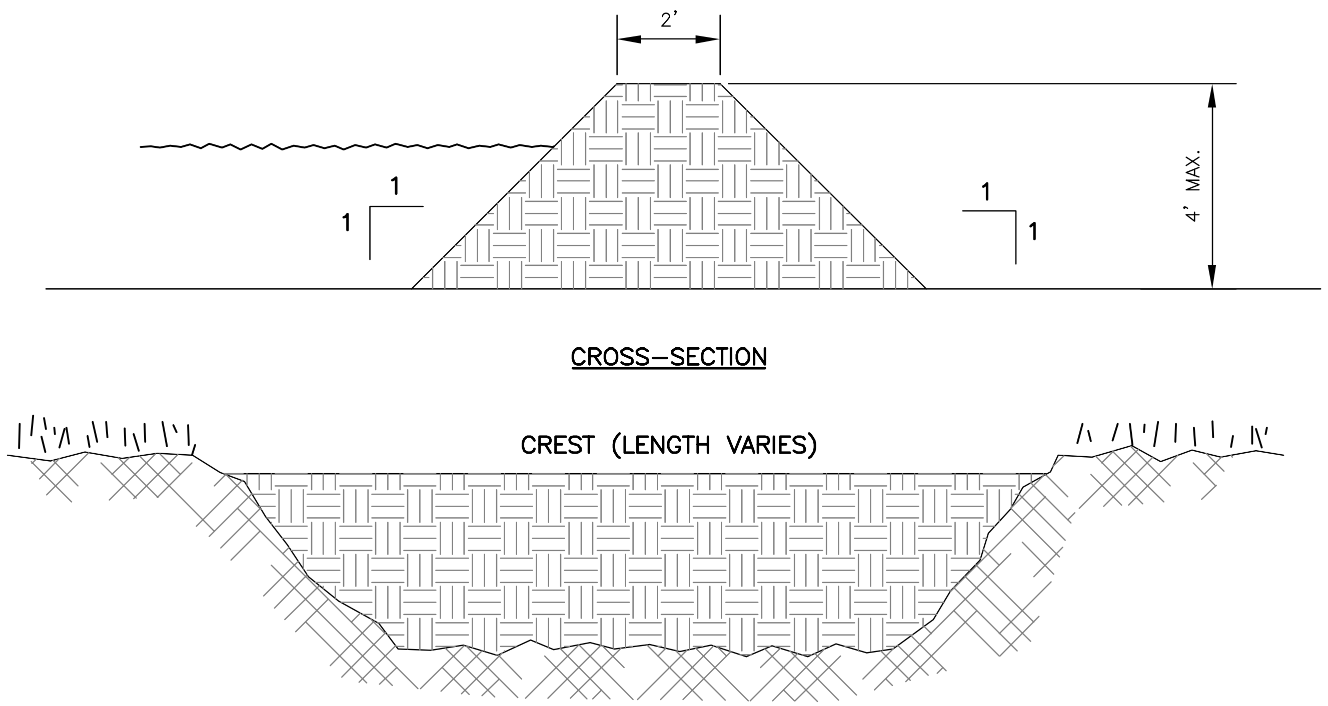
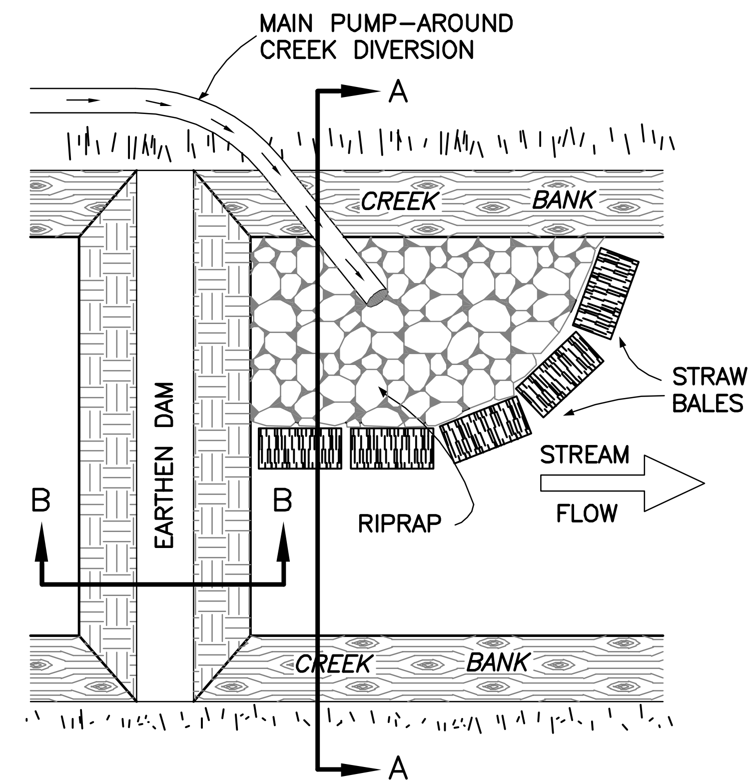
DRAWN BY: C.R.
DATE: MAY 04
FILE NAME: 3MGRIFDTL-4
SHEET NUMBER: FIGURE-4
SHEET 4 OF 7



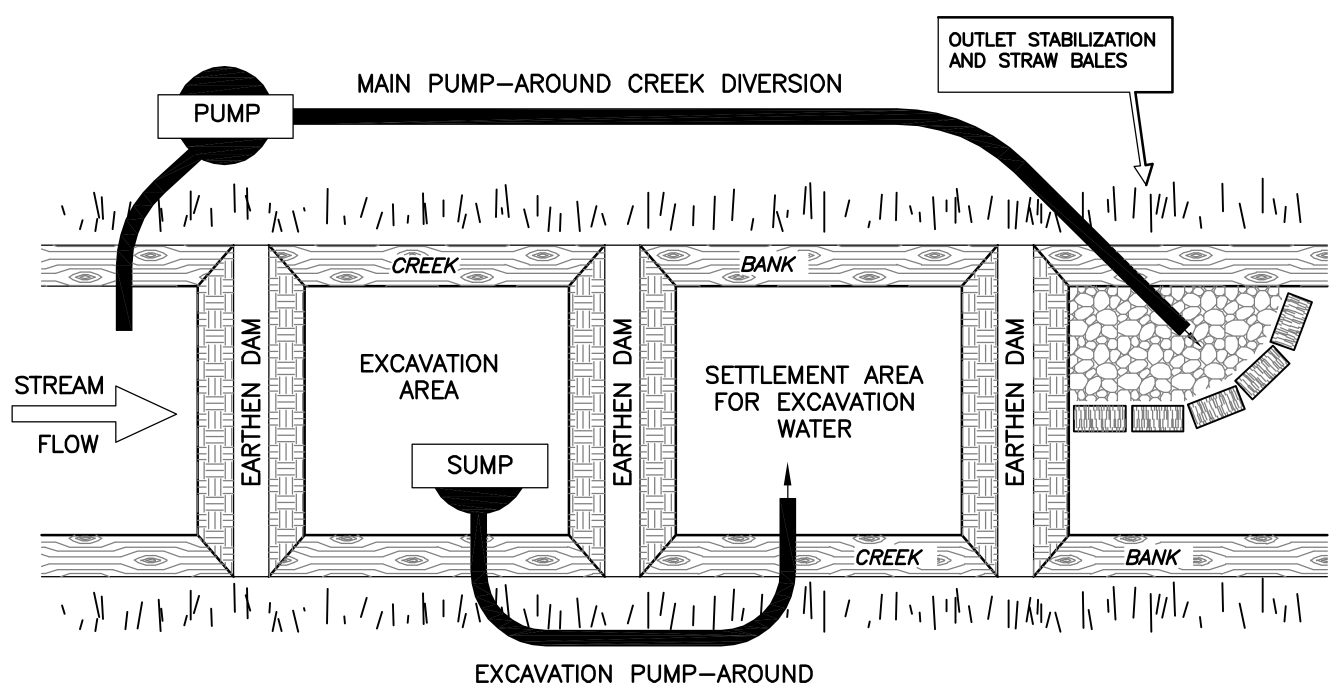
SECTION B-B EARTHEN DAM DETAILS

NOT TO SCALE



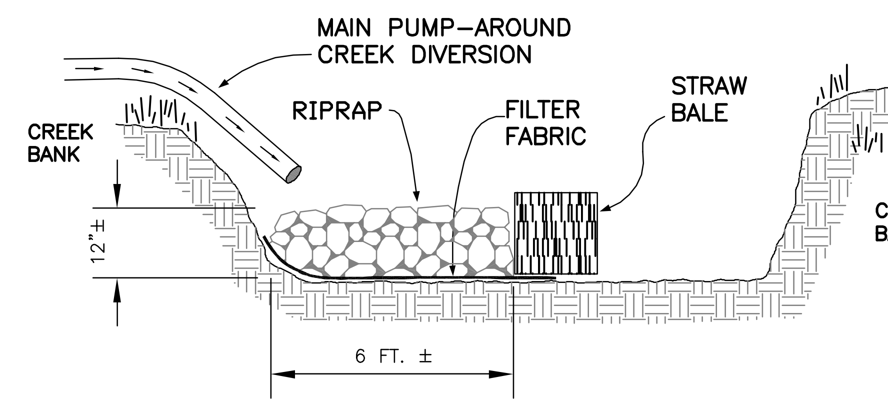
PLAN VIEW OF OUTLET STABILIZATION STRUCTURE

NOT TO SCALE



TYPICAL CREEK PUMP-AROUND

NOT TO SCALE



SECTION A-A OF OUTLET STABILIZATION STRUCTURE

NOT TO SCALE

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FORMER GRIFFISS AIR FORCE BASE
ROME, NEW YORK

PROJECT NAME
THREE MILE CREEK

SHEET TITLE
EROSION AND SEDIMENT CONTROL
DETAILS

CONTRACT NO:
DACA41-01-D-0004

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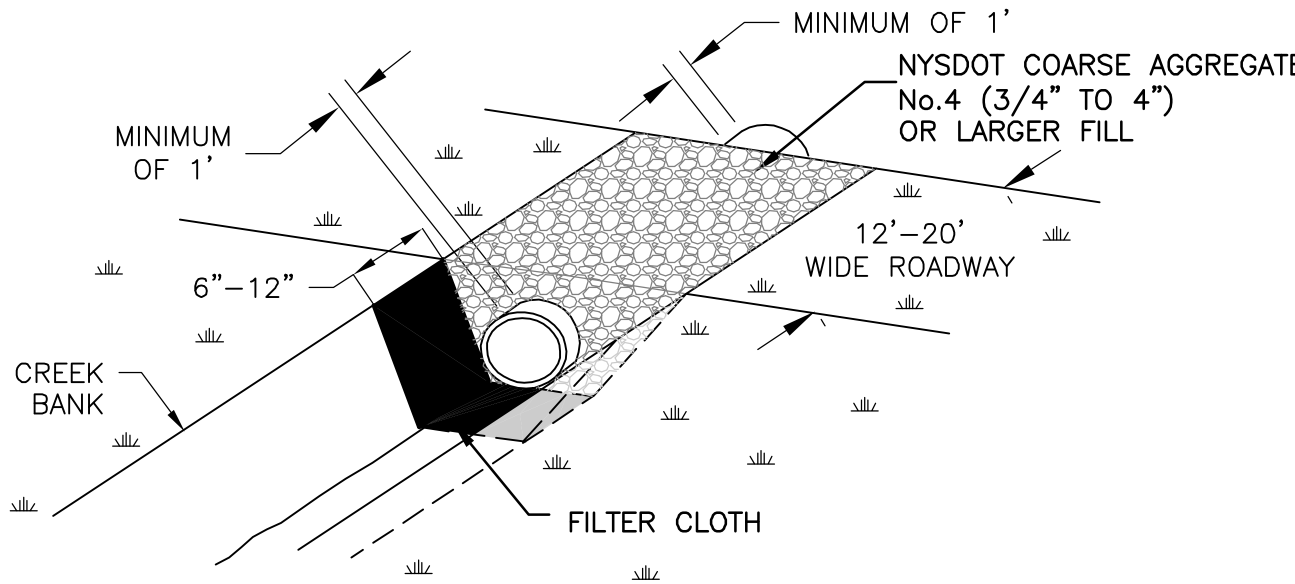
CHECKED BY:
C.W.

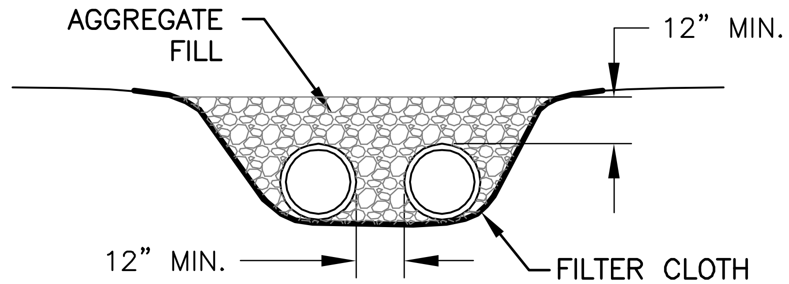
DRAWN BY:
C.R.

DATE:
MAY 04

FILE NAME:
3MGRIFDTL-5

SHEET NUMBER:
FIGURE-5
SHEET 5 OF 7

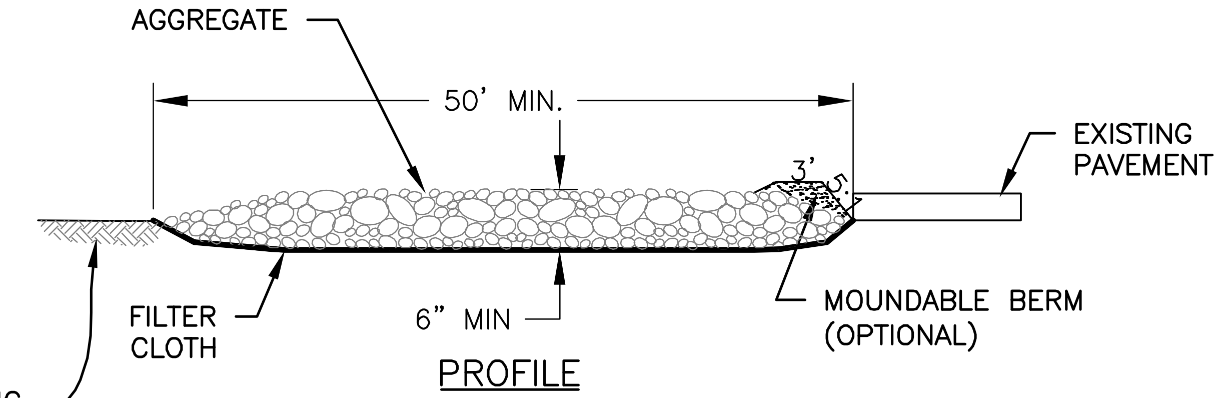


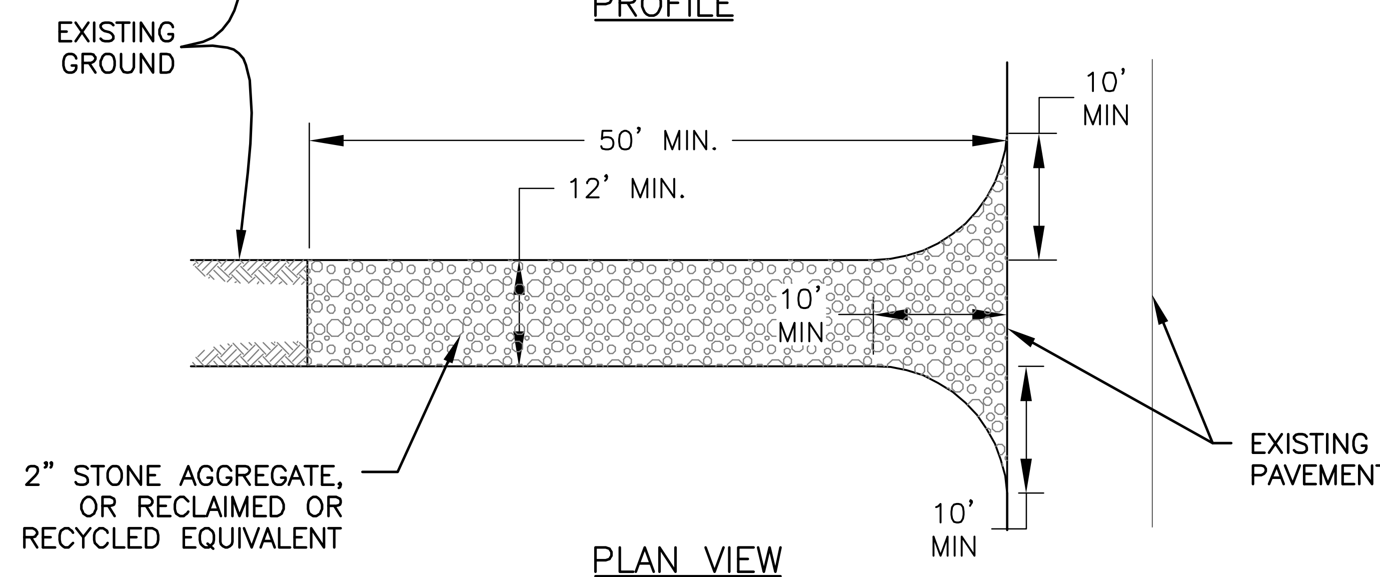


NOTE: IF MULTIPLE PIPES ARE USED, THEY WILL BE SEPARATED AS SHOWN ABOVE.

TEMPORARY CREEK CROSSING–CULVERT

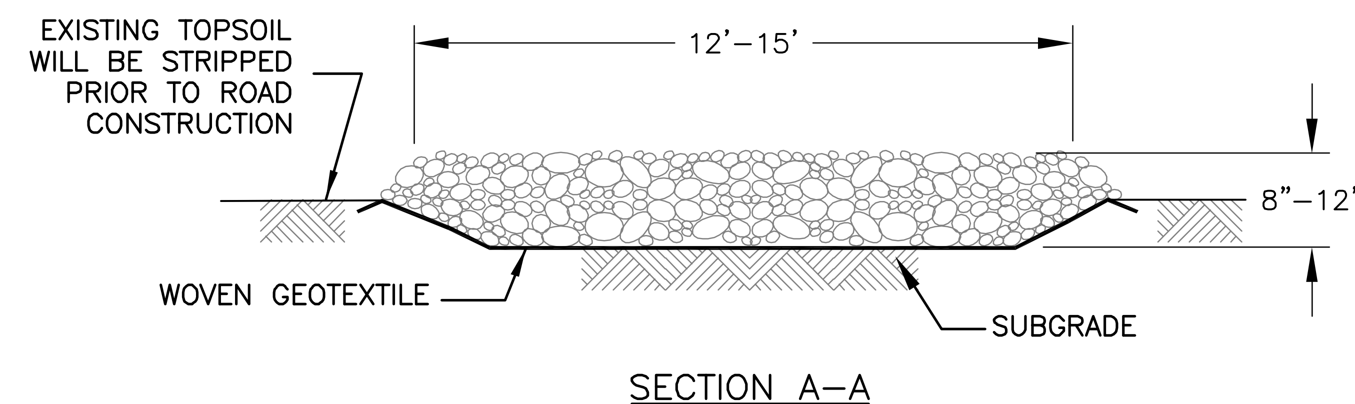
NOT TO SCALE



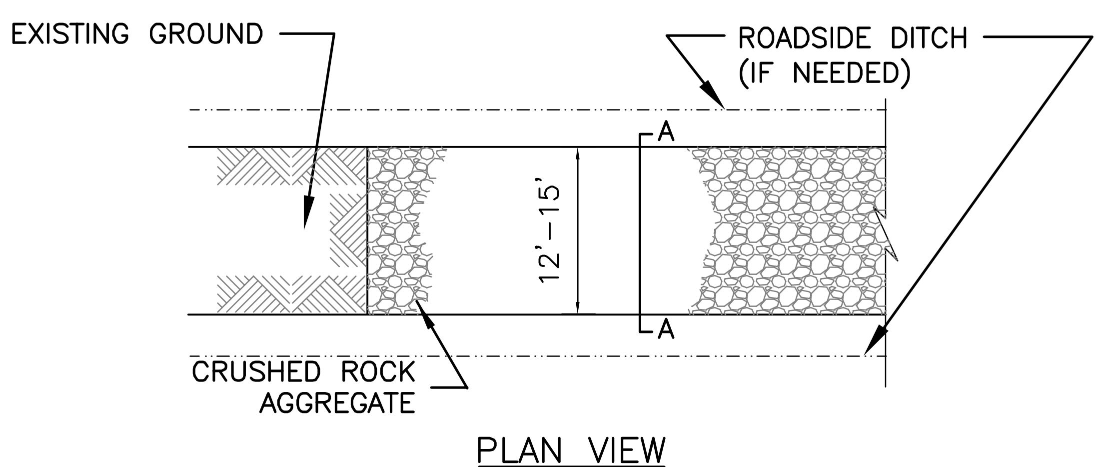


STABILIZED CONSTRUCTION ENTRANCE

NOT TO SCALE



NOTE: ROAD IMPROVEMENTS WILL BE MADE WHENEVER SITE CONDITIONS DICTATE. ROADS WILL BE GRADED TO SLOPE AWAY FROM THE CREEK.



CONSTRUCTION ROAD STABILIZATION

NOT TO SCALE

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CORPS OF ENGINEERS
FORMER GRIFFISS AIR FORCE BASE
ROME, NEW YORK

PROJECT NAME: THREE MILE CREEK

SHEET TITLE: EROSION AND SEDIMENT CONTROL DETAILS

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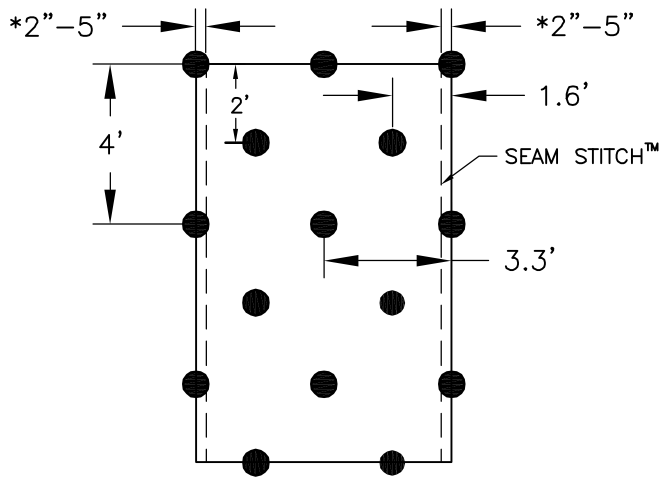
JOB NO: 10303.004.002.001
CHECKED BY: C.W.
DRAWN BY: C.R.
DATE: MAY 04
FILE NAME: 3MGRFDTL–6
SHEET NUMBER: FIGURE–6
SHEET 6 OF 7



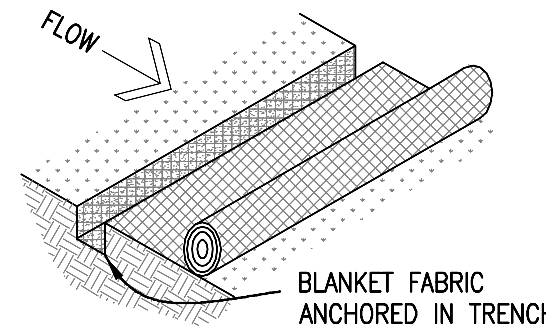
1.7 STAPLES PER SQ. YD.
PLACE STAKES THROUGH EACH
OF THE DOTS.

NOTE:
EXAMPLE TAKEN FROM NORTH AMERICAN GREEN
DOT SYSTEM™ FOR 2:1 OR STEEPER SLOPES.
BIODEGRADABLE WOODEN STAKES WILL BE USED
PER MANUFACTURER'S RECOMMENDATIONS.

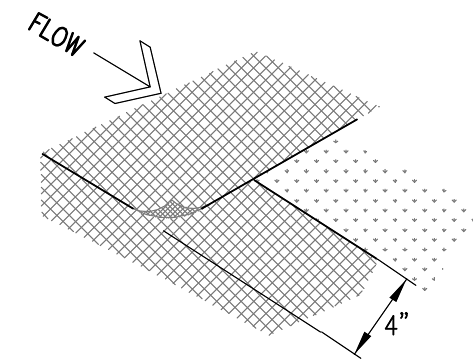
STAKE PATTERNS

NOT TO SCALE

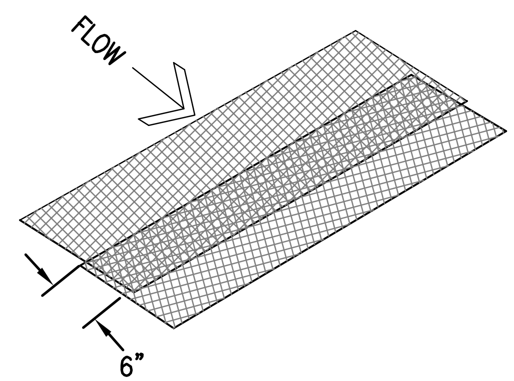
(1) BURY UPSLOPE END OF BLANKET IN A TRENCH 6" DEEP BY 6" WIDE.

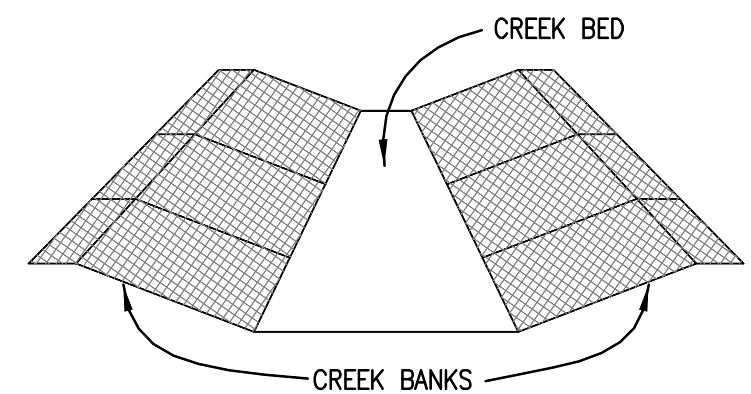


(2) USE A 4" OVERLAP WHEREVER TWO WIDTHS OF BLANKET ARE APPLIED SIDE BY SIDE.



(3) USE A 6" OVERLAP WHEREVER ONE ROLL OF BLANKET ENDS AND ANOTHER BEGINS.





PLACE BLANKET PARALLEL TO THE DIRECTION OF FLOW AND ANCHOR SECURELY.
BRING BLANKET TO A LEVEL AREA BEFORE TERMINATING THE INSTALLATION.

NOTE:
BLANKETS WILL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.

EROSION CONTROL BLANKETS

NOT TO SCALE

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FORMER GRIFFISS AIR FORCE BASE
ROME, NEW YORK

PROJECT NAME
THREE MILE CREEK

SHEET TITLE
EROSION AND SEDIMENT CONTROL DETAILS

CONTRACT NO: DACA41-01-D-0004
JOB NO: 10303.004.002.001
CHECKED BY: C.W.
DRAWN BY: C.R.
DATE: MAY 04
FILE NAME: 3MGRIFDTL-7.dwg
SHEET NUMBER: FIGURE-7

FINAL

EROSION AND SEDIMENT CONTROL PLAN

THREE MILE CREEK AREA OF CONCERN
FORMER GRIFFISS AIR FORCE BASE
ROME, NEW YORK

Preplaced Remedial Action Contract Number DACA41-01-D-0003
Task Order 0004

Prepared for:

U.S. ARMY CORPS OF ENGINEERS
KANSAS CITY DISTRICT
Federal Building 601 E. 12th Street
Kansas City, Missouri 64106-2896

Prepared by:

CAPE ENVIRONMENTAL
91 Noll Street
Waukegan, Illinois 60085

CAPE Project Number 10303.004
June 2004

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LIST OF ABBREVIATIONS AND ACRONYMS

AFB	Air Force Base
AOC	Area of Concern
BRAC	Base Closure and Realignment Act
BWMP	Basewide Wetlands Management Plan
CAPE	Cape Environmental
CY	cubic yard
DBR	Design Basis Report
E&E	Ecology and Environment Engineering, Inc.
ECM	erosion control matting
EPA	U.S. Environmental Protection Agency
ESCP	Erosion and Sediment Control Plan
FFA	Federal Facilities Agreement
gpm	gallons per minute
msl	mean sea level
NPL	National Priorities List
NYCRR	New York Code of Rules and Regulations
NYS	New York State
NYSBC	New York State Barge Canal
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
PCB	polychlorinated biphenyl
SAP	Sampling and Analysis Plan
TMC	Three Mile Creek
USACE	U.S. Army Corps of Engineers

1.0 INTRODUCTION

This Erosion and Sediment Control Plan (ESCP) outlines erosion and sediment control measures that will be implemented by Cape Environmental (CAPE) during upcoming field activities at the former Griffiss Air Force Base (AFB) in Rome, New York. This plan specifically:

- Describes the topographic, drainage, and general site features specific to Three Mile Creek (TMC)
- Provides a description of construction activities that will be performed
- Outlines control measures that will be used to minimize the risk of sediment pollution.

This ESCP has been prepared in accordance with guidelines presented in the *New York Standards and Specifications for Erosion and Sediment Control* published by the Empire State Chapter of the Soil and Water Conservation Society and shall be used in conjunction with the *Design Basis Report and Technical Specifications for Three Mile Creek, Former Griffiss Air Force Base* (E&E, 2004) and the *Remedial Action Work Plan for Three Mile Creek, Former Griffiss Air Force Base* (CAPE, 2004). Activities described herein are in accordance with the requirements of U.S. Army Corps of Engineers (USACE), Kansas City District, Contract Number DACA41-01-D-0003, Task Order 0004.

1.1 Background

Griffiss AFB is a former U.S. Air Force installation covering approximately 3,552 acres in the lowlands of the Mohawk River Valley in Rome, Oneida County, New York (see Work Plan Figure 1). In 1987, the U.S. Environmental Protection Agency (EPA) added Griffiss AFB to the National Priorities List (NPL), and in 1990, the Air Force, the New York State Department of Environmental Conservation (NYSDEC), and the EPA entered into a Federal Facilities Agreement (FFA). In 1993, Griffiss AFB was designated for realignment under the federal Base Closure and Realignment Act (BRAC) and was subsequently deactivated.

1.2 Site Description

The TMC Area of Concern (AOC), a natural stream before the construction of Griffiss AFB, is shown in Figures 2 and 3 from the work plan. The creek was dredged and straightened in 1942 during the initial stages of base construction and again at least once in 1962 to accommodate discharges from the base stormwater collection system. The headwaters of TMC originate at two stormwater discharge points (two large culverts) near the electrical power substation on the south side of Ellsworth Road and just east of the former Wright Drive. TMC receives both surface water runoff and groundwater from the surrounding watershed, including the electrical power substation, Hardfill Areas 49c and 49d, former Landfill 4, Landfills 5 and 6, and stormwater drainage that reportedly contains discharges from floor drains. A drainage ditch adjacent to Hardfill Area 49d, northeast of Landfill 5, forms a tributary to TMC.

The TMC AOC includes the entire length of the creek, which measures approximately 10,000 feet from its headwaters to its outfall. Along this length, the creek is up to 10 feet wide, with water depths ranging from 2 inches to 2 feet. The creek flows toward the southeast across the base, continues off base through pastureland and then wetland, then crosses under New York State (NYS) Route 365 and flows into a pond located just north of NYS Route 49. TMC eventually crosses under NYS Route 49 and empties into the New York State Barge Canal (NYSBC) approximately 1 mile downstream of the installation boundary.

TMC is classified as a Class C stream according to the New York Code of Rules and Regulations (NYCRR) Part 701. The best usage for Class C stream waters is fishing, where waters shall be suitable for fish propagation and survival. Based on an Aquatic Habitat Assessment performed in 1993, at least 12 species of fish are found in TMC. Due to the presence of polychlorinated biphenyls (PCBs) in fish tissue, the New York State Department of Health (NYSDOH) has posted a fish advisory for TMC. NYSDOH recommends that people eat no more than one meal per month of white sucker from this creek.

1.3 Project Overview

A Design Basis Report (DBR), prepared by Ecology and Environment Engineering, Inc. (E&E) under contract to the USACE, Kansas City District, describes the engineering design for excavation of contaminated sediments from TMC and creation of a mitigation wetland in the TMC floodplain. E&E's design was based on the combined analyses documented in the *Final Three Mile Creek Feasibility Study Addendum* (E&E, 2002a) and the *Basewide Wetlands Management Plan* (BWMP) (E&E, 2002b). The primary objective of the design is remediation of sediments located within TMC. The feasibility study addendum concluded that excavation of the creek channel and other contaminated areas is necessary to protect public health and the environment. A concurrent objective of the design is to construct a mitigation wetland on the TMC floodplain, as established in the BWMP.

CAPE's scope of work includes implementation of the engineering design in accordance with the *Design Basis Report and Technical Specifications for Three Mile Creek, Former Griffiss Air Force Base* (E&E, 2004) and the *Remedial Action Work Plan for Three Mile Creek, Former Griffiss Air Force Base* (CAPE, 2004). The purpose of this ESCP is to describe the measures that will be implemented to control erosion and sedimentation throughout the remedial work described in the work plan (see Work Plan Figures 4 through 7).

2.0 TOPOGRAPHIC, DRAINAGE, AND GENERAL SITE FEATURES

2.1 Existing Vegetation

The TMC floodplain is currently a forested wetland covered by various species of wetland vegetation and trees, including a high-quality hemlock-hardwood complex. The existing vegetation helps protect the underlying soil from the erosive forces of rain and runoff scour. Grasses and other vegetation slow the velocity of runoff and help maintain the infiltration capacity of a soil. Therefore, measures will be taken during construction to minimize the disturbance to natural vegetation. These measures will be critical to maintain the high quality of the existing wetlands and wildlife habitat on the base.

2.2 Geology and Soil

The former Griffiss AFB lies in the lowlands of the Mohawk Valley, just north of the Allegheny Plateau. The land surface generally slopes toward the south with the highest elevations in the northeast and northern areas of the base. Elevations range from 430 feet above mean sea level (msl) in the southern extremity of the property to 600 feet above msl near the northeast perimeter. The Mohawk River and the NYSBC lie south of the property. The landforms in the area are products of glacial deposition and erosion, as well as erosion and the depositional processes of the Mohawk River that produced features such as valleys, floodplains, and terraces.

The geology of the area is characterized by unconsolidated sediments overlying Cambrian to Devonian-aged shale, limestone, and sandstone. The unconsolidated sediments consist of clays, silts, sands, and gravels deposited by glacial, glacialfluvial, glacialacustrine, and alluvial processes. The thickness of these unconsolidated sediments ranges from 0 to 130 feet. The dominant bedrock formation of the region is the Ordovician-aged Utica Shale, which dips gently south-southwest toward the Mohawk River in the vicinity of the base.

Results from previous subsurface investigations indicate that native soils specific to the on-base portion of TMC, including the North Channel and Landfill 5 tributary, consist of uniformly sorted, brown tight sand; tight low-plasticity clay with some silt and fine sand; and alternating layers of sand, clay, and fine gravel. Other soils within the Main Channel were noted to contain high percentages of organic soils, including peat. Similar native soil conditions were encountered in the off-base portion of the creek and the pond, although the pond was noted to contain mostly high-organic soils (i.e., documented as dark muck containing silts and clays).

2.3 Approximate Area of Disturbance

Site preparation activities including survey layout of the excavation areas and construction of site haul roads will be completed before the start of excavation. During this phase, CAPE will determine which areas must be disturbed to accommodate the proposed construction. CAPE will minimize grading by using the existing topography wherever possible, and will avoid disturbing wetlands and other environmentally sensitive areas. Special attention will also be paid to critical areas (e.g., steep slopes, highly erodible soils, surface water borders) that must be disturbed. To the greatest extent possible, vegetated buffer strips will be maintained between disturbed and adjacent areas to minimize offsite impacts. The approximate area of disturbance, shown in Figure 2 from the work plan, includes the excavation area, site haul roads, and staging areas for clean and contaminated materials. The actual area of disturbance will be modified based on excavation limits (see Design Drawings GR-4 through GR-7), the restoration plan (see Design Drawings GR- 9 through GR-12), and site conditions.

2.4 Existing and Planned Contours

The existing topography is shown in Figure 2 in the work plan. Additionally, existing and planned contours are indicated on Design Drawings GR-4 through GR-7 and Design Drawings GR-9 through GR-12, respectively.

3.0 CONSTRUCTION SEQUENCING (SCHEDULE)

This section describes the sequence of activities that will be performed in conjunction with the TMC remedial action. These activities include mobilization, site preparation, creek diversion, excavation and stabilization, material staging and loadout, backfilling, and site restoration. During excavation, good engineering practices and appropriate measures will be implemented to control both contaminant releases and general exposures to workers. Workers engaged in waste removal or handling activities will be required to wear an appropriate level of personal protective equipment, as defined in the work plan (CAPE, 2004).

3.1 Mobilization

This task includes mobilizing all resources (i.e., personnel, subcontractors, equipment, materials, and supplies) to Griffiss AFB. Specific mobilization activities include:

- Establishing CAPE site presence
- Conducting Griffiss AFB site-specific training in accordance with the work plan
- Acquisition of equipment, materials, and supplies
- Establishing administrative procedures.

CAPE personnel and subcontractors will receive initial site orientation and training before starting field activities. Initial orientation and training will cover the requirements of the work plan, including personnel responsibilities, potential hazards, hazard recognition, and site-specific procedures.

3.2 Site Preparation

Site preparation includes preconstruction surveying to establish excavation limits, implementing erosion control measures, clearing and grubbing, constructing haul roads and stabilized construction entrances/exits, and establishing staging areas. The Station Data Table (see Design Drawing GR-8) will be used to establish the excavation boundaries. Excavation limits are shown on the engineering drawings (Design Drawings GR-4 through GR-7). Erosion control measures, described in Section 4.0, will be installed and modified throughout construction. Specific measures will be implemented during site preparation to control erosion during clearing and grubbing, construction of haul roads, and establishment of staging areas.

Clearing and grubbing will be minimized to avoid impacting existing wetlands. Whenever possible, trees will be left standing in areas such as the proposed vernal pool and emergent wetland areas and creek banks for habitat purposes. The total area estimated for clearing and grubbing is approximately 8 acres, including access roads and staging areas. Trees will be cleared with a dozer and other heavy equipment to improve access to excavation areas, and then will be stockpiled in a staging area. Some of the larger trees may be used directly in the restoration to enhance the habitat and stabilize the stream channel. Chainsaws will be used to reduce the size of the remaining trees; smaller trees and branches will be fed through a chipper. Stumps will be excavated (grubbed), shaken to remove soil, and staged of along with trees and wood chips not used in site restoration. These materials will be transported to the Air Force's NYSDEC-permitted Land Clearing Debris Landfill located near Landfill 1 for disposal. Stumps may also be ground down to the existing ground surface in lieu of excavation. CAPE plans to grub only where stump removal is necessary for removal of contaminated soils and construction of wetlands and access roads.

Haul roads and the stabilized construction entrances/exits will be constructed as described in Sections 4.1 and 4.11, respectively. Staging areas will be prepared as described in Section 4.9.

3.3 Temporary Diversion

Straw bales will be installed at the downstream base boundary before disturbing sediments in the North Channel, Main Channel, or Landfill 5 tributary. Installation and maintenance of straw bales are described in Section 4.6. After the downstream erosion control measures are in place, a series of earthen dams will be constructed to divide the creek into manageable sections. Three dams will be constructed for each excavation area; the initial diversion will occur at the upstream boundary of the North Channel (Station 1+00) and proceed downstream to the channel crossing near Station 3+25 (see Design Drawing GR-4). The entire creek flow will be diverted around the series of dams using a diesel pump.

CAPE will use a 6-inch diesel pump with a rated capacity of approximately 1,000 gallons per minute to transfer surface water around the active excavation area. One pump will be used and a second pump will be available on standby as a backup. It should be noted that based on flow data presented in the DBR, the peak flow during the 1-year, 24-hour storm event would be up to 150 cubic feet per second (approximately 67,320 gallons per minute [gpm]). The pumps will not be capable of handling storm event flowrates; therefore, CAPE will not pump around during high flow periods. If a storm event is expected, CAPE will complete the active excavation area and will remove the earthen dams to allow unimpeded creek flow. During periods of creek diversion, the pump(s) will be operated continuously to avoid excessive hydraulic loading to the upstream earthen dam.

A riprap stabilization structure will be installed at the pump discharge to minimize erosion. A typical detail of the pump-around system is shown in Figure 5 of the work plan. Details on the construction of dams and implementation of the pump-around system are provided in Sections 4.2 and 4.3, respectively. Details related to the riprap stabilization structure are provided in Section 4.4.

A similar pump-around system will be used at the downstream pond. A single dam will be constructed upstream from the pond. Surface water will be pumped around the excavation area and will be discharged to a riprap stabilization structure. The use of the pump-around systems will prevent migration of potentially impacted sediments from active excavation areas.

3.4 Excavation and Material Handling

Following construction of the earthen dams and installation/activation of the pump-around system, soil will be removed from the area between the two upstream dams with an excavator and/or bulldozer to predetermined depths specified in the DBR (i.e., from 2.5 feet to 4.0 feet). Excavated soil/sediment will be stockpiled in the creekbed to allow free drainage. Stockpiled material will then be mixed with a drying agent (e.g., Calciment) to improve physical characteristics. The drying agent will be staged on site and transferred to the creekbed via construction equipment on an as-need basis. CAPE will use an excavator to mix the drying agent with the stockpiled materials. Once the equipment operator visually determines the sediment to be solidified to the extent that it can be transferred out of the creekbed without free drainage, the sediment will be loaded with an excavator into an off-road dump truck for transfer to the material staging area (see Work Plan Figures 2 and 3 for location of staging areas). Based on bench-scale tests performed on creek and pond sediments, CAPE anticipates that up to 20 percent (by volume) Calciment may need to be added to the sediments to achieve the desired handling characteristics.

Due to groundwater influence on TMC, groundwater will likely recharge into the active excavation area. Excavation water, pumped with an appropriately sized trash pump, will be discharged between the two downstream dams. The area between these dams will be used as a temporary sediment trap, as described in Section 4.5. Pumping will only be required when a bulldozer is used in the creekbed during excavation. If the groundwater recharge rate is too high and excavation water cannot be efficiently managed, soil/sediment will be removed with an excavator positioned outside of the channel.

After the initial section of the North Channel has been excavated and solidified material has been removed from the creekbed, another series of dams will be constructed downstream toward the confluence with the Main Channel. Excavation work will always progress from upstream to downstream. Backfill and surface stabilization (revegetation) of the excavated sections will occur following excavation, as described in Section 3.5. After completing removal activities in the North Channel, excavation activities will begin at Station 1+00 in the Main Channel and will progress downstream to the base boundary. The Landfill 5 tributary will also be excavated from upstream to downstream to minimize the potential for recontamination of the restored channel. Approximately 13,050 cubic yards (CY) of material will be removed from the on-base portion of TMC. An additional 11,640 cubic yards of material will be removed from on base including the following: 7,500 cubic yards from the berms adjacent to TMC, 1,000 cubic yards from constructed meanders, 840 cubic yards from emergent wetlands, and 2,300 cy from the TMC vernal pool complex. Details related to each of the areas are described in the DBR (E&E, 2004). The DBR also references another 3,700 cubic yards that will be excavated from the Landfill 6 vernal pool complex, which is not currently part of CAPE's contracted scope.

Excavation from the off-base portion of TMC will be limited to approximately 80 CY of silt deposits located in 16 locations (see Work Plan Figures 2 and 3, or Design Drawing GR-7). Before silt deposits are excavated, EPA and NYSDEC representatives will be notified by AFRPA to verify locations. Because of the limited amount of material that will be removed from the off-base portion of TMC, sediment control measures will be limited to the installation of straw bales downstream from Silt Deposit 16. Silt deposits will be excavated with smaller excavation equipment (e.g., mini-excavator or rubber-tired backhoe) and directly transferred via off-road dump trucks to the material staging area. Solidification of these materials will be completed at the staging area, if required. Trapped sediment and sediment control measures will be removed after excavation is complete.

The TMC pond will be dewatered, then stabilized *in situ* with Calciment before loading into offroad dump trucks for transfer to the material staging area. Approximately 4,720 cubic yards of material will be removed from the pond. For all work performed off base, CAPE will verify the requirements for working in right-of-ways, easements, and private property with the onsite AFRPA representative. CAPE will complete work only in approved areas, then will restore each area to the original conditions unless otherwise stated in the DBR.

Stabilized material stockpiled at the material staging areas will be sampled for geotechnical and chemical properties in accordance with the approved work plan. Materials satisfying requirements for onsite disposal at Landfill 6 will be transferred as soon as possible to allow reuse of the contained staging area. Materials not meeting onsite disposal requirements will be loaded into dump trucks and transported to an approved offsite landfill for disposal.

3.5 Site Restoration

Following excavation of contaminated soil to predefined depths, the Three Mile Creek areas disturbed during construction will be backfilled and/or graded to match the surrounding area, then will be restored with a vegetative cover. Suitable fill materials may include material graded from the constructed wetland areas and imported backfill. Materials taken from the constructed wetland area will be used as backfill behind diversion structures and creek banks because these areas will most benefit from the existing seedbank. Imported backfill from a NYSDEC-approved source is required to have less than 7% organics and have one of the following classifications: ML, SM, SW-SM, and SPSM. Topsoil that is stripped from wetland or upland areas during site preparation will be reused in these respective areas. Topsoil removed from creek remediation areas will not be reused.

Backfilled and/or graded areas will be re-vegetated with a variety of seed mixtures and other plantings. Wetland and upland conservation seed mixes and shrub resource islands will be planted in all restored areas. A specialized seed mixture will be used within the existing wetland delineation, except for along and on access roads. The predominant species in this seed mix will include: fox sedge, Virginia wild rye, eastern burr reed, soft rush, and sensitive fern. A wildlife food and shelter shrub/sedge mix will be used along and on restored access roads within the existing wetland delineation. The predominant species in this seed mix will include: silky dogwood, grey dogwood, riverbank wild rye, winterberry, fox sedge, and elderberry. All disturbed areas outside of the existing wetland delineation will be seeded with a showy northeast native wildflower mix with the following predominant species: little bluestem camper, side oats grama, silky wild rye, Indian grass tomahawk, partridge pea, big bluestem Niagra, common milkweed, ox eye sunflower, and black-eyed Susan. Unless otherwise approved by the onsite USACE representative and by a restoration specialist (designated by USACE), final seeding and plantings must be performed from April 15 through June 1. If final seeding and plantings are not completed during this period, temporary seeding for erosion control purposes will be completed from September 1 to October 1. A ryegrass mixture will be used for erosion control purposes. Specific seed mixtures for all areas are provided in Section 02950 of the specifications. Additionally, shrub resource islands will be planted intermittently throughout the floodplain to encourage visual screening and line-of-sight obstruction. Based on the DBR, it is anticipated that 10 to 12 islands will be planted, divided between the floodplain and upland areas. The size of each shrub island will be approximately 60 by 120 feet. The composition of islands will be approximately 30% trees and 70% shrub species, utilizing one- to five-gallon planting containers. Tree spacing will be approximately 20 feet on centers, with shrubs at 5 feet on centers. Species to be incorporated into the shrub islands may include winterberry, red maple, speckled alder, red chokecherry, button bush, silky dogwood, red osier dogwood, witch hazel, spicebush, northern bayberry, swamp white oak, pin oak, and black willow. All re-vegetated areas will be fertilized and watered in accordance with Section 02950 of the specifications.

Restoration of the channel varies by subreach, as defined in Section 4.2.3 of the DBR. Subreach 1 begins at the downstream base boundary and runs approximately 1,650 feet upstream. In this subreach the stream will be restored to create a channel that is an average of 1-foot deep during base flow (i.e., 12 inches deep from the top of the channel bank to the restored bottom elevation of the creek). Also within this subreach, the berm that parallels the north side of the stream will be removed. The berm will be excavated in conjunction with the adjacent creek excavation. The portion of the creek that is dammed off and pumped around will serve as an erosion control measure for the berm removal. If the berm is excavated separately from the adjacent creek area, additional erosion controls, such as silt fence or straw bales, will be required before berm excavation can begin. Berm material will be staged, sampled, and disposed of at either Landfill 6 or an offsite landfill, depending on sampling results. Additionally, two large meanders with wavelengths of 300 feet and amplitudes of 25 and 35 feet will be constructed as shown on design drawing GR-11 in the DBR. Live willow stakes will be placed in the floodplain between the abandoned channel and the new channel to stabilize the bank and accelerate revegetation (see Section 02950 of the specifications). At the downstream end of this subreach at the 48-inch culvert at the base boundary, a step pool drop structure will be constructed. The step pool drop structure will be comprised of two 7.5-inch drops across a span of 35 feet to dissipate energy from a 2-foot drop in grade and will also create habitat. The drops will be constructed to include a layer of cobbles at the base followed by large boulders placed with an upstream facing arch to concentrate flow, protect banks, and create riffle habitat. Pools between the drops will be 15 feet long and 18 inches deep for habitat diversity. The pools will be backfilled with cobbles. The location of the step pool drop structure is shown on design drawing GR-11; material requirements are listed in Section 02950 of the specifications. Also as part of site restoration in Subreach 1, CAPE will replace the existing 48-inch culvert at the base boundary with a new 48-inch culvert. Details related to construction and inlet/outlet protection of the new culvert are shown on design drawing GR-15.

Existing conditions at Subreach 2, which runs upstream from Subreach 1 for approximately 550 feet (see Figure 4-1c in the DBR), consist of meanders with natural riffle/pool complexes. These riffle/pool complexes will be recreated and two additional meanders with similar geometries will be constructed at locations shown on design drawing GR-10. Details of the riffle/pool complexes are shown on design drawing GR-16. This subreach will be backfilled with soil, except for riffles at meander inflection points, which will be backfilled with small round cobbles. Additionally, large round stones (up to 16 inches in diameter) will be randomly placed within each riffle.

The length of Subreach 3 is approximately 900 feet (see Figure 4-1c in the DBR) and is located immediately upstream of Subreach 2. This reach will be backfilled to pre-remediation elevations. Just downstream from the steam lines, the restored channel will be realigned into a single sinuous channel, with a 400-foot wavelength and a 40-foot amplitude. Live willow and buttonbush stakes will be placed in the floodplain between the abandoned channel and the new channel to accelerate revegetation. This portion of the creek originally had significant tree fall (i.e., overhanging vegetative cover, generally from downed trees); therefore, tree fall from timber salvaged during clearing activities will be placed in this subreach to provide in-stream habitat and shade for fish.

Subreach 4, which extends upstream from Subreach 3 approximately 1,200 feet to the twin 60-inch culverts at the Three Mile Creek headwater, includes the Landfill 5 tributary and the North Channel. This subreach will be backfilled to pre-remediation elevations to recreate existing conditions. Tree fall will also be placed in this subreach.

The TMC pond will be restored with 1.5 feet of clean backfill to create habitat and accelerate natural revegetation.

The creek banks within each subreach and the pond banks will be seeded, fertilized, and watered in accordance to Section 02950 of the specifications. Erosion control matting (ECM) will be installed over the banks of the creek and pond in accordance with manufacturer's recommendations. At completion of project, CAPE will perform limited maintenance of the restored areas, including re-seeding areas where plant growth was not established, replacing plant material that is dead or not growing satisfactorily, and repairing areas that have washed out. A long term maintenance plan will also be developed for maintenance (by others) of the restored areas.

4.0 EROSION AND SEDIMENT CONTROL MEASURES

4.1 Construction Road Stabilization

To provide improved access to excavation, material staging, and disposal areas, CAPE will construct new haul roads and improve existing access roads, wherever necessary. CAPE will limit, to the greatest extent possible, the amount of clearing and/or land disturbance required for constructing new access roads.

4.1.1 Implementation

Before construction of a new access road, topsoil and/or other organic material will be stripped and stockpiled for reuse during site restoration. The construction or upgrade of site access roads will consist of installing woven geotextile fabric overlain by 8 inches to 12 inches of crushed aggregate. The detail of a stabilized construction road is shown in Figure 6 in the work plan. The aggregate will provide a stable surface for construction equipment and will be NYSDOT #4 crushed stone (75 mm) or an equivalent base course. Stabilization will occur in areas where existing roads are uneven, potholed, eroded, excessively soft, containing ponded water, or otherwise unstable for construction traffic. Where new access roads are developed, stabilization materials will likely be used over the entire new road. Upon project completion, aggregate and geotextile fabric from new access roads will be removed and disposed at Landfill 6 under the cap.

4.1.2 Maintenance

Construction access roads are expected to be relatively low maintenance; however, CAPE will inspect the stabilized roads and repair/re-stabilize as necessary to maintain competent road surfaces for construction traffic.

4.1.3 Specifications

1. The area under new construction roads will be cleared and stripped of any vegetation.

2. New roads will be graded away from the creek to minimize the potential for erosion into the creek.

3. The woven geotextile fabric will be installed in accordance with manufacturer's recommendations.

4. Crushed aggregate will be placed in 8- to 12-inch lift and compacted with heavy equipment.

5. Silt fences will be installed on the downgradient side and at all ditch dischargers to prevent sediments from leaving all construction road sites with exposed soils. These will be left in place and maintained until permanent vegetation is established.

4.2 Earthen Dam Construction

As part of the remedial activities, CAPE will construct earthen dams within the creek to divert surface water around designated excavation areas. Details of the construction and maintenance of the dams are provided in the following subsections.

4.2.1 Implementation

Upon completion of preconstruction activities including clearing, access road construction, and installation of erosion control measures, CAPE will begin construction of earthen dams to divide the creek into manageable sections. As described in Section 3.3, three dams will be constructed for each excavation area to eliminate the potential for downstream migration of excavated sediments. The two uppermost dams will isolate the active excavation area; the two lowermost dams will serve as a sedimentation basin for excavation water. Earthen dams will be constructed with sediment excavated from the creek, which will subsequently be excavated and transferred to a material staging area for additional handling. The interval between dams will be determined based on daily production rates. It should be noted that CAPE will minimize the amount of sediments spread outside of the creek banks. Figure 3 in the work plan indicates typical sections based on excavation and solidification of 300 CY to 500 CY per day. A typical detail of an earthen dam is provided in Figure 5 in the work plan.

4.2.2 Maintenance

CAPE will conduct visual inspections to verify the integrity of the earthen dams. The dams may require periodic maintenance due to precipitation events. CAPE will maintain the dams to the specifications presented in the following section.

4.2.3 Specifications

1. Dams will be constructed with excavated sediments and will span the full width of the creekbed.

2. Calciment will be used to solidify the earthen dams, as necessary.

3. Depths and widths of the dams may vary from location to location along the creek; however, the dams will meet the measurements specified in Figure 5 in the work plan.

4.3 Temporary Diversion

Diversions are measures used on a temporary or permanent basis to divert water around an area that is either under construction, being solidified, or prone to erosion. This is accomplished by constructing channels, berms, or by use of pumps to transfer water around the specified area. As described in Section 3.3, CAPE will use a pump-around system to prevent excavation sediments from migrating downstream. A typical detail of the pump-around system is shown in Figure 5 in the work plan.

4.3.1 Implementation

CAPE will use 6-inch diesel pumps to transfer surface water at a rate consistent with normal flow conditions. Under high-flow conditions, CAPE will complete the active excavation area and remove the earthen dams. The Site Superintendent will make this decision based upon site conditions. The pump will be operated continuously whenever the dams are in place to avoid excessive hydraulic loading to the upstream earthen dam.

4.3.2 Maintenance

Each earthen dam will likely be in place for only a few days; therefore, very little maintenance is expected. Maintenance activities that may be required may include reshaping and/or stabilizing with construction equipment. CAPE field personnel will visually inspect the earthen dams on an ongoing basis to determine when maintenance is required. The upstream earthen dams will be systematically removed at the completion of excavation and streambed restoration.

4.3.3 Specifications

1. Pumps will be sized to handle normal flow conditions.

2. After the dams are constructed, a sump pit with inlet stabilization will be excavated upstream from the uppermost dam. The pump discharge will be constructed to minimize the amount of sediments disturbed downstream (see Work Plan Figure 5).

3. At the discharge point, CAPE will install a riprap stabilization structure consisting of filter fabric, riprap, and straw bales (see Work Plan Figure 5).

4. Diversion pumps will be powered by a diesel engine that will run continuously when dams are in place. The pump will be activated with a float switch that will be set at a depth no greater than 12 inches above the creek bed.

4.4 Outlet Stabilization Structure (Riprap)

Outlet protection is used as a temporary or permanent measure to prevent erosion at the outlet of structures and/or pump-diverted water. The most common material used is rock riprap. In this particular application, CAPE will be pumping stream water around each active work area and will discharge into an outlet stabilization structure on the downstream side of the furthest downstream earthen dam.

4.4.1 Implementation

The stabilization structure, located downstream from the most downstream dam, will be constructed of filter fabric, riprap, and straw bales, as show in Figure 5 in the work plan. The filter fabric will be placed on the bottom of the channel and will cover an area approximately 6 feet wide by 6 feet long. Riprap will then be placed on the filter fabric and straw bales will be installed as shown in Figures 4 and 5 in the work plan.

4.4.2 Maintenance

The maintenance of the outlet stabilization structure is expected to be minimal; however, CAPE will inspect the structure periodically and after high-stream flow events for dislodged stones and damaged straw bales. Repairs to the structure will be made immediately to mitigate any erosion problems.

4.4.3 Specifications

1. Filter fabric measuring at least 6 feet by 6 feet will be installed over the creekbed at the pump-around discharge point.

2. Riprap at least 4 inches in diameter will be placed over the fabric to a minimum depth of 12 inches.

3. Straw bales will be installed as specified in Section 4.6.

4.5 Temporary Sediment Trap

Sediment traps are control devices to intercept sediment-laden runoff and to retain the sediment to protect drainage ways below the sediment trap from sedimentation. As described in Section 4.2.1, CAPE will pump excavation water to a section of the creek that is confined by upstream and downstream dams. This will allow management of excavation water while minimizing the potential for discharge of sediments downstream.

4.5.1 Implementation

Construction of the sedimentation basin will be completed by constructing earthen dams, as described in Section 4.2.1. It is anticipated the earthen dams will allow some seepage and act as a filter to treat the pumped water. If the flow rate is greater than seepage can accommodate, a silt fence will be installed on the downstream dam to accommodate greater flows and still retain sediment.

4.5.2 Maintenance

Maintenance of the dams that create the sedimentation basin is described in Section 4.2.2.

4.5.3 Specifications

Specifications for the dams that create the sedimentation basin are included in Section 4.2.3.

4.6 Straw Bales and Silt Fencing

Straw bales are temporary barriers of straw or similar material used to intercept sediment-laden runoff from small drainage areas of disturbed soil. The purpose of straw bales is to reduce runoff velocity and trap sediments.

Silt fence is a temporary barrier of geotextile fabric used to retain sediment from small, sloping disturbed areas by reducing the velocity of runoff and trapping sediments. The life of the fence depends on the ultraviolet stability of the fabric.

4.6.1 Implementation

Straw bales will be placed in a horseshoe shape around the riprap inlet and outlet stabilization structures at the pump-around discharge point. Straw bales will also be placed across the creek where the creek crosses the base boundary and off-base at the most downstream silt deposit area. Straw bales and/or silt fencing will be installed around the perimeter of vernal pools and the constructed emergent wetlands, at the base of clean soil stockpiles, and on the downgradient side of exposed soil to prevent the transport of sediment from a site. A detail showing proper installation of a straw bale barrier is shown in Figure 4 in the work plan.

As noted in the paragraph above, silt fence may be used in lieu of straw bales. If silt fencing is installed, the fence will be positioned on the downgradient side of an exposed soil area. A 6-inch-deep flat-bottomed trench will be dug along the entire fence line for installation of the fence. A detail showing proper installation of silt fencing is shown in Figure 4 in the work plan. If the berm excavation occurs separately from the adjacent creek excavation, and the creek diversion/pump-around is not in place during the berm excavation, then silt fence or straw bales will be used to protect the creek from sedimentation from the berm removal.

4.6.2 Maintenance

Straw bales typically last about 3 months. The bales will be inspected frequently, especially after each storm event, and sediment deposits will be removed promptly to ensure adequate storage volume for the next rain. Bales will also be inspected for deterioration or damage and will be repaired or replaced when needed. Bales will be removed when they have served their usefulness and after the contributing drainage area has been solidified.

The silt fence will be inspected periodically and after each storm event. If the fence fabric tears, begins to decompose, or becomes ineffective, it will be replaced immediately. Sediment deposits will be removed after they reach one half the height of the fence or when they cause the fabric to bulge. The fence and sediment deposits will be removed after the contributing drainage area has been solidified.

Straw bales and silt fence will be potentially contaminated; therefore, upon removal, will be taken to the permitted landfill adjacent to Landfill 1.

4.6.3 Specifications

<u>Straw Bales</u>

1. A trench will be excavated that is at least 4 inches deep.

2. Bales will be placed in a row with the ends tightly abutting the adjacent bales. The cut edge of the bale should adhere to the ground.

3. Each bale will be embedded in the soil a minimum of 4 inches and placed so the bindings are horizontal.

4. The bales will be securely anchored in place by either two wooden stakes or steel rebar driven through the bale (see Work Plan Figure 4). The first stake in each bale will be driven toward the previously laid bale at an angle to force the bales together. Stakes will be driven flush with the bale.

5. Tightly wedge straw into any gaps between the bales to prevent sediment-laden water from running through.

6. Drainage area will be no more than ¼ acre per 100 feet of straw bales for slopes less than 25 percent. The length of slope above the straw bales will not exceed the limits set forth in the "Standard and Specifications for Straw Bale Dike" in the *New York Standards and Specifications for Erosion and Sediment Control.*

<u>Silt Fence</u>

1. Wood or steel posts will be driven at least 16 inches into the ground on the downslope side of the trench and will be spaced no more than 10 feet apart.

2. The fence posts will be a minimum of 36 inches long. If wood posts are used, they will have a minimum cross sectional area of 3 square inches. Steel posts will be either "T" or "U" type.

3. Wire fence will be attached to the upslope side of the posts with wire ties or staples and will be extended at least 6 inches into the trench. The fence will be a minimum 14-½ gage with a maximum 6-inch mesh opening.

4. Filter fabric will be fastened to the wire fence with ties spaced every 24 inches at the top and midsection and will have a minimum height of 20 inches. The fabric will meet specifications set forth in the *New York Standards and Specifications*

for Erosion and Sediment Control. Fabric specifications are listed in Figure 4 in the work plan.

5. Where two sections of fabric adjoin, they will be overlapped by 6 inches, folded, and stapled.

6. The filter fabric will be embedded at a minimum depth of 6 inches into the ground, as shown in Figure 4 in the work plan, and the trench will be backfilled and compacted with soil.

4.7 Temporary Creek Crossing

Temporary access crossings may be constructed across the Landfill 5 tributary and the Main Channel of TMC to provide access for construction and to prevent construction equipment from damaging the waterway, blocking fish migration, and tracking sediment and other pollutants into the waterway. A culvert will be used for the creek crossing. A culvert is a structure consisting of a section of circular pipe, pipe arches, or oval pipe of reinforcing concrete, corrugated metal, or structural plate, which is used to convey flowing water through the crossing.

4.7.1 Implementation

If possible, the crossing will be constructed where creek flow is low. Clearing and excavation of the bank, bed, and approach sections will be kept to a minimum. In-creek excavation will be limited to only what is necessary to allow the installation of the temporary access culvert. The culvert will be installed parallel to creek flow. The centerline of the roadway approaches will coincide with the crossing alignment centerline. Fill materials associated with the roadway approach will not exceed the top of the adjacent creek banks.

The crossing will have only one traffic lane and will be used only for construction traffic. The crossing may remain in place for up to 4 months, and will be removed within 14 calendar days after it is no longer needed.

4.7.2 Maintenance

The temporary stream crossing will be inspected after each storm event for accumulation of debris and blockage. Periodic inspections will also be performed to ensure that the culvert, creekbed, and banks are not damaged, and that sediment is not entering the creek or blocking fish passage. Debris and trapped sediments will be removed in a timely manner to ensure the crossing is not damaged.

4.7.3 Specifications

1. A permit from NYSDEC will not be required for the installation of this temporary crossing since TMC has a classification of C.

2. The width of the crossing will be between 12 and 18 feet.

3. The culvert will be strong enough to support its cross-sectional area under the maximum expected loads. The maximum loads will be determined before procuring the culvert pipe.

4. The size of the culvert pipe will be the largest pipe diameter that will fit into the channel without major excavation of the channel or without major approach fills. Since the channel width exceeds 3 feet, additional pipes may be used until the cross-sectional area of the pipes is greater than 60 percent of the cross-sectional area of the channel. The maximum pipe size will be at least 12 inches below the top of the lowest adjacent creek bank (see Work Plan Figure 6). The minimum pipe size will be 12 inches in diameter.

5. Earth and soil materials will not be used for construction of the creek crossing. The minimum acceptable size of aggregate for temporary crossings is the New York State Department of Transportation specifications coarse aggregate No. 4 (3/4 inch to 4 inches). Larger aggregates may be used.

6. The culvert will extend a minimum of 1 foot beyond the upstream and downstream toes of the aggregate placed around the culvert. The culvert will not exceed 40 feet in length.

7. Filter cloth will be placed on the creekbed and banks before placement of the culvert and aggregate. The filter cloth will cover the creekbed and will extend between 6 inches and 1 foot beyond the end of the culvert and bedding material.

8. The invert elevation of the culvert will be installed on the natural creekbed grade to minimize interference with fish migration.

9. The culvert will be covered with at least 1 foot of aggregate. If multiple culverts are used they will be separated by at least 12 inches of compacted aggregate fill.

10. All areas disturbed during installation will be stabilized within 14 calendar days of the disturbance.

4.7.4 Removal and Cleanup

1. The crossing and all its structures, including the culvert, bedding, and filter cloth, will be removed within 14 calendar days after the crossing is no longer needed.

2. The creekbed channel cross section will be restored and the banks will be protected from erosion.

3. Removal and cleanup actions will be accomplished without using construction equipment within the channel.

4. All areas disturbed during culvert removal will be stabilized within 14 calendar days of the disturbance.

4.8 Land Grading

To the greatest extent possible, CAPE will grade all access roads to slope away from the removal areas. This will help minimize the amount of concentrated runoff into surface water in the creek and pond.

4.8.1 Implementation

Grading will be completed using heavy equipment, such as a bulldozer or excavator.

4.8.2 Maintenance

Areas of the site will be regraded on an as-needed basis to minimize the amount of runoff.

4.8.3 Specifications

1. Where practical, construction roads will be graded to divert runoff from going directly to surface water areas.

2. All exposed soil areas will have silt fence installed downgradient to intercept sediments.

3. All areas regraded during construction will be revegetated as described in Section 4.10.

4.9 Stockpile Containment

Excavated soils will be stockpiled in staging areas in 300- to 500-CY piles. Contaminated soils will be adequately segregated from "cleaner" soils to prevent cross contamination and for characterization and disposal purposes. CAPE assumes that topsoil stripped during access road construction is clean and intends to stockpile the topsoil in areas adjacent to where it originated. Topsoil stockpiles will be maintained similarly to clean fill stockpiles. Silt fence and/or straw bales may be used around the perimeter of the topsoil stockpiles to minimize erosion.

4.9.1 Implementation

The natural earth will be mounded to create berms for staging the soils. The berms will be created to eliminate runoff from potentially contaminated stockpile materials. Polyethylene sheeting (8-mil) will be used to line the inside of the bermed areas, which will prevent contaminants from migrating into the underlying soil. Excavated soil/sediment will be piled on top of the liner within the bermed area. In most cases, the soil and sediment will be solidified with a drying agent (see Section 3.4) before being transferred to the staging area. Since materials have been premixed with the drying agent, it is expected that the material can be stockpiled without much sloughing. If necessary, additional drying agent will be added at the staging area to improve the physical characteristics of the soil and sediment.

At the end of each day and/or after the 300- to 500-CY capacity has been reached, the pile will be sampled, then covered with a tarp, which will come down over the outside of the berm. Sandbags will be used to secure the tarp. The purpose of the tarp is to keep rain out of the pile and to eliminate erosion concerns from wind and rain. Stockpile samples will be submitted to a laboratory and analyzed in accordance with methods described in the Sampling and Analysis Plan (SAP).

Multiple stockpile staging areas will be constructed to accommodate production over many days. Once analytical results are available, the stockpiled soil can be transferred to Landfill 6 or to an offsite facility for disposal. The stockpile area will then be reused to stage another production day. It is anticipated that eight to 10 bermed staging areas may be constructed to accommodate the removal activities.

In certain situations, CAPE may elect to stockpile soil directly on Landfill 6. If this occurs, CAPE will not use a liner or a cover. Silt fencing and/or straw bales will be used in this scenario to control erosion from the stockpiled soil.

4.9.2 Maintenance

CAPE will use a front-end loader and/or an excavator at the staging area to maintain the stockpiles. Piles will be covered with tarps if precipitation begins, and at the end of each workday.

Although not anticipated, water may collect within a bermed staging area as a result of either dewatering or precipitation. If this occurs, CAPE will transfer standing water with a portable pump into a storage tank for future handling. This water will be consolidated with other site wastewater (e.g., from dewatering and/or decontamination activities) and sampled in accordance with methods described in the SAP to determine final disposition requirements.

4.9.3 Specifications

1. The sheeting will be 8-mil nylon-reinforced polyethylene.
2. A maximum of 500 CY of soil will be placed in a pile.

4.10 Surface Stabilization

The purpose of permanent seeding is to restore the site by stabilizing areas where final grading has occurred and to:

- Reduce problems associated with mud or dust from bare soil surfaces during construction

- Reduce sediment runoff to downstream areas

- Improve the visual aesthetics of the construction area.

All final grade areas will be permanently seeded as each is completed. Unless otherwise approved by the onsite USACE representative and by a restoration specialist (designated by USACE), final seeding and plantings must be performed from April 15 through June 1. If final seeding and plantings are not completed during this period, temporary seeding for erosion control purposes will be completed from September 1 to October 1.

4.10.1 Implementation

Seeding and planting of live stakes and shrub resource islands will be conducted in accordance with Section 3.5 of this plan and Section 02950 of the specifications included in the DBR. If prepared seeding areas are dry, the soil will be moistened prior to planting. All plant material will be thoroughly watered immediately after installation. A natural organic biofertilizer will be applied at specified rates in accordance with manufacturer's recommendations. The fertilizer will have the following nutrient composition:

- Total Nitrogen 3%
- Water Soluble Nitrogen 2%
- Water Insoluble Nitrogen 1%
- Available Phosphoric Acid 4%
- Soluble Potash 3%
- Calcium 5%
- Sulfur 2.8%
- Magnesium 0.5%
- Iron 0.4%

CAPE intends to use a hydroseeding method to apply the seed/fertilizer mix. ECM will be installed over the banks of the creek and pond in accordance with manufacturer's recommendations. ECM will be selected to fit site conditions (e.g., slope, flow velocity) and will be placed from the top of one bank to the toe of that bank, and from the top of the opposite bank to the toe of that bank. ECM will not be placed across the bottom of the channel. ECM will be laid so it is in continuous contact with the soil and so that the upslope or upstream matting overlaps the lower matting. The uppermost edge of the upper matting will be tucked into a slit trench, backfilled, and then tamped down. ECM will be anchored as specified by the manufacturer, typically by driving wooden staples and/or stakes into the ground (Figure 7 of the work plan).

Live willow and buttonbush stakes will be planted in locations specified on the design drawings on 3-foot centers along the creek diversion structures. Stakes will be planted within 48 hours of harvesting or will be stored in a cool, moist location until they can be planted.

4.10.2 Maintenance

At completion of project, CAPE will perform limited maintenance of the restored areas, including re-seeding areas where plant growth was not established, replacing plant material that is dead or not growing satisfactorily, and repairing areas that have washed out. Seeded areas will be monitored and watered as necessary. CAPE will periodically inspect below the matting for signs of erosion. If any area shows erosion, that portion of matting will be pulled back, and damaged, bare, or sparse areas will be repaired by filling any gullies, re-fertilizing, over- or re-seeding, and re-laying and stapling the matting. A long term maintenance plan will also be developed for maintenance (by others) of the restored areas.

4.10.3 Specifications

Seed mixture specifications are listed in Section 02950 of the DBR specifications. Matting will follow the manufacturer's specifications and will be chosen based on site conditions. Fertilizer specifications are listed in section 4.10.1 of this plan.

4.11 Stabilized Construction Entrance/Exit

The purpose of a stabilized construction entrance/exit is to keep mud and sediment off public roads. The plan and profile of a typical stabilized construction entrance/exit is shown in Figure 6 in the work plan.

4.11.1 Implementation

A stabilized construction entrance/exit will be maintained at all points of construction ingress and egress to paved roads.

4.11.2 Maintenance

Each stabilized construction entrance/exit will be inspected each day of use to ensure there is an open crushed rock surface visible. Additional crushed rock will be placed on the surface of the stable construction entrance/exit if all the voids in the stone surface are chocked with soil. Periodic inspection and maintenance will be provided after each rain event.

Each vehicle that leaves the site to drive on paved roads will be inspected on the stable construction exit. CAPE personnel will remove loose soil from vehicle tires and wheels before entering the paved road. If washing is required, it will be done on an area stabilized with stone that drains into a sediment trap or basin. All sediment dropped, spilled, or washed onto public rights-of-way must be removed immediately by brushing or sweeping. Flushing will only be used if the water is conveyed into a sediment trap or basin.

4.11.3 Specifications

1. Before placing stone, all vegetation will be removed from the foundation area, and the area will be graded for positive drainage.

2. Filter cloth will be placed over the entire area to be covered with stone. The filter cloth will be a woven or nonwoven fabric consisting of only continuous-chain polymeric filaments or yarns of polyester. The fabric will be inert to commonly encountered chemicals, hyrdrocarbons, and mildew; it will be rot resistant and conform to the fabric properties listed in the "Standard and Specifications for Stabilized Construction Entrance" in the *New York Standards and Specifications for Erosion and Sediment Control.*

3. If necessary, piping will be installed under the entrance/exit to provide surface water drainage. If piping is not possible, a moundable berm with 5:1 slopes is permitted.

4. Aggregate used will be 2-inch stone or reclaimed or recycled concrete equivalent.

5. The entrance/exit must be no less than 6 inches thick and not less than 50 feet long. The entrance/exit must be a minimum of 12 feet wide, but not less than the full width of points where ingress or egress occur. A 24-foot minimum width applies if there is only one access point to the site.

4.12 Dust Control

Dust may be generated by construction activities during dry weather. If visible dust appears to be generated within the breathing zone of workers, or if dust is capable of migrating beyond the construction limits, dust-control measures will be implemented. Dust-control measures are used to prevent surface and air migration of dust, which can create offsite damage, health hazards, and traffic safety/visibility problems from disturbed surfaces in construction areas.

4.12.1 Implementation

Dust-control measures may be implemented during construction road stabilization and stabilized construction entrance activities, as well as during any other activities that could potentially create a dust problem, such as stockpiling soils. The measures may include covering stockpiled soils, reducing vehicle speeds, or spraying water on the soils.

4.12.2 Maintenance

Dust-control measures will be maintained throughout dry weather periods until all disturbed areas are stabilized. Water will be applied, as needed.

4.12.3 Specifications

Spray surfaces until wet. Repeat applications as necessary.

5.0 REFERENCES

CAPE, 2004. *Remedial Action Work Plan for Three Mile Creek, Former Griffiss Air Force Base.*

E&E, 2004. *Design Basis Report and Technical Specifications for Three Mile Creek, Former Griffiss Air Force Base.*

E&E, 2002a. *Final Three Mile Creek Feasibility Study Addendum*

E&E, 2002b. Basewide Wetlands Management Plan.

Soil and Water Conservation Society, Empire State Chapter, 1997. *New York Standards and Specifications for Erosion and Sediment Control.*

Standard and Specifications for Erosion and Sediment Control
Standard and Specifications for Straw Bale Dike
Standard and Specifications for Stabilized Construction Entrance

APPENDIX B

STATION DATA TABLE

Station	Existing Creek			Excavation			Excavation Volume			
	Elevation	Toe Right	Toe Left	Elevation	Toe Right	Toe Left	x-sect area	Exc	Berm	Meander
1+00	454.3'	7' R	7' L	450.3'	6' R	6' L	60	-	-	-
1+50	454.2'	9' R	7' L	450.2'	8' R	6' L	68	118	-	-
2+00	454.3'	11' R	8' L	450.3'	10' R	7' L	80	136	-	-
2+50	454.2'	16' R	10' L	450.2'	15' R	9' L	108	173	-	-
3+00	453.9'	21' R	11' L	449.9'	20' R	10' L	132	221	-	-
3+50	453.5'	24' R	11' L	449.5'	23' R	10' L	144	255	-	-
4+00	453.5'	22' R	9' L	449.5'	21' R	8' L	128	251	-	-
4+50	453.3'	18' R	6' L	449.3'	19' R	7' L	108	218	-	-
5+00	453.3'	16' R	5' L	449.3'	17' R	6' L	96	188	-	-
5+50	453.2'	16' R	4' L	449.2'	17' R	5' L	92	173	-	-
6+00	453.2'	14' R	2' L	449.2'	15' R	3' L	76	155	-	-
6+50	453.2'	13' R	1' L	449.2'	14' R	2' L	68	132	-	-
7+00	453.2'	12' R	0' L	449.2'	13' R	1' L	60	118	-	-
7+50	453.3'	11' R	2' R	449.3'	12' R	2' R	46	97	-	-
8+00	452.2'	10' R	3' R	448.2'	12' R	2' R	42	81	-	-
8+50	452.1'	10' R	5' R	448.1'	13' R	3' R	38	73	-	-
9+00	452.1'	10' R	5' R	448.1'	13' R	3' R	38	69	-	-
9+50	452.0'	10' R	5' R	448.0'	13' R	3' R	70	100	-	-
10+00	452.0'	10' R	4' R	448.0'	12' R	2' R	70	130	-	-
10+50	452.0'	10' R	4' R	448.0'	12' R	2' R	70	130	-	-
11+00	452.0'	10' R	4' R	449.5'	12' R	2' R	44	106	-	-
11+50	452.0'	10' R	3' R	449.5'	12' R	2' R	44	82	-	-
12+00	451.0'	10' R	2' R	448.5'	11' R	1' R	44	82	-	-
12+50	451.0'	10' R	1' R	448.5'	11' R	1' R	44	82	-	-
13+00	452.0'	9' R	1' L	449.5'	9' R	1' L	44	82	-	-
13+50	452.0'	8' R	2' L	449.5'	8' R	2' L	44	82	-	-
14+00	452.0'	7' R	4' L	449.5'	8' R	5' L	52	89	-	-
14+50	452.0'	5' R	5' L	449.5'	5' R	5' L	44	89	-	-
15+00	451.1'	7' R	5' L	448.6'	8' R	6' L	54	91	-	-
15+50	452.0'	11' R	1' L	449.5'	12' R	2' L	54	100	-	-
16+00	452.0'	13' R	2' R	449.5'	14' R	1' R	52	98	-	4

Station	Existing Creek			Excavation			Excavation Volume			
	Elevation	Toe Right	Toe Left	Elevation	Toe Right	Toe Left	x-sect area	Exc	Berm	Meander
16+50	452.0'	13' R	2' R	449.5'	14' R	1' R	52	96	-	41
17+00	451.1'	14' R	2' R	448.6'	15' R	1' R	54	98	-	44
17+50	451.0'	15' R	2' R	448.5'	16' R	1' R	57	103	-	48
18+00	451.0'	15' R	2' R	448.5'	16' R	1' R	57	105	-	7
18+50	450.1'	16' R	2' R	446.1'	17' R	1' R	94	139	-	52
19+00	450.0'	16' R	2' R	446.0'	17' R	1' R	94	174	-	52
19+50	449.6'	18' R	1' R	445.6'	19' R	0' L	106	185	-	63
20+00	448.7'	16' R	1' L	444.7'	17' R	2' L	106	196	-	30
20+50	451.0'	16' R	3' L	447.0'	17' R	4' L	114	204	-	7
21+00	450.8'	10' R	5' R	446.8'	13' R	3' R	70	170	-	11
21+50	451.0'	7' R	7' L	447.0'	8' R	8' L	94	152	-	-
22+00	452.0'	5' R	7' L	448.0'	6' R	8' L	86	167	-	4
22+50	451.0'	6' R	6' L	447.0'	7' R	7' L	86	159	-	-
23+00	451.0'	6' R	4' L	447.0'	6' R	4' L	70	144	-	4
23+50	451.0'	7' R	3' L	447.0'	7' R	3' L	70	130	-	4
24+00	451.0'	9' R	2' L	447.0'	10' R	3' L	82	141	-	41
24+50	450.4'	9' R	2' L	446.4'	10' R	3' L	82	152	-	15
25+00	451.0'	11' R	3' L	447.0'	12' R	4' L	94	163	240	15
25+50	450.0'	2' R	7' L	446.0'	3' R	7' L	70	152	374	33
26+00	450.0'	2' R	6' L	446.0'	3' R	7' L	70	130	549	-
26+50	449.0'	19' R	9' R	445.0'	19' R	9' R	70	130	710	19
27+00	449.0'	12' R	4' L	445.0'	13' R	5' L	102	159	438	15
27+50	448.0'	5' R	4' L	445.5'	6' R	4' L	44	135	365	4
28+00	449.0'	6' R	4' L	446.5'	6' R	4' L	44	82	327	4
28+50	449.0'	7' R	3' L	446.5'	7' R	3' L	44	82	317	4
29+00	448.0'	6' R	4' L	445.5'	6' R	4' L	44	82	246	4
29+50	448.0'	5' R	4' L	445.5'	6' R	4' L	44	82	201	-
30+00	448.0'	5' R	3' L	445.5'	6' R	4' L	44	82	56	4
30+50	447.7'	5' R	2' L	445.2'	7' R	3' L	44	82	68	7
31+00	447.7'	6' R	2' L	445.2'	7' R	3' L	44	82	53	7
31+50	448.0'	7' R	3' L	445.5'	7' R	3' L	44	82	16	37
32+00	448.0'	6' R	3' L	445.5'	7' R	3' L	44	82	17	33
32+50	448.0'	4' R	5' L	445.5'	5' R	5' L	44	82	10	33
33+00	448.0'	1' R	7' L	445.5'	2' R	8' L	44	82	17	30
33+50	448.0'	2' L	10' L	445.5'	1' L	11' L	44	82	29	22

Station	Existing Creek			Excavation			Excavation Volume			
	Elevation	Toe Right	Toe Left	Elevation	Toe Right	Toe Left	x-sect area	Exc	Berm	Meander
34+00	448.0'	1' R	9' L	445.5'	1' R	9' L	44	82	51	4
34+50	447.0'	4' R	8' L	444.5'	5' R	9' L	54	91	225	4
35+00	447.0'	4' R	7' L	444.5'	5' R	8' L	52	98	282	4
35+50	447.0'	5' R	5' L	444.5'	5' R	5' L	44	89	69	37
36+00	447.8'	7' R	2' L	445.3'	8' R	2' L	44	82	33	33
36+50	447.0'	6' R	4' L	443.0'	6' R	4' L	70	106	79	37
37+00	447.0'	4' R	5' L	443.0'	5' R	5' L	70	130	29	33
37+50	447.0'	6' R	4' L	443.0'	6' R	4' L	70	130	151	37
38+00	447.0'	5' R	3' L	443.0'	6' R	4' L	70	130	237	4
38+50	447.0'	6' R	2' L	443.0'	7' R	3' L	70	130	188	7
39+00	447.0'	6' R	1' L	443.0'	8' R	2' L	70	130	195	11
39+50	446.7'	6' R	1' L	442.7'	8' R	2' L	70	130	236	-
40+00	446.0'	6' R	0' L	442.0'	8' R	2' L	70	130	245	4
40+50	446.0'	5' R	1' L	442.0'	7' R	3' L	70	130	89	-
41+00	446.0'	7' R	1' L	442.0'	8' R	2' L	70	130	99	11
41+50	446.0'	7' R	2' L	442.0'	8' R	2' L	70	130	254	-
42+00	446.0'	10' R	2' L	442.0'	11' R	3' L	86	144	231	4
42+50	446.0'	14' R	2' L	442.0'	15' R	3' L	102	174	209	11
43+00	446.0'	11' R	4' L	442.0'	12' R	5' L	98	185	146	15
43+50	446.0'	8' R	5' L	442.0'	9' R	6' L	90	174	157	7
44+00	445.2'	6' R	6' L	441.2'	7' R	7' L	86	163	163	-
44+33	443.8'			439.8'	5' R	5' L	70	95		
Totals								10,940	7,403	959

NORTH CHANNEL

Station	Existing Creek			Excavation			Excavation Volume			
	Elevation	Toe Right	Toe Left	Elevation	Toe Right	Toe Left	x-sect area	Exc	Berm	Meander
1+00	454.5'	4' R	4' L	450.5'	5' R	5' L	48	-	-	-
1+50	453.8'	1' R	4' L	449.8'	4' R	6' L	48	88	-	-
2+00	453.2'	1' R	6' L	449.2'	3' R	7' L	48	88	-	-
2+50	452.6'	2' R	8' L	448.6'	2' R	8' L	48	88	-	-
3+00	452.0'	4' R	12' L	448.0'	5' R	13' L	80	118	-	-
3+50	452.7'	2' L	12' L	448.7'	2' L	12' L	48	118	-	-
4+00	452.9'	2' L	12' L	448.9'	2' L	12' L	48	88	-	-
4+50	453.0'	7' L	15' L	449.0'	6' L	16' L	48	88	-	-
5+00	453.1'	8' L	16' L	449.1'	7' L	17' L	48	88	-	-
5+50	453.2'	10' L	18' L	449.2'	9' L	19' L	48	88	-	-
6+00	453.3'	16' L	21' L	449.3'	13' L	23' L	48	88	-	-
6+50	453.4'	6' L	11' L	449.4'	3' L	13' L	48	88	-	-
6+68	453.5'	3' L	8' L	449.5'	0' L	10' L	48	32	-	-
Totals								1,059	-	-

LANDFILL 5 CHANNEL

Station	Existing Creek			Excavation			Excavation Volume			
	Elevation	Toe Right	Toe Left	Elevation	Toe Right	Toe Left	x-sect area	Exc	Berm	Meander
1+00	461	4' R	3' L	457.0'	6' R	4' L	48	-	-	
1+50	460.3	3' R	5' L	456.3'	4' R	6' L	48	88	-	-
2+00	459	1' R	7' L	455.0'	2' R	8' L	48	88	-	-
2+50	458.6	0' L	8' L	454.6'	1' R	9' L	48	88	-	-
3+00	456	2' L	9' L	452.0'	0' L	10' L	48	88	-	-
3+50	456	1' L	10' L	452.0'	0' L	10' L	48	88	-	-
4+00	455	1' L	12' L	452.5'	0' L	13' L	38	79	-	-
4+50	455	2' L	14' L	452.5'	1' L	15' L	40	72	-	-
5+00	455	2' L	14' L	452.5'	1' L	15' L	40	75	-	-
5+50	454.5	1' L	15' L	452.0'	0' L	16' L	45	79	-	-
6+00	454	0' L	17' L	451.5'	1' R	18' L	53	91	-	-
6+50	454	5' R	14' L	451.5'	6' R	15' L	58	102	-	-
7+00	453	11' R	12' L	450.5'	12' R	13' L	68	116	-	-
7+03	452			449.5'				4	-	-
Totals								1,058	-	-

Station	Restoration					Backfill Volume		
	Elevation	Toe Right	Toe Left	Outside Berm	Inside Berm	x-sect area	exc (CY)	Meander
1+00	454.3'	7' R	7' L	NA	NA	(60)		
1+50	454.2'	9' R	7' L	NA	NA	(68)	(118)	-
2+00	454.3'	11' R	8' L	NA	NA	(80)	(136)	-
2+50	454.2'	16' R	10' L	NA	NA	(108)	(173)	-
3+00	453.9'	21' R	11' L	NA	NA	(132)	(221)	-
3+50	453.5'	24' R	11' L	NA	NA	(144)	(255)	-
4+00	453.5'	22' R	9' L	NA	NA	(128)	(251)	-
4+50	453.3'	18' R	6' L	NA	NA	(108)	(218)	-
5+00	453.3'	16' R	5' L	NA	NA	(96)	(188)	-
5+50	453.2'	16' R	4' L	NA	NA	(92)	(173)	-
6+00	453.2'	14' R	2' L	NA	NA	(76)	(155)	-
6+50	453.2'	13' R	1' L	NA	NA	(68)	(132)	-
7+00	453.2'	12' R	0' L	NA	NA	(60)	(118)	-
7+50	453.3'	11' R	2' R	NA	NA	(46)	(97)	-
8+00	452.2'	10' R	3' R	NA	NA	(42)	(81)	-
8+50	452.1'	10' R	5' R	NA	NA	(38)	(73)	-
9+00	452.1'	10' R	5' R	NA	NA	(38)	(69)	-
9+50	452.0'	10' R	5' R	NA	NA	(48)	(79)	-
10+00	452.0'	10' R	4' R	NA	NA	(48)	(88)	-
10+50	452.0'	10' R	4' R	NA	NA	(48)	(88)	-
11+00	452.0'	10' R	4' R	NA	NA	(30)	(72)	-
11+50	452.0'	10' R	3' R	NA	NA	(30)	(56)	-
12+00	451.0'	10' R	2' R	NA	NA	(30)	(56)	-
12+50	451.0'	10' R	1' R	NA	NA	(30)	(56)	-
13+00	452.0'	9' R	1' L	NA	NA	(30)	(56)	-
13+50	452.0'	8' R	2' L	NA	NA	(30)	(56)	-
14+00	452.0'	7' R	4' L	NA	NA	(38)	(63)	-
14+50	452.0'	5' R	5' L	NA	NA	(30)	(63)	-
15+00	451.1'	12' R	0' L	NA	NA	(40)	(65)	-
15+50	452.0'	16' R	4' R	NA	NA	(40)	(75)	-
16+00	452.0'	14' R	3' R	NA	NA	(38)	(72)	(4)

Station	Restoration					Backfill Volume		
	Elevation	Toe Right	Toe Left	Outside Berm	Inside Berm	x-sect area	exc (CY)	Meander
16+50	452.0'	21' L	32' L	NA	NA	(38)	(70)	(41)
17+00	451.1'	32' L	44' L	NA	NA	(40)	(72)	(44)
17+50	451.0'	21' L	34' L	NA	NA	(43)	(77)	(48)
18+00	451.0'	17' R	4' R	NA	NA	(43)	(79)	(7)
18+50	450.1'	17' L	31' L	NA	NA	(72)	(106)	(52)
19+00	450.0'	29' L	43' L	NA	NA	(72)	(132)	(52)
19+50	449.6'	15' L	32' L	NA	NA	(84)	(144)	(63)
20+00	448.7'	9' R	9' L	NA	NA	(84)	(155)	(30)
20+50	451.0'	15' R	5' L	NA	NA	(92)	(162)	(7)
21+00	450.8'	7' R	2' R	NA	NA	(48)	(129)	(11)
21+50	451.0'	7' R	7' L	NA	NA	(72)	(110)	-
22+00	452.0'	6' R	6' L	NA	NA	(64)	(125)	(4)
22+50	451.0'	6' R	6' L	NA	NA	(64)	(118)	-
23+00	451.0'	7' R	3' L	NA	NA	(48)	(103)	(4)
23+50	451.0'	6' R	4' L	NA	NA	(48)	(88)	(4)
24+00	451.0'	30' R	19' R	NA	NA	(60)	(99)	(41)
24+50	450.4'	6' R	6' L	NA	NA	(60)	(110)	(15)
25+00	451.0'	7' R	7' L	80' L	65' L	(72)	(121)	(15)
25+50	450.0'	16' L	25' L	92' L	77' L	(48)	(110)	(33)
26+00	450.0'	2' R	6' L	94' L	79' L	(48)	(88)	-
26+50	449.0'	24' R	14' R	95' L	80' L	(48)	(88)	(19)
27+00	448.1	17' R	1' R	75' L	60' L	(63)	(103)	(15)
27+50	448.1	7' R	3' L	76' L	61' L	(31)	(88)	(4)
28+00	448.2	7' R	3' L	75' L	60' L	(22)	(50)	(4)
28+50	448.1	6' R	4' L	79' L	64' L	(21)	(40)	(4)
29+00	449	5' R	5' L	85' L	70' L	(40)	(57)	(4)
29+50	447.5	5' R	5' L	65' L	50' L	(25)	(61)	-
30+00	448.2	4' R	4' L	45' L	30' L	(32)	(53)	(4)
30+50	447.5	4' R	4' L	47' L	32' L	(28)	(56)	(7)
31+00	448.2	4' R	4' L	51' L	36' L	(35)	(59)	(7)
31+50	448.2	20' L	30' L	55' L	40' L	(32)	(62)	(37)
32+00	448.1	28' L	37' L	48' L	33' L	(31)	(59)	(33)
32+50	448	29' L	38' L	49' L	34' L	(30)	(57)	(33)
33+00	447.9	27' L	35' L	50' L	35' L	(29)	(55)	(30)
33+50	447.2	8' L	16' L	52' L	37' L	(22)	(48)	(22)

Station	Restoration					Backfill Volume		
	Elevation	Toe Right	Toe Left	Outside Berm	Inside Berm	x-sect area	exc (CY)	Meander
34+00	447.9	2' R	8' L	49' L	34' L	(29)	(48)	(4)
34+50	447.9	5' R	7' L	65' L	50' L	(53)	(76)	(4)
35+00	447.8	6' R	6' L	72' L	57' L	(48)	(94)	(4)
35+50	447.5	14' L	24' L	69' L	54' L	(35)	(77)	(37)
36+00	447.6	19' L	28' L	59' L	44' L	(28)	(59)	(33)
36+50	447.1	17' L	27' L	49' L	34' L	(49)	(71)	(37)
37+00	446.4	15' L	24' L	52' L	37' L	(41)	(83)	(33)
37+50	447.9	9' L	19' L	59' L	44' L	(56)	(91)	(37)
38+00	446.4	6' R	2' L	53' L	38' L	(41)	(91)	(4)
38+50	447	4' R	4' L	50' L	35' L	(48)	(82)	(7)
39+00	446.8	4' R	4' L	50' L	35' L	(46)	(86)	(11)
39+50	446.5	6' R	2' L	53' L	38' L	(46)	(84)	-
40+00	445.9	5' R	1' L	54' L	39' L	(46)	(85)	(4)
40+50	446	5' R	1' L	52' L	37' L	(48)	(87)	-
41+00	446.3	4' R	4' L	55' L	40' L	(51)	(91)	(11)
41+50	446.5	8' R	2' L	59' L	44' L	(53)	(95)	-
42+00	447	11' R	1' L	63' L	48' L	(78)	(120)	(4)
42+50	446	11' R	5' L	67' L	52' L	(80)	(145)	(11)
43+00	446	8' R	8' L	58' L	43' L	(76)	(144)	(15)
43+50	446.4	7' R	7' L	63' L	48' L	(73)	(138)	(7)
44+00	445.4	6' R	6' L	73' L	58' L	(66)	(129)	-
44+33	443.8			34' L	19' L	(48)	(70)	-
Totals							(8,581)	(959)

NORTH CHANNEL

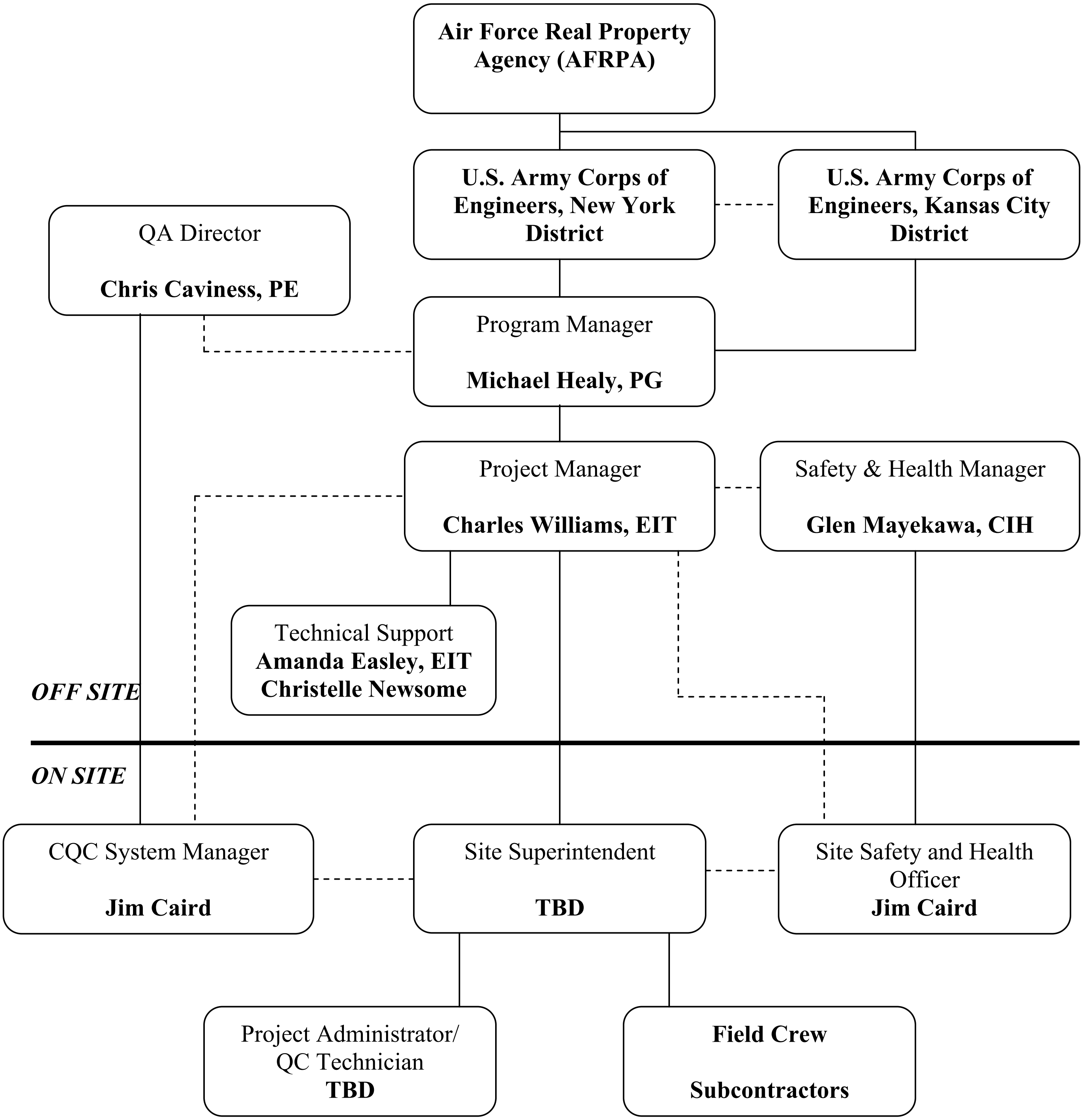
Station	Restoration					Backfill Volume		
	Elevation	Toe Right	Toe Left	Outside Berm	Inside Berm	x-sect area	exc (CY)	Meander
1+00	454.5	4' R	4' L	NA	NA	(48)		
1+50	453.8	1' R	4' L	NA	NA	(48)	(88)	-
2+00	453.2	1' R	6' L	NA	NA	(48)	(88)	-
2+50	452.6	2' R	8' L	NA	NA	(48)	(88)	-
3+00	452	4' R	12' L	NA	NA	(80)	(118)	-
3+50	452.7	2' L	12' L	NA	NA	(48)	(118)	-
4+00	452.9	2' L	12' L	NA	NA	(48)	(88)	-
4+50	453	7' L	15' L	NA	NA	(48)	(88)	-
5+00	453.1	8' L	16' L	NA	NA	(48)	(88)	-
5+50	453.2	10' L	18' L	NA	NA	(48)	(88)	-
6+00	453.3	16' L	21' L	NA	NA	(48)	(88)	-
6+50	453.4	6' L	11' L	NA	NA	(48)	(88)	-
6+68	453.5	3' L	8' L	NA	NA	(48)	(32)	-
Totals							(1,059)	-

LANDFILL 5 CHANNEL

Station	Restoration					Backfill Volume		
	Elevation	Toe Right	Toe Left	Outside Berm	Inside Berm	x-sect area	exc (CY)	Meander
1+00	461	4' R	3' L	NA	NA	(48)		
1+50	460.3	3' R	5' L	NA	NA	(48)	(88)	-
2+00	459	1' R	7' L	NA	NA	(48)	(88)	-
2+50	458.6	0' L	8' L	NA	NA	(48)	(88)	-
3+00	456	2' L	9' L	NA	NA	(48)	(88)	-
3+50	456	1' L	10' L	NA	NA	(48)	(88)	-
4+00	455	1' L	12' L	NA	NA	(38)	(79)	-
4+50	455	2' L	14' L	NA	NA	(40)	(72)	-
5+00	455	2' L	14' L	NA	NA	(40)	(75)	-
5+50	454.5	1' L	15' L	NA	NA	(45)	(79)	-
6+00	454	0' L	17' L	NA	NA	(53)	(91)	-
6+50	454	5' R	14' L	NA	NA	(58)	(102)	-
7+00	453	11' R	12' L	NA	NA	(68)	(116)	-
7+03	452			NA	NA	(5)	(4)	-
Totals							(1,058)	-

Appendix A

ORGANIZATIONAL CHART



Lines of Authority ————

Lines of Communication - - - - - - - -

Appendix J

CAPE ENVIRONMENTAL
INJURY AND ILLNESS RATES
3-Year Summary (2001 – 2003)

	2003	2002	2001
Number of Employees	237	352	200
Total Number of Hours Worked	341,942	392,541	337,043
Number of Cases with Fatalities	0	0	0
Number of Cases Classified as Recordable	4	11	6
Number of Cases with Days Away from Work	0	1	2
Number of Cases with Restriction or Transfer	2	8	1
Number of Cases with No Days Away From Work, Restriction, or Transfer	2	2	3
Number of Days Away From Work	0 day	1 day	13 day
Number of Days of Restriction or Transfer	8 day	90 day	1 day
Recordable Injury Case Rate	2.34	5.61	3.56
Lost Work Day Injury Case Rate (DART Cases)	1.17	4.59	1.78
Lost Work Day Injury Case Rate (Days Away From Work Cases Only)	0.00	0.51	1.19
Experience Modification Rate (EMR) - Interstate Rate	0.82	0.84	0.90

LEGEND:

DART: Days Away From Work, Restricted or Transferred
LWD: Lost Work Day
RWA: Restricted Work Activity

Recordable Injury Case Rate (All Recordable Cases) = (Number of Injury Cases Classified as Recordable) x (200,000) / Total Number of Hours Worked

Lost Work Day Case Injury Rate (DART Cases) = (Number or Injury Cases with Days Away From Work, Restriction, or Transfer) x (200,000) / Total Number of Hours Worked

Lost Work Day Injury Case Rate (Days Away From Work Cases Only) = (Number of Injury Cases with Days Away From Work) x (200,000) / Total Number of Hours Worked

FORMER GRIFFISS AIR FORCE BASE SSHP FORMS

CAPE Health and Safety Forms (Portrait Orientation)

SSHP Signature Page
Activity Hazard Analysis Preparatory Phase Training Log
Air Monitoring Log
Calibration Log: Direct-Reading Monitoring Instrument
Certificate of Worker and Visitor Acknowledgment
Confined Space Entry Permit (front and back)
Emergency Drill Attendance Roster
Emergency Eyewash Inspection Log
Emergency Medical Notification Form
Equipment Decontamination Release Authorization
Excavation Safety Checklist (3 pages)
Fire Extinguisher Inspection Log
First Aid Kit Inspection Log
First Aid Treatment Log
Forklift Inspection Log (Weekly)
Hazardous Substance Inventory List
Heavy Equipment Inspection Log (Daily)
Hot Work Permit (front and back)
Incident Report by Supervisor
Incident Statement by Employee
Incident Statement by Witness
Injury and Illness Report
Property Damage, Loss and General Liability Report
Respirator Fit Testing Record
Safety Inspection Report
Safety Meeting Attendance Roster
Safety Violation Disciplinary Action Report
Site Control Log
Site Safety and Health Plan Change Approval
Site Safety and Health Plan Distribution to Subcontractor
Site Safety and Health Plan Review
Tailgate Safety Meeting Log
Training Attendance Roster
Vehicle Accident Report

CAPE Health and Safety Forms (Landscape Orientation)

Activity Hazard Analysis
Tool Box Safety Meeting Record

USACE Forms
USACE New Employee Indoctrination for Contractors
USACE Accident Investigation Form
USACE Safety Inspection for Construction Equipment

SSHP SIGNATURE PAGE
CAPE ENVIRONMENTAL

FINAL

WORK PLAN

REMEDIAL ACTION AT THREE MILE CREEK
FORMER GRIFFISS AIR FORCE BASE
ROME, NEW YORK

Preplaced Remedial Action Contract Number DACA41-01-D-0003
Task Order 0004

Prepared for:

U.S. ARMY CORPS OF ENGINEERS
KANSAS CITY DISTRICT
Federal Building 601 E. 12th Street
Kansas City, Missouri 64106-2896

June 2004

Prepared by:

Glen Mayekawa, CIH
Certified Industrial Hygienist
(949) 474-3090

This Site Safety and Health Plan has been prepared to meet the requirements of: Occupational Safety and Health Administration standards, 29 CFR Part 1910 and 29 CFR Part 1926, including the “Hazardous Waste Operations and Emergency Response” regulation (29 CFR 1910.120; 29 CFR 1926.65); United States Army Corps of Engineers “Safety and Health Requirements Manual” requirements (EM 385-1-1); and the Department of the Army, Kansas City District, Corps of Engineers, Scope of Work for “Ex-Situ Bioremediation at the Former Griffiss Air Force Base, Rome, Oneida County, New York” dated August 21, 2002. Environmental remediation services are to be completed by Cape Environmental Management Inc under Preplaced Remedial Action Contract DACA41-01-D-0003.

CAPE ENVIRONMENTAL

ACTIVITY HAZARD ANALYSIS PREPARATORY PHASE TRAINING LOG

Activity Hazard Analysis Phase Number: ____________

Site: Three Mile Creek Remedial Action
Location: Former Griffiss Air Force Base, Rome, New York

The following individuals have reviewed and have agreed to follow the Activity Hazard Analysis prepared by the Cape Environmental Management Inc (CAPE) for the above indicated site and understand the hazards and control measures required on this phase of the project.

I agree to follow the procedures outlined in this plan and to inform the CAPE Project Manager, Superintendent, and/or Site Safety and Health Officer should any unsafe condition be noted.

I understand that failure to follow safety regulations can be reason for removal from this project.

Date	Name	Signature	Company

Revised 04/01

CAPE ENVIRONMENTAL

AIR MONITORING LOG

Project Name: Three Mile Creek Remedial Action
Project Location: Former Griffiss Air Force Base, Rome, New York
Page Number: ______________________
Date: ______________________
Conducted By: ______________________

Time	Location	______ ( )	______ ( )	______ ( )

LEGEND:

PID: Photoionization detector
FID: Flame ionization detector
LEL: Lower explosive limit
O_2: Oxygen meter
mg/m^3: Milligrams per cubic meter
ppm: Parts per million

Revised 04/01

CAPE ENVIRONMENTAL

CALIBRATION LOG: DIRECT-READING MONITORING INSTRUMENT

Project Name: Three Mile Creek Remedial Action

Project Location: Former Griffiss Air Force Base, Rome, New York

Date: **Name:**	**Calibration Gas:** **Concentration:**
Initial Reading: **Adjusted Reading:**	**Comments:**
Date: **Name:**	**Calibration Gas:** **Concentration:**
Initial Reading: **Adjusted Reading:**	**Comments:**
Date: **Name:**	**Calibration Gas:** **Concentration:**
Initial Reading: **Adjusted Reading:**	**Comments:**
Date: **Name:**	**Calibration Gas:** **Concentration:**
Initial Reading: **Adjusted Reading:**	**Comments:**
Date: **Name:**	**Calibration Gas:** **Concentration:**
Initial Reading: **Adjusted Reading:**	**Comments:**

CAPE ENVIRONMENTAL

CERTIFICATE OF WORKER AND VISITOR ACKNOWLEDGMENT

Name: ____
Organization: ____
Project Name / Location: Three Mile Creek Remedial Action, Former Griffiss AFB, Rome, New York

The contract for the above indicated project requires the following: That you be provided with formal and site-specific training on the applicable aspects of the Site Safety and Health Plan (SSHP); that you be supplied with proper personal protective equipment (PPE) including respirators and that you be trained in its use; that you receive a medical examination to evaluate your physical capacity to perform your assigned work tasks, under the environmental conditions expected, while wearing the required PPE. These are to be done at no cost to you. By signing this certification, you are acknowledging that your employer has met these obligations to you.

I HAVE REVIEWED, UNDERSTAND AND AGREE TO FOLLOW THE SSHP FOR THIS SITE.

____
Signature / Date

FORMAL TRAINING: I have completed the following formal hazardous waste operations (HazWOPER) training courses that meet OSHA requirements:

____ 40-Hour HazWOPER Worker (date completed): ____________________
____ 8-Hour HazWOPER Supervisor (date completed): ____________________
____ 8-Hour HazWOPER Refresher (date completed): ____________________

SITE-SPECIFIC TRAINING: I have been provided and have completed the site-specific training required by this Contract. Name of the Site Safety and Health Officer (SSHO) who conducted the training: ____________________

RESPIRATORY PROTECTION AND RESPIRATOR FIT-TEST TRAINING: I have been trained in accordance with the criteria in the [Contractors] [Employers] respiratory protection program. I have been trained in proper work procedures, use and limitations of the respirator(s) that I will wear. I have been trained in and will abide by the facial hair policy. I have been trained in the proper selection, fit, use, care, cleaning, maintenance, and storage of respirator(s) that I will wear. I have been fit-tested in accordance with criteria in the [Contractors] ([Employers] respirator program and have received a satisfactory fit. [I have been assigned my individual respirator.] I have been taught how to properly perform a positive and negative pressure user seal check upon donning a negative pressure respirator each time: Initial: ________

MEDICAL EXAMINATION: I have had a medical examination within the last twelve months that was paid for by my employer. The examination included a health history, pulmonary function test, and may have included an evaluation of a chest X-ray. A physician made determinations regarding my physical capacity to perform work tasks on the project while wearing PPE including a respirator. I was personally provided a copy and informed of the results of that examination. My employers industrial hygienist evaluated the medical certification provided by the physician and checked the following information.

Date of Medical Exam: _________
Physician Determined: _________ No limitations to performing the required work tasks
_________ Physical limitations to performing required work tasks identified

[Employee] [Visitor] Printed Name / Signature / Date: ____
Contractor SSHO Printed Name / Signature / Date: ____

CAPE ENVIRONMENTAL
CONFINED SPACE ENTRY PERMIT

Date:	**Time:**
Project Name:	**Project No.:**
Client:	**Address:**
Location at Facility:	
Tank / Vessel Number / Name:	
Work Description:	
Known Hazards in Confined Space: [ ] Chemical [ ] Mechanical [ ] Electrical [ ] Other: ________	
Chemicals Present / Introduced:	
Comments:	
PERSONNEL	
Entry Supervisor:	**Attendant #1:**
Entry Supervisor:	**Attendant #2:**
Authorized Entrants	
1.	**6.**
2.	**7.**
3.	**8.**
4.	**9.**
5.	**10.**

PRE-ENTRY CHECKLIST / DESCRIPTION	YES	NO	N/A
Ignition sources isolated			
Mechanical and electrical systems locked/tagged out, blocked out, and de-energized			
Lines to confined space isolated (disconnected, capped off, or blanked off)			
Materials in the confined space purged, flushed, or vented			
Mechanical ventilation equipment in use before and during entry			
Explosion-proof lighting and spark-proof tools			
GFCI checked and operational			
Caution signs / Caution tape posted around work area			
Hot work permit / Fire watch / Fire extinguisher / Fire hose / Fire monitor			
Top entry: Extraction winch / Retrieval lines or wristlets / Full body harness			
Side entry: Retrieval lines / Full body harness			
First aid kit on site and emergency eyewash available			
Emergency communications and evacuation routes designated			
Protective clothing, respirators, and safety equipment approved and in use			
SCBA on standby, checked, and operational			
Airline SAR breathing air supply and alarms checked and operational			
Attendant / Entrants briefed on communications and emergency procedures			
Employees trained in confined space hazards and procedures			
Safety meeting conducted and documented			
Entry permit posted at entrance to the confined space			

APPROVAL

ALL ABOVE CONDITIONS HAVE BEEN SATISFIED.
PERMIT IS VALID FOR 8-HOURS ONLY.

Entry Supervisor Name: ______________________________________
Entry Supervisor Signature: ______________________________________

CAPE ENVIRONMENTAL
CONFINED SPACE ENTRY PERMIT

PERSONAL PROTECTIVE EQUIPMENT SELECTION						
Protection Type	PPE Description (Circle items selected)					Supv. Initials
Head	Hardhat					
Eye	Safety Glasses		Goggles	Face Shield		
Foot	Steel-Toed Boots		PVC S/T Boots	Neoprene S/T Boots		
Hand	PVC Gloves		Neoprene Gloves	Nitrile Gloves	NDEX Gloves	
Body – Light	Lt. Wt. PVC Suit		Uncoated Tyvek	Poly Tyvek	Saranex	
Body – Medium	Med. Wt. PVC Suit		Chemrel			
Body – Heavy	Hvy. Wt. PVC Suit					
Hearing	Ear Plugs		Ear Muffs			
Respiratory-SAR	SCBA		SAR	SAR w/Egress		
Respiratory-APR	Half-Face APR		Full-Face APR	PAPR		
APR Cartridges	OV	AG	OV/AG AM	HEPA P-100		
Other	Nomex Coverall					

LOG OF TESTS										
Time	% Oxygen	% LEL	( )	( )	( )	( )	( )	( )	( )	Tester Initials

Tester Name: Tester Name:

Comments:

MONITORING INSTRUMENT INFORMATION				
Instrument Type	Mfr.	Model Number	Serial Number	Calibration Information

CAPE ENVIRONMENTAL

EMERGENCY DRILL ATTENDANCE ROSTER

Project: Three Mile Creek Remedial Action, Former Griffiss AFB, Rome, New York
Location: ______________________________
Topic: ______________________________

Date	Name	Signature	Company

Instructor Name (Print) **Instructor Signature** **Date**

Revised 04/01

CAPE ENVIRONMENTAL

EMERGENCY EYEWASH INSPECTION LOG

Date: ______________________________
Project Name: Three Mile Creek Remedial Action
Project Location: Former Griffiss Air Force Base, Rome, New York
Inspector: ______________________________

EMERGENCY EYEWASH INSPECTION CHECKLIST

Eyewash I.D.	Eyewash Location	Eyewash Type and Description	Last Service	Charged	Operable

Revised 04/01

CAPE ENVIRONMENTAL

EMERGENCY MEDICAL NOTIFICATION FORM

Employee Name: ______________________________

Mailing Address: ______________________________

Home Telephone: ______________________________

EMERGENCY NOTIFICATION INFORMATION

In Case of Emergency Notify:

Name / Relationship / Telephone: ______________________________

Name / Relationship / Telephone: ______________________________

ALLERGIES

List any health-threatening allergies (i.e., medications, food, bee stings):

____

____

MEDICATIONS

List current medications that may affect the ability to safely operate equipment/machinery:

____

____

____

OTHER INFORMATION

List any other information that should be known in case of an emergency:

____

____

Name (print): ______________________________

Signature / Date: ______________________________

CAPE ENVIRONMENTAL

EQUIPMENT DECONTAMINATION RELEASE AUTHORIZATION

Date / Day: ______________________________

Project Name / Location: Three Mile Creek Remedial Action, Former Griffiss Air Force Base, Rome, New York

Equipment Type: ______________________________

Equipment Mfr / Model: ______________________________

Equipment Number: ______________________________

Item	Inspection Description	Clean	Not Clean	N/A
1	Tires / Rims, outside			
2	Tires / Rims, inside			
3	Buckets / Blades			
4	Rippers / Other			
5	Cross-members			
6	Undercarriage			
7	Tracks			
8	Drive carriage			
9	Drip pans			
10	Brush guards			
11	Belly pans			
12	Scraper can interior			
13	Truck beds			
14	Frames			
15	Engine compartment			
16	Cab			

Equipment Use:

Decontamination Description:

I certify that I have inspected the equipment indicated above and have observed that visible material has been removed from the equipment.

____

Inspected By / Signature / Date

Revised 04/01

CAPE ENVIRONMENTAL

EXCAVATION SAFETY CHECKLIST
(To be Completed by the Competent Person)

Date: ______________________________
Project Name/Location: Three Mile Creek Remedial Action, Former Griffiss Air Force Base, Rome, New York
Competent Person: ______________________________
Excavation Description: ______________________________
____
Excavation Depth / Width: ______________________________
U.S.A Permit # and Date: ______________________________
OSHA Permit # and Date: ______________________________

EXCAVATION INFORMATION

	Circle	Describe
Hazardous Atmosphere:	Yes / No	______________
Access / Egress:	Yes / No	______________
Traffic Control:	Yes / No	______________
Wet Conditions:	Yes / No	______________
Utilities:	**Circle**	**Company / Date**
Electrical:	Yes / No	______________
Gas:	Yes / No	______________
Telephone:	Yes / No	______________
Water:	Yes / No	______________
Sewer:	Yes / No	______________
Protective System Used:	**Circle**	**Describe**
Sloping:	Yes / No	______________
Benching:	Yes / No	______________
Shoring:	Yes / No	______________
Shielding:	Yes / No	______________

CAPE ENVIRONMENTAL
EXCAVATION SAFETY CHECKLIST (Continued)
Visual Soil Classification Test

Date / Time: ______________________________
Competent Person: ______________________________
Soil Sample Location: ______________________________

The Competent Person is required to make daily inspections of excavations, adjacent areas, and excavation protective systems. This checklist is completed by the Competent Person to document visual soil classification tests used to determine soil type(s) present in an excavation. A separate analysis is performed on each layer of soil in the excavation walls or if the excavation stretches over a distance where the soil type may change.

	Circle	Describe
Particle Type:		
Fine grained soil (cohesive):	Yes / No	____________
Coarse grained soil (sand/gravel):	Yes / No	____________
Water Conditions:		
Dry:	Yes / No	____________
Wet/Surface Water/Submerged:	Yes / No	____________
Surface Encumbrances:	Yes / No	____________
Previously Disturbed Soil:	Yes / No	____________
Layered Soils / Dip into Excavation:	Yes / No	____________
Exposure to Vibrations:	Yes / No	____________
Fissures / Cracking / Spalling:	Yes / No	____________
Hazardous Atmosphere:	Yes / No	____________
Confined Space Exposure:	Yes / No	____________
Vehicle Traffic Present:	Yes / No	____________

CAPE ENVIRONMENTAL
EXCAVATION SAFETY CHECKLIST (Continued)
Manual Soil Classification Test

Date / Time: ______________________________
Competent Person: ______________________________
Soil Sample Location: ______________________________

The Competent Person is required to make daily inspections of excavations, adjacent areas, and excavation protective systems. This checklist is completed by the Competent Person to document manual soil classification tests used to determine soil type(s) present in an excavation. A separate analysis is performed on each layer of soil in the excavation walls or if the excavation stretches over a distance where the soil type may change. Unconfined compressive strength tests are performed on undisturbed soils. No soil is Type A if the soil is fissured; subject to vibration; previously disturbed; or layered dipping into excavation on a slope of 4H:1V.

	Circle	**Describe**
Plasticity Test:		
Cohesive:	Yes / No	____________
Non-Cohesive:	Yes / No	____________
Dry Strength Test:		
Granular (crumbles easily):	Yes / No	____________
Cohesive (broken with difficulty):	Yes / No	____________
Thumb Penetration Test:		
Type A Soil (soil indented by thumb with very great effort)	Yes / No	____________
Type B Soil (soil indented by thumb with some effort)	Yes / No	____________
Type C Soil (soil easily indented by thumb with little or no effort)	Yes / No	____________
Pocket Penetrometer Test:		
Type A Soil (∃1.5 tsf)	Yes / No	____________
Type B Soil (0.5 - 1.5 tsf)	Yes / No	____________
Type C Soil (#0.5 tsf)	Yes / No	____________

Soil Classification (Circle): Type A / Type B / Type C
Excavation Protective System: ______________________________
Competent Person: ______________________________
Signature: ______________________________
Date: ______________________________

Revised 04/01

CAPE ENVIRONMENTAL

FIRE EXTINGUISHER INSPECTION LOG

Date: ______________________________
Project Name: Three Mile Creek Remedial Action
Project Location: Former Griffiss Air Force Base, Rome, New York
Inspector: ______________________________

FIRE EXTINGUISHER INSPECTION CHECKLIST

Ext. I.D.	Ext. Location	Extinguisher Type/Description	Last Service	Charged	Operable

CAPE ENVIRONMENTAL

FIRST AID KIT INSPECTION LOG

Date: ______________________________
Project Name: Three Mile Creek Remedial Action
Project Location: Former Griffiss Air Force Base, Rome, New York
Inspector: ______________________________

FIRST AID KIT INSPECTION CHECKLIST

Kit I.D.	Kit Location	First Aid Kit Type / Description	Inventory Complete?	Missing Items

CAPE ENVIRONMENTAL

FIRST-AID TREATMENT LOG

Project: Three Mile Creek Remedial Action

Location: Former Griffiss Air Force Base, Rome, New York

Date	Name	Description of First-Aid Treatment Rendered	First-Aid Kit Supplies Used

Revised 10/02

CAPE ENVIRONMENTAL

FORKLIFT INSPECTION LOG

Project Name / Location: Three Mile Creek Remedial Action, Former Griffiss Air Force Base, Rome, New York

Equipment Type: ______________________________

Equipment Mfr / Model: ______________________________

Equipment Number: ______________________________

Item	Mon ______	Tues _______	Wed _______	Thurs _______	Fri _______	Sat _______	Sun ______
Check radiator and battery							
Check engine oil							
Check hydraulic oil and hydraulic system							
Check for hose crimp leaks							
Check lights; horn; seatbelts							
Check tires							
Check brakes							
Check back-up alarm signal							
Test operating controls							

Comments:

I have inspected this equipment and it is in good working condition except as noted above.

Inspected By:

Signature:

Date:

Revised 04/01

CAPE ENVIRONMENTAL

HAZARDOUS SUBSTANCE INVENTORY LIST

MSDS on File	Product Name	Manufacturer	Location and Container Type

Revised 04/01

CAPE ENVIRONMENTAL

HEAVY EQUIPMENT INSPECTION REPORT

Date / Day: ____
Project Name / Location: Three Mile Creek Remedial Action, Former Griffiss Air Force Base, Rome, New York
Equipment Type: ____
Equipment Mfr / Model: ____
Equipment Number: ____

Item	Inspection Description	Good	Need Repair	N/A
1	Tires or tracks			
2	Hydraulic oil and hose condition			
3	Oil leak / lube leak			
4	Cab; mirrors; seat belt; glass			
5	Horn; gauges			
6	Lights			
7	Turn signals			
8	Backup lights and alarm			
9	Brake condition (dynamic, park, etc.)			
10	Fire extinguisher condition			
11	Engine oil			
12	Transmission fluid			
13	Windshield wipers			
14	Coupling devices and connectors			
15	Exhaust system			
16	Blade / Boom / Ripper condition			
17	Frame, ladders, and walkway			
18	Power cable and/or hoist cable			
19	Steering (standard and emergency)			

Defects and Repairs Needed:

General Safety Condition:

Inspected By:

Signature:

Revised 04/01

CAPE ENVIRONMENTAL
HOT WORK PERMIT

Date:	**Time:**
Project Name:	**Project No.:**
Client:	**Address:**
Specific Location:	
Work Description:	
Hot Work Hazards:	
Chemicals Present / Introduced:	
Comments:	

PERSONNEL / IGNITION SOURCES	
Hot Work Supervisor:	**Signature:**
Fire Watch:	**Signature:**
Welder:	**Signature:**

	Oxygen / Acetylene Torch Cutting		**Grinding / Abrasive Saw**
	Propane Torch Cutting		**Drilling**
	Electric Arc Welding		**Electric Tools**
	Other:		**Soldering**

HOT WORK CHECKLIST

PRE-HOT WORK CHECK DESCRIPTION	YES	NO	N/A
Flammable and combustible materials removed from area			
Non-movable flammable and combustible materials covered and secured			
Handling of flammable and combustible materials in the area stopped			
Floor and wall openings covered or protected			
Combustible vapor test performed (must be less than 10% LEL)			
Inert gas blanket required			
Means of access and egress identified and available			
Caution signs and/or caution tape posted around the work area			
Ignition sources isolated			
Electrical equipment de-energized, locked/tagged out, and blocked out			
Mechanical ventilation in use			
Fire protection equipment available, inspected, and operational			
Fire protection equipment used (circle): Fire extinguisher / Fire hose / Fire monitor			
Fire watch equipped with fire extinguisher and/or fire hose			
Fire watch to standby in area for 30 minutes after completion of hot work			
PPE and safety equipment approved and in use			
Contractors in area advised of hot work operation and fire hazard			
Personnel trained in fire control and emergency procedures			
Safety meeting conducted			
Hot work permit approved and posted at jobsite			

APPROVAL
Above conditions satisfied. Hot work permit valid only for conditions existing at the time of permit issuance. Permit expires on change in activity or conditions that affect safety.
Hot Work Supervisor Name:
Signature:

CAPE ENVIRONMENTAL
HOT WORK PERMIT

LOG OF TESTS				
Time	**Location**	**Percent Oxygen**	**Percent LEL**	**Tester Initials**

PERSONAL PROTECTIVE EQUIPMENT SELECTION		
Protection Type	**PPE Description (Specify by circling or adding PPE)**	**Supervisor Initials**
Head	Hard hat / Welding hood	
Eye	Safety glasses / Welding hood / Welding goggles / APR welding hood	
Foot	Steel-toed boots / PVC boots / Metatarsal guards	
Hand	Leather gloves / PVC gloves	
Body	Nomex coverall / Welding jacket / Welding leg covers	
Hearing	Ear plugs / Ear muffs	
Respiratory	SCBA / Airline SAR with egress / Airline SAR / APR	
Other		

Tester Name:	**Tester Name:**
Comments:	

MONITORING INSTRUMENT INFORMATION				
Instrument Type	**Mfr.**	**Model No.**	**Serial No.**	**Calibration Information**

CAPE ENVIRONMENTAL
INCIDENT REPORT BY SUPERVISOR

Date of Incident: **Time of Incident:**
Project Name: Three Mile Creek Remedial Action **Project Number:**
Client Name: **Client Location:**
Specific Location of Incident:
Employees Involved in Incident (if applicable):
Detailed Description of Incident:
Primary Cause of Incident:
Contributing Cause(s) of Incident:
Recommendation for Preventing Such Incidents in the Future:
Supervisor Name (print): **Signature:** **Date:**

Revised 04/01

CAPE ENVIRONMENTAL
INCIDENT STATEMENT BY EMPLOYEE

Employee Name:
Date of Incident: **Time of Incident:**
Project Name: Three Mile Creek Remedial Action **Project Number:**
Client Name: **Client Location:**
Specific Location of Incident:
Describe What You Were Doing Just Before the Incident:
Detailed Description of How the Incident Occurred:
Names of Witnesses:
Other Relevant Information:
How Can the Likelihood of this Happening Again Be Reduced:
Employee Name (print): **Signature:** **Date:**

CAPE ENVIRONMENTAL
INCIDENT STATEMENT BY WITNESS

Witness Name: **Address:** **Telephone:**
Employer: **Telephone:**
Date of Incident: **Time of Incident:**
Project Name: Three Mile Creek Remedial Action **Project Number:**
Client: **Location:**
Specific Location of Incident:
DETAILED DESCRIPTION OF INCIDENT BASED ON PERSONAL OBSERVATION
Describe where you were and what you were doing just before the incident:
Describe any injuries:
Describe any property damaged:
Describe what was the apparent nature of the injury and/or damage:
Describe what personnel and/or equipment were involved:
Describe what caused the injury and/or damage:
Describe the sequence of events:
List any observed unsafe acts or conditions:
Names of other witnesses:
Other relevant information:
Witness Name (print): **Signature:** **Date:**

CAPE ENVIRONMENTAL
INJURY AND ILLNESS REPORT

Injured Employee Name:	**Date / Time of Injury:**
Social Security Number:	**Date of Birth / Age:**
Sex (M / F):	**Date of Hire:**
Job Title:	**Pay Rate:**
Home Address:	**Home Telephone:**
Cape Home Office:	**Injured on Cape Premises: Yes / No**
Client / Location:	**Injured on Client Premises: Yes / No**
Specific Accident Location:	
Nature of Injury:	
Exact Body Part Injured:	
Medical Attention (Circle): None First Aid Paramedics Doctor Hospital ER	
Medical Attention Description:	
Hospital / Doctor Name / Telephone:	
Hospital / Doctor Address:	
Date / Time Injury Reported: **By Whom:**	
Did employee leave work: (Yes / No) **When:**	
Has employee returned to work: (Yes / No) **When:** **Note: Employee must present return to work release from examining physician before return to work)**	
Did employee have a work activity restriction: (Yes / No) **Dates restricted:**	
Did employee miss a regularly scheduled work shift: (Yes / No) **Dates missed:**	
Injury Incident Description:	
What actions have been taken to prevent recurrence:	
Witness Name:	**Telephone:**
Address:	**Statement Attached: Yes / No**
INVESTIGATION AND REVIEW (Report to CHSM within 2 days of injury)	
Site Supervisor Name (print) / Signature / Date:	
Project Manager Name (print) / Signature / Date:	
CHSM Name (print) / Signature / Date:	
Attached to this report: [ ] Incident Statement by Employee [ ] Incident Report by Supervisor **[ ] Incident Statement by Witness [ ] Photographs [ ] Maps/Sketches [ ] Other _____________**	

CAPE ENVIRONMENTAL
PROPERTY DAMAGE, LOSS AND GENERAL LIABILITY REPORT

Project Name: Three Mile Creek Remedial Action **Project No.:**
Project Location:
Project Manager / Supervisor:
Date / Time of Damage or Loss:
Description / Identification of damaged or lost property:
Location of damaged or lost property (before loss):
Detailed description of how the damage or loss occurred:
Cause and corrective action recommended to prevent recurrence:
Owner of damaged or lost property / Telephone:
Address:
Employer Name and Address:
Witnesses:
Witness Name / Telephone:
Address:
Employer Name and Address:
Witness Name / Telephone:
Address:
Employer Name and Address:
Repair or Replacement Cost:
Attachments: [ ] Photographs [ ] Police Report [ ] Incident Statement by Witness [ ] Incident Report by Supervisor [ ] Incident Statement by Employee [ ] Injury Report
Supervisor Name (print): **Signature:** **Date:**

CAPE ENVIRONMENTAL

RESPIRATOR FIT-TESTING RECORD

Name: ______________________________

Date: ______________________________

Fit Test Conducted By: ______________________________

AIR-PURIFYING RESPIRATOR FIT TEST INFORMATION

Fit Test Type (Circle): Qualitative / Quantitative

Fit Test Protocol (Circle): Irritant Smoke / Isoamyl Acetate / Saccharin / Bitrex

Respirator Type (Circle): Half-Face APR / Full-Face APR

Respirator Mfr. (Circle): MSA / North / Scott / A-O / 3M / Willson / Survivair / Other

Respirator Model: ______________________________

Respirator Size (Circle): Small / Medium / Large

AIR-PURIFYING RESPIRATOR FIT TEST INFORMATION

Fit Test Type (Circle): Qualitative / Quantitative

Fit Test Protocol (Circle): Irritant Smoke / Isoamyl Acetate / Saccharin / Bitrex

Respirator Type (Circle): Half-Face APR / Full-Face APR

Respirator Mfr. (Circle): MSA / North / Scott / A-O / 3M / Willson / Survivair / Other

Respirator Model: ______________________________

Respirator Size (Circle): Small / Medium / Large

CAPE ENVIRONMENTAL

SAFETY INSPECTION REPORT

Customer / Address: ____
Date / Day / Time: ____
Job Name: Three Mile Creek Remedial Action
Job Location: Former Griffiss Air Force Base, Rome, New York
Work Description: ____
____
Comments / Other: ____
____

OBSERVATIONS

____
____
____
____
____
____
____
____

Safety Conditions Requiring Corrective Action	Corrective Action, Assignment, and Completion Date

Project Manager: ____
Safety Inspector: ____
Distribution: ____

Revised 04/01

CAPE ENVIRONMENTAL

SAFETY MEETING ATTENDANCE ROSTER

Project: Three Mile Creek Remedial Action

Location: Former Griffiss Air Force Base, Rome, New York

Topic: ______________________________

Date	Name	Signature	Company

____

Instructor Name (Print) **Instructor Signature** **Date**

CAPE ENVIRONMENTAL

SAFETY VIOLATION DISCIPLINARY ACTION REPORT

Employee Name: ______________________________
Employee Office: ______________________________
Date of Violation: ______________________________
Project Name / Number: ______________________________
Client / Location: ______________________________
Describe Safety Violation: ______________________________
____
____
____
____

Is this the first time that the violation has occurred (circle)? **Yes / No**
How many times has the violation previously occurred? ________
List Witnesses: ______________________________
Comments: ______________________________
____
____

DISCIPLINARY ACTION TO BE TAKEN

____ **Verbal Warning (circle one):** 1st offense 2nd Offense 3rd Offense

____ **Written Warning (circle one):** 1st offense 2nd Offense 3rd Offense

____ **1 to 3 Days Off Without Pay:** ______________________________

____ **3 to 7 Days Off Without Pay:** ______________________________

____ **1 to 2 Weeks Off Without Pay:** ______________________________

____ **Other Disciplinary Action:** ______________________________

____ **Employment Termination:** ______________________________

Employee (Name/Signature/Date): ______________________________
Safety Officer (Name/Signature/Date): ______________________________
Project Manager (Name/Signature/Date): ______________________________
Copies To (list): ______________________________

Revised 04/01

CAPE ENVIRONMENTAL

SITE CONTROL LOG

Date: ______________________________

Project Name: Three Mile Creek Remedial Action

Project Location: Former Griffiss Air Force Base, Rome, New York

Time		Name	Organization
In	Out		

Revised 04/01

CAPE ENVIRONMENTAL

SITE SAFETY AND HEALTH PLAN
CHANGE APPROVAL FORM

Project Name: Three Mile Creek Remedial Action
Project Location: Former Griffiss Air Force Base, Rome, New York
Date: ____________________
Requested By: ____________________
Approval By: ____________________
Distribution: ____________________

DESCRIPTION OF SSHP CHANGE REQUESTED

____

____

____

____

SUPPORTING DOCUMENTATION FOR SSHP CHANGE
(Describe and list attachments)

____

____

____

____

SSHP CHANGE APPROVAL

SSHO Name / Signature / Date: ____________________

SHM Name / Signature / Date: ____________________

PjM Name / Signature / Date: ____________________

COR Name / Signature / Date: ____________________

Revised 2/02

CAPE ENVIRONMENTAL

SITE SAFETY AND HEALTH PLAN DISTRIBUTION TO SUBCONTRACTOR

(Three Mile Creek Remedial Action, Former Griffiss Air Force Base, Rome, New York)

A copy of the Site Safety and Health Plan for the site is being provided to subcontractors who may be affected by activities covered under the scope of this plan. Distribution of the Site Safety and Health Plan to subcontractor firms and their designated contact person is with the understanding that subcontractor personnel involved in this project will review this document, abide by its provisions, and comply with OSHA and other applicable health and safety rules and regulations for work onsite.

Date	Name	Signature	Organization

CAPE ENVIRONMENTAL

SITE SAFETY AND HEALTH PLAN REVIEW

Three Mile Creek Remedial Action
Former Griffiss Air Force Base, Rome, New York

I have reviewed the Cape Environmental Management Inc (CAPE) Site Safety and Health Plan for the above indicated site and understand the hazards and control measures required on this project.

I agree to follow the procedures outlined in this plan and to inform the CAPE Project Manager, Superintendent, and/or Site Safety and Health Officer should any unsafe condition be noted.

I understand that failure to follow safety regulations can be reason for removal from this project.

Date	Name	Signature	Company

CAPE ENVIRONMENTAL

TAILGATE SAFETY MEETING RECORD

Date / Day:	**Time:**
Project Name: Three Mile Creek Remedial Action	**Project Number:**
Client:	**Address:**
Specific Location:	
Work Description:	
Comments:	
SAFETY TOPICS PRESENTED	
Protective Clothing / Equipment:	
Chemical Hazards:	
Physical Hazards:	
Emergency Procedures:	
Emergency Hospital:	
Hospital Telephone:	
Hospital Directions:	
Special Equipment:	
Other:	
SAFETY MEETING ATTENDEES	
Name Printed / Initial	**Name Printed / Initial**
1.	**6.**
2.	**7.**
3.	**8.**
4.	**9.**
5.	**10.**
Meeting conducted by (print name / signature):	

CAPE ENVIRONMENTAL

TRAINING ATTENDANCE ROSTER

Project: Three Mile Creek Remedial Action

Location: Former Griffiss Air Force Base, Rome, New York

Topic: ______________________________

Date	Name	Signature	Company

____

Instructor Name (Print) **Instructor Signature** **Date**

Revised 04/01

CAPE ENVIRONMENTAL
VEHICLE ACCIDENT REPORT

CAPE Vehicle	
Date / Time / Location:	
Driver Name:	Accident Date:
Drivers License #:	State:
Driver Address:	Project Location:
Vehicle Year/Make /Model:	
License Plate #:	State:
Vehicle Owner (Circle): Owned Leased Rented Private	
Vehicle Owner Address:	Telephone:
Vehicle Damage:	Est. Repair Cost:
Other Vehicles	
Driver Name / Telephone:	
Drivers License #:	State
Drivers Address:	
Vehicle Owner Name / Telephone:	
Vehicle Owner Address:	
Insurance Co. / Telephone:	Policy #:
Address:	Agents Name:
Vehicle Year / Make / Model:	
License Plate #:	State:
Vehicle Damage:	
Passengers (list on back): Yes / No	Injuries (list on back): Yes / No
Accident Description	
Sketch Attached: Yes / No	Photos Attached: Yes / No
Description:	
Witness Information	
Witness Name:	Telephone:
Address:	
Statement Attached: Yes / No	
Police Report	
Police Department:	Date / Time Reported:
Telephone:	Police Report #:
Police Officer Name:	
Investigation and Review	
Report Prepared By / Date:	
Supervisor Name / Signature / Date:	

Revised 04/01

CAPE ENVIRONMENTAL
ACTIVITY HAZARD ANALYSIS

ACTIVITY:	
WORK TASK	**POTENTIAL HAZARDS**

RECOMMENDED HAZARD CONTROLS

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS

CAPE ENVIRONMENTAL
TOOL BOX SAFETY MEETING RECORD

Job Name / Job Number:		**Date / Day / Time:**		**Print Name**	**Initial**
Job Location:		**Meeting Conducted By:**	1		
Project Manager:		**Number Employees:**	2		
Superintendent:		**Number Subcontractors:**	3		
Site Safety and Health Officer:		**Number Others:**	4		
I. SCOPE OF WORK			5		
			6		
			7		
			8		
			9		
II. CHEMICAL HAZARDS			10		
Chemical	**Exposure Limit**	**Health Effects**	11		
			12		
			13		
			14		
			15		
III. PHYSICAL / BIOLOGICAL HAZARDS			16		
[ ] Fire Protection [ ] Overhead Utilities [ ] Vehicle and Equipment Traffic [ ] Material Handling [ ] Tools, Machinery and Equipment			17		
[ ] Electrical Safety and Lockout/Tagout [ ]Noise Exposure [ ] Heat Stress [ ]Ladders [ ] Elevated Work Locations and Fall Protection			18		
[ ] Confined Space Entry [ ] XRF Instrument [ ] Aerial Lift (Man Lift; Scissor Lift) [ ] Inclement Weather and Adverse Environmental Conditions			19		
[ ] Slip/Trip/Fall; Uneven/Sloped/Slippery Ground [ ] Inclement Weather [ ] Housekeeping [ ] Biological Hazards (Spiders, Rodents, Ants, Bees)			20		
			21		
IV. WORK TASK / PROTECTION LEVEL			22		
Work Task		**PPE Description**	23		
		Level C [ ] Modified-Level D [ ] Level D [ ]	24		
		Level C [ ] Modified-Level D [ ] Level D [ ]	25		
		Level C [ ] Modified-Level D [ ] Level D [ ]	26		
		Level C [ ] Modified-Level D [ ] Level D [ ]	27		
PPE DESCRIPTION: Level D is Hardhat; Safety glasses; S/T boots; Work gloves; Ear plugs. Mod-D is Level D+ protective clothing; Level C is Mod-D + APR			28		
V. COMMENTS / SUGGESTIONS					
Report Prepared By:					

Revised 04/01

New Employee Indoctrination for Contractors

Reference EM 385-1-1, paragraph 01.B.02

Employee: ________________________________ Trade: ________________________

Vehicle License Number: ___________________________ State: __________________

Make: __________________ Model: _______________________ Year: ____________

______ 1. This is a 100% Hard Hat Job.
______ 2. Limits of work area discussed. Stay out of unauthorized areas.
______ 3. PPE requirements discussed. No gym shoes, shorts, muscle shirts.
______ 4. Location of emergency phone number, and medical facilities/treatment procedures.
______ 5. Location of fire extinguishers and fire alarm procedures.
______ 6. Report all accidents/injuries to the Prime Contractor immediately.
______ 7. Discussed property damage reporting requirements.
______ 8. Location of personal comfort station and designated smoking areas.
______ 9. Location of pay phone for personal calls.
______ 10. Location of project bulletin board.
______ 11. Intoxicants, drugs, guns, weapons, ammo – All are PROHIBITED on this job site.
______ 12. "HORSEPLAY" is not permitted.
______ 13. Discussed Company & job specific safety and accident prevention program/plans.
______ 14. Emphasized Good House Keeping on the job site.
______ 15. Identified vehicle parking areas.
______ 16. Discussed local traffic regulations, permits, and speed limits.
______ 17. The USACE Safety Manual (EM 385-1-1) will be complied with.
______ 18. Discussed Special Contract Requirements applicable to this project.
______ 19. Discussed safe clearance requirements.
______ 20. Discussed procedures for reporting/correcting unsafe conditions/practices.
______ 21. Each employee is responsible for his own actions and looking out for others.
______ 22. Discussed ladder security, tools, unused supplies and materials.
______ 23. Identified confined space entry requirements.
______ 24. Discussed lockout/tagout procedures.
______ 25. Reviewed applicable Activity Hazard Analyses.
______ 26. This job will have daily/weekly "tool box" safety meetings.
______ 27. Discussed hazard communication program and location of MSDS's.

Employee Signature: ____________________________________ Date: __________________

Supervisor's Signature: __________________________________

Employee Information regarding known medical problems or conditions which should be known in the event of an emergency: ____

____

____

____

(For Safety Staff only)	REPORT NO.	EROC CODE	**UNITED STATES ARMY CORPS OF ENGINEERS ACCIDENT INVESTIGATION REPORT** *(For Use of this Form See Help Menu and USACE Suppl to AR 385-40)*	**REQUIREMENT CONTROL SYMBOL: CEEC-S-8(R2)**

1. ACCIDENT CLASSIFICATION

PERSONNEL CLASSIFICATION	INJURY/ILLNESS/FATAL	PROPERTY DAMAGE	MOTOR VEHICLE INVOLVED	DIVING
GOVERNMENT ☐ CIVILIAN ☐ MILITARY	☐	☐ FIRE INVOLVED ☐ OTHER	☐	☐
☐ CONTRACTOR	☐	☐ FIRE INVOLVED ☐ OTHER	☐	☐
☐ PUBLIC	☐ FATAL ☐ OTHER		☐	

2. PERSONAL DATA

a. Name *(Last, First, MI)*

b. AGE

c. SEX ☐ MALE ☐ FEMALE

d. SOCIAL SECURITY NUMBER

e. GRADE

f. JOB SERIES/TITLE

g. DUTY STATUS AT TIME OF ACCIDENT
☐ ON DUTY ☐ TDY ☐ OFF DUTY

h. EMPLOYMENT STATUS AT TIME OF ACCIDENT
☐ ARMY ACTIVE ☐ ARMY RESERVE ☐ VOLUNTEER
☐ PERMANENT ☐ FOREIGN NATIONAL ☐ SEASONAL
☐ TEMPORARY ☐ STUDENT
☐ OTHER *(Specify)* ____________

3. GENERAL INFORMATION

a. DATE OF ACCIDENT *(month/day/year)*

b. TIME OF ACCIDENT *(Military time)* hrs

c. EXACT LOCATION OF ACCIDENT

d. CONTRACTOR'S NAME
(1) PRIME:
(2) SUBCONTRACTOR:

e. CONTRACT NUMBER ____________
☐ CIVIL WORKS ☐ MILITARY
☐ OTHER *(Specify)* ____________

f. TYPE OF CONTRACT
☐ CONSTRUCTION ☐ SERVICE
☐ A/E ☐ DREDGE
☐ OTHER *(Specify)* ____________

g. HAZARDOUS/TOXIC WASTE ACTIVITY
☐ SUPERFUND ☐ DERP
☐ IRP ☐ OTHER *(Specify)*
____

4. CONSTRUCTION ACTIVITIES ONLY *(Fill in line and corresponding code number in box from list - see help menu)*

a. CONSTRUCTION ACTIVITY ____________ (CODE) #

b. TYPE OF CONSTRUCTION EQUIPMENT ____________ (CODE) #

5. INJURY/ILLNESS INFORMATION *(Include name on line and corresponding code number in box for items e, f & g - see help menu)*

a. SEVERITY OF ILLNESS/INJURY ____________ (CODE) #

B. ESTIMATED DAYS LOST

C. ESTIMATED DAYS HOSPITALIZED

D. ESTIMATED DAYS RESTRICTED DUTY

e. BODY PART AFFECTED
PRIMARY ____________ (CODE) #
SECONDARY ____________ (CODE) #

f. NATURE OF ILLNESS / INJURY ____________ (CODE) #

g. TYPE AND SOURCE OF INJURY/ILLNESS
TYPE ____________ (CODE) #
SOURCE ____________ (CODE) #

6. PUBLIC FATALITY *(Fill in line and correspondence code number in box - see help menu)*

a. ACTIVITY AT TIME OF ACCIDENT ____________ (CODE) #

b. PERSONAL FLOATATION DEVICE USED? ☐ YES ☐ NO ☐ N/A

7. MOTOR VEHICLE ACCIDENT

a. TYPE OF VEHICLE
☐ PICKUP/VAN ☐ AUTOMOBILE
☐ TRUCK ☐ OTHER *(Specify)*
____

b. TYPE OF COLLISION
☐ SIDE SWIPE ☐ HEAD ON ☐ REAR END
☐ BROADSIDE ☐ ROLL OVER ☐ BACKING
☐ OTHER *(Specify)* ____________

c. SEAT BELTS	USED	NOT USED	NOT AVAILABLE
(1) FRONT SEAT			
(2) REAR SEAT			

8. PROPERTY/MATERIAL INVOLVED

a. NAME OF ITEM	B. OWNERSHIP	C. $ AMOUNT OF DAMAGE
(1)		
(2)		
(3)		

9. VESSEL/FLOATING PLANT ACCIDENT *(Fill in line and correspondence code number in box from list - see help menu)*

a. TYPE OF VESSEl/FLOATING PLANT ____________ (CODE) #

b. TYPE OF COLLISION/MISHAP ____________ (CODE) #

10. ACCIDENT DESCRIPTION *(Use additional paper, if necessary)*

See attached page.

11. CAUSAL FACTOR(S) *(Read Instruction Before Completing)*					
a. (Explain YES answers in item 13)	YES	NO	a. *(CONTINUED)*	YES	NO
DESIGN: Was design of facility, workplace or equipment a factor?	☐	☐	CHEMICAL AND PHYSICAL AGENT FACTORS: Did exposure to chemical agents, such as dust, fumes, mists, vapors or physical agents, such as, noise, radiation, etc., contribute to accident?	☐	☐
INSPECTION/MAINTENANCE: Were inspection & maintenance procedures a factor?	☐	☐	OFFICE FACTORS: Did office setting such as, lifting office furniture, carrying, stooping, etc., contribute to the accident?	☐	☐
PERSON'S PHYSICAL CONDITION: In your opinion, was the physical condition of the person a factor?	☐	☐	SUPPORT FACTORS: Were inappropriate tools/resources provided to properly perform the activity/task?	☐	☐
OPERATING PROCEDURES: Were operating procedures a factor?	☐	☐	PERSONAL PROTECTIVE EQUIPMENT: Did the improper selection, use or maintenance of personal protective equipment contribute to the accident?	☐	☐
JOB PRACTICES: Were any job safety/health practices not followed when the accident occurred?	☐	☐	DRUGS/ALCOHOL: In your opinion, was drugs or alcohol a factor to the accident	☐	☐
HUMAN FACTORS: Did any human factors such as, size or strength of person, etc., contribute to accident?	☐	☐	b. WAS A WRITTEN JOB/ACTIVITY HAZARD ANALYSIS COMPLETED FOR TASK BEING PERFORMED AT TIME OF ACCIDENT?		
ENVIRONMENTAL FACTORS: Did heat, cold, dust, sun, glare, etc., contribute to the accident?	☐	☐	☐ YES *(If yes, attach a copy.)* ☐ NO		

12. TRAINING		
a. WAS PERSON TRAINED TO PERFORM ACTIVITY/TASK?	b. TYPE OF TRAINING.	c. DATE OF MOST RECENT FORMAL TRAINING.
☐ YES ☐ NO	☐ CLASSROOM ☐ ON JOB	(Month) (Day) (Year)

13. FULLY EXPLAIN WHAT ALLOWED OR CAUSED THE ACCIDENT; INCLUDE DIRECT AND INDIRECT CAUSES *(See instruction for definition of direct and indirect causes.) (Use additional paper, if necessary)*

a. DIRECT CAUSE

See attached page.

b. INDIRECT CAUSE(S)

See attached page.

14. ACTION(S) TAKEN, ANTICIPATED OR RECOMMENDED TO ELIMINATE CAUSE(S).

DESCRIBE FULLY:

See attached page.

15. DATES FOR ACTIONS IDENTIFIED IN BLOCK 14.			
a. BEGINNING (Month/Day/Year)	b. ANTICIPATED COMPLETION (Month/Day/Year)		
c. SIGNATURE AND TITLE OF SUPERVISOR COMPLETING REPORT CORPS ____ CONTRACTOR ____	d. DATE *(Mo/Da/Yr)*	e. ORGANIZATION IDENTIFIER *(Div, Br, Sect)*	f. OFFICE SYMBOL

16. MANAGEMENT REVIEW *(1st)*		
a. ☐ CONCUR b. ☐ NON CONCUR c. COMMENTS		
SIGNATURE	TITLE	DATE

17. MANAGEMENT REVIEW *(2nd - Chief Operations, Construction, Engineering, etc.)*		
a. ☐ CONCUR ☐ NON CONCUR c. COMMENTS		
SIGNATURE	TITLE	DATE

18. SAFETY AND OCCUPATIONAL HEALTH OFFICE REVIEW		
a. ☐ CONCUR b. ☐ NON CONCUR c. ADDITIONAL ACTIONS/COMMENTS		
SIGNATURE	TITLE	DATE

19. COMMAND APPROVAL	
COMMENTS	
COMMANDER SIGNATURE	DATE

*U.S. GOVERNMENT PRINTING OFFICE: 1993-0-791-757

10. **ACCIDENT DESCRIPTION** *(Continuation)*

13a. **DIRECT CAUSE** *(Continuation)*

13b.	INDIRECT CAUSES *(Continuation)*

14.	ACTION(S) TAKEN, ANTICIPATED, OR RECOMMENDED TO ELIMINATE CAUSE(S) *(Continuation)*

GENERAL. Complete a separate report for each person who was injured, caused, or contributed to the accident (excluding uninjured personnel and witnesses). Use of this form for reporting USACE employee first-aid type injuries not submitted to the Office of Workers' Compensation Programs (OWCP) shall be at the descretion of the FOA commander. Please type or print legibly. Appropriate items shall be marked with an "X" in box(es). If additional space is needed, provide the information on a separate sheet and attach to the completed form. Ensure that these instructions are forwarded with the completed report to the designated management reviewers indicated in sections 16 and 17.

INSTRUCTIONS FOR SECTION 1 - ACCIDENT CLASSIFICATION

(Mark All Boxes That Are Applicable)

a. GOVERNMENT. Mark "CIVILIAN" box if accident involved government civilian employee; mark "MILITARY" box if accident involved U.S. military personnel.

(1) INJURY/ILLNESS/FATALITY - Mark if accident resulted in any government civilian employee injury, illness, or fatality that requires the submission of OWCP Forms CA-1 (injury), CA-2 (illness) or CA-6 (fatality) to OWCP; mark if accident resulted in military personnel lost-time or fatal injury or illness.

(2) PROPERTY DAMAGE - Mark the appropriate box if accident resulted in any damage of $1000 or more to government property (including motor vehicles).

(3) VEHICLE INVOLVED - Mark if accident involved a motor vehicle, regardless of whether "INJURY/ILLNESS/FATALITY" or "PROPERTY DAMAGE" are marked.

(4) DIVING ACTIVITY - Mark if the accident involved an in-house USACE diving activity.

b. CONTRACTOR.

(1) INJURY/ILLNESS/FATALITY - Mark if accident resulted in any contractor lost-time injury/illness or fatality.

(2) PROPERTY DAMAGE - Mark the appropriate box if accident resulted in any damage of $1000 or more to contractor property (including motor vehicles).

(3) VEHICLE INVOLVED - Mark if accident involved a motor vehicle, regardless of whether "INJURY/ILLNESS/FATALITY" or "PROPERTY DAMAGE" are marked.

(4) DIVING ACTIVITY - Mark if the accident involved a USACE Contractor diving activity.

c. PUBLIC.

(1) INJURY/ILLNESS/FATALITY - Mark if accident resulted in public fatality or permanent total disability. (The "OTHER" box will be marked when requested by the FOA to report an unusual non-fatal public accident that could result in claims against the government or as otherwise directed by the FOA Commander).

(2) VOID SPACE - Make no entry.

(3) VEHICLE INVOLVED - Mark if accident resulted in a fatality to a member of the public and involved a motor vehicle, regardless of whether "INJURY/ILLNESS/FATALITY" is marked.

(4) VOID SPACE - Make no entry.

INSTRUCTIONS FOR SECTION 2 - PERSONAL DATA

a. NAME - (MANDATORY FOR GOVERNMENT ACCIDENTS. OPTIONAL AT THE DISCRETION OF THE FOA COMMANDER FOR CONTRACTOR AND PUBLIC ACCIDENTS). Enter last name, first name, middle initial of person involved.

b. AGE - Enter age.

c. SEX - Mark appropriate box.

d. SOCIAL SECURITY NUMBER - (FOR GOVERNMENT PERSONNEL ONLY) Enter the social security number (or other personal identification number if no social security number issued).

e. GRADE - (FOR GOVERNMENT PERSONNEL ONLY) Enter pay grade. Example: 0-6; E-7; WG-8; WS-12; GS-11; etc.

f. JOB SERIES/TITLE - For government civilian employees enter the pay plan, full series number, and job title, e.g., GS-0810/Civil Engineer. For military personnel enter the primary military occupational specialty (PMOS), e.g., 15A30 or 11G50. For contractor employees enter the job title assigned to the injured person, e.g., carpenter, laborer, surveyor, etc.

g. DUTY STATUS - Mark the appropriate box.

(1) ON DUTY - Person was at duty station during duty hours or person was away from duty station during duty hours but on official business at time of the accident.

(2) TDY - Person was on official business, away from the duty station and with travel orders at time of accident. Line-of-duty investigation required.

(3) OFF DUTY - Person was not on official business at time of accident.

h. EMPLOYMENT STATUS - (FOR GOVERNMENT PERSONNEL ONLY) Mark the most appropriate box. If "OTHER" is marked, specify the employment status of the person.

INSTRUCTION FOR SECTION 3 - GENERAL INFORMATION

a. DATE OF ACCIDENT - Enter the month, day, and year of accident.

b. TIME OF ACCIDENT - Enter the local time of accident in military time. Example: 1430 hrs (not 2:30 p.m.).

c. EXACT LOCATION OF ACCIDENT - Enter facts needed to locate the accident scene, (installation/project name, building number, street, direction and distance from closest landmark, etc.).

d. CONTRACTOR NAME

(1) PRIME - Enter the exact name (title of firm) of the prime contractor.

(2) SUBCONTRACTOR - Enter the name of any subcontractor involved in the accident.

e. CONTRACT NUMBER - Mark the appropriate box to identify if contract is civil works, military, or other: if "OTHER" is marked, specify contract appropriation on line provided. Enter complete contract number of prime contract, e.g., DACW 09-85-C-0100.

f. TYPE OF CONTRACT - Mark appropriate box. A/E means architect/engineer. If "OTHER" is marked, specify type of contract on line provided.

g. HAZARDOUS/TOXIC WASTE ACTIVITY (HTW) - Mark the box to identify the HTW activity being performed at the time of the accident. For Superfund, DERP, and Installation Restoration Program (IRP) HTW activities include accidents that occurred during inventory, predesign, design, and construction. For the purpose of accident reporting, DERP Formerly Used DoD Site (FUDS) activities and IRP activities will be treated separately. For Civil Works O&M HTW activities mark the "OTHER" box.

INSTRUCTIONS FOR SECTION 4 - CONSTRUCTION ACTIVITIES

a. CONSTRUCTION ACTIVITY - Select the most appropriate construction activity being performed at time of accident from the list below. Enter the activity name and place the corresponding code number identified in the box.

CONSTRUCTION ACTIVITY LIST

1. MOBILIZATION	14. ELECTRICAL
2. SITE PREPARATION	15. SCAFFOLDING/ACCESS
3. EXCAVATION/TRENCHING	16. MECHANICAL
4. GRADING (EARTHWORK)	17. PAINTING
5. PIPING/UTILITIES	18. EOUIPMENT/MAINTENANCE
6. FOUNDATION	19. TUNNELING
7. FORMING	20. WAREHOUSING/STORAGE
8. CONCRETE PLACEMENT	21. PAVING
9. STEEL ERECTION	22. FENCING
10. ROOFING	23. SIGNING
11. FRAMING	24. LANDSCAPING/IRRIGATION
12. MASONRY	25. INSULATION
13. CARPENTRY	26. DEMOLITION

b. TYPE OF CONSTRUCTION EQUIPMENT - Select the equipment involved in the accident from the list below. Enter the name and place the corresponding code number identified in the box. If equipment is not included below, use code 24, "OTHER", and write in specific type of equipment.

CONSTRUCTION EQUIPMENT

1. GRADER	13. DUMP TRUCK (OFF HIGHWAY)
2. DRAGLINE	14. TRUCK (OTHER)
3. CRANE (ON VESSEL/BARGE)	15. FORKLIFT
4. CRANE (TRACKED)	16. BACKHOE
5. CRANE (RUBBER TIRE)	17. FRONT-END LOADER
6. CRANE (VEHICLE MOUNTED)	18. PILE DRIVER
7. CRANE (TOWER)	19. TRACTOR (UTILITY)
8. SHOVEL	20. MANLIFT
9. SCRAPER	21. DOZER
10. PUMP TRUCK (CONCRETE)	22. DRILL RIG
11. TRUCK (CONCRETE/TRANSIT MIXER)	23. COMPACTOR/VIBRATORY ROLLER
12. DUMP TRUCK (HIGHWAY)	24. OTHER

INSTRUCTIONS FOR SECTION 5 - INJURY/ILLNESS INFORMATION

a. SEVERITY OF INJURY/ILLNESS - Reference para 2-10 of USACE Suppl 1 to AR 385-40 and enter code and description from list below.

NOI	NO INJURY
FAT	FATALITY
PTL	PERMANENT TOTAL DISABILITY
PPR	ERMANENT PARTIAL DISABILITY
LWD	LOST WORKDAY CASE INVOLVING DAYS AWAY FROM WORK
NLW	RECORDABLE CASE WITHOUT LOST WORKDAYS

b. ESTIMATED DAYS LOST - Enter the estimated number of workdays the person will lose from work.

c. ESTIMATED DAYS HOSPITALIZED - Enter the estimated number of workdays the person will be hospitalized.

d. ESTIMATED DAYS RESTRICTED DUTY - Enter the estimated number of workdays the person, as a result of the accident, will not be able to perform all of their regular duties.

e. BODY PART AFFECTED - Select the most appropriate primary and when applicable, secondary body part affected from the list below. Enter body part name on line and place the corresponding code letters identifying that body part in the box.

GENERAL BODY AREA	CODE	BODY PART NAME
ARM/WRIST	AB	ARM AND WRIST
	AS	ARM OR WRIST
TRUNK, EXTERNAL MUSCULATURE	B1	SINGLE BREAST
	B2	BOTH BREASTS
	B3	SINGLE TESTICLE
	B4	BOTH TESTICLES
	BA	ABDOMEN
	BC	CHEST
	BL	LOWER BACK
	BP	PENIS
	BS	SIDE
	BU	UPPER BACK
	BW	WAIST
	BZ	TRUNK OTHER
HEAD, INTERNAL	C1	SINGLE EAR INTERNAL
	C2	BOTH EARS INTERNAL
	C3	SINGLE EYE INTERNAL
	C4	BOTH EYES INTERNAL
	CB	BRAIN
	CC	CRANIAL BONES
	CD	TEETH
	CJ	JAW
	CL	THROAT, LARYNX
	CM	MOUTH
	CN	NOSE
	CR	THROAT, OTHER
	CT	TONGUE
	CZ	HEAD OTHER INTERNAL
ELBOW	EB	BOTH ELBOWS
	ES	SINGLE ELBOW
FINGER	F1	FIRST FINGER
	F2	BOTH FIRST FINGERS
	F3	SECOND FINGER
	F4	BOTH SECOND FINGERS
	F5	THIRD FINGER
	F6	BOTH THIRD FINGERS
	F7	FOURTH FINGER
	F8	BOTH FOURTH FINGERS
TOE	G1	GREAT TOE
	G2	BOTH GREAT TOES
	G3	TOE OTHER
	G4	TOES OTHER

GENERAL BODY AREA	CODE	BODY PART NAME
HEAD, EXTERNAL	H1	EYES EXTERNAL
	H2	BOTH EYES EXTERNAL
	H3	EAR EXTERNAL
	H4	BOTH EARS EXTERNAL
	HC	CHIN
	HF	FACE
	HK	NECK/THROAT
	HM	MOUTH/LIPS
	HN	NOSE
	HS	SCALP
KNEE	KB	BOTH KNEES
	KS	KNEE
LEG, HIP, ANKLE, BUTTOCK	LB	BOTH LEGS/HIPS/ ANKLES/BUTTOCKS
	LS	SINGLE LEG/HIP ANKLE/BUTTOCK
HAND	MB	BOTH HANDS
	MS	SINGLE HAND
FOOT	PB	BOTH FEET
	PS	SINGLE FOOT
TRUNK, BONES	R1	SINGLE COLLAR BONE
	R2	BOTH COLLAR BONES
	R3	SHOULDER BLADE
	R4	BOTH SHOULDER BLADES
	RB	RIB
	RS	STERNUM (BREAST BONE)
	RV	VERTEBRAE (SPINE; DISC)
	RZ	TRUNK BONES OTHER
SHOULDER	SB	BOTH SHOULDERS
	SS	SINGLE SHOULDER
THUMB	TB	BOTH THUMBS
	TS	SINGLE THUMB
TRUNK, INTERNAL ORGANS	V1	LUNG, SINGLE
	V2	LUNGS, BOTH
	V3	KIDNEY, SINGLE
	V4	KIDNEYS, BOTH
	VH	HEART
	VL	LIVER
	VR	REPRODUCTIVE ORGANS
	VS	STOMACH
	VV	INTESTINES
	VZ	TRUNK, INTERNAL; OTHER

f. NATURE OF INJURY/ILLNESS - Select the most appropriate nature of injury/illness from the list below. This nature of injury/illness shall correspond to the primary body part selected in 5e, above. Enter the nature of injury/illness name on the line and place the corresponding CODE letters in the box provided.

*** The injury or condition selected below must be caused by a specific incident or event which occurred during a single work day or shift.**

GENERAL NATURE CATEGORY	CODE	NATURE OF INJURY NAME
*TRAUMATIC INJURY OR DISABILITY	TA	AMPUTATION
	TB	BACK STRAIN
	TC	CONTUSION; BRUISE; ABRASION
	TD	DISLOCATION
	TF	FRACTURE
	TH	HERNIA
	TK	CONCUSSION
	TL	LACERATION, CUT
	TP	PUNCTURE
	TS	STRAIN, MULTIPLE
	TU	BURN, SCALD, SUNBURN
	TI	TRAUMATIC SKIN DISEASES/CONDITIONS INCLUDING DERMATITIS
	TR	TRAUMATIC RESPIRATORY DISEASE
	TQ	TRAUMATIC FOOD POISONING
	TW	TRAUMATIC TUBERCULOSIS
	TX	TRAUMATIC VIROLOGICAL/ INFECTIVE/PARASITIC DISEASE
	T1	TRAUMATIC CEREBRAL VASCULAR CONDITION/STROKE
	T2	TRAUMATIC HEARING LOSS
	T3	TRAUMATIC HEART CONDITION
	T4	TRAUMATIC MENTAL DISORDER, STRESS; NERVOUS CONDITION
	T8	TRAUMATIC INJURY - OTHER (EXCEPT DISEASE, ILLNESS)

** A nontraumatic physiological harm or loss of capacity produced by systemic infection; continued or repeated stress or strain; exposure to toxins, poisons, fumes, etc.; or other continued and repeated exposures to conditions of the work environment over a long period of time. For practical purposes, an occupational illness/disease or disability is any reported condition which does not meet the definition of traumatic injury or disability as described above.

GENERAL NATURE CATEGORY	CODE	NATURE OF INJURY NAME
**NON-TRAUMATIC ILLNESS/DISEASE OR DISABILITY		
RESPIRATORY DISEASE	RA	ASBESTOSIS
	RB	BRONCHITIS
	RE	EMPHYSEMA
	RP	PNEUMOCONIOSIS
	RS	SILICOSIS
	R9	RESPIRATORY DISEASE, OTHER
VIROLOGICAL, INFECTIVE & PARASITIC DISEASES	VB	BRUCELLOSIS
	VC	COCCIDIOMYCOSIS
	VF	FOOD POISONING
	VH	HEPATITIS
	VM	MALARIA
	VS	STAPHYLOCOCCUS
	VT	TUBERCULOSIS
	V9	VIROLOGICAL/INFECTIVE/ PARASITIC - OTHER
DISABILITY, OCCUPATIONAL	DA	ARTHRITIS, BURSITIS
	DB	BACK STRAIN, BACK SPRAIN
	DC	CEREBRAL VASCULAR CONDITION; STROKE

GENERAL NATURE CATEGORY	CODE	NATURE OF INJURY NAME
	DD	ENDEMIC DISEASE (OTHER THAN CODE TYPES R&S)
	DE	EFFECT OF ENVIRONMENTAL CONDITION
	DH	HEARING LOSS
	DK	HEART CONDITION
	DM	MENTAL DISORDER, EMOTIONAL STRESS, NERVOUS CONDITION
	DR	RADIATION
	DS	STRAIN, MULTIPLE
	DU	ULCER
	DV	OTHER VASCULAR CONDITIONS
	D9	DISABILITY, OTHER
SKIN DISEASE OR CONDITION	SB	BIOLOGICAL
	SC	CHEMICAL
	S9	DERMATITIS, UNCLASSIFIED

g. TYPE AND SOURCE OF INJURY/ILLNESS (CAUSE) - Type and Source Codes are used to describe what caused the incident. The Type Code stands for an ACTION and the Source Code for an OBJECT or SUBSTANCE. Together, they form a brief description of how the incident occurred. Where there are two different sources, code the initiating source of the incident (see example 1, below). Examples:

(1) An employee tripped on carpet and struck his head on a desk.
TYPE: 210 (fell on same level) SOURCE: 0110 (walking/working surface).

NOTE: This example would NOT be coded 120 (struck against) and 0140 (furniture).

(2) A Park Ranger contracted dermatitis from contact with poison ivy/oak.
TYPE: 510 (contact) SOURCE: 0920 (plant)

(3) A lock and dam mechanic punctured his finger with a metal sliver while grinding a turbine blade.
TYPE: 410 (punctured by) SOURCE: 0830 (metal)

(4) An employee was driving a government vehicle when it was struck by another vehicle.
TYPE: 800 (traveling in) SOURCE: 0421 (government-owned vehicle, as driver)

NOTE: The Type Code 800, "Traveling In" is different from the other type codes in that its function is not to identify factors contributing to the injury or fatality, but rather to collect data on the type of vehicle the employee was operating or traveling in at the time of the incident.

Select the most appropriate TYPE and SOURCE identifier from the list below and enter the name on the line and the corresponding code in the appropriate box.

CODE	TYPE OF INJURY NAME
	STRUCK
0110	STRUCK BY
0111	STRUCK BY FALLING OBJECT
0120	STRUCK AGAINST
	FELL, SLIPPED, TRIPPED
0210	FELL ON SAME LEVEL
0220	FELL ON DIFFERENT LEVEL
0230	SLIPPED, TRIPPED (NO FALL)
	CAUGHT
0310	CAUGHT ON
0320	CAUGHT IN
0330	CAUGHT BETWEEN
	PUNCTURED, LACERATED
0410	PUNCTURED BY
0420	CUT BY
0430	STUNG BY
0440	BITTEN BY
	CONTACTED
0510	CONTACTED WITH (INJURED PERSON MOVING)
0520	CONTACTED BY (OBJECT WAS MOVING)
	EXERTED
0610	LIFTED, STRAINED BY (SINGLE ACTION)
0620	STRESSED BY (REPEATED ACTION)
	EXPOSED
0710	INHALED
0720	INGESTED
0730	ABSORBED
0740	EXPOSED TO
0800	TRAVELING IN

CODE	SOURCE OF INJURY NAME
0100	BUILDING OR WORKING AREA
0110	WALKING/WORKING SURFACE (FLOOR, STREET, SIDEWALKS, ETC.)
0120	STAIRS, STEPS
0130	LADDER
0140	FURNITURE, FURNISHINGS, OFFICE EQUIPMENT
0150	BOILER, PRESSURE VESSEL
0160	EQUIPMENT LAYOUT (ERGONOMIC)
0170	WINDOWS, DOORS
0180	ELECTRICITY
0200	ENVIRONMENTAL CONDITION
0210	TEMPERATURE EXTREME (INDOOR)
0220	WEATHER (ICE, RAIN, HEAT, ETC.)
0230	FIRE, FLAME, SMOKE (NOT TOBACCO)
0240	NOISE
0250	RADIATION
0260	LIGHT
0270	VENTILATION
0271	TOBACCO SMOKE
0280	STRESS (EMOTIONAL)
0290	CONFINED SPACE
0300	MACHINE OR TOOL
0310	HAND TOOL (POWERED; SAW, GRINDER, ETC.)
0320	HAND TOOL (NONPOWERED)
0330	MECHANICAL POWER TRANSMISSION APPARATUS
0340	GUARD, SHIELD (FIXED, MOVEABLE, INTERLOCK)

CODE	TYPE OF INJURY NAME
0350	VIDEO DISPLAY TERMINAL
0360	PUMP, COMPRESSOR, AIR PRESSURE TOOL
0370	HEATING EQUIPMENT
0380	WELDING EQUIPMENT
0400	VEHICLE
0411	AS DRIVER OF PRIVATELY OWNED/RENTAL VEHICLE
0412	AS PASSENGER OF PRIVATELY OWNED/RENTAL VEHICLE
0421	DRIVER OF GOVERNMENT VEHICLE
0422	PASSENGER OF GOVERNMENT VEHICLE
0430	COMMON CARRIER (AIRLINE, BUS, ETC.)
0440	AIRCRAFT (NOT COMMERCIAL)
0450	BOAT, SHIP, BARGE
0500	MATERIAL HANDLING EQUIPMENT
0510	EARTHMOVER (TRACTOR, BACKHOE, ETC.)
0520	CONVEYOR (FOR MATERIAL AND EQUIPMENT)
0530	ELEVATOR, ESCALATOR, PERSONNEL HOIST
0540	HOIST, SLING CHAIN, JACK
0550	CRANE
0551	FORKLIFT
0560	HANDTRUCK, DOLLY
0600	DUST, VAPOR, ETC.
0610	DUST (SILICA, COAL, ETC.)
0620	FIBERS
0621	ASBESTOS
0630	GASES
0631	CARBON MONOXIDE
0640	MIST, STEAM, VAPOR, FUME
0641	WELDING FUMES
0650	PARTICLES (UNIDENTIFIED)
0700	CHEMICAL, PLASTIC, ETC.
0711	DRY CHEMICAL - CORROSIVE
0712	DRY CHEMICAL - TOXIC
0713	DRY CHEMICAL - EXPLOSIVE
0714	DRY CHEMICAL FLAMMABLE
0721	LIQUID CHEMICAL - CORROSIVE
0722	LIQUID CHEMICAL - TOXIC
0723	LIQUID CHEMICAL - EXPLOSIVE
0724	LIQUID CHEMICAL - FLAM-MABLE
0730	PLASTIC
0740	WATER
0750	MEDICINE
0800	INAMINATE OBJECT
0810	BOX, BARREL, ETC.
0820	PAPER
0830	METAL ITEM, MINERAL
0831	NEEDLE
0840	GLASS

CODE	SOURCE OF INJURY NAME
0850	SCRAP, TRASH
0860	WOOD
0870	FOOD
0880	CLOTHING, APPAREL, SHOES
0900	ANIMATE OBJECT
0911	DOG
0912	OTHER ANIMAL
0920	PLANT
0930	INSECT
0940	HUMAN (VIOLENCE)
0950	HUMAN (COMMUNICABLE DISEASE)
0960	BACTERIA, VIRUS (NOT HUMAN CONTACT)
1000	PERSONAL PROTECTIVE EQUIPMENT
1010	PROTECTIVE CLOTHING, SHOES, GLASSES, GOGGLES
1020	RESPIRATOR, MASK
1021	DIVING EQUIPMENT
1030	SAFETY BELT, HARNESS
1040	PARACHUTE

INSTRUCTIONS FOR SECTION 6 - PUBLIC FATALITY

a. ACTIVITY AT TIME OF ACCIDENT - Select the activity being performed at the time of the accident from the list below. Enter the activity name on the line and the corresponding number in the box. If the activity performed is not identified on the list, select from the most appropriate primary activity area (water related, non-water related or other activity), the code number for "Other", and write in the activity being performed at the time of the accident.

WATER RELATED RECREATION

1. Sailing
2. Boating-powered
3. Boating-unpowered
4. Water skiing
5. Fishing from boat
6. Fishing from bank dock or pier
7. Fishing while wading
8. Swimming/supervised area
9. Swimming/designated area
10. Swimming/other area
11. Underwater activities (skin diving, scuba, etc.)
12. Wading
13. Attempted rescue
14. Hunting from boat
15. Other

NON-WATER RELATED RECREATION

16. Hiking and walking
17. Climbing (general)
18. Camping/picnicking authorized area
19. Camping/picnicking unauthorized area
20. Guided tours
21. Hunting
22. Playground equipment
23. Sports/summer (baseball, football, etc.)
24. Sports/winter (skiing, sledding, snowmobiling etc.)
25. Cycling (bicycle, motorcycle, scooter)
26. Gliding
27. Parachuting
28. Other non-water related

OTHER ACTIVITIES

29. Unlawful acts (fights, riots, vandalism, etc.)
30. Food preparation/serving
31. Food consumption
32. Housekeeping
33. Sleeping
34. Pedestrian struck by vehicle
35. Pedestrian other acts
36. Suicide
37. "Other" activities

b. PERSONAL FLOTATION DEVICE USED - If fatality was water-related was the victim wearing a person flotation device? Mark the appropriate box.

INSTRUCTIONS FOR SECTION 7 - MOTOR VEHICLE ACCIDENT

a. TYPE OF VEHICLE - Mark appropriate box for each vehicle involved. If more than one vehicle of the same type is involved, mark both halves of the appropriate box. USACE vehicle(s) involved shall be marked in left half of appropriate box.

b. TYPE OF COLLISION - Mark appropriate box.

c. SEAT BELT - Mark appropriate box.

INSTRUCTIONS FOR SECTION 8 - PROPERTY/MATERIAL INVOLVED

a. NAME OF ITEM - Describe all property involved in accident. Property/material involved means material which is damaged or whose use or misuse contributed to the accident. Include the name, type, model; also include the National Stock Number (NSN) whenever applicable.

b. OWNERSHIP - Enter ownership for each item listed. (Enter one of the following: USACE; OTHER GOVERNMENT; CONTRACTOR; PRIVATE)

c. $ AMOUNT OF DAMAGE - Enter the total estimated dollar amount of damage (parts and labor), if any.

INSTRUCTIONS FOR SECTION 9 - VESSEL/ FLOATING PLANT ACCIDENT

a. TYPE OF VESSEL/FLOATING PLANT - Select the most appropriate vessel/floating plant from list below. Enter name and place corresponding number in box. If item is not listed below, enter item number for "OTHER" and write in specific type of vessel floating plant.

VESSEL/FLOATING PLANTS

1. ROW BOAT
2. SAIL BOAT
3. MOTOR BOAT
4. BARGE
5. DREDGE/HOPPER
6. DREDGE/SIDE CASTING
7. DREDGE/DIPPER
8. DREDGE/CLAMSHELL, BUCKET
9. DREDGE/PIPE LINE
10. DREDGE/DUST PAN
11. TUG BOAT
12. OTHER

b. COLLISION/MISHAP - Select from the list below the object(s) that contributed to the accident or were damaged in the accident.

COLLISION/MISHAP

1. COLLISION W/OTHER VESSEL
2. UPPER GUIDE WALL
3. UPPER LOCK GATES
4. LOCK WALL
5. LOWER LOCK GATES
6. LOWER GUIDE WALL
7. HAULAGE UNIT
8. BREAKING TOW
9. TOW BREAKING UP
10. SWEPT DOWN ON DAM
11. BUOY/DOLPHIN/CELL
12. WHARF OR DOCK
13. OTHER

INSTRUCTIONS FOR SECTION 10 - ACCIDENT DESCRIPTION

DESCRIBE ACCIDENT - Fully describe the accident. Give the sequence of events that describe what happened leading up to and including the accident. Fully identify personnel and equipment involved and their role(s) in the accident. Ensure that relationships between personnel and equipment are clearly specified. Continue on blank sheets if necessary and attach to this report.

INSTRUCTIONS FOR SECTION 11 - CAUSAL FACTORS

a. Review thoroughly. Answer each question by marking the appropriate block. If any answer is yes, explain in item 13 below. Consider, as a minimum, the following:

(1) DESIGN - Did inadequacies associated with the building or work site play a role? Would an improved design or layout of the equipment or facilities reduce the likelihood of similar accidents? Were the tools or other equipment designed and intended for the task at hand?

(2) INSPECTION/MAINTENANCE - Did inadequately or improperly maintained equipment, tools, workplace, etc. create or worsen any hazards that contributed to the accident? Would better equipment, facility, work site or work activity inspections have helped avoid the accident?

(3) PERSON'S PHYSICAL CONDITION - Do you feel that the accident would probably not have occurred if the employee was in "good" physical condition? If the person involved in the accident had been in better physical condition, would the accident have been less severe or avoided altogether? Was over exertion a factor?

(4) OPERATING PROCEDURES - Did a lack of or inadequacy within established operating procedures contribute to the accident? Did any aspect of the procedures introduce any hazard to, or increase the risk associated with the work process? Would establishment or improvement of operating procedures reduce the likelihood of similar accidents?

(5) JOB PRACTICES - Were any of the provisions of the Safety and Health Requirements Manual (EM 385-1-1) violated? Was the task being accomplished in a manner which was not in compliance with an established job hazard analysis or activity hazard analysis? Did any established job practice (including EM 385-1-1) fail to adequately address the task or work process? Would better job practices improve the safety of the task?

(6) HUMAN FACTORS - Was the person under undue stress (either internal or external to the job)? Did the task tend toward overloading the capabilities of the person; i.e., did the job require tracking and reacting to many external inputs such as displays, alarms, or signals? Did the arrangement of the workplace tend to interfere with efficient task performance? Did the task require reach, strength, endurance, agility, etc., at or beyond the capabilities of the employee? Was the work environment ill-adapted to the person? Did the person need more training, experience, or practice in doing the task? Was the person inadequately rested to perform safely?

(7) ENVIRONMENTAL FACTORS - Did any factors such as moisture, humidity, rain, snow, sleet, hail, ice, fog, cold, heat, sun, temperature changes, wind, tides, floods, currents, dust, mud, glare, pressure changes, lightning, etc., play a part in the accident?

(8) CHEMICAL AND PHYSICAL AGENT FACTORS - Did exposure to chemical agents (either single shift exposure or long-term exposure) such as dusts, fibers (asbestos, etc.), silica, gases (carbon monoxide, chlorine, etc.,), mists, steam, vapors, fumes, smoke, other particulates, liquid or dry chemicals that are corrosive, toxic, explosive or flammable, byproducts of combustion or physical agents such as noise, ionizing radiation, non-ionizing radiation (UV radiation created during welding, etc.) contribute to the accident/incident?

(9) **OFFICE FACTORS** - Did the fact that the accident occurred in an office setting or to an office worker have a bearing on its cause? For example, office workers tend to have less experience and training in performing tasks such as lifting office furniture. Did physical hazards within the office environment contribute to the hazard?

(10) **SUPPORT FACTORS** - Was the person using an improper tool for the job? Was inadequate time available or utilized to safely accomplish the task? Were less than adequate personnel resources (in terms of employee skills, number of workers, and adequate supervision) available to get the job done properly? Was funding available, utilized, and adequate to provide proper tools, equipment, personnel, site preparation, etc.?

(11) **PERSONAL PROTECTIVE EQUIPMENT** - Did the person fail to use appropriate personal protective equipment (gloves, eye protection, hard-toed shoes, respirator, etc.) for the task or environment? Did protective equipment provided or worn fail to provide adequate protection from the hazard(s)? Did lack of or inadequate maintenance of protective gear contribute to the accident?

(12) **DRUGS/ALCOHOL** - Is there any reason to believe the person's mental or physical capabilities, judgment, etc., were impaired or altered by the use of drugs or alcohol? Consider the effects of prescription medicine and over the counter medications as well as illicit drug use. Consider the effect of drug or alcohol induced "hangovers".

b. **WRITTEN JOB/ACTIVITY HAZARD ANALYSIS** - Was a written Job/Activity Hazard Analysis completed for the task being performed at the time of the accident? Mark the appropriate box. If one was performed, attach a copy of the analysis to the report.

INSTRUCTIONS FOR SECTION 12 - TRAINING

a. **WAS PERSON TRAINED TO PERFORM ACTIVITY/TASK?** - For the purpose of this section "trained" means the person has been provided the necessary information (either formal and/or on-the-job (OJT) training) to competently perform the activity/task in a safe and healthful manner.

b. **TYPE OF TRAINING** - Mark the appropriate box that best indicates the type of training; (classroom or on-the-job) that the injured person received before the accident happened.

c. **DATE OF MOST RECENT TRAINING** - Enter the month, day, and year of the last formal training completed that covered the activity task being performed at the time of the accident.

INSTRUCTIONS FOR SECTION 13 - CAUSES

a. DIRECT CAUSES - The direct cause is that single factor which most directly lead to the accident. See examples below.

b. INDIRECT CAUSES - Indirect causes are those factors which contributed to but did not directly initiate the occurrence of the accident.

Examples for section 13:

a. Employee was dismantling scaffold and fell 12 feet from unguarded opening.

Direct cause: failure to provide fall protection at elevation.
Indirect causes: failure to enforce USACE safety requirements; improper training/motivation of employee (possibility that employee was not knowledgeable of USACE fall protection requirements or was lax in his attitude towards safety); failure to ensure provision of positive fall protection whenever elevated; failure to address fall protection during scaffold dismantling in phase hazard analysis.

b. Private citizen had stopped his vehicle at intersection for red light when vehicle was struck in rear by USACE vehicle. (Note: USACE vehicle was in proper/safe working condition).

Direct cause: failure of USACE driver to maintain control of and stop USACE vehicle within safe distance.
Indirect cause: failure of employee to pay attention to driving (defensive driving).

INSTRUCTIONS FOR SECTION 14 - ACTION TO ELIMINATE CAUSE(S)

DESCRIPTION - Fully describe all the actions taken, anticipated, and recommended to eliminate the cause(s) and prevent reoccurrence of similar accidents/illnesses. Continue on blank sheets of paper if necessary to fully explain and attach to the completed report form.

INSTRUCTIONS FOR SECTION 15 - DATES FOR ACTION

a. **BEGIN DATE** - Enter the date when the corrective action(s) identified in section 14 will begin.

b. **COMPLETE DATE** - Enter the date when the corrective action(s) identified in section 14 will be completed.

c. **TITLE AND SIGNATURE** - Enter the title and signature of supervisor completing the accident report. For a GOVERNMENT employee accident/illness the immediate supervisor will complete and sign the report. For PUBLIC accidents the USACE Project Manager/Area Engineer responsible for the USACE property where the accident happened shall complete and sign the report. For CONTRACTOR accidents the Contractor's project manager shall complete and sign the report and provide to the USACE supervisor responsible for oversight of that contractor activity. This USACE supervisor shall also sign the report. Upon entering the information required in 15.d, 15.e and 15.f below, the responsible USACE supervisor shall forward the report for mangement review as indicated in section 16.

d. **DATE SIGNED** - Enter the month, day, and year that the report was signed by the responsible supervisor.

e. **ORGANIZATION NAME** - For GOVERNMENT employee accidents enter the USACE organization name (Division, Branch, Section, etc.) of the injured employee. For PUBLIC accidents enter the USACE organization name for the person identified in block 15.c. For CONTRACTOR accidents enter the USACE organization name for the USACE office responsible for providing contract administration oversight.

f. **OFFICE SYMBOL** - Enter the latest complete USACE Office Symbol for the USACE organization identified in block 15.e.

INSTRUCTIONS FOR SECTION 16 - MANAGEMENT REVIEW (1st)

1ST REVIEW - Each USACE FOA shall determine who will provide 1st management review. The responsible USACE supervisor in section 15.c shall forward the completed report to the USACE office designated as the 1st Reviewer by the FOA. Upon receipt, the Chief of the Office shall review the completed report, mark the appropriate box, provide substantive comments, sign, date, and forward to the FOA Staff Chief (2nd review) for review and comment.

INSTRUCTIONS FOR SECTION 17 - MANAGEMENT REVIEW (2nd)

2ND REVIEW - The FOA Staff Chief (i.e., FOA Chief of Construction, Operations, Engineering, Planning, etc.) shall mark the appropriate box, review the completed report, provide substantive comments, sign, date, and return to the FOA Safety and Occupational Health Office.

INSTRUCTIONS FOR SECTION 18 - SAFETY AND OCCUPATIONAL HEALTH REVIEW

3RD REVIEW - The FOA Safety and Occupational Health Office shall review the completed report, mark the appropriate box, ensure that any inadequacies, discrepancies, etc. are rectified by the responsible supervisor and management reviewers, provide substantive comments, sign, date and forward to the FOA Commander for review, comment, and signature.

INSTRUCTION FOR SECTION 19 - COMMAND APPROVAL

4TH REVIEW - The FOA Commander shall (to include the person designated Acting Commander in his absence) review the completed report, comment if required, sign, date, and forward the report to the FOA Safety and Occupational Health Office. Signature authority shall not be delegated.

SAFETY INSPECTION CHECKLIST FOR CONSTRUCTION EQUIPMENT U.S. Army Corps of Engineers – Kansas City District	Date of Inspection:
Contractor or Unit	Contract No. or Activity
Inspected by (Signature)	Witness (Signature)

CRANE/DERRICK, DRAGLINE, RUBBER TIRE TRACTOR (BACKHOES, FRONT END LOADERS), CRAWLER TRACTOR (DOZERS), DUMP TRUCK AND SIMILAR HEAVY EQUIPMENT NOTE: Safety and Health Requirements Manual (EM 385-1-1) references in parentheses.	**YES**	**NO**	**N/A**
1 Are the following documents with the crane at all times? (16.C.02)			
1a Operating manual from the manufacturer for the specific crane being inspected.			
(1) Any operator aids for which the crane is equipped?			
1b Load rating chart for the crane which shall include:			
(1) the crane make and model, serial number, and year of manufacturer			
(2) load ratings for all crane operating configurations: including optional equipment			
(3) recommended reeving for the hoist line			
(4) operating limits in windy or cold conditions			
1c Crane logbook that shows operating hours, inspections, tests, maintenance & repair. **Note:** Has log been updated daily when crane is used, and is signed by operator & supervisor? **Note:** Mechanics shall sign after conducting maintenance or repairs.			
2 Does operator have certification that he meets operator qualifications and training as Stated in 16.C.05? (Corps' crane operators must comply with Appendix G.)			
3 Is there a hazard analysis for set-up and set-down procedures (mobilization, assembly, dismantling, etc.)? (16.C.11)			
4 Are adequate clearances provided from electrical sources, fixed objects, and swing radius? (16.C.09)			
5 Are communications provided as required? (16.C.11)			
6 Has an inspection been performed in accordance with 16.C.12 and Appendix H?			
7 Have performance load tests been conducted in accordance with 16.C.13?			
8 Are tag lines used to control loads? (16.C.16)			
9 Is a critical lift plan required? (16.C.18 and page 293)			
10 Are all environmental considerations 16.C.19 being met?			

SAFETY INSPECTION CHECKLIST FOR CONSTRUCTION EQUIPEMENT	YES	NO	N/A
12 Are cable-supported booms equipped with boom stops? (16.D.06)			
13 Do all floating cranes and derricks meet the requirements of 16.F?			
14 Are all moving parts (gears, drums, shafts, belts, etc.) and all hot surfaces (exhaust lines, pipes, etc.) guarded? (16.B.03)			
15 Is protection (grills, canopies, screens) provided to shield operator from falling or flying objects? (16.B.10 and 16.B.11)			
16 Is adequate rollover protection provided? (16.B.12)			
17 Are seat belts provided? (16.B.08)			
18. Does the unit have a suitable fire extinguisher? Min. 5 BC (16.A.26)			
19. Is there effective and operational reverse alarm? (16.B.01)			
20. Is a safe means of access to the cab provided (steps, grab bars, non-slip surfaces)? (16.B.03 (d))			
21. Are pressurized cylinders, outriggers, etc., equipped with a pilot check valve? (20.A.17)			
22. Are sufficient lights provided for night operators? (16.A.11)			
23. Are daily, initial inspections, and tests (prior to each shift) of the equipment performed by a competent person? (16.A.01 & 16.A.02)			
24. Are fuel tanks located in a manner to prevent spills or overflows from running onto engine exhaust or electrical equipment? (16.B.04)			
25. Are exhaust discharges from equipment so directed that they do not endanger persons or obstruct the view of the operator? (16.B.05)			
26. Are inspection records kept available as a part of the official project file? (16.A.01 (b))			
27. Do all motor vehicles meet the requirements of 18.A and 18.B?			
Remarks:			
NOTE: It is not anticipated that this checklist will be used for conveyors, concrete plants, material hoists, elevators air compressors and other special purpose construction equipment not mentioned on page 1 of this form.			

ACTIVITY HAZARD ANALYSIS

Date Prepared: 12/30/03
Project: Former Griffiss AFB, Three Mile Creek Area of Concern, Rome, NY
Job: Backfill, Site Restoration and Demobilization
Prepared By: Glen Mayekawa, CIH   Reviewed By: Steve Scavone, PG

Risk Assessment Code (RAC):

E = Extremely High Risk
H = High Risk
M = Moderate Risk

Recommended Protective Clothing & Equipment:

Backfill, Site Restoration and Demobilization: Use Level D protection for backfilling and site restoration tasks. For demobilization (Frac tank cleaning; equipment decon), use Modified Level D and Level C protection (if elevated VOCs or contaminated airborne dust present) for confined space entry and equipment decontamination.

Modified Level D protection consists of: Level D protection equipment plus chemical protective clothing (protective suit, gloves, and boots or boot covers).

Level C protection consists of: Modified Level D protection equipment plus an air-purifying respirator (with organic vapor and P-100 HEPA filter cartridge)

Severity	Probability: Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
Backfill, Site Restoration and Demobilization: -Backfill excavated areas -Compact backfilled soil -Grade areas -Complete other site restoration tasks -Clean Frac tanks (if applicable) -Decontaminate equipment -Demobilize.	**Backfill, Site Restoration and Demobilization**: Chemical Hazards: Potential for exposure to VOCs and other airborne contaminants during equipment decontamination Biological Hazards: Poisonous plants; Snakes; Spiders; Ants; Bees; Rodents; Ticks; Mosquitoes Physical Hazards: Fire protection; Underground and overhead utilities; Heavy equipment operation; Vehicle and equipment traffic; Material handling; Tools, machinery, and equipment use; Electrical equipment; Noise exposure; Heat stress; Cold stress; Confined space entry; Pressure washer operation; Inclement weather and adverse environmental conditions; Miscellaneous physical hazards	**Chemical Hazards**: Conduct exposure monitoring; use PPE; properly don/doff protective clothing; avoid contact with contaminated surfaces; use decontamination measures	6A-B; 28C, F
		Biological Hazards: Avoid contact with, poisonous plants, snakes, spiders, insects, rodents, ticks, and mosquitoes	6D
		Fire Protection: Have fire extinguishers; Allow smoking only in designated areas; Use OSHA-approved metal dispenser cans for flammable liquids; Use bonding and grounding for combustible liquid transfer.	9A, B, E, H, I
		Underground and Overhead Utilities: Survey for underground and overhead utilities; Do not operate equipment within 10 feet of overhead lines.	11E, I
		Heavy Equipment Operation: Inspect heavy equipment; Check backup alarms; Survey for utilities; Have ground personnel wear high-visibility safety vests; Maintain positive contact between operator and ground personnel; Use hand signals; Do not cross path of moving equipment or walk behind equipment; Keep out of heavy equipment operating area when possible; Require operators to look before backing.	16A, B; 18A

ACTIVITY HAZARD ANALYSIS

Date Prepared: 12/30/03
Project: Former Griffiss AFB, Three Mile Creek Area of Concern, Rome, NY
Job: Backfill, Site Restoration and Demobilization

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
		Vehicle and Equipment Traffic: Establish traffic control procedures; Have workers wear high-visibility safety vests in traffic areas; Have workers look where they walk to avoid moving vehicles and equipment; Maintain eye contact with equipment operators; Use traffic control devices; Use spotters for backing into tight work areas.	8A, B; 18A-C
		Material Handling: Wear work gloves when handling materials; watch for items that can cut, puncture, pinch, or crush; use proper technique	14A
		Tools, Machinery, and Equipment Use: Use proper tool for the job; use GFCIs; use safety glasses; do not use damaged tools; properly secure materials when working on them make sure area is clear when using equipment	16A, B; 13A-D
		Electrical Equipment: Use GFCIs; inspect electrical cords for damage and ground plugs; keep away from water or fuel containers; use electrical equipment lockout/tagout	11A-E; 12 (All)
		Noise Exposure: Wear earplugs when operating or working near heavy equipment.	5C
		Heat Stress: Adjust work-rest schedules; Work at a steady pace; Drink fluids; Take rest breaks and use shaded rest area; Know signs and symptoms of heat stress and treatment; Monitor for heat stress.	6J
		Cold Stress: Ambient temperatures below 45° may occur at times during site work (fall/winter/spring). Workers may be required to work outside in cold temperatures; Know signs and symptoms of cold stress and treatment; Monitor for cold stress.	6J

ACTIVITY HAZARD ANALYSIS

Date Prepared: 12/30/03
Project: Former Griffiss AFB, Three Mile Creek Area of Concern, Rome, NY
Job: Backfill, Site Restoration and Demobilization

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
		Confined Space Entry: Consider sumps and Frac tanks to be permit-required confined spaces; Prohibit confined space entry unless: the space has been tested, a qualified "Entry Supervisor" has approved and issued a confined space entry permit; perform confined space entry per OSHA regulations.	6I
		Pressure Washer Operation: Use gloves, face, and eye protection during pressure washer operation; keep area clear when washing; do not clean boots with pressure washer; watch for slippery surfaces and handling of slippery materials; have fire extinguisher and emergency eyewash supplies immediately available	5B
		Inclement Weather and Adverse Environmental Conditions: Suspend outdoor work if inclement weather or when other adverse environmental conditions exist.	6J
		Miscellaneous Physical Hazards: Use PPE for head, eye, hand, foot, and body protection; follow safe work practices; watch for slip, trip, and fall hazards from uneven, wet, slippery ground surfaces; keep ground areas clear of tripping hazards such as hoses, cords, boxes, and debris; maintain good housekeeping.	5 (All); 14C

ACTIVITY HAZARD ANALYSIS

Date Prepared: 12/30/03
Project: Former Griffiss AFB, Three Mile Creek Area of Concern, Rome, NY
Job: Backfill, Site Restoration and Demobilization

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
Heavy Equipment; Compactor; Water Truck; Pressure Washer	Safety Inspection; Heavy Equipment Inspection; Confined Space Entry Permit (if Frac tank entry for cleaning)	Site Orientation Briefing and SSHP Review; HazWOPER Training; First-aid/CPR Training; Confined Space Training (if Frac tank entry for cleaning)

ACTIVITY HAZARD ANALYSIS

Date Prepared: 12/30/03
Project: Former Griffiss AFB, Three Mile Creek Area of Concern, Rome, NY
Job: Contaminated Soil and Debris Excavation, Staging, and Onsite Disposal
Prepared By: Glen Mayekawa, CIH Reviewed By: Steve Scavone, PG

Risk Assessment Code (RAC):

Recommended Protective Clothing & Equipment:

Contaminated Soil and Debris Excavation, Staging, and Onsite Disposal: Use Level D protection for transportation and disposal of waste materials.

Use Modified Level D and Level C protection (if elevated VOCs or contaminated airborne dust are present) for contaminated soil and debris excavation and stockpiling.

Modified Level D protection consists of: Level D protection equipment plus chemical protective clothing (protective suit, gloves, and boots or boot covers.)

Level C protection consists of: Modified Level D protection equipment plus an air-purifying respirator (with organic vapor and P-100 HEPA filter cartridge)

E = Extremely High Risk
H = High Risk
M = Moderate Risk

Severity	Probability: Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
<u>Contaminated Soil and Debris Excavation, Staging, and Onsite Disposal</u>: -Excavate contaminated soil and debris -Stage contaminated soil -Transport waste for onsite disposal.	**<u>Contaminated Soil and Debris Excavation, Staging, and Onsite Disposal</u>**: <u>Chemical Hazards</u>: Potential for exposure to VOCs and contaminated airborne dust during site work <u>Biological Hazards</u>: Poisonous plants; Snakes; Spiders; Ants; Bees; Rodents; Ticks; Mosquitoes <u>Physical Hazards</u>: Fire protection; Underground and overhead utilities; Heavy equipment operation; Excavation and trench safety; Vehicle and equipment traffic; Driver safety; Material handling; Noise exposure; Heat stress; Cold stress; Inclement weather and adverse environmental conditions; Miscellaneous physical hazards	**Chemical Hazards**: Conduct exposure monitoring; use PPE; properly don/doff protective clothing; avoid contact with contaminated surfaces; use decontamination measures	6A-B; 28C, F
		Biological Hazards: Avoid contact with, poisonous plants, snakes, spiders, insects, rodents, ticks, and mosquitoes	6D
		Fire Protection: Have fire extinguishers; Allow smoking only in designated areas; Use OSHA-approved metal dispenser cans for flammable liquids; Use bonding and grounding for combustible liquid transfer.	9A, B, E, H, I
		Underground and Overhead Utilities: Survey for underground and overhead utilities; Do <u>not</u> operate equipment within 10 feet of overhead lines.	11E, I
		Heavy Equipment Operation: Inspect heavy equipment; Check backup alarms; Survey for utilities; Have ground personnel wear high-visibility safety vests; Maintain positive contact between operator and ground personnel; Use hand signals; Do <u>not</u> cross path of moving equipment or walk behind equipment; Keep out of heavy equipment operating area when possible; Require operators to look before backing.	16A, B; 18A

ACTIVITY HAZARD ANALYSIS

Date Prepared: 12/30/03
Project: Former Griffiss AFB, Three Mile Creek Area of Concern, Rome, NY
Job: Contaminated Soil and Debris Excavation, Staging, and Onsite Disposal

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
		Excavation and Trench Safety: Complete excavation entry according to OSHA requirements; Check for underground utilities before excavation; Survey for overhead utilities and do not operate equipment within 10 feet of overhead lines; Have a "Competent Person" supervise operations, conduct daily inspections, and use protective systems (sloping, benching, shielding, and/or shoring) for excavation operations.	25 (All)
		Vehicle and Equipment Traffic: Establish traffic control procedures; Have workers wear high-visibility safety vests in traffic areas; Have workers look where they walk to avoid moving vehicles and equipment; Maintain eye contact with equipment operators; Use traffic control devices; Use spotters for backing into tight work areas.	8A, B; 18A-C
		Driver Safety: Observe posted speeds and traffic signs; keep load secure; ensure axles are level before dumping truck loads; do not use truck wheel or tire as a step; stay in the truck cab during truck loading; check overhead clearance when raising truck bed; set brakes and use chocks on an incline; comply with DOT requirements.	18A-B
		Material Handling: Wear work gloves when handling materials; watch for items that can cut, puncture, pinch, or crush; use proper technique	14A
		Noise Exposure: Wear earplugs when operating or working near heavy equipment.	5C
		Heat Stress: Adjust work-rest schedules; Work at a steady pace; Drink fluids; Take rest breaks and use shaded rest area; Know signs and symptoms of heat stress and treatment; Monitor for heat stress.	6J

ACTIVITY HAZARD ANALYSIS

Date Prepared: 12/30/03
Project: Former Griffiss AFB, Three Mile Creek Area of Concern, Rome, NY
Job: Contaminated Soil and Debris Excavation, Staging, and Onsite Disposal

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
		Cold Stress: Ambient temperatures below 45° may occur at times during site work (fall/winter/spring). Workers may be required to work outside in cold temperatures; Know signs and symptoms of cold stress and treatment; Monitor for cold stress.	6J
		Inclement Weather and Adverse Environmental Conditions: Suspend outdoor work if inclement weather or when other adverse environmental conditions exist.	6J
		Miscellaneous Physical Hazards: Use PPE for head, eye, hand, foot, and body protection; follow safe work practices; watch for slip, trip, and fall hazards from uneven, wet, slippery ground surfaces; keep ground areas clear of tripping hazards such as hoses, cords, boxes, and debris; maintain good housekeeping.	5 (All); 14C

ACTIVITY HAZARD ANALYSIS

Date Prepared: 12/30/03
Project: Former Griffiss AFB, Three Mile Creek Area of Concern, Rome, NY
Job: Contaminated Soil and Debris Excavation, Staging, and Onsite Disposal

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
Heavy Equipment; Dump Truck; Water Truck	Safety Inspection; Heavy Equipment Inspection	Site Orientation Briefing and SSHP Review; HazWOPER Training; First-aid/CPR Training

ACTIVITY HAZARD ANALYSIS

Date Prepared: 12/30/03
Project: Former Griffiss AFB, Three Mile Creek Area of Concern, Rome, NY
Job: Construction of Natural Earthwork Controls
Prepared By: Glen Mayekawa, CIH   Reviewed By: Steve Scavone, PG

Risk Assessment Code (RAC):

Recommended Protective Clothing & Equipment:

Construction of Natural Earthwork Controls: Use Level D protection for construction of natural earthwork controls.

Level D protection consists of: Hardhat, steel-toed boots, work gloves, safety glasses, high-visibility safety vest (if vehicle or equipment traffic), and earplugs (if noise present).

E = Extremely High Risk
H = High Risk
M = Moderate Risk

Severity	Probability: Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
Construction of Natural Earthwork Controls: -Construction of earthen/sediment dams -Installation of a drainage channel -Installation of storm drain.	**Construction of Natural Earthwork Controls**: Chemical Hazards: None expected	**Chemical Hazards**: Conduct exposure monitoring; use PPE; properly don/doff protective clothing; avoid contact with contaminated surfaces; use decontamination measures	6A-B; 28C, F
	Biological Hazards: Poisonous plants; Snakes; Spiders; Ants; Bees; Rodents; Ticks; Mosquitoes	**Biological Hazards**: Avoid contact with, poisonous plants, snakes, spiders, insects, rodents, ticks, and mosquitoes	6D
	Physical Hazards: Fire protection; Underground and overhead utilities; Heavy equipment operation; Excavation and trench safety; Vehicle and equipment traffic; Driver safety; Material handling; Tools, machinery and equipment use; Electrical equipment; Noise exposure; Heat stress; Cold stress; Inclement weather and adverse environmental conditions; Miscellaneous physical hazards	**Fire Protection:** Have fire extinguishers; Allow smoking only in designated areas; Use OSHA-approved metal dispenser cans for flammable liquids; Use bonding and grounding for combustible liquid transfer.	9A, B, E, H, I
		Underground and Overhead Utilities: Survey for underground and overhead utilities; Do not operate equipment within 10 feet of overhead lines.	11E
		Heavy Equipment Operation: Inspect heavy equipment; Check backup alarms; Survey for utilities; Have ground personnel wear high-visibility safety vests; Maintain positive contact between operator and ground personnel; Use hand signals; Do not cross path of moving equipment or walk behind equipment; Keep out of heavy equipment operating area when possible; Require operators to look before backing.	16A, B; 18A

ACTIVITY HAZARD ANALYSIS

Date Prepared: 12/30/03
Project: Former Griffiss AFB, Three Mile Creek Area of Concern, Rome, NY
Job: Construction of Natural Earthwork Controls

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
		Excavation and Trench Safety: Complete excavation entry according to OSHA requirements; Check for underground utilities before excavation; Survey for overhead utilities and do not operate equipment within 10 feet of overhead lines; Have a "Competent Person" supervise operations, conduct daily inspections, and use protective systems (sloping, benching, shielding, and/or shoring) for excavation operations.	25 (All)
		Vehicle and Equipment Traffic: Establish traffic control procedures; Have workers wear high-visibility safety vests in traffic areas; Have workers look where they walk to avoid moving vehicles and equipment; Maintain eye contact with equipment operators; Use traffic control devices; Use spotters for backing into tight work areas.	8A, B; 18A-C
		Driver Safety: Observe posted speeds and traffic signs; keep load secure; ensure axles are level before dumping truck loads; do not use truck wheel or tire as a step; stay in the truck cab during truck loading; check overhead clearance when raising truck bed; set brakes and use chocks on an incline; comply with DOT requirements.	18A-B
		Material Handling: Wear work gloves when handling materials; watch for items that can cut, puncture, pinch, or crush; use proper technique.	14A
		Tools, Machinery, and Equipment Use: Use proper tool for the job; use GFCIs; use safety glasses; do not use damaged tools; properly secure materials when working on them make sure area is clear when using equipment.	16A,B; 13A-D
		Electrical Equipment: Use GFCIs; inspect electrical cords for damage and ground plugs; keep away from water or fuel containers; use electrical equipment lockout/tagout.	5C
		Noise Exposure: Wear earplugs when operating or working near heavy equipment.	6J

ACTIVITY HAZARD ANALYSIS

Date Prepared: 12/30/03
Project: Former Griffiss AFB, Three Mile Creek Area of Concern, Rome, NY
Job: Construction of Natural Earthwork Controls

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
		Heat Stress: Adjust work-rest schedules; Work at a steady pace; Drink fluids; Take rest breaks and use shaded rest area; Know signs and symptoms of heat stress and treatment; Monitor for heat stress.	6J
		Cold Stress: Ambient temperatures below 45° may occur at times during site work (fall/winter/spring). Workers may be required to work outside in cold temperatures; Know signs and symptoms of cold stress and treatment; Monitor for cold stress.	6J
		Inclement Weather and Adverse Environmental Conditions: Suspend outdoor work if inclement weather or when other adverse environmental conditions exist.	5 (All); 14C
		Miscellaneous Physical Hazards: Use PPE for head, eye, hand, foot, and body protection; follow safe work practices; watch for slip, trip, and fall hazards from uneven, wet, slippery ground surfaces; keep ground areas clear of tripping hazards such as hoses, cords, boxes, and debris; maintain good housekeeping.	5 (All); 14C

ACTIVITY HAZARD ANALYSIS

Date Prepared: 12/30/03
Project: Former Griffiss AFB, Three Mile Creek Area of Concern, Rome, NY
Job: Construction of Natural Earthwork Controls

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
Heavy Equipment; Compactor; Water Truck	Safety Inspection; Heavy Equipment Inspection	Site Orientation Briefing and SSHP Review; HazWOPER Training; First-aid/CPR Training

ACTIVITY HAZARD ANALYSIS

Date Prepared: 12/30/03
Project: Former Griffiss AFB, Three Mile Creek Area of Concern, Rome, NY
Job: Mobilization and Site Preparation
Prepared By: Glen Mayekawa, CIH Reviewed By: Steve Scavone, PG

Risk Assessment Code (RAC):

Recommended Protective Clothing & Equipment:

Mobilization and Site Preparation: Use Level D protection for mobilization and site preparation activities.

Level D protection consists of: Hardhat, steel-toed boots, work gloves, safety glasses, high-visibility safety vest (if vehicle or equipment traffic), and earplugs (if noise present.)

E = Extremely High Risk
H = High Risk
M = Moderate Risk

Severity	Probability: Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
Mobilization and Site Preparation: -Mobilize personnel and equipment -Set-up field office and utilities -Inspect equipment -Delineate work zones -Construct temporary access routes (if needed) -Mark excavation areas -Install construction safety fence -Clear and grub -Place erosion controls (silt fence, straw bales) -Conduct utility clearance -Complete other site preparation tasks.	**Mobilization and Site Preparation**: Chemical Hazards: None identified Biological Hazards: Poisonous plants; Snakes; Spiders; Ants; Bees; Rodents; Ticks; Mosquitoes Physical Hazards: Fire protection; Underground and overhead utilities; Heavy equipment operation; Vehicle and equipment traffic; Material handling; Tools, machinery, and equipment use; Electrical equipment; Noise exposure; Heat stress; Cold stress; Chain saw operation; Wood chipper operation; Inclement weather and adverse environmental conditions; Miscellaneous physical hazards	**Biological Hazards**: Avoid contact with, poisonous plants, snakes, spiders, ants, bees, rodents, ticks, and mosquitoes **Fire Protection:** Have fire extinguishers; Allow smoking only in designated areas; Use OSHA-approved metal dispenser cans for flammable liquids; Use bonding and grounding for combustible liquid transfer. **Underground and Overhead Utilities:** Survey for underground and overhead utilities; Do not operate equipment within 10 feet of overhead lines. **Heavy Equipment Operation:** Inspect heavy equipment; Check backup alarms; Survey for utilities; Have ground personnel wear high-visibility safety vests; Maintain positive contact between operator and ground personnel; Use hand signals; Do not cross path of moving equipment or walk behind equipment; Keep out of heavy equipment operating area when possible; Require operators to look before backing.	6D 9A, B, E, H, I 11E, I 16A, B; 18A

ACTIVITY HAZARD ANALYSIS

Date Prepared: 12/30/03
Project: Former Griffiss AFB, Three Mile Creek Area of Concern, Rome, NY
Job: Mobilization and Site Preparation

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
		Vehicle and Equipment Traffic: Establish traffic control procedures; Have workers wear high-visibility safety vests in traffic areas; Have workers look where they walk to avoid moving vehicles and equipment; Maintain eye contact with equipment operators; Use traffic control devices; Use spotters for backing into tight work areas.	8A, B; 18A-C
		Material Handling: Wear work gloves when handling materials; watch for items that can cut, puncture, pinch, or crush; use proper technique	14A
		Tools, Machinery, and Equipment Use: Use proper tool for the job; use GFCIs; use safety glasses; do not use damaged tools; properly secure materials when working on them make sure area is clear when using equipment	16A, B; 13A-D
		Electrical Equipment: Use GFCIs; inspect electrical cords for damage and ground plugs; keep away from water or fuel containers; use electrical equipment lockout/tagout	11A-E; 12 (All)
		Noise Exposure: Wear earplugs when operating or working near heavy equipment.	5C
		Heat Stress: Adjust work-rest schedules; Work at a steady pace; Drink fluids; Take rest breaks and use shaded rest area; Know signs and symptoms of heat stress and treatment; Monitor for heat stress.	6J
		Cold Stress: Adjust Ambient temperatures below 45° may occur at times during site work (fall/spring/winter). Workers may be required to work outside in cold temperatures; Know signs and symptoms of cold stress and treatment; Monitor for cold stress.	6J

ACTIVITY HAZARD ANALYSIS

Date Prepared: 12/30/03
Project: Former Griffiss AFB, Three Mile Creek Area of Concern, Rome, NY
Job: Mobilization and Site Preparation

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
		Chain Saw Operation: Chain saws may be used during site work. Safety procedures for proper use of this equipment will be required.	13F
		Wood Chipper Operation: Wood chipper equipment may be used during site work. Wood chipper equipment safety procedures include use of eye and hearing protection. Do not place any part of your body into the feed table when the chipper is in operation. Do not wear loose clothing that could get caught in equipment	31C
		Inclement Weather and Adverse Environmental Conditions: Suspend outdoor operations during inclement weather or if other adverse environmental conditions exist.	6J
		Miscellaneous Physical Hazards: Use PPE for head, eye, hand, foot, and body protection; follow safe work practices; watch for slip, trip, and fall hazards from uneven, wet, slippery ground surfaces; keep ground areas clear of tripping hazards such as hoses, cords, boxes, and debris; maintain good housekeeping.	5(All); 14C

ACTIVITY HAZARD ANALYSIS

Date Prepared: 12/30/03
Project: Former Griffiss AFB, Three Mile Creek Area of Concern, Rome, NY
Job: Mobilization and Site Preparation

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
Hand tools and power tools; Generator; Heavy equipment; Chain saw; Wood chipper	Safety Inspection; Heavy Equipment Inspection	Site Orientation Briefing and SSHP Review; HazWOPER Training; First-aid/CPR Training

ACTIVITY HAZARD ANALYSIS

Date Prepared: 12/30/03
Project: Former Griffiss AFB, Three Mile Creek Area of Concern, Rome, NY
Job: Waste Characterization and Confirmation Sampling
Prepared By: Glen Mayekawa, CIH   Reviewed By: Steve Scavone, PG

Risk Assessment Code (RAC):

Recommended Protective Clothing & Equipment:

Waste Characterization and Confirmation Sampling: Use Level D and Modified Level D protection for waste characterization and confirmation sampling.

Level D protection consists of: Hardhat, steel-toed boots, work gloves, safety glasses, high-visibility safety vest (if vehicle or equipment traffic), and earplugs (if noise present.)

Modified Level D protection consists of: Level D protection equipment plus chemical protective clothing (protective suit, gloves, and boots or boot covers.)

E = Extremely High Risk
H = High Risk
M = Moderate Risk

Severity	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
Waste Characterization and Confirmation Sampling: -Collect waste characterization samples. -Collect confirmation samples.	**Waste Characterization and Confirmation Sampling**: Chemical Hazards: Potential contact with contaminants during soil sampling Biological Hazards: Poisonous plants; Snakes; Spiders; Ants; Bees; Rodents; Ticks; Mosquitoes Physical Hazards: Heavy equipment; Material handling; Noise exposure; Heat stress; Cold stress; Inclement weather and adverse environmental conditions; Miscellaneous physical hazards	**Chemical Hazards**: Conduct exposure monitoring; use PPE; properly don/doff protective clothing; avoid contact with contaminated surfaces; use decontamination measures.	6A-B; 28C, F
		Biological Hazards: Avoid contact with, poisonous plants, snakes, spiders, ants, bees, rodents, ticks, and mosquitoes	6D
		Heavy Equipment: Have ground personnel wear high-visibility safety vests; Maintain positive contact between operator and ground personnel; Use hand signals; Do not cross path of moving equipment or walk behind equipment; Keep out of heavy equipment operating area when possible.	16A, B; 18A
		Material Handling: Wear work gloves when handling materials; watch for items that can cut, puncture, pinch, or crush; use proper technique	14A
		Noise Exposure: Wear earplugs when operating or working near heavy equipment.	5C
		Heat Stress: Adjust work-rest schedules; Work at a steady pace; Drink fluids; Take rest breaks and use shaded rest area; Know signs and symptoms of heat stress and treatment; Monitor for heat stress.	6J

ACTIVITY HAZARD ANALYSIS

Date Prepared: 12/30/03
Project: Former Griffiss AFB, Three Mile Creek Area of Concern, Rome, NY
Job: Waste Characterization and Confirmation Sampling

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
		Cold Stress: Ambient temperatures below 45° may occur at times during site work (fall/winter/spring). Workers may be required to work outside in cold temperatures; Know signs and symptoms of cold stress and treatment; Monitor for cold stress.	6J
		Inclement Weather and Adverse Environmental Conditions: Suspend outdoor operations during inclement weather or when other adverse environmental conditions exist.	6J
		Miscellaneous Physical Hazards: Use PPE for head, eye, hand, foot, and body protection; follow safe work practices; watch for slip, trip, and fall hazards from uneven, wet, slippery ground surfaces; keep ground areas clear of tripping hazards such as hoses, cords, boxes, and debris; maintain good housekeeping.	5 (All); 14C

ACTIVITY HAZARD ANALYSIS

Date Prepared: 12/30/03
Project: Former Griffiss AFB, Three Mile Creek Area of Concern, Rome, NY
Job: Waste Characterization and Confirmation Sampling

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
Sampling tools; Heavy equipment	Safety Inspection; Heavy Equipment Inspection	Site Orientation Briefing and SSHP Review; HazWOPER Training; First-aid/CPR Training

CQC TEST REPORT LIST

CQC REPORT # ______________________ SH _____ OF _____ DATE: _______________

CONTRACTOR: ____ CONTRACT #: ________________________________

PROJECT TITLE: ____ LOCATION: __________________________________

SPEC REF OR DWG#	TYPE OF TEST	DATE PERFORMED	RESULTS	REMARKS

Note: This form shall be used by the Contractor to track CQC Testing. Provide attachments as required.

CAPE
ENVIRONMENTAL MANAGEMENT
I N C

DAILY QUALITY CONTROL REPORT

Daily Report No.: Date:

Contract Title: Contract No.:

Weather: Clear ☐ Partly Cloudy ☐ Cloudy ☐ Temperature(F°) ☐ Min. ☐ Max.

Wind ☐ Precipitation: Rain ☐ Snow ☐

1. Contractor / Subcontractor and Area of Responsibility:

Number	Trade	Hours	Employer	Location / Description Of Work
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

2. Equipment (Not Hand Tools):

Plant / Equipment	Arrival Date	Departure Date	Date Of Safety Check	Hours Used	Hours Idle	Hours Repair
Field Office or Trailer						
CAPE Truck						
CAPE Truck						
25 Ton Dump Truck						
25 Ton Dump Truck						
Excavator						
Excavator						
LGP Dozer						
5 CY FEL						

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

Description:

Sketch Area:

4. Control Activities Performed:

- **Preparatory Inspections:** (Identify features of work and attach minutes).
  - None
  -
- **Initial Inspections:** (Identify features of work and attach minutes).
  - None
  -

- **Follow-up Inspections:** (List inspections performed, results of inspection compared to the specification requirements, and corrective actions taken when deficiencies are noted).
  -
  -

5. Tests Performed and Test Results:

-
-
-

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

Item	Quantity	Description	Storage Provided	Inspection Results		
				Accept	**Reject**	**Comments**

7. Submittals Reviewed:

Submittal No.	Spec/Plan Reference	By Whom	Action

8. Offsite Surveillance Activities: (Include actions taken).

- None

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

- All activities performed in accordance with EM385-1-1
-

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

- None

Contractor's Verification: On behalf of the Contractor, I certify this report is complete and correct, and all materials ands 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 ***Printed or Typed Name***	**CQC Systems Manager** ***Signature***	**Date**

FIELD INSPECTION REPORT

Contract No.:	Client:	Report No.:
Prepared By:	**Location:**	**Date:**

Description

Visual ☐ NDE ☐ In Progress ☐

Dimensional ☐ Other ☐ Final ☐

Reference Drawing/Standard

Findings

Sketch

Inspector **Date**

FCR # ____________

Date: _____________

FIELD VARIANCE REPORT

1. What is needed?

2. Why is it required? What impact if not done?

3. How much does it cost (unit, material, time, etc.)?

4. What is the bottom-line cost (overhead, indirect, fee, etc.)?

5. Where do we stand in relation to original proposal (which WADS will be effected and by how much)?

______________________________	______________________________
Contractor Quality Control System Manager	Engineering
______________________________	______________________________
Site Superintendent	Activity/USACE Representative
______________________________	
Project Manager	

INITIAL AND FOLLOW-UP PHASE CHECKLIST

☐ INITIAL
☐ FOLLOW-UP

Contract No.: ____ Date: ______________________________

Specification Paragraph or Section: ____

Description and Location of Work Inspected: ____

REFERENCE CONTRACT DRAWINGS: ____

A. PERSONNEL PRESENT:

NAME	POSITION	COMPANY
1.________________	________________	________________
2.________________	________________	________________
3.________________	________________	________________
4.________________	________________	________________

B. MATERIALS AND EQUIPMENT BEING USED ARE IN STRICT COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS: YES _______ NO_______
IF NOT, EXPLAIN:

____
____
____

PROCEDURES AND/OR WORK METHODS WITNESSED ARE IN STRICT COMPLIANCE WITH THE CONTRACT SPECIFICATIONS: YES _______ NO_______
IF NOT, EXPLAIN:

____
____
____

D. WORKMANSHIP IS ACCEPTABLE: YES _______ NO_______
STATE AREAS WHERE IMPROVEMENT IS NEEDED:

____
____

E. TESTS PERFORMED: ____

F. SAFETY VIOLATIONS NOTED: YES _______ NO_______
IF YES, CORRECTIVE ACTION TAKEN:

____
____

G. IS REINSPECTION REQUIRES: YES _______ NO_______
IF SO, LIST ITEMS OR AREAS REQUIRING REINSPECTION:

____
____

____
Quality Control Representative

LIST OF OUTSTANDING DEFICIENCIES

SH _____ OF _____ DATE: ___________

PROJECT TITLE: ____________________________________ CONTRACTOR: ______________________________________

LOCATION: ___________________________ CQC REPORT #: ____________________ CONTRACT #:_________________

SPEC REF OR DWK#	LOCATION ON PROJECT	DESCRIPTION OF DEFICIENCY	DATE FOUND	DATE TO BE CORRECTED	DATE CORRECTED	REMARKS

Note: This form shall be used by the Contractor to track outstanding construction deficiencies

Page _____ of _____

Date: ______________

NONCONFORMANCE REPORT

Project Name: ________________________________ Project Number: _______________________

Nonconformance:

Identified by: _________________________________ Date: ______________

Corrective Action Required to Rectify and to Prevent Recurrence:

Prepared By: _________________________

Date: _________________________

To Be Performed By: _________________________________ Date: _________________________

Must Correction be Verified? Yes _____ No ______

To Be Verified By: _________________________________

Corrective Action Taken:

Performed By: ____ Date: _________________________

Verified By: ____ Date: _________________________

PREPARATORY INSPECTION OUTLINE

Contract No.: ______________________________ **Date:** ______________________

Title and No. of Technical Section: ____

____

Reference Contract Drawings: ____

A. PLANNED ATTENDANTS:

NAME	POSITION	COMPANY
1.		
2.		
3.		
4.		

B. SUBMITTALS REQUIRED TO BEGIN WORK:

ITEM	SUBMITTAL NO.	ACTION CODE
a.		
b.		
c.		
d.		

I HEREBY DECLARE THAT THE ABOVE-REQUIRED MATERIALS DELIVERED TO THE JOBSITE ARE CERTIFIED TO BE THE SAME AS THOSE SUBMITTED AND APPROVED.

____

Quality Control Representative

C. EQUIPMENT TO BE USED IN EXECUTING WORK:

a. ____

b. ____

c. ____

D. WORK AREAS EXAMINED TO ASCERTAIN THAT ALL PRELIMINARY WORK HAS BEEN COMPLETED:

____

____

E. METHODS AND PROCEDURES FOR PERFORMING QUALITY CONTROL - INCLUDING SPECIFIC TESTING REQUIREMENTS:

____

____

THE ABOVE METHODS AND PROCEDURES OUTLINED ARE CERTIFIED TO COMPLY WITH THE CONTRACT REQUIREMENTS AND WILL BE PERFORMED AS PLANNED AND SPECIFIED.

____

Quality Control Representative

RECORD OF PREPARATORY AND INITIAL INSPECTIONS

DATE OF INSP	TYPE OF INSPECTION	DEFINABLE FEATURE OF WORK (DESCRIBE)	REPORT NOS QA	QA	PERSONS ATTENDING INSP	WAS MAT'L AND/OR EQUIPMENT PHYSICALLY INSPECTED?

Note: This form shall be used by the Contractor to track prep/init inspections. Attach additional results or comments as required

SUBMITTAL REGISTER

(ER 415-10)

CONTRACT NUMBER

TITLE AND LOCATION	CONTRACTOR Cape Environmental Management Inc	SPECIFICATION SECTION

					TYPE OF SUBMITTAL										CLASSIFICATION			CONTRACTOR SCHEDULE DATE			CONTRACTOR ACTION			GOVERNMENT ACTION		
ACTIVITY NO	TRANSMITTAL NO	ITEM NO	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEMS SUBMITTED	DATA	DRAWINGS	INSTRUCTIONS	SCHEDULES	STATEMENTS	REPORTS	CERTIFICATIONS	SAMPLES	RECORDS	O & M MANUAL	INFORMATION ONLY		REVIEWER	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE	DATE	REMARKS

TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE

(Read instructions on the reverse side prior to initiating this form)

DATE

TRANSMITTAL NO

SECTION I - REQUEST FOR APPROVAL OF THE FOLLOWING ITEMS *(This section will be initiated by the Contractor)*

TO:	FROM:	CONTRACT NO.	CHECK ONE: ☐THIS IS A NEW TRANSMITTAL ☐THIS IS A RESUBMITTAL OF TRANSMITTAL No.
SPECIFICATION SEC. NO. (Cover only one section with each transmittal)	PROJECT TITLE AND LOCATION		CHECK ONE: THIS TRANSMITTAL IS FOR ☐ FIO ☐ GOV'T APPROVAL

ITEM NO.	DESCRIPTION OF ITEM SUBMITTED *(Type size, model number, etc.)*	MFG OR CONTR. CAT., CURVE DRAWING OR BROCHURE NO. *(See instruction no. 8)*	NO. OF COPIES	CONTRACT REFERENCE DOCUMENT		FOR CONTRACTOR USE CODE	VARIATION *(See instruction No. 6)*	FOR CE USE CODE
				SPEC. PARA. NO.	DRAWING SHEET NO.			
a.	b.	*c.*	*d.*	*e.*	*f.*	*g.*	*h.*	*I.*

REMARKS:

I certify that the above submitted items have been reviewed and are correct and in strict conformance with the contract drawings and specifications except as otherwise attached.

NAME AND SIGNATURE OF CONTRACTOR

SECTION II - APPROVAL AND ACTION

ENCLOSURES RETURNED (List by Item No.)	**NAME, TITLE AND SIGNATURE OF APPROVING AUTHORITY**	**DATE**

INSTRUCTIONS

1. Section I will be initiated by the Contractor in the required number of copies.

2. Each transmittal shall be numbered consecutively in the space provided for “Transmittal No.” This number, in addition to the contract number, will form a serial number for identifying each submittal. For new submittals or resubmittals mark the appropriate box; on resubmittals, insert transmittal number of last submission as well as the new submittal number.

3. The “Item No.” will be the same “Item No.” as indicated on ENG FORM 4288 for each entry on this form.

4. Submittals requiring expeditious handling will be submitted on a separate form.

5. Separate transmittal form will be used for submittals under separate sections of the specifications.

6. A check shall be placed in the “Variation” column when a submittal is not in accordance with the plans and specifications -- also, a written statement to that effect shall be included in the space provided for “Remarks.”

7. Form is self-transmittal, letter of transmittal is not required.

8. When a sample of material or Manufacturer’s Certificate of Compliance is transmitted, indicate “Sample” or “Certificate” in column c, Section I.

9. Army Corps of Engineers approving authority will assign action codes as indicated below in space provided Section I, column I to each item submitted. In addition, they will ensure enclosures are indicated and attached to the form prior to return to the contractor. The Contractor will assign action codes as indicated below in Section I, column g, to each item submitted.

THE FOLLOWING ACTION CODES ARE GIVEN TO ITEMS SUBMITTED

A -- Approved as submitted.

B -- Approved, except as noted on drawings.

C - - Approved, except as noted on drawings. Refer to attached sheet resubmission required.

D -- Will be returned by separate correspondence.

E -- Disapproved (See attached)

F -- Receipt acknowledged

FX -- Receipt acknowledged, does not comply as noted with contract requirements.

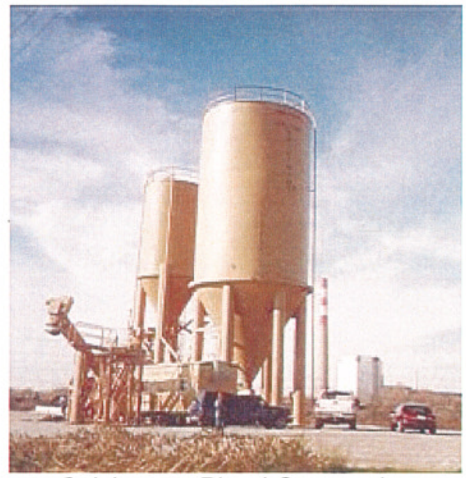
G -- Other *(Specify)*

10: Approval of items does not relieve the contractor from complying with all the requirements of the contract plans and specifications.

Reverse of ENG Form 4025

Calciment®

Mintek Resources, Inc., supplies Calciment and other lime and mineral by-products produced during the calcination of limestone from coal fired kilns and boilers. Calciment is a dry bulk powder containing calcium oxide and fly ash which reacts with water to hydrate and cement.



Calciment® Blend Corporation
Indianapolis, Indiana

Applications

Applications for Calciment include:

- Waste Solidification
- Waste Fixation
- Waste Neutralization
- Soil Stabilization
- Asphalt Reclamation

Sources of Calciment are located throughout the U.S. and are carefully evaluated for their quality and suitability for each application. Mintek provides technical assistance with mix designs and guidance to field personnel related to proper handling and mixing techniques.

Mintek evaluates project logistics to provide for the most economical form of transportation. Our large transportation network allows for back haul savings to be passed along to customers. A toll free dispatch number is provided to our customers for ease of ordering and scheduling on time deliveries.

Detroit lime facility

Custom Blending

Mintek can custom blend quicklime, fly ash, fluidized bed ash, cement, kiln dust, and other flowable powders to customer specifications.

Waste Solidification

Calciment is an economical solidfication agent used to remove free liquids from waste prior to disposal in accordance with EPA regulations. Calciment hydrates free liquid and cements to a soil or rock-like solid determined by application rate. Large volume increases typically associated with absorbents (ie. saw dust) is reduced saving disposal costs. Liquid release during transportation or compaction is eliminated.

Calciment is commonly used to solidify waste contained in surface impoundments for closure. These wastes may be solidified and removed or left in place and capped. The solidified waste will gain strength with time supporting a cap while limiting the mobility of waste constituents.

High volume wastes such as flue gas desulfurization (FGD) sludge, sewage sludge, and coal refuse waste can be solidified with Calciment to improve their handling characteristics and stability. Certain wastes when solidified are beneficially reused in construction or agricultural applications.

About Mintek Resources
Calciment Applications
Other Products
Contact Us
Home

Waste Solidification
Waste Fixation
Waste Neutralization
Soil Stabilization
Asphalt Reclamation

Soil Stabilization

Soil Properties

Soil encountered at construction sites is commonly too wet, expansive, or weak to meet structural requirements needed to support roads, buildings, parking lots, airport runways, and other load bearing structures. Soil varies in its moisture content and composition and may contain combinations of clay, silt, sand, gravel, and other inorganic and organic compounds. These properties determine how a soil compacts and absorbs and releases moisture which determines its suitability for construction applications. Calciment stabilizes soil by improving mechanical stability, durability, and volume change characteristics of soil.

Calciment Stabilization Chemistry

When Calciment is mixed into wet soil there is an immediate drying reaction as the calcium oxide hydrates and eliminates water. In fine grained soil such as clay and silt, cation exchange and flocculation reactions occur which improves soil plasticity, workability, compaction, and uncured strength. These immediate effects expedite construction operations when soft, plastic, cohesive soil won't support vehicles or provide subgrade support for paving operations. Following the drying reaction, Calciment begins to cement with the soil. These pozzolanic cementing reactions produce increased unconfined compressive strength, shear strength, tensile strength, reduced permeability and swell potential. Since Calciment is cementitious, coarse grained soil containing sand and gravel can be stabilized where lime alone would fail. Also, the more gradual pozzolanic cementing reactions of Calciment can be beneficial compared to the quick setting rigid nature of Portland cement. Calciment provides greater field working time, typically less cracking and shrinking, and exhibits autogenous healing.

Application Rate, Spreading, Mixing, Watering, Compacting, Curing

Calciment application rates are determined in the geotechnical laboratory where the properties of moisture reduction, compaction, and strength development are optimized. Typical application rates by weight of the soil range from 4 to 10 percent depending on the moisture content and soil type. Calciment is spread as a dry powder by a variety of methods. The newer spreader designs can accurately place Calciment at any application rate while minimizing dusting. Mixing is accomplished with a pulvamixer or rotary stabilizer to a depth of 12 to 18 inches. A disc harrow can be utilized provided several passes are made to assure thorough mixing. When required, water is added during or immediately after mixing with a water truck. The proper water content would allow soil to be molded in your hand without crumbling or be visibly wet. Compaction is accomplished with a sheepsfoot, smooth drum, or rubber tired roller. When bridging poor soil it is important not to make numerous unnecessary passes with the compactor which will push the stabilized soil layer into the unstable soil beneath and cause pumping. Curing or hardening is a gradual process that continues over many days. Geotechnical evaluations are commonly performed at 3, 7, and 28 days to confirm unconfined compressive strength gains. From a practical perspective the construction contractor wants to proceed as quickly as possible and it is not uncommon to support heavy equipment the same day.

Advantages of Calciment Stabilization

- Projects are not delayed by wet weather - Stabilized soil will shed additional rainfall
- Increased unconfined compressive strength of subgrade can allow for reduced pavement thickness in structural designs
- Parking lots and roads will not deteriorate prematurely due to subgrade failure
- Replace expensive cut and fill operations for marginal soils - Pumping soils can be bridged.

Appendix E

EMERGENCY CONTACT LIST

Contact	Telephone Number
Base Ambulance/Paramedics – Emergency	9-1-1
Fire/Police Department – Emergency	9-1-1
Emergency Hospital: Rome Memorial Hospital (1500 N. James Street, Rome, New York)	315-338-7000
City of Rome Fire Department (Non-Emergency)	315-339-7784
Emergency Spill Response (State of New York)	1-800-457-7362
National Response Center	800-424-8802
Chemtrec (Chemical Transportation Emergency Center)	800-424-9300
USACE Contract Specialist (Ralph Nunn)	Office: 816-983-3837
USACE Project Manager (Jean Schumacher)	Office: 816-983-3885
USACE Contracting Officer's Representative (Brett Gorham)	Office: 315-772-4098
USACE Project Engineer (Joe Wojnas)	Office: 315-330-7368
USACE Construction Representative Don Hale	Office: 315-330-1509
CAPE – Chicago, IL 91 Noll Street, Waukegan, IL 60085	Office: 847-336-4341 FAX: 847-594-4971
CAPE - Corporate Office, Atlanta, GA 2302 Parklake Drive, Suite 200, Atlanta, GA 30345	Office: 770-908-7200 FAX: 770-908-7219
CAPE - Project Field Office, Former Griffiss AFB	Office: TBD FAX: TBD
CAPE Project Manager (Charlie Williams)	Office: 865-671-0056 Cell: 865-548-6059
CAPE Site Superintendent	Office: TBD Cell: TBD
CAPE Site Safety and Health Officer (Jim Caird)	Office: 518-272-4910 Cell: 518-365-4933
CAPE Safety and Health Manager and CHSM (Glen Mayekawa, CIH)	Office: 949-474-3090 Cell: 714-920-7817
CAPE Corporate Risk Control Manager (Chris Caviness, PE, JD)	Office: 770-908-7200 FAX: 770-908-7219
CAPE Corporate Human Resources Director (John Heppner, PE, CIH)	Office: 770-908-7200 FAX: 770-908-7219

EVACUATION ASSEMBLY INFORMATION

Evacuation Alarm	CAPE Vehicle Horn (single long sound)
Onsite Assembly Area	Beside CAPE Vehicle.
Off Site Assembly Area	TBD

EMERGENCY HOSPITAL AND ROUTE

Emergency Hospital

Rome Memorial Hospital
1500 N. James Street, Rome, New York

Emergency Hospital Route

Exit site and head north to Ellsworth Road (Patrick Square, Perimeter Rd. and Wright Drive/Hill Rd. intersect Ellsworth Rd.)

Bear left onto Ellsworth Rd. to Hill Road

Turn right onto Hill Road to Mohawk Drive (0.5 mi)

Bear left onto Mohawk Drive to Black River Blvd. (1.1 mi)

Turn left onto Black River Blvd. to E. Oak Street (0.2 mi)

Turn right onto E. Oak Street and follow signs for **Emergency Entrance**

SAMPLING AND ANALYSIS PLAN

PART I – FIELD SAMPLING PLAN
AND
PART II - QUALITY ASSURANCE PROJECT PLAN

FOR
REMEDIAL ACTION AT THREE MILE CREEK
FORMER GRIFFISS AIR FORCE BASE
ROME, NEW YORK

Preplaced Remedial Action Contract Number DACA41-01-D-0003
Task Order 0004

Prepared for:

DEPARTMENT OF THE ARMY
KANSAS CITY DISTRICT
CORPS OF ENGINEERS
700 Federal Building
601 East 12th Street
Kansas City, Missouri 64106-2896

Prepared by:

CAPE ENVIRONMENTAL
91 Noll Street
Waukegan, Illinois 60085

CAPE Project Number: 10303.004
June 2004

SAMPLING AND ANALYSIS PLAN

PART I - FIELD SAMPLING PLAN
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3 Cooler Receipt Form
4 Daily Quality Control Report Form
5 Corrective Action Report

LIST OF ABBREVIATIONS AND ACRONYMS

AFB	Air Force Base
AFRPA	Air Force Real Property Agency
AOC	area of concern
ASTM	American Society for Testing and Materials
bgs	below ground surface
BRAC	Base Closure and Realignment Act
CAPE	Cape Environmental Management Inc
COC	chain of custody
CQC	Contractor Quality Control
CQCSM	Contractor Quality Control System Manager
CY	cubic yard
DFW	definable feature of work
DOT	U.S. Department of Transportation
DQCR	Daily Quality Control Report
E&E	Ecology and Environmental Engineering, Inc.
EPA	U.S. Environmental Protection Agency
FFA	Federal Facilities Agreement
FSP	Field Sampling Plan
HTRW-CX	Hazardous, Toxic and Radioactive Waste Center of Expertise
IRP	Installation Restoration Program
Lab QAM	Laboratory Quality Assurance Manual
LEL	lower explosive limit
MS/MSD	matrix spike/matrix spike duplicate
NELAP	National Environmental Laboratory Accreditation Program
NPL	National Priorities List
NYSDEC	New York State Department of Environmental Conservation
OBG	O'Brien & Gere Laboratories, Inc.
PCB	polychlorinated biphenyl
PID	photoionization detector
PM	Project Manager

POC	point of contact
POTW	publicly owned treatment works
PPE	personal protective equipment
PRAC	Preplaced Remedial Action Contract
QA	Quality Assurance
QAPP	Quality Assurance Program Plan
QC	Quality Control
RAC	Remedial Action Contract
SAP	Sampling and Analysis Plan
SOW	scope of work
SSHP	Site Safety and Health Plan
SVOC	semivolatile organic compounds
TAGM	NYSDEC Technical and Administrative Guidance Memorandum
TCLP	Toxicity Characteristic Leaching Procedure
TGSCS	NYSDEC Technical Guidance for Screening Contaminated Sediments
TMC	Three Mile Creek
TSDF	treatment, storage, and disposal facility
USACE	U.S. Army Corps of Engineers
VOC	volatile organic compound

1.0 INTRODUCTION

This Sampling and Analysis Plan (SAP) has been prepared to guide the field sampling and data collection effort associated with remediation of sediments located within the Three Mile Creek (TMC) by means of excavation at the former Griffiss Air Force Base (AFB) in Rome, New York. The work is being performed by the U.S. Army Corps of Engineers, Kansas City District (USACE) in association with the New York District, for the Air Force Real Property Agency (AFRPA). Cape Environmental (CAPE) has prepared this SAP under the Preplaced Remedial Action Contract (PRAC), Contract No. DACA41-01-D-0003, Task Order 0004. The SAP consists of the Field Sampling Plan (FSP) and the Quality Assurance Project Plan (QAPP).

Griffiss AFB is a former U.S. Air Force installation covering approximately 3,552 acres in the lowlands of the Mohawk River Valley in Rome, Oneida County, New York. In 1987, the U.S. Environmental Protection Agency (EPA) added Griffiss AFB to the National Priorities List (NPL), and in 1990, the U.S. Air Force, the New York State Department of Environmental Conservation (NYSDEC), and the EPA entered into a Federal Facilities Agreement (FFA). In 1993, Griffiss AFB was designated for realignment under the federal Base Closure and Realignment Act (BRAC) and subsequently deactivated. This project is part of the Griffiss AFB BRAC environmental restoration program that must be completed before transferring this property to private entities.

This FSP provides the overall technical approach, sampling and data collection procedures, and quality assurance (QA) requirements for the various phases of work anticipated under this soil remediation project. The QAPP provides the overall technical approach, analytical and data reporting procedures, and chemical data acquisition QA requirements for the various phases of work anticipated under this soil remediation project. The SAP was prepared in conformance with EM-200-1-3 "Requirements for the Preparation of Sampling and Analysis Plans," USACE, 1 February 2001. This SAP should be used in conjunction with the project Work Plan, the Contractor Quality Control (CQC) Plan, and the project Site Safety and Health Plan (SSHP).

Remediation of the TMC area is anticipated to include the following activities:

- Mobilization/Demobilization and general site work (e.g., installation of fences and temporary facilities, equipment decontamination, etc.)
- Excavation and disposal
- Site restoration.

1.1 Site History and Contaminants

The site geology is characterized by dense soils composed of fine- to medium-grained sand with silt and occasional clay lenses. The water table elevation ranges from 16 feet to 20 feet below ground surface (bgs). Shallow groundwater flow across the base generally moves from the northeast toward the Mohawk River and New York State Barge Canal in the south.

1.2 Summary of Existing Data

Past waste disposal and storage practices at the base have resulted in environmental contamination at multiple sites. In 1981, the Air Force initiated its Installation Restoration Program (IRP) to identify, investigate, and clean up hazardous waste contamination from past operations and activities at federal facilities.

Through the IRP, 62 potentially contaminated sites on Griffiss AFB have been identified. Of the 62 sites, 31 are designated as Areas of Concern (AOCs) and are being investigated and remediated under the FFA among the Air Force, the U.S. EPA, and the NYSDEC. The other sites are either being investigated (e.g., confirmatory sampling), have had or will have a removal action, or have been determined to require no further action.

1.3 Site-Specific Sampling and Analysis Problems

No site-specific sampling and analysis problems have been identified at this time.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

This section identifies key project personnel and their specific roles and responsibilities for each activity. This information may be found in Section 4 of the Work Plan, and will not be repeated here.

2.1 Subcontractors

CAPE will direct and control all subcontracts for this project. A list of points of contacts is provided in the Work Plan. Contractual agreements between CAPE and its subcontractors contain flow-down clauses that require subcontractors to meet all appropriate USACE, federal, and state requirements. Onsite subcontractors will coordinate their activities through the Site Superintendent and will be required to submit daily logs documenting their activities. Subcontractors may include:

- Waste haulers
- Analytical laboratories
- Other subcontractors, as required

2.1.1 Laboratory Work Group

O'Brien & Gere Laboratories, Inc. (OBG) has been tentatively selected (pending USACE's final approval after award of the Remedial Action Contract [RAC]) to provide analytical services for the project. The chosen laboratory has been validated by the USACE Hazardous, Toxic and Radioactive Waste Center of Expertise (HTRW-CX) and holds a current letter of validation from HTRW-CX to perform sample analyses in support of the USACE HTRW Program (Attachment 1 of the QAPP). The laboratory will be required to maintain this validation for all applicable methods throughout the project life. This validation confirms their ability to produce reliable and defensible data.

Additionally, the laboratory holds current New York National Environmental Laboratory Accreditation Program (NELAP) certifications.

The address and contact at the laboratory is as follows:

O'Brien & Gere Laboratories, Inc.
5000 Brittonfield Parkway
East Syracuse, NY 13057
(315) 437-0200 / FAX (315) 463-7554
Points of Contact: Tom Alexander

2.1.2 Laboratory Organization and Responsibilities

OBG has an organization with well-defined responsibilities for each individual in the management system to ensure that sufficient resources are available to maintain a successful operation. An organizational chart showing the laboratory's organization and lines of authority is included in the Laboratory Quality Assurance Manual (Lab QAM, Attachment 2 of the QAPP).

The Laboratory Project Supervisor serves as a liaison between field and laboratory operations, and is responsible for the following:

- Receipt of sample custody from the field team members, verification of sample integrity, and transfer of sample fractions to the appropriate analytical departments
- Coordination of sample analyses to meet project objectives
- Preparation of analytical reports
- Review of laboratory data for compliance with method requirements
- Review of quality control (QC) deficiencies reported by the analytical department manager
- Coordination of any data changes resulting from review by the project QA supervisor or the Project Manager (PM)
- Response to questions from the project team during the data quality evaluation process.

2.1.3 Laboratory Key Personnel and Points of Contact

- Laboratory Project Supervisor: Tom Alexander
- Laboratory QA Supervisor: Joseph Houser.

2.2 Quality Assurance Laboratory

The QA Laboratory for this project will be the USACE Environmental Chemistry Branch Laboratory in Omaha, Nebraska. The QA laboratory will analyze samples for QA purposes for the government. If directed, QA samples will be collected at a rate of 10 percent. The point of contact (POC) and address for the laboratory are as follows:

USACE Environmental Chemistry Branch
ATTN: Sample Custodian
420 South 18th Street
Omaha, NE 68102

POC: Laura Percifield, 402-444-4314

3.0 SCOPE AND OBJECTIVES

The scope of work (SOW) for this task order includes activities to accomplish remediation of the TMC at the former Griffiss AFB, Rome, New York.

CAPE will provide all services, materials, and labor to accomplish this remediation at the former Griffiss AFB, Rome, New York. Sampling activities may include: soil characterization sampling for disposal requirements; borrow source sampling; confirmatory sampling after removal of berms; wastewater sampling; and PCB wipe tests. Analytical results for the borrow source material and berm confirmatory samples will be compared to both NYSDEC Technical Guidance for Screening Contaminated Sediments (TGSCS) and NYSDEC Technical Administrative Guidance Memorandum (TAGM) #4046. An AFRPA representative will compare the results to the screening criteria and make a recommendation to the regulators, who will ultimately make a decision regarding acceptability of the borrow material and the soil below the berm.

4.0 FIELD ACTIVITIES

Table 3 in the QAPP provides a summary of the planned sampling and analysis activities.

4.1 Soil Samples

The following sections describe the sampling rationale, sample locations, and procedures associated with the soil samples for the remediation. Soil characterization samples will be collected from stockpiles for disposal purposes. Soil confirmation samples will not be collected during or after excavation with the exception of the berm excavation areas. Borrow source samples will be collected from on site sources such as vernal pool excavations and/or from offsite sources.

4.1.1 Rationale

Soil characterization samples will be collected to ensure the stockpiles meet the chemical and geotechnical disposal requirements for Landfill 6 or another appropriate treatment, storage, and disposal facility (TSDF). Landfill 6 is located at Griffiss AFB and will be used if disposal requirements are met. Confirmatory soil samples will be collected following removal of the berms to determine whether the ground surface under the berms is contaminated and to determine whether additional excavation is needed. Borrow source samples will be collected to ensure that materials used for backfill are clean and suitable to be placed back into the ground or creek bed. Landfill 6 disposal requirements are presented in Tables 2a and 2b of the QAPP, and borrow source requirements are presented in Table 1 of the QAPP.

4.1.2 Soil Sample Locations

Characterization sampling consists of sampling excavation stockpiles for disposal requirements to determine the extent of contamination, as well as to determine geotechnical characteristics of the soil. Samples will be collected for chemical analysis every 500 cubic yards (CY) (refer to Table 3). Wet stockpiled soils may be amended with Calciment, which is a lime-type product, to speed the drying process. If Calciment is mixed into the soils, the volume of the stockpiles will increase; however, the sampling frequency will be based on the pre-amended volumes. Sampling will occur after the soils have been amended.

Analysis will include Toxicity Characteristic Leaching Procedure (TCLP) hazardous metals, TCLP hazardous characteristics, TCLP volatile organic compounds (VOCs), TCLP semivolatile organic compounds (SVOCs), TCLP pesticides, TCLP herbicides, and total polychlorinated biphenyls (PCBs). Samples will be analyzed using EPA SW-846 1311 Methods 6010B/7000, 9045, 8620B, 8270C, 8081A, and 8151A, respectively. Samples for total PCBs will be analyzed using EPA SW-846 Method 8082. Characterization samples will also be analyzed for geotechnical parameters such as particle size, Atterberg Limits, soil classification, compaction, and moisture content using American Society for Testing and Materials (ASTM) D Methods 422, 4318, 2487, 698, and 2216.

Berm confirmation and borrow source samples will be analyzed for chemical parameters. Borrow source samples obtained from off site sources will also be analyzed for geotechnical parameters. Borrow samples obtained from on site sources will not be analyzed for geotechnical parameters. Confirmation and borrow samples will be collected in accordance with Table 3 of the QAPP. Analytical parameters, test methods, and sampling frequencies are presented in this table.

4.1.3 Sample Collection Techniques

Soil samples, with the exception of the berm confirmation samples, will be collected as composite samples from the excavated material stockpiles. Clean, dedicated sampling equipment, such as sterile wood tongue depressors or decontaminated stainless steel spoons will be used to collect the samples. For each composite sample, five soil aliquots of equal volume will be collected. The aliquots will be collected from random depths and locations, ensuring that all depths and locations of the pile are represented. No aliquots will be collected from the top foot of the pile's surface. The five aliquots will be combined in a large, clean stainless steel mixing bowl or a disposable aluminum pan. Any liquids will be decanted or drained away, and stones, sticks, and vegetation will be removed. The aliquots will be thoroughly mixed together with a clean stainless steel spoon or a sterile wood tongue depressor and an adequate volume will be transferred into appropriate glass sample containers. The samples will be immediately placed on ice in a cooler and shipped to the laboratory via overnight delivery.

Samples for VOCs will not be composited or mixed. Equal portions of all aliquots to be included in the composite will be placed in the VOC sample container and the lab will be informed that the sample is a composite and should be mixed before analysis. VOC samples will be collected in 4-ounce glass jars with Teflon® lids and no headspace.

Backfill source samples will also be collected using the composite technique. Berm confirmation samples will be collected using a grab technique. Grab samples will be collected from the surface at depths no greater than 6 inches below ground surface. Leaves, grass, and other surface debris will be removed before collecting the sample, and the top layer of soil will be removed to the desired sample depth. A clean stainless steel spoon or other clean, dedicated sampling equipment will be used to collect the sample. For VOC analysis, the sample will be transferred directly from the sampling equipment to an appropriate sample container, which will be filled completely to ensure there is no headspace, and the container lid or cap will be secured tightly. For other analyses, the remainder of the sample will be transferred into appropriate containers and the lids will be secured tightly.

4.1.4 Soil Quality Control Samples

Field QC samples and laboratory QA/QC samples will be collected during the sampling events. Ten percent of the samples (berm confirmatory only) will be submitted to the government laboratory for QA purposes. Duplicate samples will be collected during borrow source and berm confirmation sampling only. Equipment blanks will be submitted to the analytical laboratory for QC if disposable equipment is not used. Trip blanks are required for aqueous VOC samples only, and are not applicable for the waste characterization or borrow source sampling. Bottle temperatures will be measured by the laboratory upon receipt; therefore, temperature blanks are not required. QC samples will be collected at a rate of 10 percent duplicates and 5 percent matrix spike/matrix spike duplicates (MS/MSDs).

4.1.4.1 Field Duplicates. A field duplicate sample is a second sample collected at the same location as the original sample. Duplicate samples are collected simultaneously or in immediate succession, using identical recovery techniques, and treated in an identical manner during storage, transportation, and analysis. The sample containers are assigned an identification number in the field such that they cannot be identified (blind duplicate) as duplicate samples by laboratory personnel performing the analysis. Specific locations are designated for field duplicate sample collection before the start of sample collection.

Duplicate sample results are used to assess precision of the sample collection process. Precision of soil sample VOC analysis is assessed from co-located samples because the compositing process, required to obtain uniform samples, could result in loss of compounds of interest. Field QC duplicates and QA samples will be split from the primary samples, will be collected at a frequency of one per 10 environmental samples, and will only be collected during berm confirmation sampling.

4.1.4.2 Trip Blank. The trip blank consists of a VOC sample vial filled in the laboratory with ASTM Type II reagent-grade water. The vial is transported to the sampling site, stored and transported with the environmental samples, and returned to the laboratory for analysis. Trip blanks are not opened in the field. Trip blanks are prepared only when VOC samples are taken, and are analyzed only for VOC analytes. Trip blanks are used to assess the potential introduction of contaminants from sample containers or during the transportation and storage processes. One trip blank shall accompany each cooler of samples containing aqueous samples sent to the laboratory for analysis of VOCs.

4.1.4.3 Equipment Blank. Equipment blanks will be collected during this sampling program if nondisposable equipment is used. If reusable equipment is used, then equipment blanks shall be collected and analyzed for VOCs and SVOCs. Equipment blanks are created by passing deionized or distilled water over the sampling equipment after decontamination. An equipment blank will be collected once per day if nondisposable equipment is used.

4.1.4.4 Ambient Blank. Ambient blanks will not be collected during this sampling program.

4.1.4.5 Temperature Blanks. Temperature blanks will not be collected during this sampling program. The temperature of the bottles will be recorded by the laboratory upon receipt.

4.2 Wastewater Samples

The following sections describe the sampling rationale, sample locations, and procedures associated with any wastewater samples generated from remediation activities. Wastewater may be generated during equipment decontamination activities or decontamination of sampling supplies. After the pond has been de-watered and excavation of the pond has commenced, additional water may collect in the pond; if so, this water may be collected and sampled. Sampling will be completed as required by the selected disposal facility.

4.2.1 Rationale

Wastewater samples will be collected to confirm that the local publicly owned treatment works (POTW) discharge criteria have been met before discharge to the sanitary sewer.

If wastewater is disposed off site at an appropriate facility, the sampling parameters and frequencies may be modified to meet the facility's requirements.

4.2.2 Wastewater Sample Locations

Wastewater will be collected and stored in a tank. Wastewater samples will be collected either from a discharge valve on the bottom or from an access port on the top of the tank. Anticipated sampling frequencies and parameters are shown on Table 3. Actual frequencies and parameters will be determined when a disposal facility is chosen.

4.2.3 Wastewater Sample Collection and Field and Laboratory Analysis

If wastewater samples are collected from a bottom or side discharge port, the port will be opened slowly. A large container will be placed below the port to catch excess water. The port will be purged for at least three volumes or 10 seconds before sample collection. If the sample is collected from an access port on the top of the tank, a dedicated or decontaminated bailer, or similar sampling device, will be lowered to the bottom of the tank to retrieve the water sample.

For VOC analysis, the sample shall be transferred from the sampling device or discharge port directly into the pre-preserved sample vial using a slow, controlled pour down the side of a tilted sample vial to minimize volatilization. The sample vial shall be filled until a positive or convex (bulging) meniscus is visible, and immediately sealed. When the bottle is capped, it shall be inverted and gently tapped to ensure no air bubbles are present in the vial. If bubbles are present after the initial filling, the vials shall be discarded and the VOC sampling effort shall be repeated. Refilling of vials will result in loss of preservatives. After the containers are sealed, sample degassing may cause bubbles to form. These bubbles shall be left in the container. Following collection of VOC samples, remaining water samples shall be collected in the appropriate sample containers in the following order: SVOCs, pesticides/PCBs, herbicides, hazardous characteristics, and metals.

4.2.4 Wastewater Quality Control Samples

Field duplicate, equipment blank, and ambient blank samples will not be collected during the wastewater sampling. A trip blank will be collected if sampling parameters include VOCs.

4.3 <u>PCB Wipe Tests</u>

PCB wipe test samples will be collected after decontamination activities from all equipment that came into contact with PCB-contaminated soils. The purpose of the wipe tests is to ensure that the equipment has been properly decontaminated. Equipment will not leave the work site or be returned to the equipment suppliers until analysis of the PCB wipes confirm that the equipment is clean. PCB wipes will be analyzed using EPA SW 846 Method 3550B/8082.

4.4 Sample Containers and Preservatives

OBG will provide sample containers that have been precleaned and treated according to U.S. EPA specifications for the methods. Containers will be stored in clean areas to prevent exposure to fuels, solvents, and other contaminants. Amber glass bottles will be used routinely where glass containers are specified in the sampling protocol.

Sample container types, preservation, and holding time requirements for the various analytical methods performed on the samples are listed in Tables 4a and 4b of the QAPP. Sample holding time tracking begins with the collection of samples and continues until the analysis is complete.

4.5 Equipment Decontamination

All nondedicated equipment that may directly or indirectly contact samples shall be decontaminated in a designated decontamination area. This includes backhoes, dozers, and sampling equipment. In addition, CAPE will prevent the decontaminated sampling equipment from coming into contact with potentially contaminating substances such as oil, engine exhaust, corroded surfaces, and dirt.

For nondedicated sampling devices, the equipment will be scrubbed with a solution of potable water and Alconox, or equivalent laboratory-grade detergent. The equipment will then be rinsed with copious quantities of potable water followed by a deionized water rinse. (If equipment has come in contact with oil, grease, or free product, then rinse the equipment with pesticide-grade methanol followed by pesticide-grade hexane.) The equipment will be air dried on a clean surface or rack. If the sampling device shall not be used immediately after being decontaminated, it shall be wrapped in oil-free aluminum foil.

The following general procedure shall be used to decontaminate large pieces of equipment such as backhoes and dozers. The external surfaces of the equipment shall undergo a dry decontamination using a shovel to remove as much loose soil and mud as possible. If necessary, the equipment shall then be rinsed with potable water using a steam, high-pressure spray.

5.0 SAMPLE CHAIN OF CUSTODY/DOCUMENTATION

Procedures to ensure the custody and integrity of the samples begin at the time of sampling and continue through transport, sample receipt, preparation, analysis and storage, data generation and reporting, and sample disposal. Records concerning the custody and condition of the samples are maintained in field and laboratory record books.

5.1 Field Logbook

Field logs summarizing daily activities and the field logbook will be used to record sampling activities each day. Entries in the field logs will include the following information:

- Name of author, date, and time of entry
- Location of activity
- Names and affiliations of personnel on site
- Sample collection or measurement methods
- Number of samples collected
- Sample identification numbers
- Field observations and comments.

Sufficient information will be recorded in the field logbook to reconstruct the sampling event, if necessary.

5.2 Sample Numbering System

Identifiers shall be assigned to all environmental and QC samples and shall appear on the sample labels, chain-of-custody (COC) forms, field sampling forms, and field logbooks. Sample identifiers shall use the following format: AAAA BB CCCC D EE F.

Conventions for generating sample numbers are presented below.

- AAAA: Location Identification Code: Each sample shall be identified by a four-digit alpha-code corresponding to the Location Identification represented by AAAA. An example is:

  - GAFB, etc.

- BB: Sample Matrix Code: Each sample shall be identified by a two-digit sample matrix code as follows:

  - SO - Soil samples
  - SD - Sediment samples
  - SL - Sludge samples
  - GW - Groundwater, monitoring well samples
  - SW - Surface water samples
  - WW - Wastewater

- CCCC: Station Identification Code: Each sample shall be identified by a two-digit alpha-code corresponding to the sample station, followed by a two-digit sample location number. The alpha-code as follows:

  - SP01 - for Stockpile 01

- D: Sample QA/QC Type Code: Each sample shall be identified by a one-digit alpha-code corresponding to the sample QA/QC type. The codes are as follows:

  - A - Primary sample
  - B - Field equipment blank sample
  - C - Field QC duplicate sample
  - D - Trip blank sample
  - E - QA sample to government laboratory

- EE: Sample Depth Range: Each sample depth shall be identified by a two-digit numerical code corresponding to the sample depth. Examples are as follows:

  - 02 - Starting depth 2 feet
  - 11 - Starting depth 11 feet.

- F or FF: Sample Type: Each sample type shall be identified by a one-digit alpha-code corresponding to the sample collection type. The codes are as follows:

  - G- Grab sample
  - C - Composite sample

  Example IDs:

  GAFB-SO-SP11A-06-G (primary soil grab sample from Stockpile 11, collected at 6 feet).

  GAFB-SO-SP07C-04-C (duplicate soil composite sample from Stockpile 07, collected at 4 feet).

5.3 <u>Sample Documentation</u>

5.3.1 Sample Labels

Sample labels are necessary to prevent misidentification of samples. Each sample container will have a sample label attached. When necessary, the label will be protected from water and solvents with clear tape. Each label will contain the following information:

- Site name
- Names of sample collectors
- Date and time of collection
- Place of collection
- Sample number
- Analysis required
- Preservative.

5.3.2 Sample Field Sheets and/or Logbook

Sample field sheets and the field logbook will be completed as described in Section 5.1.

5.3.3 Chain-of-Custody Records

CAPE will maintain COC records for all field and field QC samples. An example of the COC record is provided in Figure 1, an example custody seal is provided in Figure 2, and an example cooler receipt form is provided in Figure 3. A sample is defined as being under a person's custody if any of the following conditions exist:

- It is in their possession
- It is in their view, after being in their possession
- It was in their possession and they locked it up
- It is in a designated secure area (an area controlled and restricted to authorized individuals or those accompanied by authorized individuals).

A COC record will be completed for every cooler containing fixed or onsite laboratory samples. The COC record will accompany every shipment of samples to the laboratory to establish the documentation necessary to trace sample possession from the time of collection. The record will contain the following information:

- Sample or station identification number
- Signature of collector, sampler, or recorder
- Date and time of collection
- Place of collection
- Sample matrix
- Type of preservative
- Number of containers making up the sample
- Analysis requested for sample
- COC serial numbers
- Additional notes pertaining to suspected high contaminant concentrations
- Bill of lading or transporter tracking number (if applicable)
- Signatures of persons involved in COC
- Inclusive times/dates of possession.

COC records will accompany the samples. When transferring the samples, individuals relinquishing and receiving the samples will sign, date, and note the time on the COC record. The Site Manager will notify the laboratory coordinator when samples are shipped to the offsite laboratory for analysis.

All sample coolers shall be sealed in a manner that shall prevent or detect tampering if it occurs. In no case shall tape be used to seal sample containers. Samples shall not be packaged with activated carbon unless prior approval is obtained from the client. Blue ice shall not be used to pack coolers, only double-bagged clear ice.

Signed custody seals will be placed on the front right and back left of the lid of each cooler. These seals will be covered with clear tape.

5.3.4 Receipt for Sample Forms

The laboratory portion of the form will be completed by the designated laboratory personnel and will contain the following information:

- Name of person receiving the sample
- Laboratory sample number
- Date and time of sample receipt
- Analyses requested
- Sample condition and temperature.

5.4 Documentation Procedures

Original entries recorded in field logbooks, COC records, and other forms will be written in indelible ink. None of these documents will be altered, destroyed, or discarded, even if they are illegible or contain inaccuracies that require a replacement document.

5.5 Corrections to Documentation

If an error is made on a document assigned to one individual, that individual will make corrections by drawing a line through the error, entering the correct information, and initialing and dating the change. The erroneous information will not be obliterated. Any subsequent error(s) discovered on a document will be corrected by the person who made the entry or the Site Manager or his designee. All corrections must be initialed and dated.

6.0 SAMPLE PACKAGING AND SHIPPING

Immediately after samples are collected and labeled for offsite laboratory analysis, they will be placed in a sturdy ice chest. Each sample will be sealed in a plastic bag. The samples will be packed with shock-absorbent materials, such as bubble wrap, to prevent movement of sample containers during transport. The ice chest will be packed with resealable double-bagged ice packs and sealed with packaging tape. Custody seals will be affixed over the front and back of the ice chest lid to prevent or indicate tampering.

Samples and ice will be placed in a cooler along with the appropriate COC records. The COC sample log sheet(s) will be filled out in indelible ink, placed in a resealable plastic bag, and taped to the inside lid of the cooler. Each collected sample fraction contained in the cooler will be specified on the COC records by the field sampling identification number. Sample containers will be packaged to minimize potential breakage. Sample packaging for offsite laboratory shipping will meet U.S. Department of Transportation (DOT) requirements.

At least three bands of strapping tape will be wrapped completely around the laboratory-supplied cooler to secure the lid. The cooler will be sealed with evidence tape and labeled "Fragile" and "This End Up." The containers will be shipped to the laboratory for analysis in accordance with DOT regulations and procedures. Shipping air bills will be properly completed; copies will be retained and placed in the project file.

Coolers will be of metal or rigid plastic construction, with sufficient structural strength to withstand repeated dropping from a 4-foot height without cracking. Coolers will be constructed to provide insulation during shipment such that sample preservation with ice will be sufficient to maintain the contents within the range of temperatures required by the QAPP for sample preservation. The inner liner of the cooler will be of a material (such as plastic) resistant to damage by sample contents (including acidic or basic sample preservatives), and which will not result in sample contamination (e.g., due to outgassing of organic vapors from the plastic).

6.1 QA SAMPLE SHIPMENTS

The USACE Project Chemist will be notified of QA sampling at least 1 week before the start of sampling to coordinate sample shipment to the USACE QA Laboratory.

7.0 INVESTIGATION-DERIVED WASTE

Excess soil from waste characterization soil sampling will be returned to the sample location within the stockpile. Water generated from heavy equipment and sampling equipment decontamination will be collected and transferred to one of the Frac tanks used for contaminated water storage. The water will be sampled and discharged to the POTW, or it will be transported to a licensed offsite facility for treatment.

Personal protective equipment (PPE) such as Tyvek overalls, gloves, and boot covers that have not been significantly contaminated will be collected in plastic garbage bags and transported to a sanitary landfill along with the noninvestigative waste.

Noninvestigative waste, such as litter and household garbage, shall be collected on an as-needed basis to maintain each site in a clean and orderly manner. This waste shall be containerized and transported to the designated sanitary landfill or collection bin. Acceptable containers shall be sealed boxes or plastic garbage bags.

8.0 CONTRACTOR QUALITY CONTROL

To maintain quality during all fieldwork, a three-phase control process will be followed. A CQC process consisting of preparatory, initial, and follow-up phases will be performed whether or not a government representative is present. The Contractor Quality Control System Manager (CQCSM) will be responsible for implementing this process. The three CQC phases as described below will be performed individually for each definable field task assigned under the work plan. Detailed plans for implementing the CQC phases including a description of activities during the phases and definable feature of work (DFW) identification are presented herein.

Preparatory Phase

The CQCSM, along with the applicable CAPE team members, will review work requirements for a given DFW. This includes inspecting sampling materials and equipment, and reviewing required primary and QA/QC samples and analyses, sampling procedures, and sampling locations. If new sampling or technical personnel arrive on site during the field activities, the CQCSM will repeat this phase before new personnel begin work.

Initial Phase

The CQCSM will oversee every step of each DFW and work immediately before the start of each task.

Follow-up Phase

The CQCSM will maintain continued daily contract compliance until completion of the given DFW.

9.0 DAILY QUALITY CONTROL REPORTS

During all field activities, Daily Quality Control Reports (DQCRs, Figure 4) will be prepared, dated, and signed by the CQCSM and submitted to the USACE. The following elements will be included in the DQCRs:

- Date
- General weather information
- Field instrument measurements and calibrations
- Departures from approved work plans
- Specific instructions from the USACE representative not in the work plans
- Problems or difficulties in the conduct of work
- Summary of samples collected, with corresponding QC/QA-type samples noted.

Attached to the DQCR summaries will be copies of COC forms, field-generated analytical results, and other project forms generated during the period covered by the DQCR summary. The DQCRs will be prepared daily and will be submitted to the USACE Technical Representative on a weekly basis, or as required by USACE.

10.0 CORRECTIVE ACTIONS

Deficiency tracking and corrective actions will be taken whenever there is a deficiency in characteristics(s), documentation, or procedures that result in the quality of an item being deemed unacceptable or indeterminate with respect to specified criteria. Nonconformance examples include test failure, physical defects, data losses, deviations from prescribed project plans, and deviations from industry-accepted processes and procedures. If nonconformance is related to a hazardous condition or potential safety concerns, corrective action will immediately be taken and documentation will be completed as an immediate follow-up. Prompt corrective action for safety issues will never be impeded by the need to process a deficiency report.

Corrective action for field operations includes response, reestablishment of control, and documentation.

10.1 Response

Corrective action shall be initiated when potential or existing conditions are identified that may adversely impact data quality or quantity. It is the responsibility of the individual who first recognizes an out-of-control event to initiate corrective action and to document the action. Notification of the nonconformance shall be directed to the individual's supervisor. It is the supervisor's responsibility to coordinate corrective action with the PM and to follow-up to ensure reestablishment of control. Events that require corrective action include:

- Violation of established field or sample handling procedures
- Violation of established analytical controls
- Violation of established field or sample collection procedures
- Results of performance, system, or project QA audits
- Results of laboratory/field comparison studies.

When a deficiency is detected, a deficiency report will be generated, describing and documenting the occurrence and the corrective action taken or suggested to be taken. The appropriate task order criteria will be cited and sufficient supporting data will be provided to allow a resolution to the deficiency. The report will be generated by the CQCSM, and will be provided to the Site Manager and PM for review and approval of the proposed corrected action. The report will describe the cause for the deficiency, corrective action taken, measures taken to prevent a recurrence, and the date actions are to be completed. The supervisor of the organization responsible for the deficiency will sign the deficiency report.

The deficiency will be reported to the onsite USACE representative within 48 hours. Correction of the deficiency will be verified and the deficiency report indicating closeout will be signed by the CQCSM. The deficiency report will not be closed out until all corrective and preventive measures have been completed.

The CQCSM will maintain a deficiency log of all open deficiencies, date of issue, responsible organization or individual, date of anticipated corrective action, and closed-out deficiency reports. The log will provide the deficiency number, a brief description of the action, and the date closed. Records to be retained in the project file will contain pertinent information necessary to document resolution of the deficiency including scope and significance of the problem.

Surveillance of subcontractor's operations is the responsibility of the Site Superintendent and the CQCSM. Major discrepancies that come to their attention will be recorded and transmitted to the related subcontractor. The CQCSM has authority to act directly with the subcontractor representatives to stop work. If the discrepancy will be covered by a proceeding operation, a resolution will be made before the item is covered. Major discrepancies will be followed up daily until the correction of the major discrepancy has been completed and documented.

Corrective action may take several forms, but the following steps are almost always included:

- Check the calculations
- Check the instrument for proper setup
- Reanalyze the control item
- Stop work (if necessary).

The corrective action may be immediate or long term. A corrective action requiring immediate response may be recalibration, recalculation, reanalysis, or repeating sample collection. Long-term corrective action may be identified through, but not limited to, performance evaluation samples, standards, and control charts. Corrective actions will be documented using the form in Figure 5, which will be maintained in project files.

10.2 Reestablishment of Control

Immediate corrective action is usually applied to real-time, nonrecurring problems. Instrument and equipment malfunctions and nonconforming field procedures are examples of problems amenable to this type of action. The individual who observes nonconformance to previously established criteria or protocols involving equipment, instruments, data collection or handling, or field methods shall immediately notify his/her supervisor. The supervisor and the appropriate task leader shall investigate the extent of the problem and take the necessary corrective steps. The Site Superintendent and Site Manager will prepare a corrective action report for the CQCSM and PM. These individuals will collectively decide how to proceed.

Once the immediate corrective action is implemented, the task leader will monitor the situation closely for recurrence, to ensure that the corrective action has been effective and the problem is no longer occurring. If the problem continues, the corrective action may be ineffective, and additional or alternative corrective actions may be necessary. In such cases, continued consultation with the CQCSM, Site Manager, and the PM will occur as necessary to collectively monitor and resolve the problem in a timely manner.

Long-term corrective action procedures are devised and implemented to prevent the recurrence of a potentially serious problem. The CQCSM shall be notified of the problem and shall investigate the severity and extent of the problem. A corrective action report will be filed with the PM, Site Superintendent, Site Manager, and Program Manager.

10.3 Documentation

The CQCSM (or designee), Site Manager, Site Superintendent, or the PM documents all notifications, recommendations, and the agreed-upon corrective action plan, if required. The PM notifies project staff and implements the agreed-upon course of action. The CQCSM verifies the efficacy of the implemented actions. The development and implementation of preventive and corrective actions will be timed, to the greatest extent possible, to not adversely impact either project schedules or subsequent data-generation/processing activities. The CQCSM will also be responsible for developing and implementing routine program controls to minimize the need for corrective action.

For either immediate or long-term corrective actions, steps comprising a closed-loop corrective action system to define and solve the problem are:

- Assign responsibility for investigating the problem
- Investigate and determine the cause of the problem
- Determine a corrective action to eliminate the problem
- Establish effectiveness of the corrective action and implement the correction
- Verify that the corrective action has eliminated the problem
- Maintain a log of the problem and document corrective actions in the field record logbook.

Depending on the nature of the problem, the corrective action employed may be formal or informal. In either case, occurrence of the problem, corrective action employed, and verification that the problem has been eliminated shall be documented. An example corrective action form is included as Figure 5. Copies of all corrective action forms will be maintained in the project file.

11.0 PROJECT SCHEDULE

An estimated start date for fieldwork is unknown at this point.

12.0 SAMPLING APPARATUS AND FIELD INSTRUMENTS

12.1 Equipment Calibration and Quality Control

Daily, and in some cases more frequently, calibration of equipment will provide QC checks on all equipment used during the performance of project activities. Each instrument will have an individual identification number affixed. This number will be transcribed on field data records when using a particular instrument for a sampling event.

All calibration, repair, and service records will be kept in individual equipment logbooks maintained for each instrument. Equipment that consistently falls out of calibration or exceeds manufacturer's critical limits will be repaired or replaced.

12.1.1 Photoionization Detector

The photoionization detector (PID) instrument requires calibration at least daily, using commercially available gases of known concentrations. Calibration will be performed according to the manufacturer's recommendations and will be recorded in the appropriate equipment logbook or calibration form.

12.1.2 Lower Explosivity Limit/Oxygen Instrument

The lower explosivity limit (LEL)/oxygen instrument will be calibrated before use each day. It will be calibrated according to the manufacturer's recommendations using standard calibration gas cylinders and recorded in the appropriate equipment logbook.

12.2 Equipment Maintenance and Decontamination

Field measurement equipment shall be maintained according to the manufacturer's recommended procedures provided in the operations manual for each instrument. Routine maintenance of PID instruments consists of battery charging to ensure that the instrument is ready to use when required and an occasional lamp or fan cleaning. Routine maintenance of the LEL/oxygen instrument consists of battery charging.

When possible, all field measurement equipment shall be decontaminated according to specifications in Section 4.5 and the manufacturer's recommended procedures before any measurement activities, and shall be protected from contamination until ready for use.

12.3 Field Monitoring Measurements

12.3.1 Organic Vapor Analysis

For health and safety monitoring, the air in the breathing zone will be checked with a PID for organic vapors. If organic vapors are detected, procedures provided in the SSHP will be followed. Specific procedures for PID monitoring are provided in the SSHP.

12.3.2 Explosive Vapor Survey

When an explosive hazard exists, measurements of the LEL and oxygen content will be taken. Specific procedures for explosivity limit and oxygen content monitoring will be provided in the SSHP.

13.0 REFERENCES

Ecology and Environmental Engineering, Inc. (E&E), 2004. *Final Design Basis Report for Three Mile Creek, Former Griffiss Air Force Base.*

FIGURES

Cape Environmental
91 Noll Street
Waukegan, IL 60085
847/336-4341

Figure 1
Example Chain of Custody

CHAIN OF CUSTODY RECORD

Project No.	Project Name						Parameters									Ind. Hygiene Sample	Y / N
Samplers: (signature)					(Printed)											REMARKS	
Field Sample Number	Date	Time	Comp.	GRAB	Station Location												

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)
(Printed)		(Printed)	(Printed)		(Printed)

Relinquished by: (Signature)	Date/Time	Received for Laboratory by: (Signature)	Date/Time	Remarks
(Printed)		(Printed)		

Figure 2

CUSTODY SEAL

CUSTODY SEAL

Date__________________________________

Signature ______________________________

GPL Laboratories, LLLP

Figure 1
SAMPLE RECEIPT CHECKLIST

W.O. No: ______________

Client Name: ______________

Date Received: ______________

Time Received: ______________

Received By: ______________

Carrier Name: ______________

Prepared (Logged In) By: ______ / ______
Initials Date

Project: ______________

Site: ______________

VOA Holding Blank I.D. No: ______________

	YES	NO
Airbill/Manifest Present?	___	___
No. ______________		
Shipping Container in Good Condition?	___	___
Custody Seals Present on Shipping Container? Condition: Broken _____ Intact-not dated or signed _____ Intact-dated and signed _____	___	___
Usage of Tamper Evident Type	___	___
Chain-of-Custody Present?	___	___
Chain-of-Custody Agrees with Sample Labels?	___	___
Chain-of-Custody Signed?	___	___
Packing Present in Shipping Container? Type of Packing ______________	___	___
Custody seals on Sample Bottles? Condition: Good _____ Broken _____	___	___
Total Number of Sample Bottles _____		
Total Number of Samples _____		
Samples Intact?	___	___
Sufficient Sample Volume for Indicated Test?	___	___

	YES	NO
Trip Blanks: No. of Sets _____	___	___
Field Blanks: No. of Sets _____	___	___
Equip. Blank: No. of Sets _____	___	___
Field Duplicate: No. of Sets _____	___	___
MS/MSD: No of Sets _____	___	___
VOA Vials Have Zero Headspace?	___	___
Preservatives Added to Sample?	___	___
pH Check Required?	___	___
Performed By? _____	___	___
Ice Present in Shipping Container?	___	___

Container #	Temp.	Container #	Temp.
___	___	___	___
___	___	___	___
___	___	___	___
___	___	___	___
___	___	___	___
___	___	___	___
___	___	___	___

Project Manager Contacted?
Name: ______________
Date Contacted: ______________

Any NO response must be detailed in the comments section below. If items are not applicable to particular samples or contracts, they should be marked N/A/

COMMENTS: ______________

____

____

____

Checklist Completed By: ______________

Date: ______________

SOP No: F.2V11

CAPE
ENVIRONMENTAL
MANAGEMENT
I N C

DAILY QUALITY CONTROL REPORT

Daily Report No.: Date:

Contract Title: Contract No.:

Weather: Clear ☐ Partly Cloudy ☐ Cloudy ☐ Temperature(F°) ☐ Min. ☐ Max.

Wind ☐ Precipitation: Rain ☐ Snow ☐

1. Contractor / Subcontractor and Area of Responsibility:

Number	Trade	Hours	Employer	Location / Description Of Work
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

2. Equipment (Not Hand Tools):

Plant / Equipment	Arrival Date	Departure Date	Date Of Safety Check	Hours Used	Hours Idle	Hours Repair
Field Office or Trailer						
CAPE Truck						
CAPE Truck						
25 Ton Dump Truck						
25 Ton Dump Truck						
Excavator						
Excavator						
LGP Dozer						
5 CY FEL						

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

Description:

Sketch Area:

4. Control Activities Performed:

- **Preparatory Inspections:** (Identify features of work and attach minutes).
  - None
  -
- **Initial Inspections:** (Identify features of work and attach minutes).
  - None
  -

- **Follow-up Inspections:** (List inspections performed, results of inspection compared to the specification requirements, and corrective actions taken when deficiencies are noted).
  -
  -

5. Tests Performed and Test Results:

-
-
-

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

				Inspection Results		
Item	**Quantity**	**Description**	**Storage Provided**	**Accept**	**Reject**	**Comments**

7. Submittals Reviewed:

Submittal No.	Spec/Plan Reference	By Whom	Action

8. Offsite Surveillance Activities: (Include actions taken).

- None

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

- All activities performed in accordance with EM385-1-1
-

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

- None

Contractor's Verification: On behalf of the Contractor, I certify this report is complete and correct, and all materials ands 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 ***Printed or Typed Name***	**CQC Systems Manager** ***Signature***	**Date**

Figure 5

CORRECTIVE ACTION REPORT	
SECTION A TO BE COMPLETED BY INITIATOR	
(a) Item of nonconformance:	(b) NCR number:
(c) Location of nonconforming item:	(d) Date:
(e) Name, organization, and telephone number of person initiating NCR:	(f) Date nonconformance was found:
(g) Individual/organizational responsible for the resolution of the nonconformance:	
(h) REF: SOP, SAP WORK PLAN, DWG, etc.	
(i) Description of nonconformance: (1) identification of the nonconforming item or service; (2) requirements, including the specific reference document by title, revision, and its unique identification number; and (3) as found conditions:	
(j) Signature of initiator:	Date:
(k) Quality assurance manager's concurrence:	Date:
(m) STOP WORK order required: Yes No	(n) CAR required No Yes
SECTION B TO BE COMPLETED BY THE RESPONSIBLE INDIVIDUAL/ORGANIZATION	
(a) Responsible individual/organization:	
(b) Proposed resolution: (c) Root cause: (d) Actions taken to prevent recurrence:	
(e) Responsible individual:	DATE:

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SECTION C	TO BE COMPLETED BY THE QA MANAGER OR DESIGNEE
(a) Final status o Acceptable o Rejected o Other Remarks:	
(b) Results of verification of required reinspection or retesting:	Date:
(c) Quality assurance verification and closure:	Date:

SAMPLING AND ANALYSIS PLAN

PART II - QUALITY ASSURANCE PROJECT PLAN
FOR
REMEDIAL ACTION AT THREE MILE CREEK
FORMER GRIFFISS AIR FORCE BASE
ROME, NEW YORK

Preplaced Remedial Action Contract Number DACA41-01-D-0003
Task Order 0004

Prepared for:

DEPARTMENT OF THE ARMY
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CAPE Project Number: 10303.004
June 2004

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1 Corrective Action Request Form

ATTACHMENTS

These attachments were provided with the Draft submittal. Will be provided upon request.

1 Laboratory Validation and Certification
2 Laboratory Quality Assurance Manual
3 Laboratory Standard Operating Procedures

LIST OF ABBREVIATIONS AND ACRONYMS

%R	percent recovery
AFB	Air Force Base
AFRPA	Air Force Real Property Agency
ASTM	American Society for Testing and Materials
BRAC	Base Closure and Realignment Act
BWPM	Basewide Wetlands Management Plan
CCC	calibration check compound
CCV	continuing calibration verification
CDQR	Chemical Data Quality Report
CFR	Code of Federal Regulations
CLP	Contract Laboratory Program
COC	chain-of-custody
CQAR	Chemical Quality Assurance Report
CQC	Contractor Quality Control
CQCSM	Contractor Quality Control System Manager
DQO	data quality objectives
EDD	electronic data deliverable
EPA	U.S. Environmental Protection Agency
FFA	Federal Facilities Agreement
FSP	Field Sampling Plan
GC/MS	gas chromatograph/mass spectrometer
ICAP	Inductively Coupled Argon Plasma
ICV	initial calibration verification
Lab QAM	Laboratory Quality Assurance Manual
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
LDP	laboratory data package
MDL	method detection limit
MRL	method reporting limit
MS	matrix spike
MSD	matrix spike duplicate
NPL	National Priorities List

NYSDEC	New York State Department of Environmental Conservation
OSWER	Office of Solid Waste and Emergency Response
PARCC	precision, accuracy, representativeness, completeness, and comparability
PCB	polychlorinated biphenyls
PID	photoionization detector
PM	Project Manager
POTW	publicly owned treatment works
PQL	practical quantitation limit
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
RCRA	Resource Conservation and Recovery Act
RL	reporting limits
RPD	relative percent difference
SAP	Sampling and Analysis Plan
SOP	standard operating procedure
SOW	scope of work
SSHP	Site Safety and Health Plan
SVOC	semivolatile organic compound
TAGM	Technical and Administrative Guidance Memorandum
TCL	target compound list
TCLP	toxicity characteristic leaching procedure
TGSCS	Technical Guidance for Screening Contaminated Sediments (NYSDEC)
TMC	Three Mile Creek
TOC	total organic carbon
TSCA	Toxic Substances Control Act
USACE	U.S. Army Corps of Engineers
VOC	volatile organic compound

1.0 PROJECT DESCRIPTION

This Quality Assurance Project Plan (QAPP), Part II of the Sampling and Analysis Plan (SAP), addresses the sampling and analysis activities to be conducted in support of the remediation of the Three Mile Creek (TMC) at the former Griffiss Air Force Base (AFB) in Rome, New York.

This QAPP provides the overall technical approach, analytical and data reporting procedures, and quality assurance (QA) requirements for the various phases of work anticipated under this soil remediation project. The QAPP was prepared in conformance with EM-200-1-3 *Requirements for the Preparation of Sampling and Analysis Plans*, U.S. Army Corps of Engineers (USACE) (2001a). This QAPP should be used in conjunction with the Field Sampling Plan (FSP), the project Work Plan, the Contractor Quality Control (CQC) Plan, and the project Site Safety and Health Plan (SSHP).

Remediation of the TMC area is anticipated to include the following activities:

- Mobilization/Demobilization and general site work (e.g., installation of fences and temporary facilities, equipment decontamination, etc.)

- Excavation and disposal

- Site restoration.

Sections 1 and 2 of the Work Plan describe the project including site history and contaminants, existing site data, and site-specific sampling and analysis problems.

Issues addressed by the QAPP include:

- Project description
- Project organization and responsibilities
- Data quality objectives (DQOs)
- Sampling locations and procedures
- Sample custody and holding times
- Calibration procedures and frequency
- Analytical procedures
- Data quality evaluation
- Performance and system audits
- Preventative maintenance
- Calculation of data quality indicators
- Corrective actions
- QA reports.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

The project organization and responsibilities of the key project personnel are presented in Section 4 of the Work Plan.

3.0 QUALITY ASSURANCE OBJECTIVES

DQOs are defined as an integrated set of decisions that define data quality requirements based on the intended use of the data. DQOs are necessary in obtaining sufficient data of known quality, both technically and legally defensible, for the intended data use.

This QAPP employs a systematic program of quality control (QC) procedures and checks designed to support and document the attainment of established DQOs. Since field sampling procedures, sample handling procedures, and laboratory testing procedures are all potential sources of error for chemical data, the QA Program contains QC checks intended to monitor these aspects of data collection. See Attachment 1 for the project laboratory's validation and certification documentation. The Laboratory Quality Assurance Manual (Lab QAM) is presented in Attachment 2.

3.1 Background

Griffiss AFB is a former U.S. Air Force installation covering approximately 3,552 acres in the lowlands of the Mohawk River Valley in Rome, Oneida County, New York. In 1987, the U.S. Environmental Protection Agency (EPA) added Griffiss AFB to the National Priorities List (NPL), and in 1990, the U.S. Air Force, the New York State Department of Environmental Conservation (NYSDEC), and the EPA entered into a Federal Facilities Agreement (FFA). In 1993, Griffiss AFB was designated for realignment under the federal Base Closure and Realignment Act (BRAC) and subsequently deactivated. This project is part of the Griffiss AFB BRAC environmental restoration program that must be completed before transferring this property to private entities. Additional information on the background of the site is provided in Section 1.0 of the FSP.

3.1.1 Project Objectives

The backfill and berm confirmation objectives and the soil characterization disposal requirements for Landfill 6 are presented in Tables 1, 2a, and 2b of this QAPP, and the scope of work (SOW) is discussed in the FSP, Section 3.0; thus, they are not discussed here further.

3.1.2 Measurements Required to Meet Project Objectives

Table 3 provides a summary of the number and type of field samples required for chemical and geotechnical analysis for each sample matrix.

3.2 QA Objectives for Chemical Data Measurement

Objectives for data quality reflect the expected uses of the data, the expected levels of contamination, and the available analytical and sampling resources.

3.2.1 Data Uses

The primary uses of the chemical measurement data to be gathered are as follows:

- To determine where excavated soils will be disposed.

This will be completed through the toxicity characteristic leaching procedure (TCLP) analysis of volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides, herbicides, hazardous characteristics, and metals. Total polychlorinated biphenyls (PCBs) and geotechnical analysis will also be performed on characterization samples.

- To determine whether proposed backfill material is suitable for placement on site.

This will be completed through the analysis of VOCs, SVOCs, pesticides, herbicides, PCBs, cyanide, and metals. Geotechnical analysis will also be performed on the borrow samples obtained from off site sources.

- To determine where water collected from decontamination activities and from the pond will be disposed.

This will be completed through the analysis of VOCs, SVOCs, pesticides, herbicides, PCBs, hazardous characteristics, and metals.

- To determine if the existing soil located under the excavated berms is acceptable.

This will be completed through the analysis of VOCs, SVOCs, pesticides, herbicides, PCBs, cyanide, and metals.

3.2.2 Data Quality Levels

Data must be of sufficient quality to support the decision-making process. A tiered approach to sampling and analysis will be used for the waste characterization, borrow source soil sampling, decontamination wastewater and pond water (if necessary) sampling, and berm confirmatory sampling.

Definitive laboratory data with Level III data packages will be used to determine compliance with soil disposal and backfill objectives.

3.2.3 Precision, Accuracy, Representativeness, Completeness, and Comparability Data Quality Indicators

The project DQOs are expressed as a series of requirements for the sampling procedures, sample handling procedures, analytical procedures, and analytical sensitivity; as well as precision, accuracy, representativeness, completeness, and comparability (PARCC) parameter goals for project QC check results. Quantitative DQOs are established for precision, accuracy, and completeness whereas representativeness and comparability are expressed qualitatively. Calculation of data quality results is discussed further in Section 12 of this QAPP.

3.2.3.1 Precision. Precision is a measure of the degree of reproducibility of an analytical value and is determined by analyzing duplicate samples. Precision may be affected by the natural variation of the matrix or contamination within that matrix, as well as by errors made in field and/or laboratory handling procedures. For chemical parameters that do not allow homogenization before sample acquisition (e.g., volatile organic analysis), precision values must be viewed accordingly.

Precision objectives for laboratory performance are expressed as the relative percent difference (RPD) of matrix spike (MS) and matrix spike duplicate (MSD) samples. These samples will be analyzed at a frequency of one per analytical batch or every 5 percent of samples, whichever is more frequent.

Precision objectives for field activities are expressed as RPD of field duplicate QC samples submitted "blind" to the subcontract laboratory. These samples will be analyzed at a frequency of one per every 10 samples for berm confirmation sampling.

3.2.3.2 Accuracy. Accuracy is a measure of bias in a measurement system (i.e., how closely an analytical result agrees with the true or actual value). Potential sources of error are the sampling process, field contamination, preservation, handling, sample matrix sample preparation, sample matrix interference, and analysis techniques.

Accuracy objectives for laboratory performance are expressed as percent recoveries (%R) of a known concentration of reference material added to a field sample matrix or a standard matrix. Every batch of samples analyzed shall include MSs, laboratory control samples (LCSs), and surrogate spikes (for organic analyses only). MS results are used to evaluate the ability of the analytical method to measure the analytes of interest in the actual sample matrix and to verify analyses are conducted within control limits. LCS results are used to verify analyses are conducted within control limits. Surrogate spike compounds will be added to every sample (including laboratory QC samples) analyzed for organic parameters. Surrogate spike recoveries are used to provide method performance indicators with respect to each individual sample matrix analyzed for organic compounds. Laboratory-specific LCS and MS limits for each analytical method and matrix are provided in Attachment 3. MSs and LCSs will be analyzed at a frequency of one per analytical batch or 20 samples, whichever is more frequent.

3.2.3.3 Representativeness. Representativeness expresses the degree to which sample data accurately and precisely represent actual site conditions. Representativeness is a qualitative parameter most concerned with the proper design of the sampling program or subsampling of a given sample. The representativeness criterion is satisfied by employing appropriate sampling strategies and techniques. The representativeness of the data will be evaluated by:

- Comparing actual sampling procedures and chain-of-custody (COC) forms to those described in the SAP

- Identifying and qualifying nonrepresentative data in site characterization activities

- Evaluating holding times and condition of samples upon arrival at the laboratory

- Examining blanks for cross contamination.

The objective of this SAP is to generate representative data. This shall be accomplished by using trained personnel and employing standardized and approved sampling and analytical procedures. These procedures shall be explicitly followed, with any exceptions thoroughly documented.

3.2.3.4 Comparability. Comparability is a qualitative parameter expressing the confidence with which one data set can be compared to another. The comparability objective of this project is to generate data comparable with other measurement data for similar samples and sample conditions. This goal will be accomplished by using standard techniques to collect and analyze samples, following these methods and procedures explicitly, documenting any exceptions, and reporting results in appropriate units. Any planned deviation from procedures will be approved in advance and well documented.

Comparability is assessed by evaluating field duplicate sample results in conjunction with laboratory QA/QC results. Comparability can be assessed by comparing the QA sample results to its corresponding field duplicate.

3.2.3.5 Completeness. Completeness is defined as the percentage of measurements made that are judged to be valid compared to the total number of measurements planned. A value of 90 percent or higher is the goal. For values less than 90 percent, problems in the sampling or analytical procedures will be examined and possible solutions explored.

3.2.3.6 Sensitivity. Reported chemical concentrations from the waste characterization soil samples will be compared with maximum allowable TCLP concentrations to determine disposal requirements. Total PCB concentrations will also be evaluated to determine disposal requirements (i.e., less than 10 mg/kg at Landfill 6 or at an approved off site disposal facility permitted to accept waste if greater than 10 mg/kg). Samples from potential borrow sources will be compared to the most stringent concentrations in the NYSDEC Technical Guidance for Screening Contaminated Sediments (TGSCS) and NYSDEC Technical and Administrative Guidance Memorandum (TAGM) #4046 to determine the suitability of the borrow source for use as backfill. Confirmatory samples from the berm excavations will also be compared to the most stringent concentrations in the NYSDEC TGSCS and NYSDEC TAGM #4046 to determine if unacceptable levels of contamination are remaining in the soil below the berms. Wastewater samples will be evaluated against the local publicly owned treatment works (POTW) criteria, or the criteria of an approved off site disposal facility, to determine if constituents are present at levels of concern. At a minimum, this will be completed through the analysis of VOCs, SVOCs, pesticides, herbicides, PCBs, hazardous characteristics, and metals. Sensitivity objectives will be expressed in terms of method detection limits (MDLs) and project reporting limits (RLs).

3.2.4 Method Detection Limits

The MDL, which is based on the sensitivity of the instrument and performance of the method, is the smallest reported concentration in a sample within a specified level of confidence. MDLs for each instrument and matrix are laboratory specific and are determined statistically following the procedures outlined in 40 Code of Federal Regulations (CFR) 136, Appendix B. MDLs are updated annually by the laboratory, and therefore may change somewhat over the course of a project; however, in all cases they shall remain consistent with those specified in SW-846.

MDLs are calculated as follows:

$$MDL = t_{(n-1,\ 1-oc = 0.99)}\ (S)$$

Where:

$t_{(n-1,\ 1-oc = 0.99)}$ = Students' t-value appropriate to a 99 percent confidence level and a standard deviation estimate with n-1 degrees of freedom.

S = standard deviation of the replicate analyses.

3.2.5 Project Reporting Limits

Project RLs are based on the Contract Laboratory Program (CLP) Contract Required Detection Limits. MDLs and practical quantitation limits (PQLs), which are typically the same as the lab's RLs, for the various analytical parameters anticipated for this project are provided in Tables 1 and 2a.

3.2.6 Laboratory Reporting Requirements and Sensitivity

The laboratory shall report concentrations of constituents detected above the MDL but below the RL as estimated "J." Constituents not detected shall be reported as not detected "ND" at the RL.

4.0 DATA QUALITY OBJECTIVES

The overall quality objectives of this QAPP are to outline procedures for the collection and assessment of data that are within acceptable ranges of PARCC to meet the project DQOs. DQOs are used to develop a scientific and resource-effective sampling design. DQOs are designed to define data requirements and acceptable levels of decision errors. The DQO process is a series of planning steps based on scientific methods designed to ensure that the type, quantity, and quality of environmental data used for decision-making are appropriate for the intended application. The DQO process, as defined by the EPA, consists of seven steps designed to provide a systematic approach to resolving issues that pertain to site investigation and remediation (EPA, 1994a and 1994b).

4.1 Stating the Problem

The primary objective of the proposed remedial action is to remove and remediate contaminated sediments located within TMC by means of excavation. Areas of excavation will include the entire length of the on-base portion of the creek channel (including the North Channel and the Landfill 5 Tributary), berms that are adjacent to the on-base portion of TMC, 16 silt deposits that are located in the off-base portion of the creek, and an off-base pond that receives flow from the creek.

A concurrent ecological objective is to construct a mitigation wetland on the TMC floodplain as established in the Basewide Wetlands Management Plan (BWMP). The goal of the mitigation is to restore, enhance, and create at least 5 acres of wetlands within the historic floodplain wetland of TMC and to restore the TMC channel.

4.2 Identifying the Decision

The primary decision to be made during waste characterization is to determine if results exceed regulatory requirements for nonhazardous and hazardous waste and if PCB concentrations exceed the Landfill 6 disposal requirements (less than 10 mg/kg). The primary decision to be made during borrow source sampling is to determine whether the source is suitable for use as backfill.

The primary decision is composed of the following question: Do chemical concentrations measured in any of the samples exceed the regulatory or Landfill 6 requirements?

If the answer to this question is no, then the material is in compliance with the provisions of the regulations (including the Landfill 6 disposal requirements). Excavated soils may be disposed in the onsite disposal area (Landfill 6) and tested borrow sources may be used for backfill.

If the answer to this question is yes, then the material is out of compliance with the regulatory provisions (or Landfill 6 disposal requirements), and the excavated material must be disposed off site in an approved Resource Conservation and Recovery Act (RCRA) Subtitle C or D landfill or a Toxic Substances Control Act (TSCA) landfill and/or an alternate borrow source should be located and tested.

The primary decision to be made during wastewater sampling is to determine how wastewater will be disposed. The primary decision is composed of the following question: Do chemical concentrations in any of the samples exceed the local POTW's discharge criteria? If the answer to the question is no, then the wastewater can be discharged to the local POTW. If the answer to the question is yes, then the wastewater will need to be transported off site to an approved treatment and disposal facility.

The primary decision to be made during the confirmation sampling underneath the excavated berms is to determine whether the soil in that area is contaminated. The primary decision is composed of the following question: Do chemical concentrations in any of the samples exceed the regulatory requirements? If the answer to the question is no, then the soil underneath the excavated berms can be considered uncontaminated and no further excavation in this area is required. If the answer to the question is yes, then the soil under the excavated berms may be considered contaminated and further excavation may be required.

4.3 Identifying Inputs to the Decision

Information required to make primary decisions is as follows:

- The analytical results for the samples collected from stockpiles, borrow sources, below the berms, and wastewater.

4.4 Defining the Boundaries

There are no temporal boundaries, nor are there any physical boundaries that constrain most of the area undergoing remediation.

4.5 Develop a Decision Rule

The initial decision for characterization samples will be based on a comparison of analytical results to the TCLP, TSCA, and Landfill 6 geotechnical requirements. The decision statements are described below:

- If waste passes the TCLP criteria, the Landfill 6 geotechnical criteria, and has PCB concentrations less than 10 ppm, then the materials may be placed in Landfill 6

- If waste passes the TCLP criteria, but contains between 10 and 50 ppm PCBs, then the materials will need to be disposed off site at an approved landfill

- If waste fails the TCLP criteria but passes the TSCA (PCB) requirements, then the materials will need to be disposed off site at an approved RCRA facility

- If waste contains PCB concentrations greater than 50 ppm, then the materials will need to be disposed off site at an approved TSCA facility

The initial decision for borrow source samples will be based on a comparison of analytical results to the most stringent NYSDEC TGSCS and NYSDEC TAGM #4046 concentration levels. An Air Force Real Property Agency (AFRPA) will make a recommendation to the regulators regarding acceptability of the borrow source. The decision statements are described below:

- If borrow samples meet the NYSDEC TGSCS and TAGM requirements, the source may be used as backfill. Off site borrow sources must also meet geotechnical requirements.

- If borrow samples do not meet the NYSDEC TGSCS and TAGM requirements or geotechnical requirements, an alternate borrow source should be identified and sampled.

The initial decision for wastewater samples will be based on a comparison of analytical results to the local POTW's requirements. The decision statements are described below:

- If wastewater samples meet the local POTW's requirements, the water may be discharged directly from the site.

- If wastewater samples do not meet the local POTW's requirements, the water will need to be transported off site to an approved treatment and disposal facility.

The initial decision for confirmation samples will be based on a comparison of analytical results to the NYSDEC TGSCS and NYSDEC TAGM #4046 concentration levels. The decision statements are described below:

- If confirmation samples meet the NYSDEC TGSCS and TAGM requirements, the soil underneath the excavated berms may be considered uncontaminated and no further excavation in this area is required.

- If confirmation samples do not meet the NYSDEC TGSCS and TAGM requirements, the soil below the excavated berms may be considered contaminated and further excavation may be required.

4.6 Specifying Limits on Decision Errors

Limits on decision errors specify the tolerable limits of errors, based on potential consequences of making an incorrect decision. Decision errors are discussed in the following subsection.

4.7 Sampling Decision Errors

The null hypothesis is: The results are below the regulatory requirements.

False positive decision error: The sample results indicate that organic and inorganic concentrations are above the regulatory requirements and offsite disposal is required when actually the concentrations are below the permit requirements. The sample results indicate the borrow source concentrations are above acceptable requirements when the source is actually acceptable.

False negative decision error: The sample results indicate that organic and inorganic concentrations are below the regulatory requirements when actually the concentrations are above the regulatory requirements. The sample results indicate that the borrow source concentrations are below the acceptable requirements when the source is actually not acceptable.

The consequences of making a false positive decision error would increase project costs associated with additional offsite disposal or additional borrow source sampling. This type of false positive decision error should be less than 20 percent. The consequences of making a false negative decision error could result in the release of contaminants to the onsite disposal area or could increase exposure risk. The latter error is considered more severe than the false positive decision error. This type of false negative decision error should be less than 5 percent and approaching zero.

4.8 Optimizing Sampling Design

Sampling locations have been selected to provide sufficient information to make decisions regarding the attainment of system compliance, and thus, risk levels protective of human health.

Laboratory measurement procedures have been selected based on established and well-recognized technology and methods. All the methods used in this project originated with the EPA.

To design the most resource-effective study that can achieve the DQOs of this remedial action, the least expensive sampling methods that are in compliance with regulatory requirements have been selected. The DQOs are based on the objectives of the study to gather data that will be used to effectively remediate TMC and properly dispose of TMC sediments and soils to meet regulatory requirements.

The accuracy provided by the selected methods is deemed adequate to achieve the DQOs. The impact of statistical variability in data collected using the selected sampling methods is not significant. In summary, the sampling design is optimized based on cost and regulatory acceptance.

5.0 SAMPLING LOCATIONS AND PROCEDURES

5.1 Sampling Procedure Requirements

Project-specific sampling rationale, sampling procedures, and the number and types of samples to be collected for each sample matrix are presented in Section 4 of the FSP as well as in Table 3. The following general sampling requirements will be maintained during all sampling:

- Dedicated or disposable sampling equipment will be used to the greatest extent practicable

- All nondedicated sampling devices will be thoroughly decontaminated before and after use

- The analytical laboratory will provide precleaned sample containers. All sample container records will be maintained by the analytical laboratory and will be available upon request

- A sample that is representative of the matrix being sampled will be collected

- Sample integrity will be maintained from the time of sample collection to receipt by the laboratory.

All field notes will be recorded in indelible ink on standard forms in bound notebooks. The Contractor Quality Control System Manager (CQCSM) will complete a daily field log. This log will be signed and dated daily. Significant events occurring during the day will be recorded and reported to the Project Manager (PM). Daily communication is essential to evaluate whether timely corrective actions are necessary. The field logbook(s) must provide a place for the field team members to sign and date the entries. The CQCSM must review all field notes.

5.2 QA/QC and Blank Samples

Various QA/QC samples will be collected during the project to provide a mechanism to evaluate the attainment of project DQOs. The estimated number of QA/QC samples to be collected is presented in Table 3. The types of QA/QC samples planned are discussed below. Due to the nature of the project, not all types of QA/QC samples are applicable to this project.

5.2.1 Field Duplicates

A field duplicate sample is a second sample collected at the same location as the original sample. Duplicate samples are collected simultaneously or in immediate succession, using identical recovery techniques, and treated in an identical manner during storage, transportation, and analysis. The sample containers are assigned an identification number in the field such that they cannot be identified (blind duplicate) as duplicate samples by laboratory personnel performing the analysis. Specific locations are designated for collection of field duplicate samples before the beginning of sample collection.

Duplicate sample results are used to assess precision of the sample collection process. Precision of soil samples to be analyzed for VOCs is assessed from co-located samples because the compositing process required to obtain uniform samples could result in loss of compounds of interest. Duplicates will only be collected for berm confirmation samples, and they will be collected at a rate of 10 percent of the environmental samples.

5.2.2 Trip Blank

The trip blank consists of a VOC sample vial filled in the laboratory with American Society for Testing and Materials (ASTM) Type II reagent-grade water, transported to the sampling site, stored and transported with the environmental samples, and returned to the laboratory for analysis. Trip blanks are not opened in the field. Trip blanks are prepared only when aqueous VOC samples are taken and are analyzed only for VOC analytes. Trip blanks are used to assess the potential introduction of contaminants from sample containers or during the transportation and storage procedures. One trip blank shall accompany each cooler of samples sent to the laboratory for aqueous analysis of VOCs.

5.2.3 Matrix Spike/Matrix Spike Duplicate

MS/MSD samples will be collected and shipped to the laboratory for spike analyses. MS/MSD samples will be collected at a rate of 5 percent of the environmental samples. However, if a spike sample has not been collected in a 14-day time period, a spike sample will be collected and sent for analyses. A lab can often use primary samples to run spike analyses and no additional samples need to be collected; however, as Table 3 indicates, additional sample volumes are required for MS/MSD samples for several analytical methods for this project.

5.2.4 QA Split Samples

QA samples are used to calculate the precision of the sampling and analytical processes by providing a measure of comparability between laboratories. QA samples will be collected during berm confirmatory sampling at a rate of 10 percent and will be split from the primary samples. QA samples will be submitted to the USACE QA Laboratory, the Missouri River District Laboratory, for independent analysis.

5.2.5 Other Samples

Equipment blanks, ambient blanks, and field replicates will not be collected during this sampling program.

6.0 SAMPLE CUSTODY AND HOLDING TIMES

To preserve the sample quality and integrity from time of collection until time of analysis, sample preparation, preservation, storage, and shipment procedures have been established. The appropriate type and number of sample containers, method of preservation, and analytical holding times are summarized in Tables 4a and 4b. Additional custody procedures are discussed in Section 5.3.3 of the FSP.

7.0 ANALYTICAL PROCEDURES

Analytical procedures required to meet the specified level of analytical support are from *Test*

Methods for Evaluating Solid Waste Physical/Chemical Methods, SW-846, Third Edition, Final Update III, U.S. EPA Office of Solid Waste and Emergency Response (OSWER), September 1986 (SW-846). Note that EnCore samplers and Extraction Method 5035 will not be used for soil VOC sampling and analysis.

No method modifications are planned. If exceptions or modifications are found following project execution, the procedures used will be documented in the Chemical Data Quality Report (CDQR) prepared by CAPE along with the reason for the deviation. Equivalent methods will only be substituted for the listed methodology if prior approval by the USACE Contracting Officer is given.

7.1 Laboratory Data Packages

A CLP-like or Level III data package (laboratory data package [LDP]) will be submitted by the laboratory for each sample delivery group. Elements of the LDP deliverables are summarized in Tables 5a through 5d.

7.2 Analytical Constituent Lists and Practical Quantitation Limits

Lists of constituents to be used for this project are included with their respective MDLs and PQLs in Tables 1 and 2a. These tables compare the backfill and berm confirmation objectives, which are the most stringent NYSDEC TGSCS or TAGM #4046 levels, to the lab's MDLs and PQLs. The tables also compare TCLP criteria to the lab's MDLs and PQLs.

Chemical concentrations in the wastewater samples will be evaluated against the local POTW requirements or an off site disposal facility's requirements.

Chemical concentrations in the characterization samples will be evaluated against the off site disposal facility's requirements.

8.0 CALIBRATION PROCEDURES AND FREQUENCY

This section of the QAPP discusses the calibration procedures that will be used by the selected subcontracted laboratory. Laboratory standard operating procedures (SOPs) describe the laboratory procedures for instrument calibration and will be provided in Attachment 3 to this QAAP.

Calibration procedures for field instruments are addressed in Section 12.1 of the FSP.

9.0 INTERNAL QUALITY CONTROL CHECKS

The data quality evaluation process is used to assess the effect of the overall analytical process on the usability of the data. The two major categories of data evaluation are laboratory performance and matrix interferences. Evaluation of laboratory performance is a check for compliance with the method requirements and is a straightforward examination; either the laboratory did, or did not, analyze the samples within the limits of the analytical method. Evaluation of the matrix interferences is subtler and involves examination of several results including surrogate spike recoveries, LCS recoveries, MS recoveries, and duplicate sample results.

Before the analytical results are released by the laboratory, both the sample and QC data will be carefully reviewed to verify sample identity, instrument calibration, detection limits, dilution factors, numerical computations, accuracy of transcriptions, and chemical interpretations. Additionally, the QC data will be reduced and spike recoveries will be included in control charts, and the resulting data will be reviewed to ascertain whether they are within the laboratory-defined limits for accuracy and precision. Any nonconforming data will be discussed in the data package cover letter and case narrative. The laboratory will retain all the analytical and QC documentation associated with each data package. Such retained documentation need not be hard (paper) copy, but can be available on other storage media such as magnetic tape. However, the laboratory must be able to produce a hard copy of all the retained information upon request.

The LDP will be reviewed by the project chemists in accordance with the process outlined in the EPA guidance document, *Functional Guidelines for Evaluating Data Quality* (EPA, 1999, 2002, or latest revision). This overall process is used regardless of whether the samples were analyzed using CLP methods or not. The data review and validation process is independent of the laboratory's checks. It focuses on the usability of the data to support the project data interpretation and decision-making process. Areas of review include LDP completeness, holding time compliance, initial and continuing calibration, spiked sample results, method blank results, and duplicate sample results. Acceptance criteria for each area of review are specified in the analytical method or Functional Guidelines. Any nonconformances will be noted in the data review report and the effect of the nonconformance on the overall usability of the data will be evaluated as part of the overall data quality evaluation.

Samples that do not meet the acceptance limit criteria will be indicated with a qualifying flag, which is a one- or two-letter abbreviation that indicates a problem with the data.

Flags used in the text may include the following:

U Undetected. Analyte was analyzed for but not detected above the detection limit.

J Estimated. The analyte was present, but the reported value may not be accurate or precise.

UJ RL estimated. The analyte was not detected above the MDL, but the actual detection limit may be estimated.

R Rejected. The data were rejected because the corresponding QC data were not within the method-specified limits.

It is important to note that laboratory qualifying flags are included on the data summary forms that are submitted to the project by the laboratory. However, during the data review and validation process, the laboratory qualifying flags are evaluated and replaced with validation flags.

Once each of the LDPs has been reviewed, and the data review report completed, then the entire data set will be evaluated for overall trends in data quality and usability. Information summarized as part of the data quality evaluation may include chemical compound frequencies of detection, dilution factors that might affect data usability, and patterns of target compound distribution. The data set will also be evaluated to identify potential data limitation or uncertainties in the laboratory. Additional areas of review are discussed below.

9.1 Field and Laboratory Blank Contamination

This review includes the appearance and concentration of target compounds in field and laboratory blanks as well as of environmental samples. Common field sampling and laboratory contaminants detected in blanks include acetone, methylene chloride, and phthalates. Acetone and methylene chloride are used to extract samples in the laboratory and hence are common laboratory contaminants. Phthalates are used as plasticizers, the most common of which is bis (2-ethylhexyl) phthalate, and are often introduced during sample handling.

According to the EPA Functional Guidelines (EPA, 1999, 2002), concentrations of these common contaminants detected in samples at less than 10 times the maximum concentration in the blanks can be attributed to field sampling and laboratory contamination rather than to environmental contamination from site activities. As a note, concentrations of common contaminants such as acetone, methylene chloride, and phthalates detected in both the sample and the corresponding blanks use the 10X rule. Concentrations of less common contaminants are multiplied by five rather than 10, as required by the EPA Functional Guidelines.

9.2 Surrogate Spike Recoveries

Surrogate spike recoveries are compounds for each of the organic analytical methods. For gas chromatograph/mass spectrometer (GC/MS) analyses, surrogate spike compounds are the structural homologs of target compounds, often with deuterium substituted for hydrogen, and are therefore expected to behave in a similar manner during analysis. For GC analyses, surrogate spike compounds are structurally similar (but not identical) to target compounds, and again, should behave in a similar manner during analysis. Surrogate spike recoveries are used to monitor both laboratory performance and matrix interferences. Surrogate spike recoveries from field and laboratory blanks are used to evaluate laboratory performance because these blanks represent an ideal sample matrix. Surrogate spike recoveries for field samples are used to evaluate the potential for matrix interferences. When surrogate spike recoveries for field samples fall outside the method target acceptance windows, the samples are reanalyzed. If the surrogate spike recovery is still outside the acceptance window for the reanalyzed sample, then the sample results are qualified as affected by matrix interferences.

9.3 Matrix Spike Recoveries

For this QC measure, three aliquots of a single sample are analyzed: one native and two spiked with the same concentration of MS compounds. Unlike the surrogate spike compounds, MS compounds are found on the method target compound list. Spike recovery is used to evaluate potential matrix interferences as well as accuracy. The duplicate spike results are compared to evaluate precision.

9.4 Duplicate Sample Results

Typically, one duplicate field sample will be collected for every 10 field samples. Both the native and duplicate samples are analyzed for the same parameters. Target compounds that are detected in both the native and duplicate samples can be compared and precision for the sample results calculated. Field duplicates will only be collected during berm confirmation sampling for this project.

9.5 Reconciliation with Data Quality Objectives

The final activity of the data quality evaluation is an assessment of whether the data meets the DQOs. The goal of this assessment is to demonstrate that a sufficient number of representative samples were collected and the resulting analytical data can be used to support the project decision-making process. The following precision, accuracy, representativeness, completeness, and comparability measures are used:

- **Precision** - is the agreement between duplicate results and can be estimated by comparing duplicate MS recoveries and field duplicate sample results

- **Accuracy** - is a measure of the agreement between an experimental determination and the true value of the parameter being measured. For organic analyses, each of the samples is spiked with a surrogate spike compound; for inorganic analyses, each sample is spiked with a known reference material before digestion. Each of these approaches provides a measure of the matrix effects on the analytical accuracy. Accuracy can be estimated from the analytical data and cannot be measured directly

- **Representativeness** - is a qualitative measure of the degree to which sample data accurately and precisely represent a characteristic environmental condition. Representativeness is a subjective parameter and is used to evaluate the efficacy of the sampling plan design. Representativeness is demonstrated by providing full descriptions of the sampling techniques and the rationale used for selecting sampling locations in the project scoping documents

- **Completeness** - is defined as the percentage of measurements that are judged to be valid compared to the total number of measurements made. A goal of 90 percent usable data is desired for this project.

- **Comparability** - is another qualitative measure designed to express the confidence with which one data set may be compared to another. The following factors affect comparability: sample collection and handling techniques, sample matrix type, and analytical method. Comparability is limited by the other PARCC parameters because data sets can be compared with confidence only when precision and accuracy are known. Data from one phase of an investigation to another can be compared when the same EPA-approved methods are used and LDP deliverables are similar.

10.0 CALCULATION OF DATA QUALITY INDICATORS

10.1 Quality Control Measures

The QC measures described below are incorporated into the SW-846 analytical methods.

10.1.1 Method Blanks

A method blank is a sample of analyte-free water that is treated as a sample in that it undergoes the same analytical process as the corresponding field samples. Method blanks are used to monitor laboratory performance and contamination introduced during the analytical procedure. Typically, one method blank is required per 10 or 20 samples (depending on the analytical method) or one per batch, whichever is more frequent.

10.1.2 Matrix Spikes

For inorganic analyses, a single sample is split and one portion is spiked with a known amount of reference material. For organic analyses, three aliquots of a single sample are analyzed, one native and two spiked with MS compounds. Unlike the surrogate spike compounds, MS compounds are found on the method target compound list (TCL). Spike recovery is used to evaluate potential matrix interferences as well as accuracy. The duplicate spike results are compared to evaluate precision. The MS compounds and method target acceptance ranges are summarized for each analytical method. Typically, one MS (inorganic) or MS/MSD sample (organic) is analyzed for every 20 samples of the same matrix.

10.1.3 Surrogate Spikes Recoveries

This QC measure is applicable only to organic analyses. Surrogate compounds are the structural homologs of target compounds, often with deuterium substituted for hydrogen, and are therefore expected to behave in a similar manner during the analysis. Surrogate spike recoveries are used to monitor both laboratory performance and matrix interferences. Surrogate spike recoveries from field and laboratory blanks are used to evaluate laboratory performance because the field blanks represent an "ideal" sample matrix. Surrogate spike recoveries for field samples are used to evaluate the potential for matrix interferences. For field samples, when the surrogate spike recoveries fall outside the method target acceptance windows, the samples are reanalyzed. If the surrogate spike is still outside the acceptance window for the reanalysis, then the sample results are qualified as affected by matrix interferences.

10.2 Formulas for Calculating Data Quality Indicators

This section discusses how the quantitative DQO parameters of precision, accuracy, and completeness will be calculated from project data.

10.2.1 Precision

Precision is a measure of the agreement or repeatability of a set of replicate results obtained from duplicate analyses made under the same conditions. Precision will be estimated from analytical data and cannot be measured directly. The precision of a duplicate determination can be expressed as the RPD, as calculated from the equation:

$$RPD = \frac{S - D}{\frac{(S + D)}{2}} \times 100$$

Where: S = First sample value (original or MS spike value)
D = Second sample value (duplicate or MSD value).

10.2.2 Accuracy

Accuracy is a measure of the agreement between an experimental determination and the true value of the parameter being measured. Accuracy is estimated through the use of known reference materials or MS. Accuracy is calculated from analytical data and is not measured directly. Spiking of reference materials into an actual sample matrix is the preferred technique because it provides a measure of the matrix effects on the analytical accuracy. Accuracy, defined as percent recovery (P), is calculated by the following equation:

$$PERCENT\ RECOVERY = \frac{(C_2 - C_1)}{C_0} x100\%$$

where: C_2 = measured value of the spiked sample
C_1 = measured value of the unspiked sample
C_0 = known amount of the spike in the sample.

10.2.3 Completeness

Completeness is defined as the percentage of measurements judged to be valid compared to the total number of measurements made. Completeness is calculated using the formula:

$$\text{Completeness} = \frac{\text{Valid Measurements}}{\text{Total Measurements}} \times 100$$

11.0 CORRECTIVE ACTIONS

11.1 Field Activities Corrective Actions

The PM is responsible for initiating corrective actions. Corrective action steps include problem identification, investigation responsibility assignment, investigation, action to eliminate the problem, increased monitoring of the effectiveness of the corrective action, and verification that the problem has been eliminated.

Documentation of the problem is important to the overall management of the study. A corrective action request form for problems associated with sample collection is completed by the person discovering the QA problem. This form identifies the problem, establishes possible causes, and designates the person responsible for action. The responsible person will be either the PM or the CQCSM.

The correction action request form (Figure 1) includes a description of the corrective action planned and has space for follow-up. The PM verifies that the initial action has been taken and appears to be effective and, at an appropriate later date, checks to see if the problem has been resolved fully. The PM receives a copy of all corrective action request forms and enters them into the corrective action log. This permanent record aids the PM in follow-up and assists in resolving the QA problems.

Examples of corrective action include, but are not limit to, correcting COC forms, analysis reruns (if holding time criteria permit), recalibration with fresh standards, replacement of sources of blank contamination, or additional training in sampling and analysis.

Additional approaches may include the following:

- Resampling and reanalyzing
- Evaluating and amending sampling and analytical procedures
- Accepting the data and acknowledging the level of uncertainty or inaccuracy by flagging the validated data and providing an explanation for the qualification.

11.2 Laboratory Activities Corrective Actions

The laboratory department supervisors review the data generated to verify that all QC samples have been run as specified in the protocol. Laboratory personnel are alerted that corrective actions may be necessary under the following conditions:

- QC data are outside the warning or acceptable windows for precision and accuracy established for laboratory samples
- Blanks contain contaminants at concentrations above the levels specified in the laboratory QAPP for any target compound
- Undesirable trends are detected in MS recoveries or RPD between MSDs

- There are unusual changes in detection limits

- Deficiencies are detected by the Laboratory QA Director during internal or external audits, or from the results of performance evaluation samples.

If nonconformances appear in analytical methodologies, QC sample results are identified by the bench analyst, and corrective actions are implemented immediately. Corrective action procedures are handled initially at the bench level by the analyst, who reviews the preparation or extraction procedure for possible errors; and checks the instrument calibration, spike and calibration mixes, instrument sensitivity, and so forth. The analyst immediately notifies his/her supervisor of the problem that is identified and the investigation being made. If the problem persists or cannot be identified, the matter must be referred to the laboratory supervisor and QA/QC officer for further investigation. Once resolved, full documentation of the corrective action procedure must be filed with the laboratory supervisor, and the QA/QC officer must be provided with a corrective action memorandum for inclusion into the project file if data are affected.

Corrective actions may include, but are not limited to, the following:

- Reanalyzing suspect samples
- Resampling and analyzing new samples
- Evaluating and amending sampling and analytical procedures
- Accepting data with an acknowledged level of uncertainty
- Recalibrating analytical instruments
- Qualifying or rejecting the data.

After the implementation of the required corrective action measures, data deemed unacceptable may not be accepted by the PM, and follow-up corrective actions may be explored. Details of laboratory corrective actions are provided in the Lab QAM. A summary of typical laboratory QC requirements and corrective actions is included as Tables 6a – 6e.

12.0 DATA REDUCTION, VALIDATION, AND REPORTING

This section of the QAPP discusses the data review process that is required to assure the validity of the data. This process includes a combination of laboratory data reduction and review, independent review and validation, and laboratory reporting procedures that are discussed in the following paragraphs.

All data generated through field activities or by the laboratory operation shall be reduced and validated before reporting. The laboratory shall extensively review all analytical data generated before report generation to verify the validity of the reported data. This internal data review process shall consist of data generation, reduction, a minimum of three levels of documented review, and reporting. In each stage, the review process shall be documented using an appropriate checklist form that is signed and dated by the reviewer. The completed forms shall be maintained in the laboratory project files.

12.1 Data Reduction

12.1.1 Field Data Reduction Procedures

Field data reduction procedures will be minimal in scope compared to those implemented in the laboratory setting. Only direct-reading instrumentation will be employed in the field. The use of photoionization detector (PIDs) will generate some measurements directly read from the meters following calibration per manufacturer's recommendations as outlined in Section 12.1 of the FSP. Such data will be written into field logbooks immediately after measurements are taken. If errors are made, results will be legibly crossed out, initialed, and dated by the field member, and corrected in a space adjacent to the original (erroneous) entry. Later, when the results forms required for this study are being filled out, the CAPE CQCSM or PM will proof the forms to determine whether any transcription errors have been made by the field crew.

Because the use of field instrumentation such as a mobile GC will not be used, there will be no further need for assuring that field data has been reduced properly through the use of formulas or interpretation of raw data printouts.

12.1.2 Laboratory Data Reduction Procedures

For this program, the equations that will be employed in reducing data are those specified in SW-846 and the applicable laboratory SOP for inorganic and organic analyses. Laboratory data reduction procedures will be followed according to the following protocol: all raw analytical data will be recorded in numerically identified laboratory notebooks. Only the Laboratory QA Supervisor will issue these notebooks. Data are recorded in this notebook along with other pertinent information, such as the sample identification number and the sample label number. Other details will also be recorded in the laboratory notebook, such as the analytical method used (SOP#), name of analyst, the date of analysis, matrix sampled, reagent concentrations, instrument settings, and the raw data. Each page of the notebook shall be signed and dated by the analyst. Copies of the strip chart printouts (such as gas chromatograms) will be maintained on file. Periodic review of these notebooks by the Laboratory QA Supervisor takes place before final data reporting. (Records of notebook entry inspections are maintained by the Laboratory QA Supervisor.)

Specific data reduction procedures are summarized within the laboratory SOPs along with the persons responsible for each task. These procedures address any statistical approaches used for reducing data, and include applicable units and any term definitions.

In general, data will be reduced in one of the following ways:

- Manual computation of results directly on the laboratory bench sheet or on calculation pages attached to the data sheets

- Input of raw data for computer processing

- Direct acquisition and processing of raw data by a computer.

If data are manually processed by an analyst, all steps in the computation are provided including the equations used and the source of input parameters such as response factors, dilution factors, and calibration constants. If calculations are not performed directly on the data sheet, calculations are done on standard calculation paper and attached to the data sheets.

If data are input and processed using a computer, a copy of the input is kept and uniquely identified with the project number and other information, as needed. The samples analyzed shall be evident and the input signed and dated by the analyst.

If data are directly acquired from instrumentation and processed, the analyst verifies that the following are correct: project and sample numbers, calibration constants and response factors, output parameters such as units, and numerical values used for detection limits (if a value is reported as less than). The analyst signs and dates the resulting output.

12.1.3 Laboratory Data Review Procedures

The laboratory's data review process is detailed within the respective laboratory QA plan and is summarized in this section. The analyst who generates the analytical data has the prime responsibility for the correctness and completeness of that data. Each step of the review process involves evaluation of data quality based on both the results of the QC data and the professional judgment of those conducting the review. This application of technical knowledge and experience to the evaluation of data is essential in ensuring that data of quality are generated consistently.

All data generated and reduced shall follow well-documented in-house protocols, including three levels of technical review:

- Level 1 technical data review, performed by the analyst

- Level 2 technical review, performed by a supervisor or data review specialist

- Level 3 administrative data review, performed by the QA Officer or the Program Administrator at the subcontract laboratory.

Laboratory review of analytical data shall be consistent with SW-846 protocol and applicable laboratory SOPs. One hundred percent of laboratory-generated data will be subjected to internal data review. If matrix interferences are identified during analysis, method modifications such as additional cleanup steps, sample volume changes, and analytical procedure revisions will be attempted and documented. If method modifications do not remedy the problem, alternative procedures will be proposed. The laboratory will assign qualifiers to the data consistent with those described within the U.S. EPA CLP to indicate impacts to data use. At a minimum, the following information will be evaluated by the laboratory, as applicable:

- Calibration (initial and continuing) and tuning check results
- Analyte identification and quantification are correct
- QC samples and method blanks are within control limits
- Data summaries and reports for transcription and typographical errors
- Holding times, sample preservation, and sample storage criteria have been met
- Sample COC documentation for completeness, accuracy, and to ensure sample integrity has been maintained
- Sample preparation information for completeness and accuracy
- Documentation (including the case narrative) is complete and correct.

12.1.4 Treatment of Outliers and Nonconforming Data

Corrective action measures will be taken to resolve problems and restore proper function to any analytical system generating data that indicate that the system is not performing adequately.

Corrective measures may be necessary when the following occurs:

- QC data are not within control for precision and accuracy
- Blanks are found with contaminants above acceptable levels
- Calibration data or instrument performance parameters are not within acceptance criteria
- Undesirable trends are observed in QC data or calibration data
- There are sudden changes in instrument sensitivity or performance
- Deficiencies are identified during audits or from the results of performance evaluation samples.

Initiation of corrective action resulting from the evaluation of QC results will be the responsibility of the Laboratory QA Manager in consultation with the Project Chemist. Corrective action may include, but is not limited to the following:

- Reanalysis of the samples
- Documentation of interferences or matrix effects that result in poor analytical performance
- Evaluating and changing sampling or analytical procedures
- Resampling and reanalysis, if the completeness or usability of the data set does not meet the criteria for acceptability.

12.2 Data Validation

Data validation procedures shall be performed for both field and laboratory operations as described below.

12.2.1 Procedures Used to Evaluate Field Data

Procedures to evaluate field data for this program primarily include checking for transcription errors and review of field logbooks, on the part of the field crewmembers. This task will be the responsibility of the CQCSM or Site Manager, who will otherwise not participate in making any of the field measurements, or in adding notes, data, or other information to the logbook.

12.2.2 Procedures to Validate Laboratory Data

Review of the analytical data will be conducted incrementally on each LDP. Analytical results will be thoroughly reviewed before release to the client (CAPE or USACE depending on the point in the review process). There are five steps for review to achieve acceptable data for the purposes of this program. These steps are defined below.

<u>Step 1 - Laboratory Data Review</u>

The primary laboratory shall review their data before releasing LDPs /reports to CAPE. This step is applicable to all LDPs.

Process: The review process shall be as described in Section 12.1.3 of this QAPP.

Product: Analytical reports shall contain the analytical results with laboratory QC data. The reports will contain the items described in Section 12.3.2 of this QAPP.

<u>Step 2 - Data Verification</u>

CAPE shall perform this task for 100 percent of the primary laboratory data. This step is applicable to all LDPs.

Process: This is the process of evaluating the completeness, consistency, and compliance of an LDP against the QAPP DQOs. This process requires a definitive data package. CAPE shall extend the data assessment process to include additional data verification**.** This verification process shall include the following: results of LCS/laboratory control sample duplicate (LCSD), and/or MS/MSD, results of surrogate recoveries, and results of duplicates. The reviewer shall perform verification of 100 percent primary sample results with respect to these QC indicators. Note that the verification performed by CAPE is intended to assist the USACE to fulfill the Chemical Quality Assurance Report (CQAR) requirement for primary laboratory data review in Step 3. The procedure CAPE will use to complete this process is described in Section 12.2.3 of this QAPP.

Product: The reviewer shall assign and/or change qualifiers that were assigned by the laboratory to fit their findings, without recalculating the positive hits in the data. This will result in a CDQR that shall include QC nonconformances in summary table(s) format, analytical results, and QC summary tables as submitted by the laboratory.

Step 3 - Data Assurance

USACE will have QA split samples analyzed at the Missouri River District Laboratory and prepare the CQAR.

Process: The intent of data assurance is to provide a complete assessment of the quality of the data by examining primary samples, 10 percent duplicates, and their 10 percent split samples (QA) via comparison of the QA sample results to the duplicate and/or primary sample results. Examination of the primary sample data and their 10 percent split samples (QA) provides the data user with a degree of the acceptance and usability of the Chemical Data Quality. The findings should be summarized in the CQAR.

Product: A detailed description of the CQAR preparation is provided in Chapter 4, EM 200-1-6, USACE, 10 October 97. The CQAR is a document that is prepared by an independent entity, not involved directly in the analysis of the primary samples, and is the responsibility of the USACE. Note that the verification and validation performed by CAPE in Steps 2 and 4 are intended to fulfill the CQAR requirement for primary laboratory data review. To assure an acceptable quality of primary sample results, the CQAR will normally be divided into sampling event CQARs over the duration of the project. Any nonconformance with the SAP will be related to CAPE, and to the project laboratory for corrective actions. Corrective actions will be implemented to avoid such deficiency in the subsequent phases of analysis. This approach allows in real-time, determination of the laboratory analytical performance, allows immediate determination of data integrity, and data usability. At the end of each project all the CQARs will be assembled into one final CQAR.

Step 4 - Data Validation

A full data validation will not be performed on the waste characterization soil samples, the berm confirmatory samples, or the borrow source samples. If data validation is completed, procedures will be based on EPA-approved procedures included in *U.S. EPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, EPA-540/R-94-012 (U.S. EPA, 1994a) and *U.S. EPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, EPA-540/R-94-013 (U.S. EPA, 1994b) (Functional Guidelines).

Process: Full data validation will not be performed on the waste characterization soil sample data, the berm confirmatory sample data, or the borrow source sample data. However, comprehensive data packages shall be provided for all soil sample analyses so that data could be selected for recalculation.

Product: Validation is not to be completed under this contract; however, validators could randomly choose a percent of the raw data for recalculation and validation, if needed. Full validation includes recalculating the positive hits above the method reporting limit (MRL). The validator will qualify the data as "U" for levels below the MRL, "J" for estimated values, and "R" for rejected values. If serious problems are encountered during the validation process, recalculation could be conducted on the next 10 percent of the raw data, and so on until a level of confidence is reached to accept or reject the data.

Step 5 – Chemical Data Quality Assurance Report

To determine whether the data is acceptable or not, two elements may be required, CQAR and/or Validation Report. If there are no major discrepancies between the QC and primary data, and also, the full data validation determined that the data is acceptable based on the level of confidence (normally at more than or equal to 90 percent usable data), then the data is considered acceptable. If the level of confidence is less than 90 percent, then an additional 10 percent full data validation will be conducted. To this end, the USACE Chemist prepares the CDQAR as outlined in EM200-1-6, Chapter 5, 10 October 97.

12.2.3 CAPE Procedures to Verify Laboratory Data

A Data Evaluation Review (Step 2 of the data assessment process) will be performed by CAPE personnel independent of the laboratory generating the data and will be documented in the CDQR prepared by CAPE upon receipt of the final LDP of each task order. The process will identify any data omissions and out-of-control data points for QC included in the evaluation and interact with the laboratory to correct data deficiencies. Decisions to repeat sample collection and analysis may be made by the PM based on the extent of the deficiencies and their importance in the overall context of the project.

Data evaluations will be based on the QA/QC requirements of the referenced analytical procedures, QC objectives presented in this QAPP, and professional judgment of the evaluator. At a minimum, specific data evaluations shall include evaluation of:

- Sample receipt records
- Technical holding times
- Constituent reporting limits
- Laboratory duplicate RPD results
- MS/MSD analyses (for organics only)
- MS/Post-digestion spike analyses (for inorganics only)
- LCS
- Blank analyses
- Surrogate spike analyses (for organics only)
- Laboratory case narratives
- Calibration (initial calibration verification [ICV] and continuing calibration verification [CCV]).

The data quality review shall include evaluation of 100 percent of these data. If this review reveals trends of data quality deficiencies or systematic laboratory problems, appropriate additional QC data will be requested (if necessary) from the laboratory for review. Additional laboratory QC data may include initial calibration summaries, calibration check compounds (CCCs), GC/MS tuning checks, internal standard performance, target compound identification and quantitation summaries, sample or standard chromatograms, serial dilutions (used for Inductively Coupled Argon Plasma [ICAP] metals only), or others. These data will be evaluated against established criteria defined in the project DQOs, the functional guidelines, and the approved analytical method.

Data evaluation findings will be documented in the CDQR in terms of analytical representativeness, accuracy, precision, completeness, and sensitivity. Assessment of data comparability is performed by evaluation of QA split sample results that will not be available during the review, and will be the responsibility of the USACE QA Officer.

12.2.3.1 Nonconformance of Data. CAPE will evaluate the above listed criteria and additional information provided in Section 12.3.2 to determine compliance with the acceptance criteria. In the case that the data do not meet the acceptance criteria, the laboratory will be contacted immediately to determine the source of the failure and determine the need for reanalysis of the sample to meet the criteria. A nonconformance report will be issued at this time, if appropriate. Additional documentation procedures and requirements are outlined in Section 10 of the FSP.

12.3 <u>Data Reporting</u>

Data reporting procedures shall be carried out for field and laboratory operations as indicated below.

12.3.1 Field Data Reporting

Field data reporting shall be conducted principally through the transmission of report sheets containing tabulated results of all measurements made in the field, and documentation of all field calibration activities.

12.3.2 Laboratory Data Reporting

Analytical data reports shall use a CLP-like (Level III), comprehensive data package that is fully validatable. These reports shall contain all information and data as required in the applicable CLP SOW and as described below.

- Case narrative:
  - Date of issuance
  - Laboratory report table of contents
  - Project name and number
  - Laboratory analysis performed
  - Any deviations from intended analytical strategy
  - Laboratory batch number
  - Numbers of samples and respective matrices
  - QC procedures used and also references to the acceptance criteria
  - Condition of samples ‘as received’
  - Discussion of whether or not sample holding times were met
  - Discussion of technical problems or other observations that may have created analytical difficulties
  - Discussion of laboratory QC checks that failed to meet project criteria
  - Signature of the Laboratory QA Manager

- Sample custody documentation
  - Original signed COC records
  - Cooler receipt forms

- Chemistry data package
  - Case narrative for each analyzed batch of samples
  - Summary page indicating dates of analyses for samples and laboratory QC checks
  - Cross referencing of laboratory samples to project sample identification numbers
  - Data qualifiers to be used shall be adequately described
  - Sample preparation and analyses methods for samples
  - Sample results
  - MS and MSD recoveries, LCSs, method blank results, and surrogate spike results
  - Dilution factors, collection dates, extraction dates, and analysis dates
  - Laboratory sample spiking levels

- Calibration data and raw data package
  - Results of (dated) initial and continuing calibration checks, and GC/MS tuning results
  - Calibration check compounds and internal standard results
  - Labeled (and dated) chromatograms/spectra of sample results and laboratory QC checks
  - Raw data for sample results and laboratory QC samples.

12.3.3 Electronic Data Deliverable

CAPE will submit all analytical data to the USACE. The electronic data deliverable (EDD) from the laboratory will be in Excel format. The laboratory will certify that the EDD and the hard copy reports are identical.

12.4 Laboratory Turnaround Time

The analytical laboratory will provide faxed and/or electronic results to CAPE within 21 working days of sample receipt, or the requested turnaround time. These data will be used to make operational field decisions. Level III data packages will be submitted to CAPE within 30 working days of sample receipt.

13.0 PREVENTIVE MAINTENANCE

13.1 Field Instruments

All equipment used by CAPE will be maintained in accordance with the manufacturer's instructions. Routine maintenance and all equipment repairs will be documented in the site logbook. Whenever a piece of equipment fails to operate properly, the instrument either will be repaired in-house (if possible) or will be sent out for repairs and another instrument equivalent to the original substituted.

13.2 Analytical Laboratory Instruments

Preventive maintenance for laboratory instruments is discussed in detail in the Laboratory SOPs (Attachment 3).

14.0 PERFORMANCE AND SYSTEM AUDITS

Performance and systems will be audited to verify documentation and implementation of the project work plan, to identify nonconformances, and to verify correction of identified deficiencies.

14.1 Assessments and Response Actions

Assessment activities may include surveillance, inspections, peer review, management system review, readiness review, technical systems audit, performance evaluation, and data quality assessment. The CAPE PM or Project Chemist will be responsible for initiating audits, for selecting the audit team, and for overseeing audit implementation.

The CAPE PM or Project Chemist will evaluate the need for a performance audit independently, or by recommendation of the PM or the client. Performance audits are used to quantitatively assess the accuracy of analytical data through the use of performance evaluation and blind check samples. Laboratory performance will be audited by the PM, Project Chemist, or a designee.

The CQCSM or Site Manager is responsible for supervising and checking that samples are collected and handled in accordance with the approved project plans and that documentation of work is adequate and complete. The PM is responsible for seeing that project performance satisfies the QA/QC objectives. Reports and technical correspondence will be peer reviewed by an assigned qualified individual, otherwise external to the project, before being finalized.

14.2 Field Team Performance and System Audits

The Site Superintendent or a designated representative will conduct weekly informal audits of the field activities.

The weekly audit for completeness will include the following items:

- Sample labels
- COC records
- Field notebooks
- Sampling operations
- Document control.

The first three items above will be checked for completeness. Sampling operations will be reviewed to determine if they are performed as stated in the project-specific work plan, or as directed by the Site Superintendent. The informal document control audit will consist of checking each document for completeness, including such items as signatures, dates, and project numbers.

A systems audit of field operations may be required by the project-specific work plan and will be used to review the total data generation process, which includes onsite review of the field operational system, physical facilities for sampling, and equipment calibrations. A performance audit may be conducted by the PM and the Site Superintendent during the first week of sampling if it is deemed necessary by the PM, Site Superintendent, Project Chemist, or client. The audit may focus on verifying that proper procedures are followed so that subsequent sample data will be valid. Before the audit, a checklist will be prepared by the

PM and the Site Superintendent, and will serve as a guide for the performance audit. The audit may verify the following:

- Collection of samples follows the available written procedures
- COC procedures are followed for traceability of sample origin
- Appropriate QC checks are being made in the field and documented in the field logbook
- Specified equipment is available, calibrated, and in proper working order
- Sampling crews are adequately trained
- Recordkeeping procedures are being followed and appropriate documentation is maintained
- Corrective action procedures are followed.

An audit report summarizing the results and corrections will be prepared and filed in the project files.

14.3 Laboratory Performance and Systems Audits

The analytical laboratory will conduct both internal and external QC checks. External QC checks include participation in EPA's certification and performance evaluation programs. The results of quarterly performance evaluation samples will be made available to the PM on request. Internal QC checks (duplicates, blanks, and spiked samples) will be performed in accordance with the approved methods.

Laboratory systems will be audited annually and as required by specific projects. Contracted laboratories are required to submit a Lab QAM and relevant SOPs before the field effort begins. If, during data evaluation and data use, any problems are noted, specific corrective actions will be implemented on a case-by-case basis. An additional systems audit may be requested by the CAPE PM or Project Chemist, if warranted.

Depending on the project objectives, the laboratory may be required to perform the following:

- Monthly project review of 10 percent of all projects done by the QA department
- Audits performed by the Laboratory QA Manager at a frequency greater than specified in the Lab QAM
- Special audits by the Project Chemist or corporate management when a problem is suspected.

15.0 QUALITY CONTROL REPORTS TO MANAGEMENT

The purpose of QC reports is to document implementation of the QAPP. These reports include periodic assessments of measurement data accuracy, precision, and completeness; the results of performance audits; the results of system audits; and identification of significant QC problems and recommended solutions.

The final QC report will be attached as an appendix to the project report and may include the following:

- Data quality assessment in terms of PARCC, and the method detection limits

- The degree to which DQOs were met

- Limitations of the measurement data; usability of the data

- Applicability of the data to site conditions

- Laboratory QC activities, including a summary of planned versus actual laboratory QC activities, explanations for deviations, and an evaluation of data quality for each analysis for each media

- Field QC activities, including a summary of planned versus actual field QC activities, explanations for deviations, and an evaluation of the data quality of field QC samples/activities and estimated effect on sample data

- Data presentation and evaluation, including an assessment of sampling and analysis techniques, data quality for each analysis and each media, and data usability.

A final report will be submitted to the client after comments from the client and any regulatory agencies have been incorporated.

16.0 QAPP REFERENCES

New York State Department of Environmental Conservation. *Technical Guidance for Screening Contaminated Sediments*. January 1999.

New York State Technical and Administrative Guidance Memorandum #4046. *Determination of soil cleanup objectives and cleanup levels.* January 1994.

U.S. Army Corps of Engineers (USACE), 2001a. *Requirements for the Preparation of Sampling and Analysis Plans*, EM 200-1-3. 1 February 2001.

U.S. Environmental Protection Agency (EPA), 2002. *Functional Guidelines for Evaluating Data Quality, Inorganic*.

U.S. EPA, 1999. *Functional Guidelines for Evaluating Data Quality, Organic*.

U.S. EPA, 1994a. *U.S. EPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, EPA-540/R-94/012*. February.

U.S. EPA, 1994b. *U.S. EPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, EPA-540/R-94/013*. February.

U.S. EPA, 1986. *Test Methods for Evaluating Solid Waste, SW-846, Third Edition (including Update III)*. November.

TABLES

Table 1

BACKFILL AND BERM CONFIRMATION OBJECTIVES

METHOD	PARAMETER	MDL[1,*]	PQL[1,*]	SOIL OBJECTIVE[1]	
				TAGM	TGSCS**
TAL Metals 6010B/7000	Aluminum	0.53649	10.0	SB	N/A
	Antimony	0.18451	6.0	SB	2.0
	Arsenic	0.14914	0.5	7.5 or SB	6.0
	Barium	0.02237	10.0	300 or SB	N/A
	Beryllium	0.00474	1.0	0.16 or SB	N/A
	Cadmium	0.02716	1.0	1.0 or SB	0.6
	Calcium	0.75122	100.0	SB	N/A
	Chromium	0.11543	1.0	10 or SB	26.0
	Cobalt	0.11894	5.0	30 or SB	N/A
	Copper	0.10505	1.0	25 or SB	16.0
	Iron	0.67295	5.0	2,000 or SB	20,000
	Lead	0.0997	0.5	SB	31.0
	Magnesium	2.58267	100.0	SB	N/A
	Manganese	0.02479	5.0	SB	460.0
	Mercury	0.00229	0.1	0.1	0.15
	Nickel	0.09908	5.0	13 or SB	16.0
	Potassium	4.0159	500.0	SB	N/A
	Selenium	0.2478	0.5	2.0 or SB	N/A
	Silver	0.13074	1.0	SB	1.0
	Sodium	0.98477	100.0	SB	N/A
	Thallium	0.1996	1.0	SB	N/A
	Vanadium	0.08245	5.0	150 or SB	N/A
	Zinc	0.08203	1.0	20 or SB	120.0
Cyanide 9012A	Cyanide	0.127	0.5	SB	N/A
TCL VOCs 8260B	Acetone	0.00153	0.01	0.0011	N/A
	Benzene	0.00008	0.0025	0.0006	28
	2-Butanone	0.00061	0.01	0.003	N/A
	Carbon Disulfide	0.00035	0.0025	0.027	N/A
	Carbon Tetrachloride	0.00011	0.0025	0.006	0.6
	Chlorobenzene	0.00007	0.0025	0.017	3.5
	Chloroethane	0.00017	0.005	0.019	N/A
	Chloroform	0.00008	0.0025	0.003	N/A
	Dibromochloromethane	0.00013	0.0025	N/A	N/A
	1,2-Dichlorobenzene	0.0001	0.0025	0.079	12.0
	1,3-Dichlorobenzene	0.00011	0.0025	0.0155	12.0
	1,4-Dichlorobenzene	0.00023	0.0025	0.085	12.0
	1,1-Dichloroethane	0.00009	0.0025	0.002	N/A
	1,2-Dichloroethane	0.0001	0.0025	0.001	0.7
	1,1-Dichloroethene	0.00011	0.0025	0.004	0.02
	1,2-Dichloroethene (trans)	0.00008	0.0025	0.003	N/A
	Ethylbenzene	0.00008	0.0025	0.055	24
	1,1,2 Trichloro-1,2,2 Trifluoroethane	0.00011	0.0025	0.06	N/A
	Methylene chloride	0.00039	0.005	0.001	N/A
	4-Methyl-2-Pentanone	0.00048	0.005	0.01	N/A
	Tetrachloroethene	0.00011	0.0025	0.014	0.8
	1,1,1-Trichloroethane	0.00009	0.0025	0.0076	N/A
	1,1,2,2-Tetrachloroethane	0.00017	0.0025	0.006	0.3
	1,2,4-Trichlorobenzene	0.0002	0.005	0.034	91
	Toluene	0.00017	0.0025	0.015	49
	Trichloroethene	0.00011	0.0025	0.007	2.0
	Vinyl chloride	0.00014	0.005	0.0012	0.07
	Xylenes	0.0003	0.0025	0.012	92
TCL SVOCs 8270C	Acenaphthene	0.00363	0.33	0.9	140
	Acenaphthylene	0.00408	0.33	0.41	N/A
	Anthracene	0.0038	0.33	7.0	107
	Benzo(a)anthracene	0.00351	0.33	0.03	12
	Benzo(a)pyrene	0.00204	0.33	0.0609	1.3

Table 1

BACKFILL AND BERM CONFIRMATION OBJECTIVES

METHOD	PARAMETER	MDL[1,*]	PQL[1,*]	SOIL OBJECTIVE[1] TAGM	TGSCS**
	Benzo(b)fluoranthene	0.00248	0.33	0.011	N/A
	Benzo(g,h,I)perylene	0.00277	0.33	8.0	N/A
	Benzo(k)fluoranthene	0.00238	0.33	0.011	N/A
	bis(2-ethylhexyl)phthalate	0.05187	0.33	4.35	199.5
	Butylbenzylphthalate	0.00376	0.33	1.215	N/A
	Chrysene	0.00238	0.33	0.004	N/A
	4-Chloroaniline	0.0045	0.33	0.0022	N/A
	4-Chloro-3-methylphenol	0.00317	0.33	0.0024	N/A
	2-Chlorophenol	0.0032	0.33	0.008	N/A
	Dibenzofuran	0.00372	0.33	0.062	N/A
	Dibenzo(a,h)anthracene	0.0028	0.33	0.0143	N/A
	3,3'-Dichlorobenzidine	0.00367	0.66	N/A	N/A
	2,4-Dichlorophenol	0.00341	0.33	0.004	N/A
	2,6-Dinitrotoluene	0.00765	0.33	0.01	N/A
	Diethylphthalate	0.00472	0.33	0.071	N/A
	Dimethylphthalate	0.00301	0.33	0.02	N/A
	Di-n-butyl phthalate	0.13619	0.33	0.081	N/A
	Di-n-octyl phthalate	0.00547	0.33	1.2	N/A
	Fluoranthene	0.00224	0.33	19.0	1020
	Fluorene	0.0038	0.33	3.5	8
	Hexachlorobenzene	0.00289	0.33	0.014	0.15
	Indeno(1,2,3-cd)pyrene	0.00361	0.33	0.032	N/A
	Isophorone	0.00594	0.33	0.044	N/A
	2-Methylnaphthalene	0.004	0.33	0.364	34
	2-Methylphenol	0.00628	0.33	0.001	N/A
	4-Methylphenol	0.00601	0.33	0.009	N/A
	Naphthalene	0.00367	0.33	0.13	30
	Nitrobenzene	0.00472	0.33	0.002	N/A
	2-Nitroaniline	0.00927	1.6	0.0043	N/A
	2-Nitrophenol	0.00668	0.33	0.0033	N/A
	4-Nitrophenol	0.01725	1.6	0.001	N/A
	3-Nitroaniline	0.01546	1.6	0.005	N/A
	Pentachlorophenol	0.06815	1.6	0.01	40
	Phenanthrene	0.00313	0.33	2.2	120
	Phenol	0.0077	0.33	0.0003	1.1
	Pyrene	0.00232	0.33	6.65	961
	2,4,5-Trichlorophenol	0.04417	1.6	0.001	N/A
TCL Organochlorine Pesticides 8081A	Aldrin	0.000443	0.001666	0.005	0.1
	alpha-BHC	0.000139	0.001666	0.002	N/A
	beta-BHC	0.000275	0.001666	0.002	N/A
	delta-BHC	0.00023	0.001666	0.003	N/A
	4,4'-DDD	0.000256	0.00333	0.0077	0.01
	4,4'-DDE	0.000434	0.00333	0.044	0.01
	4,4'-DDT	0.000405	0.00333	0.025	0.01
	Dieldrin	0.000132	0.00333	0.001	0.1
	Endosulfan I	0.000349	0.001666	0.009	0.03
	Endosulfan II	0.000657	0.00333	0.009	0.03
	Endosulfan Sulfate	0.000193	0.00333	0.01	N/A
	Endrin	0.000459	0.00333	0.001	0.8
	Endrin keytone	0.000666	0.00333	N/A	N/A
	gamma-BHC (Lindane)	0.000145	0.001666	0.0006	N/A
	gamma-chloradane	0.000229	0.001666	0.14	0.001
	Heptachlor	0.000209	0.001666	0.001	0.0008
	Heptachlor epoxide	0.000229	0.001666	0.0002	0.0008
	Methoxychlor	0.000691	0.01666	9.0	0.6
Herbicides 8151A	2,4-D	0.22	0.667	0.005	N/A
	Silvex	0.02	0.0667	0.007	N/A

Table 1

BACKFILL AND BERM CONFIRMATION OBJECTIVES

METHOD	PARAMETER	MDL[1,*]	PQL[1,*]	SOIL OBJECTIVE[1]	
				TAGM	TGSCS**
	2,4,5-T	0.05	0.0667	0.019	N/A
PCB Aroclors 8082	PCBs	0.02078	0.1162	ND	ND
Geotechnical Requirements	Backfill imported from off-site sources must have less than 7% organics and must have one of the following soil classifications: ML, SM, SW-SM, or SP-SM.				

[1] concentractions in mg/kg

SB = Site background levels.

N/A = not available

MDL – method detection limit

PQL – practical quantitation limits

Soil objectives are in accordance with the New York DEC Technical and Administrative Guidance Memordandum (TAGM) #4046 most stringent levels and the New York State DEC Technical Guidance for Screening Contaminated Sediments(TGSCS) most stringent levels.

*In instances where the soil objectives are lower than the laboratory's MDLs and/or PQLs, the laboratory's established PQLs will become the default soil objective.

**The TGSCS levels shown for metals are the actual screening criteria. For VOCS, SVOCs, pesticides, herbicides, and PCBs, the levels shown and the percent total organic carbon must be entered into an equation to determine the actual screening criteria.

Table 2a

SOIL CHARACTERIZATION
LANDFILL 6 DISPOSAL REQUIREMENTS

EPA Hazardous Waste Number	Parameter	MDL[1]	PQL[1]	TCLP Regulatory Level[1]	TCLP Alt. Guidance Value[1,2]
D004	Arsenic	0.00293	0.5	5.0	100
D005	Barium	0.00025	0.5	100.0	2000
D018	Benzene	0.000032	0.01	0.5	10
D006	Cadmium	0.00025	1.0	1.0	20
D019	Carbon tetrachloride	0.000019	0.01	0.5	10
D020	Chlordane	0.00000506	0.0025	0.03	0.6
D021	Chlorobenzene	0.000033	0.01	100.0	2000
D022	Chloroform	0.000015	0.01	6.0	120
D007	Chromium	0.00122	0.5	5.0	100
D023	o-Cresol	0.00012	0.1	200.0	4000
D024	m-Cresol	N/A	0.1	200.0	4000
D025	p-Cresol	0.0001	0.1	200.0	4000
D016	2,4-D	0.00312	0.1	10.0	200
D027	1,4-Dichlorobenzene	0.000025	0.1	7.5	150
D028	1,2-Dichloroethane	0.000029	0.01	0.5	10
D029	1,1-Dichloroethylene	0.000025	0.01	0.7	14
D030	2,4-Dinitrotoluene	0.0001	0.1	0.13	2.6
D012	Endrin	0.00000619	0.0005	0.02	0.4
D031	Heptachlor (and its epoxide)	0.0000061	0.00025	0.008	0.16
D032	Hexachlorobenzene	0.0001	0.1	0.13	2.6
D033	Hexachlorobutadiene	0.00019	0.1	0.5	10
D034	Hexachloroethane	0.00023	0.1	3.0	60
D008	Lead	0.0007	0.5	5.0	100
D013	Lindane	0.00000613	0.00025	0.4	8
D009	Mercury	0.00002181	0.0004	0.2	4
D014	Methoxychlor	0.00000871	0.0025	10.0	200
D035	Methyl ethyl ketone	0.000088	0.04	200.0	4000
D036	Nitrobenzene	0.00009	0.1	2.0	40
D037	Pentachlorophenol	0.00031	0.5	100.0	2000
D038	Pyridine	0.00014	0.5	5.0	100
D010	Selenium	0.00136	0.1	1.0	20
D011	Silver	0.00083	0.5	5.0	100
D039	Tetrachloroethylene	0.000033	0.01	0.7	14
D015	Toxaphene	0.000431	0.0025	0.5	10
D040	Trichloroethylene	0.000029	0.01	0.5	10
D041	2,4,5-Trichlorophenol	0.0001	0.5	400.0	8000
D042	2,4,6-Trichlorophenol	0.0001	0.1	2.0	40
D017	2,4,5-TP (Silvex)	0.00034	0.01	1.0	20
D043	Vinyl Chloride	0.000023	0.02	0.2	4

MDL - method detection limit
PQL - practical quantitation limits
[1]Concentrations are in mg/L.
[2]The 20 times rule may be used in lieu of the TCLP analysis.
N/A - not availbable

Table 2b

SOIL CHARACTERIZATION
LANDFILL 6 GEOTECHNICAL AND PCB DISPOSAL REQUIREMENTS

Parameter	Test Method	Landfill 6 Acceptance Requirements
Particle Size - Soil Analysis	ASTM D 422	Maximum of 40% passing the No. 200 sieve
Atterberg Limits	ASTM D 4318	Maximum liquid limit of 35 (not dried); Maximum plasticity index of 12 (not
Classification of Soils (USCS)	ASTM D 2487	GW, GP, GM, GP-GM, GC, GP-GC, GM-GC, SW, SP, SM, SW-SM, SC, SW-SC, SP-SM, or SP-SC
Compaction of Soils (Standard)	ASTM D 698	90%
Moisture content	ASTM D 2216	Moisture content within the range required to achieve a minimum compactive effort of 90% of the maximum density based on a standard proctor test
Total PCBs	8082[1]	< 10 mg/kg

[1]Test Method is an EPA SW-846 method.

Table 3

PROJECT FIELD SAMPLE SUMMARY

SAMPLE DESCRIPTION	MATRIX	SAMPLE TYPE	ANALYTICAL PARAMETERS	METHODS[1]	NUMBER AND TYPE OF FIELD SAMPLES					
					Primary		QA/QC			
					Frequency	Estimate	Trip Blank[2]	MS/MSD	Duplicate	QA
Waste Characterization	Soil/Sediment	Composite	TCLP Hazardous Metals TCLP Hazardous Characterisitcs TCLP VOC TCLP SVOC TCLP Pesticides TCLP Herbicides Total PCBs	6010B/7470A 9040/1010/Ch. 7 SW846 8260B 8270C 8081A 8151A 8082	1 per 500 CY	51	0	3	0	0
			Particle Size - Soil Analysis	ASTM D 422	1 per 2,500 CY	10	0	0	0	0
			Atterberg Limits	ASTM D 4318	1 per 1,000 CY	25	0	0	0	0
			Classification of Soils (USCS)	ASTM D 2487	1 per 2,500 CY	10	0	0	0	0
			Compaction of Soils (Standard)	ASTM D 698	1 per 5,000 CY	5	0	0	0	0
			Moisture content	ASTM D 2216	1 per 1,000 CY	25	0	0	0	0
Decontamination Wastewater[3]	Water	Grab	TAL Metals Hazardous Characterisitcs TCL VOCs TCL SVOCs TCL Organochlorine Pesticides Herbicides Total PCBs	6010B/7470A 9045 8260B 8270C 8081A 8151A 8082	1 per 5,000 gal	2	1	0	0	0
Backfill Soil Sample – On site Source	Soil	Composite	TAL Metals Cyanide TCL VOCs TCL SVOCs TCL Organochlorine Pesticides Herbicides PCB Aroclors	6010B/7471A 9012A 8260B 8270C 8081A 8151A 8082	1 per source	1	0	0	0	0

Table 3

PROJECT FIELD SAMPLE SUMMARY

SAMPLE DESCRIPTION	MATRIX	SAMPLE TYPE	ANALYTICAL PARAMETERS	METHODS[1]	NUMBER AND TYPE OF FIELD SAMPLES					
					Primary		QA/QC			
					Frequency	Estimate	Trip Blank[2]	MS/MSD	Duplicate	QA
Backfill Soil Sample – Off site Source	Soil	Composite	TAL Metals Cyanide TCL VOCs TCL SVOCs TCL Organochlorine Pesticides Herbicides PCB Aroclors Classification of Soils (USCS) Percent Organics	6010B/7471A 9012A 8260B 8270C 8081A 8151A 8082 ASTM D 2487 ASTM D2974	1 per 1,000 CY – max of 3 per source	3	0	0	0	0
Berm Confirmation Samples	Surface Soil	Grab	TAL Metals Cyanide TCL VOCs TCL SVOCs TCL Organochlorine Pesticides Herbicides PCB Aroclors	6010B/7471A 9012A 8260B 8270C 8081A 8151A 8082	1 per 100 linear feet, from 0-6" deep	20	0	1	2	2
PCB Wipe Test[4]	N/A	Wipe	PCB Aroclors	8082	As needed	10	0	0	0	0

[1]EPA SW-846 will be used for analysis of all samples, and EPA SW-846 1311 will be used for TCLP analysis.
[2]Trip blanks are water samples provided by the analytical laboratory. Required for VOC aqueous samples only.
[3]Testing parameters, frequency and final requirements will be determined by the off-site facility accepting the waste.
[4]PCB wipe tests will only be taken from equipment that is in contact with potentially PCB-contaminated soils.

Table 4a

ANALYTICAL REFERENCES, CONTAINERS, PRESERVATION, AND HOLDING TIME - SOIL

Analysis	Analytical Methods	Container and Volume	Preservation	Holding Time
VOCs	EPA 8260B	4 oz glass jar with Teflon-lined lid	2 to 6°C	14 days
SVOCs	EPA 8270C	G; 200 grams	2 to 6°C	14 days for extraction, 40 days for analysis
Organochlorine pesticides	EPA 8081A		2 to 6°C	14 days for extraction, 40 days for analysis
PCBs	EPA 8082		2 to 6°C	14 days for extraction, 40 days for analysis
Chlorophenoxy acid herbicides	EPA 8151A		2 to 6°C	14 days for extraction, 40 days for analysis
PCB wipe	EPA 8082	16 oz glass jar with 1 wipe and hexane	2 to 6°C	14 days for extraction, 40 days for analysis
Metals	EPA 6010B/7471A	G; 200 grams	2 to 6°C	Six months, mercury 28 days
Cyanide	EPA 9012A		2 to 6°C	14 days
Reactivity – cyanide	Chapter 7, Part 7.3		2 to 6°C	Not specified
Reactivity – sulfide	Chapter 7, Part 7.3		2 to 6°C	Not specified
Corrosivity - pH	EPA 9045		2 to 6°C	Not specified
Ignitability	EPA 1030		2 to 6°C	Not specified
TCLP-VOCs	EPA 1311/8260B	G; 200 grams	2 to 6°C	14 days for TCLP extraction, 14 days for analysis
TCLP-SVOCs	EPA 1311/8270C	G; 200 grams	2 to 6°C	14 days for TCLP extraction, 7 days for preparative extraction, 40 days for analysis
TCLP-Pesticides	EPA 1311/8081A		2 to 6°C	14 days for TCLP extraction, 7 days for preparative extraction, 40 days for analysis
TCLP-Herbicides	EPA 1311/8151A		2 to 6°C	14 days for TCLP extraction, 7 days for preparative extraction, 40 days for analysis
TCLP-Metals	EPA 1311/6010B/7470		2 to 6°C	Six months for TCLP extraction, six months for analysis, except for mercury
				Mercury: 28 days for TCLP extraction, 28 days for analysis

°C degrees Celsius
SVOC semivolatile organic compound
VOC volatile organic compound
TCLP Toxicity Characteristic Leaching Procedure Test
G 8 ounce glass jar with Teflon-lined lid
PCB polychlorinated biphenyl

Table 4b

ANALYTICAL REFERENCES, CONTAINERS, PRESERVATION, AND HOLDING TIMES - WATER

Analysis	Analytical Methods	Container and Volume	Preservation	Holding Time
VOCs	EPA 8260B	3 40 mL vials with Teflon-lined septum; 1:1 HCl	2 to 6°C	14 days
SVOCs	EPA 8270C	Glass liter with Teflon liner	2 to 6°C	7 days for extraction, 40 days for analysis
Organochlorine pesticides	EPA 8081A	Glass liter with Teflon liner	2 to 6°C	7 days for extraction, 40 days for analysis
PCBs	EPA 8082	Glass liter with Teflon liner	2 to 6°C	7 days for extraction, 40 days for analysis
Chlorophenoxy acid herbicides	EPA 8151A	Glass liter with Teflon liner	2 to 6°C	7 days for extraction, 40 days for analysis
Metals	EPA 6010B/7470A	Plastic or glass; 300 mL	2 to 6°C; HNO_3; pH < 2	Six months, mercury 28 days
Reactivity – cyanide	Chapter 7, Part 7.3	Plastic; 100 mL	2 to 6°C	As soon as possible
Reactivity – sulfide	Chapter 7, Part 7.3	Plastic or glass; 100 mL	2 to 6°C	As soon as possible
Corrosivity	EPA 9040B	Plastic or glass; 100 mL	2 to 6°C	As soon as possible
Ignitability	EPA 1010	Plastic or glass; 100 mL	2 to 6°C	As soon as possible

°C degrees Celsius

SVOC semivolatile organic compound

VOC volatile organic compound

PCB polychlorinated biphenyl

Table 5a

GC/MS DATA DELIVERABLES PACKAGE REQUIREMENTS

Method	Deliverable Requirement	Equivalent EPA Form	CLP or CLP-like Package Level IV	SW-846 Package, Level III	Standard Laboratory Report
Organic Analysis by GC/MS	Case narrative		X	X	X
	Corrective action report(s)		X	X	X
	Cross-reference of field sample numbers, laboratory identification numbers, and analytical QC batches		X	X	X
	Chain-of-custody form, cooler receipt form		X	X	X
	Sample log-in sheet	DC-1	X		
	Complete SDG file inventory sheet	DC-2-1	X		
	Data summary for each blank and sample (1)	I	X	X	X
	Tentatively identified compounds (TICs) for each sample (10 peaks)	I,TIC	X	(Only if requested by project)	
	Laboratory control sample/laboratory control duplicate (LCS/LCD) report (including concentration spiked, percent recovered, percent recovery acceptance limits, relative percent difference (RPD), and RPD acceptance limits)	III (modified)	X	X	X
	Surrogate recovery report (including concentration spiked, percent recovered, and percent recovery acceptance limits)	II	X	X	X
	Matrix spike/matrix spike duplicate (MS/MSD) report (including concentration spiked, percent recovered, percent recovery acceptance limits, RPD, and RPD acceptance limits)	III	X	X	X
	Instrument performance check (tuning) report	V	X	X	
	Initial calibration data (including acceptance limits)	VI	X	X (summary only)	
	Continuing calibration data (including acceptance limits)	VII	X	X (summary only)	

Method	Deliverable Requirement	Equivalent EPA Form	CLP or CLP-like Package Level IV	SW-846 Package, Level III	Standard Laboratory Report
	Internal standard areas and retention time reports (including acceptance limits and out-of-control flags)	VIII/IX	X	X	
	Reconstructed ion chromatogram for each sample and rerun, blank, spike, duplicate, and standard		X		
	Instrument quantitation report		X		
	Raw and background subtracted mass spectra for each target analyte found		X		
	Mass spectra of TICs with library spectra of five best-fit matches		X		
	Sample preparation bench sheets		X	X	
	Gel permeation chromatography cleanup logs		X		
	Method blank summary	IV	X	X	
	Standard preparation logs		X	X	
	Analysis run logs	VIII	X	X	
	Percent moisture		X	X	X
	pH		X (2)		
	Data evaluation report	X	X	X	

1) Must include: field sample identification, laboratory identification, date/time sampled, date received, extracted/analyzed, RL, MDL, dilution factor(s), results, comments, approval signature/date.

2) For water samples volatile analysis only.

Table 5b

GC OR HPLC DATA DELIVERABLES PACKAGE REQUIREMENTS

GC/HPLC	Deliverable Requirement	Equivalent EPA Form	CLP or CLP-like Package, Level IV	SW-846 Package, Level III	Standard Laboratory Report
Organic Analysis by GC or HPLC	Case narrative		X	X	X
	Corrective action report(s)		X	X	X
	Cross-reference of field sample numbers, laboratory identification numbers, and analytical QC batches		X	X	X
	Chain-of-custody form, cooler receipt form		X	X	X
	Sample log-in sheet	DC-1	X		
	Complete SDG file inventory sheet	DC-2-1	X		
	Data summary for each blank and sample (1)	I	X	X	X
	Lab control sample/laboratory control duplicate (LCS/LCD) report (including concentration spiked, percent recovered, percent recovery acceptance limits, relative percent difference (RPD), and RPD acceptance limits)	III (modified)	X	X	X
	Surrogate recovery report (including concentration spiked, percent recovered, and percent recovery acceptance limits)	II	X	X	X
	Matrix spike/matrix spike duplicate (MS/MSD) report (including concentration spiked, percent recovered, percent recovery acceptance limits, RPD, and RPD acceptance limits)	III	X	X	X
	Initial calibration data for each column (indicate which column was used for quantitation)	VI	X	X (summary only)	
	Continuing calibration data (indicate which column was used for quantitation) and calibration verification data	VII	X	X (summary only)	

GC/HPLC	Deliverable Requirement	Equivalent EPA Form	CLP or CLP-like Package, Level IV	SW-846 Package, Level III	Standard Laboratory Report
	Chromatograms for each sample (and reruns), confirmation runs, blank, spike, duplicate, and standards		X	X (2)	
	Instrument quantitation report		X	X (2)	
	Method blank summary	IV	X	X	
	Pesticide identification summary	X	X		
	Sample preparation bench sheets		X	X	
	Gel permeation chromatography cleanup logs		X		
	Standard preparation logs		X	X	
	Analysis run logs	VIII	X	X	
	Percent moisture		X	X	X
	Data evaluation report	X	X	X	

1) Must include: field sample identification, laboratory identification, date/time sampled, date received, extracted/analyzed, RL, MDL, dilution factor(s), comments, approval signature/date. Results from the primary and secondary columns/detector shall be reported.

2) For petroleum fuels or PCB analyses chromatograms for samples with compound detection only.

Table 5c

METALS DATA DELIVERABLES PACKAGE REQUIREMENTS

Method	Deliverable Requirement	Equivalent EPA Form	CLP or CLP-like Package, Level IV	SW-846 Package, Level III	Standard Laboratory Report
Metals Analysis	Case narrative		X	X	X
	Corrective action report(s)		X	X	X
	Cross-reference of field sample numbers, laboratory identification numbers, and analytical QC batches		X	X	X
	Chain-of-custody form, cooler receipt form		X	X	X
	Sample log-in sheet	DC-1	X		
	Complete SDG file inventory sheet	DC-2-1	X		
	Data summary for each blank and sample (1)	I-IN	X	X	X
	Lab control sample/laboratory control duplicate (LCS/LCD) report (including concentration spiked, percent recovered, percent recovery acceptance limits, relative percent difference (RPD), and RPD acceptance limits)	VII-IN	X	X	X
	Matrix spike/matrix spike duplicate (MS/MSD) report (including concentration spiked, percent recovered, percent recovery acceptance limits, RPD, and RPD acceptance limits)	V (Part 1)-IN	X	X	X
	Post-digestion spike recovery	V (Part 2)-IN	X	X	X
	Duplicate sample report	VI-IN	X	X	X
	Blank results	III-IN	X	X	X
	Initial and continuing calibration data	II (PART I)-IN	X	X	
	ICP interference check sample report	IV-IN	X	X	
	Standard addition results	VIII-IN	X	X	
	ICP serial dilution results	IX-IN	X		

Method	Deliverable Requirement	Equivalent EPA Form	CLP or CLP-like Package, Level IV	SW-846 Package, Level III	Standard Laboratory Report
	Preparation logs	XIII-IN	X	X	
	Analysis run logs	XIV-IN	X	X	
	Standard preparation logs		X	X	
	CRDL standard report	II (Part 2)-IN	X		
	Instrument detection limits	X-IN	X		
	ICP interelement correction factors	XI-IN	X	X	
	Data and instrument printouts		X		
	Percent moisture		X	X	X
	pH		X (2)		

1) Must include: field sample identification, laboratory identification, date/time sampled, date received, extracted/analyzed, RL, MDL, dilution factor(s), results, comments, approval signature/date.

2) For water samples only.

Table 5d

INORGANIC DATA DELIVERABLES PACKAGE REQUIREMENTS

Method	Deliverable Requirement	Equivalent EPA Form	CLP or CLP-like Package	SW-846 Package	Standard Laboratory Report
Inorganic Chemistry	Case narrative		x	x	x
	Corrective action report(s)		x	x	x
	Cross-reference of field sample numbers, laboratory identification numbers, and analytical QC batches		x	x	x
	Chain-of-custody form, cooler Receipt Form		x	x	x
	Sample log-in sheet	DC-1	x		
	Complete SDG file inventory sheet	DC-2-1	x		
	Data summary for each blank and sample (1)	I-IN	x	x	x
	Laboratory control sample/laboratory control duplicate (LCS/LCD) report (concentration spiked, percent recovered, percent recovery acceptance limits, relative percent difference (RPD), and RPD acceptance limits)	VII-IN	x	x	x
	Matrix spike (MS) report (concentration spiked, percent recovered, percent recovery acceptance limits)	V(PART1)-IN	x	x	x
	Duplicate sample report	VI-IN	x	x	x
	Calibrations, initial and vertification	II(PART1)-IN	x	x	
	Copies of sample preparation logs	XIII	x	x	
	Copies of analysis run logs	XIV	x	x	
	Raw data and instrument printouts		x		

Method	Deliverable Requirement	Equivalent EPA Form	CLP or CLP-like Package	SW-846 Package	Standard Laboratory Report
	Copies of standard preparation logs		x	x	
	Percent moisture		x	x	x

1) Must include: field sample identification, laboratory identification, date/time sampled, date received, extracted/analyzed, analytical results, dilution factors, RLs, MDLs, comments, approval signature/date.

Table 6a

SUMMARY OF QC REQUIREMENTS AND CORRECTIVE ACTION FOR EPA METHODS 8260B AND 8270C

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
Five-point initial calibration for target analytes	Initial calibration prior to sample analysis	8260B: The minimum average SPCC RF for Chloromethane, 1,1-Dichloroethane, Bromoform is 0.1; for Chlorobenzene and 1,1,2,2-Tetrachloroethane is 0.30 8270C: The minimum average SPCC RF is 0.050 8260B and 8270C: RSD is less than or equal to 15% for target analytes, and is less than or equal to 30% for CCC[1]	Correct problem, then repeat initial calibration.
Second-source calibration verification	Once per five-point initial calibration	Less than 25% difference for all target analytes and CCCs	Correct problem, then repeat initial calibration.
Daily calibration verification	Before sample analysis and every 12 hours of analysis time	Less than 20% difference for all target analytes and CCCs	Correct problem, then repeat initial calibration.
Demonstrate ability to generate acceptable accuracy and precision using four replicate analyzes of a QC check sample	Once	QC acceptance criteria per method's requirements	Recalculate results; locate and fix the problem, if exists, re-run demonstration of those analytes that did not meet acceptance criteria.

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
Check of mass spectral ion intensities (tuning procedure) using BFB (8260B) and DFTPP (8270C)	Prior to initial calibration and calibration verification	Must meet the method's requirements before samples are analyzed	Retune instrument and verify the tune acceptability
Internal Standards	During data acquisition of calibration standard, samples and QC check samples	Areas within -50% to +100% of last calibration verification (12 hours) for each	Inspect mass spectrometer and GC for malfunctions; mandatory reanalysis of samples analyzed while system was malfunctioning
Method blank	One per analytical batch (8260B) and one per preparation batch (8270C)	No analytes detected above the RL	Correct problem, then reextract and reanalyze method blank and all samples processed with the contaminated blank
MS/MSD	One MS/MSD pair conducted on Navy samples per analytical/preparation batch	Advisory recovery limits: 70-130%	Identify problem. If not related to matrix interference, reextract and re-analyze MS/MSD and all associated batch samples
LCS or LCS/LCD pair if there is not enough sample for MS/MSD	One LCS or LCS/LCD per analytical/preparation batch	Advisory recovery limits: 70-130%	Correct problem, then re-extract and reanalyze the LCS (LCS/LCD) and all associated batch samples
Surrogate standards	Every sample, spiked sample, standard, and method blank	Advisory QC acceptance criteria per method specification	Correct problem, then reextract and reanalyze all affected samples
MDL study	Once per 12-month period	Detection limits established will be below the RLs	Correct problem, repeat the MDL study.

[1] *If RSD for any analyte is >15%, regression fit may be used for the calibration curve for that analyte. Acceptance criteria for first order regression is* $r^2 \geq 0.99$.

CCC calibration check compound
GC gas chromatography
LCS/LCD laboratory control sample/laboratory control duplicate compound
MDL method detection limits
QC quality control
RF response factor
RSD relative standard deviation
SPCC system performance check
MS/MSD matrix spike/matrix spike duplicate

Table 6b

SUMMARY OF QC REQUIREMENTS AND CORRECTIVE ACTION FOR CHROMATOGRAPHY METHODS (8081A, 8082, 8151A)

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
Five-point initial calibration for target analytes	Initial calibration before sample analysis	Lowest calibration standard must be at or below the reporting limit. Target analyte CF or RF RSD less than or equal to 20%[1] Mean CF or RF RSD less than or equal to 20%[1]	Correct problem, then repeat initial calibration
Second-source calibration verification	Once per five-point initial calibration	Less than 20% difference for most target analytes, 25% for difficult compounds	Correct problem, then repeat initial calibration
Daily calibration verification	Before sample analysis and every 10 samples or every 12 hours, as specified by the method	Less than 15% difference for all target analytes	Correct problem, then repeat initial calibration
Demonstrate ability to generate acceptable accuracy and precision using four replicate analyzes of a QC check sample	Once	QC acceptance criteria per method's requirements	Recalculate results; locate and fix the problem, if exists, re-run demonstration of those analytes that did not meet acceptance criteria
Retention time window study	Establish initially, verify during daily calibrations	Within ∀3 standard deviations of each analyte retention time from the initial study.	Correct problem, reevaluate analyte identification
<u>8081A:</u> DDT and Endrin breakdown check	Daily prior to analysis of samples and every 10 samples	Degradation ≤15%	Clean the system, repeat breakdown check

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
Internal standards (optional)	Every sample, spiked sample, standard, and method blank	Laboratory established QC acceptance criteria	Correct problem, reextract and reanalyze affected samples
Method blank	One per analytical batch (VOCs) and one per preparation batch (SVOCs)	No analytes detected above the RL	Correct problem, then reextract and reanalyze method blank and all samples processed with the contaminated blank
MS/MSD	One MS/MSD pair conducted on Navy samples per each analytical/preparation batch	Advisory recovery limits: 70-130%	Identify problem. If not related to matrix interference, reextract and reanalyze MS/MSD and all associated batch samples
LCS or LCS/LCD pair if there is not enough sample for MS/MSD	One LCS or LCS/LCD pair per analytical/preparation batch	Advisory recovery limits: 70-130%	Correct problem, then reextract and reanalyze the LCS and all associated batch samples
Surrogate standards	Every sample, spiked sample, standard, and method blank	Advisory recovery limits: 70-130%	Correct problem, then reextract and reanalyze all affected samples
MDL study	Once per 12-month period	Detection limits established will be below the RLs	Correct problem, repeat the MDL study

[1] *If RSD for any analyte is > 20%, regression fit may be used for the calibration curve for that analyte. Acceptance criteria for first order regression is* $r^2 \geq 0.995$.

CF calibration factor
DDT dichlorodiphenyltrichloroethane
RF response factor
RSD relative standard deviation

Table 6c

SUMMARY OF QC REQUIREMENTS AND CORRECTIVE ACTION FOR EPA METHOD 6010B

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
Initial calibration (IC) per manufacturer's instructions with a minimum of one standard and a calibration blank	Initial calibration prior to sample analysis	Accepted if the initial calibration verification (ICV) passes	Correct problem, repeat initial calibration.
Second-source ICV, prepared at the calibration mid-point	Once per initial calibration	Less than 10% difference from IC for all target analytes	Correct problem, repeat initial calibration.
Continuing calibration verification (CCV), same source as IC	Following IC, after every 10 samples and the end of the sequence	Less than 10% difference from IC for all target analytes; #%5 RSD for a minimum of two integrations	Correct problem, repeat initial calibration.
Calibration Blank	After IC, before CCV calibration, after every 10 samples, and at the end of the sequence	All target analytes are within three times the IDL	Prepare and analyze the blank again, re-calibrate the instrument.
Demonstrate ability to generate acceptable accuracy and precision using four replicate analyzes of a QC check sample	Once	QC acceptance criteria per method's requirements	Re-calculate results; locate and fix the problem, if exists, re-run demonstration of those analytes that did not meet acceptance criteria.
IDL study	Once per 12 month period	IDL will be below the MDL	Correct problem, repeat the IDL study.
MDL study (water only)	Once per 12 month period	MDL will be below the RL	Correct problem, repeat the MDL study.
Method blank	One per digestion batch	No analytes detected above the RL	Correct problem, then prepare and analyze again the method blank and all samples processed with the contaminated blank.

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
Interference check solution (ICS)	At the beginning of an analytical run	Within ±20% of expected value	Terminate analysis; correct problem; reanalyze ICS; reanalyze all affected samples.
MS/MSD for all analytes	One MS/MSD pair conducted on Navy samples per each preparation batch	QC acceptance criteria: 75-125% accuracy, 20% precision	Identify problem, re-prepare and re-analyze the MS/MSD pair and all samples in the associated batch.
LCS or LCS/LCD pair if there is not enough sample for MS/MSD	One LCS or LCS/LCD pair per each preparation batch	QC acceptance criteria: 75-125% accuracy, 20% precision	Terminate analysis, identify and correct the problem, prepare and analyze all affected samples and QC checks again.
Dilution test	Each new sample matrix	1:5 dilution must agree within ±10% of the original determination for analytes detected a minimum of 10 times the IDL	Perform post digestion spike addition.
Method of standard addition (MSA), single or multi-level	When interferences are suspected or and for new sample matrix	Linearity of a multi-level MSA	Correct problem, repeat MSA.
Post digestion spike addition	When dilution test fails	Recovery within 75-125% of expected results	Correct problem, reanalyze post digestion spike addition.

RSD relative standard deviation
MDL method detection limit
MSA method of standard additions

Table 6d

SUMMARY OF QC REQUIREMENTS AND CORRECTIVE ACTION FOR EPA METHOD 7000A

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
Initial multi-point calibration (IC) with a minimum of three standards and a calibration blank	Initial calibration prior to sample analysis	Correlation coefficient >0.995; accepted if the initial calibration verification (ICV) passes	Correct problem, repeat initial calibration
Second-source Initial Calibration Verification standard, prepared at the calibration mid-point	Once per initial calibration	Less than 10% difference from IC for all target analytes	Correct problem, repeat initial calibration
Continuing calibration verification (CCV), same source as IC	After every 10 samples and at the end of the sequence	Less than 20% difference from IC for all target analytes	Correct problem, re-analyze previous 10 samples
Calibration Blank	After IC, before CCV calibration, after every 10 samples, and at the end of the sequence	All target analytes not detected above the RL	Prepare and analyze the blank again, recalibrate the instrument
Demonstrate ability to generate acceptable accuracy and precision using four replicate analyzes of a QC check sample	Once	QC acceptance criteria per method's requirements	Recalculate results; locate and fix the problem, if exists, rerun demonstration of those analytes that did not meet acceptance criteria.
Method detection limit (MDL) study (water only)	Once per 12 month period	MDL will be below the RL	Correct problem, repeat the MDL study.
Method blank	One per digestion batch	No analytes detected above the RL	Correct problem, then prepare and analyze again the method blank and all samples processed with the contaminated blank

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
MS/MSD for all analytes	One MS/MSD pair conducted on Navy samples per each preparation batch	QC acceptance criteria: 80-120% accuracy, 20% precision	Identify problem. If not related to matrix interference, reextract and reanalyze MS/MSD and all associated batch samples
LCS or LCS/LCD pair if there is not enough sample for MS/MSD	One LCS or LCS/LCD pair per each preparation batch	QC acceptance criteria: 80-120% accuracy, 20% precision	Correct problem, redigest and reanalyze LCS/LCD pair and the affected batch
Dilution test	One sample per batch	1:5 dilution must agree within ±10% of the original determination	Perform post digestion spike addition.
Post digestion spike addition (recovery test)	When dilution test fails	Recovery within 85-115% of expected results	Conduct MSA test
Method of standard addition (MSA), single or multi-level	When post-digestion spike addition fails	Linearity of a multi-level MSA	Correct problem, repeat MSA

Table 6e

SUMMARY OF QC REQUIREMENTS AND CORRECTIVE ACTION FOR INORGANIC ANALYSES

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
Initial three-point calibration (IC) and a blank	Initial calibration prior to sample analysis	Correlation coefficient >0.99	Correct problem, repeat initial calibration
Second-source ICV, prepared at the calibration mid-point	Once per initial calibration	Per method's requirements or laboratory established criteria	Correct problem, repeat initial calibration
Continuing calibration verification (CCV), same source as IC	After every 10 samples and at the end of the sequence	Per method's requirements or laboratory established criteria	Correct problem, re-analyze previous 10 samples
Calibration Blank	After IC, before CCV calibration, after every 10 samples, and at the end of the sequence	All target analytes not detected above the RL	Prepare and analyze the blank again, re-calibrate the instrument.
Demonstrate ability to generate acceptable accuracy and precision using four replicate analyzes of a QC check sample	Once	QC acceptance criteria per method's requirements	Re-calculate results; locate and fix the problem, if exists, re-run demonstration of those analytes that did not meet acceptance criteria
MDL study (water only)	Once per 12 month period	MDL will be below the RL	Correct problem, repeat the MDL study
Method blank	One per preparation batch	No analytes detected above the RL	Correct problem, then prepare and analyze again the method blank and all samples processed with the contaminated blank
MS for all analytes	One MS conducted on Navy samples per each preparation batch	Advisory recovery limits 70-130%	Identify problem. If not related to matrix interference, re-extract and re-analyze MS/MSD and all associated batch samples.

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
Sample duplicate (SD) or MS/MSD pair	One SD or MS/MSD pair conducted on Navy samples per each preparation batch	30% RPD for soil, 20% RPD for water Advisory recovery limits 70-130%	Identify problem. If not related to matrix interference, re-extract and re-analyze MS/MSD or SD and all associated batch samples.
LCS or LCS/LCD pair if there is not enough sample for MS/MSD or SD	One LCS or LCS/LCD pair per each preparation batch	30% RPD for soil, 20% RPD for water Advisory recovery limits 70-130%	Correct problem, re-prepare and re-analyze LCS/LCD and the affected batch

ICV Initial Calibration Verification

RL Reporting Limit

MDL Method Detection Limit

FIGURES

Figure 1

CORRECTIVE ACTION REQUEST FORM

Originator: ____ Date: _____________

Person responsible for replying: ____

Description of problem and when identified: ______________________________________

Sequence of Corrective Action (CA): (Note, if no responsible person is identified, submit this form directly to the Project Manager)

State date, person, and action planned:

____

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____

CA initially approved by: __________________________________ Date: _____________

Follow-up date: ____

Final CA approval by: _____________________________________ Date: _____________

Information copies to:

Responsible Person: ____

Project Superintendent: ____

Project Manager: ____

ATTACHMENT 1

LABORATORY VALIDATION AND CERTIFICATION

(To be supplied upon request)

ATTACHMENT 2

LABORATORY QUALITY ASSURANCE MANUAL

(To be supplied upon request)

ATTACHMENT 3

LABORATORY STANDARD OPERATING PROCEDURES

(To be supplied upon request)