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INTERIM CORRECTIVE MEASURES WORK PLAN WITH TRANSMITTAL LETTER FOR SOLID WASTE MANAGEMENT UNIT (SWMU) 56 HANGAR 200 APRON NAVAL ACTIVITY PUERTO RICO

8/31/2015

RESOLUTION CONSULTANTS

Resolution Consultants
A Joint Venture of AECOM & EnSafe
1500 Wells Fargo Building
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August 31, 2015

Mr. Phil Flax
Chief, Resource Conservation and Special Projects Section
U.S. EPA Region II
RCRA Programs Branch
290 Broadway, 22nd Floor
New York, New York 10007-1866

Re: Final Interim Corrective Measures Work Plan
SWMU 56 Hangar 200 Apron
Naval Activity Puerto Rico; Ceiba, Puerto Rico
N62470-11-D-8013; CTO JM41

Dear Phil,

Please find enclosed the *Final Interim Corrective Measures Work Plan for SWMU 56 — Hangar 200 Apron.* This document contains all the revisions agreed to in the Draft Final version. The Navy responses to U.S. EPA and PREQB comments are attached. Additional distribution has been made as indicated below.

If you should have any questions, please don't hesitate to contact me at (901) 937-4242 or Stacin Martin at (757) 322-4780.

Sincerely,

Resolution Consultants

Mark E. Kimes

By: Mark E. Kimes, P.E.
Project Manager

cc:	Ms. Debbie Sanders	—	BRAC PMO SE (letter only)
	Ms. Thuane Fielding	—	BRAC PMO SE (letter only)
	Mr. Pedro Ruiz	—	NAPR (electronic copy)
	Mr. Stacin Martin	—	NAVFAC Atlantic (CD)
	Ms. Bonnie Capito	—	NAVFAC Atlantic – Code EV42 (1 hard copy and CD)
	Mr. Doug Pocze	—	U.S. EPA Region II (2 hard copy and 2 CD)
	Chief, Carribean Section	—	U.S. EPA Region II (1 hard copy and CD)
	Mr. Jose Font	—	U.S. EPA Caribbean Office (letter only)
	Ms. Gloria Toro	—	PREQB (1 hard copy and CD)
	Mr. Felix Lopez	—	U.S. F&WS (CD)
	CTO JM41 file		

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Navy Responses to EPA Comments dated 29 July 2014

Below is EPA's technical review of the October 2013 Draft Interim Corrective Measures (ICM) Work Plan SWMU 56 - Hangar 200 Apron, Naval Activity Puerto Rico located in Ceiba, Puerto Rico. Our review indicates that certain necessary details are missing, which are fundamental to the review of the ICM. Detailed comments regarding this missing information are provided below. Please note EPA concurs with the comments provided by EQB but has not repeated them in the review.

TECHNICAL REVIEW
OCTOBER 2013
DRAFT INTERIM CORRECTIVE MEASURES WORK PLAN
SWMU 56 — HANGAR 200 APRON
NAVAL ACTIVITY PUERTO RICO
CEIBA, PUERTO RICO
29 July 2014

I. INTRODUCTION

The following is an evaluation of the Navy's October 2013 Draft Interim Corrective Measures (ICM) Work Plan for SWMU 56 - Hangar 200 Apron, for Naval Activity Puerto Rico, located in Ceiba, Puerto Rico.

Our review indicates that certain necessary details are missing which are fundamental to the review of the ICM. Detailed comments regarding this missing information are provided below.

II. GENERAL COMMENTS

1. Section 1.4 of the ICM identifies soil and sediment corrective action objectives (CAO) and briefly discusses the risk assessments used to calculate the CAOs. However additional discussion regarding the CAOs is requested. Specifically, with regard to the soil CAOs, indicate whether the CAOs are generic values or based on specific receptors. For the sediment CAOs, also discuss whether the values are generic or whether they were derived from site specific toxicity or benthic surveys. The ICM does not need to repeat the risk assessment, but should provide sufficient information to make it a standalone document. Currently as written it is difficult to evaluate the appropriateness of the CAOs, without reviewing the previous risk assessments.

Navy Response to EPA General Comment No. 1

Section 1.4 of the ICM will be revised to provide additional information from the risk assessments to assist in evaluating the appropriateness of the CAOs.

2. Section 4.3 discusses the excavation procedures at SWMU 56. In order to better evaluate the appropriateness of the proposed areas of excavation and the actual removal areas, the ICM should provide the actual previous analytical sampling results. Although figures (are provided depicting previous sampling locations, the ICM does not appear to include any of the actual analytical results. This information would be helpful and is recommended to evaluate the appropriateness of the proposed ICM work.

Navy Response to EPA General Comment No. 2

The analytical data from the previous investigations will be included within Section 1.2.2.

3. It appears (pp. 1-8) that confirmatory samples are not planned for the bottoms of the excavations. The ICM indicates this is due to the results of the ecological risk assessment. It would be helpful if the ICM could clarify this statement. Specifically as discussed in General Comment No. 1, include details on the receptors, and why metal concentrations below 1 foot are not expected to pose any risks to any receptors.

Navy Response to EPA General Comment No. 3

Additional detail will be provided in the text in regards to why confirmation samples are not planned for the bottoms of the excavations.

Navy Responses to PREQB Comments dated 9 January 2014

Technical Review of the Draft Interim Corrective Measures Work Plan for SWMU 56 — Hanger 200 Apron, Naval Activity Puerto Rico, Ceiba, Puerto Rico

GENERAL COMMENTS

1. This document reiterates the recommendations of the final Corrective Measures Report, dated September 29, 2011 to put institutional controls on the property to prohibit residential land use and potable use of groundwater due to elevated concentrations of metals, predominately vanadium, in soil, sediment and groundwater. In addition to exceedances of the target HI for the residential receptors, the CMS Report documents exceedances of the target HI for the construction worker, on-site worker and commercial/industrial worker also due to vanadium, yet attributes the vanadium to background, rather than past releases at the site. Please clarify why an institutional control is necessary for the residential receptor due to exposure to vanadium in site media, yet no such institutional control is needed for other receptors similarly exposed to vanadium in site media. Also, the CMS Report was finalized prior to the Groundwater Usability Technical Memorandum; therefore, no site-specific demonstration of non-potability was conducted. PREQB requests that a site-specific determination is made as to whether groundwater is potable or not and also requests further justification on the need to implement a groundwater restriction if chemicals of concern are considered to be attributed to background rather than site releases.

Navy Revised Response to PREQB General Comment No. 1

The ICM for SWMU 56 is to deal with the ecological risk in the surface soil to avian omnivores and the ecological risk from the metals concentrations in the drainage ditch sediment. The appropriateness of land use controls/restrictions and evaluation of groundwater as a potable source is outside the scope of this ICM Work Plan and action. The Navy will, outside of this interim measure, determine in conjunction with the regulatory agencies if and why any previous agreed to findings/recommendations in the CMS warrant changes.

2. In several places in the work plan and sampling and analysis plan, it is stated that confirmatory samples are not proposed for sediment. However, it is unclear how removal of impacted sediment to corrective action objectives (CAOs) in unlined portions of the drainage ditch can be verified without confirmatory sampling along the edges of the excavated area. Note that confirmatory sediment sampling has been proposed by the Navy at SWMU 69 to verify attainment of CAOs at that SWMU. On this basis, PREQB requests that the work plan be revised to include confirmatory sediment samples along the edge of the excavation in the unlined portion of the drainage ditch for analysis of barium, cadmium, chromium, lead and zinc at a frequency of one per 25 feet of excavation.

Navy Response to PREQB General Comment No. 2

Confirmatory sediment sampling will be added. However, there are only two unlined drainage swales, C-D and E-F. As presented in the CMS and the Statement of Basis, the CAOs for portion C-D are only for cadmium and lead. The CAO for portion E-F is only for lead. Therefore the confirmation samples to be collected from these two unlined portions of the ditch will only be analyzed for cadmium and lead in segment C-D and only lead in segment E-F. It should also be noted that the horizontal extent of the sediment excavation will not extend beyond the soil/sediment boundary as the COCs were determined based on potential ecological risk indicated from sediment exposures; sediment exposure pathways are incomplete beyond the soil/sediment boundary.

3. The drainage swale may potentially contain surface water at the time of or during the proposed sediment excavation and removal. Please provide additional discussion or details on the methods to divert surface water present within the drainage ditch, such as temporary coffer dams, pumping, etc. in order to reduce downstream transport of contaminated sediments.

Navy Response to PREQB General Comment No. 3

Additional details will be provided on dealing with the surface water.

PAGE-SPECIFIC COMMENTS

1. Page 1-6, Figure 3: The drainage swale contains culverts and both concrete-lined and unlined sections where sediment remediation is proposed. Although the locations of the culverts are depicted in Figure 3, it is unclear where the concrete-lined and unlined sections of the drainage swale are located. Please indicate on Figure 3 the locations of the lined and unlined areas within the drainage swale.

Navy Response to PREQB Page-Specific Comment No. 1

Figure 3 will be revised to call out the lined and unlined areas within the drainage swale.

2. Page 1-10, Section 1.3.2: The fourth bullet under Sediment Excavation and Removal is to "locate the ditches requiring sediment removal". It is unclear if this statement is referring to surveyors locating the proposed drainage swale remediation areas. Please clarify.

Navy Response to PREQB Page-Specific Comment No. 2

Your assumption is correct; the bullet will be revised to make it clear.

3. Page 1-10, Section 1.3.2: Catch basins are proposed to be installed using hay bales, plastic sheeting, etc. at the downgradient portions of the concrete-lined sections of the drainage swale. Please provide either a drawing detail or describe the details of the catch basins in greater detail. For example, discuss if these areas are excavated within the drainage swale as well as their approximate dimensions. In addition, discuss the volume of water these catch basins been designed to handle and is that sufficient for the estimated volume that will be generated by the pressure washing of the lined sections of the drainage swale.

Navy Response to PREQB Page-Specific Comment No. 3

The requested additional details are provided in Section 1.3.2.

4. Page 1-11, Section 1.3.2: Disturbed areas associated with the sediment removal within the drainage swale are proposed to be re-vegetated. Please provide additional details regarding the proposed revegetation such as what areas will be revegetated, species proposed for revegetation, soil preparation measures, and activities necessary to allow vegetation to become established (e.g., watering, fertilizer, etc.).

Navy Response to PREQB Page-Specific Comment No. 4

The reference to "Re-vegetate disturbed areas" on Page 1-11 is in reference to disturbed areas in the upland areas not within the drainage swale. No vegetation will be planted within the drainage swale. The objective is to limit vegetative growth in the swale as not to impede the flow of the storm water within the swale. The bullet on Page 1-11 will be modified to read "Re-vegetate disturbed areas outside of the drainage swale".

5. Page 4-2, Section 4.3.2. Sediment: This section describes the removal of sediment from the ditch. According to the text, two segments of the ditch where sediment is to be removed (i.e., B-C and D-E) consist of 24-inch diameter and a 36-inch diameter culverts over 100 feet in length. Please provide the details on the method that will be used to remove the sediments from these culverts prior to pressure-washing the culverts and describe the method that will be used to verify/document that all contaminated sediments have been removed from the culverts. Please provide this information in a technical specification.

Navy Response to PREQB Page-Specific Comment No. 5

The work plan has been edited to remove the use of mechanical means for the removal of the residual sediments with the culverts. Additional text has been added to the work plan explain the possible use of a pipe cleaning subcontractor to remove any sediment from within the two culverts. Either a visual inspection or a remote camera will be utilized to ensure that the residual sediments have been removed from within the culverts. Therefore, no additional information is required in the technical specifications.

6. Technical Specification 31.23.00.00.20, Section 1.6: According to the specification, borrow pit soil stock pile samples will be analyzed for full TCLP analysis including RCRA characteristics of ignitability, reactivity, and corrosivity. It is not clear why borrow pit soils are being analyzed for TCLP parameters or RCRA characteristics as these analyses are generally performed for waste disposal characterization to ascertain if a material is hazardous, not clean. Although a sample might pass TCLP analysis, the soil could contain a concentration of a parameter that exceeds risk based exposure criteria to potential receptors. Therefore, please analyze Borrow Pit Soil Stockpile Samples for the following parameters using SW-846 (or other appropriate) methods to characterize if the soil is clean: full suite of VOCs, SVOCs, pesticides, and herbicides, polychlorinated biphenyls (Aroclors), TPH GRO, TPH DRO, and Appendix IX Metals.

Navy Response to PREQB Page-Specific Comment No. 6

The referenced section of the technical specification will be revised as requested.

INTERIM CORRECTIVE MEASURES WORK PLAN
SOLID WASTE MANAGEMENT UNIT 56
HANGER 200 APRON

NAVAL ACTIVITY PUERTO RICO
CEIBA, PUERTO RICO
U.S. ENVIRONMENTAL PROTECTION AGENCY
I.D. NO. PR2170027203

Revision Number: 0

Prepared For:

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Norfolk, Virginia 23510

Contract Number N62470-11-D-8013
CTO JM41

August 2015

I certify under penalty of law, that I have examined and am familiar with the information submitted in this document and all attachments, and that this document and its attachments were prepared either by me personally, or under my direction or supervision, in a manner designed to ensure that qualified and knowledgeable personnel properly gather and present the information contained therein. I further certify, based on my personal knowledge or on my inquiry of those individuals immediately responsible for obtaining the information, that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowingly and willfully submitting a materially false statement.

Signature: MARTIN.STACIN.R.1391434553 Digitally signed by MARTIN.STACIN.R.1391434553 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USN, cn=MARTIN.STACIN.R.1391434553 Date: 2015.08.25 14:47:35 -04'00'

Name: Stacin Martin

Title: Remedial Project Manager

Date: August 25, 2015

Table of Contents

LIST OF ACRONYMS v

1.0 INTRODUCTION 1-1
- 1.1 Purpose 1-2
- 1.2 Site Location, Background, and History 1-2
  - 1.2.1 NAPR 1-2
  - 1.2.2 SWMU 56 1-4
- 1.3 Project Statement of Work 1-8
  - 1.3.1 Soil Excavation 1-8
  - 1.3.2 Sediment Excavation and Removal 1-26
- 1.4 Corrective Action Objectives 1-30

2.0 PROJECT ORGANIZATION 2-1
- 2.1 U.S. Department of the Navy — NAVFAC Southeast 2-1
- 2.2 U.S. EPA — Region 2 2-2
- 2.3 Puerto Rico Environmental Quality Board 2-2
- 2.4 RWEC 2-2
  - 2.4.1 Program Manager 2-3
  - 2.4.2 Project Manager 2-3
  - 2.4.3 Quality Control Systems Manager 2-4
  - 2.4.4 Health and Safety Manager 2-4
  - 2.4.5 Site Superintendent 2-5
  - 2.4.6 Quality Control Officer 2-5
  - 2.4.7 Site Personnel 2-6
- 2.5 Subcontractors 2-6

3.0 GENERAL REQUIREMENTS 3-1
- 3.1 Security Requirements and Facility Access 3-1
- 3.2 Site Controls 3-1
- 3.3 Protection of Existing Structures and Utility Clearances 3-1
- 3.4 Safety Requirements 3-1
- 3.5 Decontamination Procedures 3-2
  - 3.5.1 Dry Decontamination 3-2
  - 3.5.2 Wet Decontamination 3-2
- 3.6 Permits and Licenses 3-4

4.0 PROJECT ACTIVITIES 4-1
- 4.1 Mobilization and Site Preparation 4-1
- 4.2 Site Surveying 4-1
- 4.3 Excavation Procedures 4-1
  - 4.3.1 Soil 4-1
  - 4.3.2 Sediment 4-2
- 4.4 Material Handling, Staging and Loadout 4-5
- 4.5 Sampling and Analysis 4-6
- 4.6 Backfill and Site Restoration 4-6

5.0 ENVIRONMENTAL PROTECTION PLAN 5-1
5.1 Protection of Features 5-1
5.2 Traffic Plans 5-1
5.3 Erosion Control Plan 5-1
5.4 Spill Control Plan 5-2
5.4.1 Spill Response 5-2
5.4.2 Notification of Spills and Discharges 5-3
5.4.3 Spill Response Resources 5-4
5.5 Dust Control Plan 5-4
5.6 Contaminant Prevention Plan 5-4

6.0 CONTRACTOR QUALITY CONTROL 6-1
6.1 QC Coordination 6-1
6.2 Meetings 6-1
6.2.1 Preconstruction Quality Management Coordination Meeting 6-1
6.2.2 Progress Meetings 6-2
6.2.3 Daily Safety and Coordination Meetings 6-3
6.3 Selection, Approval and Monitoring 6-3
6.4 Change and Control Procedures 6-4
6.5 Construction Activities and Definable Features of Work 6-4
6.5.1 Project Planning and Submittals 6-5
6.5.2 Mobilization 6-5
6.5.3 Site Preparation 6-5
6.5.4 Solid (Soil) Excavation and Staging 6-6
6.5.5 Solid (Sediment) Excavation and Staging 6-6
6.5.6 Confirmation and Characterization/Profile Sampling 6-6
6.5.7 Contaminated Soil/Sediment Loadout, Transportation, and Disposal 6-7
6.5.8 Restoration 6-7
6.5.9 Equipment Decontamination 6-7
6.5.10 Demobilization 6-7
6.6 Inspections 6-8
6.6.1 Preparatory Phase 6-8
6.6.2 Initial Phase 6-9
6.6.3 Follow-Up Phase 6-11
6.6.4 Additional Preparatory and Initial Phases 6-11
6.6.5 Completion Phase 6-11
6.7 Nonconformance and Corrective Action 6-11
6.8 Documentation 6-12
6.8.1 Responsibility 6-12
6.8.2 Requirements 6-13

7.0 DOCUMENTATION AND REPORTING 7-1
7.1 Construction Completion Report 7-1
7.2 Weekly Progress Meetings 7-2
7.3 Daily Quality Control Reports 7-2

8.0 PROJECT SCHEDULE 8-1

9.0 REFERENCES 9-1

Figures

Figure 1 Site Location Map 1-3
Figure 2 Site Aerial Map 1-5
Figure 3 Site Layout Map 1-6

Tables

Table 1-1 Summary of Detected Laboratory Results — Surface Soil 1-9
Table 1-2 Summary of Detected Laboratory Results — Subsurface Soil 1-15
Table 1-3 Summary of Detected Laboratory Results — Groundwater 1-18
Table 1-4 Summary of Detected Laboratory Results — Surface Water 1-20
Table 1-5 Summary of Detected Laboratory Results — Sediment 1-21
Table 1-6 Corrective Action Objectives for Soil 1-31
Table 1-7 Corrective Action Objectives for Sediment 1-31

Appendices

Appendix A SWMU 56 Design Drawings
Appendix A1 Cofferdam Information
Appendix B Organizational Chart
Appendix C Site Safety and Health Plan
Appendix D Sampling and Analysis Plan
Appendix E SWMU 56 Technical Specifications
Appendix F Erosion and Control Plan
Appendix G Quality Control Forms
Appendix H Submittal Register
Appendix I Project Schedule

List of Acronyms

APA	Aerial Photography Analysis
Baker	Baker Environmental, Inc.
Baker	Michael Baker Jr., Inc.
bgs	Below ground surface
BRAC	Base Realignment and Closure
CAOs	Corrective Action Objectives
CFR	Code of Federal Regulations
CMS	Corrective Measures Study
CNRSE	Commander Navy Region Southeast
CO	Contracting Officer
COCs	Contaminants of concern
COR	Contracting Officer Representative
CQC	Contractor Quality Control Plan
DFWs	Definable features of work
DQCR	Daily Quality Control Report
DRO	Diesel range organics
ECP	Environmental condition of property
EM	Engineering Manual
EQB	Environmental Quality Board
FVR	Field Variance Report
GRO	Gasoline range organics
HHRA	Human Health Risk Assessment
HSM	Health and Safety Manager
ICM	Interim Corrective Manager
mg/kg	Milligrams per kilogram
NAPR	Naval Activity Puerto Rico
NAVFAC	Naval Facilities Engineering Command
NSRR	Naval Station Roosevelt Roads
NTR	Navy Technical Representative
PGM	Program Manager
PM	Project Manager
POL	Petroleum, oils, and lubricants
QC	Quality control
QCSM	Quality Control Systems Manager

RCRA	Resource Conservation and Recovery Act
RWEC	Right Way Environmental Contractors, Inc.
SAP	Sampling and Analysis Plan
SOW	Scope of work
SSHP	Site Safety and Health Plan
SVOC	Semi-volatile organic compounds
SWMU	Solid waste management unit
TPH	Total petroleum hydrocarbons
U.S. EPA	United States Environmental Protection Agency
VOC	Volatile organic compounds

1.0 INTRODUCTION

This document provides overall guidance for the successful completion of the Interim Corrective Measures (ICM) at Solid Waste Management Unit (SWMU) 56 Naval Activity Puerto Rico (NAPR), Ceiba, Puerto Rico. Activities described herein are in accordance with the requirements of Contract Number N62450-08-C-0093. This ICM Work Plan applies only to activities to be performed by Right Way Environmental Contractors, Inc. (RWEC) and its subcontractors under the above-referenced contract; these activities include sampling and soil and sediment removal.

This document is divided into nine sections:

- Section 1: Introduction
- Section 2: Project Organization
- Section 3: General Requirements
- Section 4: Project Activities
- Section 5: Environmental Protection Plan
- Section 6: Contractor Quality Control
- Section 7: Documentation and Reporting
- Section 8: Project Schedule
- Section 9: References

The attached appendices contain auxiliary document information. These include:

- Appendix A: SWMU 56 Design Drawings
- Appendix B: Organizational Chart
- Appendix C: Site Safety and Health Plan (SSHP)
- Appendix D: Sampling and Analysis Plan
- Appendix E: SWMU 56 Technical Specifications
- Appendix F: Erosion and Control Plan
- Appendix G: Quality Control Forms
- Appendix H: Submittal Register
- Appendix I: Project Schedule

1.1 Purpose

This ICM Work Plan has been prepared to provide overall guidance for the successful completion of fieldwork described in the project scope of work (SOW) and associated design documents. It also describes the coordination activities and sequence of events necessary to ensure the proper and timely completion of work.

1.2 Site Location, Background, and History

1.2.1 NAPR

NAPR occupies over 8,800 acres on the northern side of the east coast of Puerto Rico along Vieques Passage, with Vieques Island lying to the east about 10 miles off the harbor entrance. NAPR also occupies the islands of Piñeros and Cabeza de Perro, as presented on Figure 1. The northern entrance to NAPR is about 35 miles east along the coast road (Route 3) from San Juan. The property consists of 3,938 acres of upland (developable) property and 4,955 acres of environmentally sensitive areas including wetlands, mangrove, and wildlife habitat. The closest large town is Fajardo (population approximately 37,000), which is about 5 miles north of NAPR off Route 3. Ceiba (population approximately 17,000) adjoins the west boundary of NAPR (see Figure 1).

The facility was commissioned in 1943 as a Naval Operations Base, and designated as a Naval Station in 1957. Naval Station Roosevelt Roads (NSRR) operated as a Naval Station from 1957 until 31 March 2004. NSRR was one of the largest naval facilities in the world with more than 100 miles of paved roads, approximately 1,300 buildings, a large scale airfield (Ofstie Field), a deep water port, and over 30 tenant commands. NSRR provided communication support to the Atlantic and Caribbean areas and also served as a major training site for fleet exercises.

Section 8132 of fiscal year 2004 Defense Appropriations Act, signed into law on 30 September 2003, directed that NSRR be disestablished within six months, and that the real estate disposal/transfer be carried out in accordance with procedures contained in the Base Realignment and Closure (BRAC) Act of 1990. This legislation required that the base closure be conducted in accordance with the Comprehensive Environmental Response Compensation and Liability Act, as amended by the Community Environmental Response Facilitation Act. NSRR underwent operational closure on 31 March 2004 and is now designated as NAPR. The mission of NAPR is to comply with environmental regulations.

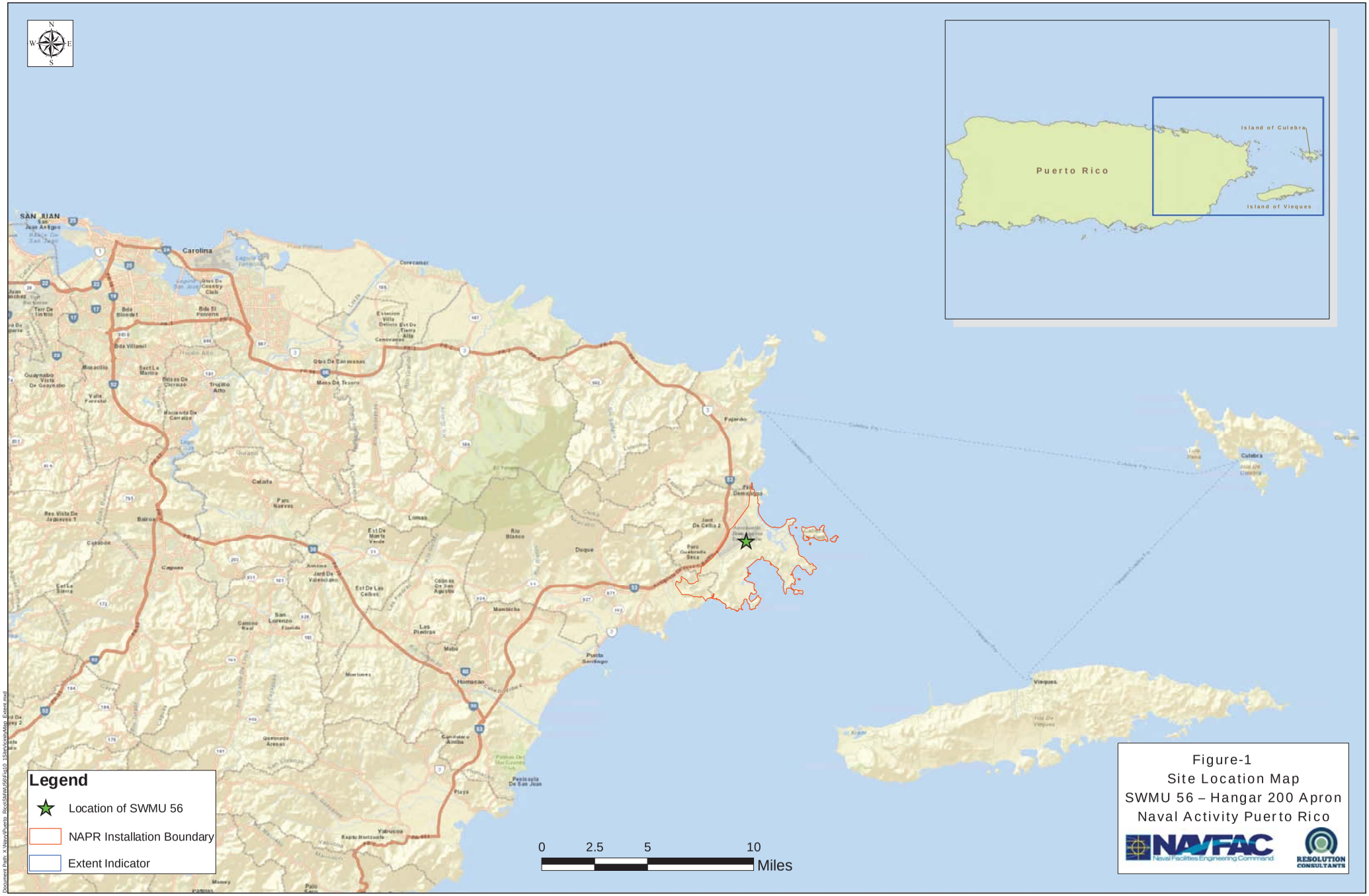

Figure-1
Site Location Map
SWMU 56 – Hangar 200 Apron
Naval Activity Puerto Rico

NAVFAC Naval Facilities Engineering Command
RESOLUTION CONSULTANTS

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In anticipation of operational closure of NSRR the Naval Facilities Engineering Command, Atlantic Division (NAVFAC Atlantic) prepared *Phase I/Phase II Environmental Condition of Property Reports* (hereinafter referred to as the Phase I ECP and Phase II ECP), to document the environmental condition of NSRR. The *Draft Phase I Environmental Condition of Property Report* dated 31 March 2004 (NAVFAC Atlantic, 2004), identified new sites at NAPR based on a review of records, an analysis of historical aerial photographs, physical site inspections, and interviews with persons familiar with past and current operations and activities. The new ECP sites had not been previously identified or investigated under existing environmental program areas. A Phase II ECP field investigation was performed in 2004 to conduct environmental sampling to determine if a release/disposal actually occurred at any of the sites recommended for further evaluation in the Phase I ECP, and if so, whether any potential risk to human health was present. The Final Phase II ECP Report recommended additional sampling under the Resource Conservation and Recovery Act (RCRA) Program at several sites to permit a more detailed assessment (NAVFAC, 2005).

The United States Environmental Protection Agency (U.S. EPA) issued a RCRA 7003 Administrative Order (U.S. EPA Docket No. RCRA-02-2007-7301), which identified a number of SWMUs (including SWMU 56) as having documented releases of solid and/or hazardous waste and hazardous constituents, and required follow-on actions. Following a public comment period, the Consent Order became effective on 29 January 2007 (U.S. EPA, 2007).

Ownership of the airfield parcel at NAPR (Ofstie Airfield) was transferred from the United States Navy to the Puerto Rico Ports Authority on 7 February 2008. The Puerto Rico Ports Authority developed the airfield into an operational regional airport. However, in accordance with the Administrative Order, the Covenant Deferral Request, and the Quitclaim Deed of Transfer, the United States Navy maintains responsibility for the investigation and cleanup of SWMU 56.

The following subsections provide a brief discussion of the background for SWMU 56. The location of SWMU 56 is shown on Figure 2 and design drawings are included in Appendix A.

1.2.2 SWMU 56

SWMU 56 (also known as ECP Site 2) covers an area of approximately 1.3 acres and is located on the south side of Ofstie Field, just off of the aircraft apron on the northwest side of Hangar 200, as shown on Figures 2 and 3.

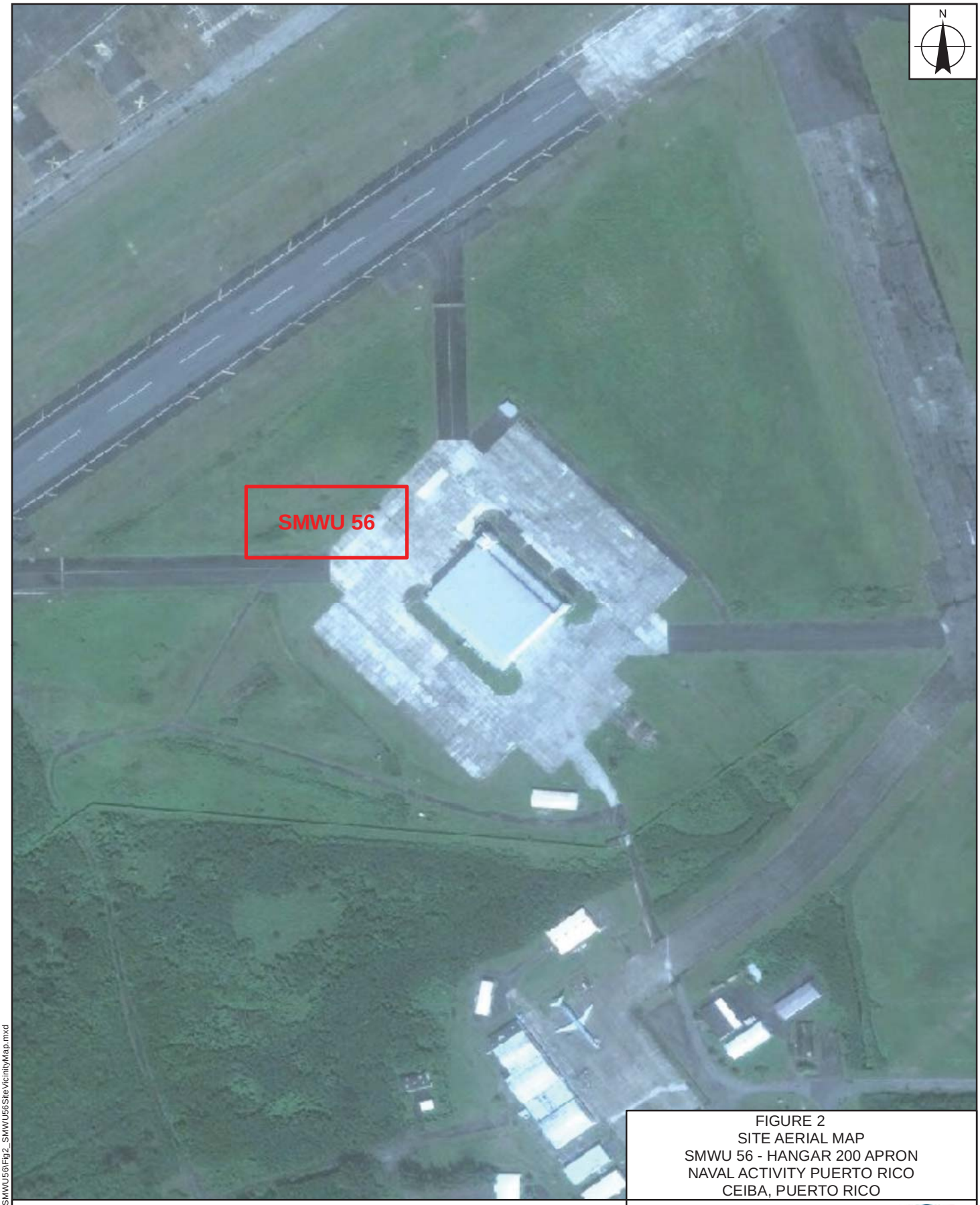

FIGURE 2
SITE AERIAL MAP
SMWU 56 - HANGAR 200 APRON
NAVAL ACTIVITY PUERTO RICO
CEIBA, PUERTO RICO

-Study Area

0 75 150 225 300
Feet

Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

NAVFAC Naval Facilities Engineering Command

RESOLUTION CONSULTANTS

REQUESTED BY: H. GOVENOR	DATE: 7/18/2013
DRAWN BY: M. SENNE	TASK ORDER NUMBER: JM41

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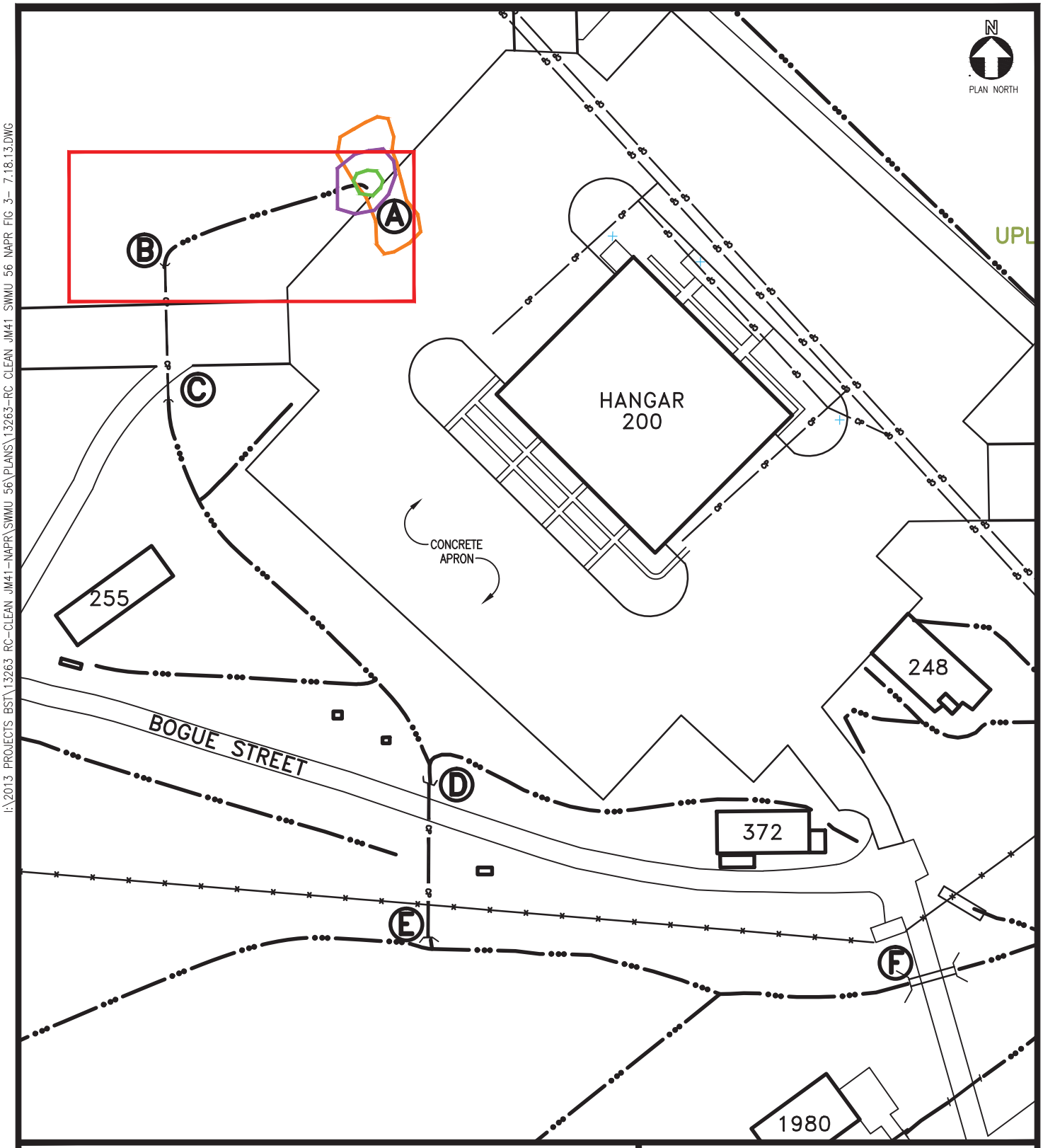

SMWU BOUNDARY
1958 POLYGON FEATURE
1961 POLYGON FEATURE
1964 POLYGON FEATURE

NOTE: POLYGON FEATURES INDICATE AREAS OF DISTURBANCE IDENTIFIED IN HISTORICAL PHOTOGRAPHS.

CP — CULVERT, EXISTING
HEADWALL, EXISTING
DRAINAGE SWALE, EXISTING
SECURITY FENCE, EXISTING
VEGETATION, EXISTING

0 150 300
SCALE IN FEET

FIGURE 3
SITE LAYOUT MAP
SMWU 56 - HANGAR 200 APRON
NAVAL ACTIVITY PUERTO RICO
CEIBA, PUERTO RICO

NAVFAC Naval Facilities Engineering Command
RESOLUTION CONSULTANTS

REQUESTED BY: H.K.	DWG DATE: 07/18/13
DRAWN BY: J.L.	DWG NO: 13263

I:\2013 PROJECTS BST\13263 RC-CLEAN JM41-NAPR\SWMU 56\PLANS\13263-RC CLEAN JM41 SWMU 56 NAPR FIG 3- 7.18.13.DWG

The aerial photography analysis (APA) presented within the Phase I ECP Report (NAVFAC Atlantic, 2004) identified this area as photo-identified Site 2. During the APA, an extensive analysis of aerial photography and records reviews was conducted, as presented in the *Environmental Condition of the Property Report* (LANTDIV, 2004). Aerial photographs were used to identify anomalies (e.g., large spills/stains, ground scars, debris piles, pits, possible disposal areas, etc.) that were not identified in previous investigations. Photos from 1958 to 1965 show stains/liquid extending off the edge of the hardstand at SWMU 56 to a surrounding drainage ditch.

A concrete channel is estimated to have been constructed between 1985 and 1995 in the area of the stained soil adjacent to the concrete apron. The Phase I ECP records review confirmed that Hangar 200 has historically been used for aircraft maintenance. The physical site inspections did not observe any significant stains or stressed vegetation. However, interviews confirmed numerous past spills of petroleum, oils, and lubricant (POL), in addition to hazardous materials, from the 1950s to the 1990s. Thus, former use of the concrete apron as an aircraft wash down area is considered likely.

The Phase II ECP investigation, performed in 2004, observed that the surrounding drainage ditch mentioned above is concrete lined and filled with water (NAVFAC, 2005). Surface water was observed east of the drainage culvert under the tarmac leading to the runway on the northwestern side of the site. Also observed during the investigation was an old floating absorbent sock that might have been utilized to stop potential phase-separated hydrocarbons from moving further downgradient within the storm water drainage system. The sock was observed immediately east of the drainage tunnels as mentioned above. Fish approximately four inches in length were observed within this drainage ditch. The majority of the drainage ditch contains thick organic material including long grass and other plant material. There were no signs of any stains or stressed vegetation observed during the investigation.

The 2004 Phase II ECP investigation indicated that surface water and sediment were impacted by past operations in the area. In surface water, very low, estimated concentrations were found for one volatile organic compound (VOC), three semi-volatile organic compounds (SVOCs), and for total petroleum hydrocarbons (TPH), diesel range organics (DRO), and gasoline range organics (GRO). The VOC, toluene, and TPH/GRO/DRO were only found at location 2E-SW02; SVOCs were quantified in the duplicate sample analysis only at location 2E-SW01. Inorganics were found at all locations; comparison of the surface water samples to relevant surface water screening criteria indicated slight exceedances of copper and mercury.

Sediment analyses detected four VOCs, four SVOCs, and TPH DRO. Although not strictly applicable to the sediment collected in the drainage swale, sediment data was compared to marine sediment screening values. This comparison showed exceedances for four organic compounds (acetone, chrysene, fluoranthene, and meta and para [m&p] cresol). Thirteen inorganic compounds were detected in the sample; all but beryllium and mercury exceeded the marine sediment screening criteria.

A *Final Corrective Measures Study Report* (hereinafter referred to as CMS Report) (Baker Environmental, Inc. [Baker], 2011) describes the site conditions, presents results from previous investigations, assesses risk to human and ecological receptors, and identifies the strategy for corrective measures at the site. The analytical results from previous investigations as presented in the CMS Report are presented in Tables 1-1 through 1-5 of this ICM Work Plan for informational purposes only. The selected remedy includes excavation of sediment throughout the impacted portion of the drainage ditch. The drainage ditch will be excavated to a maximum depth of 1.0 feet (ft) below ground surface (bgs) or to the concrete ditch lining or the culvert invert. The selected remedy also includes the excavation of surface soil (0.0 to 1.0 ft bgs) from two areas (Area A and Area B). Excavation and offsite disposal of approximately 465 cubic yards of contaminated soil and 238 cubic yards of contaminated sediment was selected as the cleanup alternative or corrective measure. In addition, the corrective measure includes an institutional control restricting future residential land and groundwater use. The Final CMS Report recommended institutional controls as a means of communicating these risks to future property owners. However, since there were no unacceptable groundwater human health risks related to past site activities, no corrective action for groundwater is required. The Statement of Basis for the site identify no groundwater risks related to past site activities were identified and no corrective action is required for groundwater.

1.3 Project Statement of Work

This ICM Work Plan outlines soil and sediment excavation to be completed at SWMU 56.

1.3.1 Soil Excavation

The predetermined limits of soil excavation (shown in Appendix A) will be excavated to a maximum depth of one foot bgs; if obstructions are encountered, samples will be taken at the lowest achievable depth. Confirmation samples will be collected from each sidewall of the excavation area at a frequency of one sample every 25 linear feet along the wall, or a minimum of one sample per sidewall. No bottom samples will be collected because the excavation depths were established by an ecological risk assessment and represent relevant exposure depths for ecological receptors. No unacceptable risk was identified for ecological receptors at depths greater than the identified excavation depths. The sample identification, depth, number of samples, and quality control (QC) samples within each area will be identified in the Sampling and Analysis Plan. Confirmation samples will be collected and analyzed for cadmium and lead.

TABLE 1-1

Revised: September 29, 2011

SUMMARY OF DETECTED LABORATORY RESULTS - SURFACE SOIL
SWMU 56 - HANGAR 200 APRON
CORRECTIVE MEASURES STUDY REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	NAPR	56SB01	56SB02	56SB03	56SB03	56SB04	56SB05	56SB06	56SB07	56SB08
Sample ID	Basewide	56SB01-00	56SB02-00	56SB03-00	56SB03-00D	56SB04-00	56SB05-00	56SB06-00	56SB07-00	56SB08-00
Date	Background (1)	4/28/2008	4/28/2008	4/29/2008	4/29/2008	4/28/2008	4/29/2008	4/30/2008	5/1/2008	5/5/2008
Depth Range	(ft bgs)	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0
Volatile Organic Compounds (ug/kg)										
Acetone	NE	50 J	89 J	130 J	270 J	23 J	86 U	110 J	260	280
Benzene	NE	0.76 U	0.76 U	0.68 U	0.7 U	0.79 U	0.95 J	0.8 U	0.73 U	0.99 J
Carbon disulfide	NE	0.49 U	0.49 U	0.44 U	0.45 U	0.51 U	0.51 U	0.51 U	1.9 J	0.6 U
Chloromethane	NE	0.68 U	0.69 U	1.1 J	2.2 J	0.71 U	0.71 U	0.72 U	0.65 U	0.84 U
Iodomethane	NE	1 J	0.96 UJ	2.2 J	1.8 J	1 UJ	1 U	1.7 J	2.4 J	1.2 U
Semivolatile Organic Compounds (ug/kg)										
2-Methylnaphthalene	NE	2.2 U	2.2 U	2 UJ	2.1 UJ	2.3 U	2.1 UJ	2.3 UJ	2.1 U	19
Benzo[a]anthracene	NE	2.2 U	2.2 U	3.1 UJ	9.2 J	2.3 U	2.1 UJ	2.3 UJ	2.4 J	2.9 J
Benzo[a]pyrene	NE	0.86 U	0.85 U	3.6 J	20 J	0.88 U	0.83 UJ	0.88 UJ	2.8 J	3 J
Benzo[b]fluoranthene	NE	0.99 U	0.98 U	9.2 J	44 J	1 U	0.96 UJ	1 UJ	3.1 J	8 J
Benzo[g,h,i]perylene	NE	2.2 U	2.2 U	2 UJ	17 J	2.3 U	2.1 UJ	2.3 UJ	2.1 U	3.1 J
Benzo[k]fluoranthene	NE	1.3 U	1.3 U	1.2 UJ	1.2 UJ	1.3 U	1.3 UJ	1.3 UJ	1.5 J	1.3 U
Butyl benzyl phthalate	NE	9.4 U	9.3 U	8.7 UJ	10 J	9.6 U	9 UJ	9.6 UJ	9.1 U	9.7 U
Chrysene	NE	0.8 U	0.79 U	2.9 J	36 J	0.81 U	1.4 UJ	0.81 UJ	2.2 J	3.9 J
Dibenz(a,h)anthracene	NE	0.77 U	0.76 U	0.71 UJ	2.9 J	0.79 U	0.74 UJ	0.78 UJ	0.75 U	0.79 U
Fluoranthene	NE	2.2 U	2.2 U	2.2 J	9.2 J	2.3 U	2.1 UJ	2.3 UJ	2.1 U	5 J
Indeno[1,2,3-cd]pyrene	NE	1.6 UJ	1.5 UJ	1.9 UJ	7.5 J	1.6 UJ	1.5 UJ	1.6 UJ	1.9 J	1.6 UJ
Naphthalene	NE	0.78 U	0.77 U	0.72 UJ	0.73 UJ	0.8 U	0.75 UJ	0.8 UJ	1.9 J	4.3 J
Phenanthrene	NE	2.2 UJ	2.2 UJ	2 UJ	2.3 J	2.3 UJ	2.1 UJ	2.3 UJ	3.1 U	2.5 J
Pyrene	NE	2.2 U	2.2 U	3.6 J	16 J	2.3 U	2.1 UJ	2.3 UJ	5.4 J	5.1 J

TABLE 1-1

Revised: September 29, 2011

SUMMARY OF DETECTED LABORATORY RESULTS - SURFACE SOIL
SWMU 56 - HANGAR 200 APRON
CORRECTIVE MEASURES STUDY REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	NAPR	56SB01	56SB02	56SB03	56SB03	56SB04	56SB05	56SB06	56SB07	56SB08
Sample ID	Basewide	56SB01-00	56SB02-00	56SB03-00	56SB03-00D	56SB04-00	56SB05-00	56SB06-00	56SB07-00	56SB08-00
Date	Background [1]	4/28/2008	4/28/2008	4/29/2008	4/29/2008	4/28/2008	4/29/2008	4/30/2008	5/1/2008	5/5/2008
Depth Range	(ft bgs)	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0
Metals (mg/kg)										
Antimony	2.43	2	0.14 U	0.095 UJ	0.11 UJ	0.091 U	0.11 UJ	0.13 UJ	0.16 UJ	0.11 UJ
Arsenic	2.34	2.3	2.4	2.9	2.8	0.59 J	3.4	2.2	3	1.4
Barium	231.22	39 J	16 J	130 J	130 J	15 J	120 J	20 J	190 J	71
Beryllium	0.65	0.14	0.096 J	0.27	0.28	0.053 J	0.24	0.15	0.34	0.24
Cadmium	0.65	3.3 J	0.1 J	0.16 J	0.13 J	0.038 UJ	0.18 J	0.055 J	0.16 J	0.15
Chromium	68.81	33	21	17 J	19 J	6.3	22 J	48 J	54 J	24
Cobalt	46.43	12	4.2	25 J	29 J	2.6	27 J	6.8 J	50 J	24 J
Copper	223.05	81 J	50 J	67 J	67 J	31 J	72 J	56 J	130 J	100
Lead	16.86	210	6.1	8.3 J	10 J	0.88	4.8 J	6.3 J	5.5 J	5.3
Mercury	0.10	0.015 J	0.033	0.043 J	0.046 J	0.018 J	0.041 J	0.0047 U	0.066 J	0.028
Nickel	22.97	12	4.4	8.5 J	8.9 J	1.1	13 J	7 J	14 J	8.7
Selenium	1.85	1.6	2.7	0.59 J	0.61 J	1.4	0.88 J	1.7 J	1.7 J	0.64
Silver	NE	0.24 J	0.032 J	0.069 UJ	0.042 UJ	0.019 U	0.057 UJ	0.13 UJ	0.078 UJ	0.069 U
Thallium	0.77	0.15 U	0.14 U	0.17 J	0.16 J	0.15 U	0.15 J	0.15 U	0.25 J	0.15 U
Vanadium	367.18	170 J	250 J	190 J	200 J	170 J	190 J	320 J	360 J	180
Zinc	112.16	77 J	25 J	48 J	54 J	7.5 J	49 J	23 J	62 J	58

Notes/Qualifiers:

J - Estimated value
U - Not detected above the reported method detection limit
UJ - Reported method detection limit is qualified as estimated
ft bgs - feet below ground surface
ug/kg - micrograms per kilogram
mg/kg - miligrams per kilogram
Na - Not Analyzed
NE - Not Established
NAPR - Naval Activity Puerto Rico
[1] NAPR basewide background airfield soil screening value (upper limit of the means concentration [mean plus two standard deviations]) (Baker, 2010)

TABLE 1-1

Revised: September 29, 2011

SUMMARY OF DETECTED LABORATORY RESULTS - SURFACE SOIL
SWMU 56 - HANGAR 200 APRON
CORRECTIVE MEASURES STUDY REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	NAPR	56SS01	56SS02	56SS03	56SS04	56SS05	56SS06	56SS07	56SS08	56SS09
Sample ID	Basewide	56SS01	56SS02	56SS03	56SS04	56SS05	56SS06	56SS07	56SS08	56SS09
Date	Background (1)	9/24/2008	9/24/2008	9/24/2008	9/24/2008	9/24/2008	9/24/2008	9/24/2008	9/24/2008	9/24/2008
Depth Range	(ft bgs)	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0
Volatile Organic Compounds (ug/kg)										
Acetone	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon disulfide	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloromethane	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iodomethane	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (ug/kg)		NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[a]anthracene	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[a]pyrene	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[b]fluoranthene	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[g,h,i]perylene	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[k]fluoranthene	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno[1,2,3-cd]pyrene	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 1-1

Revised: September 29, 2011

SUMMARY OF DETECTED LABORATORY RESULTS - SURFACE SOIL
SWMU 56 - HANGAR 200 APRON
CORRECTIVE MEASURES STUDY REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	NAPR	56SS01	56SS02	56SS03	56SS04	56SS05	56SS06	56SS07	56SS08	56SS09
Sample ID	Basewide	56SS01	56SS02	56SS03	56SS04	56SS05	56SS06	56SS07	56SS08	56SS09
Date	Background [1]	9/24/2008	9/24/2008	9/24/2008	9/24/2008	9/24/2008	9/24/2008	9/24/2008	9/24/2008	9/24/2008
Depth Range	(ft bgs)	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0
Metals (mg/kg)										
Antimony	2.43	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	2.34	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	231.22	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	0.65	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	0.65	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	68.81	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	46.43	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	223.05	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	16.86	83	5	8	5.9	7.2	3	NA	NA	NA
Mercury	0.10	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	22.97	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	1.85	0.51	2	2.2	3.5	0.86	1.4	0.86	0.62	2.3
Silver	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	0.77	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	367.18	NA	NA	NA	NA	NA	NA	160	55	430
Zinc	112.16	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes/Qualifiers:

J - Estimated value
U - Not detected above the reported method detection limit
UJ - Reported method detection limit is qualified as estimated
ft bgs - feet below ground surface
ug/kg - micrograms per kilogram
mg/kg - miligrams per kilogram
Na - Not Analyzed
NE - Not Established
NAPR - Naval Activity Puerto Rico
[1] NAPR basewide background airfield soil screening value (upper limit of the means concentration [mean plus two standard deviations]) (Baker, 2010)

TABLE 1-1

SUMMARY OF DETECTED LABORATORY RESULTS - SURFACE SOIL
SWMU 56 - HANGAR 200 APRON
CORRECTIVE MEASURES STUDY REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	NAPR	56SS10	56SS11D	56SS11	56SS12
Sample ID	Basewide	56SS10	56SS11D	56SS11	56SS12
Date	Background [1]	9/24/2008	9/24/2008	9/24/2008	9/24/2008
Depth Range	(ft bgs)	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0
Volatile Organic Compounds (ug/kg)					
Acetone	NE	NA	NA	NA	NA
Benzene	NE	NA	NA	NA	NA
Carbon disulfide	NE	NA	NA	NA	NA
Chloromethane	NE	NA	NA	NA	NA
Iodomethane	NE	NA	NA	NA	NA
Semivolatile Organic Compounds (ug/kg)		NA	NA	NA	NA
2-Methylnaphthalene	NE	NA	NA	NA	NA
Benzo[a]anthracene	NE	NA	NA	NA	NA
Benzo[a]pyrene	NE	NA	NA	NA	NA
Benzo[b]fluoranthene	NE	NA	NA	NA	NA
Benzo[g,h,i]perylene	NE	NA	NA	NA	NA
Benzo[k]fluoranthene	NE	NA	NA	NA	NA
Butyl benzyl phthalate	NE	NA	NA	NA	NA
Chrysene	NE	NA	NA	NA	NA
Dibenz(a,h)anthracene	NE	NA	NA	NA	NA
Fluoranthene	NE	NA	NA	NA	NA
Indeno[1,2,3-cd]pyrene	NE	NA	NA	NA	NA
Naphthalene	NE	NA	NA	NA	NA
Phenanthrene	NE	NA	NA	NA	NA
Pyrene	NE	NA	NA	NA	NA

TABLE 1-1

SUMMARY OF DETECTED LABORATORY RESULTS - SURFACE SOIL
SWMU 56 - HANGAR 200 APRON
CORRECTIVE MEASURES STUDY REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	NAPR	56SS10	56SS11D	56SS11	56SS12
Sample ID	Basewide	56SS10	56SS11D	56SS11	56SS12
Date	Background [1]	9/24/2008	9/24/2008	9/24/2008	9/24/2008
Depth Range	(ft bgs)	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0
Metals (mg/kg)					
Antimony	2.43	NA	NA	NA	NA
Arsenic	2.34	NA	NA	NA	NA
Barium	231.22	NA	NA	NA	NA
Beryllium	0.65	NA	NA	NA	NA
Cadmium	0.65	NA	NA	NA	NA
Chromium	68.81	NA	NA	NA	NA
Cobalt	46.43	NA	NA	NA	NA
Copper	223.05	NA	NA	NA	NA
Lead	16.86	NA	NA	NA	NA
Mercury	0.10	NA	NA	NA	NA
Nickel	22.97	NA	NA	NA	NA
Selenium	1.85	1.2	0.89	1.7	0.33 J
Silver	NE	NA	NA	NA	NA
Thallium	0.77	NA	NA	NA	NA
Vanadium	367.18	190	190 J	280 J	140
Zinc	112.16	NA	NA	NA	NA

Notes/Qualifiers:

J - Estimated value
U - Not detected above the reported method detection limit
UJ - Reported method detection limit is qualified as estimated
ft bgs - feet below ground surface
ug/kg - micrograms per kilogram
mg/kg - miligrams per kilogram
Na - Not Analyzed
NE - Not Established
NAPR - Naval Activity Puerto Rico
[1] NAPR basewide background airfield soil screening value (upper limit of the means concentration [mean plus two standard deviations]) (Baker, 2010)

TABLE 1-2

Revised: September 29, 2011

SUMMARY OF DETECTED LABORATORY RESULTS - SUBSURFACE SOIL
SWMU 56 - HANGAR 200 APRON
CORRECIVE MEASURES STUDY REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	NAPR	56SB01	56SB01	56SB02	56SB02	56SB03	56SB03	56SB04	56SB04	56SB05
Sample ID	Basewide	56SB01-01	56SB01-04	56SB02-02	56SB02-04	56SB03-02	56SB03-04	56SB04-03	56SB04-04	56SB05-03
Date	Background [1]	4/28/2008	4/28/2008	4/28/2008	4/28/2008	4/29/2008	4/29/2008	4/28/2008	4/28/2008	4/29/2008
Depth Range	(ft bgs)	1.0-3.0	7.0-9.0	3.0-5.0	7.0-9.0	3.0-5.0	7.0-9.0	5.0-7.0	7.0-9.0	5.0-7.0
Volatile Organic Compounds (ug/kg)										
Acetone	NE	8.3 J	9.7 J	22 J	25 J	120 J	49 J	17 J	11 J	99 J
Carbon disulfide	NE	0.51 U	0.53 U	0.46 U	0.52 U	0.53 U	0.57 U	0.5 U	0.51 U	0.51 U
Iodomethane	NE	1 UJ	1 UJ	0.9 U	1 UJ	1 UJ	1.1 UJ	0.98 UJ	0.99 UJ	1 UJ
Semivolatile Organic Compounds (ug/kg)										
2-Methylnaphthalene	NE	2.3 U	2.3 U	2.1 U	2.2 U	2.3 UJ	2.3 UJ	2.2 U	2.2 U	2.2 UJ
Benzo[a]anthracene	NE	2.3 U	2.3 U	2.1 U	2.2 U	2.3 UJ	2.3 UJ	4 J	2.2 U	2.2 UJ
Benzo[a]pyrene	NE	0.89 U	0.9 U	0.82 U	0.86 U	0.89 UJ	0.88 UJ	4.2 J	0.85 U	0.86 UJ
Benzo[b]fluoranthene	NE	1 U	1 U	0.95 U	0.99 U	1 UJ	1 UJ	0.99 U	0.98 U	0.99 UJ
Benzo[k]fluoranthene	NE	1.3 U	1.4 U	1.2 U	1.3 U	1.3 UJ	1.3 UJ	8.6 J	1.3 U	1.3 UJ
Chrysene	NE	0.82 U	0.83 U	0.76 U	0.79 U	0.82 UJ	0.81 UJ	6.9 J	0.78 U	0.8 UJ
Di-n-butyl phthalate	NE	34 U	34 U	31 U	33 U	34 UJ	33 UJ	35 U	32 U	33 UJ
Fluoranthene	NE	2.3 U	2.3 U	2.1 U	2.2 U	2.3 UJ	2.3 UJ	5.7 J	2.2 U	2.2 UJ
Pyrene	NE	2.3 U	2.3 U	2.1 U	2.2 U	2.3 UJ	2.3 UJ	8.1 J	2.2 U	2.2 UJ
Metals (mg/kg)										
Arsenic	2.34	1.1	1.2	0.5 J	0.48 J	0.47 U	3.4	0.8	1.5	1.2
Barium	231.22	13 J	16 J	12 J	55 J	34 J	42 J	14 J	7.9 J	10 J
Beryllium	0.65	0.046 J	0.096 J	0.089 J	0.21	0.064 U	0.18	0.098 J	0.18	0.15
Cadmium	0.65	0.039 UJ	0.04 UJ	0.035 UJ	0.04 UJ	0.04 UJ	0.064 J	0.036 UJ	0.036 UJ	0.037 UJ
Chromium	68.81	15	19	3.6	4	17 J	25 J	7.2	12	56 J
Cobalt	46.43	2.3	1.6	2.7	8	0.5 J	9.9 J	5.4	12	5.6 J
Copper	223.05	45 J	55 J	94 J	130 J	18 J	85 J	42 J	84 J	59 J
Lead	16.86	1.4	3	1.3	0.54	0.39 J	4.7 J	0.8	1.5	0.76 J
Mercury	0.10	0.042	0.0054 U	0.0049 U	0.0056 J	0.0047 U	0.74 J	0.015 J	0.0048 U	0.017 J
Nickel	22.97	2.9	3.6	1.3	2.5	2.3 J	6.7 J	2.2	4.9	5.8 J
Selenium	1.85	2.9	0.64 J	0.76	0.4 J	0.59 J	2.2 J	0.57 J	1.2	0.49 J
Silver	NE	0.091 J	0.051 J	0.018 U	0.035 J	0.034 UJ	0.052 UJ	0.04 J	0.036 J	0.035 UJ
Thallium	0.77	0.15 U	0.16 U	0.13 U	0.15 U	0.15 U	0.14 U	0.14 U	0.14 U	0.14 U
Vanadium	367.18	110 J	140 J	230 J	200 J	29 J	470 J	170 J	380 J	170 J
Zinc	112.16	8.7 J	16 J	14 J	33 J	8.1 J	31 J	16 J	47 J	26 J

TABLE 1-2

Revised: September 29, 2011

SUMMARY OF DETECTED LABORATORY RESULTS - SUBSURFACE SOIL
SWMU 56 - HANGAR 200 APRON
CORRECIVE MEASURES STUDY REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	NAPR	56SB05	56SB06	56SB06	56SB06	56SB07	56SB07	56SB08	56SB08
Sample ID	Basewide	56SB05-05	56SB06-01	56SB06-01D	56SB06-03	56SB07-02	56SB07-03	56SB08-01	56SB08-02
Date	Background (1)	4/29/2008	4/30/2008	4/30/2008	4/30/2008	5/1/2008	5/1/2008	5/5/2008	5/5/2008
Depth Range	(ft bgs)	9.0-10.0	1.0-3.0	1.0-3.0	5.0-7.0	3.0-5.0	5.0-7.0	1.0-3.0	3.0-5.0
Volatile Organic Compounds (ug/kg)									
Acetone	NE	95 J	50 J	55 UJ	25 U	260	54 U	110	140
Carbon disulfide	NE	0.57 U	0.5 U	0.47 U	0.53 U	1.9 J	0.46 U	0.49 U	0.49 U
Iodomethane	NE	1.1 UJ	0.97 UJ	0.92 U	1 U	1.7 J	0.89 U	2.6 J	1.2 J
Semivolatile Organic Compounds (ug/kg)									
2-Methylnaphthalene	NE	2.3 UJ	2.2 UJ	2.2 UJ	2.3 UJ	2.2 U	2.1 U	6.2 J	2.3 UJ
Benzo[a]anthracene	NE	2.3 UJ	2.2 UJ	2.2 UJ	2.3 UJ	2.2 U	2.1 U	2.2 UJ	2.3 UJ
Benzo[a]pyrene	NE	0.9 UJ	0.84 UJ	0.84 UJ	0.9 UJ	1.2 J	0.83 U	0.85 UJ	0.89 UJ
Benzo[b]fluoranthene	NE	1 UJ	0.96 UJ	0.97 UJ	1 UJ	1 J	0.96 U	0.98 UJ	1 UJ
Benzo[k]fluoranthene	NE	1.4 UJ	1.3 UJ	1.3 UJ	1.4 UJ	1.3 U	1.3 U	1.3 UJ	1.3 UJ
Chrysene	NE	0.84 UJ	0.77 UJ	0.77 UJ	0.83 UJ	1.0 J	0.77 U	0.79 UJ	0.82 UJ
Di-n-butyl phthalate	NE	41 J	32 UJ	32 UJ	34 UJ	33 U	32 U	32 UJ	69 UJ
Fluoranthene	NE	2.3 UJ	2.2 UJ	2.2 UJ	2.3 UJ	2.2 U	2.1 U	2.2 UJ	2.3 UJ
Pyrene	NE	2.3 UJ	2.2 UJ	2.2 UJ	2.3 UJ	2.2 U	2.1 U	2.2 UJ	2.3 UJ
Metals (mg/kg)									
Arsenic	2.34	1.7	0.86 R	4.9 R	2.6	2.4	2.1	1.2	2.1
Barium	231.22	470 J	28 J	18 J	18 J	130 J	49 J	21	100
Beryllium	0.65	0.43	0.13	0.17	0.3	0.3	0.3	0.071 U	0.28
Cadmium	0.65	0.061 J	0.038 UJ	0.037 UJ	0.038 UJ	0.14 J	0.16 J	0.048 U	0.12 U
Chromium	68.81	120 J	19 R	90 R	70 J	60 J	67 J	13	33
Cobalt	46.43	21 J	1.1 J	2.1 J	7.3 J	34 J	29 J	4.3 J	55 J
Copper	223.05	98 J	30 J	75 J	140 J	120 J	130 J	40 J	73
Lead	16.86	0.99 J	2.4 R	19 R	11 J	8.5 J	5.8 J	1.2	7.7
Mercury	0.10	0.0051 U	0.078 J	0.025 J	0.11 J	0.13 J	0.081 J	0.056	0.11
Nickel	22.97	16 J	4.1 J	2.8 J	6.5 J	17 J	11 J	2.6	9.7
Selenium	1.85	0.62 J	2.3 J	2.3 J	1 J	1.4 J	0.85 J	0.72	2.2
Silver	NE	0.061 UJ	0.027 UJ	0.056 UJ	0.044 UJ	0.089 J	0.11 J	0.028 J	0.19 U
Thallium	0.77	0.65	0.15 U	0.14 U	0.15 U	0.19 J	0.19 J	0.15 U	0.15 U
Vanadium	367.18	220 J	83 R	940 R	410 J	290 J	360 J	120	270
Zinc	112.16	62 J	8.8 J	8.7 J	20 J	72 J	35 J	8.9	67

TABLE 1-2

SUMMARY OF DETECTED LABORATORY RESULTS - SUBSURFACE SOIL
SWMU 56 - HANGAR 200 APRON
CORRECTIVE MEASURES STUDY REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Revised: September 29, 2011

Notes/Qualifiers:

J - Estimated value
R - Result is rejected; the presence or absense of the analyte cannot be verified
U - Not detected above the reported method detection limit
UJ - Reported method detection limit is qualified as estimated
ft bgs - feet below ground surface
ug/kg - micrograms per kilogram
mg/kg - miligrams per kilogram
NE - Not Established
NAPR - Naval Activity Puerto Rico
(1) NAPR basewide background airfield soil screening value (upper limit of the means concentration [mean plus two standard deviations]) (Baker, 2010)

TABLE 1-3

Revised: September 29, 2011

SUMMARY OF DETECTED LABORATORY RESULTS - GROUNDWATER
SWMU 56 - HANGAR 200 APRON
CORRECTIVE MEASURES STUDY REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	NAPR	56SB01	56SB02	56SB03	56SB03D	56SB04	56SB05	56SB06	56SB07	56SB08
Sample ID	Basewide	56GW01	56GW02	56GW03	56GW03D	56GW04	56GW05	56GW06	56GW07	56GW08
Date	Background (1)	5/1/2008	5/1/2008	5/1/2008	5/1/2008	5/1/2008	5/2/2008	5/3/2008	5/3/2008	5/7/2008
Volatile Organic Compounds (ug/L)										
Acetone	NE	5 R	5.2 J	5 UJ	5 UJ	5 UJ	7.1 J	5 U	5 U	5 U
Chloromethane	NE	0.28 R	0.28 U	1.8 J	0.28 UJ	0.28 U	0.28 UJ	0.28 U	0.28 U	0.28 U
Semivolatile Organic Compounds (ug/L)										
1,4-Dichlorobenzene	NE	0.12 U	0.16 J	0.12 UJ	0.12 UJ	0.12 U	0.12 UJ	0.12 U	0.12 U	0.12 U
3 & 4 Methylphenol	NE	0.15 U	0.15 U	0.15 UJ	0.15 UJ	0.15 U	0.15 UJ	0.15 U	0.15 U	0.63 J
Anthracene	NE	0.021 U	0.021 U	0.021 UJ	0.021 UJ	0.021 U	0.021 UJ	0.021 U	0.033 J	0.021 U
Bis(2-ethylhexyl) phthalate	NE	0.34 U	0.98	0.34 UJ	0.34 UJ	0.34 U	0.73 UJ	0.71 U	0.66 U	0.34 U
Diethyl phthalate	NE	0.18 U	0.32 J	0.18 UJ	0.18 UJ	0.18 U	0.18 UJ	0.18 U	0.18 U	0.18 U
Fluoranthene	NE	0.049 U	0.049 U	0.049 UJ	0.049 UJ	0.049 U	0.049 UJ	0.049 U	0.056 J	0.049 U
Fluorene	NE	0.018 U	0.018 U	0.018 UJ	0.018 UJ	0.018 U	0.018 UJ	0.018 U	0.055 J	0.018 U
Phenanthrene	NE	0.017 U	0.017 U	0.017 UJ	0.017 UJ	0.017 U	0.017 UJ	0.05 J	0.39	0.017 U
Total Metals (ug/L)										
Arsenic	18.89	1.8 U	1.9 U	0.5 J	0.52 J	1.7 U	0.42 J	0.31 U	0.7 U	1.2 U
Barium	686	7.1	24	21 J	21 J	23	16 J	18	100	170
Chromium	162.41	1.3 U	2.4 U	0.6 UJ	0.6 UJ	1.7 U	0.6 UJ	0.6 U	0.6 U	2.3 J
Cobalt	633.21	0.18 R	0.42 R	1.2 J	1.6 J	6.6	1.2 J	0.29 U	1.5 J	38
Copper	324	1.2 U	1.7 U	1.6 UJ	1.8 UJ	2.5 U	1.2 UJ	2.7 U	1.2 U	8.3
Nickel	95.74	0.32 U	0.88 J	0.32 UJ	0.32 UJ	0.82 J	0.35 J	0.38 J	0.32 U	3.9
Selenium	29.88	0.6 U	0.6 U	0.6 UJ	0.6 UJ	0.79 J	0.6 UJ	0.6 U	0.6 U	0.6 U
Vanadium	484.66	9.3	17	14 J	16 J	20	8.8 J	7.9	2.7 U	13
Zinc	547.53	6.5 U	6.5 U	6.5 UJ	6.5 UJ	8.7 J	6.5 UJ	6.5 U	6.5 U	18 J
Dissolved Metals (ug/L)										
Antimony	11.19	0.36 U	0.39 U	0.38 J	0.36 UJ	0.36 U	0.36 UJ	0.36 U	0.36 U	0.36 U
Arsenic	14.03	1.1 U	1.6 U	0.5 J	0.46 J	0.99 U	0.28 UJ	0.28 U	0.54 U	0.86 U
Barium	260	7.1	22	18 J	20 J	14	15 J	15	100	140
Cobalt	580.50	1.6 R	1.6 R	1.8 J	1.1 J	2.1	1.4 J	0.45 UJ	1.9 J	31
Mercury	0.157	0.08 U	0.08 U	0.08 UJ	0.08 UJ	0.098 J	0.08 UJ	0.08 U	0.08 U	0.08 U
Nickel	84.1	0.82 J	0.69 J	0.55 J	0.32 U	0.58 J	0.4 J	0.32 U	0.4 J	2.6
Selenium	23.92	0.6 U	0.6 U	0.6 UJ	0.6 UJ	0.65 J	0.7 J	0.6 U	0.6 U	0.6 U
Vanadium	20.96	8	14	12 J	14 J	9.8	5.8 J	3.6 U	2.5 U	1.7 J
Zinc	360.64	6.5 U	6.5 U	7.4 J	6.5 UJ	6.5 U	6.5 UJ	6.5 U	6.5 U	8 J

TABLE 1-3

SUMMARY OF DETECTED LABORATORY RESULTS - GROUNDWATER
SWMU 56 - HANGAR 200 APRON
CORRECTIVE MEASURES STUDY REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Notes/Qualifiers:

J - Estimated value
R - Result is rejected; the presence or absense of the analyte cannot be verified
U - Not detected above the reported method detection limit
UJ - Reported method detection limit is qualified as estimated
ft bgs - feet below ground surface
ug/L - micrograms per liter
NE - Not Established
NAPR - Naval Activity Puerto Rico
(1) NAPR basewide background groundwater screening value (upper limit of the means concentration [mean plus two standard deviations]) (Baker, 2010)

TABLE 1-4

Revised: September 29, 2011

SUMMARY OF DETECTED LABORATORY RESULTS - SURFACE WATER
SWMU 56 - HANGAR 200 APRON
CORRECTIVE MEASURES STUDY REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	NAPR	56SW01	56SW02	56SW03	56SW04	56SW04D	56SW05
Sample ID	Basewide	56SW01	56SW02	56SW03	56SW04	56SW04D	56SW05
Date	Background	4/29/2008	4/29/2008	4/29/2008	4/29/2008	4/29/2008	4/29/2008
Low level PAHs (ug/L)							
Not Detected							
Total Metals (ug/L)							
Arsenic	NE	3.2	1.4 U	1.4 U	1.6 U	1.7 U	2.4 U
Barium	NE	60	15	13	35	35	86
Cadmium	NE	1.1 J	0.12 UJ	0.12 UJ	0.12 UJ	0.12 UJ	0.12 UJ
Chromium	NE	6.3	1.6 U	1.5 U	1.5 U	1.4 U	1.7 U
Cobalt	NE	3.1	0.37 R	0.27 R	0.32 R	0.37 R	1.7 R
Copper	NE	13	2.3 J	3.1 J	1.2 U	1.4 J	2.4 J
Lead	NE	16	0.25 J	0.43 J	0.55 J	0.73 J	0.21 J
Nickel	NE	3.8	0.52 J	0.53 J	0.43 J	0.43 J	1.3
Selenium	NE	0.71 J	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
Vanadium	NE	22	5.2	6	4.5 U	5 U	5.3
Zinc	NE	46	6.5 U	6.6 J	6.5 U	8.6 J	6.5 J
Dissolved Metals (ug/L)							
Barium	NE	33	14	12	33	33	84
Cobalt	NE	3.7	3.7 R	2.3 R	2.1 R	0.62 R	3.8 R
Copper	NE	1.5 U	2 J	2.6 J	1.2 U	1.2 U	1.9 J
Lead	NE	0.43 U	0.17 J	0.15 U	0.47 J	0.15 U	0.15 U
Nickel	NE	2.1	1	1.2	0.82 J	0.47 J	1.6
Zinc	NE	8.8 J	6.7 J	6.5 U	6.5 U	6.5 U	6.5 U

Notes/Qualifiers:

J - Estimated value
R - Result is rejected; the presence or absense of the analyte cannot be verified
U - Not detected above the reported method detection limit
UJ - Reported method detection limit is qualified as estimated
ug/L - micrograms per liter
NE - Not Established for freshwater
NAPR - Naval Activity Puerto Rico

TABLE 1-5

Revised: September 29, 2011

SUMMARY OF DETECTED LABORATORY RESULTS - SEDIMENT
SWMU 56 - HANGAR 200 APRON
CORRECTIVE MEASURES STUDY REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	NAPR	56SD03	56SD04	56SD04D	56SD05	56SD12	56SD13	56SD14D	56SD14	56SD15
Sample ID	Basewide	56SD03	56SD04	56SD04D	56SD05	56SD12	56SD13	56SD14D	56SD14	56SD15
Date	Background [1]	4/29/2008	4/29/2008	4/29/2008	4/29/2008	9/25/2008	9/25/2008	9/25/2008	9/25/2008	6/24/2009
Depth Range (ft. bgs)		0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
Volatile Organic Compounds (ug/kg)										
2-Butanone (MEK)	NE	65 J	3.6 R	35 UJ	110 UJ	NA	NA	NA	NA	NA
Acetone	NE	200 J	5.9 R	250 J	1200 J	NA	NA	NA	NA	NA
Carbon disulfide	NE	0.29 UJ	19 J	15 J	800 J	NA	NA	NA	NA	NA
Iodomethane	NE	0.58 UJ	1.3 R	2.9 UJ	36 J	NA	NA	NA	NA	NA
Semivolatile Organic Compound (ug/kg)										
Benzo[a]anthracene	NE	270 J	58 J	28 J	9.8 UJ	NA	NA	NA	NA	NA
Benzo[a]pyrene	NE	300 J	85 J	39 J	3.8 UJ	NA	NA	NA	NA	NA
Benzo[b]fluoranthene	NE	1.6 UJ	3.1 UJ	77 J	4.4 UJ	NA	NA	NA	NA	NA
Benzo[g,h,i]perylene	NE	150 J	46 J	31 J	9.8 UJ	NA	NA	NA	NA	NA
Benzo[k]fluoranthene	NE	630 J	160 J	3.6 UJ	5.7 UJ	NA	NA	NA	NA	NA
Benzyl alcohol	NE	17 UJ	32 UJ	29 UJ	47 J	NA	NA	NA	NA	NA
Bis(2-ethylhexyl) phthalate	NE	260 J	79 U	70 U	160 U	NA	NA	NA	NA	NA
Butyl benzyl phthalate	NE	22 J	29 UJ	26 UJ	41 UJ	NA	NA	NA	NA	NA
Chrysene	NE	410 J	87 J	36 J	7.1 J	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NE	52 J	2.4 UJ	2.1 UJ	3.4 UJ	NA	NA	NA	NA	NA
Fluoranthene	NE	350 J	79 J	32 J	9.8 UJ	NA	NA	NA	NA	NA
Indeno[1,2,3-cd]pyrene	NE	110 J	32 J	19 J	6.9 UJ	NA	NA	NA	NA	NA
Phenanthrene	NE	21 J	19 J	13 J	9.8 UJ	NA	NA	NA	NA	NA
Phenol	NE	9.9 UJ	19 UJ	19 J	28 UJ	NA	NA	NA	NA	NA
Pyrene	NE	570 J	110 J	51 J	9.8 UJ	NA	NA	NA	NA	NA
Total Metals (mg/kg)										
Antimony	8.62	0.59 UJ	1.4 UJ	1.3 UJ	0.66 UJ	0.42 UJ	0.97 UJ	0.62 UJ	0.66 UJ	0.57 UJ
Arsenic	2.83	3.9 J	4.2 J	3 J	3.8 J	2.6 J	3.2 J	3.4 J	4 J	1.5 J
Barium	208.04	54 J	78 J	70 J	160 J	78 J	110 J	43 J	51 J	93 J
Beryllium	0.36	0.21 J	0.29 J	0.24 J	0.27 J	0.26 UJ	0.25 UJ	0.28 J	0.3 J	0.45 UJ
Cadmium	0.22	2.6 J	3.9 J	3.4 J	0.54 J	0.54 J	0.72 J	0.39 J	0.23 J	0.09 UJ
Chromium	63.41	39 J	46 J	43 J	34 J	29 J	38 J	51 J	46 J	28.7 J
Cobalt	45.07	18 J	24 J	17 J	40 J	29 J	29 J	43 J	59 J	27.5 J

TABLE 1-5

Revised: September 29, 2011

SUMMARY OF DETECTED LABORATORY RESULTS - SEDIMENT
SWMU 56 - HANGAR 200 APRON
CORRECTIVE MEASURES STUDY REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	NAPR	56SD03	56SD04	56SD04D	56SD05	56SD12	56SD13	56SD14D	56SD14	56SD15
Sample ID	Basewide	56SD03	56SD04	56SD04D	56SD05	56SD12	56SD13	56SD14D	56SD14	56SD15
Date	Background [1]	4/29/2008	4/29/2008	4/29/2008	4/29/2008	9/25/2008	9/25/2008	9/25/2008	9/25/2008	6/24/2009
Total Metals (mg/kg)										
Copper	159.81	130 J	130 J	110 J	110 J	100 J	110 J	98 J	100 J	107 J
Lead	19.38	280 J	110 J	160 J	25 J	13 J	48 J	34 J	54 J	32.4 J
Mercury	0.17	0.052 J	0.11 J	0.069 J	0.069 J	0.039 UJ	0.086 J	0.063 J	0.064 J	0.092 J
Nickel	18.12	13 J	19 J	16 J	16 J	11 J	14 J	16 J	19 J	9.5 J
Selenium	3.69	1.2 J	4.2 J	2.9 J	2 J	1.3 J	1.2 J	0.88 J	0.99 J	0.92 UJ
Silver	NE	0.18 J	0.15 J	0.21 J	0.23 J	0.074 UJ	0.72 J	0.089 UJ	0.14 UJ	4.6 J
Tin	7.72	7.8 UJ	15 UJ	13 UJ	23 UJ	14 UJ	13 UJ	9.5 UJ	8.7 UJ	8.2 J
Vanadium	241.10	220 J	250 J	160 J	190 J	240 J	180 J	260 J	230 J	184 J
Zinc	148.46	89 J	140 J	130 J	110 J	86 J	100 J	120 J	110 J	93.3 J
Total Organic Carbon (mg/kg)										
Total Organic Carbon	NE	36000 J	42000 J	NA	76000 J	NA	NA	NA	NA	NA

Notes/Qualifiers:

J - Estimated value
R - Result is rejected; the presence or absense of the analyte cannot be verified
U - Not detected above the reported method detection limit (2008 data)/ quantitation limit (2009 data)
UJ - Reported method detection limit (2008 data) or quantitation limit (2009 data) is qualified as estimated
ug/kg - micrograms per kilogram
mg/kg - miligrams per kilogram
NE - Not Established
NAPR - Naval Activity Puerto Rico
[1] NAPR basewide background freshwater drainage ditch sediment value (upper limit of the means concentration [mean plus two standard deviations]) (Baker, 2010)

TABLE 1-5

SUMMARY OF DETECTED LABORATORY RESULTS - SEDIMENT
SWMU 56 - HANGAR 200 APRON
CORRECTIVE MEASURES STUDY REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	NAPR	56SD16	56SD17	56SD18	56SD19	56SD20	56SD21	56SD22	56SD22D
Sample ID	Basewide	56SD16	56SD17	56SD18	56SD19	56SD20	56SD21	56SD22	56SD22D
Date	Background [1]	6/24/2009	6/24/2009	6/24/2009	6/24/2009	6/24/2009	6/24/2009	6/24/2009	6/24/2009
Depth Range (ft. bgs)		0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
Volatile Organic Compounds (ug/kg)									
2-Butanone (MEK)	NE	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	NE	NA	NA	NA	NA	NA	NA	NA	NA
Carbon disulfide	NE	NA	NA	NA	NA	NA	NA	NA	NA
Iodomethane	NE	NA	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compound (ug/kg)									
Benzo[a]anthracene	NE	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[a]pyrene	NE	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[b]fluoranthene	NE	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[g,h,i]perylene	NE	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[k]fluoranthene	NE	NA	NA	NA	NA	NA	NA	NA	NA
Benzyl alcohol	NE	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl) phthalate	NE	NA	NA	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	NE	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NE	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NE	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	NE	NA	NA	NA	NA	NA	NA	NA	NA
Indeno[1,2,3-cd]pyrene	NE	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NE	NA	NA	NA	NA	NA	NA	NA	NA
Phenol	NE	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NE	NA	NA	NA	NA	NA	NA	NA	NA
Total Metals (mg/kg)									
Antimony	8.62	0.64 UJ	0.66 UJ	0.92 J	0.29 UJ	0.81 UJ	0.72 UJ	0.74 UJ	0.86 UJ
Arsenic	2.83	0.96 J	2.2 J	3.4 J	2	1.1 UJ	1 J	10.4 J	2.4 J
Barium	208.04	67.3 J	140 J	101 J	42	109 J	105 J	571 J	197 J
Beryllium	0.36	0.5 UJ	0.5 UJ	0.56 UJ	0.4 U	0.44 UJ	0.57 UJ	1.2 UJ	0.59 UJ
Cadmium	0.22	0.1 UJ	0.1 UJ	0.13 UJ	0.04 U	0.12 UJ	0.11 UJ	0.11 UJ	0.13 UJ
Chromium	63.41	27.7 J	29.7 J	25.1 J	29.2	19.8 J	24.4 J	34.4 J	18.2 J
Cobalt	45.07	23.6 J	41.9 J	58.8 J	33	50.8 J	36.7 J	91.4 J	47.6 J

TABLE 1-5

Revised: September 29, 2011

SUMMARY OF DETECTED LABORATORY RESULTS - SEDIMENT
SWMU 56 - HANGAR 200 APRON
CORRECTIVE MEASURES STUDY REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	NAPR	56SD16	56SD17	56SD18	56SD19	56SD20	56SD21	56SD22	56SD22D
Sample ID	Basewide	56SD16	56SD17	56SD18	56SD19	56SD20	56SD21	56SD22	56SD22D
Date	Background [1]	6/24/2009	6/24/2009	6/24/2009	6/24/2009	6/24/2009	6/24/2009	6/24/2009	6/24/2009
Total Metals (mg/kg)									
Copper	159.81	100 J	96.6 J	89.3 J	77.3	75.1 J	85.7 J	92.8 J	67.6 J
Lead	19.38	39.4 J	45.7 J	23.3 J	73.1	16.7 J	19.7 J	22 J	15.1 J
Mercury	0.17	0.38 J	0.068 J	0.11 J	0.11	0.15 J	0.1 J	0.086 UJ	0.088 J
Nickel	18.12	9.6 J	11.5 J	10.5 J	11.9	8.7 J	9.9 J	19.1 J	8.7 J
Selenium	3.69	2 J	1.1 UJ	1.8 J	0.46 UJ	1.3 UJ	1.4 J	1.2 UJ	1.4 UJ
Silver	NE	0.31 J	0.12 UJ	0.16 UJ	0.05 U	0.15 UJ	0.13 UJ	0.14 UJ	0.16 UJ
Tin	7.72	7.7 J	13.6 J	10.7 J	4.6 J	14.6 J	10.1 J	16 J	14.1 J
Vanadium	241.10	172 J	189 J	201 J	167	147 J	176 J	171 J	151 J
Zinc	148.46	90.5 J	98.1 J	104 J	86	69.2 J	75.5 J	98.2 J	71.1 J
Total Organic Carbon (mg/kg)									
Total Organic Carbon	NE	NA	NA	NA	NA	NA	NA	NA	NA

Notes/Qualifie	**Notes/Qualifiers:**
J - Estimated	J - Estimated value
R - Result is	R - Result is rejected; the presence or absense of the analyte cannot be verified
U - Not detec	U - Not detected above the reported method detection limit (2008 data)/ quantitation limit (2009 data)
UJ - Reported	UJ - Reported method detection limit (2008 data) or quantitation limit (2009 data) is qualified as estimated
ug/kg - micro	ug/kg - micrograms per kilogram
mg/kg - milig	mg/kg - miligrams per kilogram
NE - Not Esta	NE - Not Established
NAPR - Nava	NAPR - Naval Activity Puerto Rico
[1] NAPR bas the means cc	[1] NAPR basewide background freshwater drainage ditch sediment value (upper limit of the means concentration [mean plus two standard deviations]) (Baker, 2010)

The processes to be followed for implementation of the surface soil excavation and disposal portion of this ICM Work Plan include:

- Mobilization of an excavator or grade all, small front end loader, and associated equipment to the site.
- Preparation/construction of a decontamination area and equipment lay down area.
- Construction of a lined stockpile area (sloped to collect any potential run off from precipitation) within the vicinity of excavation areas A and B.
- Installation of erosion and sediment controls.
- Surveying the excavation limits.
- Excavation of surface soil to the proposed horizontal limits and to a maximum depth of one foot.
- Deposit the excavated surface soil into lined stockpile areas.
- Collect confirmation samples from the sidewalls of the excavation.
- Analyze confirmation samples for cadmium and lead using SW-846 method 6010B/6020A, using ICP-mass spectrometry.
- If confirmation sample results exceed Corrective Action Objectives (CAOs), extend the excavation on the associated sidewall a minimum of one foot and resample sidewall for confirmation.
- Collection and analysis of representative excavated soil for toxicity characteristics in accordance with 40 Code of Federal Regulations (CFR) Part 261.24.
- Collection, analysis, and disposal of water from the lined stockpile areas.

- Transportation and disposal of excavated soil to an approved on-island, permitted, disposal facility, unless characterization testing indicates levels exceeding landfill acceptance criteria. If the waste is characterized as hazardous, then it must be disposed of off-island at a facility in the continental United States, substantially increasing project costs.

- Backfilling and compacting existing excavated areas with clean fill to match existing grade.

- Re-vegetation of any disturbed areas.

- Demobilization of all equipment, etc.

- Removal of erosion and sediment control structures.

Prior to development of the CMS, surface soil samples were collected to delineate the extent of surface soil contamination. The initial limits of surface soil excavation completely encompass the contamination as presented in Appendix A. Post-excavation confirmation sampling will be required from the side walls to verify remaining soils are below the CAOs.

1.3.2 Sediment Excavation and Removal

The predetermined limits of sediment excavation (shown in Appendix A) in unlined areas of the drainage ditch will be a maximum depth of one foot bgs; if obstructions are encountered, samples will be taken at the lowest achievable depth. No bottom of excavation samples will be collected because the basis for the removal action is to remediate ecological risk, and the 0-1 foot depth interval is the relevant exposure depths for ecological receptors. Any contamination in excess of the CAOs that remains below the one foot excavation will not pose a risk to ecological receptors because the excavation will be lined with geotextile, backfilled with one foot of compacted low permeability soil, and armored with riprap to limit erosion (i.e., incomplete exposure pathway).

Sediment overlying impermeable barriers, such as those in Segments A-B, B-C, and D-E, will be removed to the barrier surface, which may be more or less than one foot. Confirmation sampling will not be required for the sediment excavation in these areas since the sediment will be removed to the barrier surface and thus no sediment will be left to sample.

Drainage ditch bypass pumping will be set-up to manage the water in the drainage ditch. Two 12-inch dri-prime pumps with a capacity in the range of 4,000 to 5,000 gallons per minute will be set up in series for a total maximum pumping capacity of approximately 14 million gallons

per day. One additional pump with the same capacity will remain on standby in case of equipment breakdown or maintenance. Twelve inch hard pipe will be used for the discharge of water around the segment to be excavated. Water pumped from the segments will be pumped into cofferdams using trash pumps, as shown in Appendix A1. Any additional water removed from the segments to be excavated will be pumped around the drainage ditch segment downstream into the ditch.

Confirmation samples will be collected from each sidewall of the excavation area at a frequency of one sample every 25 linear feet along the wall, or a minimum of one sample per sidewall. The horizontal extent of the sediment excavation will not extend beyond the soil/sediment boundary as the contaminants of concern (COCs) were determined based on potential ecological risk indicated from sediment exposures; sediment exposure pathways are incomplete beyond the soil/sediment boundary. Confirmation samples will be collected and analyzed for cadmium and lead in segment C-D and for lead in segment E-F. The sample identification, depth, number of samples, and QC samples within each area will be identified in the Sampling and Analysis Plan.

The processes to be followed for implementation of the sediment excavation and disposal portion of this ICM Work Plan include:

- Mobilize an excavator or grade all, small front end loader, and associated equipment to the site.
- Prepare/construct a decontamination area and equipment lay down area.
- Construct sediment drying areas sloped with collection area for water with erosion and sedimentation controls along the edge of the drainage ditch.
- Survey the sediment excavation limits within ditches requiring sediment removal.
- Delineate the sediment/soil boundary based on presence/absence of hydric soils and vegetation.
- Set-up pumps to dewater drainage ditch segment C-D, if necessary.
- Dewater ditch segment C-D discharging water to segment E-F, if necessary.

- Place a sediment barrier across drainage ditch segment C-D to trap any sediment from the cleaning of segments A-B and B-C.

- Remove sediment from the lined reach of drainage ditch segment A-B using mechanical means.

- Pressure wash lined segments A-B and B-C to remove any remaining sediment and allow sediment to collect behind the sediment barrier. Allow sediment to settle behind the sediment barrier.

- Dewater ditch segment C-D containerizing water from the ditch for testing and appropriate disposal, if necessary.

- Excavate sediment from the unlined segment C-D drainage ditch to a maximum depth of one foot and a width that is the lesser of the soil/sediment boundary or 5 feet from center.

- Collect confirmation samples from the sidewalls of the excavation in the unlined segments of drainage ditch C-D. Analyze confirmation samples for cadmium and lead in segment C-D

- If confirmation sample results exceed Corrective Action Objectives (CAOs), extend the excavation on the associated sidewall the lesser of one foot or to the soil/sediment boundary and resample sidewall for confirmation. The maximum horizontal extent of excavation will be the field-delineated soil/sediment boundary.

- Set-up pumps upstream of point E on the west to east drainage ditch. Set up pumps upstream of the drainage ditch discharging into drainage ditch E-F approximately midway along its length, if necessary.

- Set up the discharge lines from these two pumping locations after the culvert east of point F, if necessary.

- Install cofferdams upstream of point E on the west to east drainage ditch and upstream of the drainage ditch discharging into drainage ditch E-F approximately midway along its length, if necessary.

- Dewater ditch segment E-F discharging water downstream of the culvert near point F, if necessary.

- Pressure wash lined segment D-E to remove any remaining sediment and allow water to collect in reach E-F. Once sediment has settled, dewater ditch segment E-F containerizing water from the cleaning of ditch segment D-E for testing and appropriate disposal.

- Excavate sediment from the unlined segment E-F drainage ditch to a maximum depth of one foot and a width that is the lesser of the soil/sediment boundary or 5 ft from center.

- Collect confirmation samples from the sidewalls of the excavation in the unlined segments of drainage ditch E-F. Analyze confirmation samples for lead in segment E-F.

- If confirmation sample results exceed Corrective Action Objectives (CAOs), extend the excavation on the associated sidewall the lesser of one foot or to the soil/sediment boundary and resample sidewall for confirmation. The maximum horizontal extent of excavation will be the field-delineated soil/sediment boundary.

- Place excavated sediment onto dewatering areas for dewatering and drying.

- Collect and analyze representative excavated sediment samples for toxicity characteristics in accordance with 40 CFR Part 261.24.

- Collect, analyze, and dispose of water from sediment storage areas.

- Load dewatered sediment into Super Sack® for transportation and disposal at an appropriate disposal facility.

- Transport and dispose of excavated sediment to an approved on-island, permitted, disposal facility, unless characterization testing indicates levels exceeding landfill acceptance criteria. If the waste is characterized as hazardous, it must be disposed of off-island at a facility in the continental United States, thereby substantially increasing project costs.

- Line excavated area in segments C-D and E-F with geotextile, and secure in place with stakes.

- Backfill excavated area in segments C-D and E-F with one foot of compacted low permeability soil and grade to promote positive drainage.

- Backfill ditch segments C-D and E-F with clean aggregate rip rap to provide future erosion resistance.
- Remove coffer dams from drainage ditch segment E-F.
- Remove pumps and associated piping from ditch segment E-F, if necessary.
- Re-vegetate disturbed upland areas outside of the drainage swale.
- Demobilize equipment.
- Remove erosion and sediment control structures.

1.4 Corrective Action Objectives

A Human Health Risk Assessment (HHRA) evaluated the exposure of contaminants in soil, groundwater, freshwater drainage ditch surface water, and sediment on human receptors (Baker, 2011). Risk estimates have exceeded target limits, as follows:

- Arsenic (total soil, groundwater, and sediment) and benzo(a)pyrene (sediment) exceeded the point of departure risk of 1×10^{-06}
- Noncarcinogenic risks were above the target limits for the residential adult and child scenario, primarily due to vanadium in soil and sediment

Estimated carcinogenic risks from all media were within the target risk range for the remaining receptors (i.e., current/future trespassers, future construction workers, and future industrial/commercial workers). Future land use at SWMU 56 is expected to remain industrial; therefore, potential human exposure is limited to industrial or commercial property use. The Puerto Rico Ports Authority has developed the adjacent Ofstie Field into a regional airport, precluding residential development. The future residential scenario was assessed for comparative purposes in order to evaluate unrestricted land use, and potable use of groundwater represents an incomplete exposure pathway.

Unrestricted land use cannot be recommended because risk estimates exceeded target limits for future residential receptors. Therefore, the recommended qualitative CAO is restricting the future residential use of the site. The HHRA did find that levels of COCs in surface soil and sediment samples did exceed acceptable limits. Thus, the HHRA recommended a qualitative CAO, including an institutional control restricting future residential land.

A Screening Level Ecological Risk Assessment and Step 3a of the baseline ERA was completed for SWMU 56 — Hangar 200 Apron (Baker, 2011). CAOs were identified for two chemicals (cadmium and lead) for surface soil (0-1 foot bgs), as shown in Table 1-6.

Table 1-6
Corrective Action Objectives for Surface Soil (0-1 foot bgs)

Chemical	Final CAO (mg/kg)	Basis
Cadmium	1.8	Risk-based concentration for avian omnivores[1]
Lead	96	Risk-based concentration for avian omnivores[1]

Note:
[1] The value shown is the soil concentration that results in a No Observed Adverse Effects Level-based hazard quotient value of 1.00 for the most sensitive receptor (American Robin).
CAO = Corrective action objectives
bgs = Below ground surface
mg/kg = Milligrams per kilogram

CAOs were identified for five chemicals (barium, cadmium, chromium, lead, and zinc) for sediment, as shown on Table 1-7. As discussed further in Section 4.3, the drainage ditch was divided into segments to assist with characterization (see Table 1-2 and Appendix A).

Table 1-7
Corrective Action Objectives for Sediment

Chemical	Final CAO (mg/kg)	Basis	Applicable Drainage Ditch Segment
Barium	214	Background Concentration[1]	A-B
Cadmium	0.99	Sediment Ecological Screening Value[2]	A-B and C-D
Chromium	65	Background Concentration[1]	A-B
Lead	35.8	Sediment Ecological Screening Value[2]	A-B, C-D, and E-F
Zinc	152	Background Concentration [1]	A-B

Note:
[1] Background airfield drainage ditch sediment upper limit of the mean concentration presented in Addendum C of Baker (2010).
[2] The value shown is a Threshold Effect Concentration (MacDonald et al., 2003).
mg/kg = Milligrams per kilogram
CAO = Corrective action objectives

The ecological risk assessment did not indicate an adverse risk to receptors exposed to site contamination detected in subsurface soil, groundwater, or drainage ditch surface water.

2.0 PROJECT ORGANIZATION

This section identifies and defines responsibilities of the principle decision-makers and all persons responsible for implementing the work (see Appendix B, Organizational Chart)

2.1 U.S. Department of the Navy — NAVFAC Southeast

The Contractor's responsibility is directly to the Contracting Officer (CO) via the Contracting Officer's Representative (COR). Any requested change and/or deviation in scope will be brought to the attention of and approved by the CO. In no case will changes to the contract SOW be made at the activity level or by any person other than the CO. If work outside the SOW is required (i.e., over-excavation), the CO or COR will be notified immediately. This notification will be via email and telecom and will be initiated by RWEC. The CO for this project is Debbie R. Sanders.

Contact information is presented below:

BRAC Program Management Office, SE
4130 Faber Place Drive, Suite 202
North Charleston, South Carolina 29405-8503
843-743-2145
debbie.sanders@navy.mil

Inherent to this project is the potential to excavate beyond the design limits in order to maximize the amount of contaminated materials removed under this remedial action. The project has been scoped such that unit pricing will be used to compensate RWEC based on the amount and types of material removed (hazardous soils versus nonhazardous soils). RWEC will closely monitor the quantities and types of soils removed. In the event that the budgeted estimated quantities will be approached, RWEC will notify the CO. The CO will authorize any change that is required for quantities of soils disposed.

The Navy Technical Representative (NTR) is RWEC's point of contact for day-to-day project communication and project deliverables. The NTR is responsible for Navy technical review and approval of all deliverables prepared by the Contractor. The NTR will coordinate technical input as required or requested by the contractor and may provide recommendations and/or information to the CO. RWEC and the NTR understand that the CO is responsible for authorizing, in writing, any changes in scope. Stacin Martin is the NTR for this project.

Contact information is presented below:

Stacin Martin
NAVFAC Atlantic
6506 Hampton Blvd., Bldg. A
Norfolk, Virginia 23508
757-341-0478
Stacin.Matin@navy.mil

2.2 United States Environmental Protection Agency — Region 2

Doug Pocze has overall responsibility to ensure the environmental program at NAPR is in compliance with the U.S. EPA environmental program. U.S. EPA will review this ICM Work Plan and the project closure reports.

2.3 Puerto Rico Environmental Quality Board

Wilmarie Rivera and Gloria Toro have overall responsibility to provide regulatory oversight for Puerto Rico's Environmental Quality Board (EQB). All interaction with Puerto Rico EQB will be through the Navy.

2.4 Right Way Environmental Contractors, Inc.

RWEC has the ultimate responsibility for the successful execution of this project, as measured by achieving all of the project goals within the planned schedule and budget. All RWEC subcontractors will adhere to RWEC's QC program to ensure all corporate and project QC standards are met.

Personnel performing specific QC functions will be selected based on their experience related to the work being performed and their educational qualifications. Personnel selection for project delivery activities are based upon an evaluation of the staff member's education, work experience, and training. The Program Manager (PGM) conducts these evaluations before the project begins and selects the project personnel.

For this project, key personnel have been selected, and brief descriptions of their specific responsibilities are provided in the following subsections.

2.4.1 Program Manager

The PGM, Pedro Tejada, will have the overall responsibility for all technical, contractual, safety, and administrative matters for RWEC under this contract. He will ensure that a high degree of client responsiveness is maintained. Additionally, he will be responsible for overseeing staff selection, monitoring the contract and task funds and schedules, and ensuring quality assurance processes are being implemented. Mr. Tejada will delegate day-to-day project management to the Project Manager (PM) and QC management to the Quality Control Officer.

2.4.2 Project Manager

Pedro Tejada will also serve as the RWEC PM for this project. As PM, Mr. Tejada will:

- Track project progress and communicating progress via updated project schedules and budgets
- Supervise daily project execution
- Establish work teams for specific tasks
- Allocate assigned resources for optimum work execution
- Conduct direct and frequent technical communication with the Navy BRAC Program Management Office Southeast and the NTR
- Ensure early identification and resolution of technical problems
- Identify, communicate, and execute potential or desired modifications to the SOW
- Assign and track field QC while assuring its effectiveness through review of documentation and communication with the QC Officer
- Assign and track site safety and health responsibilities by reviewing site safety and health documentation and communication with the Health and Safety Manager (HSM)
- Serve as a primary point of contact for incident reporting
- Address and resolve QC nonconformance issues
- Prepare project progress reports

Mr. Tejada will be RWEC's primary contact person with the Navy. He will be in regular contact with the NTR regarding project status, potential schedule, cost impacts, and QC issues.

2.4.3 Quality Control Systems Manager

The Quality Control Systems Manager (QCSM) for this contract is Luis Rios. The QCSM is responsible for the development and interpretation of QC policies and procedures, and carries the requisite authority to oversee and execute QC activities for the projects that will be implemented under this contract. The QCSM is responsible for establishing the definable features of work (DFWs) and the appropriate QC monitoring and testing. He will provide overall direction to the program QC function; perform audits, surveillance, and document reviews; and execute other quality functions as required in the Contactor Quality Control Plan (CQC). Implementation of the QC duties will be delegated to the QC Officer in the field.

Duties of the QCSM include, but are not limited to, the following:

- Implement the project QC requirements
- Oversee onsite QC staff
- Identify and report nonconforming items or activities
- Initiate or recommend corrective actions
- Verify implementation of corrective actions
- Notify the PM of conditions adverse to quality that cannot be resolved at the project level
- Oversee activities to monitor operations for compliance with contract requirements

2.4.4 Health and Safety Manager

The HSM for this contract is Felix Gonzalez, Certified Industrial Hygienist. He has the overall responsibility for the RWEC Corporate Safety and Health Program. Under this project, the HSM reports directly to RWEC's PGM, Pedro Tejada.

The HSM is responsible for the development of safety and health policies and procedures, and carries the requisite authority to oversee and execute safety and health activities for the projects that will be implemented under this contract. The HSM is responsible for all aspects of the Site Safety and Health Plan (SSHP). The HSM will provide overall direction of safety and health functions, perform safety inspections, and perform document reviews as required by the SSHP. Any proposed deviations from the SSHP or changes in the expected site conditions will be immediately presented to the HSM for consideration and approval. The HSM will interface with the PM on the safety and health performance of the program and will coordinate all safety and health activities. Implementation of the safety and health duties will be delegated to the Site Safety and Health Officer in the field.

2.4.5 Site Superintendent

The Site Superintendent for this project is Luis Rios. The Site Superintendent is responsible for managing all aspects of project implementation in the field including quality, safety, and coordinating the activities of task-specific groups, subcontractors, or teams working on the project. The Site Superintendent is also the primary interface with the NTR in the field. The Site Superintendent will report directly to the PM, and will provide the PM with daily progress reports. The Site Superintendent will be accessible at all times while the field activities are in progress.

2.4.6 Quality Control Officer

The onsite QC Officer for this project is Alejandro Rodriquez. The QC Officer is responsible for the implementation of the CQC Plan in the field. Responsibilities of the QC Officer include:

- Review received submittals from subcontractors so that all submittals meet QC requirements
- Report to the QCSM on the status of submittals and QC-related activities (see Appendices G, Quality Control Forms, and H, Submittal Register)
- Prepare the Daily Quality Control Report (DQCR) covering all associated activities for this project using the DQCR
- Perform daily inspections of RWEC and subcontractor work activities
- Read and understand all QC requirements for specific tasks being performed by RWEC and subcontractors, and monitoring for compliance with the specifications

- Ensure that quality standards in the project plans are met
- Assist in maintaining an effective CQC system
- Perform and monitor all control activities and testing
- Provide acceptable documentation of daily CQC activities that will be incorporated into the DQCR
- Implement changes, as appropriate, to the CQC Plan
- Ensure compliance with the requirements of the CQC Plan
- Maintain complete, accurate, legible, permanent, and defensible records that document all work performed

In his role as the QC Officer, Mr. Rodriguez will report to the PGM. The QC Officer will report any deficiencies immediately to the PGM for consultation and assignment of corrective actions. The PGM will empower the QC Officer to enforce all QC issues in the field, including the authority to stop work if QC issues are being compromised.

A copy of the CQC Plan will be made available to all personnel working on the corrective measures activity in the field.

2.4.7 Site Personnel

All site personnel will be required to adhere to the procedures set forth in this ICM Work Plan. The QC Officer and the HSM will be responsible for ensuring that site personnel perform all aspects of the work in accordance with the ICM Work Plan, the CQC Plan, and the SSHP.

2.5 Subcontractors

RWEC will direct and control all subcontractors for this project. Contractual agreements between RWEC and its subcontractors contain flow-down clauses that require subcontractors to meet all appropriate Navy, Federal, and Puerto Rico territory requirements. Onsite subcontractors will coordinate their activities through the Site Superintendent and will be required to submit daily logs documenting their activities. All subcontractors will be required to adhere to the procedures set forth in this ICM Work Plan. The QC Officer will be responsible for ensuring that subcontractors perform all aspects of the work in accordance with the CQC Plan and SSHP.

3.0 GENERAL REQUIREMENTS

3.1 Security Requirements and Facility Access

RWEC will initiate facility access requests for RWEC and subcontractor personnel as soon as possible to avoid potential project start delays. The Puerto Rico Ports Authority is the current property owner.

3.2 Site Controls

RWEC will erect temporary construction barriers (i.e., fencing or caution tape) around active work sites. Fences will be constructed of orange construction safety fence fabric hung on steel posts set at 10-foot intervals. Fencing and/or caution tape 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 will also be erected around any open excavations in areas where there is potential for vehicular or foot traffic. RWEC will not leave open excavations unattended without fencing or providing a barrier around the full perimeter of the excavation.

RWEC will also 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 orderly and organized manner.

3.3 Protection of Existing Structures and Utility Clearances

RWEC will take necessary measures to protect existing structures, facilities, and utilities that may be affected by removal and cleanup activities. Before intrusive work is initiated at the sites, a site inspection will be performed to identify potential site hazards, such as overhead power lines and structures or other features, requiring special attention. RWEC will be responsible for locating and clearing utilities. Utility markings will be maintained throughout construction activities. RWEC will avoid unnecessary disturbance of all utilities and will protect any utilities that may be impacted by the ICM.

3.4 Safety Requirements

RWEC will take necessary preventive measures for the safe handling of contaminated media. RWEC's Emergency Response Plan is contained in the SSHP, which is included as Appendix C of this Plan. The SSHP explains the operations necessary to ensure compliance with federal Occupational Safety and Health Administration and American National Standards Institute.

3.5 Decontamination Procedures

Equipment will be decontaminated by dry means (e.g., brushes, shovels) and/or with a power washer and water-soap solution. Solids will be collected and disposed with the waste soil, and liquids will be containerized, characterized, and disposed appropriately. Decontamination equipment and solutions will be treated and/or disposed in accordance with the Sampling and Analysis Plan (SAP) (Appendix D).

3.5.1 Dry Decontamination

- As a first measure in decontamination, use shovels and brooms to remove large dirt clods and debris. If possible, lift and spin tracks to loosen material.

- To collect and control any removed debris during the dry decontamination, this work should be performed over the wet decontamination pad or the approved waste storage container to ensure that potentially impacted soils will not contaminate the ground surface.

- Collect solids and combine with waste soil.

3.5.2 Wet Decontamination

- Once dry decontamination has been completed, wet decontamination will be performed in an area that is covered with plastic sheeting and is bermed to contain and collect all fluids.

- Using a potable water 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.

- Collect and containerize waste solids and liquids. Solids will be combined with waste soil, and liquids will be containerized in 55-gallon drums and staged, as described in the SAP (Appendix D).

- The following procedures will be used to decontaminate field heavy equipment at least 24-hours before excavation activities or departing site:

  — Steam clean and/or power washer with potable water.

  — Wash with non-phosphate detergent and water solution. Dilute non-phosphate detergent as directed by the manufacturer.

— Rinse with potable water. Change the water frequently and containerize used fluids appropriately.

— Rinse with potable water. Rinsing will be done by applying the water from a pressurized sprayer or garden hose while holding equipment over an appropriate liquid collection system.

— Allow heavy equipment to air dry at least 24 hours.

— All containerized fluids will be sampled and analyzed for disposal purposes.

Whenever possible, disposable equipment will be used to minimize the amount of decontamination required.

For hand-auger sampling, it is not possible to exclusively use disposable sampling equipment. Rods, flights, and spoons will require field decontamination between sampling locations and between actual samples when more than one sample is to be collected at a given location. Decontamination of reusable sampling equipment that comes in contact with samples will be performed to prevent the introduction of extraneous material into samples, and to prevent cross-contamination between samples. To prevent possible contamination from sampling equipment, all sampling devices will be decontaminated and sealed before initiation of sample collection. To the greatest extent possible, sampling equipment will be field decontaminated.

The following procedures will be used for field decontamination of reusable sampling equipment and personal protective equipment, including non-disposable hand augers, stainless-steel sampling spoons, etc.:

- Rinse with potable water. Change the water frequently and containerize used fluids appropriately.

- Wash with the non-phosphate detergent and water solution. Dilute non-phosphate detergent as directed by the manufacturer.

- Rinse with potable water. Change the water frequently and containerize used fluids appropriately.

- Triple rinse with pesticide-grade (99 percent or better) isopropyl alcohol.

- A rinse with nitric acid/deionized water solution. The solution will be made from 10 percent reagent-grade nitric acid and deionized water.

- Triple rinse with deionized water. Rinsing will be done by applying the deionized water from a stainless steel Hudson-type sprayer or squeeze bottle made of Nalgene or Teflon (or equivalent) while holding equipment over a 5-gallon bucket.

- Allow equipment to air dry at least 24-hours. Then wrap equipment with aluminum foil and cover with plastic. Rinsate will be placed in drums or tanks and staged for disposal

- All containerized fluids will be sampled and analyzed for disposal purposes

3.6 Permits and Licenses

The federal agency, in this case the Navy, is responsible for obtaining National Environmental Policy Act permits with the regulatory agencies. It is expected that a DS-1 (Solid Waste Transporter) and an Air Emissions permit will be required. These permits will be requested by RWEC. The basis of the permit request will be a directive from EQB.

4.0 PROJECT ACTIVITIES

The following subsections describe field activities that will be performed in conjunction with this project. The main components of the construction activities are listed in Section 1.3.

4.1 Mobilization and Site Preparation

RWEC will mobilize a Site Superintendent, the QC Officer, and the HSM. Heavy equipment will be procured from local suppliers throughout the duration of fieldwork to address the ongoing needs at the Site. Site preparation will include verifying utility locations with onsite Navy personnel, installing erosion controls, clearing and grubbing (where required), constructing laydown and staging areas, establishing access routes for equipment and transport vehicles, and delineating work areas. Temporary laydown and staging areas will be approved by the NTR.

Erosion controls will be installed around excavation areas in accordance with remedial designs and applicable regulations (e.g., National Pollutant Discharge Elimination System; see Section 5.3 of this ICM Work Plan). Soil and sediment storage areas for excavated material stockpiles will be underlain with 20-mil polyethylene sheeting as described in specification Section 02 61 13 in Appendix E, and will be bermed to prevent runoff from potentially contaminated stockpile materials. The storage areas will be sloped to allow for collection of water from dewatering activities or collected precipitation runoff. At the completion of site preparation, work areas will be delineated with plastic safety fencing and/or caution tape to limit access to excavation areas and the material staging pads. Plastic safety fencing will be installed using steel rods driven 2 feet or more into the ground, and the fencing will be attached to each rod at the top, middle, and bottom elevations of the fence.

4.2 Site Surveying

RWEC will use a subcontractor for surveying services, as necessary. Proposed survey coordinates for the excavation areas are provided in design drawings in Appendix A. The subcontracted surveyor will lay out the removal limits, which will be tied into local reference points as required by the remedial design documents. The surveyor will be requested to return to the site to re-survey if any sampling locations that may have been moved due to refusal or other obstructions, or if the soil removal areas expand beyond their initial proposed limits.

4.3 Excavation Procedures

4.3.1 Soil

At SWMU 56, soil will be removed from the site to decrease the risk of COCs found during the site evaluation.

COCs and associated CAOs as determined in the CMS are:

- Lead 96 milligrams per kilogram (mg/kg)
- Cadmium 1.8 mg/kg

Soil will be removed from Areas 1 and 2 as shown on drawings in Appendix A. Areas 1 and 2 will be excavated to a maximum depth of one foot as determined in the ecological risk assessment. The lateral extent of Areas 1 and 2 were determined though previous sample collection. The predetermined limits of soil excavation will be excavated to a maximum depth of one foot bgs unless excavation refusal due to obstructions is encountered, at which time samples will be taken at the lowest achievable depth. Based on the areas selected in the CMS, approximately 444 cubic yards of soil from Area 1 and approximately 24 cubic yards of soil from Area 2 will be removed. Excavated soil will be placed in the storage areas, as described in Section 4.1. Confirmation samples will be collected from each sidewall of the excavation area at a frequency of one sample every 25 linear feet along the wall or a minimum of one sample per sidewall. No bottom samples will be collected, as the excavation depths were established by the ecological risk assessment. Confirmation samples will be collected and analyzed for cadmium and lead. As described in Section 4.1, excavated soil will be stockpiled on plastic sheeting to wait for confirmation soil results. Any water resulting from stockpiling will be characterized for disposal.

Based on results from waste characterization samples, the contaminated soil will be transported to an on-island, permitted, disposal facility, unless characterization testing indicates levels exceeding landfill acceptance criteria. If the waste is characterized as hazardous, then it must be disposed of off-island at a facility in the continental United States. The on-island disposal facilities are located in Ponce and Penuelas. Licensed waste haulers will be used to transport the soil to the disposal facility. Finally, the excavation area will be backfilled with clean soil, graded, and revegetated.

4.3.2 Sediment

Sediment will be removed from the entire drainage ditch (segment points A to F), as determined in the CMS. Concentrations of one or more sediment COCs exceeded established CAOs at these locations.

COCs and associated CAOs as determined in the CMS are:

- Barium 214 mg/kg
- Cadmium 0.99 mg/kg
- Chromium 65.0 mg/kg
- Lead 35.8 mg/kg
- Zinc 152 mg/kg

The extent of sediment contamination in excess of the CAOs is shown in Appendix A. The area planned for sediment excavation includes two segments of the drainage ditch (segment C-D and segment E-F). Residual sediments will be removed from the concrete lined drainage ditch (segment A-B) using hand tools (i.e., transfer shovel) and a pressure washer. Residual sediments will also be removed from the two culverts (segment B-C and D-E) by means of pressure washing or a strong stream of water to wash the sediments out of the culverts. A pipe cleaning subcontractor may be utilized to clean out the culverts. Depending on the size of the culverts, for the safety of the workers, either a visual observation or a remote camera will be utilized to determine if all of the residual sediment has been removed from the culvert. A description of each segment and the associated volume of sediment are as follows:

- Drainage Ditch Segment A-B: Drainage ditch segment A-B extends from the edge of the Hangar 200 Apron downstream approximately 248 feet to the first 24-inch diameter culvert under the taxiway. The drainage ditch along this reach is concrete lined and the depth of sediment is expected to be minimal (1 inch). Sediments will be removed to a depth required to expose the concrete liner. The ditch will be pressure washed following sediment removal. The drainage ditch channel width is assumed to be 1.5 feet throughout the length of this reach and the sediment depth is assumed to be 1 inch, resulting in a total volume of sediment for excavation of approximately 1.1 cubic yards.

- Drainage Ditch Segment B-C: This reach consists of a 24-inch diameter culvert extending approximately 133 feet under the taxiway. The depth of sediment in this culvert is assumed to be minimal: approximately 6 inches wide by 1 inch deep over the length of the pipe. The ditch will be pressure washed following sediment removal. This results in a total volume of sediment for disposal of approximately 0.2 cubic yards.

- Drainage Ditch Segment C-D: This segment extends 533 feet from the 24-inch culvert under the taxiway to the 36-inch culvert under Bogue Street. The channel width along this reach is assumed to be approximately 4 feet and the excavation depth is assumed to be 1 foot over the length of the reach, resulting in a volume of sediment for removal of approximately 2,150 cubic feet (79 cubic yards).

- Drainage Ditch Segment D-E: This segment consists of a 36-inch diameter culvert extending approximately 181 feet under Bogue Street. The sediment in this culvert is assumed to be approximately 1 foot wide by 2 inches (0.17 foot) deep over the length of the pipe. The ditch will be pressure washed following sediment removal. This results in a total volume of sediment for removal of approximately 1.1 cubic yards.

- Drainage Ditch Segment E-F: This segment extends approximately 527 feet from the 36-inch culvert under Bogue Street to the double 4-x 8-foot box culverts under the Forrestal Drive access road. The channel width along this reach is assumed to be approximately 4 feet at the upstream end of the reach, increasing to approximately 8 feet at the downstream end (assuming a conservative average channel width of 8 feet). The excavation depth is assumed to be 1 foot over the length of the reach, resulting in an approximate volume of sediment for removal of 156 cubic yards.

Based on the above, the total volume of sediment requiring excavation at SWMU 56 is approximately 238 cubic yards.

It is assumed that within the concrete channel (segment A-B) only sediment will be removed; the excavation depth will be to the top of the concrete channel or to the top of the bottom of the culvert inverts (segments B-C and D-E); and the excavation depth will not exceed one foot in the soil drainage ditches (segments C-D and E-F), which is of sufficient depth to provide protection to aquatic receptors. SWMU 56 CMS sediment removal will not extend beyond segment E-F. As described in Section 4.1, sediment will be stockpiled on plastic sheeting.

Confirmation sampling will not be required for the sediment excavation in the areas lined with impermeable barriers (i.e., Segments A-B, B-C, and D-E) as sediment will be removed to the barrier surface. Confirmation samples will be collected from sidewalls of excavation in unlined portions of the channel (i.e., Segments C-D and E-F) as detailed in Section 4.3.2. Confirmation samples will not be collected from the bottom of the sediment excavations in unlined portions of the drainage channel. The removal of the upper one foot of drainage ditch sediment removes the potential

pathways to ecological receptors. Contamination in excess of the CAOs that remains below the one foot excavation will not pose a risk to ecological receptors because the excavation will be lined with geotextile, backfilled with 6 inches of compacted low permeability soil, and armored with 6 inches of riprap. The excavated sediment will be dewatered by placing it on polyethylene sheeting and allowing the excess water to drain or evaporate. The drained water will be containerized and samples will be collected for hazardous waste characterization. Similarly, the sediment will be sampled for hazardous waste characteristics. If the waste streams are determined to be hazardous, they must be disposed of off-island at a facility in the continental United States, thereby substantially increasing project costs. Otherwise, the contaminated sediment will be transported to an on-island, permitted, disposal facility. The on-island disposal facilities are located in Ponce and Penuelas. Licensed waste haulers are available and will be used to transport the sediment to the disposal facility. Following excavation, ditch segments C-D and E-F will be lined with geotextile to prevent re-exposure of the excavated sidewalls and bottom.

Ditch segments C-D and E-F will then be backfilled with 6 inches of compacted low permeability soil and armored with 6 inches of riprap. There are no long term restrictions, controls, or monitoring associated with the sediment excavation and offsite disposal portion of this alternative.

To avoid surface water contact with contaminated materials, the Contractor may employ devices such as water proofing barriers or covers (plastic sheeting) or constructing earthen berms to divert surface water away from construction areas.

As described in Section 4.1, excavated and removed sediment will be stockpiled on plastic sheeting to wait for confirmation soil results. Any water resulting from stockpiling will be characterized for disposal. Based on results from confirmation samples, the contaminated sediment will be transported to an on-island, permitted, disposal facility, unless characterization testing indicates levels exceeding landfill acceptance criteria. If the waste is characterized as hazardous, it must be disposed of off-island at a facility in the continental United States. The on-island disposal facilities are located in Ponce and Penuelas. Licensed waste haulers will be used to transport the soil to the disposal facility.

4.4 Material Handling, Staging and Loadout

The excavation will be completed with heavy equipment. At a minimum, a small backhoe, excavator, or grader and small front end loader will be used during the removal activities. RWEC will excavate soil to the required depth at each site within the removal areas staked by the surveyor. During excavation, good engineering practices and appropriate measures will be

implemented to control both contaminant releases and general exposure to workers. Workers engaged in waste removal or handling activities will be required to wear an appropriate level of personal protective equipment as described in the SSHP and as determined onsite by the HSM. Excavated soil and sediment will be placed directly onto plastic sheeting in preparation for transport to and disposal at a Navy- and U.S. EPA-approved facility. Stockpile areas will be covered with 8-mil polyethylene sheeting at the end of each day to protect against excess moisture from precipitation and to prevent runoff caused by rain events. Stockpile areas will be inspected weekly or after rain events for storage area integrity, and inspection comments will be noted on the DQCR.

Upon approval from the disposal facility, stockpiled soil and sediment will be loaded for transport to the approved facility. An excavator, backhoe, or front end loader will be used to load the material into the containers for transportation to the disposal facility. Trucks, roll-off boxes, or super sacs will be used for the transportation of the soils and sediments to the disposal facility.

4.5 Sampling and Analysis

As part of the corrective measures activities, RWEC will collect representative samples from various media. Sampling activities for this project include confirmation sampling for soil removal, backfill material characterization, and waste characterization sampling for other solid and liquid wastes. Detailed discussions of the confirmation sampling and analysis program are provided in the SAP (Appendix D). The NTR will approve the completed excavations based upon the confirmation sample analytical results.

Quality control samples will be taken at 10 percent intervals for duplicates and 5 percent for matrix spike and matrix spike duplicates. Equipment blanks will be collected and analyzed for field instruments used to collect samples.

Excavated soil and sediment and liquid wastes will be sampled for hazardous waste characterization so that the appropriate off-site disposal facility can be determined. Waste characterization sampling will be performed in accordance with the Project Specifications provided in Appendix E.

4.6 Backfill and Site Restoration

Backfill and site restoration will be performed in accordance with the Project Specifications provided in Appendix E. RWEC will maintain a clean site by disposing any generated construction debris. Construction debris will be stored within the designated work areas and will be disposed as directed by the NTR. After site activities are completed, RWEC will restore the site to its original condition

to the extent possible. However, RWEC will not restore or replace trees that are damaged or removed for site access or as a result of remediation activities. Surplus materials, rubbish, temporary structures, barricades, and project signs will be removed from the site.

Upon completion of excavation and satisfactory confirmatory sampling activities, site restoration will begin. Restoration consists of backfilling the excavations with clean borrow source material from an NTR-approved offsite source. Backfill material shall be obtained from offsite sources; therefore, it is required to be tested in accordance with Technical Specification 31 23 00.00 20, Part 1.6 Requirements for Off Site Soil in Appendix E.

Backfill material shall not be brought onsite until test results have been approved by the NTR. The required chemical and physical characteristics and testing methods for backfill and topsoil are provided in the Technical Specifications in Appendix E.

The soil will also be tested to determine the geotechnical properties. A minimum 6-inch layer of certified-clean topsoil will be used to restore the surfaces of all soil excavation areas. The primary specifications are as follows:

- The topsoil will contain from 5 percent to 8 percent organic matter
- The maximum particle size will be ¾ inch with a maximum of 3 percent retained on a ¼-inch screen
- The composition of the fill will be 25 percent to 50 percent silt, 10 percent to 30 percent clay, 20 percent to 35 percent sand
- The pH of the soil will be from 5 to 7.6 and will have a maximum of 600 parts per million soluble salts

Final grading will provide positive drainage of surface water across the restored area, i.e., grading will be performed such that there will be no areas where surface water may collect. Site restoration will involve removing all construction-related facilities, including leftover construction materials and materials used to construct equipment staging areas. RWEC will remove all equipment at the time of demobilization from each site. Temporary erosion control measures will be removed after permanent erosion control has been established.

Any other construction-impacted areas or features, including utilities, structures, pavement, or curbs, will be restored to preexisting conditions. Trees that are damaged and/or removed as part of clearing for access or remediation activities will not be replaced.

Once backfilling and final grading is completed, RWEC will seed and fertilize the disturbed upland areas with 100 percent Common Bermuda grass and fertilizer, as identified in the specifications.

5.0 ENVIRONMENTAL PROTECTION PLAN

RWEC, as the prime contractor, is responsible for ensuring adherence to this Environmental Protection Plan.

5.1 Protection of Features

RWEC will confine construction activities to areas defined in the plans or to areas specifically assigned for RWEC's use. Equipment storage and related areas and access routes required temporarily by RWEC will be assigned by the NTR. No other areas on government premises will be used by RWEC without written consent of the NTR.

RWEC 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. Any tree scarred or damaged by RWEC's operations outside of authorized removal areas will be restored as much as possible to its original condition. Some trees and foliage in the immediate work area will be removed to access excavation areas, while those outside of the immediate work area will be left undisturbed. Trees and foliage will be inspected during the final site walkthrough. Appropriate actions will be taken at the direction of the NTR. Trees outside of authorized removal areas that are damaged by RWEC that cannot be saved will be immediately removed, and if directed by the NTR, replaced with a tree of the same species. Trees that are damaged and/or removed as part of clearing for access or remediation activities will not be replaced.

All streams, waterways, and storm drainage systems will be protected from damage and from sedimentation in accordance with the Erosion Control Plan discussed in Section 5.3.

5.2 Traffic Plans

RWEC will coordinate with the NTR and Puerto Rico Ports Authority to determine an appropriate haul route for equipment/material deliveries and transport of wastes offsite. All RWEC personnel and subcontractors will be informed of the approved route and will adhere strictly to the approved route. The Site Superintendent will audit conformance with the approved route on a daily basis.

5.3 Erosion Control Plan

Erosion control will be maintained on each site in accordance with the requirements and plans presented in the design documents (Baker, 2012). The Erosion and Control Plan is located in Appendix F.

5.4 Spill Control Plan

RWEC will be responsible for any spills or leaks caused by its operations during the performance of this contract. RWEC will provide contingency measures for potential onsite spills of any potentially hazardous or other regulated materials. RWEC 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 RWEC'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 installing liners inside appropriate waste storage containers; carefully loading soil into containers to avoid spillage; and always using good work practices to avoid unnecessary spillage.

5.4.1 Spill Response

The following requirements will be met for a spill of a hazardous material:

- Take immediate measures to control and contain the spill to prevent releases into sewers to surface water
- Notify the NTR immediately
- Notify local Fire Department immediately at 911

If the amount is above a reportable quantity or if any amount enters a waterway or storm sewer, RWEC will notify both The National Response Center Spill Reporting Hotline at 1-800-424-8802 and the Puerto Rico Environmental Quality Board at 787-767-8056 within two hours of the spill and do the following:

- 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

5.4.2 Notification of Spills and Discharges

RWEC will provide verbal and written notification of any spill of hazardous substances as required by the federal 40 CFR 355, state, and local regulations, and Navy Instructions. Spill response shall be in accordance with 40 CFR 300 and applicable state and local regulations. The reportable quantities of a release can be found in 40 CFR 302.5 (Table 302.4 — List of Hazardous Substances and Reportable Quantities).

Refer to the SSHP for the Emergency Contact List. In the event of a spill, the NTR and the local Fire Department will be notified immediately at 911. If the amount is above a reportable quantity or if any amount enters a waterway or storm sewer, RWEC will notify both The National Response Center Spill Reporting Hotline at 1-800-424-8802 and the Puerto Rico Environmental Quality Board at 787-767-8056 within 2 hours of the spill. RWEC will submit a spill and/or discharge report to the NTR within 2 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 RWEC communications with other agencies

The report will be finalized between RWEC and the Navy within seven days of the spill, and the Navy will provide the report to the appropriate regulatory authorities.

5.4.3 Spill Response Resources

RWEC will have a representative available on-call 24 hours a day during this project to handle emergencies at the site. Refer to the SSHP for the Emergency Contact List. An established local work force having Occupational Safety and Health Administration 1910.120 training will be used for emergency response. RWEC will have spill kits, absorbent pads, and a decontamination pad onsite for the duration of the project.

5.5 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 or spraying water on the soils and worksite. If dust is still not adequately controlled, workers exposed to the dust may be required to upgrade their personal protection equipment from Level D to Level C (full-face respirator with the appropriate cartridge) in accordance with the SSHP. The particulate (dust) concentration and action levels will be determined and documented as described in the SSHP, and personal protection equipment upgrade will be performed if the particulate action level is exceeded.

5.6 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. RWEC will minimize the number of times contaminated soils are handled. Onsite handling of soils will occur during excavation, loading, and sampling activities. Soil removed from the excavated areas shall be placed directly into appropriate waste storage containers, minimizing the migration of contaminants offsite or into clean soil.

Exclusion zones will be established within the work areas by the HSM. All heavy equipment, machinery, vehicles, instrumentation, and personnel will be decontaminated before exiting these zones in an effort to minimize migration of contaminants.

6.0 CONTRACTOR QUALITY CONTROL

The following section outlines operational corrective measures procedures to ensure CQC from the preparatory stages of vendor material inspections and project plan reviews to delivery of a final product to the Navy. This section also covers actual procedure selection, control, monitoring, change, and application to remedial measures and construction activities outlined in the project SOW.

6.1 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. RWEC will provide notification to the NTR for coordination of meetings, inspections, testing, and start-up activities at the job site. RWEC will provide required engineering and other support services throughout the construction process, accurate test results, and field reports.

6.2 Meetings

6.2.1 Preconstruction Quality Management Coordination Meeting

Before the start of construction, a preconstruction quality management coordination meeting will be held. During this meeting between RWEC's staff and the appropriate Navy personnel, a mutual understanding of the QC System details (onsite and offsite) 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, the following:

- 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 for modifying the CQC Plan
- DFWs
- Three-phase control system

- Procedures for observation, testing, and sampling
- Procedures for nonconformance identification, documentation, and resolution tracking in DQCRs
- Document control
- Construction schedule

This meeting will be conducted by the NTR and attended by the PM and QC Officer and other team members including, but not limited to, the Site Superintendent and the HSM, as required. Minutes of these meetings will be recorded by the project QC Officer 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.

6.2.2 Progress Meetings

Progress meetings will be scheduled weekly or as established by the NTR, and whenever necessary, 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 RWEC staff such as the QC Officer and HSM will attend these meetings, and will record and distribute the meeting minutes. Topics that typically will be addressed at the progress meetings include:

- Review and approval of minutes of a previous meeting
- Review safety and health requirements and procedures
- Review QC requirements and procedures
- Review work progress
- Field observations, problems, and conflicts
- Problems that may impede the schedule, and proposed corrective actions
- Revisions to project schedule
- Coordinate scheduled activities
- Review submittal schedules
- Pending changes and substitutions

- Review proposed changes for their effect on construction and on completion date, and effect on other contracts of the project

6.2.3 Daily Safety and Coordination Meetings

The Site Superintendent and the HSM 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 daily tailgate safety meeting record will be used to document the meeting. A serious discussion will occur on the following issues as they pertain to each day's work:

- Review of the activity hazard analyses for specific tasks to be conducted on that day
- Work planned for the current day and any coordination required to maintain a no-delay schedule
- Safety hazards associated with specific feature of work
- Tools and equipment to be used, and special safety and maintenance procedures/ requirements to be used with the equipment
- Pre-work inspections to be performed
- Emergency plan including brief review of emergency hospital route
- End-of-day work area condition issues including cleanup, placement of equipment and materials, and preparation for next day

6.3 Selection, Approval and Monitoring

The NTR, PM, Site Superintendent, and QC Officer 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 QC Officer 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 QC Officer will closely monitor the actual field testing, verifying proper procedure technique, sample handling, and chain of custody, as required. The QC Officer will report to the PM the results of testing to provide timely authorization to proceed with work sequence or initiate nonconformance action.

6.4 Change and Control Procedures

RWEC 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 a 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. A copy of an FVR is included in Appendix G.

The Site Superintendent and the QC Officer, as required, will prepare the FVR and submit it to the PM for review. The PM will discuss potential changes with the NTR and RWEC'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 QC Officer 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 NTR for review and processing.

In summary, the NTR will determine if the FVR represents a significant change to the ICM Work Plan. Procedure for resolution of FVR requires agreement between RWEC personnel (PM, Site Superintendent, or QC Officer) and NTR.

U.S. EPA will be notified of any significant changes within 48 hours of identification of the need to make a significant change. A significant change is defined as a circumstance not covered in the SOW.

6.5 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. Activities 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 QC Officer in ensuring that the work elements are properly performed. The DFWs for all of the site work are summarized below.

6.5.1 Project Planning and Submittals

Anticipated submittals for approval include a draft and final ICM Work Plan, including a SAP, CQC Plan, and SSHP; draft and final versions of the Construction Completion Report; data, procedures, confirmation, and borrow sampling results. Submittals that RWEC expects from its subcontractors include laboratory analytical results and quality assurance/quality control documentation; qualifications from the surveyor; and completed shipping manifests and bills of lading. The submittal register is included in Appendix H.

6.5.2 Mobilization

Mobilization will include the following activities:

- Mobilize equipment and personnel
- Establish equipment staging and waste storage container locations

Mobilization will be executed upon approval by the NTR.

6.5.3 Site Preparation

RWEC will perform the following site preparation activities:

- Establish support area
- Establish initial site controls and zones
- Establish/construct staging areas for waste storage containers
- Identify, protect, and relocate utilities, if necessary
- Construct necessary erosion controls
- Clear vegetation and establish access routes
- Establish vehicle entrance/exit pads
- Construct decontamination pad
- Site surveying and layout of removal areas

RWEC will supervise the surveying and layout of excavation grids by a subcontractor.

6.5.4 Solid (Soil) Excavation and Staging

RWEC will remove contaminated materials from the defined areas at the SWMU and place them directly in the designated appropriate waste storage containers for subsequent transportation and disposal. RWEC will measure the sizes of excavated areas and estimate quantities by both volume and weight. At the onset of excavation work, RWEC will use a multiplier of 1.3 tons per cubic yard of soil, and RWEC will adjust that estimate based on the actual weights of the soil as recorded by the weight tickets at the landfill. Thus, the cubic volume of soil will be tracked and the weight of soil will be estimated using a site specific conversion factor.

6.5.5 Solid (Sediment) Excavation and Staging

The excavated sediment will be dewatered by placing it on polyethylene sheeting and allowing the excess water to drain or evaporate. The drained water will be containerized and samples will be collected for hazardous waste characterization. Similarly, the sediment will be sampled for hazardous waste characteristics. RWEC will measure the sizes of excavated areas and estimate quantities by both volume and weight. At the onset of excavation work, RWEC will use a multiplier of 1.5 tons per cubic yard of drained sediment, and RWEC will adjust that estimate based on the actual weights of the soil as recorded by the weight tickets at the landfill. Thus, the cubic volume of soil will be tracked and the weight of soil will be estimated using a site specific conversion factor.

6.5.6 Confirmation and Characterization/Profile Sampling

Following excavation, confirmation samples of the soil excavation sidewalls will be obtained in accordance with the SAP to verify that the extent of contamination has been delineated and that the contaminated materials have been removed. Composite samples of material removed during excavation will be tested for hazardous waste characteristics in accordance with 40 CFR Part 261.24 and Technical Specifications provided in Appendix E of the ICM Work Plan.

No confirmation samples are proposed for the sediment excavation since all sediment to a depth of one foot or to the top of the lined channel barrier will be removed. The excavated sediment will be dewatered by placing it on polyethylene sheeting and allowing the excess water to drain or evaporate. The drained water will be containerized and samples will be collected for hazardous waste characterization. As for surface soil, sediment will be sampled for hazardous waste characteristics in accordance with 40 CFR Part 261.24 and Technical Specifications provided in Appendix E of the ICM Work Plan.

Hazardous waste sampling will also include characterization of dewatering liquids (if any), and decontamination fluids. Fluid samples will be evaluated for disposal purposes in accordance with 40 CFR Part 261.24 and Technical Specifications provided in Appendix E of the ICM Work Plan.

6.5.7 Contaminated Soil/Sediment Loadout, Transportation, and Disposal

RWEC will supervise the transportation and disposal of all waste streams associated with the project work. Waste profiles and shipping manifests will be signed by a government authorized representative.

6.5.8 Restoration

Following the completion of soil excavation and disposal activities, the edges of the excavations will be regarded and the excavations will be backfilled with clean borrow source material, graded, seeded, and fertilized.

Following sediment excavation, ditch segments C-D and E-F will be lined with geotextile to prevent re-exposure of the excavated sidewalls and bottom. Ditch segments C-D and E-F will then be backfilled with 6 inches of compacted low permeability soil to eliminate the ecological exposure pathway, and graded to promote positive drainage. The ditch invert will be armored with 6 inches of riprap to prevent future erosion.

6.5.9 Equipment Decontamination

Heavy equipment will be decontaminated by dry means (e.g., brushes, shovels) and/or with a steam clean and/or power washer and water-soap solution. The rinsate and solids will be collected and disposed of appropriately. Decontamination equipment and solutions will be treated and/or disposed of in accordance with applicable regulations and requirements.

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.

6.5.10 Demobilization

Once site restoration activities are complete, RWEC will:

- Clean all affected areas of the site and remove support facilities, temporary storm water and erosion-control measures, temporary construction roads, and decontamination facilities

- Prepare and submit final documentation of completed work and project areas

- Notify all applicable parties that the remediation activities are complete

The Navy and RWEC will then perform a final inspection of the areas to ensure compliance with the ICM Work Plan and the contract documents.

6.6 Inspections

To ensure that all construction activities comply with the requirements of the contract, RWEC's QC Officer 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 QC Officer 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 QC Officer or another designated member of the QC Team. The QC Officer or another designated member of the QC Team will document all QC meetings with meeting minutes. The format for documenting preparatory and initial inspections is included in Appendix G. Compliance with all QC requirements is accomplished by using this three-phase process for all DFWs.

6.6.1 Preparatory Phase

The QC Officer 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 ICM 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 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 the appropriate Health and Safety Plan to ensure safety requirements are met
- Discussion on 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 NTR
- 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

RWEC will notify the NTR at least 48 hours in advance of beginning the preparatory phase. This phase will also include a meeting conducted by the QC Officer 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 QC Officer or another designated member of the QC Team and attached to the DQCR. The QC Officer 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 Site Safety and Health Plan.

6.6.2 Initial Phase

This phase of inspection must be accomplished at the beginning of physical work on a DFW. 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. RWEC will ensure that subcontractor and RWEC 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 items will be accomplished during this phase:

- Check work to ensure that it fully complies with the contract requirements. Review minutes of the preparatory meeting.
- 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. Review the safety plan with each worker.
- Document the QC process, including a narrative description of detailed QC inspection procedures, minutes of meetings, inspection results, corrective measures, etc., using forms presented in Appendix G.

RWEC's QC Officer or another designated member of the QC Team will notify the NTR at least 48 hours in advance of beginning the initial phase. Separate minutes of this phase will be prepared by the QC Officer or another designated member of the QC Team and attached to the DQCR. The 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 onsite any time after an extended work stoppage (greater than a week) or any time acceptable specified quality standards are not being met.

6.6.3 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.

6.6.4 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 (i.e., work not executed in accordance with this ICM Work Plan or the Design Drawings, Appendix A), 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.

6.6.5 Completion Phase

At the completion of the DFW, the QC Officer 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.

Pre-final Inspection: Upon completion of work, the QC Officer will inspect the work and develop a "punch list" of items that do not conform to the approved drawings and ICM Work Plan. This 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.

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

6.7 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 Navy requirements, the nonconformity will be resolved.

The QC Officer 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 QC Officer will notify the RWEC 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 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 QC Officer, 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 QC Officer will note on the Final Acceptance Report any retest required and performed, nondestructive examination 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 NTR, PM, Site Superintendent, and QCSM, and the U.S. EPA. Notification will occur within 48 hours of incident occurrence.

6.8 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.

6.8.1 Responsibility

The QC Officer 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.

6.8.2 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 QC Officer or another designated QC Team member and discussed with the testing personnel before execution. The QC Officer 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 COR, Site Superintendent, and QCSM.

Reports and Records

The QC Officer will maintain current records providing factual evidence that required QC activities and/or tests have been performed as specified. 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 ICM 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 given, 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 QC Officer. The report from the QC Officer will include copies of test reports and copies of reports prepared by all QC personnel.

Forms

Construction QC forms will be used for visual observations, inspections, and testing. The QC Officer 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 QC Officer and submitted to the Site Superintendent for approval.

The QC Officer will document all QC activity on the appropriate forms as specified. Appendix G contains the formats for the DQCR, FVR, List of Outstanding Deficiencies, Nonconformance Report, 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 as approved by the QCSM.

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 five years or as specified by the government.

Project record maintenance will 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 five years or as specified by the government.

7.0 DOCUMENTATION AND REPORTING

7.1 Construction Completion Report

Following the completion of all construction work, RWEC 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 ICM Work Plan, which includes the CQC Plan, SAP, and SSHP
- Explanation and description of any modifications to the ICM Work Plan or any other plans and why the modifications were necessary
- Information demonstrating that the approved plans were implemented and the cleanup criteria have been met
- 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
- Information on who sampled, analyzed, transported, and accepted all wastes encountered and copies of manifests, as applicable
- As-built scale drawings that depict the site
- A CQC summary
- Summary of total project costs
- Preconstruction, progress, and post-construction photographs

7.2 Weekly Progress Meetings

While field activities are in progress, RWEC will participate in weekly progress meetings with the NTR. The standard agenda will include the following:

- A description and status of the project and cost report
- Summaries of all findings and description of significant activities and work completed or accomplished
- Summaries of all changes made during the reporting period (e.g., personnel, documentation, construction)
- Summaries of all problems encountered or anticipated problems prevented during the reporting period
- Actions taken to rectify/prevent problems
- Problems resolved
- Changes to key project personnel
- Projected work for the next reporting period
- Deliverables submitted
- Schedule updates.

7.3 Daily Quality Control Reports

A DQCR will be completed daily during field activities 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 QC Officer or authorized designee will sign the DQCR to validate the certification.

The DQCR will include, but not be limited to the following:

- 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
- Types and quantities of equipment onsite
- Types and quantities of materials delivered to site
- Weather conditions/long-term forecast
- Delays and their causes, if any
- Verbal instructions
- Samples collected
- Waste transportation and disposal summary
- Visitors to the site such as regulators, politicians, reporters, etc.
- Health and safety activities
- Daily and cumulative safety hours

8.0 PROJECT SCHEDULE

A chart showing the corrective measures schedule is in Appendix I. Before mobilization, the proposed construction schedule will be reviewed with the appropriate Navy personnel to identify the best time frame to complete the work and to identify access limitations, if any. Work will be scheduled to minimize delays and expedited to determine if additional funding is needed to complete the project.

The schedule includes reviews of plans by U.S. EPA, Puerto Rico EQB, and Navy personnel; sampling and analysis; procurement of necessary equipment and materials; completion of all corrective measures activities; and the preparation of final reports.

9.0 REFERENCES

Baker Environmental, Inc. *Final RCRA Facility Investigation Management Plans, Naval Station Roosevelt Roads, Ceiba, Puerto Rico*. Coraopolis, Pennsylvania. 14 September 1995.

— *Revised Final II Summary Report for Environmental Background Concentrations of Inorganic Compounds, Naval Activity Puerto Rico, Ceiba, Puerto Rico.* 30 July 2010.

— *Final Corrective Measures Study Report for SWMU 56, Naval Activity Puerto Rico, Ceiba, Puerto Rico*. 29 September 2011.

— *Statement of Basis/Final Proposed Remedy Decision for SWMU 56, Naval Activity Puerto Rico, Ceiba, Puerto Rico*. 25 October 2011.

MacDonald, D.D, C.G. Ingersoll, D.E. Smorong, R.A. Lindskoog, G. Sloane, and T. Biernacki. *Development and Evaluation of Numerical Sediment Quality Assessment Guidelines for Florida Inland Waters*. Prepared for Florida Department of Environmental Protection, Tallahassee, Florida. January 2003.

Naval Facilities Engineering Command Atlantic. *Phase I Environmental Condition of Property Report, U.S. Naval Station Roosevelt Roads, Ceiba, Puerto Rico*. Prepared for Commander, Navy Region Southeast, U.S. Navy, by Naval Facilities Engineering Command, Atlantic Division, Norfolk, Virginia. 31 March 2004.

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United States Army Corps of Engineers. *Engineering Manual 385-1-1. Safety — Safety and Health Requirements. Class III Perimeter Protection, Chapter 25 and Appendix Q. COE EM 385-1-1*. 3 November 2003.

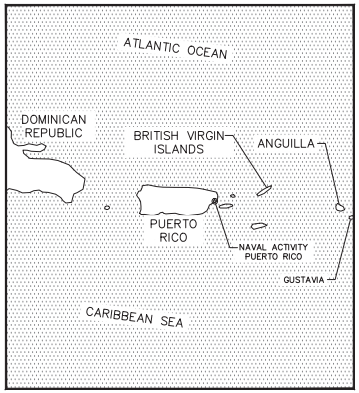
United States Environmental Protection Agency. *RCRA § 7003 Administrative Order on Consent in the Matter of: United States The Department of the Navy, Naval Activity Puerto Rico formerly Naval Station Roosevelt Roads, Puerto Rico*. Environmental Protection Agency, EPA Docket No. RCRA-02-2007-7301. 29 January 2007

Appendix A
SWMU 56 Design Drawings

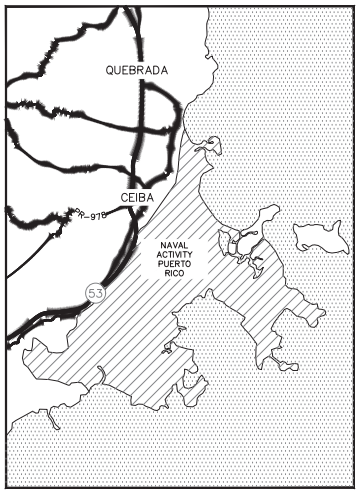
NAVAL ACTIVITY PUERTO RICO - CEIBA, PR

INTERIM CORRECTIVE MEASURES WORK PLAN DESIGN FOR SOIL & SEDIMENT REMOVAL FOR SWMU 56

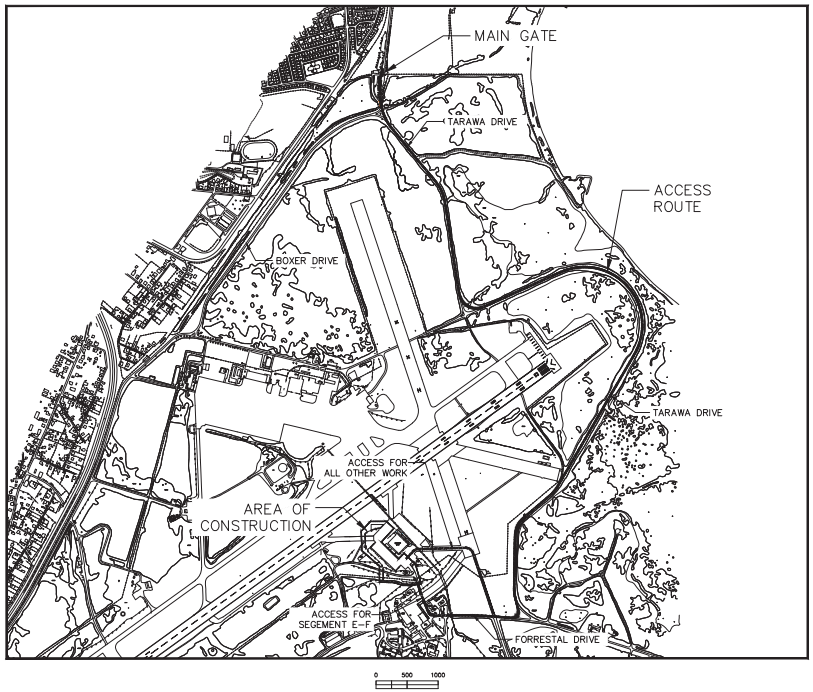
CONTRACT NO. N62470-11-D-8013



AREA MAP



VICINITY MAP

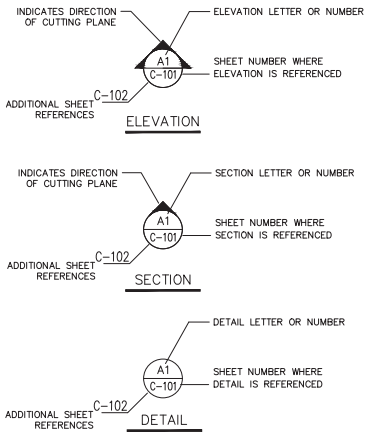


SITE PLAN
SCALE: 1" = 1000'

LIST OF DRAWINGS

SHEET	SHEET NO.	DRAWING TITLE
1 OF 6	G-001	TITLE SHEET
2 OF 6	C-001	EXISTING CONDITIONS
3 OF 6	C-002	SEDIMENT & EROSION CONTROL
4 OF 6	C-003	SOIL EXCAVATION PLAN
5 OF 6	C-004	SEDIMENT REMOVAL PLAN
6 OF 6	C-005	DETAILS

ELEVATION, SECTION OR DETAIL SYMBOLS



SYM	DESCRIPTION	DATE	APPR

NAVFAC

SEAL

RESOLUTION CONSULTANTS

A/E INFO

APPROVED

FOR COMMANDER NAVFAC

ACTIVITY

SATISFACTORY TO DATE

DES: JDL DRW JDL CHK MK

<CPN/Date>

BRANCH MANAGER

CHIEF ENG/ARCH

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
PUBLIC WORKS DEPARTMENT
NAVAL FACILITIES ENGINEERING COMMAND – SOUTHEAST
NAS - JACKSONVILLE, FL
NAVAL ACTIVITY PUERTO RICO
CEIBA, PR
INTERIM CORRECTIVE MEASURES WORK PLAN
SWMU 56 - HANGAR 200 APRON
COVER SHEET

SCALE: NO SCALE

EPROJECT NO.:

CONSTR. CONTR. NO.
N69450-08-C-0093

NAVFAC DRAWING NO.

SHEET 1 OF 6

G-001

DRAWFORM REVISION: 10 MARCH 2009

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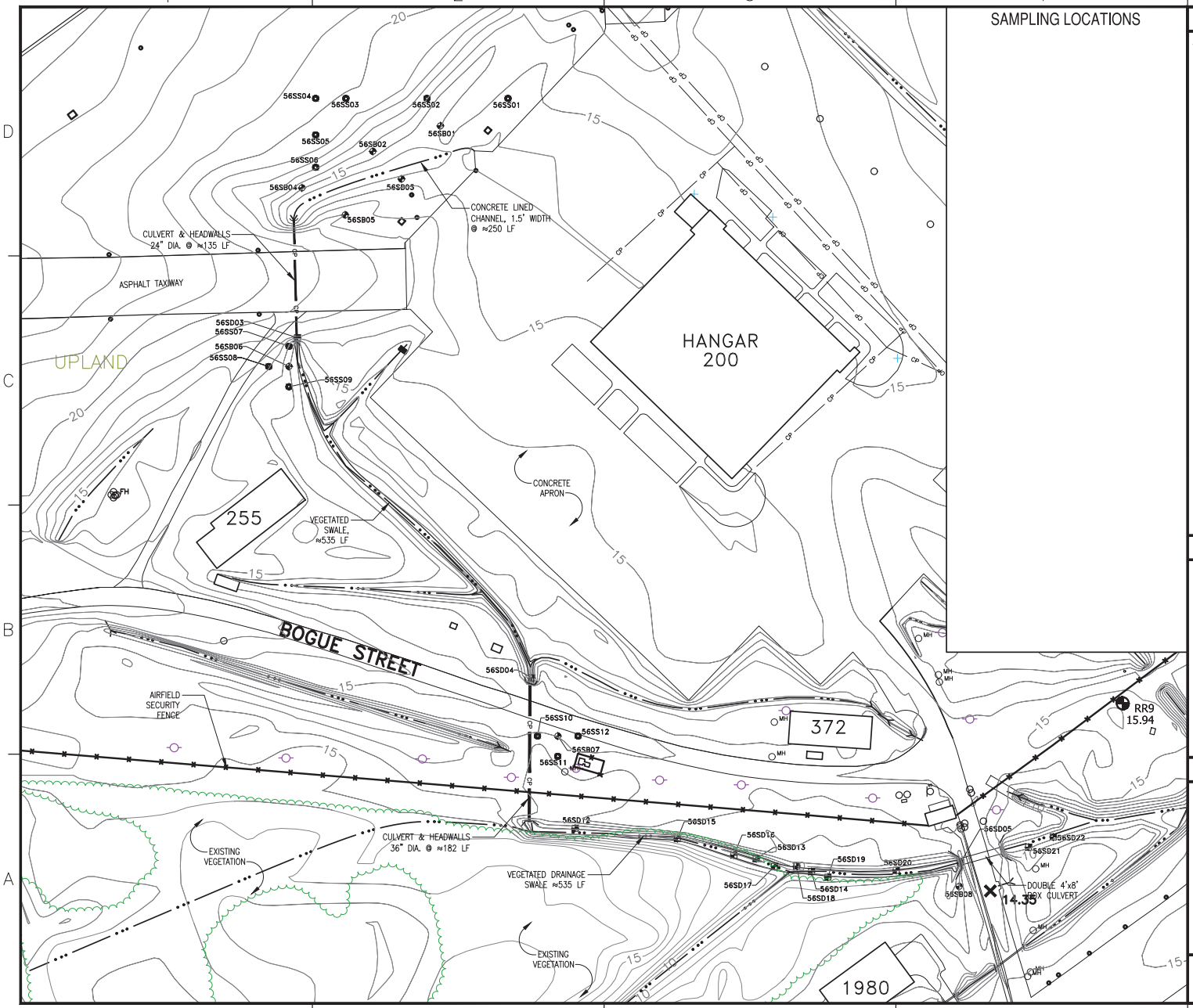

GENERAL SHEET NOTES

GENERAL NOTES

1. BASED UPON FIELD OBSERVATIONS, NO KNOWN UTILITIES ARE EXPECTED WITHIN THE EXCAVATION LIMITS IDENTIFIED ON THESE DRAWINGS UNLESS INDICATED. THE CONTRACTOR SHALL CONFIRM A UTILITY-FREE AREA PRIOR TO COMMENCEMENT OF ANY FIELD ACTIVITY. DAMAGE TO UTILITIES WILL BE REPAIRED AT NO EXPENSE TO THE GOVERNMENT, UNLESS OTHERWISE INDICATED.
2. THE CONTRACT DRAWINGS AND TECHNICAL SPECIFICATIONS ADDRESS MINIMUM EROSION AND SEDIMENT CONTROL REQUIREMENTS. THESE REQUIREMENTS SHALL BE ADAPTED AND MODIFIED TO BEST SUIT THE SEQUENCE OF CONSTRUCTION. THE CONTRACTOR SHALL DEVELOP AND IMPLEMENT AN EROSION AND SEDIMENT CONTROL PLAN IN ACCORDANCE WITH THE COMMONWEALTH OF PUERTO RICO'S EROSION CONTROL LAWS, REGULATIONS, AND HANDBOOKS, LATEST REVISION.
3. FIELD-STAKE THE LOCATIONS OF ALL AREAS TO BE DISTURBED PRIOR TO ACTUAL WORK. THESE LOCATIONS SHALL BE REVIEWED BY THE NAVY REPRESENTATIVE PRIOR TO CLEARING, GRUBBING, AND EXCAVATION ACTIVITIES.
4. LIMIT ALL WORK TO THE IMMEDIATE PROJECT AREA. RESTORE ALL DISTURBED AREAS THAT ARE OUTSIDE THE PROJECT LIMITS OF WORK TO THEIR ORIGINAL CONDITION.
5. SITE RESTORATION EFFORTS ARE NOT TO BE PERFORMED UNTIL CONFIRMATION OF CONTAMINANT REMOVAL HAS BEEN ACCOMPLISHED AND APPROVED BY THE NAVY REPRESENTATIVE.
6. COMPLY WITH ALL FEDERAL, STATE, AND LOCAL ORDINAINCES UNLESS OTHERWISE NOTED IN THE CONTRACT DRAWINGS AND TECHNICAL SPECIFICATIONS.
7. INSPECT ALL TRUCK HAULING ROUTES PRIOR TO COMMENCEMENT OF HAULING ACTIVITIES TO ENSURE THAT THE PROPOSED ROUTES AND ASSOCIATED FACILITIES (E.G. ROAD SURFACES, BRIDGES, CULVERTS, UTILITIES) WILL SUSTAIN THE ADDITIONAL TRAFFIC LOADS.

SYMBOL LEGEND

- CULVERT, EXISTING
- HEAD WALL, EXISTING
- DRAINAGE SWALE, EXISTING
- SECURITY FENCE, EXISTING
- UTILITY POLE, EXISTING
- SURFACE & SUBSURFACE SOIL & GROUNDWATER SAMPLES
- SURFACE SOIL SAMPLES
- SEDIMENT SAMPLES
- VEGETATION, EXISTING
- SURVEY MONUMENT

KEYPLAN

N
PLAN NORTH

GRAPHIC SCALE

1"=60' 60' 0' 60' 120' 240'

NO.	DESCRIPTION	DATE	APPR

NAVFAC

SEAL

RESOLUTION CONSULTANTS

A/E INFO

APPROVED

FOR COMMANDER NAVFAC

ACTIVITY

SATISFACTORY TO DATE

DES: JDL DRW: JDL CHK: MK

<CIVIL/MEC>

BRANCH MANAGER

CHIEF ENG/ARCH

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
PUBLIC WORKS DEPARTMENT

NAVAL FACILITIES ENGINEERING COMMAND – SOUTHEAST
NAS – JACKSONVILLE, FL
CEIBA, PR
NAVAL ACTIVITY PUERTO RICO
INTERIM CORRECTIVE MEASURES WORK PLAN
SWMU 56 - HANGAR 200 APRON
EXISTING CONDITIONS

SCALE: 1 = 60

EFPROJECT NO.:

CONSTR. CONTR. NO.
N69450-08-C-0093

NAVFAC DRAWING NO.

SHEET 2 OF 6

C-001

DRAWFORM REVISION: 10 MARCH 2009

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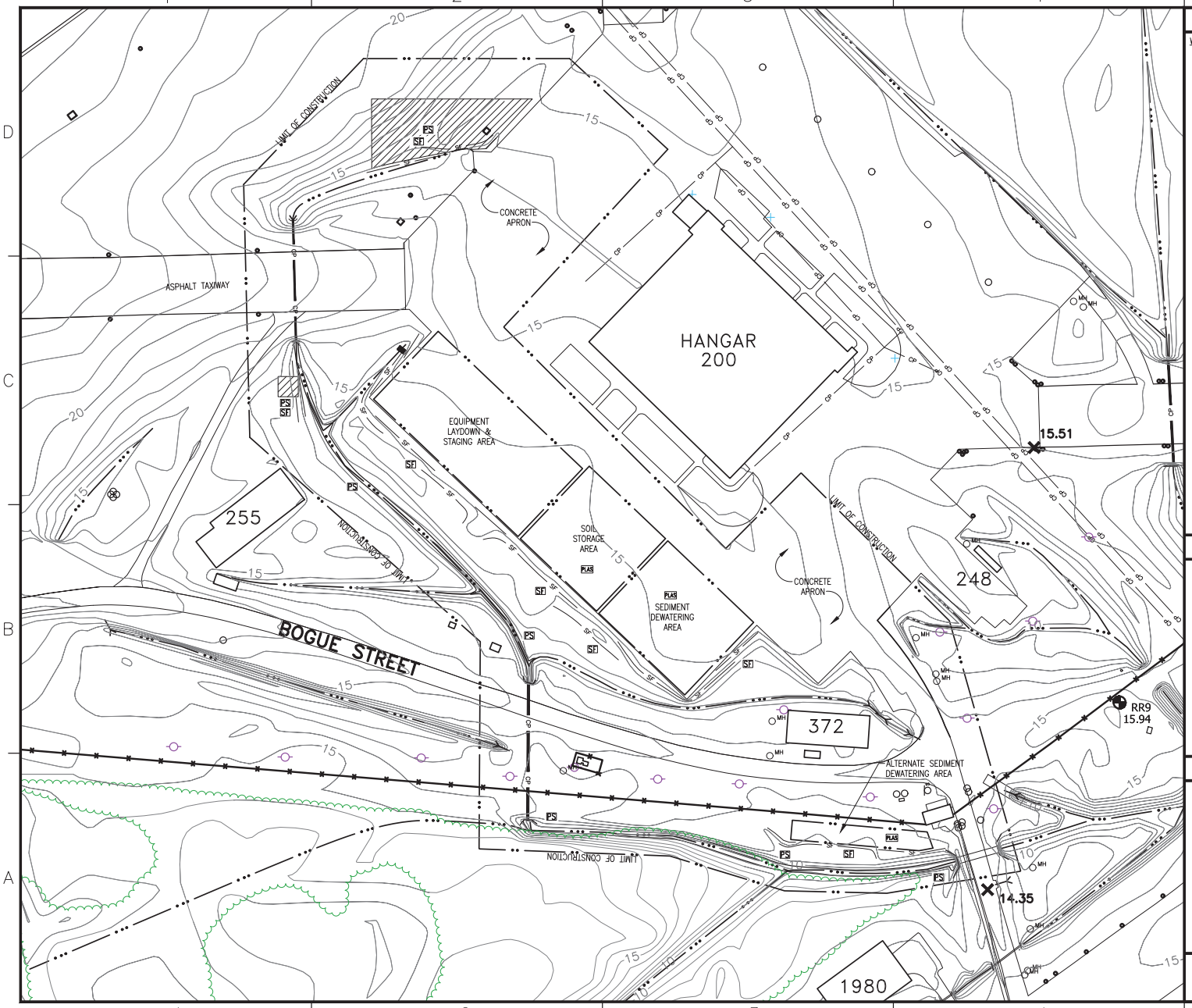

GENERAL SHEET NOTES

WORK NOTES

1. THE LOCATION SHOWN FOR THE STOCKPILE AREA, DEWATERING AREA, AND EQUIPMENT LAYDOWN AREA ARE SUGGESTED. THE CONTRACTOR SHALL FIELD ADJUST THE SIZE, SHAPE, AND DESIGN OF THE NECESSARY AREAS TO ACCOMMODATE THIS WORK AND SHALL FACILITATE PLACEMENT OF ADDITIONAL FACILITIES AS REQUIRED.
2. INSTALL ALL NECESSARY EROSION AND SEDIMENT CONTROL FACILITIES AS SPECIFIED TO ACCOMMODATE THIS WORK.

SYMBOL LEGEND

- CONSTRUCTION LIMIT/STAGING AREA
- CULVERT, EXISTING
- HEAD WALL, EXISTING
- DRAINAGE SWALE, EXISTING
- FENCE, EXISTING
- UTILITY POLE, EXISTING
- EXCAVATION AREA
- VEGETATION, EXISTING
- PS PERMANENT VEGETATIVE COVER
- PLAS TEMPORARY STOCKPILE COVER
- SF TEMPORARY SEDIMENT FENCE
- SURVEY MONUMENT

KEYPLAN

N
PLAN NORTH

GRAPHIC SCALE

1"=60' 60' 0' 60' 120' 240'

NO.	DESCRIPTION	DATE	APPR

NAVFAC

SEAL

RESOLUTION CONSULTANTS

A/E INFO

APPROVED

FOR COMMANDER NAVFAC

ACTIVITY

SATISFACTORY TO DATE

DES: JDL DRW: JDL CHK: MK

<<PM/Web>>

BRANCH MANAGER

CHIEF ENG/ARCH

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
PUBLIC WORKS DEPARTMENT

NAVAL FACILITIES ENGINEERING COMMAND – SOUTHEAST
NAS – JACKSONVILLE, FL

NAVAL ACTIVITY PUERTO RICO
CEIBA, PR

INTERIM CORRECTIVE MEASURES WORK PLAN
SWMU 56 - HANGAR 200 APRON

SEDIMENT & EROSION CONTROL

SCALE: 1 = 60

EPROJECT NO.:

CONSTR. CONTR. NO.
N69450-08-C-0093

NAVFAC DRAWING NO.

SHEET 3 OF 6

C-002

DRAWFORM REVISION: 10 MARCH 2009

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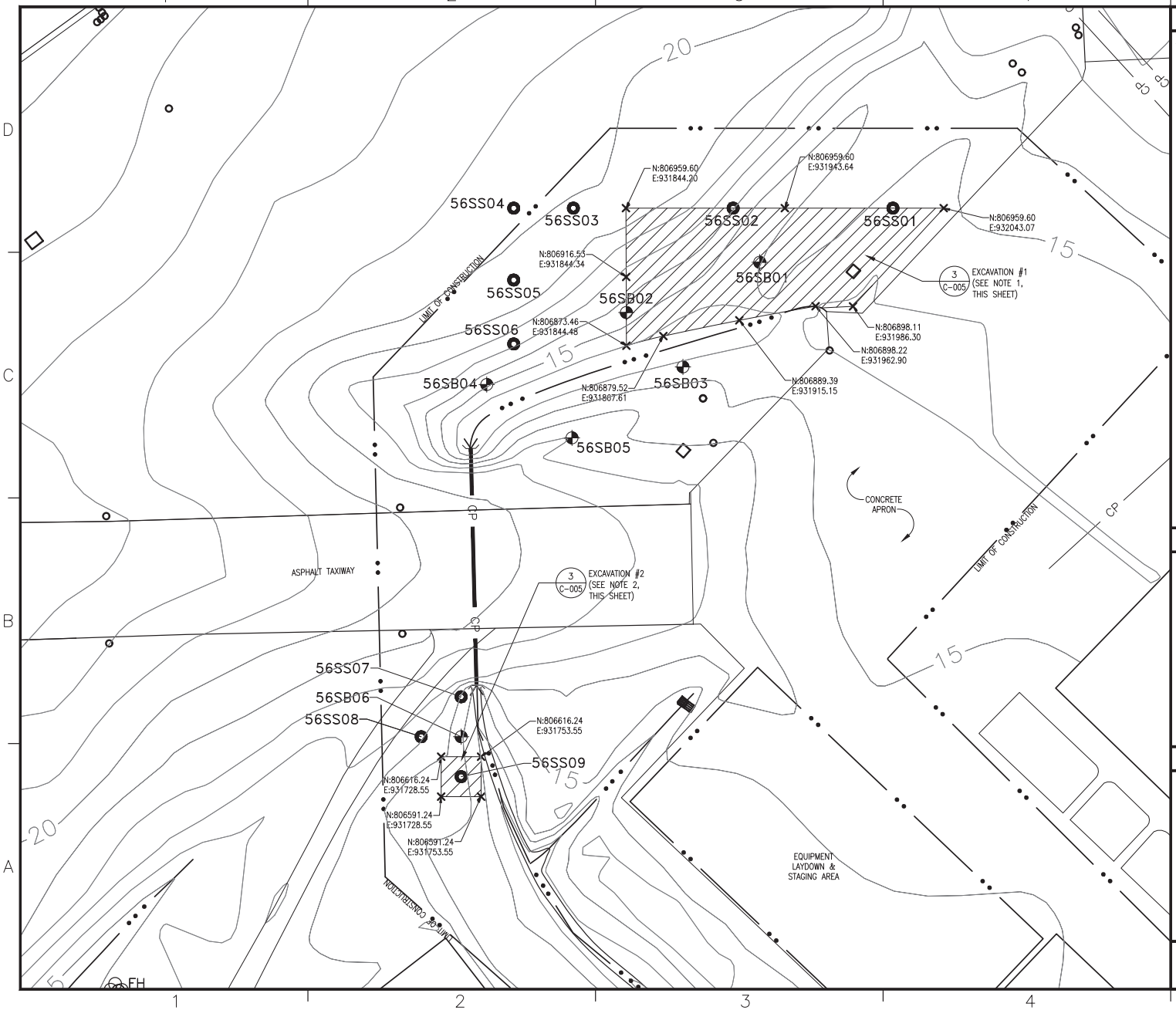

GENERAL SHEET NOTES

WORK NOTES

1. EXCAVATION AREA #1 IS ≈12,000 SQUARE FEET (SF) AND SHALL BE EXCAVATED TO A DEPTH OF ONE FOOT (1') BELOW EXISTING GROUND SURFACE. APPROXIMATE AMOUNT OF EXCAVATED SOIL REMOVED FROM AREA #1 IS 444 CY. BACKFILL EXCAVATED AREA WITH ≈490 CY OF CLEAN FILL MATERIAL (10% COMPACTION RATE INCLUDED). COORDINATES HAVE BEEN PROVIDED TO DELINEATE THE LIMIT OF EXCAVATION.
2. EXCAVATION AREA #2 IS ≈625 SQUARE FEET (SF) AND SHALL BE EXCAVATED TO A DEPTH OF ONE FOOT (1') BELOW EXISTING GROUND SURFACE. APPROXIMATE AMOUNT OF EXCAVATED SOIL REMOVED FROM AREA #2 IS 24 CY. BACKFILL EXCAVATED AREA WITH ≈27 CY OF CLEAN FILL MATERIAL (10% COMPACTION RATE INCLUDED). COORDINATES HAVE BEEN PROVIDED TO DELINEATE THE LIMIT OF EXCAVATION.
3. PROVIDE SAFETY FENCING AROUND EXCAVATION AREAS FOR WORKER SAFETY AND PROTECTION OF WILDLIFE. FIELD ADJUST LOCATIONS AS NECESSARY. PROVIDE ACCESS TO EXCAVATION AREAS.
4. FOLLOWING EXCAVATION TO IDENTIFIED LIMITS, CONDUCT CONFIMATORY SAMPLING AS SPECIFIED TO VERIFY THE REMOVAL OF METALS-CONTAMINATED SOILS FROM THE SITE. EXCAVATION WILL CONTINUE UNTIL THE REMOVAL GOALS ARE MET AS FOLLOWS:

CHEMICAL OF CONCERN	FINAL CAO (mg/Kg)
Cadmium	1.8
Lead	96

5. UPON APPROVAL FROM THE NAVY, BACKFILL THE EXCAVATION AREAS AS SPECIFIED WITH MATERIAL.
6. REVEGETATE ALL DISTURBED AREAS AS SPECIFIED.
7. UPON THE RE-ESTABLISHMENT OF VEGETATION AND APPROVAL FROM THE NAVY, REMOVE ALL EROSION AND SEDIMENT CONTROL FACILITIES. REVEGETATE AS SPECIFIED.
8. REMOVE CAUTION TAPE AND SAFETY FENCING UPON COMPLETION OF WORK.
9. APPROXIMATE LOCATION OF CONFIRMATORY SAMPLES, FINAL SAMPLE LOCATIONS, AND SAMPLE IDENTIFICATIONS WILL BE DOCUMENTED BY SURVEY.
10. REFER TO SAMPLING LOCATIONS TABLE, SHEET C-001 FOR SAMPLE POINT LOCATION INFORMATION.

SYMBOL LEGEND

- CONSTRUCTION LIMIT/STAGING AREA
- HEAD WALL, EXISTING
- CULVERT, EXISTING
- DRAINAGE SWALE, EXISTING
- UTILITY POLE, EXISTING
- EXCAVATION AREA
- COORDINATE POINT
- SURFACE & SUBSURFACE SOIL & GROUNDWATER SAMPLES
- SURFACE SOIL SAMPLES

KEYPLAN

N
PLAN NORTH

GRAPHIC SCALE

1"=30' 30' 0' 30' 60' 120'

SYM	DESCRIPTION	DATE	APPR

NAVFAC

SEAL

RESOLUTION CONSULTANTS

A/E INFO

APPROVED

FOR COMMANDER NAVFAC

ACTIVITY

SATISFACTORY TO DATE

DES: JDL DRW: JDL CHK: MK

<CPN/DIV>

BRANCH MANAGER

CHIEF ENG/ARCH

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND – SOUTHEAST
PUBLIC WORKS DEPARTMENT
NAS – JACKSONVILLE, FL

NAVAL ACTIVITY PUERTO RICO
CEIBA, PR

INTERIM CORRECTIVE MEASURES WORK PLAN
SWMU 56 - HANGAR 200 APRON

SOIL EXCAVATION PLAN

SCALE: 1 = 30

EPROJECT NO.:

CONSTR. CONTR. NO.
N69450-08-C-0093

NAVFAC DRAWING NO.

SHEET 4 OF 6

C-003

DRAWFORM REVISION: 10 MARCH 2009

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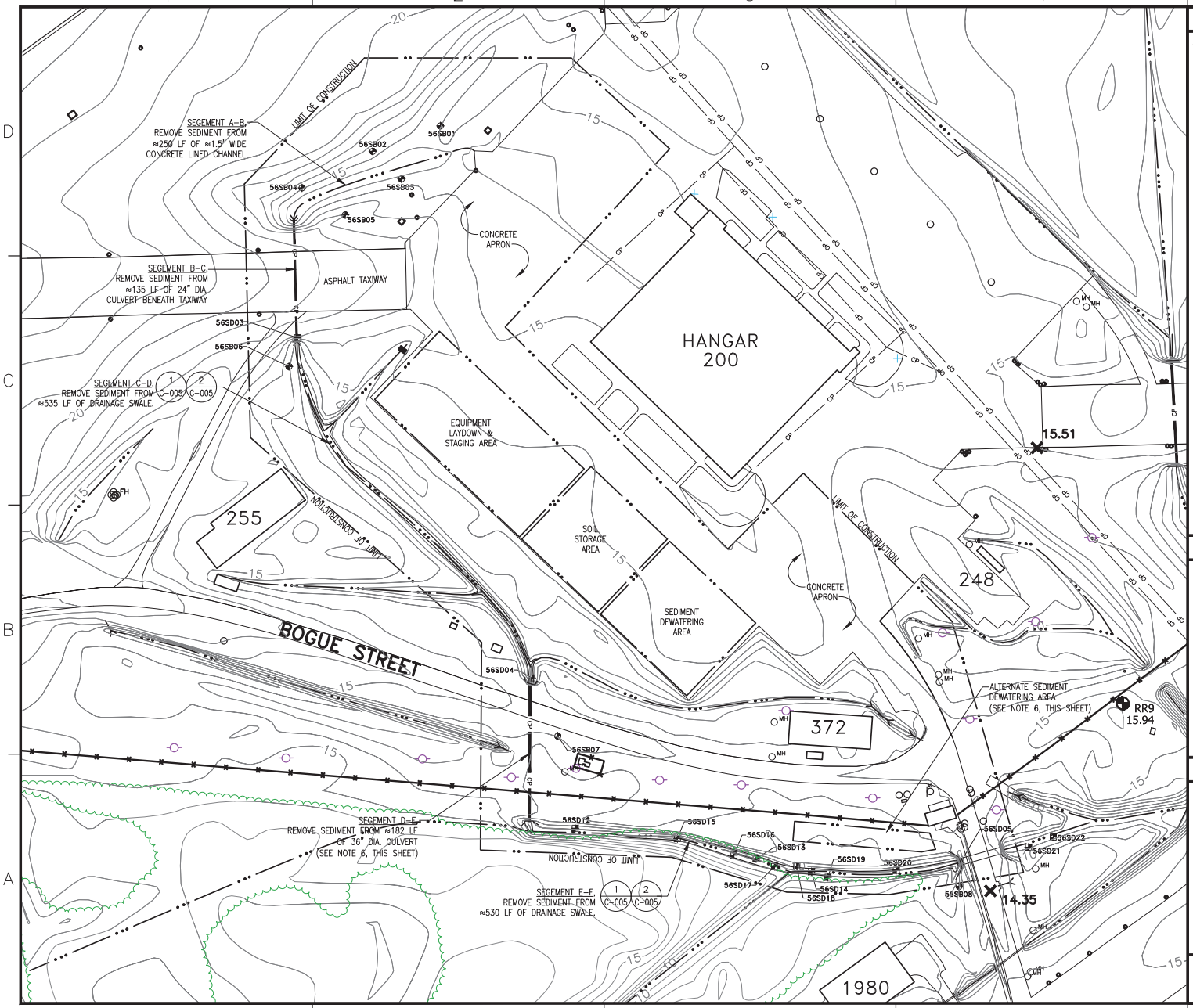

GENERAL SHEET NOTES

WORK NOTES

1. SEGMENT A–B, CONCRETE LINED CHANNEL IS ≈250 LINEAR FEET (LF) IN LENGTH AND 1.5 FEET IN WIDTH. ACCUMULATED SEDIMENT TO AN APPROXIMATE DEPTH OF ONE INCH (1") SHALL BE REMOVED FROM THE CHANNEL AND TRANSPORTED TO THE SEDIMENT STORAGE AREA FOR DEWATERING. APPROXIMATE AMOUNT OF EXCAVATED SEDIMENT TO BE REMOVED FROM SEGMENT A–B IS 30 CUBIC FEET.
2. SEGMENT B–C, 24" DIA. CONCRETE CULVERT AT ≈135 LINEAR FEET (LF) IN LENGTH. ACCUMULATED SEDIMENT TO AN APPROXIMATE DEPTH OF ONE INCH (1") SHALL BE REMOVED FROM THE CULVERT AND TRANSPORTED TO THE SEDIMENT STORAGE AREA FOR DEWATERING. APPROXIMATE AMOUNT OF EXCAVATED SEDIMENT TO BE REMOVED FROM SEGMENT B–C IS 5.5 CUBIC FEET.
3. SEGMENT C–D, VEGETATED SWALE AT ≈535 LINEAR FEET (LF) IN LENGTH WITH AN EXCAVATION AREA OF ≈4 FEET IN WIDTH. ACCUMULATED SEDIMENT TO A DEPTH OF ONE FOOT (1') SHALL BE REMOVED FROM THE CHANNEL AND TRANSPORTED TO THE SEDIMENT STORAGE AREA FOR DEWATERING. APPROXIMATE AMOUNT OF EXCAVATED SEDIMENT TO BE REMOVED FROM SEGMENT C–D IS ≈2,150 CUBIC FEET. EXCAVATED AREA SHALL SHALL BE REPAIRED AS PER DETAILS 1 & 2, SHEET C–005.
4. SEGMENT D–E, 36" DIA. CONCRETE CULVERT AT ≈182 LINEAR FEET (LF) IN LENGTH. ACCUMULATED SEDIMENT TO AN APPROXIMATE DEPTH OF TWO INCHES (2") SHALL BE REMOVED FROM THE CULVERT AND TRANSPORTED TO THE SEDIMENT STORAGE AREA FOR DEWATERING. APPROXIMATE AMOUNT OF EXCAVATED SEDIMENT TO BE REMOVED FROM SEGMENT D–E IS 31 CUBIC FEET.
5. SEGMENT E–F, VEGETATED SWALE AT ≈530 LINEAR FEET (LF) IN LENGTH WITH AN EXCAVATION AREA OF ≈4 TO ≈8 FEET IN WIDTH. ACCUMULATED SEDIMENT TO A DEPTH OF ONE FOOT (1') SHALL BE REMOVED FROM THE CHANNEL AND TRANSPORTED TO THE SEDIMENT STORAGE AREA FOR DEWATERING (SEE NOTE 6). APPROXIMATE AMOUNT OF EXCAVATED SEDIMENT TO BE REMOVED FROM SEGMENT E–F IS ≈4,220 CUBIC FEET. EXCAVATED AREA SHALL SHALL BE REPAIRED AS PER DETAILS 1 & 2, SHEET C–005.
6. EXTERNAL SEDIMENT DEWATERING AREA HAS BEEN LOCATED OUTSIDE OF THE FENCED AREA ON THE NORTH SIDE OF SEGMENT E–F IN ORDER TO MITIGATE IMPACTS TO AIRFIELD OPERATIONS AND SITE SECURITY.
7. UPON APPROVAL FROM THE NAVY, BACKFILL THE EXCAVATION AREAS AS SPECIFIED WITH MATERIAL.
8. UPON APPROVAL FROM THE NAVY, REMOVE ALL EROSION AND SEDIMENT CONTROL FACILITIES. REVEGETATE AS SPECIFIED.
9. REFER TO SAMPLING LOCATIONS TABLE, SHEET C–001 FOR SAMPLE POINT LOCATION INFORMATION.

SYMBOL LEGEND

- CONSTRUCTION LIMIT/STAGING AREA
- HEAD WALL, EXISTING
- CULVERT, EXISTING
- DRAINAGE SWALE, EXISTING
- SECURITY FENCE, EXISTING
- UTILITY POLE, EXISTING
- SURFACE & SUBSURFACE SOIL & GROUNDWATER SAMPLES
- SURFACE SOIL SAMPLES
- SEDIMENT SAMPLES
- VEGETATION, EXISTING
- SURVEY MONUMENT

KEYPLAN

PLAN NORTH

GRAPHIC SCALE

1"=60' 60' 0' 60' 120' 240'

SYM	DESCRIPTION	DATE	APPR

NAVFAC

SEAL

RESOLUTION CONSULTANTS

A/E INFO

APPROVED

FOR COMMANDER NAVFAC

ACTIVITY

SATISFACTORY TO DATE

DES: JDL DRW: JDL CHK: MK

<<PM/Web>>

BRANCH MANAGER

CHIEF ENG/ARCH

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND – SOUTHEAST
PUBLIC WORKS DEPARTMENT
NAS – JACKSONVILLE FL
NAVAL ACTIVITY PUERTO RICO
CEIBA, PR
INTERIM CORRECTIVE MEASURES WORK PLAN
SWMU 56 - HANGAR 200 APRON
SEDIMENT REMOVAL PLAN

SCALE: 1 = 60

EFPROJECT NO.:

CONSTR. CONTR. NO. N69450–08–C–0093

NAVFAC DRAWING NO.

SHEET 5 OF 6

C-004

DRAWFORM REVISION: 10 MARCH 2009

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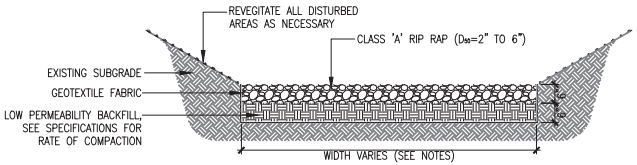
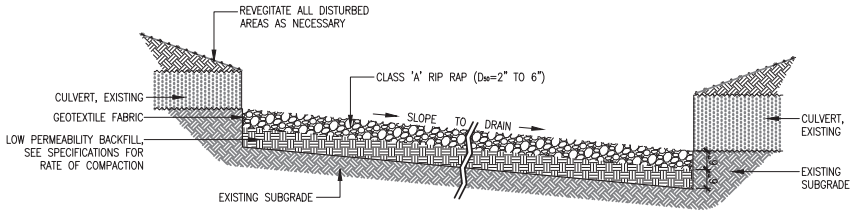


1 C-005 DRAINAGE SWALE

NOT TO SCALE

NOTES

1) SEGMENT C–D WIDTH IS ≈4 FEET
2) SEGEMENT E–F WIDTH IS ≈4 TO 8 FEET

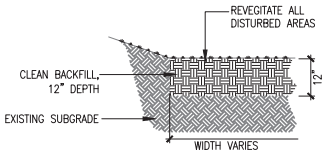


2 C-005 DRAINAGE SWALE

NOT TO SCALE

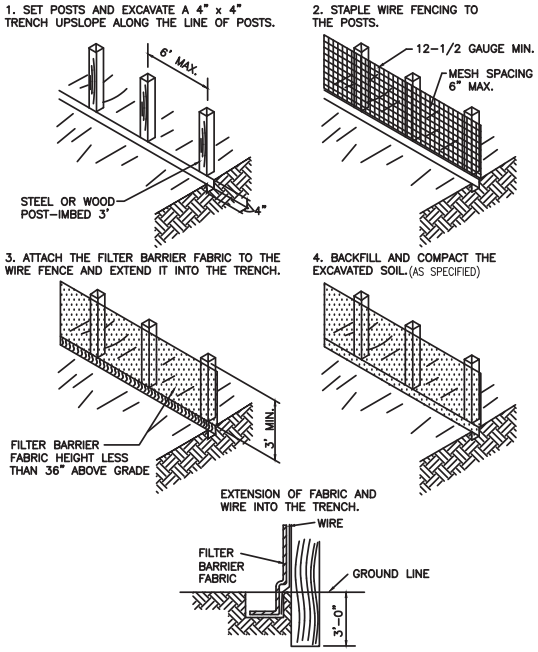
NOTES

1) CONTRACTOR SHALL PLACE EDGE OF GEOTEXTILE FABRIC BENEATH CULVERT INVERT & OUTFALL TO ALLEVIATE POSSIBILITY OF UNDERMINING THE DRAINAGE SWALE IMPROVEMENTS. SEE SPECIFICATIONS FOR COMPACTION REQUIREMENTS REGARDING BACKFILL UNDER CULVERTS.



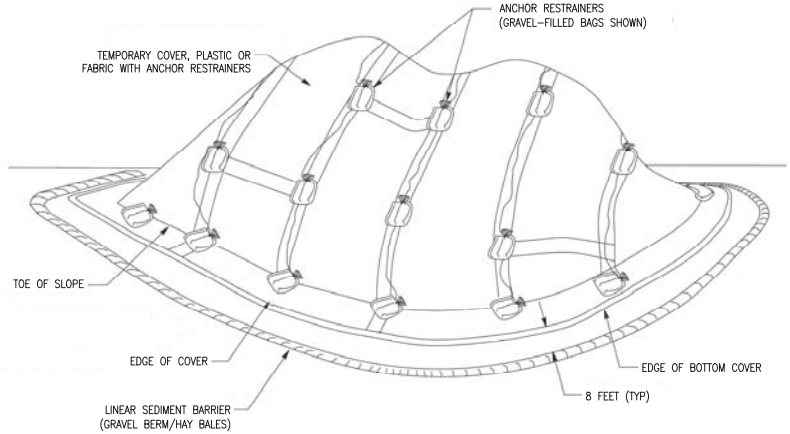
3 C-005 EXCAVATION BACKFILL

NOT TO SCALE



TEMPORARY SEDIMENT FENCE (SF)

NOT TO SCALE



TEMPORARY COVER ON STOCKPILE

NOT TO SCALE

						DATE	APPR

NAVFAC

SEAL

RESOLUTION CONSULTANTS

A/E INFO

APPROVED

FOR COMMANDER NAVFAC

ACTIVITY

SATISFACTORY TO DATE

DES: JDL DRW JDL CHK MK

<CPN/Date>

BRANCH MANAGER

CHIEF ENG/ARCH

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND – SOUTHEAST
RPBU: SERVICE DEPARTMENT
NAS – JACKSONVILLE FL
CEBA, PR
NAVAL ACTIVITY PUERTO RICO
INTERIM CORRECTIVE MEASURES WORK PLAN
SWMU 56 - HANGAR 200 APRON
DETAILS

SCALE: NO SCALE

EPROJECT NO.:

CONSTR. CONTR. NO.
N69450–08–C–0093

NAVFAC DRAWING NO.

SHEET 6 OF 6

C-005

DRAWFORM REVISION: 10 MARCH 2009

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Appendix A1
Cofferdam Information

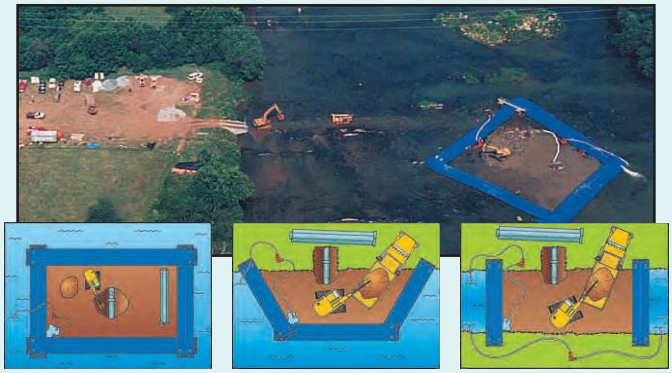
Aqua-Barrier™

Water-Inflated Dams

DEWATERING PROJECTS COME IN ALL SHAPES AND SIZES. AQUA-BARRIER™ PROVIDE A MULTI-PURPOSE SOLUTION TO YOUR TEMPORARY DAM REQUIREMENTS.

BOAT RAMP INSTALLATIONS

PIPELINE INSTALLATION & REPAIR



BRIDGE CONSTRUCTION

CULVERT INSTALLATION AND REPAIR

SHORELINE STABILIZATION

OTHER PROJECTS

Concrete channel repair

Water park construction & repair

Dredging project

Weir installation

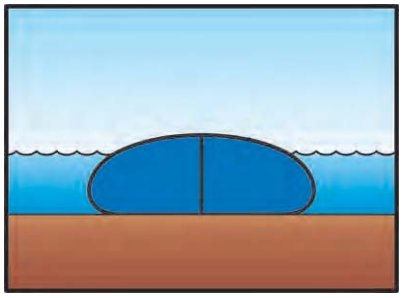
1-800-245-0199

www.aquabarrier.com

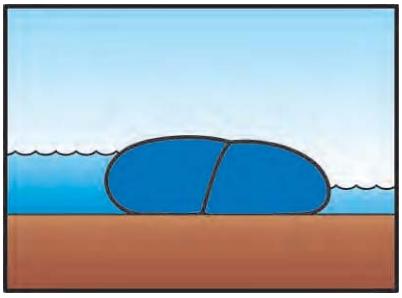
Aqua-Barrier™

Water-Inflated Dams

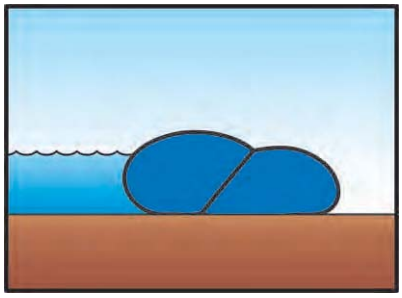
AQUA-BARRIER™ IS A WATER FILLED DAM THAT UTILIZES A PATENTED INTERNAL BAFFLE FOR STABILITY



System prior to dewatering worksite



Baffle shifts to stabilize system



Dewatered worksite; baffle has stabilized the system

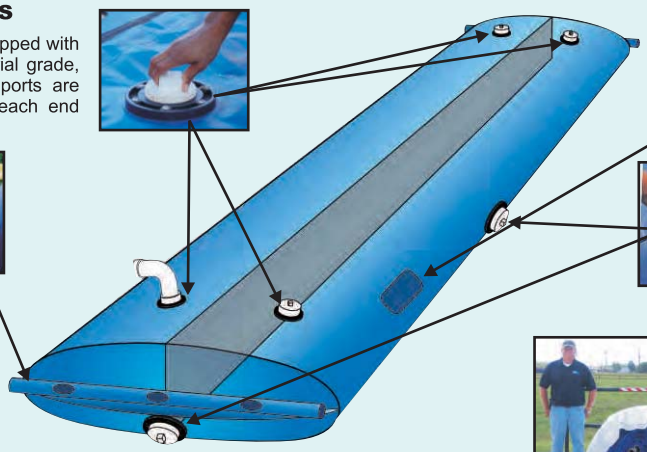
AQUA-BARRIER™ OFFERS UNIQUE ACCESSORIES TO FACILITATE INFIELD USE

FILL PORTS

Aqua-Barriers™ are equipped with 3- or 4- inch ID, industrial grade, threaded fill ports. Fill ports are installed in pairs near each end of the barrier.

END PIPELOOPS

Pipeloops are fabricated on each end of the barrier to facilitate precise placement and rapid removal. Inserting a pipe through the loops allows you to maneuver the barriers with an elevated, heavy equipment arm.



REPAIRABILITY

Aqua-Barriers™ are infield repairable. Utilizing a specialized adhesive and material patch, repairs can be made even while the barrier is wet.

DRAIN PORTS

There are 8-inch drain ports on each end of the barrier. Additional drain ports are also located along both sides of the unit; the number and position vary depending upon barrier length.

SHIPPING AND STORAGE

The Aqua-Barriers™ are produced from a flexible vinyl membrane. The barriers are able to be packaged on standard pallets for cost effective shipping and storage.

AQUA-BARRIERS™ COME IN MULTIPLE SIZES TO MEET ALL YOUR DEWATERING NEEDS

Inflated Height in Feet	Maximum Controllable Water/Sediment Depth in Inches*	Inflated Volume in Gal. per liner Foot	Inflated Width in Feet	Connection Overlap Requirements in Feet
3	27	131	7	4.5
4	36	225	9	6
5	45	352	11.25	7.5
6	54	506	13.5	9
8	72	901	18	12

* The depth of water represents 75% of the inflated height of a fully inflated Aqua-Barrier™. It is required that a minimum 25% freeboard (portion of barrier above water level) inflated capacity be maintained during all phases of a project. Excess slopes and grades, soil composition, moving water, and other related hydrological criteria may increase or decrease the ability of the Aqua-Barrier™ to perform as projected.

RENT OR PURCHASE

GSA Schedule
GS-07F-0543N

1-800-245-0199

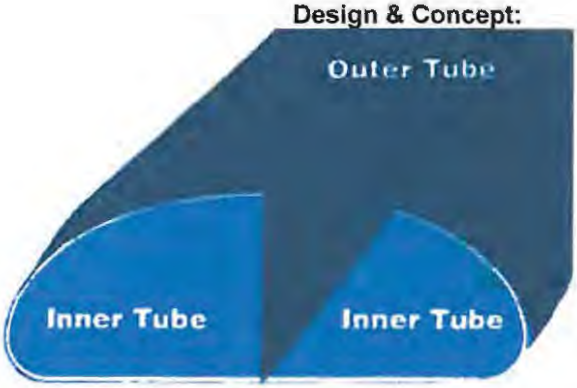
www.aquabarrier.com

Hydrological Solutions, Inc.
Harnessing the Power of Water

How It Works:

AquaDams® are lightweight, easy to handle, and can be used in virtually any location. On-site requirements are just a portable pump, and the usually abundant local water supply. This means AquaDams® are ideal for water control projects such as stream or lake bed construction diversions, coffer damming, or environmental pollution confinement and silt control. They also provide fast, effective relief for tougher applications such as mud slides, hazardous waste control, and flooding. They are also ideal for preventing the overtopping of levees, the number one cause of levee failure.

Design & Concept:



AquaDams® are environmentally safe and specifically engineered to provide rapid deployment. They are a stable barrier of water to contain, divert, and control the flow of water. The AquaDam® concept combines multiple inner tubes within an outer tube to provide an effective portable dam to control the flow of water.

The unique, patented design consists of four basic components:

1. Multiple impermeable inner tubes which are filled with water to provide the mass needed for stability
2. A strong, woven outer tube which contains the inner tubes and provides the structural integrity of the system
3. Water for mass weight
4. Collar for joining two or more AquaDams® together

All materials used in the construction of the AquaDams® are flexible to allow them to conform to uneven terrain. This provides an effective seal between the ground and the AquaDams®.

Two or more AquaDams® may be joined to form an AquaDam® of any workable length. A coupling collar, manufactured from the same high-strength woven material as the outer tube, aligns the AquaDams®.

The unique combination of properties of AquaDam® make them ideal for a wide variety of applications. A few of the more common uses include:

1. Water diversions during pipeline installation in and around rivers or standing water
2. Water containment during repairs on bridges, sewage systems and power plants
3. Easy, rapidly deployed flood control
4. Erosion control through diversion or containment of flowing water
5. Temporary reservoirs for water storage
6. Temporary containment of spilled materials
7. Silt containment and sediment collection

The standard AquaDam® system is filled from one end only via two inner tubes. The closed end is fitted with a collar that allows two AquaDams® to be linked together. Utilizing the linking collars allows the AquaDam® to be customized to meet the individual needs of the job site.

The open-ended system can be filled from either open end. This system is appropriate when placing one AquaDam® entirely across a riverbed or canal, where both ends can extend up the opposite bank.

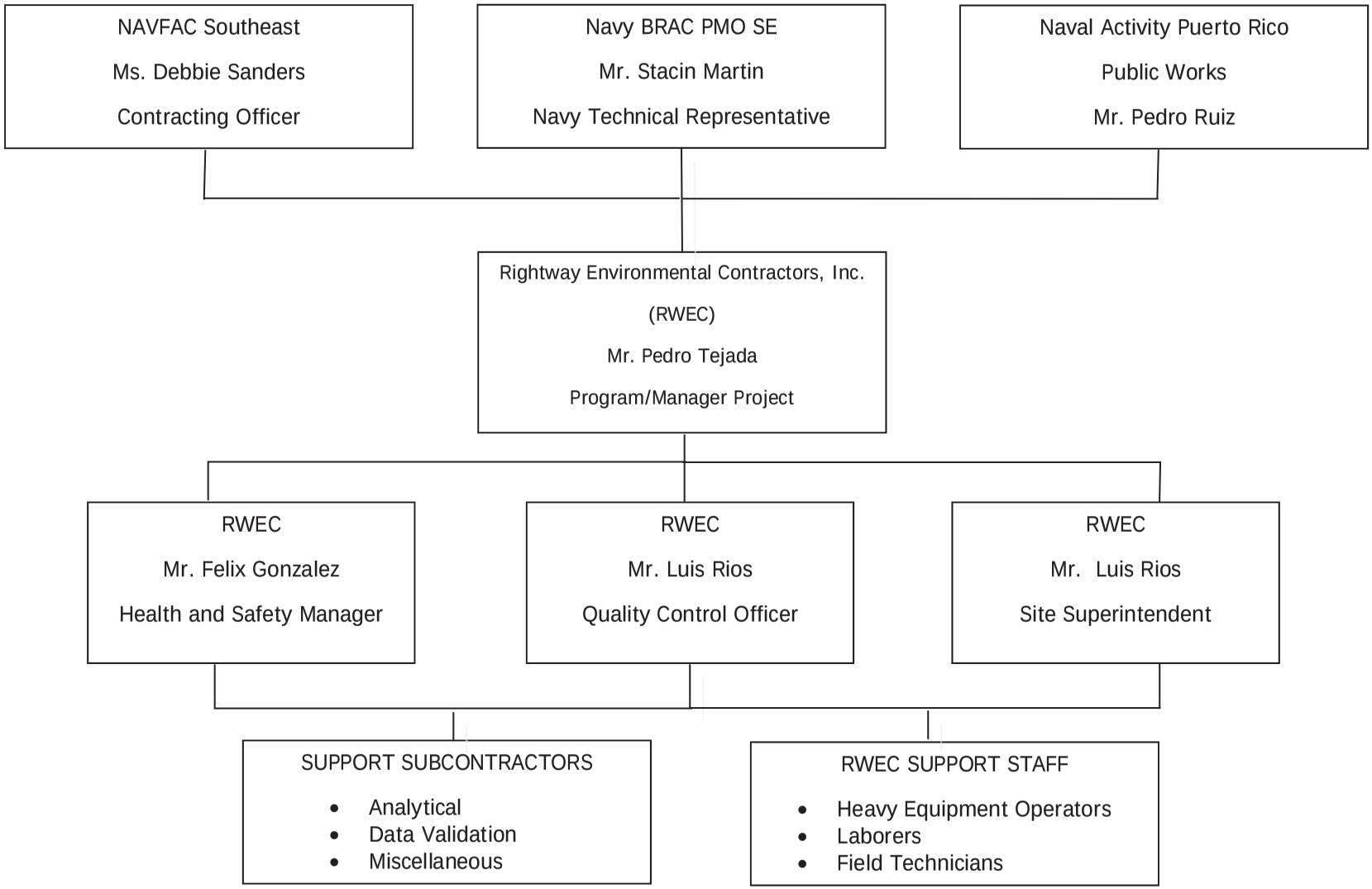
Appendix B
Organizational Chart

APPENDIX B

PROJECT ORGANIZATION

Interim Corrective Measures Work Plan — SWMU 56, Hangar 200 Apron

Naval Activity Puerto Rico; Ceiba, Puerto Rico



Appendix C
Site Safety and Health Plan

The contractor implementing the ICM will use their Site Health and Safety Plan and will place a copy of the Plan in Appendix C.

Appendix D
Sampling and Analysis Plan

SAMPLING AND ANALYSIS PLAN

INTERIM CORRECTIVE MEASURES AT SWMU 56
NAVAL ACTIVITY PUERTO RICO
CEIBA, PUERTO RICO

Revision: 0

Prepared For:

Department of the Navy
Naval Facilities Engineering Command Southeast
Building 135 North, P.O. Box 30
Jacksonville, Florida 32212-0030

Prepared By:

Resolution Consultants
A Joint Venture of AECOM & EnSafe
1500 Wells Fargo Building
440 Monticello Avenue
Norfolk, Virginia 23510

Contract Number: N62470-11-D-8013
CTO JM41

August 2015

SAP WORKSHEET #1: TITLE AND APPROVAL PAGE
(UFP-QAPP Manual Section 2.1)

SAMPLING AND ANALYSIS PLAN

INTERIM CORRECTIVE MEASURES AT SWMU 56
NAVAL ACTIVITY PUERTO RICO
CEIBA, PUERTO RICO

Version Number: 0

Prepared For:

Department of the Navy
Naval Facilities Engineering Command Southeast
Building 135 North, P.O. Box 30
Jacksonville, Florida 32212-0030

Prepared By:

Resolution Consultants
A Joint Venture of AECOM & EnSafe
1500 Wells Fargo Building
440 Monticello Avenue
Norfolk, Virginia 23510

Contract Number: N62470-11-D-8013
CTO JM41

August 2015

Alejandro Rodriguez Pagan — Digitally signed by Alejandro Rodriguez Pagan DN: cn=Alejandro Rodriguez Pagan, o=Right Way Environmental Contractors, Inc., ou=RWEC, Inc., email=arodriguez@rightwaypr.com, c=US Date: 2013.10.09 19:26:41 -04'00'

Alejandro Rodriquez/Quality Control Officer — Date

NIXON.MONIQUE.L.1272150628 — Digitally signed by NIXON.MONIQUE.L.1272150628 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USN, cn=NIXON.MONIQUE.L.1272150628 Date: 2013.10.08 07:43:01 -04'00'

Ken Bowers/Navy Quality Assurance Officer/Chemist — Date

Pedro Tejada — Digitally signed by Pedro Tejada DN: cn=Pedro Tejada, o=RWEC, Inc, ou, email=ptejada@rightwaypr.com, c=US Date: 2013.10.09 10:56:13 -04'00'

Pedro Tejada/ Program Manager — Date

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Stacin Martin/Navy Remedial Project Manager — Date

EXECUTIVE SUMMARY

Resolution Consultants has prepared this Uniform Federal Policy Sampling and Analysis Plan (UFP-SAP) for the Interim Corrective Measures at Solid Waste Management Unit 56, Naval Activity Puerto Rico, Ceiba, Puerto Rico. Activities described herein are in accordance with the requirements of Contract Number N62470-11D-8013, Comprehensive Long-term Environmental Action Navy, Contract Task Order JM41. This UFP-SAP applies only to activities to be performed by Right Way Environmental Contractors, Inc. and its subcontractors under their contract N69450-08-R-0093, consisting of sampling and removal of soil and sediment.

The Interim Corrective Measure (ICM) will be performed to mitigate threats to ecological health posed by soil and sediment. Land Use Controls will be instituted to mitigate threats to human health.

Results generated during previous investigations indicate that soil and sediment were impacted by historical releases from airport maintenance operations near Hangar 200, and that these contaminated media may adversely impact ecological receptors. Potential human health impacts from groundwater and soil are indicated, and will be alleviated via institutional controls restricting residential land use and groundwater consumption. As determined in the Corrective Measures Study (Baker, 2011) and documented in the *Interim Corrective Measures Work Plan, SWMU 56 — Hangar 200 Apron* (ICM Work Plan), the contaminated soil and sediment will be removed, characterized in accordance with Commonwealth and Federal laws, and disposed of at an offsite facility.

The goal of the ICM is to remove impacted soil and sediment and therefore remove the potential risk to ecological receptors.

For the soil removal action, confirmation samples will be collected to confirm that the lateral extent of the contamination has been removed. For the sediment removal action, confirmation samples are not required because the planned sediment excavation will remove all sediment to a depth of one foot or to the top of the lined channel barrier, thus removing the risk to ecological receptors.

This UFP-SAP was generated for, and complies with, applicable Navy, U.S. Environmental Protection Agency (U.S. EPA) Region 2, and Puerto Rico's Environmental Quality Board requirements, regulations, guidance, and technical standards, as appropriate. This includes the Department of Defense, Department of Energy, and U.S. EPA Interagency Data Quality Task Force environmental requirements regarding federal facilities, as specified in the Uniform Federal Policy Quality Assurance Project Plan guidance (U.S. EPA, 2005).

This UFP-SAP outlines the organization, project management, objectives, planned activities, measurement, data acquisition, assessment, oversight, and data review procedures associated with the planned interim corrective measure at Naval Activity Puerto Rico. Protocols for sample collection, handling, and storage, and for chain of custody, laboratory and field analyses, data validation, and reporting are also addressed. Field activities conducted under this plan will be conducted in accordance with Standard Operating Procedures and will meet the requirements of the Health and Safety Plan, prepared under separate cover.

Table of Contents

SAP WORKSHEET #1: TITLE AND APPROVAL PAGE ..... WS 1-1

SAP WORKSHEET #2: SAMPLING AND ANALYSIS PLAN IDENTIFYING INFORMATION ..... WS 2-1

SAP WORKSHEET #3: DISTRIBUTION LIST ..... WS 3-1

SAP WORKSHEET #4: PROJECT PERSONNEL SIGN-OFF SHEET ..... WS 4-1

SAP WORKSHEET #5: PROJECT ORGANIZATIONAL CHART ..... WS 5-1

SAP WORKSHEET #6: COMMUNICATION PATHWAYS ..... WS 6-1

SAP WORKSHEET #7: PERSONNEL RESPONSIBILITIES TABLE ..... WS 7-1

SAP WORKSHEET #8: SPECIAL PERSONNEL TRAINING REQUIREMENTS TABLE ..... WS 8-1

SAP WORKSHEET #9: PROJECT SCOPING SESSION PARTICIPANTS SHEET ..... WS 9-1

SAP WORKSHEET #10: CONCEPTUAL SITE MODEL ..... WS 10-1

SAP WORKSHEET #11: PROJECT QUALITY OBJECTIVES/SYSTEMATIC PLANNING PROCESS STATEMENTS ..... WS 11-1

SAP WORKSHEET #12: FIELD QUALITY CONTROL SAMPLES ..... WS 12-1

SAP WORKSHEET #13: SECONDARY DATA CRITERIA AND LIMITATIONS TABLE ..... WS 13-1

SAP WORKSHEET #14: SUMMARY OF PROJECT TASKS ..... WS 14-1

SAP WORKSHEET #15: REFERENCE LIMITS AND EVALUATION TABLES ..... WS 15-1

SAP WORKSHEET #16: PROJECT SCHEDULE/TIMELINE TABLE (OPTIONAL FORMAT) ..... WS 16-1

SAP WORKSHEET #17: SAMPLING DESIGN AND RATIONALE ..... WS 17-1

SAP WORKSHEET #18: LOCATION-SPECIFIC SAMPLING METHODS/SOP REQUIREMENTS TABLE ..... WS 18-1

SAP WORKSHEET #19: FIELD SAMPLING REQUIREMENTS TABLE ..... WS 19-1

SAP WORKSHEET #20: FIELD QUALITY CONTROL SAMPLE SUMMARY TABLE ..... WS 20-1

SAP WORKSHEET #21: PROJECT SAMPLING SOP REFERENCES TABLE ..... WS 21-1

SAP WORKSHEET #22: FIELD EQUIPMENT CALIBRATION, MAINTENANCE, TESTING, AND INSPECTION TABLE ..... WS 22-1

SAP WORKSHEET #23: ANALYTICAL SOP REFERENCES TABLE ..... WS 23-1

SAP WORKSHEET #24: ANALYTICAL INSTRUMENT CALIBRATION TABLE ..... WS 24-1

SAP WORKSHEET #25: ANALYTICAL INSTRUMENT AND EQUIPMENT MAINTENANCE, TESTING, AND INSPECTION TABLE ..... WS 25-1

SAP WORKSHEET #26: SAMPLE HANDLING SYSTEM ..... WS 26-1

SAP WORKSHEET #27: SAMPLE CUSTODY REQUIREMENTS ..... WS 27-1

SAP WORKSHEET #28: LABORATORY QC SAMPLES TABLE ..... WS 28-1

SAP WORKSHEET #29: PROJECT DOCUMENTS AND RECORDS TABLE ..... WS 29-1

SAP WORKSHEET #30: ANALYTICAL SERVICES TABLE ..... WS 30-1

SAP WORKSHEET #31: PLANNED PROJECT ASSESSMENTS TABLE ..... WS 31-1

SAP WORKSHEET #32: ASSESSMENT FINDINGS AND CORRECTIVE ACTION RESPONSES TABLE ..... WS 32-1

SAP WORKSHEET #33: QUALITY ASSURANCE MANAGEMENT REPORTS TABLE ..... WS 33-1

SAP WORKSHEETS #34-36: DATA VERIFICATION AND VALIDATION (STEPS I AND IIA/IIB) PROCESS TABLE ..... WS 34 — 36-1

SAP WORKSHEET #37: USABILITY ASSESSMENT ..... WS 37-1

REFERENCES REF-1

Figures

Figure 10-1 Site Location Map ..... WS 10-3
Figure 10-2 Site Aerial Map ..... WS 10-4
Figure 10-3 Site Layout Map ..... WS 10-5
Figure 10-4 Conceptual Site Model ..... WS 10-14
Figure 10-5 Conceptual Design for Surface Soil Excavation ..... WS 10-17
Figure 10-6 Conceptual Design for Sediment Excavation ..... WS 10-18

Tables

Table 10-1 Surface Soil Corrective Action Objectives ..... WS 10-7
Table 10-2 Sediment Corrective Action Objectives ..... WS 10-7

Appendices

Appendix A Field Standard Operating Procedures and Field Forms
Appendix B Laboratory Accreditation Certificates

List of Acronyms

AES	Atomic emission spectroscopy
Baker	Michael Baker Jr., Inc.
Bgs	Below ground surface
BRAC	Base Realignment and Closure
CAO	Corrective action objective
CCV	Continuing calibration verification
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CLEAN	Comprehensive Long-Term Environmental Action Navy
CMI	Corrective measures implementation
CMS	Corrective measures study
COC	Contaminant of concern
COPC	Contaminant of potential concern
CSM	Conceptual site model
CTO	Contract task order
DL	Detection limit
DoD	Department of Defense
DoD ELAP	Department of Defense Environmental Laboratory Accreditation Program
DQO	Data quality objective
ECP	Environmental condition of property
ICAL	Initial calibration
ICM	Interim Corrective Measures
ICP	Inductively coupled plasma
ICP-AES	Inductively coupled plasma-atomic emission spectrometry
ICS	Interference check solutions
ICV	Initial calibration verification
IDW	Investigative derived waste
kg	Kilogram
LCS	Laboratory control sample
LOD	Limit of detection
LOQ	Limit of quantitation
LRA	Local Redevelopment Authority
MDL	Method detection limit
mg	Milligram
MS/MSD	Matrix spike/matrix spike duplicate

NAPR	Naval Activity Puerto Rico
NAVFAC	Naval Facilities Engineering Command
NELAP	National Environmental Laboratory Accreditation Program
NIRIS	Naval Installation Restoration Information Solution
NSRR	Naval Station Roosevelt Roads
PAL	Project action limit
PID	Photo-ionization detector
PM	Project manager
PMO	Program management office
POC	Point of contact
POL	Petroleum, oil, and lubricant
PQO	Project quality objective
PSQ	Principal study question
PT	Proficiency test
QA	Quality assurance
QAPP	Quality assurance project plan
QC	Quality control
QSM	Quality systems manual
R or r	Correlation coefficient
RCRA	Resource Conservation and Recovery Act
RPD	Relative percent difference
RPM	Remedial project manager
RSD	Relative standard deviation
RWEC	Right Way Environmental Contractors, Inc.
SAP	Sampling and analysis plan
SE	Southeast
SOP	Standard operating procedure
SSO	Site safety officer
SWMU	Solid waste management unit
TBD	To be determined
UFP	Uniform Federal Policy
U.S. EPA	United States Environmental Protection Agency
VOC	Volatile organic compounds

SAP WORKSHEET #2: SAMPLING AND ANALYSIS PLAN IDENTIFYING INFORMATION

(UFP-QAPP Manual Section 2.2.4)

Site Name/Number: Solid Waste Management Unit (SWMU) 56

Operable Unit: Not applicable

Contractor Name: Resolution Consultants

Contract Number: N62470-11-D-8013

Contract Title: Comprehensive Long-term Environmental Action Navy (CLEAN)

Work Assignment Number (optional):

1. This sampling and analysis plan (SAP) was prepared in accordance with the requirements of the United States Environmental Protection Agency (U.S. EPA) documents *Uniform Federal Policy for Quality Assurance Plans (UFP-QAPP)* (U.S. EPA 2005) and *Guidance for Quality Assurance Project Plans, EPA QA/G-5* (U.S. EPA 2002).

2. Identify regulatory program: Resource Conservation and Recovery Act (RCRA).

3. This SAP is a project-specific SAP.

4. List organizational partners (stakeholders) and identify the connection with lead organization:

Organization Partners/Stakeholders	Connection	Date
U.S. Department of the Navy — NAVFAC Southeast	Property Owner	April 2013
U.S. EPA — Region 2	Regulatory Stakeholder	April 2013
Puerto Rico Environmental Quality Board	Regulatory Stakeholder	April 2013
Right Way Environmental Contractors	Contractor performing work	April 2013

Notes:
NAVFAC = Naval Facilities Engineering Command
U.S. EPA = United States Environmental Protection Agency

5. Lead organization: Naval Facilities Engineering Command Southeast (NAVFAC).

6. If any required SAP elements and required information are not applicable to the project or are provided elsewhere, then note the omitted SAP elements and provide an explanation for their exclusion below:

   - Not applicable, all worksheets are applicable

SAP WORKSHEET #3: DISTRIBUTION LIST

(UFP-QAPP Manual Section 2.3.1)

SAP Recipients	Organization	Mailing Address or Email Address
Stacin Martin	NAVFAC Atlantic	6506 Hampton Blvd, Bldg. A Norfolk, VA 23509
David Criswell	BRAC PMO SE	4130 Faber Place Drive, Suite 202 N. Charleston, SC 29405
Phil Flax	U.S. EPA, Region 2	RCRA Programs Branch 290 Broadway, 22nd Floor New York, NY 10007-1866
Doug Pocze	U.S. EPA, Region 2	290 Broadway, 22nd Floor New York, NY 10007-1866
Jose Font	U.S. EPA Caribbean Office	Centro Europa Building, Suite 417 1492 Ponce de Leon Ave Santurce, PR 00907-4127
Wilmarie Rivera	Puerto Rico Environmental Quality Board	1305 Avenida Ponce de Leon San Juan, PR 00907
Gloria Toro	Puerto Rico Environmental Quality Board	1305 Avenida Ponce de Leon San Juan, PR 00907
Pedro Ruiz	NAPR	pedro.ruiz1@navy.mil
Felix Lopez	U.S. Fish & Wildlife Service	Road 301 km 5.1 Boqueron, PR 00622
Pedro Tejada	RWEC	HC 72 Box 3744 Naranjito, PR 00719 ptejada@rightwaypr.com
Luis Rios	RWEC	HC 72 Box 3744 Naranjito, PR 00719 lrios@rightwaypr.com
Alejandro Rodriquez	RWEC	HC 72 Box 3744 Naranjito, PR 00719 arodriquez@rightwaypr.com
Felix Gonzalez	RWEC	HC 62 Box 3744 Naranjito, PR 00719 fgonzalez@rightwaypr.com

Notes:

SAP = Sampling and Analysis Plan
BRAC = Base Realignment and Closure Commission
PMO = Program Management Office
SE = Southeast
NAPR = Naval Activity Puerto Rico
NAVFAC = Naval Facilities Engineering Command
RCRA = Resource Conservation and Recovery Act
RPM = Remedial Project Manager
U.S. EPA = United States Environmental Protection Agency
RWEC = Right Way Environmental Contractors, Inc.

SAP WORKSHEET #4: PROJECT PERSONNEL SIGN-OFF SHEET

(UFP-QAPP Manual Section 2.3.2)

Certification that project personnel have read the text will be obtained by the following methods:

- E-mails will be sent to Navy, Right Way Environmental Contractors, regulatory agencies, and subcontractor project personnel, who will be requested to verify by e-mail that they have read the applicable SAP sections and the date on which they were reviewed. Copies of the verification e-mail will be included in the project files and identified in Worksheet #29. Copies of regulatory agency comments, if received, will be retained in the project files and are listed in Worksheet #29 as project records.

- A copy of the signed Worksheet #4 will be retained in the project files and identified as a project document in Worksheet #29.

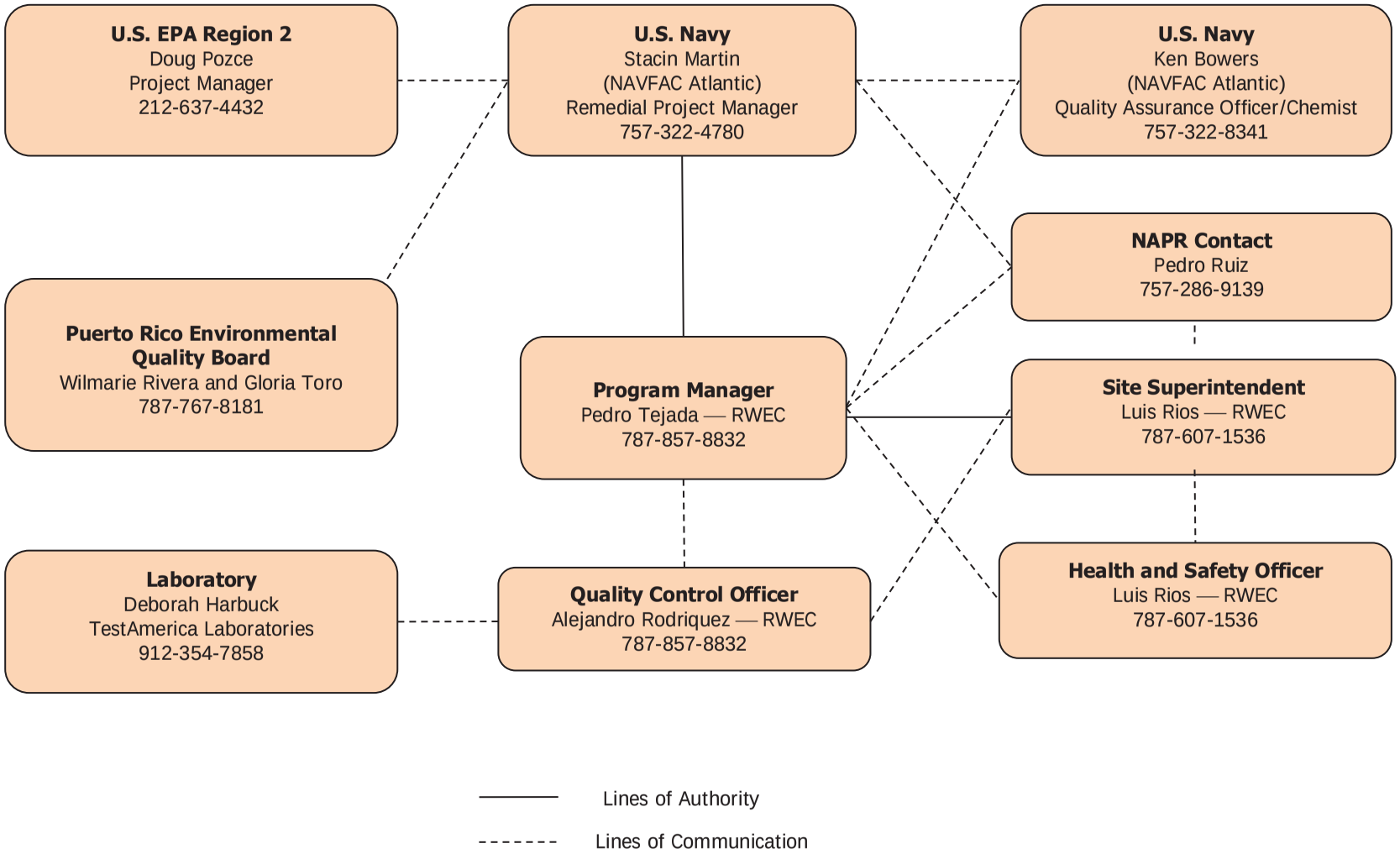
Project Personnel Sign-Off Sheet				
Name	**Organization/Title/Role**	**Signature/email receipt**	**SAP Section Reviewed**	**Date SAP Read**
Navy and Regulator Project Team Personnel				
Stacin Martin	NAVFAC Atlantic/RPM		All	
Doug Pocze	U.S. EPA, Region 2		All	
Wilmarie Rivera	Puerto Rico Environmental Quality Board		All	
Gloria Toro	Puerto Rico Environmental Quality Board		All	
Project Team Personnel				
Redro Tejada	RWEC/Program and Project Manager		All	
Alejandro Rodriquez	RWEC/Quality Control Officer		All	
Luis Rios	RWEC/Quality Control Systems Manager and Site Superintendent/Site Safety Officer		All	
Felix Gonzalez	RWEC/Health and Safety Manager		All	
Subcontractor Personnel				
Deborah Harbuck	TestAmerica Savannah/Project Manager		Worksheets #6, #12, #14, #15, #19, #23-28, #30, and #34-36	

Notes:

NAVFAC	=	Naval Facilities Engineering Command
RPM	=	Remedial Project Manager
U.S. EPA	=	U.S. Environmental Protection Agency
RWEC	=	Right Way Environmental Contractors, Inc.

SAP WORKSHEET #5: PROJECT ORGANIZATIONAL CHART

(UFP-QAPP Manual Section 2.4.1)



SAP WORKSHEET #6: COMMUNICATION PATHWAYS

(UFP-QAPP Manual Section 2.4.2)

The communication pathways for the SAP are shown below.

Communication Drivers	Responsible Entity	Name	Phone Number	Procedure (Timing, Pathway To/From, etc.)
Regulatory Agency Interface	Navy RPM	Stacin Martin	757-341-0478	The Navy RPM informs regulatory agency of work progress on a periodic basis.
Field Progress Reports	RWEC Site Superintendent RWEC Project/Program Manager Navy RPM	Luis Rios Pedro Tejada Stacin Martin	787-607-1536 787-857-8832 757-341-0478	RWEC Site Superintendent verbally informs the Project/Program Manager on a daily basis with field updates. Project/Program Manager provides a weekly update to the RPM either by phone message and/or e-mail each Friday afternoon while field activities are taking place.
Gaining Site Access	RWEC Site Superintendent NAPR POC	Luis Rios Pedro Ruiz	787-607-1536 757-286-9139	The RWEC Site Superintendent will contact the NAPR point of contact verbally or via e-mail at least 3 days prior to commencement of field work to arrange for access to the site for all field personnel.
Obtaining Utility Clearances for Intrusive Activities	RWEC Site Superintendent NAPR POC	Luis Rios Pedro Ruiz	787-607-1536 757-286-9139	The RWEC Site Superintendent will coordinate verbally or via e-mail with NAPR POC at least 14 days in advance of needing site access. RWEC will initiate the utility clearance process for all intrusive activities.
Stop Work due to Safety Issues	RWEC Site Superintendent/Site Safety Officer RWEC Project/Program Manager RWEC Health and Safety Manager Navy RPM NAPR POC	Luis Rios Pedro Tejada Felix Gonzalez Stacin Martin Pedro Ruiz	787-607-1536 787-857-8832 787-902-4972 757-341-0478 757-286-9139	Any field team member who observes an unsafe situation has the authority to stop work. The responsible party verbally informs the RWEC Site Superintendent, RWEC Project/Program Manager, and subcontractors within 1 hour on recommendation to stop work and within 24 hours of recommendation to restart work. Responsible party follows verbal notification with an e-mail to the Project Team within 24 hours. If a subcontractor is the responsible party, the subcontractor PM must verbally inform the RWEC SSO within 15 minutes, and the RWEC SSO will then follow the procedure listed above.
SAP Changes prior to Field/Laboratory Work	RWEC Project/Program Manager Navy RPM	Pedro Tejada Stacin Martin	787-857-8832 757-341-0478	Any change of the approved SAP will be made only upon authorization of the Navy RPM and regulatory agencies. The RWEC Project/Program Manager is responsible for initiating any SAP change requests via the communication channels described for the Navy and regulatory agencies.

Communication Drivers	Responsible Entity	Name	Phone Number	Procedure (Timing, Pathway To/From, etc.)
SAP Changes in the Field	RWEC Site Superintendent RWEC Project/Program Manager Navy RPM	Luis Rios Pedro Tejada Stacin Martin	787-607-1536 787-857-8832 757-341-0478	RWEC Site Superintendent informs RWEC Project/Program Manager verbally within same day; RWEC Project/Program Manager informs Navy RPM via e-mail within 24 hours; RWEC Project/Program Manager sends a concurrence letter to RPM, if warranted, within 7 calendar days and RPM signs the letter within 5 business days of receipt. Scope change is to be implemented before work is executed. Document the change on a field task modification request form (within 2 business days) or SAP amendment (within timeframe agreed to by Project Team). Any change of the approved SAP affecting the scope or implementation of the sampling program will be made only upon authorization of the Navy RPM and regulatory agencies.
Field Corrective Actions	RWEC Site Superintendent RWEC Project/Program Manager Navy RPM	Luis Rios Pedro Tejada Stacin Martin	787-607-1536 787-857-8832 757-341-0478	RWEC Site Superintendent informs RWEC Project/Program Manager verbally within same day; RWEC Project/Program Manager informs Navy RPM via e-mail within 24 hours that corrective actions have been implemented. Corrective actions will be documented in weekly progress reports
Recommendations to Stop Work and Initiate Work upon Corrective Action	RWEC Site Superintendent RWEC Project/Program Manager RWEC Quality Control Systems Manager Navy RPM	Luis Rios Pedro Tejada Luis Rios Stacin Martin	787-607-1536 787-857-8832 787-607-1536 757-341-0478	Responsible party verbally informs the Project/Program Manager, RWEC Site Superintendent, and subcontractors within 1 hour of recommendation to stop work and within 24 hours of recommendation to restart work. Responsible party follows verbal notification with an e-mail to the Project Team within 24 hours.
Sample Receipt Variances	Laboratory PM RWEC Site Superintendent RWEC Project/Program Manager RWEC Quality Control Officer	Deborah Harbuck Luis Rios Pedro Tejada Alejandro Rodriquez	912-354-7858 787-607-1536 787-857-8832 787-553-7444	The Laboratory PM will notify (verbally or via e-mail) the RWEC Quality Control Officer and RWEC Site Superintendent immediately upon receipt of any chain of custody/sample receipt variances for clarification or direction from the RWEC Quality Control Officer or RWEC Site Superintendent. The RWEC Site Superintendent will notify (verbally or via e-mail) the RWEC Project/Program Manager within 1 business day, if corrective action is required. The RWEC Project/Program Manager will notify (verbally or via e-mail) the Laboratory PM and the RWEC Site Superintendent within 1 business day of any required corrective action.

Communication Drivers	Responsible Entity	Name	Phone Number	Procedure (Timing, Pathway To/From, etc.)
Analytical Corrective Actions	Laboratory PM RWEC Quality Control Officer	Deborah Harbuck Alejandro Rodriquez	912-354-7858 787-553-7444	The laboratory shall notify the RWEC Quality Control Officer of any analytical data anomaly within 1 business day of discovery. After the laboratory receives guidance from RWEC Quality Control Officer, the laboratory shall initiate any corrective action to prevent further anomalies.
Analytical Data Quality Issues	Laboratory PM RWEC Quality Control Officer RWEC Project/Program Manager Navy RPM	Deborah Harbuck Alejandro Rodriquez Pedro Tejada Stacin Martin	912-354-7858 787-553-7444 787-857-8832 757-341-0478	The laboratory PM notifies (verbally or via e-mail) the RWEC Quality Control Officer within 1 business day of when an issue related to laboratory data is discovered. RWEC Quality Control Officer notifies RWEC Project/Program Manager within 1 business day. RWEC Quality Control Officer notifies the RWEC Project/Program Manager verbally or via e-mail within 48 hours of validation completion that a non-routine and significant laboratory quality deficiency has been detected that could affect this project and/or other projects. RWEC Project/Program Manager verbally advises the Navy RPM within 24 hours of notification from the chemist. The Navy RPM takes corrective action that is appropriate for the identified deficiency. The Navy RPM, may at his discretion, contact the Navy Quality Control Officer/Chemist for assistance in problem resolution. If there are significant data quality or non-useable data issues the Navy Quality Control Officer/Chemist will be contacted to ensure the issues do not have the potential to impact other Navy projects.
Reporting Data Validation Issues/ Data Validation Corrective Actions	RWEC Quality Control Officer RWEC Project/Program Manager	Alejandro Rodriquez Pedro Tejada	787-553-7444 787-857-8832	The RWEC Quality Control Officer or data validator will perform validation as specified in Worksheets #34, #35, and #36, and will contact the laboratory as soon as possible if issues are found that require corrective action. If the RWEC Quality Control Officer or data validator identifies non-usable data during the data validation process requiring corrective action, the RWEC Project/Program Manager will coordinate with the RWEC Quality Control Officer to take corrective action appropriate for the identified deficiency to ensure the project objectives are met. Corrective action may include resampling and/or reanalyzing the affected samples, as determined by the RWEC Project/Program Manager.

Communication Drivers	Responsible Entity	Name	Phone Number	Procedure (Timing, Pathway To/From, etc.)
Notification of Non-Usable Data	Laboratory PM RWEC Quality Control Officer RWEC Project/Program Manager Navy RPM	Deborah Harbuck Alejandro Rodriquez Pedro Tejada Stacin Martin	912-354-7858 787-553-7444 787-857-8832 757-341-0478	If the laboratory determines that any data they have generated is non-usable, the Laboratory PM will notify (verbally or via e-mail) the RWEC Quality Control Officer within 1 business day of when the issue is discovered. The RWEC Quality Control Officer will notify (verbally or via e-mail) RWEC Project/Program Manager within 1 business day of the need for corrective action if the non-usable data is a significant issue (i.e., critical sample data). Corrective action may include resampling and/or reanalyzing the affected samples. If a RWEC Quality Control Officer or data validator identifies non-usable data during the data validation process, the Project/Program Manager will be notified verbally or via e-mail within 48 hours of validation completion that a non-routine and significant laboratory quality deficiency has resulted in non-usable data. The RWEC Project/Program Manager will take corrective action appropriate for the identified deficiency to ensure the project objectives are met. The RWEC Project/Program Manager will notify (verbally or via email) the Navy RPM on any problems with the laboratory or analysis that could significantly affect the usability of the data or project failures that impact the ability to complete the scope of work. The Navy RPM, may at their discretion, contact the Navy Quality Control Officer/Chemist for assistance in problem resolution. Such notification will be made within 1 business day of when the issue is discovered.

Notes:

RPM = Remedial project manager
PM = Project Manager
POC = Point of Contact
SSO = Site safety officer
SAP = Sampling and analysis plan
RWEC = Right Way Environmental Contractors, Inc.
NAPR = Naval Activity Puerto Rico

SAP WORKSHEET #7: PERSONNEL RESPONSIBILITIES TABLE

(UFP-QAPP Manual Section 2.4.3)

Name	Title/Role	Organizational Affiliation	Responsibilities
Stacin Martin	Remedial Project Manager	NAVFAC Atlantic	Oversees project implementation, including scoping, data review, and evaluation.
Pedro Ruiz	Point of Contact	Naval Activity Puerto Rico	Oversees Base activities, including field work coordination, scoping, data review, and evaluation.
Doug Pocze	Project Coordinator	U.S. EPA Region 2	Participates in scoping, data review, evaluation, and review of the SAP. Oversees project execution for U.S. EPA.
Wilmarie Rivera		Puerto Rico Environmental Quality Board	Participates in scoping, data review, evaluation, and review of the SAP. Oversees project execution for Puerto Rico Environmental Quality Board.
Gloria Toro		Puerto Rico Environmental Quality Board	Participates in scoping, data review, evaluation, and review of the SAP. Oversees project execution for Puerto Rico Environmental Quality Board.
Pedro Tejada	Program/Project Manager	RWEC	Oversees project, financial, schedule, and technical day to day management of the project.
Luis Rios	Site Superintendent	RWEC	As the Site Superintendent, supervises, coordinates, and performs field sampling activities.
Luis Rios	Site Safety Officer	RWEC	As the Site Safety Officer, is responsible for onsite project-specific health and safety training and monitoring site conditions.
Felix Gonzalez	Health and Safety Manager	RWEC	Responsible for providing health and safety training for all personnel and approving the site-specific Health and Safety Plan.
Alejandro Rodriquez	Quality Control Officer	RWEC	As Quality Control Officer, prepares laboratory scopes of work and coordinates laboratory related functions with laboratory. Performs or oversees data quality reviews and quality assurance of data validation deliverables. As Quality Control Officer, ensures quality aspects of the project are implemented, documented, and maintained; performs or oversees data input in both the project database and the Navy's Naval Installation Restoration Information Solution database. Analyzes and presents analytical data. Coordinates mapping of data.
Deborah Harbuck	Laboratory Project Manager	TestAmerica	Coordinates analyses with laboratory chemists, ensures that scope of work is followed, provides quality review of data packages, and communicates with Resolution Consultant project staff.

Notes:

NAVFAC = Naval Facilities Engineering Command
SAP = Sampling and analysis plan
U.S. EPA = United States Environmental Protection Agency
RWEC = Right Way Environmental Contractors, Inc.

SAP WORKSHEET #8: SPECIAL PERSONNEL TRAINING REQUIREMENTS TABLE

(UFP-QAPP Manual Section 2.4.4)

No special personnel training are required for this project.

SAP WORKSHEET #9: PROJECT SCOPING SESSION PARTICIPANTS SHEET

(UFP-QAPP Manual Section 2.5.1)

Worksheet not applicable. There were no scoping sessions, and the ICM is being implemented as documented in the approved Statement of Basis/Final Proposed Remedy Decision for SWMU 56 (Baker 2012).

SAP WORKSHEET #10: CONCEPTUAL SITE MODEL

(UFP-QAPP Manual Section 2.5.2)

This worksheet presents a site description, history, and a conceptual site model (CSM) for SWMU 56 at the Naval Activity Puerto Rico (NAPR), as initially presented in the *Final Corrective Measures Study Report, SWMU 56, Naval Activity Puerto Rico, Ceiba, Puerto Rico* (Baker 2011). The site description and history are provided both for NAPR in general and for SWMU 56 in particular in the following sections. The CSM describes potential contamination routes and possible exposure pathways to humans and ecological receptors at SWMU 56, and serves as the basis for the proposed Interim Corrective Measure (ICM). The ICM will be performed to mitigate threats to ecological health posed by soil and sediment. Land Use Controls (LUC) will be instituted to mitigate threats to human health. Decision rules for all sampling associated with the ICM are described in Worksheet #11.

10.1 Site Description

NAPR occupies over 8,800 acres along Vieques Passage on the northern side of the east coast of Puerto Rico, and includes the nearby islands of Piñeros and Cabeza de Perro, as shown on Figure 10-1. The northern entrance to NAPR is about 35 miles east along the coast road (Route 3) from San Juan. The property consists of 3,938 acres of upland, developable property and 4,955 acres of environmentally sensitive areas consisting of wetlands, mangrove, and wildlife habitat. The closest large town is Fajardo (population approximately 37,000), which is about 5 miles north of NAPR. Ceiba (population approximately 17,000) adjoins the west boundary of NAPR (see Figure 10-1). SWMU 56, also known as Environmental Condition of Property (ECP) Site 2, covers an area of approximately 1.3 acres and is located on the south side of Ofstie Field, a large-scale airfield in the north-central portion of the facility. The site is on the northwest side of Hangar 200, and consists of a portion of concrete apron, an adjacent concrete-lined drainage ditch and surrounding soils, as shown on Figures 10-2 and 10-3.

10.2 Site History

The facility was commissioned in 1943 as a Naval Operations Base, and re-designated a Naval Station in 1957. Naval Station Roosevelt Roads (NSRR) operated as a Naval Station from 1957 until 31 March 2004. NSRR was one of the largest naval facilities in the world with more than 100 miles of paved roads, approximately 1,300 buildings, a large-scale airfield (Ofstie Field), a deep water port, and over 30 tenant commands. NSRR provided communication support to the Atlantic and Caribbean areas and also served as a major training site for fleet exercises.

NSRR underwent operational closure on 31 March 2004 and is now designated as Naval Activity Puerto Rico. The mission of NAPR is to comply with environmental regulations.

In anticipation of operational closure of NSRR, NAVFAC Atlantic conducted an ECP investigation to document the environmental condition of the facility. The investigation identified new sites at NAPR based on a review of records, an analysis of historical aerial photographs, physical site inspections, and interviews with persons familiar with past and current operations and activities. SWMU 56 was identified as ECP Site 2 based on aerial photography analysis that indicated stains/liquid extending off the edge of the hardstand to a surrounding drainage ditch from 1958-65 (Figure 10-3). The records review confirmed that Hangar 200 was historically used for aircraft maintenance. Former use of the concrete apron as an aircraft wash down area is considered likely. The preliminary site investigation did not observe any significant stains or stressed vegetation; however, interviews confirmed numerous past spills of petroleum, oils, and lubricant (POL) and hazardous materials from the1950s to the 1990s. The U.S.EPA issued a RCRA § 7003 Administrative Order (U.S. EPA Docket No. RCRA-02-2007-7301), which identifies SWMU 56 as having documented releases of solid and/or hazardous waste and hazardous constituents and requiring an acceptable work plan to complete site characterization and a CMS to determine the final remedy. Following a public comment period the Consent Order became effective on 29 January 2007.

Ownership of the airfield parcel (Ofstie Airfield) was transferred from the United States Navy to the Puerto Rico Ports Authority on 7 February 2008. The Ports Authority developed the airfield into a regional airport. However, in accordance with the Administrative Order, the Covenant Deferral request and Quitclaim Deed of transfer, the US Navy maintains responsibility for the investigation and cleanup of SWMU 56.

A summary of investigations that have taken place at SWMU 56 are provided in the following section.

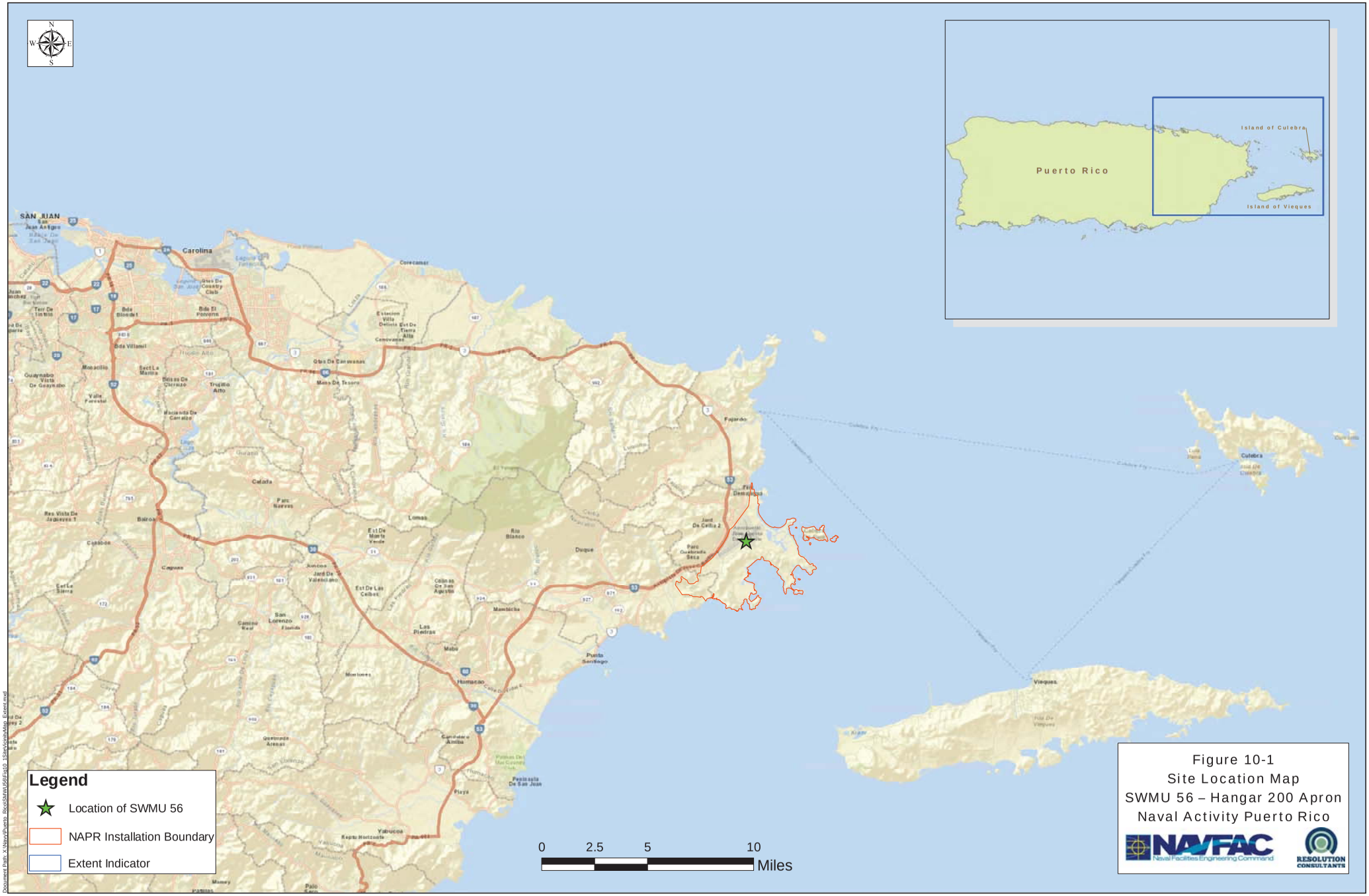


Figure 10-1
Site Location Map
SWMU 56 – Hangar 200 Apron
Naval Activity Puerto Rico

NAVFAC Naval Facilities Engineering Command
RESOLUTION CONSULTANTS

Document Path: X:\Navy\Puerto_Rico\SWMU56\Fig10_1SiteVicinityMap_Extent.mxd

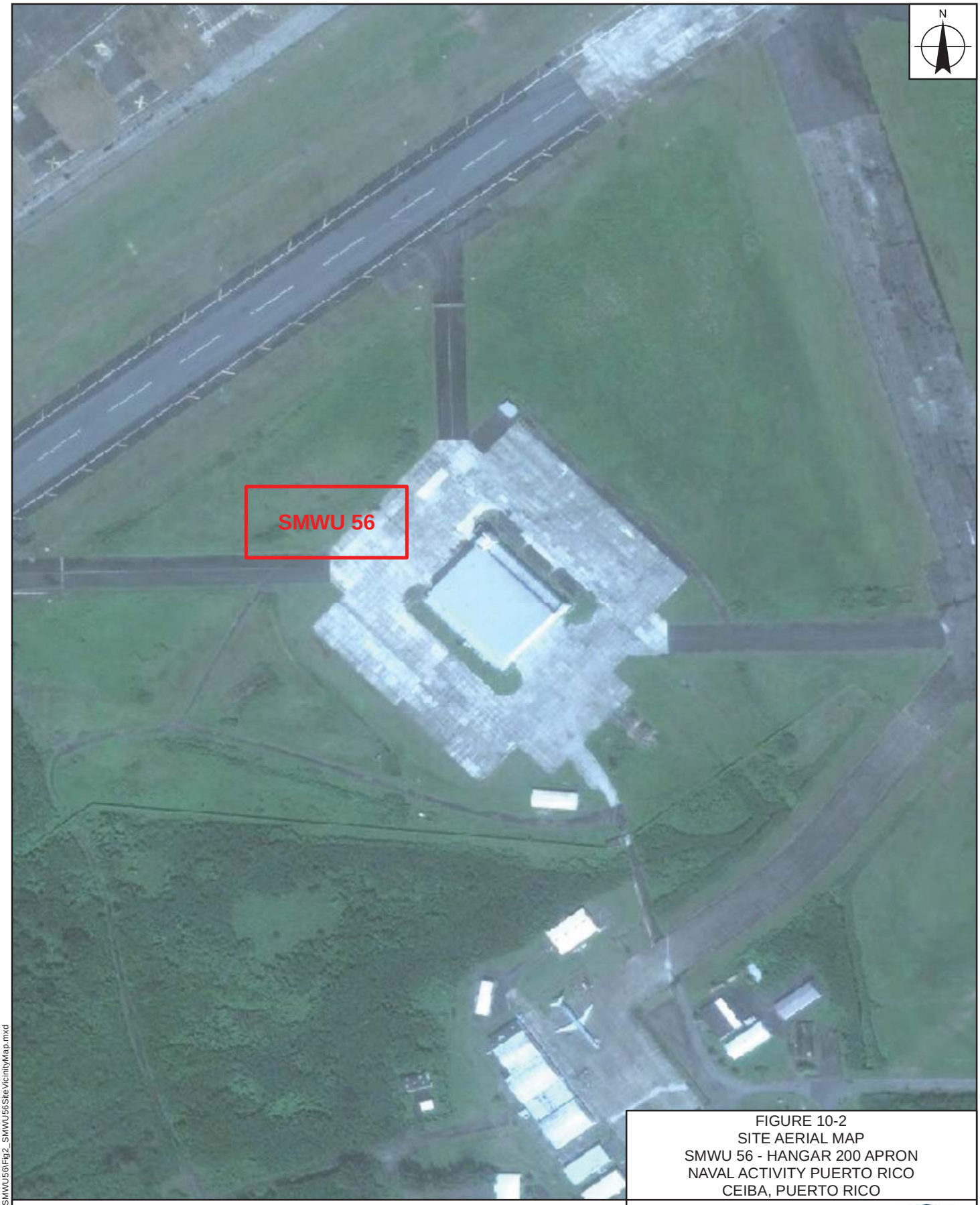


FIGURE 10-2
SITE AERIAL MAP
SMWU 56 - HANGAR 200 APRON
NAVAL ACTIVITY PUERTO RICO
CEIBA, PUERTO RICO

-Study Area

0 75 150 225 300
Feet

Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

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REQUESTED BY: H. GOVENOR	DATE: 7/18/2013
DRAWN BY: M. SENNE	TASK ORDER NUMBER: JM41

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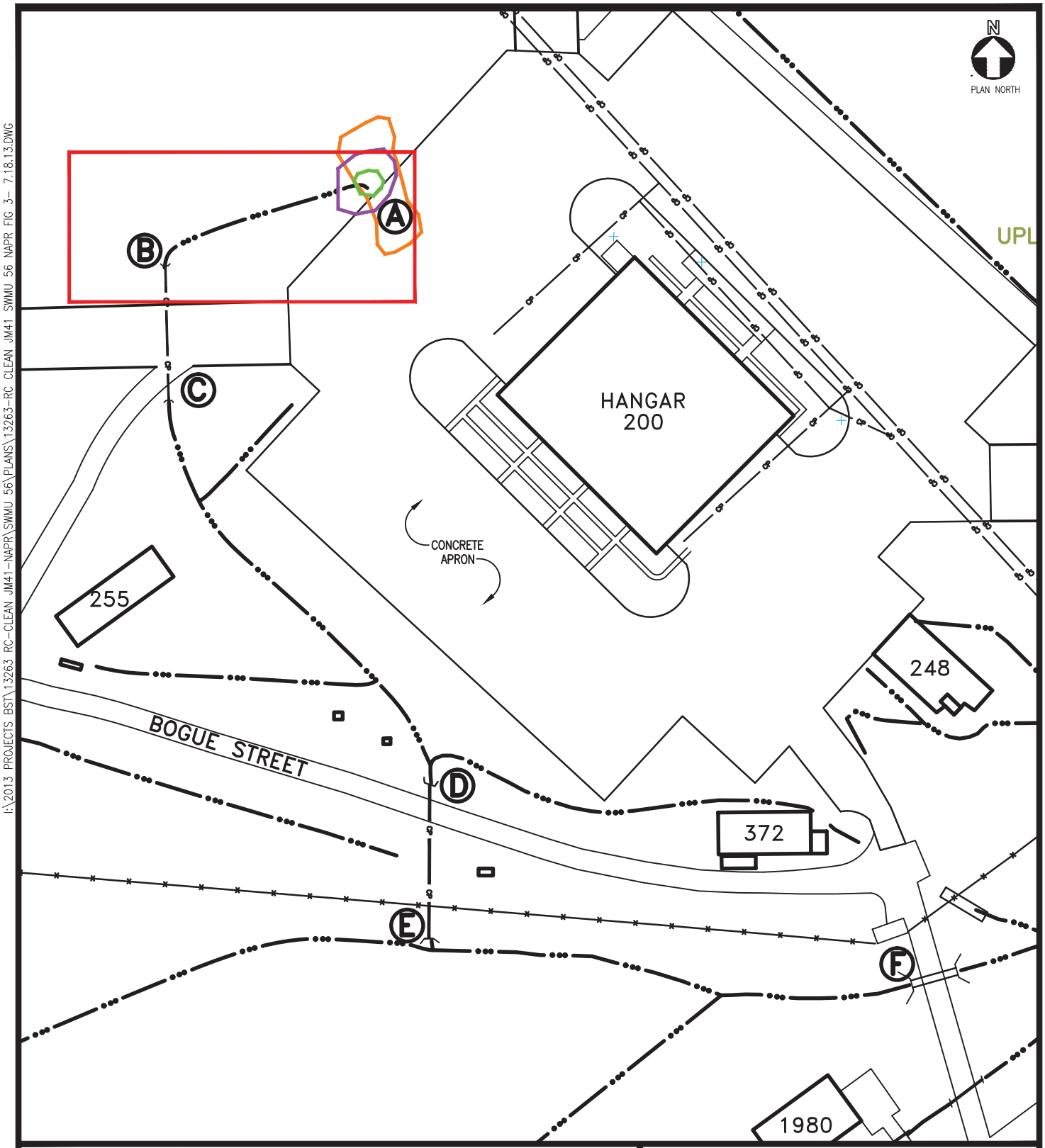

SMWU BOUNDARY
1958 POLYGON FEATURE
1961 POLYGON FEATURE
1964 POLYGON FEATURE

NOTE: POLYGON FEATURES INDICATE AREAS OF DISTURBANCE IDENTIFIED IN HISTORICAL PHOTOGRAPHS.

CP — CULVERT, EXISTING
HEADWALL, EXISTING
DRAINAGE SWALE, EXISTING
SECURITY FENCE, EXISTING
VEGETATION, EXISTING

0 150 300
SCALE IN FEET

FIGURE 10-3
SITE LAYOUT MAP
SMWU 56 - HANGAR 200 APRON
NAVAL ACTIVITY PUERTO RICO
CEIBA, PUERTO RICO

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REQUESTED BY: H.G.	DWG DATE: 07/18/13
DRAWN BY: J.L.	DWG NO: 13263

I:\2013 PROJECTS BST\13263 RC-CLEAN JM41-NAPR\SWMU 56\PLANS\13263-RC CLEAN JM41 SWMU 56 NAPR FIG 3- 7.18.13.DWG

10.3 Previous Investigations

Previous investigations at the site include:

- *Phase I Environmental Condition of Property Report, U.S. Naval Station Roosevelt Roads, Ceiba, Puerto Rico* (NAVFAC Atlantic 2004) – The Draft Phase I ECP identified new sites at NAPR based on a review of records, an analysis of historical aerial photographs, physical site inspections, and interviews with persons familiar with past and current operations and activities. The new ECP sites had not been previously identified or investigated under existing environmental program areas. As noted above, SWMU 56 was identified as ECP Site 2 based on aerial photography analysis, records review, and interviews. Hangar 200 was historically used for aircraft maintenance, and former use of the concrete apron as an aircraft wash down area is considered likely.

- *Final Phase I/II Environmental Condition of Property Report, Former U.S. Naval Station Roosevelt Roads, Ceiba, Puerto Rico* (NAVFAC Atlantic 2005) – Environmental sampling was performed at designated ECP sites in 2004 to determine if a release/disposal occurred and, if so, whether any potential risk to human health was present. Sampling at SWMU 56 included surface water and sediment samples collected within the concrete-lined drainage swale. Sampling indicated contamination related to heavy metal and fuel contamination had impacted the environment. The Final Phase II ECP Report recommended additional sampling of SWMU 56 under the RCRA Corrective Action/IRP process.

- *Final Corrective Measures Study Report - SWMU 56, Naval Activity Puerto Rico, Ceiba, Puerto Rico* (CMS) (Baker 2011) – The CMS field investigation took place in May 2008, with additional sampling in September 2008 and June 2009 to delineate the extent of contamination in surface soil, subsurface soil, groundwater, and drainage ditch surface water and sediment.

The CMS included ecological and human health risk assessments. The ecological risk assessment (ERA) evaluated surface soil (0.0 to 1.0 ft below ground surface [bgs]), subsurface soil from 1.0 to 3.0 ft bgs, groundwater, surface water, and sediment data. Ecological receptors included lower trophic level aquatic and terrestrial receptors, and avian herbivores, omnivores, and carnivores. The ERA identified cadmium and lead as ecological COCs in surface soil, and barium, cadmium, chromium, lead, and zinc as ecological COCs in sediment within the drainage ditch. No chemicals were identified as ecological COCs for subsurface soil, groundwater or drainage ditch surface water.

Corrective action objectives (CAOs) were developed as described in the CMS (Baker 2011). These CAOs are presented in Table 10-1 (surface soil) and Table 10-2 (sediment).

Table 10-1
Surface Soil Corrective Action Objectives

Chemical	CAO (mg/kg)
Cadmium	1.8
Lead	96

Notes:
CAO = Corrective Action Objectives
mg/kg = Milligrams per kilograms

Table 10-2
Sediment Corrective Action Objectives

Chemical	CAO (mg/kg)
Barium	214
Cadmium	0.99
Chromium	65
Lead	35.8
Zinc	152

Notes:
CAO = Corrective Action Objectives
mg/kg = Milligrams per kilograms

The human health risk assessment (HHRA) evaluated surface soil (0.0 to 1.0 ft bgs), combined surface and subsurface soil (0.0 to 6.0 ft bgs), groundwater, surface water, and sediment data. Receptors evaluated included adult and youth (6-16 years) trespassers, adult and young child (1-6 years) residents, industrial/commercial workers, and construction workers. No further actions in the form of corrective measures were recommended for site media based on risk to future residential receptors, trespassers, construction workers, or industrial/commercial workers. However, because risk estimates exceeded target limits for the future child residential receptor, unrestricted land use could not be recommended. Therefore, an institutional control restricting future residential land and groundwater use was developed as a qualitative human health CAO for SWMU 56. The selected remedy for the site is excavation of contaminated surface soil (0.0 to 1.0 ft bgs) and contaminated sediment (0.0 to the base of the lined ditch or 1.0 ft bgs), and an institutional control restricting future residential land and groundwater use. Areas planned for excavation are indicated in Figure 10-4 (Conceptual Site Model), Figure 10-5 (surface soil) and Figure 10-6 (sediment). CAOs identified in Tables 10-1 and 10-2 were used to develop remedial areas/remedial volumes.

10.4 Geology, Hydrogeology, and Hydrology

General Geology

Puerto Rico is a volcanic island platform which is part of an island chain known as the Greater Antilles. It is located along the leading edge (northernmost portion) of the Caribbean tectonic plate and adjacent the Puerto Rico Trench which is the deepest point in the Atlantic Ocean. The island of Puerto Rico and the Puerto Rico Trench are the result of an active plate boundary zone in which the North American plate is converging (obliquely) with and subducting beneath the Caribbean plate. Typically, subduction occurs at convergent boundaries in which one plate (the more dense plate) is forced beneath another. However, subductive forces in this area are a secondary component to transform (strike-slip) plate boundary forces as the Caribbean plate is sliding east past the west-moving North American plate (USGS 2013a).[1] While subductive forces are subordinate to transform forces on the regional level, subductive forces have played a significant role in the formation of the Greater Antilles Islands and the Puerto Rico Trench, as well as regional geology underlying the island of Puerto Rico. Both transform and subductive plate boundary forces in this region of the Caribbean have been active since the late Cretaceous period (USGS 2013a). Tectonic activity along the plate boundary is still ongoing and has resulted in numerous large magnitude earthquakes and tsunamis– a great earthquake (magnitude 8.0) struck Puerto Rico in 1946 and a magnitude 7.0 earthquake struck Haiti (another Greater Antilles Island approximately 300 miles west of Puerto Rico) in 2010.

Volcanic activity resulting from subductive forces along with regional tectonic forces greatly contributed to the formation of the Greater Antilles Islands. As a result, Puerto Rico was separated from the other Greater Antilles Islands by block faulting while arching, uplifting, and realignment to the northeast also occurred. The islands of Culebra, Vieques, and the Virgin Islands are also part of the Puerto Rico block; however, they are separated from the main island as a result of transgressional sea level changes. Volcanism on Puerto Rico was active from the late Cretaceous period (approximately 65 million years ago) to the middle Paleogene period (Eocene epoch)[Morelock, 2000].

[1] For additional details, reference the United States Geological Survey (USGS) Woods Hole Science Center website on Carribbean Tsunami and Earthquake Hazards Studies, http://woodshole.er.usgs.gov/project-pages/caribbean/index.html

A mountainous region with a core of volcanic and batholithic deposits runs east/west just south of the centerline of the island (Morelock 2000). This mountainous region dominates the regional geology of Puerto Rico and is flanked on the north and south by alluvial fans, limestone, and classic coastal deposits (Morelock 2000). The northern coastal plain is wider than its counterpart with most of the island's surface water draining to the north (University of Puerto Rico 2013).[2] The north and south coasts are composed of Paleogene limestones and Quaternary deposits including: alluvial plains, sand dunes, beachrock, and eolianites. The Paleogene limestone deposits tend to be karstified while the Quaternary limestones are weakly cemented and erode easily. The east and west coasts are both dominated by rocky shorelines; however, the west coast is underlain by interbedded limestone and volcanoclastic deposits alternating with alluvial valley and beach deposits, as well as mangrove shorelines (Morelock, 2000). The east coast is composed of volcanic and intrusive igneous rocks alternating with similar patterns of alluvial deposits as those observed along the west coast (Morelock 2000).

Site Geology

The general underlying geology of east region of Puerto Rico, including NAPR, is predominantly volcanic (early Cretaceous massive andesitic interbedded volcanoclastic breccia, lava, sandstone, and crystalline tuff) and intrusive igneous (lower Paleogene/late Cretaceous porphyritic diorite) rocks interbedded with (discontinuous Paleogene and Quaternary limestones as well as Quaternary alluvial deposits (M'Gonigle 1977). These rocks have been complexly faulted and folded, as well as intruded by granodiorites, resulting from tectonic activities and forces affecting the region since the late Cretaceous period (M'Gonigle 1977). Additionally, unconsolidated alluvial sediments (including marine and beach sediments) have been deposited upon the volcanic and igneous formations across much of the east coastal region of Puerto Rico. The primary geology beneath NAPR in order from ground surface to depth include: beach deposits, alluvium, quartz diorite and granodiorite, quartz keratophyre, the Daguao Formation (maximum estimated thickness 3,280 feet), and the Figuera Lava (maximum estimated thickness 6,560 feet) (USGS 2013b).[3]

[2] University of Puerto Rico's Department of Geology Coastal Papers, http://geology.uprm.edu/Morelock/wcpr.htm
[3] USGS Mineral Resources On-Line Spatial Data website at http://mrdata.usgs.gov/geology/pr/]

The Peña Pobre fault zone traverses NAPR (trending southwest/northeast from Humacao). The fault zone is a secondary fault zone associated with the Cerro Mula Fault Zone (an east/west trending fault zone located approximately 6 miles southwest of NAPR) which dominates much of the geology and topography of the eastern half of Puerto Rico (M'Gonigle 1977). These fault zones are directly related to Cretaceous hydrothermal alteration (or low grade metamorphism associated with igneous batholithic intrusions) (M'Gonigle 1977).

NAPR can be divided into three general topographic areas:

- Upland areas
- Near-shore flat lands
- Inland flat lands

The upland areas of NAPR includes the hills encompassing the Tow Way Fuel Farm and hospital areas, as well as the hills encompassing the area behind the Exchange, the former Atlantic Fleet Weapons Training Facility (AFWTF) Command, and Fort Bundy area. These upland areas are underlain by bedrock (predominately Gabbro) and exhibit varying degrees of weathering. Typically, the bedrock is overlain by a relatively thin layer of unconsolidated soil, or residuum sand, silt, and clay originating from weathered-in-place bedrock. .

The near-shore areas include the mangrove swamp areas as well as the shores of Ensenada Honda and Puerca Bay. The near-shore areas are typically underlain by marine/coastal deposits (with coral and shell fragments), silt and clay layers, and occasional peat layers. In some near-shore areas, particularly by the harbor and Camp Moscrip in the southeastern portion of the base, fill material overlays the marine layers. The fill consists of rock fragments, debris (e.g., brick), sand, silt, and clay.

The inland flat land area generally encompasses the airfield and golf course areas. The inland flat land area is typically underlain by relatively thick residuum. The residuum generally consists predominately of clay. Fill material overlays the residuum in some areas, particularly the airfield, and generally consists of sand and gravel with lesser amounts of silt and clay.

SWMU 56 is located in the airfield area, which lies is within the inland flat area discussed above. During the CMS investigation, subsurface sampling included the advancement of several soil borings (ranging in depths from 15 to 28 feet bgs) adjacent to SWMU 56 and along the

drainage ditch extending around the perimeter of the Hangar 200 building's concrete apron west, south, and southeast (discussed in detail in Section 10.4 Site Hydrology). Geologic data from the soil borings yielded a general stratigraphic sequence: a thin layer of topsoil made up of dark brown silty or sandy loam and gravel was observed within 0.5 to 1.5 feet bgs, typically followed by significant layers of clay and/or silty clay to termination depth. The clay and silty clay encountered in the soil borings was typically light gray to white intermixed with maroon or dark reddish brown clay. Occasionally, a change to a greenish gray lithology was observed resembling a more saprolitic, or weathered bedrock characteristic. Additionally, saprolite laminar conditions were occasionally noted at approximately 20 feet below ground surface in the area west of SWMU 56.

Site Hydrogeology

Little information outside the data obtained during the 2008 CMS investigation exists concerning the hydrogeology of NAPR. The only known potential sources of groundwater lie in lenticular beds of clay, sand and gravel, and rock fragments, which occur at a depth of less than 100 feet. Groundwater yields for monitoring wells installed during 2008 CMS investigation activities in the vicinity of SWMU 56 were low, with an estimated pumping rate of less than one gallon per minute.[4] Shallow groundwater in the vicinity of SWMU 56 appears to be derived from underlying clays and silty clays and is most likely controlled by localized vertical fracturing at surficial and shallow depths (Parker 1999). Some monitoring wells were pumped dry during development using low flow rates, while yield was consistent at low flow rates for other monitoring wells. Depth to groundwater was observed to be three to four feet bgs in the area of SWMU56 and less than five feet bgs along the ditch line west, south, and southeast of the Hangar 200 concrete apron.

The groundwater flow direction at SWMU 56 is towards the southeast with an average gradient of 0.005. By multiplying the average hydraulic conductivity obtained from the slug tests with the hydraulic gradient calculated from the contours, and dividing by an assumed effective porosity, an average groundwater flow velocity is calculated as 0.031 feet/day. The effective porosity for the fractured shallow clays was assumed to be 30 percent. This groundwater flow velocity value does not take into account flow retardation factors or contaminant physical properties, but gives a general potential contaminant transport rate.

[4] These wells included SWMU 56 wells and wells near the drainage ditch extending around the perimeter of the Hangar 200 building's concrete apron (west, south, and southeast)

Site Hydrology

There are no surface water features in the vicinity of SWMU 56; however, storm water generally flows northwest to southeast via laminar flow across paved and vegetated surfaces to drainage ditches and swales and through culverts eventually discharging into the Caribbean Sea. The portion of the apron northwest of Hangar 200 is sloped to the northwest in order to direct storm water flow to a central discharge feature consisting of a curbed/bermed area along the edge of the apron to divert water into a shallow concrete channel (approximately eighteen inches wide and six inches deep). The channel (Segment A to B on Figure 10-3) slopes gently away from the apron area and trends west and southwest for approximately 248 feet toward a 24-inch diameter culvert (Segment B to C on Figure 10-3). The culvert routes storm water flow under the western taxiway where it discharges into an earthen drainage ditch several feet wide with sloped sides (Segment C to D on Figure 10-3). The depth of the drainage ditch at the downstream end of the culvert (south of the taxiway) is estimated to be between 8 and 12 feet.

The earthen drainage ditch extends approximately 533 feet southeast and south, past the southwestern portion of the Hangar 200 apron to a 36-inch diameter culvert that carries the flow under Bogue Street (Segment D to E on Figure 10-3). A small drainage ditch discharges to this reach from the west. The 36-inch diameter culvert routes the flow south, under Bogue Street, where the flow is again discharged into an earthen drainage ditch. Flow continues east and southeast another 527 feet (Segment E to F on Figure 10-3) to a double 4-foot by 8-foot box culvert under an airfield access road (east of point F on Figure 10-3). Additional flows enter the drainage ditch along this reach from the west and southwest. Flow continues northeast in the earthen drainage ditch approximately 376 feet where it is comingled with flows from other portions of the airfield and routed into triple 5-foot by 9-foot box culverts. Flow is transmitted south through a series of box culverts and earthen drainage ditches approximately 822 feet to a discharge point in a vegetated area adjoining an E2SS3 wetland (estuarine, intertidal, scrub-shrub, broad-leaved evergreen wetland). The area of interest for this CSM is drainage ditch segments A through F (Figure 10-3).

10.5 Conceptual Site Model

The conceptual site model describes current site conditions relating to contaminants of concern and potential migration and exposure risks. Based on the findings of the ECP and CMS, releases at SWMU 56 associated with historical airport activities including aircraft maintenance have resulted in surface soil and sediment contamination that may pose a threat to current and future receptors. Figure 10-4 presents a graphical site conceptual model (CSM) which identifies the source area and primary transport mechanisms.

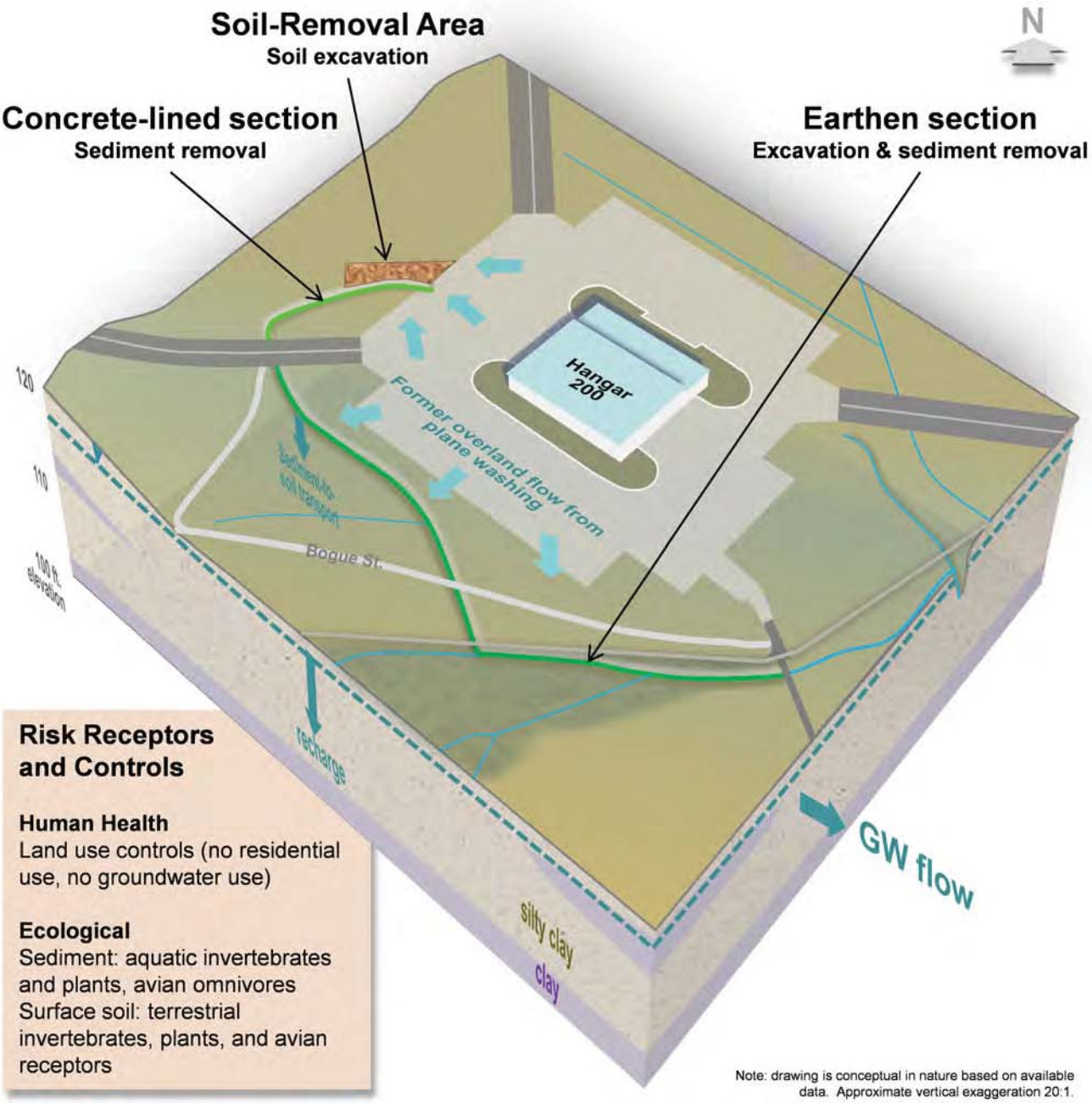

FIGURE 10-4
CONCEPTUAL SITE MODEL
SWMU 56 - HANGAR 200 APRON
NAVAL ACTIVITY PUERTO RICO
CEIBA, PUERTO RICO

NAVFAC Naval Facilities Engineering Command
RESOLUTION CONSULTANTS

REQUESTED BY: H. GOVENOR	DATE: 8/22/2013
DRAWN BY: L. HUGHES	JM41

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Service Layer Credits:

10.5.1 Nature and Extent of Contamination

The ECP and CMS investigations assessed surface soil, subsurface soil, sediment, groundwater, and surface water contamination at and downgradient of SWMU 56. Investigations and subsequent risk assessments identified the following COPCs:

- Surface soil (0- to 1-foot bgs) — cadmium, lead
- Sediment (0- to 1-foot bgs) — barium, cadmium, chromium, lead, zinc

CAOs identified in Tables 10-1 and 10-2 were used to develop remedial footprints and volumes. Figure 10-5 shows the extent of soil exceeding CAOs proposed for removal in the ICM. Approximately 464.2 cubic yards of soil in two excavation areas covering a combined 12,541 square feet exceed cadmium and/or lead CAOs and are planned for excavation and offsite disposal. Figure 10-6 shows the extent of sediment within the drainage ditch exceeding CAOs for barium, cadmium, chromium, lead, and/or zinc. Approximately 237.5 cubic yards of sediment along a length of 1622.52 feet of drainage way are planned for excavation and offsite disposal.

In addition, based on ECP and CMS investigations, institutional controls prohibiting residential land and groundwater use at the SWMU will be implemented. No corrective actions were recommended for groundwater, surface water, or subsurface soil.

10.5.2 Contaminant Migration Pathways

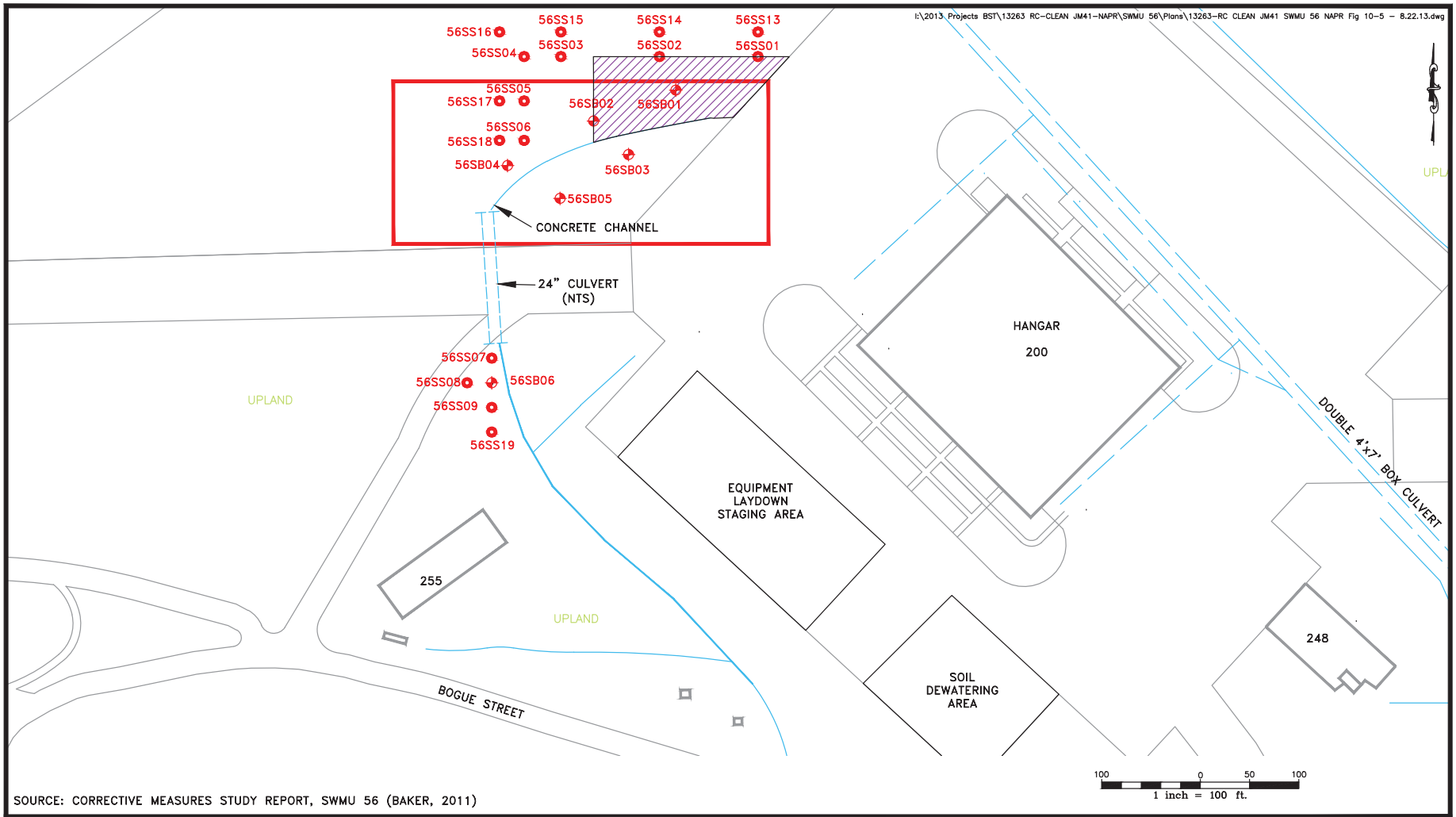
Based on findings of the ECP and CMS investigations, the source of contamination at SWMU 56 is spills and releases of POL related to historical aircraft maintenance activities at SWMU 56. Contamination impacted surface soil adjacent to the Hangar 200 concrete apron and sediment within the drainage way downgradient of the Site. Transport and migration pathways include overland flow and runoff from precipitation events.

10.5.3 Exposure Pathways and Potential Receptors

Potential risk to human receptors was indicated under a residential exposure scenario. This exposure pathway will be eliminated with institutional controls restricting residential land use and groundwater consumption.

Ecological receptors including terrestrial plants, invertebrates, and avian receptors may be adversely affected by cadmium and lead in surface soils adjacent to the site. Exposure pathways include direct contact with contaminated soils, and consumption of plant and prey items within the

impacted area. Aquatic ecological receptors including plants, invertebrates, and avian omnivores may be adversely affected by barium, cadmium, chromium, lead, and zinc in drainage ditch sediment. Exposure pathways include direct contact with contaminated sediment and consumption of food items within the contaminated area. Corrective action at the site (excavation of contaminated soil and sediment) will remove exposure pathways to contaminated media and protect ecological health at the Site. Planned excavations are indicated in Figures 10-5 (surface soil) and 10-6 (sediment).



SOURCE: CORRECTIVE MEASURES STUDY REPORT, SWMU 56 (BAKER, 2011)

LEGEND

- —DRAINAGE DITCH
- —SWMU BOUNDARY
- —CULVERTS
- —CMS INVESTIGATION SOIL BORING AND GROUNDWATER SAMPLE LOCATIONS (APRIL 2008)
- —SURFACE SOIL SAMPLES (SEPTEMBER 2008)
- —AREA OF SURFACE SOIL EXCAVATION (0–1')

APPROXIMATE SURFACE AREA	APPROXIMATE DEPTH	APPROXIMATE VOLUME	
(SQUARE FEET)	(FEET)	(CUBIC FEET)	(CUBIC YARDS)
11,916	1	11,916	441.3

FIGURE 10-5
CONCEPTUAL DESIGN FOR SURFACE SOIL EXCAVATION
SMWU 56 - HANGAR 200 APRON
NAVAL ACTIVITY PUERTO RICO

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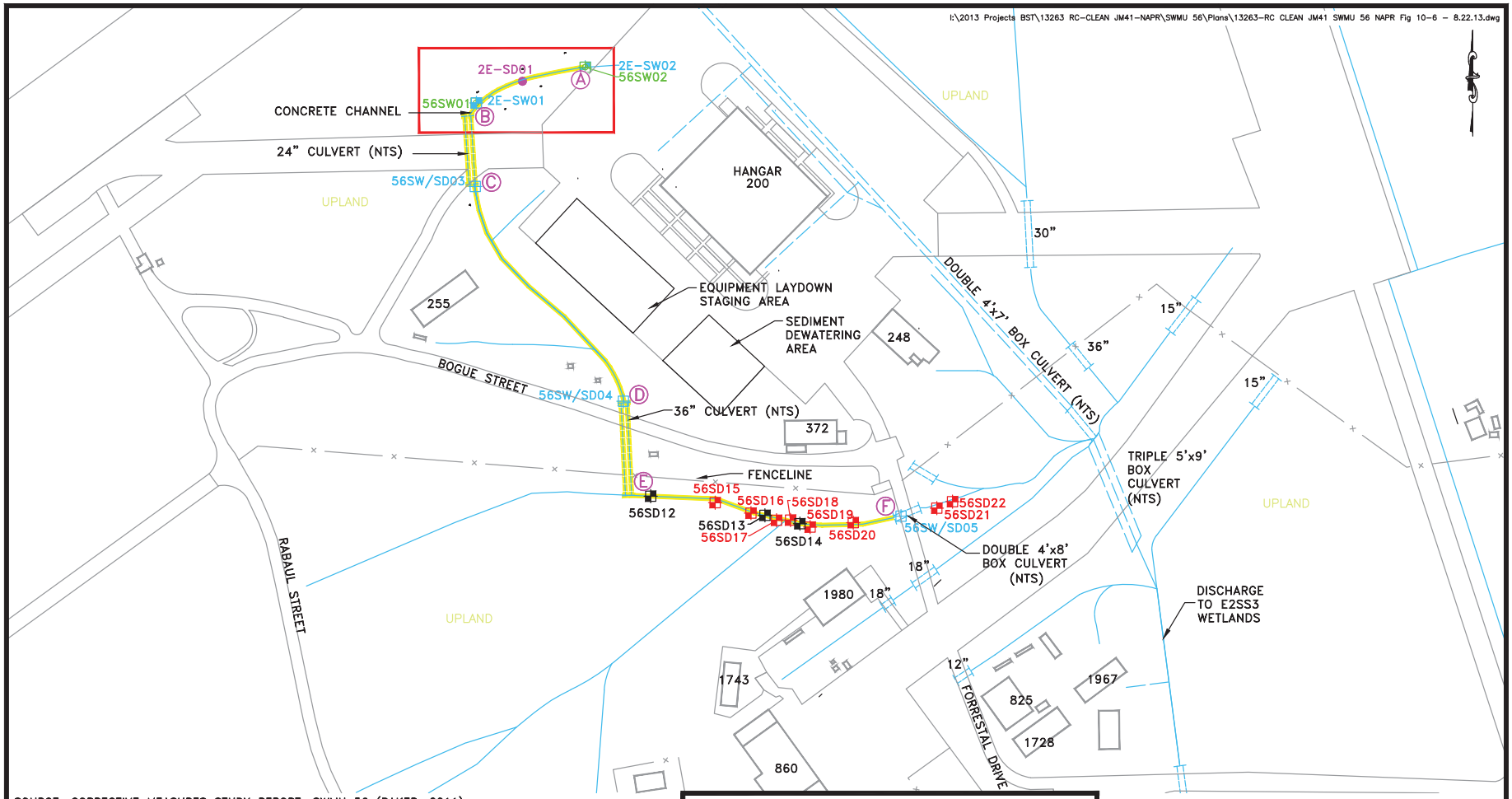

SOURCE: CORRECTIVE MEASURES STUDY REPORT, SWMU 56 (BAKER, 2011)

DITCH SEGMENT	DESCRIPTION	APPROXIMATE LENGTH (FEET)	ESTIMATED WIDTH (FEET)	ESTIMATED DEPTH (FEET)	ESTIMATED VALUE OF CONTAMINATED SEDIMENT (CUBIC FEET)	(CUBIC YARDS)
Ⓐ – Ⓑ	CONCRETE LINED	248.14	1.5	0.08	29.8	1.1
Ⓑ – Ⓒ	24" DIA CULVERT	133.4	2	0.08	5.3	0.2
Ⓒ – Ⓓ	SOIL	532.76	4	1.0	2,132	79
Ⓓ – Ⓔ	36"DIA. CULVERT	181.37	3	0.17	30.77	1.1
Ⓔ – Ⓕ	SOIL	526.85	4 TO 8	1.0	4,216	156.1
				TOTALS	6,413.9	237.5

DRAINAGE DITCH / SEDIMENT EXCAVATION

LEGEND

- –SWMU BOUNDARY
- –DRAINAGE DITCH
- –PREVIOUS SURFACE WATER SAMPLE LOCATION, 2004
- –PREVIOUS COMPOSITE SEDIMENT SAMPLE FROM ENTIRE LENGTH OF DRAINAGE DITCH, 2004
- –CMS INVESTIGATION SURFACE WATER AND SEDIMENT SAMPLE LOCATION (APRIL 2008)
- –CMS INVESTIGATION SURFACE WATER SAMPLE LOCATIONS (APRIL 2008)
- –SEDIMENT SAMPLES (SEPTEMBER 2008)
- –SEDIMENT ADDITIONAL DATA COLLECTION (JUNE 2009)
- –CULVERTS

FIGURE 10-6
CONCEPTUAL DESIGN FOR SEDIMENT EXCAVATION
SMWU 56 - HANGAR 200 APRON
NAVAL ACTIVITY PUERTO RICO

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SAP WORKSHEET #11: PROJECT QUALITY OBJECTIVES/SYSTEMATIC PLANNING PROCESS STATEMENTS

(UFP-QAPP Manual Section 2.6.1)

Project quality objectives (PQOs) were developed based on the U.S. EPA document, *Guidance for Systematic Planning Using the DQO Process* (U.S. EPA 2006).

11.1 Problem Statement

Results generated during previous investigations indicate that soil and sediment were impacted by historical releases from airport maintenance operations near Hangar 200, and that these contaminated media may adversely impact ecological receptors. Potential human health impacts from groundwater and soil are indicated, and will be alleviated via institutional controls restricting residential land use and groundwater consumption. As determined in the CMS and documented in the *Interim Corrective Measures Work Plan, SWMU 56 — Hangar 200 Apron* (ICM Work Plan), the contaminated soil and sediment will be removed, characterized in accordance with Commonwealth and Federal laws, and disposed of at an offsite facility.[1]

11.2 Goals of the Study

The goal of the ICM is to remove impacted soil and sediment and therefore remove the potential risk to ecological receptors.

The principal study question (PSQ) for the soil removal action developed to define decision statements to resolve the problem is: Do COPC concentrations in confirmation samples collected from soil excavation side walls exceed Project Action Limits (PALs) (presented in Section 11.3 and Worksheet #15) with the potential to pose unacceptable ecological risks, thus requiring follow-up action?

Based on this PSQ, the following project decision statement has been developed:

For the soil removal action, confirmation samples will be collected to confirm that the lateral extent of the contamination has been removed (i.e., that cadmium and lead concentrations in side wall samples are less than Project Action Limits (PALs), which are equivalent to CAOs).

[1] Sampling and analytical requirements associated with waste characterization are discussed in the ICM Work Plan and in the associated specifications.

For the sediment removal action, no specific PSQ is defined because the planned sediment excavation will removal all sediment to a depth of one foot or to the top of the lined channel barrier, thus removing the risk to ecological receptors. No confirmation samples for sediment are proposed.

11.3 Inputs to Problem Resolution

The inputs needed to resolve the project problem statement identified in Section 11.1 include the following measurements, observations, data, and PALs:

- Confirmation Sampling: Soil will be collected and analyzed for cadmium and lead to determine the concentration of target analytes present in the remaining soil after removal of contaminated media. The concentrations of detected target analytes will be compared to their respective PALs as part of the evaluation to support the decision making process. Details of the sampling design are presented in Worksheet #17.

- Project Action Limits: Chemical data will be compared to PALs, as summarized in Worksheet #15, to determine if COPCs remain above the CAO (Baker 2011) after excavation of contaminated soil.

Note that Worksheet #15 PALs are only developed for soil, as no sediment samples will be collected during excavation activities. Therefore, only Table 10-1 (soil CAOs) are used.

11.4 Define the Study Boundaries

The physical boundaries of the ICM include the excavation areas noted on Figures 10-5 and 10-6 and support area, site control zones, construction staging areas for waste storage, erosion control regions, access routes, and decontamination area. The locations of these areas are indicated in Design Drawings (Appendix A of the ICM Work Plan).

The project schedule/timeline is presented in Worksheet #16.

11.5 Analytical Approach

The need for follow-up action will be based on whether analytical results from soil confirmation samples (e.g., sidewall samples) exceed PALs.

Decision rule #1: If a COPC at a sampling point exceeds its PAL, then that sampling point will be considered within the extent of contamination and the excavation boundary will be reassessed (i.e., point compliance).

Decision rule #2: If a COPC is below its PAL, then that sampling point will define soil outside the extent of contamination and will confirm that the extent of contamination was removed.

11.6 Performance or Acceptance Criteria

The objective of this section is to complete the following:

- Identify potential sources of study error (i.e., field error, analytical error)
- Identify the methods used to reduce potential sources of error
- Determine how decision errors will be managed during the project

Study error can be managed and/or minimized in many ways, but is primarily addressed through use of standard field techniques to minimize field error. In this project, the COPCs are inorganics in soil and sediment. The soil sampling design was developed to confirm that the lateral extent of the contamination has been removed.

11.6.1 Total Study Error

Sources of error in the ICM confirmation sampling program may be divided into two main categories: sampling errors and measurement errors. A sampling error occurs when the sampling design, planning, and implementation do not provide for a representative range of heterogeneity at the site. A measurement error occurs because of performance variance from laboratory instrumentation, analytical methods, and operator error. The U.S. EPA identifies the combination of all these errors as a "total study error" (U.S. EPA 2006). One objective of the investigation is to reduce the total study error so that decision-makers can be confident that the data collected accurately represent the chemical characteristics of the site.

Possible decision errors will be minimized during the confirmation sampling by using the following methods:

- Use standard field sampling methodologies (as discussed in Worksheets #18 and #21).

- Use applicable analytical methods and standard operating procedures (SOPs) for sample analysis by a competent analytical laboratory having state appropriate National Environmental Laboratory Accreditation Program (NELAP) accreditation, and accredited through the Department of Defense Environmental Laboratory Accreditation Program (DoD ELAP).

- Confirm analytical data to identify and control potential laboratory error and sampling error by using spikes, blanks, and replicated samples.

11.6.2 Decision Error

The ICM confirmation sampling program will utilize decision-error minimization techniques in sampling design, sampling methodologies, and laboratory measurement of COPCs. Decision errors associated with judgmental sampling are based on sample design and measurement errors. Assuming that the best possible professional judgment was used to develop the judgmental sampling plan (i.e., sampling locations), the most important decision errors will be associated with field and laboratory techniques involved in the collection and analysis of the data.

To ensure an accurate record of field sampling methodology and any nonconformities from the sampling plan or obstacles faced, field logbooks will be kept by field personnel. All sample information will be transcribed into a field logbook and/or onto field data sheets.

11.6.3 Analytical Laboratory Sample Management

The sample matrix, number of samples, and number and type of laboratory quality assurance (QA)/quality control (QC) samples are summarized in Worksheets #18, 19, 20, and 30. These worksheets include details on the analytical group, sample volumes, sample container specifications, preservation requirements, and maximum holding times.

The laboratory will provide electronic data deliverable files, portable document format files of the data deliverables for all project data, and a hard copy of data deliverables for all results. Designated samples will be used to obtain necessary subsamples for laboratory QC measurements (i.e., analytical sample duplicate and sample matrix spike/matrix spike duplicate [MS/MSD]). Tasks will be completed using the laboratory SOPs.

A third party validator to be named at a later date will provide data validation services and verify and evaluate the usability of the data, as described in Worksheets #34 through #36.

Portable document format copies of all analytical data packages will be stored on CD-ROM, archived in the NAVFAC Atlantic Administrative Record, and uploaded onto the Naval Installation Restoration Information Solution (NIRIS) system at the close of the project. All other data generated in the field and reports generated for the project will be stored as computer readable data files by RWEC.

11.7 Data Collection Plan

The sample design and rationale is presented in Worksheet #17. Confirmation samples will be collected and analytical data for COPCs will be compared to PALs on a point-compliance basis.

SAP WORKSHEET #12: FIELD QUALITY CONTROL SAMPLES

(UFP-QAPP Manual Section 2.6.2)

Measurement Performance Criteria Table — Field QC Samples				
QC Sample	**Analytical Group**	**Frequency**	**Data Quality Indicators**	**Measurement Performance Criteria**
Field Duplicate	Metals	10%	Accuracy	Relative Percent Difference ≤ 30
Equipment Blank	Metals	As needed[1]	Contamination	No analytes ≥ ½ LOQ, except common laboratory contaminants, which must be < LOQ.
Matrix Spike/Matrix Spike Duplicate	Metals	5%	Accuracy/Bias/Precision	Percent recoveries 80-120 Relative Percent Difference ≤ 20

Notes:
[1]Equipment blanks will be submitted in cases where there is shared sampling equipment that requires decontamination.
LOQ = Limit of quantitation
QC = Quality control

SAP WORKSHEET #13: SECONDARY DATA CRITERIA AND LIMITATIONS TABLE

(UFP-QAPP Manual Section 2.7)

Worksheet not applicable.

SAP WORKSHEET #14: SUMMARY OF PROJECT TASKS

(UFP-QAPP Manual Section 2.8.1)

The following project tasks are summarized below:

- Field Tasks
- Analytical Tasks
- Data Management and Review

FIELD TASKS

Mobilization/Demobilization — Mobilization includes procurement of field equipment and supplies; a site walkover; mobilization of field staff, equipment, and supplies to the site; and site set-up. The Navy remedial project manager (RPM) will be notified of Right Way Environmental Contractors, Inc. (RWEC) mobilizations a minimum of one week before the start of field activities.

A field team orientation meeting will be conducted prior to starting the fieldwork to familiarize the team personnel with the site-specific health and safety requirements, the objectives and scope of the field activities, and chain of command. This meeting will be attended by the field staff and conducted by the project manager or site superintendent.

A site walkover will be conducted prior to field activities. The field team will identify related field support areas and requirements.

Demobilization includes removing field equipment and supplies from the site, returning rented equipment, managing investigative derived waste (IDW), performing general site cleanup, organizing and finalizing field paperwork, and entering field records/data into the database.

Utility Clearance — RWEC will take necessary measures to protect existing structures, facilities, and utilities that may be affected by removal and cleanup activities. Before intrusive work is initiated at the sites, 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. RWEC will be responsible for locating and clearing utilities. Utility markings will be maintained throughout construction activities. RWEC will avoid unnecessary disturbance of all utilities and will protect any utilities that may be impacted by the corrective measures implementation.

Decontamination — Non-disposable equipment that comes into contact with the sample medium will be decontaminated to prevent cross-contamination between sampling points. Equipment will be decontaminated by dry means (e.g., brushes, shovels) and/or with a power washer and water-soap solution. Solids will be collected and disposed with the waste soil, and liquids will be containerized, characterized, and disposed appropriately.

Sample Collection and Sample Handling Tasks

The sampling and analysis program is outlined in Worksheet #18. Sample collection and handling will be in accordance with the SOPs listed in Worksheet #21. Sample containers will be provided in "certified-clean" condition (I-Chem 300 or equivalent) from the analytical laboratory. The selection of sample containers, sample preservation, packaging, and shipping will be in accordance with Worksheets #19 and #30. Field and laboratory QC samples will be collected as outlined in Worksheet #20.

Confirmation Soil Sampling

Confirmation soil samples will be collected by trowel. Samples will be collected as discrete grab samples. The areas to be sampled will be cleared of any surface debris (e.g., leaves, twigs). A properly decontaminated stainless steel trowel will be used to remove the confirmation soil sample material from 0 to 12 inches from the wall of the excavation and transfer it to the appropriate sample container.

The sample identifications, date, and time will be marked on the container with an indelible marker. Required information will be entered on the Soil Sample Log Sheet and the Chain-of-Custody Form. Excess soil will be returned to the excavation side wall area, and the trowel will be decontaminated between discrete samples.

Investigative-Derived Waste — IDW includes excavated soils and sediment, decontamination fluid, used personal protective equipment (PPE), used disposable sampling equipment, etc. For removed soil and sediment, the excavated material will be placed directly into plastic sheeting in preparation for transport to and disposal at a Navy- and U.S. EPA-approved facility. Stockpile areas will be covered with 8-mil polyethylene sheeting at the end of each day to prevent excess moisture from precipitation and to prevent runoff caused by rain events. Stockpile areas will be inspected weekly or after rain events for storage area integrity, and inspection comments will be noted on the daily quality control report. Disposable PPE and disposable sampling equipment/materials will be disposed of as general refuse at an approved disposal location.

Wastes including environmental media and decontamination fluids will be characterized for toxicity characteristics. The characterization process to be used for IDW generated onsite is outlined in U.S. EPA's *Management of Investigation-Derived Wastes* (SESDPROC-202-R2, 15 October 2010). Classification of IDW will also follow the regulations as published in 40 CFR Part 261. Once the IDW is characterized, a determination will be made as to the material's proper management.

Analytical Laboratory Tasks

Chemical analysis of soil confirmation samples will be performed by a subcontracted laboratory, TestAmerica Savannah. TestAmerica Savannah is DoD ELAP accredited; their certificate is in Appendix B. Analyses will be performed in accordance with the analytical methods specified in Worksheet #19. TestAmerica Savannah will strive to meet the project action levels as shown in Worksheet #15 and will perform chemical analyses following laboratory-specific SOPs cited on Worksheet #23.

Data Handling and Management — After field work is completed, the field sampling log sheets will be organized by date and media and filed in the project files. The field logbooks for this project will be used only for this site, and will also be categorized and maintained in the project files after the completion of the field program.

Data Review and Validation — A third party data validator will be contracted to verify the completeness of analytical laboratory results, as specified on Worksheet #34. To ensure that the analytical results meet the project quality objectives, the confirmation sample data will undergo validation, without raw data review, as cited in Worksheets #34 through #36. The usability assessment processes are described in Worksheet #37.

After the data are validated, a list of nonconformities will be generated. For situations in which several quality control criteria are out of specification, the data validators may make professional judgments and/or comments on the validity of the overall data package. In situations where the validity of an entire data package is in question, it may be necessary for the sample(s) to be reanalyzed. The validator will prepare a technical memorandum presenting changes in the data, if necessary, and the rationale for making such changes. The final data validation report will include a technical memorandum, qualified analytical results, results reported by the laboratory, and documentation to support data qualification. All data that require qualification will be flagged with an appropriate qualifying symbol.

Data Tracking and Control — The program manager (or designee) is responsible for the overall tracking and control of data generated for the project. Data are tracked from their generation to archiving in the project specific files. The quality control officer (or designee) is responsible for tracking the samples collected and shipped to the contracted laboratory. Upon receipt of the data packages from the analytical laboratory, the quality control officer will oversee the data validation effort, which includes verifying that the data packages are complete and that results for all samples have been delivered by the analytical laboratory.

RWEC shall submit all Administrative Record Files, Site Files, and Post Decision Files in accordance with the specifications defined in the NAVFAC Environmental Restoration Recordkeeping Manual. Additionally, RWEC will update and manage the project related documents, data, and maps in NIRIS. Project related spatial data including maps, models, and associated collected or created data will also be uploaded into NIRIS. All documentation submittals for NIRIS will be coordinated with the RPM.

SAP WORKSHEET #15: REFERENCE LIMITS AND EVALUATION TABLES

(UFP-QAPP Manual Section 2.8.1)

Matrix:	Soil						
Analytical Group:	Metals						
Analyte	**CAS No.**	**Project Action Level (mg/kg)**	**Project Action Level Source**	**Project Quantitation Limit Goal (mg/kg)**	**Laboratory Limit of Quantitation[1] (mg/kg)**	**Laboratory Limit of Detection[1] (mg/kg)**	**Laboratory Method Detection Limit[1] (mg/kg)**
Lead	7439-92-1	96	SWMU 56 CMS[2]	32	1	0.53	0.53
Cadmium	7440-43-9	1.8	SWMU 56 CMS[2]	0.6	0.5	0.2	0.1

Notes:
[1] Laboratory quantitation, detection, and method detection limits are provided by TestAmerica, Savannah laboratory and may vary during the course of the sampling events.
[2] Project Action Levels were determined in the Corrective Measures Study report (Baker 2011).
CAS = Chemical Abstract Service identifier
CMS = Corrective Measures Study
SWMU = Solid waste management unit
mg/kg = Milligrams per kilogram

SAP WORKSHEET #16: PROJECT SCHEDULE/TIMELINE TABLE (OPTIONAL FORMAT)

(UFP-QAPP Manual Section 2.8.2)

Date Start	Date End	Number Of Days	Task
TBD	TBD	1	Notice to Proceed
TBD	TBD	546	**CMI Design Package and Project Plans**
TBD	TBD	90	Pre-Draft Remedial Design Package
TBD	TBD	21	Navy Review
TBD	TBD	14	Draft Remedial Design Package
TBD	TBD	90	Regulator Review
TBD	TBD	30	Address Regulators Comments on Draft
TBD	TBD	60	Draft Final Remedial Design Package
TBD	TBD	90	Regulator Review
TBD	TBD	60	Final Remedial Design Package
TBD	TBD	90	Regulator Review
TBD	TBD	1	Work Approval/Notice to Proceed
TBD	TBD		**Corrective Action**
TBD	TBD	15	Mobilization
TBD	TBD	4	Field Staking of Contaminated Areas
TBD	TBD	7	Approval of Field Staked Areas
TBD	TBD	14	Excavation and Staging
TBD	TBD	14	Confirmation and Characterization Sampling and Analysis
TBD	TBD	7	Transportation and Off-Site Disposal
TBD	TBD	5	Backfill and Revegetation
TBD	TBD	4	Demobilization
TBD	TBD		**CMI Closeout Report**
TBD	TBD	60	Draft Closeout Report
TBD	TBD	90	Regulator Review
TBD	TBD	60	Final Closeout Report
TBD	TBD	90	Regulator Review and Approval

Notes:

CMI = Corrective measures implementation
TBD = To be determined

SAP WORKSHEET #17: SAMPLING DESIGN AND RATIONALE

(UFP-QAPP Manual Section 3.1.1)

17.1 Sampling Approach

As described in Worksheet #11, the nature and extent of contamination and the potential risks to human health and the environment have been previously assessed. Contaminated media will be removed and disposed of at an offsite facility. Sampling strategies are designed to confirm that contaminated soil has been removed to a sufficient depth to mitigate the ecological risk associated with the known nature and extent of contamination. Findings will support a decision concerning whether or not future action is required.

This worksheet presents the design and rationale of the sampling and analysis program to be conducted during the ICM for confirmation sampling. The sampling approach, based on professional judgment, is biased to determine the boundaries of contamination identified during previous investigations. Specifically, the sampling plan was developed using information from historical investigations, corrective actions and the preliminary CSM presented in Worksheet #10. A summary table, including sample identification numbers, depth, relevant SOPs, and applicable laboratory and field analyses, is included as Worksheet #18. SOPs for field activities are summarized in Worksheet #21 and detailed in Appendix A. Professional judgment may be used to adjust sampling locations and/or depths in the field. Examples of criteria which may lead to changes to the sampling plan may include (but are not limited to) visual observations, odors, etc.

Samples collected during the ICM will be submitted to TestAmerica for chemical analyses. Analytical methods are identified in Worksheet #23. Laboratory SOPs are listed in Worksheet #23. The total numbers of sample analyses to be performed for each target analyte or analytical group are identified in Worksheets #18 and #20. Worksheets #19 and #30 present a summary of the sample analyses, container types and volumes, preservation requirements, and holding times.

Planned field QC samples will include field duplicates and equipment rinsate blanks. Worksheet #12 presents the field QC sample summary. Additional sample volume will be collected as necessary for laboratory QC analysis of MS/MSD samples.

17.2 Soil Sampling Program

Up to 26 confirmation soil samples will be taken from the sidewalls of the two excavation areas (as shown in Figure 10-5). The samples will be collected at a frequency of one sample every 25 linear feet or portion of 25 linear feet along the sidewall or a minimum of one sample per

sidewall. No bottom samples will be collected, as the maximum excavation depth of one foot was established by the ecological risk assessment. Confirmation samples will be analyzed for cadmium and lead by method SW846-6010B.

17.3 Sediment Sampling Program

Confirmation samples in the sediment excavated areas are not required. Any contamination in excess of the CAOs that remains below the one-foot excavation will not pose a risk to deeper ecological receptors because the excavation will be lined with geotextile, backfilled with 6 inches of compacted low permeability soil, and armored with 6 inches of riprap.

SAP WORKSHEET #18: LOCATION-SPECIFIC SAMPLING METHODS/SOP REQUIREMENTS TABLE

(UFP-QAPP Manual Section 3.1.1)

Sampling Location/ID Number	Matrix	Depth (foot bgs)	Analytical Group[1]	Sampling SOP Reference
56SSA01 (Area A north wall)	Soil	1	Metals	SOP Surface Soil Sampling
56SSA02 (Area A north wall)	Soil	1	Metals	SOP Surface Soil Sampling
56SSA03 (Area A north wall)	Soil	1	Metals	SOP Surface Soil Sampling
56SSA04 (Area A north wall)	Soil	1	Metals	SOP Surface Soil Sampling
56SSA05 (Area A north wall)	Soil	1	Metals	SOP Surface Soil Sampling
56SSA06 (Area A north wall)	Soil	1	Metals	SOP Surface Soil Sampling
56SSA07 (Area A north wall)	Soil	1	Metals	SOP Surface Soil Sampling
56SSA08 (Area A north wall)	Soil	1	Metals	SOP Surface Soil Sampling
56SSA09 (Area A south wall)	Soil	1	Metals	SOP Surface Soil Sampling
56SSA10 (Area A south wall)	Soil	1	Metals	SOP Surface Soil Sampling
56SSA11 (Area A south wall)	Soil	1	Metals	SOP Surface Soil Sampling
56SSA12 (Area A south wall)	Soil	1	Metals	SOP Surface Soil Sampling
56SSA13 (Area A south wall)	Soil	1	Metals	SOP Surface Soil Sampling
56SSA14 (Area A south wall)	Soil	1	Metals	SOP Surface Soil Sampling
56SSA15 (Area A east wall)	Soil	1	Metals	SOP Surface Soil Sampling
56SSA16 (Area A east wall)	Soil	1	Metals	SOP Surface Soil Sampling
56SSA17 (Area A east wall)	Soil	1	Metals	SOP Surface Soil Sampling
56SSA18 (Area A east wall)	Soil	1	Metals	SOP Surface Soil Sampling
56SSA19 (Area A west wall)	Soil	1	Metals	SOP Surface Soil Sampling
56SSA20 (Area A west wall)	Soil	1	Metals	SOP Surface Soil Sampling
56SSA21 (Area A west wall)	Soil	1	Metals	SOP Surface Soil Sampling

Sampling Location/ID Number	Matrix	Depth (foot bgs)	Analytical Group[1]	Sampling SOP Reference
56SSA22 (Area A west wall)	Soil	1	Metals	SOP Surface Soil Sampling
56SSB01 (Area B north wall)	Soil	1	Metals	SOP Surface Soil Sampling
56SSB02 (Area B south wall)	Soil	1	Metals	SOP Surface Soil Sampling
56SSB03 (Area B west wall)	Soil	1	Metals	SOP Surface Soil Sampling
56SSB04 (Area B east wall)	Soil	1	Metals	SOP Surface Soil Sampling
56DS (Field Duplicate 1)[2]	Soil	1	Metals	SOP Surface Soil Sampling
55DS (Field Duplicate 2)[2]	Soil	1	Metals	SOP Surface Soil Sampling
55DS (Field Duplicate 3)[2]	Soil	1	Metals	SOP Surface Soil Sampling

Notes:
SOP = Standard Operating Procedure
bgs = Below ground surface
[1] Soils will be analyzed for cadmium and lead only.
[2] Field duplicates will be indicated by media code "DS" (duplicate soil), with the 5th and 6th characters indicating sample location.

SAP WORKSHEET #19: FIELD SAMPLING REQUIREMENTS TABLE

(UFP-QAPP Manual Section 3.1.1)

Matrix	Analytical Group[1]	Analytical and Preparation Method/ SOP Reference	Containers (number, size, and type)	Sample Volume (grams)	Preservation Requirements (chemical, temperature, light protected)	Maximum Holding Time[2] (preparation/ analysis)
Soil	Metals	EPA SW846 6010B/SA-ME-051, SA-ME-070	one 4 oz jar	10	none	180 days

Notes:

1 Soils will be analyzed for cadmium and lead only.

2 Maximum holding time is calculated from the time the sample is collected to the time the sample is prepared/extracted.

SOP = Standard Operating Procedure

SAP WORKSHEET #20: FIELD QUALITY CONTROL SAMPLE SUMMARY TABLE

(UFP-QAPP Manual Section 3.1.1)

Matrix	Analytical Group	Number of Sampling Locations	Number of Field Duplicates	Number of MS/MSDs	Number of Equipment Blanks	Total Number of Samples to Lab
Soil	Metals	26	3	2	2	29

Note:
MS/MSD = Matrix spike/matrix spike duplicate

SAP WORKSHEET #21: PROJECT SAMPLING SOP REFERENCES TABLE

(UFP-QAPP Manual Section 3.1.2)

Reference Number	Title, Revision Date and/or Number	Originating Organization of Sampling SOP	Equipment Type	Modified for Project Work? (Yes/No)	Comments
NA	SOP Surface Soil Sampling, Rev 0	RWEC		No	
NA	SOP Decontamination Procedures, Rev 0	RWEC		No	
NA	SOP Packaging and Shipment of Samples, Rev 0	RWEC		No	

Notes:

SOP = Standard Operating Procedure
RWEC = Right Way Environmental Contractors, Inc.

SAP WORKSHEET #22: FIELD EQUIPMENT CALIBRATION, MAINTENANCE, TESTING, AND INSPECTION TABLE

(UFP-QAPP Manual Section 3.1.2.4)

Worksheet not applicable.

There will be no field equipment used that would require calibration, maintenance, testing, or inspection.

SAP WORKSHEET #23: ANALYTICAL SOP REFERENCES TABLE

(UFP-QAPP Manual Section 3.2.1)

Laboratory Name and Address: TestAmerica 5102 La Roche Ave, Savannah, GA 31404
Laboratory Point of Contact/Project Manager: Deborah Harbuck 912-354-7858

SOP Number	Title, Revision Date, and/or Number	Definitive or Screening Data	Matrix and Analytical Group	Instrument	Variance to Quality Systems Manual	Modified for Project Work? (Yes/No)
SA-ME-070	Elements by ICP, Revision 14, Effective 11/23/2012	Definitive	Metals	ICP-AES — Varian 730 ES	No	No
SA-ME-051	Soil Preparation Procedures for ICP and ICP/MS, Revision 8, Effective 11/19/2012	Definitive	Metals	Not Applicable	No	No

Notes:

ICP = Inductively coupled plasma
AES = Atomic emission spectroscopy
MS = Mass spectroscopy
SOP = Standard Operating Procedure

SAP WORKSHEET #24: ANALYTICAL INSTRUMENT CALIBRATION TABLE

(UFP-QAPP Manual Section 3.2.2)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Person Responsible for Corrective Action	SOP Reference
ICP-AES Metals	ICAL for all analytes: minimum one high standard and a calibration blank	Daily initial calibration prior to sample analysis	If more than one calibration standard is used, r≥0.995	Recalibrate and/or perform necessary equipment maintenance.	Analyst, Supervisor	SA-ME-051
ICP-AES Metals	Second source ICV	Once after each initial calibration	All analytes within ±10% of expected value	Repeat initial calibration and reanalyze all samples analyzed since the last successful calibration verification.	Analyst, Supervisor	SA-ME-051
ICP-AES Metals	CCV	CCV after every 10 samples and at the end of the analytical sequence	All analytes within ±10% of expected value	Repeat initial calibration and reanalyze all samples analyzed since the last successful calibration verification.	Analyst, Supervisor	SA-ME-051
ICP-AES Metals	Low-level calibration check standard	Daily following calibration	All analytes within ±20% of expected value	Recalibrate and/or perform necessary equipment maintenance.	Analyst, Supervisor	SA-ME-051
ICP-AES Metals	Calibration blank	Once with each ICAL, after every 10 samples and at the end of an analytical sequence	Determined concentration ≤ LOD	Determine source of possible contamination, perform maintenance and recalibrate.	Analyst, Supervisor	SA-ME-051
ICP-AES Metals	ICS	After beginning of the analytical run	ICS-A: Absolute value of concentration for all non-spiked analytes < LOD; ICS-AB: Within 20% of true value	Terminate analysis; locate and correct problem; reanalyze ICS, reanalyze all samples. If corrective action fails, qualify all associated analyte results "Q."	Analyst, Supervisor	SA-ME-051
ICP-AES Metals	Linear dynamic range/high level check	Every 6 months and with major maintenance	90-110% recovery	Perform maintenance and/or reanalyze at lower concentration.	Analyst, Supervisor	SA-ME-051

Notes:

SOP = Standard operating procedure
ICP-AES = Inductively coupled plasma-atomic emission spectrometry
ICAL = Initial calibration
ICS = Interference check solutions
ICV = Initial calibration verification
CCV = Continuing calibration verification
r = Correlation coefficient
LOD = Limit of detection

SAP WORKSHEET #25: ANALYTICAL INSTRUMENT AND EQUIPMENT MAINTENANCE, TESTING, AND INSPECTION TABLE

(UFP-QAPP Manual Section 3.2.3)

Instrument	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference
ICP-AES	Clean torch assembly and spray chamber when discolored or when degradation in data quality is observed. Clean nebulizer, check argon, and replace peristaltic pump tubing as needed. Other maintenance specified in lab Equipment Maintenance SOP.	Metals	Torch, nebulizer chamber, pump, pump tubing	Prior to initial calibration and as necessary	Acceptable calibration or continuing calibration verification	Correct the problem and repeat calibration or continuing calibration verification	Analyst, Department Manager	SA-ME-051

Notes:

SOP = Standard operating procedure
ICP-AES = Inductively coupled plasma-atomic emission spectrometry

SAP WORKSHEET #26: SAMPLE HANDLING SYSTEM

(UFP-QAPP Manual Appendix A)

SAMPLE COLLECTION, PACKAGING, AND SHIPMENT	
Sample Collection (Personnel/Organization):	Quality Control Officer, Alejandro Rodriquez/RWEC
Sample Packaging (Personnel/Organization):	Quality Control Officer, Alejandro Rodriquez/RWEC
Coordination of Shipment (Personnel/Organization):	Quality Control Officer, Alejandro Rodriquez/RWEC
Type of Shipment/Carrier:	Coolers/ Federal Express
SAMPLE RECEIPT AND ANALYSIS	
Sample Receipt (Personnel/Organization):	Sample Receiving Supervisor, Eddie Barnett/TestAmerica Savannah
Sample Custody and Storage (Personnel/Organization):	Sample Receiving Supervisor, Eddie Barnett/TestAmerica Savannah
Sample Preparation (Personnel/Organization):	Metals Manager, Cliff Eaton/TestAmerica Savannah
Sample Determinative Analysis (Personnel/Organization):	Laboratory Manager, Todd Baumgartner/TestAmerica Savannah
SAMPLE ARCHIVING	
Field Sample Storage (No. of days from sample collection):	180 Days from receipt of samples
Sample Extract/Digestate Storage (No. of days from extraction/digestion):	180 Days from receipt of samples
SAMPLE DISPOSAL	
Personnel/Organization:	Waste Compliance Manager, Wayne Robbins/TestAmerica Savannah
Number of Days from Analysis:	180 Days from receipt of samples

SAP WORKSHEET #27: SAMPLE CUSTODY REQUIREMENTS

(UFP-QAPP Manual Section 3.3.3)

The following sections outline the procedures that will be used to document project activities and sample collection, handling, tracking, and custody procedures during the investigation. All forms must be filled in as completely as possible.

Sample Nomenclature

Sample nomenclature put forth for this field event has been selected based on the site name (56) media (surface soil "SS"), site area (Area A or B), and the order of the sample collected starting on the north wall of the individual removals, (56SSA01, 56SSB01). Duplicate samples will be submitted to the laboratory as blind duplicates and will be identified using sample media code "DS." The field QC blank codes that will be used during this event are as follows. "EB" will be used for equipment rinsate blanks. Field QC blanks will be labeled sequentially followed by the month, day, and year sampled (i.e., EBMMDDYY). Samples to be used for MS/MSD will be labeled MS/MSD on the container label and noted on the chain-of-custody; however, "MS/MSD" will not be part of the unique sample identifier in order to maintain consistency with the project database. Worksheet #18 provides anticipated sample identifiers for this scope of work.

Sample Collection Documentation

Field observations will be recorded in a field logbook and/or field log sheets, including sample collection logs. Field logbooks utilized on this project will consist of a bound, water-resistant logbook. All pages of the logbook will be numbered sequentially and observations will be recorded with indelible ink.

Field sample log sheets will be used to document sample collection details and other observations and activities will be recorded in the field logbook.

For sampling and field activities, the following types of information will be recorded in the field logbook as appropriate:

- Site name and location
- Date and time of logbook entries
- Personnel and their affiliations
- Weather conditions
- Activities involved with the sampling

- Subcontractor activity summary
- Site observations including site entry and exit times
- Site sketches made onsite
- Visitor names, affiliations, arrival and departure times
- Health and safety issues, including PPE

Sample Handling and Tracking System

The laboratory will provide pre-preserved (as appropriate) sample containers for sample collection. Following collection, all samples will be immediately placed in a cooler. Glass sample containers will be enclosed in bubble-wrap to protect them during shipment. Coolers will be secured using strapping tape along with a signed custody seal. Sample coolers will be delivered to a local courier location for priority overnight delivery to the selected laboratory for analysis. Samples will be preserved as appropriate based on the analytical method. Proper custody procedures will be followed throughout all phases of sample collection and handling. For all samples collected, chain-of-custody forms will document the date and time of sample collection, the sampler's name, and the names of all others who subsequently held custody of the sample. Specifications for chemical analyses will also be documented on the chain-of-custody form.

These subsections outline the procedures that will be used by field and laboratory personnel to document project activities and sample collection procedures.

- Right Way Environmental Contractor, Inc. personnel will collect the samples.
- The samplers will take care not to contaminate samples through improper handling.
- Samples will be sealed in appropriate containers and placed into sealed coolers under chain-of-custody.
- After samples have been collected, they will be sent to the laboratory within 24 hours.
- Samples will be transferred under chain-of-custody by a public courier (i.e., FedEx).
- Once received by the laboratory, receipt will be documented on the chain-of-custody form and the samples will be checked in.

- The samples will remain under chain-of-custody throughout the analysis period to ensure their integrity is preserved; further details are provided below regarding custody procedures.

- All forms must be filled in as completely as possible.

Field Sample Custody Procedures

Chain-of-custody protocols will be used throughout sample handling to establish the evidentiary integrity of sample containers. These protocols will be used to demonstrate that the samples were handled and transferred in a manner that would eliminate possible tampering.

A sample is under custody if:

- The sample is in the physical possession of an authorized person.

- The sample is in view of an authorized person after being in his/her possession.

- The sample is placed in a secure area by an authorized person after being in his/her possession.

- The sample is in a secure area, restricted to authorized personnel only.

The RWEC Site Superintendent is responsible for the care and custody of the samples collected until they are delivered to the laboratory or are entrusted to a carrier. When transferring samples, the individuals relinquishing and receiving them will sign, date, and note the time on the chain-of-custody form. These forms are designed to document preparation, handling, storage, and shipping of all samples collected. These records document the sample custody transfer from the sampler to the laboratory, often through another person or agency (common carrier). Copies of the custody record are retained each time a sample transfer occurs. Upon arrival at the laboratory, internal sample custody procedures will be followed as defined in the Laboratory SOPs.

Laboratory Chain of Custody

Laboratory sample custody procedures (receipt of samples, archiving, and disposal) will use TestAmerica SOPs. A sample cooler receipt form will be filled out to note conditions and any discrepancies. The chain-of-custody form will be checked against the sample containers

for accuracy. Samples will be logged into the laboratory information management system and given a unique log number which can be tracked through processing. The laboratory project manager will notify the RWEC Quality Control Officer verbally or via e-mail immediately if any problems are identified. Discrepancies and resolutions will be documented on the sample receiving checklist.

SAP WORKSHEET #28: LABORATORY QC SAMPLES TABLE

(UFP-QAPP Manual Section 3.4)

Matrix:	Soil
Analytical Group:	Metals
Analytical Method/SOP Reference:	SW-6010B/SA-ME-051

QC Sample	Frequency & Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicators	Measurement Performance Criteria
Method Blank	One per preparatory batch	No analytes detected > ½ LOQ and > 1/10 the amount measured in any sample or 1/10 the regulatory limit (whichever is greater). Blank result must not otherwise affect sample results. For common laboratory contaminants, no analytes detected > LOQ (see Box D-1 in QSM V4.2).	Correct problem; re-prepare and/or reanalyze any sample associated with a blank that fails criteria.	Analyst, Supervisor, QA Manager	Bias, Contamination	No analytes detected > ½ LOQ and > 1/10 the amount measured in any sample or 1/10 the regulatory limit (whichever is greater). Blank result must not otherwise affect sample results. For common laboratory contaminants, no analytes detected > LOQ (see Box D-1 in QSM V4.2).
LCS	One LCS per preparatory batch	QC acceptance criteria specified in DoD QSM Version 4.2	Correct problem. If the LCS recoveries are high but the sample results are <LOQ, narrate. Otherwise, re-prepare and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available.	Analyst, Supervisor, QA Manager	Accuracy, Bias	QC acceptance criteria specified in DoD QSM Version 4.2
Sample Duplicate or MSD	One per preparatory batch	RPD ≤ 20%	Contact the client to determine if additional measures are required.	Analyst, Supervisor, QA Manager	Precision	RPD ≤ 20%
Matrix Spike	One per preparatory batch per matrix	For matrix evaluation, use LCS recovery criteria	Contact the client to determine if additional measures are required.	Analyst, Supervisor, QA Manager	Accuracy, Bias	For matrix evaluation, use LCS recovery criteria
Dilution Test	One per preparatory batch	Five-fold dilution must agree within ± 10% of the original measurement for samples with concentrations > 50 x LOQ	Perform Post Digestion Spike	Analyst, Supervisor, QA Manager	Accuracy, Bias	Five-fold dilution must agree within ±10% of the original measurement for samples with concentrations > 50 x LOQ

Matrix:		Soil				
Analytical Group:		Metals				
Analytical Method/SOP Reference:		SW-6010B/SA-ME-051				
QC Sample	**Frequency & Number**	**Method/SOP QC Acceptance Limits**	**Corrective Action**	**Person(s) Responsible for Corrective Action**	**Data Quality Indicators**	**Measurement Performance Criteria**
Post Digestion Spike	When dilution test fails or analyte concentration in all samples < 50 x LOD	Recovery 75-125%	Contact the client to determine if additional measures are required.	Analyst, Supervisor, QA Manager	Accuracy, Bias	Recovery 75-125%

Notes:

LCS = Laboratory control sample
QA = Quality assurance
QC = Quality control
LCS = Laboratory control sample
MSD = Matrix sample duplicate
LOQ = Limit of Quantitation
QSM = Quality systems manual
DoD = Department of defense
RPD = Relative percent difference
SOP = Standard operating procedure

SAP WORKSHEET #29: PROJECT DOCUMENTS AND RECORDS TABLE

(UFP-QAPP Manual Section 3.5.1)

Document	Where Maintained
SAP (including regulator comments and response to comments, the SAP review sign-off sheet, and associated documentation)	Electronic Portable Document File (PDF) copy will be maintained on Resolution Consultant's network server; hardcopy original will be maintained in the project file; uploaded to the NIRIS website; archived at project closeout
Sample Collection Records - Field Logbooks - Daily Meter Calibration Records - Chain-of-Custody Forms - Site Photographs	Electronic PDF copies will be maintained on RWEC's network server; hardcopies will be maintained in the project file; included in the Project Closeout Report; archived at project closeout
- Air Bills - Pertinent E-mail Correspondence/Telephone Logs - Corrective Action Forms	Electronic PDF copies will be maintained on RWEC's network server; hardcopies will be maintained in the project file; archived at project closeout
Sampling Location Survey Data	Electronic data will be maintained on RWEC's network server and included in the Project Closeout Report; archived at project completion
IDW Disposal Records (e.g., waste profiles, manifests)	Electronic PDF copies will be maintained on RWEC's network server; hardcopies will be maintained in the project file; archived at project closeout
Laboratory Documents and Records - Sample Receipt, Chain-of-Custody, and Tracking Records - Standards Traceability Logs - Equipment Calibration Logs - Sample Prep Logs - Extraction/Clean-up Records - Run Logs - Equipment Maintenance, Testing, and Inspection Logs - Corrective Action Logs - Reported Field Sample Results - Reported Results for Standards, QC Checks, and QC Samples - Instrument Printouts (Raw Data) for Field Samples, Standards, QC Checks, and QC Samples - Data Package Completeness Checklists - Sample Disposal Records - Pertinent email Correspondence/Telephone Logs	Maintained by the laboratory (TestAmerica Savannah) and included in the Level IV data packages; electronic PDF copies of the data packages will be maintained on RWEC's network server; electronic data will be uploaded to the project database and included in the Project Closeout Report; archived at project closeout
Puerto Rico Chemist Certifications	Electronic PDF copy will be maintained on RWEC's network server; hardcopy will be maintained in the project file; included in the Project Closeout Report; archived at project closeout
Data Assessment Documents and Records - Data Validation Reports - Pertinent email Correspondence/Telephone Logs - Corrective Action Forms	Electronic PDF copies will be maintained on RWEC's network server; hardcopies will be maintained in the project file; data validation narrative summaries will be included in the Project Closeout Report; archived at project closeout
Project Closeout Report (including regulator comments and response to comments)	Electronic PDF copy will be maintained on RWEC's network server; hardcopy original will be maintained in the project file; uploaded to the NIRIS website; archived at project closeout

Notes:

SAP = Sampling and analysis plan
QC = Quality control
NIRIS = Naval installation restoration information solution
RWEC = Right Way Environmental Contractor, Inc.
IDW = Investigation derived waste

SAP WORKSHEET #30: ANALYTICAL SERVICES TABLE

(UFP-QAPP Manual Section 3.5.2.3)

Matrix	Analytical Group	Sample Locations/ID Numbers	Analytical SOP	Data Package Turnaround Time	Laboratory/Organization[1] (name and address, contact person and telephone number)	Backup Laboratory/Organization (name and address, contact person and telephone number)
Soil	Metals	See Worksheet #18	SA-ME-051	21 Days	TestAmerica - Deborah Harbuck 5102 La Roche Ave, Savannah, GA 31404 912-354-7858	None

Notes:
[1] Laboratory meets accreditation requirements to support project needs.
SOP = Standard operating procedure

SAP WORKSHEET #31: PLANNED PROJECT ASSESSMENTS TABLE

(UFP-QAPP Manual Section 4.1.1)

Worksheet not applicable.

SAP WORKSHEET #32: ASSESSMENT FINDINGS AND CORRECTIVE ACTION RESPONSES TABLE

(UFP-QAPP Manual Section 4.1.2)

Worksheet not applicable.

SAP WORKSHEET #33: QUALITY ASSURANCE MANAGEMENT REPORTS TABLE

(UFP QAPP Manual Section 4.2)

Type of Report	Frequency (daily, weekly monthly, quarterly, annually, etc.)	Projected Delivery Date(s)	Person(s) Responsible for Report Preparation (title and organizational affiliation)	Report Recipient(s) (title and organizational affiliation)
Daily Field Reports	Daily	Every day that remediation activities are occurring	Luis Rios/Site Superintendent/RWEC	Pedro Tejada/Program and Project Manager/RWEC
Data Validation Reports	Once (for each SDG)	14 days after receipt of final, complete Level IV analytical data package	Third Party Data Validator	Pedro Tejada/Program and Project Manager/RWEC
Project Closeout Report	Once	60 days after receipt of validated analytical data	Pedro Tejada/Program and Project Manager/RWEC	Stakeholders (see Worksheet #3)
RCRA Progress Reports	Quarterly	Quarterly during duration of the project	Stacin Martin/RPM/Navy	Stakeholders (see Worksheet #3)

Notes:

SDG = Sample delivery group
RWEC = Right Way Environmental Contractor, Inc
RPM = Remedial project manager
RCRA = Resource conservation and recovery act

SAP WORKSHEETS #34-36: DATA VERIFICATION AND VALIDATION (STEPS I AND IIA/IIB) PROCESS TABLE

(UFP-QAPP Manual Section 5.2.1), (UFP-QAPP Manual Section 5.2.2), (Figure 37 UFP-QAPP Manual), (Table 9 UFP-QAPP Manual)

Data Review Input	Description	Responsible for Verification (name, organization)	Step I/IIa/ IIb [1]	Internal/ External
Verification Chain-of-custody forms Sample Login/Receipt	Review the sample shipment for completeness, integrity, and sign accepting the shipment. All sample labels will be checked against the chain-of-custody form, and any discrepancies will be identified, investigated, and corrected. The samples will be logged in at every storage area and work station required by the designated analyses. Individual analysts will verify the completeness and accuracy of the data recorded on the forms.	Laboratory sample custodians and analysts, TestAmerica	I	Internal
Verification Chain-of-custody forms	Check that the chain-of-custody form was signed/dated by the sampler relinquishing the samples and by the laboratory sample custodian receiving the samples for analyses.	Quality Control Officer or designee, RWEC	I	External
Verification SAP sample tables	Verify that all proposed samples listed in the SAP tables have been collected.	Quality Control Officer or designee, RWEC	I	Internal
Verification Sample log sheets and field notes	Verify that information recorded in the log sheets and field notes is accurate and complete.	Quality Control Officer or designee, RWEC	I	Internal
Verification Field QC samples	Check that field QC samples, described in Worksheet #12 and listed in Worksheet #20 were collected as required.	Quality Control Officer or designee, RWEC	I	Internal
Verification Analytical data package	Verify all analytical data packages are verified internally for completeness by the laboratory performing the work. The laboratory project manager (or designee) will sign the case narrative for each data package.	Laboratory project manager, TestAmerica	I	Internal
Verification Analytical data package	Verify the data package for completeness. Missing information will be requested from the laboratory and validation (if performed) will be suspended until missing data are received.	Quality Control Officer, RWEC	I	External
Verification Electronic data deliverables	Verify the electronic data against the chain-of-custody and hard copy data package for accuracy and completeness.	Quality Control Officer, RWEC	I	External
Validation Chain-of-custody	Examine the traceability of the data from time of sample collection until reporting of data. Ensure that the custody and integrity of the samples were maintained from collection to analysis and the custody records are complete and any deviations are recorded.	Quality Control Officer or third party validator, RWEC	IIa	External
Validation Holding Times	Review that the samples were shipped and stored at the required temperature and that sample pH for chemically-preserved samples meet the requirements listed in Worksheet #19. Ensure that the analyses were performed within the holding times. If holding times were not met, confirm that deviations were documented.	Quality Control Officer or third party validator, RWEC	IIa	External

Data Review Input	Description	Responsible for Verification (name, organization)	Step I/IIa/ IIb [1]	Internal/ External
Validation Laboratory data results for accuracy	Ensure that the laboratory QC samples were analyzed and that the measurement performance criteria, listed in Worksheet #28, were met for all field samples and QC analyses. Check that specified field QC samples were collected and analyzed, as listed in Worksheet #12, and that the analytical QC criteria were met.	Quality Control Officer or third party validator, RWEC	IIa/IIb	External
Validation Field and laboratory duplicate analyses for precision	Check the field sampling precision by calculating the RPD for field duplicate samples. Check the laboratory precision by reviewing the RPD or percent difference values from laboratory duplicate analyses; MS/MSDs; and LCS/LCSDs. Ensure compliance with the precision goals listed in Worksheets #12 and #28.	Quality Control Officer or third party validator, RWEC	IIa/IIb	External
Validation Sample results for representativeness	Check that the laboratory recorded the temperature at sample receipt and the pH of the chemically preserved samples to ensure sample integrity from sample collection to analysis.	Quality Control Officer or third party validator, RWEC	IIa/IIb	External
Validation Project action limits	Assess and document the impact on matrix interferences or sample dilutions performed on target compounds reported as undetected caused by the high concentration of one or more contaminants.	Quality Control Officer or third party validator, RWEC	IIa/IIb	External
Validation Data quality assessment report	Summarize deviations from methods, procedures, or contracts. Qualify data results based on method or QC deviation and explain all the data qualifications. Present tabular qualified data and data qualifier codes and summarize data qualification outliers. Determine if the data met the measurement performance criteria and determine the impact of any deviations on the technical usability of the data.	Quality Control Officer or third party validator, RWEC	IIa/IIb	External
Validation SAP QC sample documentation	Ensure that all QC samples specified in the SAP were collected and analyzed and that the associated results were within acceptance limits.	Quality Control Officer or third party validator, RWEC	IIa/IIb	External
Validation Analytical data deviations	Determine the impact of any deviation from sampling or analytical methods and laboratory SOP requirements, and matrix interferences effect on the analytical results.	Quality Control Officer or third party validator, RWEC	IIb	External
Validation Project quantitation limits for sensitivity	Ensure that the project detection limits were achieved.	Quality Control Officer or third party validator, RWEC	IIb	External
Validation Soil-Metals	Assess arsenic data using U.S. EPA Method 6010B and method-specific criteria, the DoD QSM, and those listed in Worksheets #12, 19, and 28. *U.S. EPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review*, (January 2010) will be used to apply qualifiers to data.	Quality Control Officer or third party validator, RWEC	IIa/IIb	External

Notes:

1 IIa=compliance with methods, procedures, and contracts [see Table 10, page 117, UFP-QAPP manual, V.1, March 2005]
IIb=comparison with measurement performance criteria in the SAP [see Table 11, page 118, UFP-QAPP manual, V.1, March 2005]

SAP	=	Sampling and Analysis Plan
SOP	=	Standard operating procedure
QC	=	Quality control
RPD	=	Relative percent difference
MS/MSD	=	Matrix spike/matrix spike duplicate
LCS	=	Laboratory control sample
LCSD	=	Laboratory control sample duplicate
U.S. EPA	=	Unites States Environmental Protection Agency
RWEC	=	Right Way Environmental Contractor, Inc
DoD	=	Department of Defense
QSM	=	Quality systems manual

SAP WORKSHEET #37: USABILITY ASSESSMENT

(UFP-QAPP Manual Section 5.2.3)

Data Review

The usability of the data directly affects whether project objectives can be achieved. The following characteristics will be evaluated at a minimum. The results of these evaluations will be included in the project report. The characteristics will be evaluated for multiple concentration levels if the evaluator determines that this is necessary. To the extent required by the type of data being reviewed, the assessors will consult with other technically competent individuals to render sound technical assessments of these data characteristics:

- **Completeness —** The Quality Control Officer, acting on behalf of the Project Team, will determine whether deviations from the scheduled sample collection or analyses occurred. If they have occurred and the Project Manager determines that the deviations compromise the ability to meet project objectives, he will consult with the Navy RPM and other project team members, as necessary (determined by the Navy RPM), to develop appropriate corrective actions.

- **Precision —** The Quality Control Officer, acting on behalf of the Project Team, will determine whether precision goals for field duplicates and laboratory duplicates were met. This will be accomplished by comparing duplicate results to precision goals identified in Worksheets #12 and #28. This will also include a comparison of field and laboratory precision with the expectation that laboratory duplicate results will be no less precise than field duplicate results. If the goals are not met or data have been flagged as estimated (J qualifier), limitations on the use of the data will be described in the project report.

- **Accuracy —** The Quality Control Officer, acting on behalf of the Project Team, will determine whether the accuracy/bias goals were met for project data. This will be accomplished by comparing percent recoveries of LCS, LCSD, MS, MSD, and surrogate compounds to accuracy goals identified in Worksheet #28. This assessment will include an evaluation of field and laboratory contamination; instrument calibration variability; and analyte recoveries for surrogates, matrix spike, matrix spike duplicate, and laboratory control samples. If the goals are not met, limitations on the use of the data will be described in the project report. Bias of the qualified results and a description of the impact of identified non-compliances on a specific data package or on the overall project data will be described in the project report.

- **Representativeness —** A project scientist, identified by the Project Manager and acting on behalf of the Project Team, will determine whether the data are adequately representative of intended populations, both spatially and temporally. This will be accomplished by verifying that samples were collected and analyzed in accordance with this SAP, by reviewing spatial and temporal data variations, and by comparing these characteristics to expectations. The usability report will describe the representativeness of the data for each matrix and analytical fraction. This will not require quantitative comparisons unless professional judgment of the project scientist indicates that a quantitative analysis is required.

- **Comparability —** The Quality Control Officer, acting on behalf of the Project Team, will determine whether the data generated under this project are sufficiently comparable to historical property data generated by different methods and for samples collected using different procedures and under different property conditions. This will be accomplished by comparing overall precision and bias among data sets for each matrix and analytical fraction. This will not require quantitative comparisons unless the Quality Control Officer indicates that such quantitative analysis is required.

- **Sensitivity —** The Quality Control Officer, acting on behalf of the Project Team, will determine whether project sensitivity goals listed in Worksheet #15 are achieved. The overall sensitivity and quantitation limits from multiple data sets for each matrix and analysis will be compared. If sensitivity goals are not achieved, the limitations on the data will be described.

Describe the evaluative procedures used to assess overall measurement error associated with the project:

After completion of the data validation, the data and data quality will be reviewed to determine whether sufficient data of acceptable quality are available for decision making. In addition to the evaluations described above, a series of inspections and statistical analyses will be performed to estimate these characteristics. The statistical evaluations will include simple summary statistics for target analytes, such as maximum concentration, minimum concentration, number of samples exhibiting non-detected results, number of samples exhibiting positive results, and the proportion of samples with detected and non-detected results. The Project Team members, identified by the Project Manager, will assess whether the data collectively support the attainment of project objectives. They will consider whether any missing or rejected data have compromised the

ability to make decisions or to make the decisions with the desired level of confidence. The data will be evaluated to determine whether missing or rejected data can be compensated by other data. Although rejected data will generally not be used, there may be reason to use them in a weight-of-evidence argument, especially when they supplement data that have not been rejected. If rejected data are used, their use will be supported by technically defensible rationales.

Identify the personnel responsible for performing the usability assessment:

The Project Manager, Quality Control Officer, and Site Superintendent will be responsible for conducting the listed data usability assessments. The data usability assessment will be reviewed with the Project Team. If deficiencies affecting the attainment of project objectives are identified, the review will take place either in a face to face meeting or a teleconference depending on the extent of identified deficiencies. If no significant deficiencies are identified, the data usability assessment will simply be documented in the project report and reviewed during the normal document review cycle.

Describe the documentation that will be generated during usability assessment and how usability assessment results will be presented so that they identify trends, relationships (correlations), and anomalies:

The data will be presented in tabular format, including data qualifications such as estimation (J, UJ) or rejection (R). The project report will identify and describe the data usability limitations and suggest re-sampling or other corrective actions, if necessary. Graphical presentations of the data such as concentration tag maps will be generated as part of the overall data evaluation process.

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Appendix A
Field Standard Operating Procedures and Field Forms

Organizational Acceptance	Authorization	Date
Originator		
Technical Reviewer		
Quality Assurance		

Revision No.	Changes	Authorization	Date

Note: Acceptance signatures are on file with the original document at RWEC.

1. General Applicability

This SOP describes the methods to be used for the decontamination of all field equipment which becomes potentially contaminated during a sample collection task. The equipment may include split spoons, bailers, trowels, shovels, hand augers, or any other type of equipment used during field activities.

Decontamination is performed as a quality assurance measure and a safety precaution. It prevents cross-contamination between samples and also helps to maintain a clean working environment for the safety of all field personnel involved, including the environment.

Decontamination is mainly achieved by rinsing with liquids which include: soap and/or detergent solutions, tap water, deionized water, and methanol. Equipment will be allowed to air dry after being cleaned or may be wiped dry with chemical free cloths or paper towels if immediate re-use is needed.

The frequency of equipment use, dictates that most decontamination be accomplished at each sampling site between collection points. Waste products produced by the decontamination procedures such as waste liquids, solids, rags, gloves, etc. will be collected and disposed of properly based on the nature of contamination. All cleaning materials and wastes should be-stored in a central location so as to maintain control over the quantity of materials used and/or produced throughout the study.

2. Responsibilities

It is the primary responsibility of the site supervisor, or project manager to assure that the proper decontamination procedures are followed and that all waste materials produced by decontamination are properly stored and disposed of.

It is the responsibility of the project safety officer to draft and enforce safety measures which provide the best protection for all persons involved directly with sampling and/or decontamination.

It is the responsibility of any subcontractors (i.e., drilling contractors) to follow the proper, designated decontamination procedures that are stated in their contracts and outlined in the Project Health and Safety Plan.
It is the responsibility of all personnel involved with sample collection or decontamination to maintain a clean working environment and to ensure that any contaminants are not negligently introduced to the environment.

3. Supporting Materials

- cleaning liquids: soap and/or detergent solutions, tap water, deionized water, methanol
- personal safety gear (defined in Project Health and Safety Plan)
- chemical-free paper towels
- disposable gloves
- waste storage containers: drums, boxes, plastic bags cleaning
- containers: plastic buckets, galvanized steel pans cleaning brushes

4. Methods or Protocol for Decontamination

4.1 General Procedures

The extent of known contamination will determine to what extent the equipment needs to be decontaminated. If the extent of contamination cannot be readily determined, cleaning should be done according to the assumption-that the equipment is highly contaminated until enough data are available to allow assessment of the actual level of contamination.

Adequate supplies of all materials must be kept on hand. This Includes all rinsing liquids and other materials listed in Section 3.0.

The standard procedures listed in the following section can be considered the procedure for full field decontamination. If different or more elaborate procedures are required for a specific project, they will be spelled out in the project work plan. Such variations in decontamination may include following all, just part, or an expanded scope of the decontamination procedure stated herein.

4.1.1 Clean the upright plastic-nalgene cylinder with first a methanol and then a deionized water rinse, wiping the free liquids after each.

4.1.2 Reverse pump backwashing all removable residual water present in the pump tubing. The pump should be shut off as soon as Intermittent flow is observed from the reverse discharge.

4.1.3 Rinse the stainless steel submersible down hole pump section with a liberal application of methanol and wipe dry.

4.1.4 Place the submersible pump section upright in the cylinder and fill the cylinder with tap water, adding 50-100 ml of methanol for every one liter of water.

4.1.5 Activate the pump in the forward mode withdrawing water from the cylinder.

4.1.6 Continue pumping until the water in the cylinder is pumped down and air is drawn through the pump. At this time air pockets will be observed in the discharge line. Shut off the pump immediately.

4.1.7 Remove the pump from the cylinder and place the pump in the reverse mode allowing that all removable water be discharged on to the ground surface as discussed in Step 2.

4.1.8 Using the water remaining in the cylinder, rinse the sealed portion of the power chord and discharge tube by pouring the water carefully over the coiled lines.

4.1.9 When reaching the next monitoring well place the pump in the well casing and wipe dry both the power and discharge lines with a clean paper towel as the pump is lowered.

5. Specific Decontamination Procedures

5.1 Submersible Pump

This procedure will be used to decontaminate submersible pumps between ground-water sample collection points and at the end of each day of use.

5.1.1 Materials

- plastic-nalgene upright cylinder
- gallon plastic water storage containers
- methanol and dispenser bottle
- deionized water and dispenser bottle
- chemical free paper towels

5.1.2 Procedure

5.1.3 During decontamination the submersible pump will be placed on a clean surface or held away from ground.

5.1.4 When removing the submersible pump from each well the power cord and discharge line will be wiped dry using chemical-free disposable towels.

5.2 Quality Assurance

To assure that decontamination is complete, field blank samples shall be collected using the cleaned submersible pump. These field blanks will be subsequently analyzed for the parameters of interest with respect to the ground water.

The procedure for collecting the field blanks will comprise using the pump to withdraw the tap water used for decontamination, from the plastic cylinder to sample containers. This field blank sample collection procedure shall only be performed after the materials to be used have been decontaminated.

Organizational Acceptance	Authorization	Date
Originator		
Technical Reviewer		
Quality Assurance		

Revision No.	Changes	Authorization	Date

Note: Acceptance signatures are on file with the original document at RWEC.

1. General Applicability

This Standard Operating Procedure (SOP) is concerned with procedures associated with the packaging and shipment of samples. Two general categories of samples exist: environmental samples consisting of air, water and soil; and waste samples which include non-hazardous solid wastes and hazardous wastes as defined by 40 CFR Part 261.

2. Responsibilities

It is the responsibility of the project manager to assure that the proper packaging and shipping techniques are utilized for each projects The site operations manager shall be responsible for the enactment and completion of the packaging and shipping requirements outlined in the project specific sampling plan. The site operations manager shall be responsible to research. identify and follow all applicable U.S. Department of Transportation (DOT) regulations regarding shipment of materials classified as waste.

3. General Method

The objective of sample packaging and shipping protocol is to identify standard procedures which will minimize the potential for sample spillage or leakage and maintain field sampling program compliance with U.S. EPA and U.S. DOT regulations.

The extent and nature of sample containerization will be governed by the type of sample, and the most reasonable projection of the sample's hazardous nature and constituents. The EPA regulations (40 CFR Section 261.4(d)) specify that samples of solid waste, water, soil or air, collected for the sole purpose of testing, are exempt from regulation under the Resource Conservation and Recovery Act (RCRA) when all of the following conditions are applicable:

A. Samples are being transported to a laboratory for analysis;
B. Samples are being transported to the collector from the laboratory after analysis;
C. Samples are being stored
   1) by the collector prior to shipment for analyses,
   2) by the analytical laboratory prior to analyses,
   3) by the analytical laboratory after testing but prior to return of sample to the collector or pending the conclusion of a court case.

Qualification for categories A and B above require that sample collectors comply with U.S. DOT and U.S. Postal Service (USPS) regulations or comply with the following items if U.S. DOT and USPS regulations are found not to apply:

The following information must accompany all samples and will be entered on a sample specific basis on chain of custody records:

- sample collector's name, mailing address and telephone number,
- analytical laboratory's name, mailing address and telephone number,
- quantity of sample,
- date of shipment,
- description of sample, and

- in addition, all samples must be packaged so that they do not leak, spill or vaporize.

4. General Methods

4.1 Place plastic bubble wrap matting over the base and bottom corners of each cooler or shipping container as needed to manifest each

4.2 Obtain a chain of custody record as shown in Figure I and enter all the appropriate information as discussed in Section 3.0 of this SOP. Chain of custody records will include complete information for each sample. One or more chain of custody records shall be completed for each cooler or shipping container as needed to manifest each sample.

4.3 Wrap each sample bottle individually and place standing upright on the base of the appropriate cooler, taking care to leave room for some packing material and ice or equivalent. Rubber bands or tape should be used to secure wrapping, completely around each sample bottle.

4.4 Place additional bubble wrap and/or Styrofoam pallet packing material throughout the voids between sample containers within each cooler.

4.5 Place ice or cold packs in heavy duty zip-lock type plastic bags, close the bags, and distribute such packages over the top of the samples.

4.6 Add additional bubble wrap/styrofoam pellets or other packing materials to fill the balance of the cooler or container.

4.7 Obtain two pieces of chain of custody tape as shown in Figure 2 and enter the custody tape numbers in the appropriate place on the chain of custody form. Sign and date the chain of custody tape.

4.8 To complete the chain of custody form enter the type of analysis required for each sample, by container, under the "ANATYSES" section. Under the specific analysis enter the quantity/volume of sample collected for each corresponding analysis.

If shipping the samples where travel by air or other public transportation is to be undertaken, sign the chain of custody record thereby relinquishing custody of the samples. Relinquishing custody should only be performed when directly transmitting custody to a receiving party or when transmitting to a shipper for subsequent receipt by the analytical laboratory. Shippers should not be asked to sign chain of custody records.

4.9 Remove the last copy from the chain of custody record and retain with other field notes. Place the original and remaining copies in a zip-lock type plastic bag

and place the bag on the top of the contents within the cooler or shipping container.

4.10 Close the top or lid of the cooler or shipping container and with another person rotate/shake the container to verify that the contents are packed so that they do not move. Improve the packaging if needed and reclose.

When transporting samples by automobile to the laboratory, and where periodic changes of ice are required, the cooler should only be temporarily closed go that reopening is simple. In these cases, chain of custody will be maintained by the person transporting the sample and chain of custody tape need not be used. If the cooler is to be left unattended, then chain of custody procedures should be enacted.

4.11 Place the chain of custody tape at two different locations on the cooler or container lid and overlap with transparent packaging tape. For coolers with hinged covers, if the hinges are attached with screws, chain of custody tape should also be used on the hinge side.

4.12 Packaging tape should be placed entirely around the sample shipment containers. A minimum of one to two full wraps of packaging tape will be placed at least two places on the cooler. Shake the cooler again to verify that the sample containers are well packed.

4.13 If shipment is required, transport the cooler to an overnight express package terminal or arrange for pickup. obtain copies of all shipment records as provided by the shipper.

4.14 If the samples are to travel as luggage, check with regular baggage.

4.15 Upon receipt of the samples, the analytical laboratory will open the cooler or shipping container and will sign "received by laboratory" on each chain of custody form. The laboratory will verify that the chain of custody tape has not been broken previously and that the chain of custody tape number corresponds with the number on the chain of custody record. The analytical laboratory will then forward the back copy of the chain of custody record to the sample collector to indicate that sample transmittal Is complete.

5. Documentation

As discussed in Section 4.0 the documentation for supporting the sample packaging and shipping will consist of chain of custody records and shipper's records. In addition a description of sample packaging procedures will be written in the field log book. The documentation will be retained in the project files following project completion.

Chain of Custody Form

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide a standardized method for surface soil sampling, to be used by employees of Right Way Environmental Contractors, Inc. (RWEC), or contractors and subcontractors supporting RWEC projects and tasks. This SOP describes the equipment and operations used for sampling surface soils in areas which will produce data that can be used to support risk evaluations. Deviations from the procedures outlined in this document must be approved by the RWEC prior to initiation of the sampling activity.

2.0 RESPONSIBILITIES

The Sampling Project Supervisor (SPS) may be a RWEC employee or contractor who is responsible for overseeing the soil sampling activities. The SPS is also responsible for checking all work performed and verifying that the work satisfies the specific tasks outlined by this SOP and the Project Plan. It is the responsibility of the SPS to communicate with the Field Personnel regarding specific collection objectives and anticipated situations that require any deviation from the Project Plan. It is also the responsibility of the SPS to communicate the need for any deviations from the Project Plan with the appropriate RWEC personnel.

Field personnel performing surface soil sampling are responsible for adhering to the applicable tasks outlined in this procedure while collecting samples. The field personnel should have limited discretion with regard to collection procedures, but should exercise judgment regarding the exact location of sample collection, within the boundaries outlined by the SPS.

3. 0 EQUIPMENT

a) Thin-walled tube sampler - thin-walled metal or teflon tube (also called a Shelby tube) used to recover relatively undisturbed soil samples. Augers are available at various depths, and soil cores may range in length from 6 inches to 24 inches.

b) Soil augers - Various models of soil augers are acceptable and selection of the specific brand and make of tool will be recommended by the contractor implementing the field work. Augers must be made of stainless steel, and should be capable of retrieving a cylindrical plug of soil 2 inches in diameter and 2 inches deep. In all cases the procedures recommended by the manufacturers should be followed with regard to use of the auger.

c) Trowels - for extruding the soil sample from the auger. For samples that will be analyzed for trace metals, avoid the use of chrome-plated trowels, as they may interfere with the analysis.

d) Collection containers - as specified in the Project Plan.

e) Gloves - for personal protection and to prevent cross-contamination of samples. May be plastic or latex; should be disposable and powderless.

f) Field clothing and Personal Protective Equipment - as specified in the

Health and Safety Plan.

g) Sampling flags - used for identifying soil sampling locations.

h) Field notebook - a bound book used to record progress of sampling effort and record any problems and field observa

i) Three-ring binder book- to store necessary forms used to record and track samples collected at the site. Binders will contain the Field Data Sheet, Site Diagram, and sample labels. Example forms are provided in the Sample Documentation SOP.

j) Permanent marking pen - used to identify sample containers and for documentation of field logbooks and data sheets.

k) Measuring tape or pocket ruler - used to measure the length of soil core in the soil coring device.

l) Trash Bag - used to dispose of gloves and any other non-hazardous waste generated during sampling.

4.0 SURFACE SOIL COLLECTION

4.1. COLLECTION OF SOIL CORES FOR NON-VOLATILE CHEMICAL ANALYSIS

Surface soil will be collected from each of the areas identified in the Project Plan. Samples will be collected with an auger and Thin Wall Tube Sampler. This system consists of a “T” shaped handle auger fitted with a sample tube capable of collecting soil cores that are at least 6 inches in depth. The sample collection tube must be constructed of teflon, or other non-reactive material, to avoid contamination of the soil sample.

A new pair of plastic gloves are to be worn at each boring location. Each soil boring location must be recorded on the site diagram prior to collecting the sample. Clear the area to be sampled of any surface debris (e.g., twigs, rocks, litter) that can be easily removed by hand. After the sampling tube is fitted to the auger, push the auger into the soil by a continuous and rapid motion, without impacting or twisting. In no case shall the tube be pushed further than 6 inches.

After reaching the desired depth, slowly and carefully remove the auger from the boring. Measure the length of the core and record on the Field Data Sheet. Carefully remove the soil from the auger, and place directly into the sample container. Affix one sample ID label to the sample container, and one to the Field Data Sheet.

Decontaminate sample equipment as described in Section 8.0.

4.2. COLLECTION OF SOIL CORES FOR VOLATILE ANALYSIS

Use a new pair of disposable gloves for each sample. Record the sample location on the site diagram. Repeat the same procedure as described in Section 4.1, placing the soil

core directly into a sample container that is designed for volatile organic analysis. Affix one sample ID label to the sample container, and one to the Field Data Sheet.

If sampling equipment is to be re-used, follow the decontamination procedures outlined in Section 8.0 before collecting the next sample.

4.3. COLLECTION OF SURFACE SOIL SAMPLES USING A SOIL AUGER

Place the soil coring tool on the ground and position it vertically. Holding the tool handle with both hands, apply pressure sufficient to drive the tool approximately 2 inches into the ground while applying a slight twisting force to the coring tool. Remove the tool by pulling up on the handle while simultaneously applying a twisting force. If the sample was retrieved successfully, a plug of soil approximately two inches long should have been removed with the coring tool.

Hold the soil coring tool horizontally or place it on the ground. Using a clean spatula or knife, remove the soil collected at depth greater than two inches from the end of the sampling tool. Use a trowel to extrude the soil from the auger, pushing the two-inch soil plug from the coring tool so that it falls directly into the container.

If sampling equipment is to be re-used, follow the decontamination procedures outlined in Section 8.0 before collecting the next sample.

Care should be taken to avoid tracking soil from one area to another. As samples are taken sequentially, care should also be taken not to contaminate an area yet to be sampled with the residue of the sample that is currently being taken. In general one should move in a single direction through the sampling area. If an area is known or suspected of having a higher concentration of contaminants, all other considerations being equal, it should be sampled last to prevent cross contamination.

Decontaminate equipment as described in Section 8.0.

5.0 SAMPLE CONTAINERS AND LABELING

Following the procedures outlined in Section 4.0, soil borings will be collected directly into sample containers, and shipped to the participating laboratory. For each soil core, two sample identification labels are required. One label is placed on the Field Data Sheet and the other label is affixed to the sample container.

Sample labeling will occur as prescribed below:

1) Place a pre-printed label onto the sample container (See Project Plan).
2) Place a pre-printed label onto the Field Data Sheet.
3) This procedure will be repeated for each soil core collected using clean sample containers and unique sample ID numbers.

Do not allow samples to freeze; place all samples directly onto wet ice (4°C). Ship samples under chain- of-custody, protected with suitable resilient packing material to reduce shock, vibration, and disturbance.

6.0 SITE CLEAN-UP

All soil boring holes will be back-filled with site soil or clean topsoil. If any rinse water used for sample decontamination is generated in the course of sample collection, it must be disposed of as specified in the Project Plan. Wherever possible, soil should be replaced in the sampling hole.

All marker flags (if reused) should be decontaminated by wiping off with towels and/or baby wipes before re-use.
Disposable PPE and other non-hazardous waste generated during sampling activities will be placed in a trash bag and taken to a waste receptacle at the field office to prevent disturbance by animals and dispersion by wind. These wastes will be disposed along with trash at a municipal landfill.

Soils and decontamination rinsate waste generated during sampling activities will be placed in DOT- compliant drums in accordance with 40 CFR 265 Part I. All non-hazardous waste will be disposed of in municipal waste bins.

7.0 RECORD KEEPING AND QUALITY CONTROL

Each field crew will carry a three-ring binder book that contains the riparian soil data sheet, site diagram, and sample labels. In addition, each individual should maintain a field notebook or team that is collecting samples, as described in the Project Plan. Each soil sample location must be recorded on the site diagram. Each sample should have an ID number affixed to the sample container, and the duplicate label must be affixed to the data sheet. Deviations from this sampling plan should be noted in the field notebook, as necessary.

For each location, the notebook information must include:

a) date
b) time
c) personnel
d) weather conditions
e) sample identification numbers that were used
f) descriptions of any deviations to the Project Plan and the reason for the deviation.

Samples taken from soils with visible staining or other indications of non-homogeneous conditions should also be noted. Field personnel will collect the proper type and quantity of quality control samples as prescribed in the Project Plan.

8.0 DECONTAMINATION

Because decontamination procedures are time consuming, having a quantity of sampling tools sufficient to require decontamination at a maximum of once per day is recommended. All sampling equipment must be decontaminated prior to reuse as prescribed in the Project Plan.

9.0 GLOSSARY

Project Plan A written document that spells out the detailed site-specific procedures to be followed by the SPS and the field personnel.

10.0 REFERENCES

Mason, B.J. 1983. Preparation of soil sampling protocol: Techniques and strategies. EPA - 600/4-83-020.

USEPA. 1984. Characterization of hazardous waste sites - a methods manual: vol. 2. EPA-600/4-84- 076.

American Society for Testing and Materials, 1985. Thin-Walled Tube Sampling of Soils. Method D- 1587-83, Annual Book of Standards.

American Society for Testing and Materials, 1995. Standard Practice for Field Collection of Soil Samples for Lead Determination by Atomic Spectrometery Techniques, ASTM Designation: E 1727 - 95, October 1995, 3 p.

Appendix B
Laboratory Accreditation Certificates

American Association for Laboratory Accreditation

Accredited DoD ELAP Laboratory

A2LA has accredited

TEST AMERICA SAVANNAH

Savannah, GA

for technical competence in the field of

Environmental Testing

In recognition of the successful completion of the A2LA evaluation process that includes an assessment of the laboratory's compliance with ISO/IEC 17025:2005, the 2003 NELAC Chapter 5 Standard, and the requirements of the Department of Defense Environmental Laboratory Accreditation Program (DoD ELAP) as detailed in version 4.2 of the DoD Quality System Manual for Environmental Laboratories (QSM); accreditation is granted to this laboratory to perform recognized EPA methods as defined on the associated A2LA Environmental Scope of Accreditation. This accreditation demonstrates technical competence for this defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009).

Presented this 18th day of June 2013.

President & CEO
For the Accreditation Council
Certificate Number 0399.01
Valid to February 28, 2015

For the tests to which this accreditation applies, please refer to the laboratory's Environmental Scope of Accreditation.

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

TEST AMERICA SAVANNAH
5102 LaRoche Avenue
Savannah, GA 31404
Andrea Teal Phone: 912 354 7858

ENVIRONMENTAL

Valid To: February 28, 2015 Certificate Number: 0399.01

In recognition of the successful completion of the A2LA evaluation process, (including an assessment of the laboratory's compliance with ISO IEC 17025:2005, the 2003 NELAC Chapter 5 Standard, and the requirements of the DoD Environmental Laboratory Accreditation Program (DoD ELAP) as detailed in version 4.2 of the DoD Quality Systems Manual for Environmental Laboratories), accreditation is granted to this laboratory to perform recognized EPA methods using the following testing technologies and in the analyte categories identified below

Testing Technologies

ICP-AES Spectrometry, Gas Chromatography, Gas Chromatography/Mass Spectrometry, Gravimetry, Ion Chromatography, ICP/MS, Misc.- Electronic Probes (pH, F^-, O_2), , Hazardous Waste Characteristics Tests, Spectrophotometry (Visible), Total Organic Carbon, Total Organic Halide

Parameter/Analyte	**Potable Water**	**Nonpotable Water**	**Solid Hazardous Waste**	
			Aqueous	**Solid**
Metals				
Aluminum	- - - - - - - - - -	- - - - - - - - - -	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A
Antimony	- - - - - - - - - -	- - - - - - - - - -	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A

5301 Buckeystown Pike, Suite 350 | Frederick, Maryland 21704-8373 | Phone: 301 644 3248 | Fax: 301 662 2974 | www.A2LA.org

Arsenic	- - - - - - - - - -	- - - - - - - - - -	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A
Barium	- - - - - - - - - -	- - - - - - - - - -	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A
Beryllium	- - - - - - - - - -	- - - - - - - - - -	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A
Boron	- - - - - - - - - -	- - - - - - - - - -	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A
Cadmium	- - - - - - - - - -	- - - - - - - - - -	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A
Calcium	- - - - - - - - - -	- - - - - - - - - -	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A
Chromium	- - - - - - - - - -	- - - - - - - - - -	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A
Chromium 6+	- - - - - - - - - -	- - - - - - - - - -	EPA 7196A	EPA 3060A/7196A

Cobalt	- - - - - - - - - -	- - - - - - - - - -	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A
Copper	- - - - - - - - - -	- - - - - - - - - -	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A
Iron	- - - - - - - - - -	- - - - - - - - - -	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A
Lead	- - - - - - - - - -	- - - - - - - - - -	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A
Magnesium	- - - - - - - - - -	- - - - - - - - - -	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A
Manganese	- - - - - - - - - -	- - - - - - - - - -	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A
Mercury	- - - - - - - - - -	- - - - - - - - - -	EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A EPA 7470A	EPA 3050B/6020A EPA 7471A EPA 7471B
Molybdenum	- - - - - - - - - -	- - - - - - - - - -	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A

Nickel	- - - - - - - - - -	- - - - - - - - - -	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A
Potassium	- - - - - - - - - -	- - - - - - - - - -	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A
Selenium	- - - - - - - - - -	- - - - - - - - - -	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A
Silica	- - - - - - - - - -	- - - - - - - - - -	EPA 6010C	- - - - - - - - - -
Silicon	- - - - - - - - - -	- - - - - - - - - -	EPA 6010C	- - - - - - - - - -
Silver	- - - - - - - - - -	- - - - - - - - - -	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A
Sodium	- - - - - - - - - -	- - - - - - - - - -	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A
Strontium	- - - - - - - - - -	- - - - - - - - - -	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A
Thallium	- - - - - - - - - -	- - - - - - - - - -	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A

Tin	----------	----------	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A
Titanium	----------	----------	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A
Vanadium	----------	----------	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A
Zinc	----------	----------	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A
Nutrients				
Nitrate (as N)	----------	----------	EPA 9056A	EPA 9056A
Nitrate-nitrite (as N)	----------	----------	EPA 9056A	EPA 9056A
Nitrite (as N)	----------	----------	EPA 9056A	EPA 9056A
Nitrate (as NO3)	----------	----------	EPA 9056A	EPA 9056A
Nitrate-nitrite (as NO3-NO2)	----------	----------	EPA 9056A	EPA 9056A
Nitrite (as NO2)	----------	----------	EPA 9056A	EPA 9056A
Demands				
Extractable organic halides	----------	----------	----------	EPA 9023
Total carbon	----------	----------	EPA 9060A	----------
Total inorganic carbon	----------	----------	EPA 9060A	----------
Total organic carbon	----------	----------	EPA 9060A	----------
Total organic halides	----------	----------	EPA 9020B	EPA 9020B
Wet Chemistry				
Bromide	----------	----------	EPA 9056A	EPA 9056A
Chloride	----------	----------	EPA 9056A	EPA 9056A
Cyanide	----------	----------	EPA 9012B	EPA 9012B
Fluoride	----------	----------	EPA 9056A	EPA 9056A
pH/Corrosivity	----------	----------	EPA 9040C	EPA 9045D
Phenols	----------	----------	EPA 9065A	EPA 9065A
Percent Moisture	----------	----------	----------	SM2540G
Specific conductance	----------	----------	EPA 9050A	EPA 9050A

Sulfide	----------	----------	EPA 9030B/9034	EPA 9030B/9034
Sulfate	----------	----------	EPA 9056A	EPA 9056A
Total Petroleum Hydrocarbons (TPH or SGT-HEM)	----------	----------	EPA 1664A	EPA 9071B
Purgeable Organics (Volatiles)				
Acetone	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Acetonitrile	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Acrolein	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Acrylonitrile	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Benzene	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
BTEX, Total	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Bromobenzene	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Bromochloromethane	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Bromodichloromethane	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Bromoform	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Bromomethane	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
n-Butanol	----------	----------	EPA 8015C-DAI	EPA 8015C-DAI
sec-Butanol	----------	----------	EPA 8015C-DAI	EPA 8015C-DAI
2-Butanone	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
2-Butoxyethanol (Butyl cellosolve)	----------	----------	EPA 8015C-DAI	EPA 8015C-DAI
n-Butyl acetate	----------	----------	EPA 8015C-DAI	EPA 8015C-DAI
sec-Butyl acetate	----------	----------	EPA 8015C-DAI	EPA 8015C-DAI
tert-Butyl alcohol (2-methyl-2-propanol)	----------	----------	EPA 8015C-DAI	EPA 8015C-DAI
n-Butylbenzene	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
sec-Butylbenzene	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
tert-Butylbenzene	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Carbon disulfide	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B

Carbon tetrachloride	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Cellosolve acetate	----------	----------	EPA 8015C-DAI	EPA 8015C-DAI
Chlorobenzene	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Chloroethane	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
2-Chloroethyl vinyl ether	----------	----------	EPA 5030B/8260B	----------
Chloroform	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
1-Chlorohexane	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
4-Isopropyltoluene	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Chloromethane	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
3-Chloro-1-propene	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Chloroprene	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Cyclohexane	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
2-Chlorotoluene	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
4-Chlorotoluene	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Dibromochloromethane	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
1,2-Dibromo-3-chloropropane (DBCP)	----------	----------	EPA 5030B/8260B EPA 8011	EPA 5030/8260B EPA 5035A/8260B
Dibromomethane	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
1,2-Dibromoethane (EDB)	----------	----------	EPA 5030B/8260B EPA 8011	EPA 5030/8260B EPA 5035A/8260B
1,2-Dichlorobenzene	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
1,3-Dichlorobenzene	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
1,4-Dichlorobenzene	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Trans-1,4-dichloro-2-butene	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Dichlorodifluoromethane	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
1,1-Dichloroethane	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B

1,2-Dichloroethane	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
1,1-Dichloroethene	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
cis-1,2-Dichloroethene	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
trans-1,2-Dichloroethene	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
1,2-Dichloroethene, Total	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
1,2-Dichloropropane	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
1,3-Dichloropropane	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
2,2-Dichloropropane	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
1,1-Dichloropropene	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
cis-1,3-Dichloropropene	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
trans-1,3-Dichloropropene	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
1,3-Dichloropropene, Total	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Diethyl ether	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
1,4-Dioxane	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Ethanol	----------	----------	EPA 8015C-DAI EPA 5030B/8260B	EPA 8015C-DAI EPA 5030/8260B EPA 5035A/8260B
Ethyl acetate	----------	----------	EPA 8015C-DAI	EPA 8015C-DAI
Ethyl benzene	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Ethyl methacrylate	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Ethylene glycol	----------	----------	EPA 8015C-DAI	EPA 8015C-DAI
Tetraethylene glycol	----------	----------	EPA 8015C-DAI	EPA 8015C-DAI
Triethylene glycol	----------	----------	EPA 8015C-DAI	EPA 8015C-DAI
Furan	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
n-Heptane	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
n-Heptanol	----------	----------	EPA 8015C-DAI	EPA 8015C-DAI
2-Hexanone	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Hexachlorobutadiene	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B

Hexane	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Isoamyl acetate	----------	----------	EPA 8015C-DAI	EPA 8015C-DAI
Isobutanol	----------	----------	EPA 5030B/8260B EPA 8015C-DAI	EPA 5030/8260B EPA 5035A/8260B EPA 8015C-DAI
Isobutyl acetate	----------	----------	EPA 8015C-DAI	EPA 8015C-DAI
Isopropyl acetate	----------	----------	EPA 8015C-DAI	EPA 8015C-DAI
Isopropanol	----------	----------	EPA 8015C-DAI	EPA 8015C-DAI
Isopropyl ether	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Isopropylbenzene	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Iodomethane	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Methacrylonitrile	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Methanol	----------	----------	EPA 8015C-DAI	EPA 8015C-DAI
Methyl acetate	----------	----------	EPA 5030B/8260B EPA 8015C-DAI	EPA 5030/8260B EPA 5035A/8260B EPA 8015C-DAI
Methylene chloride	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Methyl isobutyl ketone	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Methyl methacrylate	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Methyl cyclohexane	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Methyl tert-butyl ether (MTBE)	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Naphthalene	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
2,2'-Oxybisethanol (Diethylene glycol)	----------	----------	EPA 8015C-DAI	EPA 8015C-DAI
Pentachloroethane	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Phenol	----------	----------	EPA 8015C-DAI	EPA 8015C-DAI
n-Propanol	----------	----------	EPA 8015C-DAI	EPA 8015C-DAI
Propionitrile	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
2-Propoxy ethanol (Propyl cellosolve)	----------	----------	EPA 8015C-DAI	EPA 8015C-DAI
n-Propyl acetate	----------	----------	EPA 8015C-DAI	EPA 8015C-DAI
n-Propylbenzene	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Propylene glycol	----------	----------	EPA 8015C-DAI	EPA 8015C-DAI

Di-propylene glycol	----------	----------	EPA 8015C-DAI	EPA 8015C-DAI
Di-propylene glycol methyl ether	----------	----------	EPA 8015C-DAI	EPA 8015C-DAI
Styrene	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Tert-amyl alcohol	----------	----------	EPA 8015C-DAI	EPA 8015C-DAI
Tert-butyl alcohol (TBA)	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
1,1,1,2-Tetrachloroethane	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
1,1,2,2-Tetrachloroethane	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Tetrachloroethene	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Tetrahydrofuran	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Toluene	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
1,1,1-Trichloroethane	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
1,1,2-Trichloroethane	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Trichloroethene	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Trichlorofluoromethane	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
1,2,3-Trichlorobenzene	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
1,2,4-Trichlorobenzene	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
1,2,3-Trichloropropane	----------	----------	EPA 5030B/8260B EPA 8011	EPA 5030/8260B EPA 5035A/8260B
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
1,2,4-Trimethylbenzene	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
1,3,5-Trimethylbenzene	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Vinyl acetate	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Vinyl chloride	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Xylenes, total	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
1,2-Xylene	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
1,3 & 1,4-Xylene	----------	----------	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B

Gasoline Range Organics	- - - - - - - - - -	- - - - - - - - - -	EPA 5030B/8015C	EPA 5030/8015C EPA 5035A/8015C
Extractable Organics (Semivolatiles)				
Acenaphthene	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Acenaphthylene	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Acetophenone	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
2-Acetylaminofluorene	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
4-Aminobiphenyl	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Aniline	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Anthracene	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Aramite, Total	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Atrazine	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Benzaldehyde	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Benzidine	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Benzoic acid	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Benzo (a) anthracene	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Benzo (b) fluoranthene	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Benzo (k) fluoranthene	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Benzo (ghi) perylene	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Benzo (a) pyrene	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Benzyl alcohol	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
1,1-Biphenyl	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Bis (2-chloroethoxy) methane	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Bis (2-chloroethyl) ether	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Bis (2-chloroisopropyl) ether	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Bis (2-ethylhexyl) phthalate	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
4-Bromophenylphenyl ether	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Butyl benzyl phthalate	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
2-sec-Butyl-4,6-dinitrophenol	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Caprolactam	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Carbazole	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
4-Chloroaniline	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
4-Chloro-3-methylphenol	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
2-Chloronaphthalene	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
2-Chlorophenol	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
4-Chlorophenol	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
4-Chlorophenyl phenyl ether	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Chrysene	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Cresols (total methyl phenols)	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Diallate	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Dibenzofuran	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Dibenz(a,h) anthracene	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
1,2-Dichlorobenzene	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
1,3-Dichlorobenzene	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D

1,4-Dichlorobenzene	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
3,3-Dichlorobenzidine	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
2,4-Dichlorophenol	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
2,6-Dichlorophenol	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
Diethyl phthalate	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
Di(2-ethylhexyl)adipate	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
Dimethoate	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
p-Dimethylaminoazobenzene	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
7,12-Dimethylbenz (a) anthracene	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
3,3'-Dimethylbenzidine	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
alpha-, alpha-Dimethylphenethlylamine	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
2,3-Dimethylphenol	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
2,4-Dimethylphenol	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
2,5-Dimethylphenol	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
2,4 & 2,5-Dimethylphenol	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
2,6-Dimethylphenol	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
3,4-Dimethylphenol	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
Dimethyl phthalate	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
Di-n-butyl phthalate	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
Di-n-octyl phthalate	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
Diphenyl ether	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
1,3-Dinitrobenzene	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
2,4-Dinitrophenol	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
2,4-Dinitrotoluene	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
2,6-Dinitrotoluene	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
1,4-Dioxane	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
1,2-Diphenylhydrazine	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
Ethyl methane sulfonate	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
Fluoranthene	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
Fluorene	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
Hexachlorobenzene	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
Hexachlrobutadiene	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
Hexachlorocyclopentadiene	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
Hexachloroethane	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
Hexachlorophene	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
Hexachloropropene	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
Indeno (1,2,3-cd) pyrene	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
Isophorone	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
Isosafrole	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
Methapyrilene	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
Methylbenzoate	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
3-Methylcholanthrene	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
2-Methyl-4,6-Dinitrophenol	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
Methyl methane sulfonate	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
1-Methylnaphthalene	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
2-Methylnaphthalene	----------	----------	EPA 3520C/8270D	EPA 3546/8270D

2-Methylphenol	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
3 & 4-Methylphenol	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
Naphthalene	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
1,4-Naphthoquinone	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
1-Naphthylamine	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
2-Naphthylamine	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
2-Nitroaniline	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
3-Nitroaniline	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
4-Nitroaniline	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
Nitrobenzene	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
2-Nitrophenol	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
4-Nitrophenol	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
N-Nitroso-di-n-butylamine	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
N-Nitrosodiethylamine	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
N-Nitrosodimethylamine	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
N-Nitrosomethylethylamine	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
N-Nitrosomorpholine	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
N-Nitrosodi-n-propylamine	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
N-Nitrosodiphenylamine	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
N-Nitrosopiperidine	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
N-Nitrosopyrrolidine	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
4-Nitroquinoline-1-oxide	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
Pentachlorobenzene	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
Pentachlronitrobenzene	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
Pentachlorophenol	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
Phenacetin	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
Phenanthrene	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
Phenol	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
Phenyl ether	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
p-Phenylene diamine	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
Phorate	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
2-Picoline	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
alpha-Pinene	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
Pronamide	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
Pyrene	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
Pyridine	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
Safrole, Total	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
1,2,4,5-Tetrachlorobenzene	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
2,3,4,6-Tetrachlorophenol	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
2-Toluidine (o-Toluidine)	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
1,2,3-Trichlorobenzene	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
1,2,4-Trichlorobenzene	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
1,3,5-Trichlorobenzene	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
2,4,5-Trichlorophenol	----------	----------	EPA 3520C/8270D	EPA 3546/8270D
2,3,6-Trichlorophenol	----------	----------	EPA 3520C/8270D	EPA 3546/8270D

2,4,6-Trichlorophenol	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
o,o',o"-Triethylphosphorothioate	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
1,3,5-Trinitrobenzene	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
2,3-Xylenol	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
3,4-Xylenol	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
#2 Diesel Fuel (Product Identification)	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8015C	EPA 3550C/8015C EPA 3546/8015C
Diesel Range Organics	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8015C	EPA 3550C/8015C EPA 3546/8015C
Kerosene (Product Identification)	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8015C	EPA 3550C/8015C EPA 3546/8015C
Mineral Spirits (Product Identification)	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8015C	EPA 3550C/8015C EPA 3546/8015C
Motor Oil (Product Identification)	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8015C	EPA 3550C/8015C EPA 3546/8015C
Oil Range Organics	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8015C	EPA 3550C/8015C EPA 3546/8015C
Pesticides-Herbicides-PCBs				
Aldrin	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8081B	EPA 3546/8081B
alpha-BHC	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8081B	EPA 3546/8081B
beta-BHC	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8081B	EPA 3546/8081B
delta-BHC	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8081B	EPA 3546/8081B
gamma-BHC	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8081B	EPA 3546/8081B
Chlordane (technical)	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8081B	EPA 3546/8081B
Chlordane (alpha)	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8081B	EPA 3546/8081B
Chlordane (gamma)	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8081B	EPA 3546/8081B
Chlorobenzilate	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8081B	EPA 3546/8081B
2,4-D	- - - - - - - - - -	- - - - - - - - - -	EPA 8151A	EPA 8151A
2,6-Dichlorophenol	- - - - - - - - - -	- - - - - - - - - -	EPA 8151A	EPA 8151A
DCPA (Dacthal)	- - - - - - - - - -	- - - - - - - - - -	EPA 8151A	EPA 8151A
Dalapon	- - - - - - - - - -	- - - - - - - - - -	EPA 8151A	EPA 8151A
2,4-DB	- - - - - - - - - -	- - - - - - - - - -	EPA 8151A	EPA 8151A
2,4’-DDD	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8081B	EPA 3546/8081B
2,4’ DDE	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8081B	EPA 3546/8081B
2,4’-DDT	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8081B	EPA 3546/8081B
4,4’-DDD	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8081B	EPA 3546/8081B
4,4’ DDE	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8081B	EPA 3546/8081B
4,4’-DDT	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8081B	EPA 3546/8081B
Dicamba	- - - - - - - - - -	- - - - - - - - - -	EPA 8151A	EPA 8151A
Dichloroprop	- - - - - - - - - -	- - - - - - - - - -	EPA 8151A	EPA 8151A
Dieldrin	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8081B	EPA 3546/8081B
Dinoseb	- - - - - - - - - -	- - - - - - - - - -	EPA 8151A	EPA 8151A
Disulfoton	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C /8270D	EPA 3546/8270D
Endosulfan I (alpha)	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8081B	EPA 3546/8081B
Endosulfan II (beta)	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8081B	EPA 3546/8081B
Endosulfan sulfate	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8081B	EPA 3546/8081B
Endrin	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8081B	EPA 3546/8081B

Endrin aldehyde	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8081B	EPA 3546/8081B
Endrin ketone	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8081B	EPA 3546/8081B
Famphur	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C /8270D	EPA 3546/8270D
Heptachlor	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8081B	EPA 3546/8081B
Heptachlor epoxide	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8081B	EPA 3546/8081B
Isodrin	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8081B	EPA 3546/8081B
MCPA	- - - - - - - - - -	- - - - - - - - - -	EPA 8151A	EPA 8151A
MCPP	- - - - - - - - - -	- - - - - - - - - -	EPA 8151A	EPA 8151A
Methoxychlor	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8081B	EPA 3546/8081B
Mirex	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8081B	EPA 3546/8081B
Parathion ethyl	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C /8270D	EPA 3546/8270D
Parathion methyl	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C /8270D	EPA 3546/8270D
PCB-1016	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8082A	EPA 3546/8082A
PCB-1221	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8082A	EPA 3546/8082A
PCB-1232	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8082A	EPA 3546/8082A
PCB-1242	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8082A	EPA 3546/8082A
PCB-1248	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8082A	EPA 3546/8082A
PCB-1254	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8082A	EPA 3546/8082A
PCB-1260	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8082A	EPA 3546/8082A
PCB-1262	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8082A	EPA 3546/8082A
PCB-1268	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8082A	EPA 3546/8082A
Pentachlorophenol	- - - - - - - - - -	- - - - - - - - - -	EPA 8151A	EPA 8151A
Picloram	- - - - - - - - - -	- - - - - - - - - -	EPA 8151A	EPA 8151A
Sulfotepp	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C /8270D	EPA 3546/8270D
2,4,5-T	- - - - - - - - - -	- - - - - - - - - -	EPA 8151A	EPA 8151A
Thionazin	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C /8270D	EPA 3546/8270D
2,4,6-Trichlorophenol	- - - - - - - - - -	- - - - - - - - - -	EPA 8151A	EPA 8151A
2,4,5-TP (Silvex)	- - - - - - - - - -	- - - - - - - - - -	EPA 8151A	EPA 8151A
Toxaphene	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8081B	EPA 3546/8081B
Hazardous Waste Characteristics				
Free Liquid	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -	EPA 9095B
Ignitability	- - - - - - - - - -	- - - - - - - - - -	EPA 1010A	EPA 1030
SPLC	- - - - - - - - - -	- - - - - - - - - -	EPA 1312	EPA 1312
TCLP	- - - - - - - - - -	- - - - - - - - - -	EPA 1311	EPA 1311
Air Testing				
Purgeable Organics				
Methane (FID)	- - - - - - - - - -	RSK-175	RSK-175	- - - - - - - - - -
Methane (TCD)	- - - - - - - - - -	RSK-175	RSK-175	- - - - - - - - - -
Ethane (FID)	- - - - - - - - - -	RSK-175	RSK-175	- - - - - - - - - -
Ethene (FID)	- - - - - - - - - -	RSK-175	RSK-175	- - - - - - - - - -

In addition, In recognition of the successful completion of the A2LA evaluation process, (including an assessment of the laboratory's compliance with ISO IEC 17025:2005 and the 2009 TNI Standard, accreditation is granted to this laboratory to perform recognized EPA methods using the following testing technologies and in the analyte categories identified below and for the test methods applicable to Kentucky Statute KRS 224.60-130(2)(a):

Testing Technologies

Atomic Absorption/ICP-AES Spectrometry, Gas Chromatography, Gas Chromatography/Mass Spectrometry, Gravimetry, Ion Chromatography, ICP/MS, Methylene Blue Active Substances, Misc.- Electronic Probes (pH, F^-, O_2), Oxygen Demand, Hazardous Waste Characteristics Tests, Spectrophotometry (Visible), Spectrophotometry (Automated), Titrimetry, Total Organic Carbon, Total Organic Halide, Turbidity

Parameter/Analyte	**Potable Water**	**Nonpotable Water**	**Solid Hazardous Waste**	
			Aqueous	**Solid**
Metals				
Aluminum	EPA 200.7 EPA 200.8	EPA 200.7 EPA 200.8	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A
Antimony	EPA 200.7 EPA 200.8	EPA 200.7 EPA 200.8	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A
Arsenic	EPA 200.7 EPA 200.8	EPA 200.7 EPA 200.8	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A
Barium	EPA 200.7 EPA 200.8	EPA 200.7 EPA 200.8	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A
Beryllium	EPA 200.7 EPA 200.8	EPA 200.7 EPA 200.8	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A

Parameter/Analyte	Potable Water	Nonpotable Water	Solid Hazardous Waste	
			Aqueous	Solid
Boron	EPA 200.7 EPA 200.8	EPA 200.7 EPA 200.8	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A
Cadmium	EPA 200.7 EPA 200.8	EPA 200.7 EPA 200.8	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A
Calcium	EPA 200.7 EPA 200.8	EPA 200.7 EPA 200.8	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A
Chromium	EPA 200.7 EPA 200.8	EPA 200.7 EPA 200.8	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A
Chromium 3+	SM 3500 Cr B_01 SM3500 Cr D	EPA 7196A SM 3500 Cr B_01 SM 3500 Cr D	EPA 7196A SM3500 Cr B_01 SM3500 Cr D	EPA 3060A/7196A
Chromium 6+	SM 3500 Cr B_01 SM3500 Cr D	EPA 7196A SM 3500 Cr B_01 SM 3500 Cr D	EPA 7196A SM3500 Cr B_01 SM3500 Cr D	EPA 3060A/7196A
Cobalt	EPA 200.7 EPA 200.8	EPA 200.7 EPA 200.8	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A
Copper	EPA 200.7 EPA 200.8	EPA 200.7 EPA 200.8	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A

Parameter/Analyte	Potable Water	Nonpotable Water	Solid Hazardous Waste	
			Aqueous	Solid
Iron	EPA 200.7 EPA 200.8	EPA 200.7 EPA 200.8	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A
Iron, Ferric	SM 3500 Fe B_97 SM3500 Fe D	SM 3500 Fe B_97 SM3500 Fe D	SM3500 Fe B_97 SM3500 Fe D	- - - - - - - - - -
Iron, Ferrous	SM 3500 Fe B_97 SM3500 Fe D	SM 3500 Fe B_97 SM3500 Fe D	SM3500 Fe B_97 SM3500 Fe D	- - - - - - - - - -
Lead	EPA 200.7 EPA 200.8	EPA 200.7 EPA 200.8	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A
Magnesium	EPA 200.7 EPA 200.8	EPA 200.7 EPA 200.8	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A
Manganese	EPA 200.7 EPA 200.8	EPA 200.7 EPA 200.8	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A
Mercury	EPA 200.8 EPA 245.1	EPA 200.8 EPA 245.1	EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A EPA 7470A	EPA 3050B/6020A EPA 7471A EPA 7471B
Molybdenum	EPA 200.7 EPA 200.8	EPA 200.7 EPA 200.8	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A

Parameter/Analyte	Potable Water	Nonpotable Water	Solid Hazardous Waste	
			Aqueous	Solid
Nickel	EPA 200.7 EPA 200.8	EPA 200.7 EPA 200.8	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A
Potassium	EPA 200.7 EPA 200.8	EPA 200.7 EPA 200.8	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A
Selenium	EPA 200.7 EPA 200.8	EPA 200.7 EPA 200.8	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A
Silica	EPA 200.7	EPA 200.7	EPA 6010C	- - - - - - - - - -
Silicon	EPA 200.7	EPA 200.7	EPA 6010C	- - - - - - - - - -
Silver	EPA 200.7 EPA 200.8	EPA 200.7 EPA 200.8	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A
Sodium	EPA 200.7 EPA 200.8	EPA 200.7 EPA 200.8	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A
Sodium Adsorption Ratio	- - - - - - - - - -	USDA 20B	USDA 20B	- - - - - - - - - -
Strontium	EPA 200.7 EPA 200.8	EPA 200.7 EPA 200.8	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A

Parameter/Analyte	Potable Water	Nonpotable Water	Solid Hazardous Waste	
			Aqueous	Solid
Thallium	EPA 200.7 EPA 200.8	EPA 200.7 EPA 200.8	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A
Tin	EPA 200.7 EPA 200.8	EPA 200.7 EPA 200.8	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A
Titanium	EPA 200.7 EPA 200.8	EPA 200.7 EPA 200.8	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A
Vanadium	EPA 200.7 EPA 200.8	EPA 200.7 EPA 200.8	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A
Zinc	EPA 200.7 EPA 200.8	EPA 200.7 EPA 200.8	EPA 3005A/6010C EPA 3010A/6010C SM3030C/EPA 6010C EPA 3005A/6020A EPA 3010A/6020A SM3030C/EPA 6020A	EPA 3050B/6010C EPA 3050B/6020A
Nutrients				
Ammonia (as N)	EPA 350.1 SM4500NH3_G	EPA 350.1 SM4500NH3_G	EPA 350.1 SM4500NH3_G	- - - - - - - - - -
Kjeldahl nitrogen	EPA 351.2	EPA 351.2	EPA 351.2	- - - - - - - - - -
Nitrate (as N)	EPA 300.0 EPA 353.2	EPA 300.0 EPA 353.2 EPA 9056A	EPA 300.0 EPA 353.2 EPA 9056A	EPA 300.0 EPA 9056A
Nitrate-nitrite (as N)	EPA 300.0 EPA 353.2	EPA 300.0 EPA 353.2 EPA 9056A	EPA 300.0 EPA 353.2 EPA 9056A	EPA 300.0 EPA 9056A
Nitrite (as N)	EPA 300.0 EPA 353.2	EPA 300.0 EPA 353.2 EPA 9056A	EPA 300.0 EPA 353.2 EPA 9056A	EPA 300.0 EPA 9056A

Parameter/Analyte	**Potable Water**	**Nonpotable Water**	**Solid Hazardous Waste**	
			Aqueous	**Solid**
Nitrate (as NO3)	EPA 300.0 EPA 353.2	EPA 300.0 EPA 353.2 EPA 9056A	EPA 300.0 EPA 353.2 EPA 9056A	EPA 300.0 EPA 9056A
Nitrate-nitrite (as NO3-NO2)	EPA 300.0 EPA 353.2	EPA 300.0 EPA 353.2 EPA 9056A	EPA 300.0 EPA 353.2 EPA 9056A	EPA 300.0 EPA 9056A
Nitrite (as NO2)	EPA 300.0 EPA 353.2	EPA 300.0 EPA 353.2 EPA 9056A	EPA 300.0 EPA 353.2 EPA 9056A	EPA 300.0 EPA 9056A
Organic Nitrogen (as N)	- - - - - - - - - -	TKN minus Ammonia	TKN minus Ammonia	- - - - - - - - - -
Orthophosphate (as P)	EPA 365.1 SM4500P F	EPA 365.1 SM4500P F	EPA 365.1 SM4500P F	- - - - - - - - - -
Total Nitrogen (as N)	- - - - - - - - - -	TKN plus Nitrate-Nitrite (as N)	TKN plus Nitrate-Nitrite (as N)	- - - - - - - - - -
Total phosphorus	EPA 365.4	EPA 365.4	EPA 365.4	- - - - - - - - - -
Demands				
Adsorbable organic halides (AOX)	- - - - - - - - - -	EPA 1650	EPA 1650	- - - - - - - - - -
Biochemical oxygen demand	EPA 405.1 SM 5210 B	EPA 405.1 SM 5210 B	EPA 405.1 SM5210 B	- - - - - - - - - -
Carbonacious biochemical oxygen demand	SM 5210 B	SM 5210 B	SM 5210 B	- - - - - - - - - -
Chemical oxygen demand	EPA 410.4 SM 5220 D	EPA 410.4 SM 5220 D	EPA 410.4 SM5220 D	- - - - - - - - - -
Dissolved carbon	EPA 415.1 SM 5310B	EPA 415.1 SM 5310B EPA 9060A	EPA 415.1 SM5310B EPA 9060A	- - - - - - - - - -
Dissolved inorganic carbon	EPA 415.1 SM 5310B	EPA 415.1 SM 5310B EPA 9060A	EPA 415.1 SM5310B EPA 9060A	- - - - - - - - - -
Dissolved organic carbon	EPA 415.1 SM 5310B	EPA 415.1 SM 5310B EPA 9060A	EPA 415.1 SM5310B EPA 9060A	- - - - - - - - - -
Extractable organic halides	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -	EPA 9023
Total carbon	EPA 415.1 SM 5310B	EPA 415.1 SM 5310B EPA 9060A	EPA 415.1 SM5310B EPA 9060A	- - - - - - - - - -
Total inorganic carbon	EPA 415.1 SM 5310B	EPA 415.1 SM 5310B EPA 9060A	EPA 415.1 SM5310B EPA 9060A	- - - - - - - - - -
Total organic carbon	EPA 415.1 SM 5310B	EPA 415.1 SM 5310B EPA 9060A	EPA 415.1 SM5310B EPA 9060A	- - - - - - - - - -

Parameter/Analyte	Potable Water	Nonpotable Water	Solid Hazardous Waste	
			Aqueous	Solid
Total organic halides	EPA 9020B	EPA 450.1 EPA 9020B	- - - - - - - - - -	- - - - - - - - - -
Wet Chemistry				
Acidity	EPA 305.1 SM 2310B	EPA 305.1 SM 2310B	EPA 305.1 SM2310B	- - - - - - - - - -
Alkalinity	EPA 310.1 SM 2320B	EPA 310.1 SM 2320B	EPA 310.1 SM2320B	- - - - - - - - - -
Anion/Cation Balance	- - - - - - - - - -	SM 1030 F	SM1030 F	- - - - - - - - - -
Bicarbonate alkalinity	EPA 310.1 SM 2320B	EPA 310.1 SM 2320B	EPA 310.1 SM2320B	- - - - - - - - - -
Bromide	EPA 300.1B	EPA 300.0 EPA 9056A	EPA 300.0 EPA 9056A	EPA 300.0 EPA 9056A
Bromate	EPA 300.1B	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Carbon dioxide, free	EPA 310.1 SM 2320B	EPA 310.1 SM 2320B	EPA 310.1 SM2320B	- - - - - - - - - -
Carbonate alkalinity	EPA 310.1 SM 2320B	EPA 310.1 SM 2320B SM 4500 CO2D	EPA 310.1 SM2320B SM4500 CO2 D	- - - - - - - - - -
Chlorate	EPA 300.1B	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Chloride	EPA 300.0 EPA 325.2 SM 4500 Cl- E	EPA 300.0 EPA 325.2 SM4500 Cl- E EPA 9056A EPA 9251	EPA 9056A EPA 9251 EPA 300.0 EPA 325.2 SM4500 Cl-E	EPA 300.0 EPA 9056A EPA 9251
Chloride, residual	EPA 330.3 SM 4500 Cl-B	EPA 330.3 SM4500 Cl-B	EPA 330.3 SM4500 Cl-B	- - - - - - - - - -
Chlorite	EPA 300.1B	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Color	EPA 110.2 SM 2120B	EPA 110.2 SM 2120B	EPA 110.2 SM2120B	- - - - - - - - - -
Corrosivity-calc.carb. stability	SM 2330B	SM 2330B	SM2330B	- - - - - - - - - -
Cyanide	EPA 335.4 SM 4500-CN-E	EPA 335.4 SM 4500 CN-E EPA 9012B	EPA 9012B EPA 335.4 SM4500 CN-E	EPA 9012B
Cyanide amenable to chlorination	EPA 335.1	EPA 335.1 EPA 9013/9012B	EPA 9013/9012B EPA 335.1	EPA 9013/9012B
Cyanide, weak acid dissociable	- - - - - - - - - -	SM 4500-CN-I	SM4500-CN-I	- - - - - - - - - -
Fluoride	EPA 300.0	EPA 300.0 EPA 9056A	EPA 300.0 EPA 9056A	EPA 300.0 EPA 9056A
Hardness (as calcium carbonate)	EPA 130.2 SM 2340B SM 2340C	EPA 130.2 SM 2340B SM 2340C	EPA 130.2 SM2340B SM2340C	- - - - - - - - - -
Hardness, Calcium (as calcium carbonate)	SM 2340B	SM 2340B	SM2340B	- - - - - - - - - -

Parameter/Analyte	Potable Water	Nonpotable Water	Solid Hazardous Waste	
			Aqueous	Solid
Hardness, Magnesium (as calcium carbonate)	SM 2340B	SM2340B	SM2340B	- - - - - - - - - -
Hydroxide alkalinity	EPA 310.1 SM2320B	EPA 310.1 SM2320B	EPA 310.1 SM2320B	- - - - - - - - - -
Odor	EPA 140.1 SM2150 B	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Oxygen, dissolved	EPA 360.2 SM4500 O C	EPA 360.2 SM4500 O C	EPA 360.2 SM4500 O C	- - - - - - - - - -
pH	EPA 150.1 SM4500 H+ B	EPA 150.1 SM4500 H+ B EPA 9040C	EPA 9040C EPA 150.1 SM4500 H+ B	EPA 9045D
Phenolphthalein alkalinity	EPA 310.1 SM2320B	EPA 310.1 SM2320B	EPA 310.1 SM2320B	- - - - - - - - - -
MBAS (Surfactants)	EPA 425.1 SM5540C	EPA 425.1 SM5540C	EPA 425.1 SM5540C	
Oil and Grease (HEM)	- - - - - - - - - -	EPA 1664A	EPA 1664A	EPA 9071B
Phenols	EPA 420.1	EPA 420.1 EPA 9065A	EPA 9065A EPA 420.1	EPA 9065A
Filterable residue	EPA 160.1 SM2540C	EPA 160.1 SM2540C	EPA 160.1 SM2540C	- - - - - - - - - -
Nonfilterable residue	EPA 160.2 SM2540D	EPA 160.2 SM2540D	EPA 160.2 SM2540D	- - - - - - - - - -
Settleable residue	EPA 160.5 SM2540F	EPA 160.5 SM2540F	EPA 160.5 SM2540F	- - - - - - - - - -
Total residue	EPA 160.3 SM2540B	EPA 160.3 SM2540B	EPA 160.3 SM2540B	SM2540G
Volatile dissolved residue	- - - - - - - - - -	SM2540E	SM2540E	- - - - - - - - - -
Total volatile suspended residue	- - - - - - - - - -	SM2540E	SM2540E	- - - - - - - - - -
Volatile residue	EPA 160.4 SM2540E	EPA 160.4 SM2540E	EPA 160.4 SM2540E	SM2540G
Ash content	- - - - - - - - - -	SM2540E	SM2540E	SM2540G
Fixed residue	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -	SM2540G
Percent moisture	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -	SM2540G
Resistivity	EPA 120.1 SM2510B	EPA 120.1 SM2510B	EPA 120.1 SM2510B	- - - - - - - - - -
Salinity	SM2520B	SM2520B	SM2520B	- - - - - - - - - -
Specific conductance	EPA 120.1 SM2510B	EPA 120.1 SM2510B	EPA 9050A EPA 120.1 SM2510B	EPA 9050A
Sulfide	EPA 376.1 SM4500-S2-F	EPA 376.1 EPA 9030B/9034 SM4500 S2 F	EPA 9030B/9034 EPA 376.1 SM4500 S2 F	EPA 9030B/9034

Parameter/Analyte	Potable Water	Nonpotable Water	Solid Hazardous Waste	
			Aqueous	Solid
Sulfate	EPA 300.0 EPA 375.4	EPA 300.0 EPA 375.4 EPA 9038 EPA 9056A	EPA 300.0 EPA 375.4 EPA 9056A EPA 9038	EPA 300.0 EPA 9056A EPA 9038
Sulfite	EPA 377.1 SM4500 SO3 B	EPA 377.1 SM4500 SO3 B	EPA 377.1 SM4500-SO3-B	- - - - - - - - - -
Total Petroleum Hydrocarbons (TPH or SGT-HEM)	- - - - - - - - - -	EPA 1664A	EPA 1664A	EPA 9071B
Turbidity	EPA 180.1 SM2130B	EPA 180.1 SM2130B	EPA 180.1 SM2130B	- - - - - - - - - -
Unionized ammonia	- - - - - - - - - -	FL-DEP SOP	FL-DEP SOP	- - - - - - - - - -
UV-254	SM5910B	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Purgeable Organics (Volatiles)				
Acetone	EPA 524.2	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Acetonitrile	- - - - - - - - - -	- - - - - - - - - -	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Acrolein	- - - - - - - - - -	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Acrylonitrile	- - - - - - - - - -	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Benzene	EPA 524.2	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
BTEX, Total	- - - - - - - - - -	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Bromobenzene	EPA 524.2	- - - - - - - - - -	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Bromochloromethane	EPA 524.2	- - - - - - - - - -	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Bromodichloromethane	EPA 524.2	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Bromoform	EPA 524.2	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Bromomethane	EPA 524.2	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
n-Butanol	- - - - - - - - - -	- - - - - - - - - -	EPA 8015C-DAI	EPA 8015C-DAI
sec-Butanol	- - - - - - - - - -	- - - - - - - - - -	EPA 8015C-DAI	EPA 8015C-DAI
2-Butanone	EPA 524.2	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
2-Butoxyethanol (Butyl cellosolve)	- - - - - - - - - -	- - - - - - - - - -	EPA 8015C-DAI	EPA 8015C-DAI
n-Butyl acetate	- - - - - - - - - -	- - - - - - - - - -	EPA 8015C-DAI	EPA 8015C-DAI
sec-Butyl acetate	- - - - - - - - - -	- - - - - - - - - -	EPA 8015C-DAI	EPA 8015C-DAI

Parameter/Analyte	Potable Water	Nonpotable Water	Solid Hazardous Waste	
			Aqueous	Solid
tert-Butyl alcohol (2-methyl-2-propanol)	- - - - - - - - - -	- - - - - - - - - -	EPA 8015C-DAI	EPA 8015C-DAI
n-Butylbenzene	EPA 524.2	- - - - - - - - - -	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
sec-Butylbenzene	EPA 524.2	- - - - - - - - - -	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
tert-Butylbenzene	EPA 524.2	- - - - - - - - - -	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Carbon disulfide	- - - - - - - - - -	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Carbon tetrachloride	EPA 524.2	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Cellosolve acetate	- - - - - - - - - -	- - - - - - - - - -	EPA 8015C-DAI	EPA 8015C-DAI
Chlorobenzene	EPA 524.2	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Chloroethane	EPA 524.2	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
2-Chloroethyl vinyl ether	- - - - - - - - - -	EPA 624	EPA 5030B/8260B	- - - - - - - - - -
Chloroform	EPA 524.2	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
1-Chlorohexane	- - - - - - - - - -	- - - - - - - - - -	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
4-Isopropyltoluene	EPA 524.2	- - - - - - - - - -	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Chloromethane	EPA 524.2	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
3-Chloro-1-propene	- - - - - - - - - -	- - - - - - - - - -	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Chloroprene	- - - - - - - - - -	- - - - - - - - - -	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Cyclohexane	- - - - - - - - - -	- - - - - - - - - -	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
2-Chlorotoluene	EPA 524.2	- - - - - - - - - -	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
4-Chlorotoluene	EPA 524.2	- - - - - - - - - -	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Dibromoacetic Acid (DBAA)	EPA 552.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Dibromochloromethane	EPA 524.2	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
1,2-Dibromo-3-chloropropane (DBCP)	EPA 504.1 EPA 524.2	- - - - - - - - - -	EPA 5030B/8260B EPA 8011	EPA 5030/8260B EPA 5035A/8260B
Dibromomethane	EPA 524.2	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
1,2-Dibromoethane (EDB)	EPA 504.1 EPA 524.2	EPA 624	EPA 5030B/8260B EPA 8011	EPA 5030/8260B EPA 5035A/8260B

Parameter/Analyte	Potable Water	Nonpotable Water	Solid Hazardous Waste	
			Aqueous	Solid
Dichloroacetic Acid (DCAA)	EPA 552.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
1,2-Dichlorobenzene	EPA 524.2	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
1,3-Dichlorobenzene	EPA 524.2	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
1,4-Dichlorobenzene	EPA 524.2	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
trans-1,4-dichloro-2-butene	- - - - - - - - - -	- - - - - - - - - -	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Dichlorodifluoromethane	EPA 524.2	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
1,1-Dichloroethane	EPA 524.2	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
1,2-Dichloroethane	EPA 524.2	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
1,1-Dichloroethene	EPA 524.2	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
cis-1,2-Dichloroethene	EPA 524.2	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
trans-1,2-Dichloroethene	EPA 524.2	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
1,2-Dichloroethene, Total	- - - - - - - - - -	- - - - - - - - - -	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
1,2-Dichloropropane	EPA 524.2	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
1,3-Dichloropropane	EPA 524.2	- - - - - - - - - -	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
2,2-Dichloropropane	EPA 524.2	- - - - - - - - - -	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
1,1-Dichloropropene	EPA 524.2	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
cis-1,3-Dichloropropene	EPA 524.2	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
trans-1,3-Dichloropropene	EPA 524.2	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
1,3-Dichloropropene, Total	EPA 524.2	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Diethyl ether	- - - - - - - - - -	- - - - - - - - - -	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Disopropyl ether	EPA 524.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
1,4-Dioxane	- - - - - - - - - -	- - - - - - - - - -	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B

Parameter/Analyte	Potable Water	Nonpotable Water	Solid Hazardous Waste	
			Aqueous	Solid
Ethanol	- - - - - - - - - -	- - - - - - - - - -	EPA 8015B-DAI EPA 8015C-DAI EPA 5030B/8260B	EPA 8015B-DAI EPA 8015C-DAI EPA 5030/8260B EPA 5035A/8260B
Ethyl acetate	- - - - - - - - - -	- - - - - - - - - -	EPA 8015C-DAI	EPA 8015C-DAI
Ethyl benzene	EPA 524.2	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Ethyl methacrylate	- - - - - - - - - -	- - - - - - - - - -	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Ethylene glycol	- - - - - - - - - -	- - - - - - - - - -	EPA 8015C-DAI	EPA 8015C-DAI
Tetraethylene glycol	- - - - - - - - - -	- - - - - - - - - -	EPA 8015C-DAI	EPA 8015C-DAI
Triethylene glycol	- - - - - - - - - -	- - - - - - - - - -	EPA 8015C-DAI	EPA 8015C-DAI
Furan	- - - - - - - - - -	- - - - - - - - - -	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Haloacetic Acids, Total (HAA5)	EPA 552.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
n-Heptane	- - - - - - - - - -	- - - - - - - - - -	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
n-Heptanol	- - - - - - - - - -	- - - - - - - - - -	EPA 8015C-DAI	EPA 8015C-DAI
2-Hexanone	EPA 524.2	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Hexachlorobutadiene	EPA 524.2	- - - - - - - - - -	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Hexane	- - - - - - - - - -	- - - - - - - - - -	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Isoamyl acetate	- - - - - - - - - -	- - - - - - - - - -	EPA 8015C-DAI	EPA 8015C-DAI
Isobutanol	- - - - - - - - - -	- - - - - - - - - -	EPA 5030B/8260B EPA 8015C-DAI	EPA 5030/8260B EPA 5035A/8260B EPA 8015C-DAI
Isobutyl acetate	- - - - - - - - - -	- - - - - - - - - -	EPA 8015C-DAI	EPA 8015C-DAI
Isopropyl acetate	- - - - - - - - - -	- - - - - - - - - -	EPA 8015C-DAI	EPA 8015C-DAI
Isopropanol	- - - - - - - - - -	- - - - - - - - - -	EPA 8015C-DAI	EPA 8015C-DAI
Isopropyl ether	- - - - - - - - - -	- - - - - - - - - -	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Isopropylbenzene	EPA 524.2	- - - - - - - - - -	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Iodomethane	- - - - - - - - - -	- - - - - - - - - -	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Methacrylonitrile	- - - - - - - - - -	- - - - - - - - - -	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Methanol	- - - - - - - - - -	- - - - - - - - - -	EPA 8015C-DAI	EPA 8015C-DAI
Methyl acetate	- - - - - - - - - -	- - - - - - - - - -	EPA 5030B/8260B EPA 8015C-DAI	EPA 5030/8260B EPA 5035A/8260B EPA 8015C-DAI

Parameter/Analyte	Potable Water	Nonpotable Water	Solid Hazardous Waste	
			Aqueous	Solid
Methylene chloride	EPA 524.2	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Methyl isobutyl ketone	EPA 524.2	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Methyl methacrylate	- - - - - - - - - -	- - - - - - - - - -	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Methyl cyclohexane	- - - - - - - - - -	- - - - - - - - - -	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Monobromoacetic Acid (MBAA)	EPA 552.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Monochloroacetic Acid (MCAA)	EPA 552.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Methyl tert-butyl ether (MTBE)	EPA 524.2	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Naphthalene	EPA 524.2	- - - - - - - - - -	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
2,2'-Oxybisethanol (Diethylene glycol)	- - - - - - - - - -	- - - - - - - - - -	EPA 8015C-DAI	EPA 8015C-DAI
Pentachloroethane	- - - - - - - - - -	- - - - - - - - - -	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Phenol	- - - - - - - - - -	- - - - - - - - - -	EPA 8015C-DAI	EPA 8015C-DAI
n-Propanol	- - - - - - - - - -	- - - - - - - - - -	EPA 8015C-DAI	EPA 8015C-DAI
Propionitrile	- - - - - - - - - -	- - - - - - - - - -	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
2-Propoxy ethanol (Propyl cellosolve)	- - - - - - - - - -	- - - - - - - - - -	EPA 8015C-DAI	EPA 8015C-DAI
n-Propyl acetate	- - - - - - - - - -	- - - - - - - - - -	EPA 8015C-DAI	EPA 8015C-DAI
n-Propylbenzene	EPA 524.2	- - - - - - - - - -	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Propylene glycol	- - - - - - - - - -	- - - - - - - - - -	EPA 8015C-DAI	EPA 8015C-DAI
Di-propylene glycol	- - - - - - - - - -	- - - - - - - - - -	EPA 8015C-DAI	EPA 8015C-DAI
Di-propylene glycol methyl ether	- - - - - - - - - -	- - - - - - - - - -	EPA 8015C-DAI	EPA 8015C-DAI
Styrene	EPA 524.2	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Tert-amyl alcohol	- - - - - - - - - -	- - - - - - - - - -	EPA 8015C-DAI	EPA 8015C-DAI
Tert-amyl methyl ether (TAME)	EPA 524.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Tert-butyl alcohol (TBA)	EPA 524.2	- - - - - - - - - -	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Tert-butyl ethyl ether (ETBE)	EPA 524.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
1,1,1,2-Tetrachloroethane	EPA 524.2	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
1,1,2,2-Tetrachloroethane	EPA 524.2	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Tetrachloroethene	EPA 524.2	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B

Parameter/Analyte	Potable Water	Nonpotable Water	Solid Hazardous Waste	
			Aqueous	Solid
Tetrahydrofuran	- - - - - - - - - -	- - - - - - - - - -	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Toluene	EPA 524.2	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Trichloroacetic acid	EPA 552.2	- - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
1,1,1-Trichloroethane	EPA 524.2	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
1,1,2-Trichloroethane	EPA 524.2	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Trichloroethene	EPA 524.2	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Trichlorofluoromethane	EPA 524.2	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
1,2,3-Trichlorobenzene	EPA 524.2	- - - - - - - - - -	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
1,2,4-Trichlorobenzene	EPA 524.2	- - - - - - - - - -	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
1,2,3-Trichloropropane	EPA 524.2 EPA 504.1	- - - - - - - - - -	EPA 5030B/8260B EPA 8011	EPA 5030/8260B EPA 5035A/8260B
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	EPA 524.2	- - - - - - - - - -	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
1,2,4-Trimethylbenzene	EPA 524.2	- - - - - - - - - -	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
1,3,5-Trimethylbenzene	EPA 524.2	- - - - - - - - - -	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Trihalomethanes, Total	EPA 524.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Vinyl acetate	- - - - - - - - - -	- - - - - - - - - -	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Vinyl chloride	EPA 524.2	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Xylenes, total	EPA 524.2	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
1,2-Xylene	EPA 524.2	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
1,3 & 1,4-Xylene	EPA 524.2	EPA 624	EPA 5030B/8260B	EPA 5030/8260B EPA 5035A/8260B
Gasoline Range Organics	- - - - - - - - - -	- - - - - - - - - -	EPA 5030B/8015C	EPA 5030/8015C EPA 5035A/8015C
Extractable Organics (Semivolatiles)				
Acenaphthene	EPA 525.2	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
Acenaphthylene	EPA 525.2	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
Acetochlor	EPA 525.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -

Parameter/Analyte	Potable Water	Nonpotable Water	Solid Hazardous Waste	
			Aqueous	Solid
Acetophenone	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
2-Acetylaminofluorene	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Alachlor	EPA 525.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
4-Aminobiphenyl	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Aniline	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Anthracene	EPA 525.2	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
Aramite, Total	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Atrazine	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Benzaldehyde	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Benzidine	- - - - - - - - - -	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
Benzoic acid	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Benzo (a) anthracene	EPA 525.2	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
Benzo (b) fluoranthene	EPA 525.2	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
Benzo (k) fluoranthene	EPA 525.2	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
Benzo (ghi) perylene	EPA 525.2	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
Benzo (a) pyrene	EPA 525.2	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
Benzyl alcohol	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
1,1-Biphenyl	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Bis (2-chloroethoxy) methane	- - - - - - - - - -	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
Bis (2-chloroethyl) ether	- - - - - - - - - -	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
Bis (2-chloroisopropyl) ether	- - - - - - - - - -	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
Bis (2-ethylhexyl) phthalate	EPA 525.2	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
Bromacil	EPA 525.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
4-Bromophenylphenyl ether	- - - - - - - - - -	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
Butachlor	EPA 525.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Butylate	EPA 525.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Butyl benzyl phthalate	EPA 525.2	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
2-sec-Butyl-4,6-dinitrophenol	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Caprolactam	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Carbazole	- - - - - - - - - -	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
4-Chloroaniline	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
4-Chloro-3-methylphenol	- - - - - - - - - -	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
2-Chloronaphthalene	- - - - - - - - - -	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
2-Chlorobiphenyl	EPA 525.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
2-Chlorophenol	- - - - - - - - - -	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
4-Chlorophenol	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
4-Chlorophenyl phenyl ether	- - - - - - - - - -	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
Chrysene	EPA 525.2	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
Cresols (total methyl phenols)	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Diallate	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Dibenzofuran	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Dibenz(a,h) anthracene	EPA 525.2	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
1,2-Dichlorobenzene	- - - - - - - - - -	EPA 625	EPA 3520C/8270D	EPA 3546/8270D

Parameter/Analyte	Potable Water	Nonpotable Water	Solid Hazardous Waste	
			Aqueous	Solid
1,3-Dichlorobenzene	- - - - - - - - - -	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
1,4-Dichlorobenzene	- - - - - - - - - -	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
3,3-Dichlorobenzidine	- - - - - - - - - -	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
2,4-Dichlorophenol	- - - - - - - - - -	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
2,6-Dichlorophenol	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Diethyl phthalate	EPA 525.2	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
Di(2-ethylhexyl)adipate	EPA 525.2	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Dimethoate	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
p-Dimethylaminoazobenzene	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
7,12-Dimethylbenz (a) anthracene	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
3,3'-Dimethylbenzidine	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
alpha-, alpha-Dimethylphenethlylamine	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
2,3-Dimethylphenol	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
2,4-Dimethylphenol	- - - - - - - - - -	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
2,5-Dimethylphenol	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
2,4 & 2,5-Dimethylphenol	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
2,6-Dimethylphenol	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
3,4-Dimethylphenol	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Dimethyl phthalate	EPA 525.2	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
Di-n-butyl phthalate	EPA 525.2	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
Di-n-octyl phthalate	- - - - - - - - - -	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
Diphenyl ether	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
1,3-Dinitrobenzene	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
2,4-Dinitrophenol	- - - - - - - - - -	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
2,4-Dinitrotoluene	EPA 525.2	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
2,6-Dinitrotoluene	EPA 525.2	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
1,4-Dioxane	- - - - - - - - - -	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
1,2-Diphenylhydrazine	- - - - - - - - - -	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
Diphenamide	EPA 525.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
EPTC	EPA 525.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Ethoprop (Mocap)	EPA 525.2	- - - - - - - - - -		- - - - - - - - - -
Ethyl methane sulfonate	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Etridiazole	EPA 525.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Fenarimol	EPA 525.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Fluoranthene	EPA 525.2	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
Fluorene	EPA 525.2	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
Fluridone	EPA 525.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
2,2',3,3',4,4',6-Heptachlorobiphenyl	EPA 525.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Hexachlorobenzene	EPA 525.2	EPA 625	EPA 3520C/8270D	EPA 3546/8270D

Parameter/Analyte	Potable Water	Nonpotable Water	Solid Hazardous Waste	
			Aqueous	Solid
Hexachlrobutadiene	- - - - - - - - - -	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
Hexachlorocyclopentadiene	EPA 525.2	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
Hexachloroethane	- - - - - - - - - -	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
Hexachlorophene	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Hexachloropropene	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Hexazinone	EPA 525.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Indeno (1,2,3-cd) pyrene	EPA 525.2	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
Isophorone	EPA 525.2	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
Isosafrole	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Methapyrilene	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Methylbenzoate	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
3-Methylcholanthrene	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
2-Methyl-4,6-Dinitrophenol	- - - - - - - - - -	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
Methyl methane sulfonate	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
1-Methylnaphthalene	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
2-Methylnaphthalene	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Methyl paraoxon	EPA 525.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
2-Methylphenol	- - - - - - - - - -	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
3 & 4-Methylphenol	- - - - - - - - - -	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
Metolachlor	EPA 525.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Metribuzin	EPA 525.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Mevinphos	EPA 525.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
MGK 264, total (isomer a+b)	EPA 525.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Molinate	EPA 525.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Napropamide	EPA 525.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Naphthalene	EPA 525.2	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
1,4-Naphthoquinone	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
1-Naphthylamine	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
2-Naphthylamine	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
2-Nitroaniline	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
3-Nitroaniline	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
4-Nitroaniline	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Nitrobenzene	- - - - - - - - - -	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
2-Nitrophenol	- - - - - - - - - -	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
4-Nitrophenol	- - - - - - - - - -	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
N-Nitroso-di-n-butylamine	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
N-Nitrosodiethylamine	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
N-Nitrosodimethylamine	- - - - - - - - - -	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
N-Nitrosomethylethylamine	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
N-Nitrosomorpholine	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
N-Nitrosodi-n-propylamine	- - - - - - - - - -	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
N-Nitrosodiphenylamine	- - - - - - - - - -	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
N-Nitrosopiperidine	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
N-Nitrosopyrrolidine	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D

Parameter/Analyte	Potable Water	Nonpotable Water	Solid Hazardous Waste	
			Aqueous	Solid
4-Nitroquinoline-1-oxide	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
trans-Nonachlor	EPA 525.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Norflurazon	EPA 525.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Pebulate	EPA 525.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Pentachlorobenzene	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
2,2',3,4,6-Pentachlorobiphenyl	EPA 525.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Pentachlronitrobenzene	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Pentachlorophenol	- - - - - - - - - -	EPA 625 EPA 1653	EPA 3520C/8270D EPA 1653	EPA 3546/8270D
Permethrin, total	EPA 525.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Phenacetin	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Phenanthrene	EPA 525.2	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
Phenol	- - - - - - - - - -	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
Phenyl ether	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
p-Phenylene diamine	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Phorate	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
2-Picoline	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
alpha-Pinene	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Pronamide	EPA 525.2	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Propazine	EPA 525.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Pyrene	EPA 525.2	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
Pyridine	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Safrole, Total	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Terbacil	EPA 525.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
1,2,4,5-Tetrachlorobenzene	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270C EPA 3520C/8270D	EPA 3550B/8270C EPA 3546/8270C EPA 3550C/8270D EPA 3546/8270D
2,2',4,4'-Tetrachlorobiphenyl	EPA 525.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Tetrachlorocatechol	- - - - - - - - - -	EPA 1653	EPA 1653	- - - - - - - - - -
Tetrachloroguaicol	- - - - - - - - - -	EPA 1653	EPA 1653	- - - - - - - - - -
2,3,4,6-Tetrachlorophenol	- - - - - - - - - -	EPA 1653	EPA 1653 EPA 3520C/8270D	EPA 3546/8270D
2-Toluidine (o-Toluidine)	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Triademefon	EPA 525.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
2,4,5-Trichlorobiphenyl	EPA 525.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
1,2,3-Trichlorobenzene	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
1,2,4-Trichlorobenzene	- - - - - - - - - -	EPA 625	EPA 3520C/8270D	EPA 3546/8270D
1,3,5-Trichlorobenzene	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
3,4,5-Trichlorocatechol	- - - - - - - - - -	EPA 1653	EPA 1653	- - - - - - - - - -
3,4,6-Trichlorocatechol	- - - - - - - - - -	EPA 1653	EPA 1653	- - - - - - - - - -
3,4,5-Trichloroguaicol	- - - - - - - - - -	EPA 1653	EPA 1653	- - - - - - - - - -
3,4,6-Trichloroguaicol	- - - - - - - - - -	EPA 1653	EPA 1653	- - - - - - - - - -

Parameter/Analyte	Potable Water	Nonpotable Water	Solid Hazardous Waste	
			Aqueous	Solid
4,5,6-Trichloroguaicol	- - - - - - - - - -	EPA 1653	EPA 1653	- - - - - - - - - -
2,4,5-Trichlorophenol	- - - - - - - - - -	EPA 1653	EPA 3520C/8270D	EPA 3546/8270D
2,3,6-Trichlorophenol	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
2,4,6-Trichlorophenol	- - - - - - - - - -	EPA 625 EPA 1653	EPA 3520C/8270D	EPA 3546/8270D
3,4,5-Trichlorophenol	- - - - - - - - - -	EPA 1653	EPA 1653	- - - - - - - - - -
Trichlorosyringol	- - - - - - - - - -	EPA 1653	EPA 1653	- - - - - - - - - -
Tricyclazole	EPA 525.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
o,o',o"-Triethylphosphorothioate	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Trifluralin	EPA 525.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
1,3,5-Trinitrobenzene	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
Vernolate	EPA 525.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
2,3-Xylenol	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
3,4-Xylenol	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270D	EPA 3546/8270D
#2 Diesel Fuel (Product Identification)	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8015B EPA 3520C/8015C	EPA 3550B/8015B EPA 3546/8015B EPA 3550C/8015C EPA 3546/8015C
Diesel Range Organics	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8015C	EPA 3550C/8015C EPA 3546/8015C
Kerosene (Product Identification)	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8015C	EPA 3550C/8015C EPA 3546/8015C
Mineral Spirits (Product Identification)	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8015C	EPA 3550C/8015C EPA 3546/8015C
Motor Oil (Product Identification)	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8015C	EPA 3550C/8015C EPA 3546/8015C
Oil Range Organics	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8015C	EPA 3550C/8015C EPA 3546/8015C
Pesticides-Herbicides-PCBs				
Acifluorfen	EPA 515.1	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Aldicarb (MS)	EPA 531.1	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Aldicarb sulfone	EPA 531.1	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Aldicarb sulfoxide	EPA 531.1	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Aldrin	EPA 508 EPA 525.2	EPA 608	EPA 3520C/8081B	EPA 3546/8081B
Atrazine	EPA 525.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
alpha-BHC	EPA 508 EPA 525.2	EPA 608	EPA 3520C/8081B	EPA 3546/8081B
Bentazon	EPA 515.1	- - - - - - - - - -	- - - - - - - - - -	----------
beta-BHC	EPA 508 EPA 525.2	EPA 608	EPA 3520C/8081B	EPA 3546/8081B
delta-BHC	EPA 508 EPA 525.2	EPA 608	EPA 3520C/8081B	EPA 3546/8081B

Parameter/Analyte	Potable Water	Nonpotable Water	Solid Hazardous Waste	
			Aqueous	Solid
gamma-BHC	EPA 508 EPA 525.2	EPA 608	EPA 3520C/8081B	EPA 3546/8081B
Carbaryl	EPA 531.1	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Carbofuran (MS)	EPA 531.1	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Chloramben	EPA 515.1			
Chlordane (technical)	EPA 508	EPA 608	EPA 3520C/8081B	EPA 3546/8081B
Chlordane (alpha)	EPA 525.2	EPA 608	EPA 3520C/8081B	EPA 3546/8081B
Chlordane (gamma)	EPA 525.2	EPA 608	EPA 3520C/8081B	EPA 3546/8081B
Chlorobenzilate	EPA 525.2		EPA 3520C/8081B	EPA 3546/8081B
Decachlorobiphenyl	- - - - - - - - - -	EPA 680	EPA 680	EPA 680
Dichlorobiphenyl	- - - - - - - - - -	EPA 680	EPA 680	EPA 680
Heptachlorobiphenyl	- - - - - - - - - -	EPA 680	EPA 680	EPA 680
Hexachlorobiphenyl	- - - - - - - - - -	EPA 680	EPA 680	EPA 680
Monochlorobiphenyl	- - - - - - - - - -	EPA 680	EPA 680	EPA 680
Nonachlorobiphenyl	- - - - - - - - - -	EPA 680	EPA 680	EPA 680
Octachlorobiphenyl	- - - - - - - - - -	EPA 680	EPA 680	EPA 680
Pentachlorobiphenyl	- - - - - - - - - -	EPA 680	EPA 680	EPA 680
Tetrachlorobiphenyl	- - - - - - - - - -	EPA 680	EPA 680	EPA 680
Trichlorobiphenyl	- - - - - - - - - -	EPA 680	EPA 680	EPA 680
Chloroneb	EPA 525.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Chlorpropham	EPA 525.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Chlorpyrifos	EPA 525.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Chlorthalonil	EPA 525.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Cycloate	EPA 525.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
2,4-D	EPA 515.1	EPA 615	EPA 8151A	EPA 8151A
2,6-Dichlorophenol	- - - - - - - - - -	EPA 615	EPA 8151A	EPA 8151A
DCPA (Dacthal)	EPA 515.1 EPA 525.2	- - - - - - - - - -	EPA 8151A	EPA 8151A
Dalapon	EPA 515.1	EPA 615	EPA 8151A	EPA 8151A
2,4-DB	EPA 515.1	EPA 615	EPA 8151A	EPA 8151A
2,4’-DDD	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8081B	EPA 3546/8081B
2,4’ DDE	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8081B	EPA 3546/8081B
2,4’-DDT	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8081B	EPA 3546/8081B
4,4’-DDD	EPA 508 EPA 525.2	EPA 608	EPA 3520C/8081B	EPA 3546/8081B
4,4’ DDE	EPA 508 EPA 525.2	EPA 608	EPA 3520C/8081B	EPA 3546/8081B
4,4’-DDT	EPA 508 EPA 525.2	EPA 608	EPA 3520C/8081B	EPA 3546/8081B
Dicamba	EPA 515.1	EPA 615	EPA 8151A	EPA 8151A
Dichlorvos	EPA 525.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
3,5-Dichlorobenzoic acid	EPA 515.1	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
2,3-Dichlorobiphenyl (PCB 5)	EPA 525.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -

Parameter/Analyte	Potable Water	Nonpotable Water	Solid Hazardous Waste	
			Aqueous	Solid
Dichloroprop	EPA 515.1	EPA 615	EPA 8151A	EPA 8151A
Dieldrin	EPA 508 EPA 525.2	EPA 608	EPA 3520C/8081B	EPA 3546/8081B
Dinoseb	EPA 515.1	EPA 615	EPA 8151A	EPA 8151A
Diquat	EPA 549.2	- - - - - - - - - -	- - - - - - - - -	- - - - - - - - - -
Disulfoton	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C /8270D	EPA 3546/8270D
Endosulfan I (alpha)	EPA 508 EPA 525.2	EPA 608	EPA 3520C/8081B	EPA 3546/8081B
Endosulfan II (beta)	EPA 508 EPA 525.2	EPA 608	EPA 3520C/8081B	EPA 3546/8081B
Endosulfan sulfate	EPA 508 EPA 525.2	EPA 608	EPA 3520C/8081B	EPA 3546/8081B
Endothall	EPA 548.1	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Endrin	EPA 508 EPA 525.2	EPA 608	EPA 3520C/8081B	EPA 3546/8081B
Endrin aldehyde	EPA 508 EPA 525.2	EPA 608	EPA 3520C/8081B	EPA 3546/8081B
Endrin ketone	- - - - - - - - - -	EPA 608	EPA 3520C/8081B	EPA 3546/8081B
Famphur	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C /8270D	EPA 3546/8270D
Glyphosate	EPA 547	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Heptachlor	EPA 508 EPA 525.2	EPA 608	EPA 3520C/8081B	EPA 3546/8081B
Heptachlor epoxide	EPA 508 EPA 525.2	EPA 608	EPA 3520C/8081B	EPA 3546/8081B
2,2',4,4',5,6'-Hexachlorobiphenyl (PCB 154)	EPA 525.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
3-Hydroxycarbofuran	EPA 531.1	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Isodrin	- - - - - - - - - -		EPA 3520C/8081B	EPA 3546/8081B
MCPA	EPA 515.1	EPA 615	EPA 8151A	EPA 8151A
MCPP	EPA 515.1	EPA 615	EPA 8151A	EPA 8151A
Methiocarb	EPA 531.1	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Methomyl	EPA 531.1	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Methoxychlor	EPA 508 EPA 525.2	EPA 608	EPA 3520C/8081B	EPA 3546/8081B
Mirex	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8081B	EPA 3546/8081B
4-Nitrophenol	EPA 515.1	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
2,2',3,3',4,5',6,6'-Octachlorobiphenyl (PCB 201)	EPA 525.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Oxamyl (MS)	EPA 531.1	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Paraquat	EPA 549.2	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Parathion ethyl	- - - - - - - - - -	EPA 614	EPA 3520C /8270D	EPA 3546/8270D
Parathion methyl	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C /8270D	EPA 3546/8270D
PCB-1016	EPA 508	EPA 608	EPA 3520C/8082A	EPA 3546/8082A
PCB-1221	EPA 508	EPA 608	EPA 3520C/8082A	EPA 3546/8082A

Parameter/Analyte	Potable Water	Nonpotable Water	Solid Hazardous Waste	
			Aqueous	Solid
PCB-1232	EPA 508	EPA 608	EPA 3520C/8082A	EPA 3546/8082A
PCB-1242	EPA 508	EPA 608	EPA 3520C/8082A	EPA 3546/8082A
PCB-1248	EPA 508	EPA 608	EPA 3520C/8082A	EPA 3546/8082A
PCB-1254	EPA 508	EPA 608	EPA 3520C/8082A	EPA 3546/8082A
PCB-1260	EPA 508	EPA 608	EPA 3520C/8082A	EPA 3546/8082A
PCB-1262	EPA 508	EPA 608	EPA 3520C/8082A	EPA 3546/8082A
PCB-1268	EPA 508	EPA 608	EPA 3520C/8082A	EPA 3546/8082A
PCBs, Total	EPA 508	EPA 608	EPA 3520C/8082A	EPA 3546/8082A
Pentachlorophenol	EPA 515.1	----------	EPA 8151A	EPA 8151A
Picloram	EPA 515.1	----------	EPA 8151A	EPA 8151A
Propachlor	EPA 525.2	----------	----------	----------
Propoxur (Baygon)	EPA 531.1	----------	----------	----------
Simazine	EPA 525.2	----------	----------	----------
Stirophos	EPA 525.2	----------	----------	----------
Sulfotepp	----------	----------	EPA 3520C /8270D	EPA 3546/8270D
2,4,5-T	EPA 515.1	EPA 615	EPA 8151A	EPA 8151A
Thionazin	----------	----------	EPA 3520C /8270D	EPA 3546/8270D
2,4,6-Trichlorophenol	----------	EPA 615	EPA 8151A	EPA 8151A
2,4,5-TP (Silvex)	EPA 515.1	EPA 615	EPA 8151A	EPA 8151A
Toxaphene	EPA 508	EPA 608	EPA 3520C/8081B	EPA 3546/8081B
Hazardous Waste Characteristics				
BTU	----------	ASTM D240	ASTM D240	ASTM D240
Free Liquid	----------	----------	----------	EPA 9095B
Ignitability	----------	EPA 1010A	EPA 1010A	EPA 1030
Specific Gravity	----------	SM2710 F	SM2710 F	SM2710 F
SPLC	----------	----------	EPA 1312	EPA 1312
TCLP	----------	----------	EPA 1311	EPA 1311
Air Testing				
Purgeable Organics				
Methane (FID)	----------	RSK-175	RSK-175	----------
Methane (TCD)	----------	RSK-175	RSK-175	----------
Ethane (FID)	----------	RSK-175	RSK-175	----------
Ethene (FID)	----------	RSK-175	RSK-175	----------
Kentucky UST Program				
TCLP Metals				
Arsenic	----------	----------	EPA 3005A/6010B EPA 3010A/6010B SM3030C/EPA 6010B	EPA 3005A/6010B EPA 3010A/6010B SM3030C/EPA 6010B
Barium	----------	----------	EPA 3005A/6010B EPA 3010A/6010B SM3030C/EPA 6010B	EPA 3005A/6010B EPA 3010A/6010B SM3030C/EPA 6010B

Parameter/Analyte	**Potable Water**	**Nonpotable Water**	**Solid Hazardous Waste**	
			Aqueous	**Solid**
Cadmium	- - - - - - - - - -	- - - - - - - - - -	EPA 3005A/6010B EPA 3010A/6010B SM3030C/EPA 6010B	EPA 3005A/6010B EPA 3010A/6010B SM3030C/EPA 6010B
Chromium	- - - - - - - - - -	- - - - - - - - - -	EPA 3005A/6010B EPA 3010A/6010B SM3030C/EPA 6010B	EPA 3005A/6010B EPA 3010A/6010B SM3030C/EPA 6010B
Lead	- - - - - - - - - -	- - - - - - - - - -	EPA 3005A/6010B EPA 3010A/6010B SM3030C/EPA 6010B	EPA 3005A/6010B EPA 3010A/6010B SM3030C/EPA 6010B
Mercury	- - - - - - - - - -	- - - - - - - - - -	EPA 7470A	EPA 7470A
Selenium	- - - - - - - - - -	- - - - - - - - - -	EPA 3005A/6010B EPA 3010A/6010B SM3030C/EPA 6010B	EPA 3005A/6010B EPA 3010A/6010B SM3030C/EPA 6010B
Silver	- - - - - - - - - -	- - - - - - - - - -	EPA 3005A/6010B EPA 3010A/6010B SM3030C/EPA 6010B	EPA 3005A/6010B EPA 3010A/6010B SM3030C/EPA 6010B
Organics				
PAH	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270C	EPA 3546/8270C
DRO	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8015B	EPA 3550B/8015B EPA 3545/8015B
GRO	- - - - - - - - - -	- - - - - - - - - -	EPA 5030B/8015B	EPA 5035A/8015B
TPH (Oil and Grease)	- - - - - - - - - -	- - - - - - - - - -	EPA 9071	EPA 9071
TCLP Volatiles	- - - - - - - - - -	- - - - - - - - - -	EPA 5030B/8260B	EPA 5030B/8260B
TCLP Semi-Volatiles	- - - - - - - - - -	- - - - - - - - - -	EPA 3520C/8270C	EPA 3520C/8270C

Appendix E
Technical Specification

SECTION 01 33 00

SUBMITTAL PROCEDURES
05/11

PART 1 GENERAL

1.1 SUMMARY

The Contracting Officer may request submittals in addition to those specified when deemed necessary to adequately describe the work covered in the respective sections.

Units of weights and measures used on all submittals are to be the same as those used in the contract drawings.

Each submittal is to be complete and in sufficient detail to allow ready determination of compliance with contract requirements.

Contractor's Quality Control (CQC) System Manager and the Designer of Record, if applicable, to check and approve all items prior to submittal and stamp, sign, and date indicating action taken. Proposed deviations from the contract requirements are to be clearly identified. Include within submittals items such as: Contractor's, manufacturer's, or fabricator's drawings; descriptive literature including (but not limited to) catalog cuts, diagrams, operating charts or curves; test reports; test cylinders; samples; O&M manuals (including parts list); certifications; warranties; and other such required submittals.

Submittals requiring Government approval are to be scheduled and made prior to the acquisition of the material or equipment covered thereby. Pick up and dispose of samples not incorporated into the work in accordance with manufacturer's Material Safety Data Sheets (MSDS) and in compliance with existing laws and regulations.

1.2 DEFINITIONS

1.2.1 Submittal Descriptions (SD)

Submittals requirements are specified in the technical sections. Submittals are identified by Submittal Description (SD) numbers and titles as follows:

SD-01 Preconstruction Submittals

Submittals which are required prior to start of construction (work) issuance of contract notice to proceed or commencing work on site or the start of the next major phase of the construction on a multi-phase contract, includes schedules, tabular list of data, or tabular list including location, features, or other pertinent information regarding products, materials, equipment, or components to be used in the work.

- Certificates of insurance
- Surety bonds
- List of proposed Subcontractors
- List of proposed products
- Construction progress schedule
- Network Analysis Schedule (NAS)
- Submittal register
- Schedule of prices
- Health and safety plan
- Work plan
- Quality Control (QC) plan
- Environmental protection plan
- SD-06 Test Reports

Report signed by authorized official of testing laboratory that a material, product or system identical to the material, product or system to be provided has been tested in accord with specified requirements. (Testing must have been within three years of date of contract award for the project.)

Report which includes findings of a test required to be performed by the Contractor on an actual portion of the work or prototype prepared for the project before shipment to job site.

Report which includes finding of a test made at the job site or on sample taken from the job site, on portion of work during or after installation.

Investigation reports.

Daily logs and checklists.

Final acceptance test and operational test procedure.

SD-07 Certificates

Statements printed on the manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material

attesting that product, system or material meets specification requirements. Must be dated after award of project contract and clearly name the project.

Document required of Contractor, or of a manufacturer, supplier, installer or Subcontractor through Contractor, the purpose of which is to further quality of orderly progression of a portion of the work by documenting procedures, acceptability of methods or personnel qualifications.

Confined space entry permits.

Text of posted operating instructions.

SD-08 Manufacturer's Instructions

Preprinted material describing installation of a product, system or material, including special notices and (MSDS) concerning impedances, hazards and safety precautions.

SD-11 Closeout Submittals

Documentation to record compliance with technical or administrative requirements or to establish an administrative mechanism.

Special requirements necessary to properly close out a construction contract. For example, Record Drawings and as-built drawings. Also, submittal requirements necessary to properly close out a major phase of construction on a multi-phase contract.

Interim "DD Form 1354" with cost breakout for all assets 30 days prior to facility turnover.

1.2.2 Approving Authority

Office or designated person authorized to approve submittal.

1.2.3 Work

As used in this section, on- and off-site construction required by contract documents, including labor necessary to produce submittals, except those SD-01 Pre-Construction Submittals noted above, construction, materials, products, equipment, and systems incorporated or to be incorporated in such construction.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor QC approval. Submit the following in accordance with this section.

SD-01 Preconstruction Submittals
Submittal Register; G

1.4 SUBMITTAL CLASSIFICATION

Submittals are classified as follows:

1.4.1 Designer of Record Approved (DA)

Designer of Record (DOR) approval is required for extensions of design, critical materials, any deviations from the solicitation, the accepted proposal, or the completed design, equipment whose compatibility with the entire system must be checked, and other items as designated by the Contracting Officer. Within the terms of the Contract Clause entitled, "Specifications and Drawings for Construction," they are considered to be "shop drawings." Contractor to provide the Government with the number of copies designated hereinafter of all DOR approved submittals. The Government may review any or all Designer of Record approved submittals for conformance to the Solicitation, Accepted Proposal and the completed design. The Government will review all submittals designated as deviating from the Solicitation or Accepted Proposal, as described below. Generally, design submittals should be identified as SD-05 Design Data submittals.

1.4.2 Government Approved

Government approval is required for extensions of design, critical materials, deviations, equipment whose compatibility with the entire system must be checked, and other items as designated by the Contracting Officer. Government approval is required for any deviations from the Solicitation or Accepted Proposal and other items as designated by the Contracting Officer. Within the terms of the Contract Clause entitled, "Specifications and Drawings for Construction," they are considered to be "shop drawings."

1.4.3 Government Conformance Review of Design (CR)

The Government will review all intermediate and final design submittals for conformance with the technical requirements of the solicitation. Review will be only for conformance with the applicable codes, standards and contract requirements.

1.4.4 Designer of Record Approved/Government Conformance Review (DA/CR)

1.4.4.1 Deviations to the Accepted Design

Designer of Record approval and the Government's concurrence are required for any proposed deviation from the accepted design which still complies with the contract before the Contractor is authorized to proceed with material acquisition or installation. Within the terms of the Contract Clause entitled, "Specifications and Drawings for Construction", they are considered to be "shop drawings." If necessary to facilitate the project schedule, the Contractor and the DOR may discuss a submittal proposing a deviation with the Contracting Officer's Representative prior to officially submitting it to the Government. However, the Government reserves the right to review the submittal before providing an opinion, if deemed necessary. In any case, the Government will not formally agree to or provide a preliminary opinion on any deviation without the DOR's approval or recommended approval. The Government reserves the right to non-concur with any deviation from the design, which may impact furniture, furnishings, equipment selections or operations decisions that were made, based on the reviewed and concurred design.

1.4.4.2 Substitutions

Unless prohibited or provided for otherwise elsewhere in the Contract, where the accepted contract proposal named products, systems, materials or equipment by manufacturer, brand name and/or by model number or other specific identification, and the Contractor desires to substitute manufacturer or model after award, submit a requested substitution for Government concurrence. Include substantiation, identifying information and the DOR's approval, as meeting the contract requirements and that it is equal in function, performance, quality and salient features to that in the accepted contract proposal. If the Contract otherwise prohibits substitutions of equal named products, systems, materials or equipment by manufacturer, brand name and/or by model number or other specific identification, the request is considered a "variation" to the contract. Variations are discussed below in paragraphs: "Designer of Record Approved/Government Approved" and "VARIATIONS."

1.4.5 Designer of Record Approved/Government Approved (DA/GA)

In addition to the above stated requirements for proposed deviations to the accepted design, both Designer of Record and Government Approval and, where applicable, a contract modification are required before the Contractor is authorized to proceed with material acquisition or installation for any proposed variation to the contract (the solicitation and/or the accepted proposal), which constitutes a change to the contract terms. Within the terms of the Contract

Clause entitled, "Specifications and Drawings for Construction," they are considered to be "shop drawings." The Government reserves the right to accept or reject any such proposed deviation at its discretion.

1.4.6 Information Only

Submittals not requiring Government approval will be for information only. For Design-build construction all submittals not requiring Designer of Record or Government approval will be for information only. They are not considered to be "shop drawings" within the terms of the Contract Clause referred to above.

1.5 FORWARDING SUBMITTALS REQUIRING GOVERNMENT APPROVAL

1.5.1 Submittals Required from the Contractor

As soon as practicable after award of contract, and before procurement of fabrication, forward to the Ms. Debbie R. Sanders, BRAC Program Management Office SE, 4130 Farber Place Drive, North Charleston, SC 29405-8503 and Architect-Engineer: Resolution Consultants submittals required in the technical sections of this specification, including shop drawings, product data and samples. One copy of the transmittal form for all submittals shall be forwarded to the Resident Officer in Charge of Construction.

The Architect-Engineer for this project will review and approve for the Contracting Officer those submittals reserved for Contracting Officer approval to verify submittals comply with the contract requirements.

1.5.1.1 O&M Data

The Architect-Engineer for this project will review and approve for the Contracting Officer O&M Data to verify the submittals comply with the contract requirements; submit data specified for a given item within 30 calendar days after the item is delivered to the contract site.

In the event the Contractor fails to deliver O&M Data within the time limits specified, the Contracting Officer may withhold from progress payments 50 percent of the price of the item with which such O&M Data are applicable.

1.5.1.2 Overseas Shop Drawing Submittals

All submittals shall be sent via overnight express mail service. All costs associated with the overnight express mail service shall be borne by the construction Contractor. Costs associated with the overnight express mail of

submittals related to proposed submittal variances of resubmittals necessary as a result of noncompliant or incomplete Contractor submittals shall be the responsibility of the Contractor.

1.6 PREPARATION

1.6.1 Transmittal Form

Use the attached sample transmittal form (ENG Form 4025) for submitting both Government approved and information only submittals in accordance with the instructions on the reverse side of the form. Properly complete this form by filling out all the heading blank spaces and identifying each item submitted. Exercise special care to ensure proper listing of the specification paragraph and sheet number of the contract drawings pertinent to the data submitted for each item.

1.6.2 Identifying Submittals

When submittals are provided by a Subcontractor, the Prime Contractor is to prepare, review and stamp with Contractor's approval all specified submittals prior to submitting for Government approval.

Identify submittals, except sample installations and sample panels, with the following information permanently adhered to or noted on each separate component of each submittal and noted on transmittal form. Mark each copy of each submittal identically, with the following:

a. Project title and location.

b. Construction contract number.

c. Date of the drawings and revisions.

d. Name, address, and telephone number of subcontractor, supplier, manufacturer and any other subcontractor associated with the submittal.

e. Section number of the specification section by which submittal is required.

f. Submittal description (SD) number of each component of submittal.

g. When a resubmission, add alphabetic suffix on submittal description, for example, submittal 18 would become 18A, to indicate resubmission.

h. Product identification and location in project.

1.6.3 Format for SD-02 Shop Drawings
(Not Used)

1.6.4 Format of SD-03 Product Data and SD-08 Manufacturer's Instructions
(Not Used)

1.6.5 Format of SD-04 Samples
(Not Used)

1.6.6 Format of SD-05 Design Data and SD-07 Certificates
(Not Used)

1.6.7 Format of SD-06 Test Reports and SD-09 Manufacturer's Field Reports

Provide reports on 8 1/2 by 11 inches paper in a complete bound volume.

Indicate by prominent notation, each report in the submittal. Indicate specification number and paragraph number to which it pertains.

1.6.8 Format of SD-10 Operation and Maintenance Data (O&M)

Comply with the requirements specified in Section 01 78 23 OPERATION AND MAINTENANCE DATA for O&M Data format.

1.6.9 Format of SD-01 Preconstruction Submittals and SD-11 Closeout Submittals

When submittal includes a document which is to be used in project or become part of project record, other than as a submittal, do not apply Contractor's approval stamp to document, but to a separate sheet accompanying document.

1.7 QUANTITY OF SUBMITTALS

1.7.1 Number of Copies of SD-02 Shop Drawings
(Not Used)

1.7.2 Number of Copies of SD-03 Product Data and SD-08 Manufacturer's Instructions
(Not Used)

1.7.3 Number of Samples SD-04 Samples
(Not Used)

1.7.4 Number of Copies SD-05 Design Data and SD-07 Certificates
(Not Used)

1.7.5 Number of Copies SD-06 Test Reports and SD-09 Manufacturer's Field Reports

Submit in compliance with quantity and quality requirements specified for shop drawings other than field test results that will be submitted with QC reports.

1.7.6 Number of Copies of SD-10 Operation and Maintenance Data
(Not Used)

1.7.7 Number of Copies of SD-01 Preconstruction Submittals and SD-11 Closeout Submittals

Unless otherwise specified, submit three sets of administrative submittals.

1.8 INFORMATION ONLY SUBMITTALS

Normally submittals for information only will not be returned. Approval of the Contracting Officer is not required on information only submittals. The Government reserves the right to require the Contractor to resubmit any item found not to comply with the contract. This does not relieve the Contractor from the obligation to furnish material conforming to the plans and specifications; will not prevent the Contracting Officer from requiring removal and replacement of nonconforming material incorporated in the work; and does not relieve the Contractor of the requirement to furnish samples for testing by the Government laboratory or for check testing by the Government in those instances where the technical specifications so prescribe.

1.9 VARIATIONS

Variations from contract requirements require both Designer of Record (DOR) and Government approval pursuant to contract Clause FAR 52.236-21 and will be considered where advantageous to Government.

1.9.1 Considering Variations

Discussion with Contracting Officer prior to submission, after consulting with the DOR, will help ensure functional and quality requirements are met and minimize rejections and re-submittals. When contemplating a variation which results in lower cost, consider submission of the variation as a Value Engineering Change Proposal (VECP).

Specifically point out variations from contract requirements in transmittal letters. Failure to point out deviations may result in the Government requiring rejection and removal of such work at no additional cost to the Government.

1.9.2 Proposing Variations

When proposing variation, deliver written request to the Contracting Officer, with documentation of the nature and features of the variation and why the variation is desirable and beneficial to Government, including the DOR's written analysis and approval. If lower cost is a benefit, also include an estimate of the cost savings. In addition to documentation required for variation, include the submittals required for the item. Clearly mark the proposed variation in all documentation.

Check the column "variation" of ENG Form 4025 for submittals which include proposed deviations requested by the Contractor. Set forth in writing the reason for any deviations and annotate such deviations on the submittal. The Government reserves the right to rescind inadvertent approval of submittals containing unnoted deviations.

1.9.3 Warranting That Variations Are Compatible

When delivering a variation for approval, Contractor, including its Designer(s) of Record, warrants that this contract has been reviewed to establish that the variation, if incorporated, will be compatible with other elements of work.

1.9.4 Review Schedule Is Modified

In addition to normal submittal review period, a period of 10 working days will be allowed for consideration by the Government of submittals with variations.

1.10 SUBMITTAL REGISTER AND DATABASE

1.10.1 Use of Submittal Register

Submit submittal register with QC plan and project schedule. Verify that all submittals required for project are listed and add missing submittals. Coordinate and complete the following fields on the register database submitted with the QC plan and the project schedule:

- Column (a) Activity Number: Activity number from the project schedule.
- Column (g) Contractor Submit Date: Scheduled date for approving authority to receive submittals.

- Column (h) Contractor Approval Date: Date Contractor needs approval of submittal.

- Column (i) Contractor Material: Date that Contractor needs material delivered to Contractor control.

1.10.2 Contractor Use of Submittal Register

Update the following fields with each submittal throughout contract:

- Column (b) Transmittal Number: Contractor assigned list of consecutive numbers.

- Column (j) Action Code (k): Date of action used to record Contractor's review when forwarding submittals to QC.

- Column (l) List date of submittal transmission.

- Column (q) List date approval received.

1.10.3 Approving Authority Use of Submittal Register

Update the following fields:

- Column (b) Transmittal Number: Contractor assigned list of consecutive numbers.

- Column (l) List date of submittal receipt.

- Column (m) through (p) List Date related to review actions.

- Column (q) List date returned to Contractor.

1.10.4 Action Codes

Entries for columns (j) and (o), are to be used are as follows (others may be prescribed by Transmittal Form):

1.10.4.1 Contractor Action Codes

NR - Not Received

AN - Approved as noted

A - Approved

RR - Disapproved, Revise, and Resubmit

1.10.5 Copies Delivered to the Government

Deliver one copy of submittal register updated by Contractor to Government with each invoice request. Deliver in electronic format, unless a paper copy is requested by Contracting Officer.

1.11 SCHEDULING

Schedule and submit concurrently submittals covering component items forming a system or items that are interrelated. Include certifications to be submitted with the pertinent drawings at the same time. No delay damages or time extensions will be allowed for time lost in late submittals.

a. Coordinate scheduling, sequencing, preparing and processing of submittals with performance of work so that work will not be delayed by submittal processing. Allow for potential resubmittal of requirements.

b. Submittals called for by the contract documents will be listed on the register. If a submittal is called for but does not pertain to the contract work, the Contractor is to include the submittal in the register and annotate it "N/A" with a brief explanation. Approval by the Contracting Officer does not relieve the Contractor of supplying submittals required by the contract documents but which have been omitted from the register or marked "N/A."

c. Re-submit register and annotate monthly by the Contractor with actual submission and approval dates. When all items on the register have been fully approved, no further re-submittal is required.

d. Carefully control procurement operations to ensure that each individual submittal is made on or before the Contractor scheduled submittal date shown on the approved "Submittal Register."

e. Except as specified otherwise, allow review period, beginning with receipt by approving authority that includes at least 15 working days for submittals for QC Manager approval and 20 working days for submittals for Contracting Officer approval. Period of review for submittals with Contracting Officer approval begins when Government receives submittal from QC organization.

f. For submittals requiring review by fire protection engineer, allow review period, beginning when Government receives submittal from QC organization, of 30 working days for return of submittal to the Contractor.

g. Period of review for each resubmittal is the same as for initial submittal.

Within 15 calendar days of notice to proceed, provide, for approval by the Contracting Officer, the following schedule of submittals:

a. A schedule of shop drawings and technical submittals required by the specifications and drawings. Indicate the specification or drawing reference requiring the submittal; the material, item, or process for which the submittal is required; the "SD" number and identifying title of the submittal; the Contractor's anticipated submission date and the approval need date.

b. A separate schedule of other submittals required under the contract but not listed in the specifications or drawings. Schedule will indicate the contract requirement reference; the type or title of the submittal; the Contractor's anticipated submission date and the approved need date (if approval is required).

1.11.1 Reviewing, Certifying, Approving Authority

The QC organization is responsible for reviewing and certifying that submittals are in compliance with contract requirements. Approving authority on submittals is QC Manager unless otherwise specified for specific submittal. At each "Submittal" paragraph in individual specification sections, a notation "G," following a submittal item, indicates Contracting Officer is approving authority for that submittal item.

1.11.2 Constraints

Conform to provisions of this section, unless explicitly stated otherwise for submittals listed or specified in this contract.

Submit complete submittals for each definable feature of work. Submit at the same time components of definable feature interrelated as a system.

When acceptability of a submittal is dependent on conditions, items, or materials included in separate subsequent submittals, submittal will be returned without review.

Approval of a separate material, product, or component does not imply approval

of assembly in which item functions.

1.11.3 QC Organization Responsibilities

a. Note date on which submittal was received from Contractor on each submittal.

b. Review each submittal; and check and coordinate each submittal with requirements of work and contract documents.

c. Review submittals for conformance with project design concepts and compliance with contract documents.

d. Act on submittals, determining appropriate action based on QC organization's review of submittal.

(1) When QC Manager is approving authority, take appropriate action on submittal from the possible actions defined in paragraph entitled, "Approved Submittals," of the section."

(2) When Contracting Officer is approving authority or when variation has been proposed, forward submittal to Government with certifying statement or return submittal marked "not reviewed" or "revise and resubmit" as appropriate. The QC organization's review of submittal determines appropriate action.

e. Ensure that material is clearly legible.

f. Stamp each sheet of each submittal with QC certifying statement or approving statement, except that data submitted in bound volume or on one sheet printed on two sides may be stamped on the front of the first sheet only.

(1) When approving authority is Contracting Officer, QC organization will certify submittals forwarded to Contracting Officer with the following certifying statement:

"I hereby certify that the (equipment) (material) (article) shown and marked in this submittal is that proposed to be incorporated with contract Number N69450-08-C-0093, is in compliance with the contract drawings and specification, can be installed in the allocated spaces, and is submitted for Government approval.

Certified by Submittal Reviewer _____, Date _____
(Signature when applicable)

Certified by QC Manager _____, Date _____"
(Signature)

(2) When approving authority is QC Manager, QC Manager will use the following approval statement when returning submittals to Contractor as "Approved" or "Approved as Noted."

"I hereby certify that the (material) (equipment) (article) shown and marked in this submittal and proposed to be incorporated with contract Number N69450-08-C-0093, is in compliance with the contract drawings and specification, can be installed in the allocated spaces, and is approved for use.

Certified by Submittal Reviewer _____, Date _____
(Signature when applicable)

Approved by QC Manager _____, Date _____"
(Signature)

g. Sign certifying statement or approval statement. The QC organization member designated in the approved QC plan is the person signing certifying statements. The use of original ink for signatures is required. Stamped signatures are not acceptable.

h. Update submittal register as submittal actions occur and maintain the submittal register at project site until final acceptance of all work by Contracting Officer.

i. Retain a copy of approved submittals at project site, including Contractor's copy of approved samples.

1.11.4 Government Reviewed Design

The Government will review design submittals for conformance with the technical requirements of the solicitation. Section 01 33 16 DESIGN AFTER AWARD covers the design submittal and review process in detail. Government review is required for deviation from the completed design. Review will be only for conformance with the contract requirements. Included are only those construction submittals for which the Designer of Record design documents do not include enough detail to ascertain contract compliance. The Government may, but is not required, to review extensions of design such as structural steel or reinforcement shop drawings.

1.12 GOVERNMENT APPROVING AUTHORITY

When approving authority is Contracting Officer, the Government will:

a. Note date on which submittal was received from QC Manager.

b. Review submittals for approval within scheduling period specified and only for conformance with project design concepts and compliance with contract documents.

c. Identify returned submittals with one of the actions defined in paragraph entitled, "Review Notations," of this section and with markings appropriate for action indicated.

Upon completion of review of submittals requiring Government approval, stamp and date approved submittals. Two copies of the approved submittal will be retained by the Contracting Officer and Two copies of the submittal will be returned to the Contractor. If the Government performs a conformance review of other Designer of Record approved submittals, the submittals will be so identified and returned, as described above.

1.12.1 Review Notations

Contracting Officer review will be completed within 15 calendar days after date of submission. Submittals will be returned to the Contractor with the following notations:

a. Submittals marked "approved" or "accepted" authorize the Contractor to proceed with the work covered.

b. Submittals marked "approved as noted" "or approved except as noted, resubmittal not required," authorize the Contractor to proceed with the work covered provided he takes no exception to the corrections.

c. Submittals marked "not approved" or "disapproved," or "revise and resubmit," indicate noncompliance with the contract requirements or design concept, or that submittal is incomplete. Resubmit with appropriate changes. No work shall proceed for this item until resubmittal is approved.

d. Submittals marked "not reviewed" will indicate submittal has been previously reviewed and approved, is not required, does not have evidence of being reviewed and approved by Contractor, or is not complete. A submittal marked "not reviewed" will be returned with an explanation of the reason it is not reviewed. Resubmit submittals returned for lack of review by Contractor or for being incomplete, with

appropriate action, coordination, or change.

1.13 DISAPPROVED OR REJECTED SUBMITTALS

Contractor shall make corrections required by the Contracting Officer. If the Contractor considers any correction or notation on the returned submittals to constitute a change to the contract drawings or specifications; notice as required under the clause entitled, "Changes," is to be given to the Contracting Officer. Contractor is responsible for the dimensions and design of connection details and construction of work. Failure to point out deviations may result in the Government requiring rejection and removal of such work at the Contractor's expense.

If changes are necessary to submittals, the Contractor shall make such revisions and submission of the submittals in accordance with the procedures above. No item of work requiring a submittal change is to be accomplished until the changed submittals are approved.

1.14 APPROVED/ACCEPTED SUBMITTALS

The Contracting Officer's approval or acceptance of submittals is not to be construed as a complete check, and indicates only that the general method of construction, materials, detailing and other information are satisfactory. design, general method of construction, materials, detailing and other information appear to meet the Solicitation and Accepted Proposal.

Approval or acceptance will not relieve the Contractor of the responsibility for any error which may exist, as the Contractor under the Contractor Quality Control (CQC) requirements of this contract is responsible for dimensions, the design of adequate connections and details, and the satisfactory construction of all work design, dimensions, all design extensions, such as the design of adequate connections and details, etc., and the satisfactory construction of all work.

After submittals have been approved or accepted by the Contracting Officer, no resubmittal for the purpose of substituting materials or equipment will be considered unless accompanied by an explanation of why a substitution is necessary.

1.15 APPROVED SAMPLES

(Not Used)

1.16 WITHHOLDING OF PAYMENT

Payment for materials incorporated in the work will not be made if required approvals have not been obtained. No payment for materials incorporated in the work will be made if all required Designer of Record or required Government approvals have not been obtained. No payment will be made for any materials incorporated into the work for any conformance review submittals or information only submittals found to contain errors or deviations from the Solicitation or Accepted Proposal.

1.17 PROGRESS SCHEDULE

1.17.1 Bar Chart

a. Submit the progress chart, for approval by the Contracting Officer, at the Preconstruction Conference in one reproducible and 4 copies.

b. Prepare the progress chart in the form of a bar chart utilizing form "Construction Progress Chart" or comparable format acceptable to the Contracting Officer.

c. Include no less than the following information on the progress chart:

(1) Break out by major headings for primary work activity.

(2) A line item break out under each major heading sufficient to track the progress of the work.

(3) A line item showing contract finalization task which includes punch list, clean-up and demolition, and final construction drawings.

(4) A materials bar and a separate labor bar for each line item. Both bars will show the scheduled percentage complete for any given date within the contract performance period. Labor bar will also show the number of men (man-load) expected to be working on any given date within the contract performance period.

(5) The estimated cost and percentage weight of total contract cost for each materials and labor bar on the chart.

(6) Separate line items for mobilization and drawing submittal and approval. (These items are to show no associated costs.)

d. Update the progress schedule in one reproduction and 4 copies every 30 calendar days throughout the contract performance period.

1.17.2 Project Network Analysis
(Not Used)

1.18 STATUS REPORT ON MATERIALS ORDERS

Within 15 calendar days after notice to proceed, submit, for approval by the Contracting Officer, an initial material status report on all materials orders. This report will be updated and re-submitted every 15 calendar days as the status on material orders changes.

Report to include list, in chronological order by need date, materials orders necessary for completion of the contract. The following information will be required for each material order listed:

a. Material name, supplier, and invoice number.

b. Bar chart line item or CPM activity number affected by the order.

c. Delivery date needed to allow directly and indirectly related work to be completed within the contract performance period.

d. Current delivery date agreed on by supplier.

e. When item d exceeds item c, the effect that delayed delivery date will have on contract completion date.

f. When item d exceeds item c, a summary of efforts made by the Contractor to expedite the delayed delivery date to bring it in line with the needed delivery date, including efforts made to place the order (or subcontract) with other suppliers.

1.19 STAMPS

Stamps used by the Contractor on the submittal data to certify that the submittal meets contract requirements is to be similar to the following:

_____

CONTRACTOR (Firm Name)

_____ Approved

_____ Approved with corrections as noted on submittal data and/or

attached sheets(s)

SIGNATURE: _____

TITLE: _____

DATE: _____

For design-build construction, both the Contractor Quality Control System Manager and the Designer of Record are to stamp and sign to certify that the submittal meets contract requirements.

PART 2 PRODUCTS

(Not Used)

PART 3 EXECUTION

(Not Used)

-- End of Section --

SECTION 01 35 45.00 10

CHEMICAL DATA QUALITY CONTROL
04/06

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 200-1-1	(1994) Environmental Quality -- Validation of Analytical Chemistry Laboratories
EM 200-1-3	(2001) Engineering and Design -- Requirements for the Preparation of Sampling and Analysis Plans
EM 200-1-6	(1997) Environmental Quality -- Chemical Quality Assurance for HTRW Projects
ER 1110-1-263	(1998) Engineering and Design -- Chemical Data Quality Management for Hazardous, Toxic, Radioactive Waste Remedial Activities

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 540/R 94-008	(1999) USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review
EPA SW-846.3-3	(1999, Third Edition, Update III-A) Test Methods for Evaluating Solid Waste: Physical/Chemical Methods

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

40 CFR 261	Identification and Listing of Hazardous Waste

40 CFR 262	Standards Applicable to Generators of Hazardous Waste
40 CFR 268	Land Disposal Restrictions
49 CFR 172	Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements
49 CFR 178	Specifications for Packaging

1.2 ACRONYMS

The definition of acronyms used by the Contractor that pertain to chemical data quality control shall be clearly defined for all contract related products and communications.

1.3 MEASUREMENT AND PAYMENT

Separate payment will not be made for providing and maintaining the chemical data quality requirements including the chemical data quality management, chemical data validation, minimum chemical data reporting requirements, and chemical data quality submittal requirements; these costs shall be included in the applicable unit prices or lump sum prices contained in the bidding schedule.

1.4 CHEMISTRY REQUIREMENTS

Chemical Data Quality Control (CDQC) shall be as defined in ER 1110-1-263; this ER, which integrates USACE guidance on the subject, shall be supplemented by EM 200-1-6 for detail technical guidance on CDQC. Tables and charts defining Design Analysis (DA), ROD, and remedial technology specific chemistry shall be according to or consistent with EM 200-1-3.

1.4.1 Site History

Solid Waste Management Unit (SWMU) 56, located in the central portion of Naval Activity Puerto Rico (NAPR), covers an area of approximately 1.3 acres and is located on the south side of Ofstie Field, just off of the aircraft apron on the northwest side of Hangar 200. Hanger 200 has historically been used for aircraft maintenance. Interviews confirmed numerous past spills of petroleum, oils, and lubricant (POL) and hazardous materials from the 1950s to the 1990s, and former use of the concrete apron as an aircraft wash down area is considered likely. An aerial photography analysis presented in the ECP (Environmental Condition of

Property) Report noted that stains/liquid observed extending off the edge of the hardstand to a surrounding drainage ditch from 1958-1965. A concrete channel is estimated to have been constructed between 1985 and 1995, in the area of the stained soil adjacent to the concrete apron

1.4.2 Data Quality Objectives (DQO)

Sample acquisition, chemical analysis and chemical parameter measurements shall be performed so that the resulting data meet and support data use requirements. The chemical data shall be acquired, documented, verified and reported to ensure that the specified precision, accuracy, representativeness, comparability, completeness and sensitivity requirements are achieved.

1.4.3 Sampling, Analysis and Measurement

Supply all personnel, equipment, and facilities to collected and analyze the environmental samples required to characterized waste.

1.4.3.1 Soil/Sediment and Ground/Surface Water Samples

Soil/sediment and ground/surface water samples shall be collected and analyzed and/or shipped to a primary laboratory by the Navy's designated representative.

1.4.3.2 Process Solid and Liquid Samples

Process solid and liquid samples shall be collected and analyzed and/or shipped to a primary laboratory by the Navy's designated representative.

1.4.3.3 Borrow or Fill Material Samples

Borrow or fill material samples shall be collected and analyzed according to the Section 31 23 00.00 20.

1.4.3.4 Investigation Derived Waste Samples

Investigation derived waste (IDW) samples shall be collected and analyzed according to Section 1.4.3.1 and 1.4.3.2.

1.4.3.5 Manifesting Samples

Material shipping manifesting shall be in accordance with 40 CFR 261, 40 CFR 262, 40 CFR 268, 49 CFR 172, and 49 CFR 178.

1.4.3.6 Process Gas and Particulate Emission Samples
(Not Used)

1.4.3.7 Real-Time Instrumental Measurement Samples

Real-time instrumental measurements shall be analyzed onsite for chemical parameters.

1.4.3.8 Perimeter Air Monitoring Samples

Perimeter air monitoring samples shall be analyzed.

1.4.3.9 Compatibility Field Testing for Bulking Operations

Samples for compatibility field testing for bulking operations shall be conducted by the contractor. Use appropriate compatibility field tests before any bulking operations. The compatibility testing system shall include procedures for: 1) tests conducted prior to drum opening; 2) tests conducted at the drum head; 3) sample acquisition; 4) compatibility tests on collected samples; 5) sample compositing; 6) bulking; and 7) limitations.

1.4.3.10 Demolition Samples
(Not Used)

1.4.3.11 Field Screening

Field screening shall be performed by the contractor.

1.5 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Sampling and Analysis Plan; G,

Submit no later than 60 days after receipt of notice to proceed.

SD-06 Test Reports

QA Sample Collection and Analysis

Chemistry Data Package

Chemical Data Final Report; G,

Each report shall be labeled with the contract number, project name and location.

1.6 QUALITY ASSURANCE ELEMENTS

Follow the QA elements necessary to monitor and ensure the quality of chemical data produced.

1.6.1 Laboratory Validation Requirements

Propose the minimum number of laboratories that can attain or have attained U.S. Army Corps of Engineers (USACE) validation in accordance with EM 200-1-1 and consistent with contract required chemical data quality. The Contractor may propose laboratories that shall subsequently be validated by the USACE, or select currently validated USACE laboratories. Identify all proposed project laboratories no later than the coordination meeting. If a proposed analytical laboratory cannot meet specified analytical requirements or achieve the required validation, select another laboratory. If not currently validated, the USACE laboratory validation process requires a nominal 120 day process.

1.6.2 QA Sample Collection and Analysis

Collect and transport QA samples to the QA laboratory. Samples for all analyses (except volatiles) shall be taken as splits of homogenized samples. Samples for volatiles shall be collected as discrete duplicates/triplicates. Samples shall be collected at a rate of 10 percent per matrix per analysis per sampling event.

a. Submit the QA Laboratory Advance Notification (QALAN) to the QA laboratory at least 10 business days before the initial shipment of samples. The QALAN shall include a list of laboratory-related DQO. The DQO shall include, but shall not be limited to, identification of extraction and analysis method numbers, a list of analytes with required limits, estimated number of tests, approximate sampling dates, and requested completion date for QA testing. Notify the Contracting Officer (CO) and the QA laboratory immediately of any changes.

b. Provide all labor and field supplies, including sample containers and shipping coolers, for collecting and shipping samples for QA testing. In the presence of the Contracting Officer, properly collect, label, and package the QA samples, fill out all chain-of-custody forms, and ship the samples by one-day

delivery service to the designated QA laboratory for analysis. Notify the laboratory when all sampling is completed and shall clearly mark the chain-of-custody form accompanying the final shipment "FINAL" in 1 inch high lettering.

c. Allow 60 calendar days for laboratory analysis of QA samples, data review, and submission of the Government chemical quality assurance report. The elapsed time shall begin when the Contractor's last sample arrives at the QA laboratory, provided that the Contractor's completed chemistry data package is received within 30 calendar days thereafter. Otherwise, allow 30 calendar days from the date the completed chemistry data package is received at the laboratory. The Contractor may, as an option, continue activities based on initial sampling and QC results, before receipt of QA test results. Where QA results are unacceptable due to Contractor negligence (e.g. improper sample collection and/or handling by the Contractor), or where QA sample results conflict with the Contractor's primary sample results, further sampling and testing shall be performed as directed by the CO. All costs for such additional sampling and testing due to Contractor negligence, including both QC and QA testing and analysis, and for any required remedial actions in the work, shall be borne by the Contractor. USACE acceptance of final disposition of any excavated soil shall not occur until the Contractor's sampling and QC results have been confirmed by QA results. This includes all final stockpiling, wasting, backfilling, and related construction. No payment will be made for laboratory sampling and testing before receipt and acceptance by the Government of the QA samples and the completed Chemical Data Final Report (CDFR), properly formulated according to these specifications.

1.6.3 Single or Double Blind Performance Evaluation Samples

Submit certified soil and water Performance Evaluation (PE) samples. The PE samples shall contain the site specific contaminants of concern. The analytes shall be contained in the PE samples at the site specific action levels for each target analyte.

1.6.4 Review of Primary Laboratory Data

Secure independent data review of the entire primary data set.

1.6.5 Validation of Data

Validate 100 percent of the data in accordance with EPA 540/R 94-008. The data validation strategy shall be established at the beginning of the project to be consistent with project DQO.

1.6.6 Electronic Tape Audits

Perform an electronic tape audit on 10 percent of project sample results. The raw data from a given batch shall be re-calculated and compared to the results reported by the laboratory. The data quality shall be measured by laboratory compliance with the required methods and acceptable practices for analysis and data reduction.

1.7 QUALIFICATIONS

1.7.1 Chemical Quality Control Officer

As a minimum, the Contractor's Chemical Quality Control Officer shall have: 5 years of experience related to investigations, studies, design and remedial actions at HTRW sites; and 4 field seasons (or one continuous calendar year experience) in calibration and operation of various field monitoring devices as well as standard analytical chemistry methods common for analyzing soil, water, air and other materials for chemical contamination assessment, including hazardous waste manifesting. The Chemical Quality Control Officer shall ensure that all chemistry related objectives including responsibilities for DQO definitions, sampling and analysis, project requirements for data documentation and validation, and final project reports are attained. The Chemical Quality Control officer need not be present onsite during routine sampling, but shall be available for consultation with Government and Contractor personnel.

1.7.2 Environmental Sampler

As a minimum, the Contractor's Environmental Sampler shall have: a BS degree in Chemistry, Environmental Science, Engineering, Geology, Hydrology, or a related field; 3 years of experience in the development and preparation of SAP and work plans; 3 years of experience in and knowledge of EPA methods for collecting environmental and hazardous waste samples; 3 years of experience in operation of field screening equipment (e.g. PID, FID, infrared spectrometer, immunoassay, etc.); and 4 field seasons of experience with the particular field screening techniques for use on this project. The Environmental Sampler shall collect all onsite samples and perform all field screening tests. The Environmental Sampler shall review the sampling results, and provide recommendations for the Contractor's sampling program. The Environmental Sampler shall be onsite during excavation and stockpiling operations involving contaminated soil or soil to be checked for contamination.

1.8 COORDINATION MEETING

After the preconstruction conference, before any sampling or testing, the

Contractor and the Contracting Officer will meet at to discuss the CQC Plan and the SAP. The coordination meeting will be simultaneous to any CQC coordination meeting required in Section 01 45 00.00 10 QUALITY CONTROL unless otherwise indicated or directed. A list of definable features that involve chemical measurements shall be agreed upon. At a minimum, each matrix (soil, water, air, containerized wastes, radioactive wastes, instrumental chemical parameter measurement, etc.) shall be a definable work feature. Management of the chemical data quality system including project DQO, project submittals, chemical data documentation, chemical data assessment, required sampling and analysis protocols, and minimum data reporting requirements shall be agreed upon. The meeting will serve to establish an interrelationship between the Contractor's chemical data quality management and Government chemical quality assurance requirements. Minutes of the meeting will be documented by the Government and shall be signed by both the Contractor and the Contracting Officer. The minutes will include any or all unresolved chemical issues along with the conditions for resolution and will become a part of the contract file.

PART 2 PRODUCTS

(Not Used)

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

Provide chemical sample acquisition, sample analysis, instrumental measurements of chemical parameters for chemical data quality control. An effective chemical data quality control system shall be established that meets the requirements for the chemical measurement DQO applicable to the project. The system shall cover chemical measurements pertaining to and required for Contractor and subcontractor produced chemical data. Control field screening, sampling, and testing in conjunction with remedial activities to meet all DQO; minimize the amount of excavated material requiring temporary storage; prevent dilution of contaminated soils with clean soils; and ensure completion of work within the required time.

For SWMU 56 soil, confirmation samples will be collected from each sidewall of the excavation area at a frequency of one sample every 25 linear feet along the wall or a minimum of one sample per sidewall. No bottom samples will be collected as the excavation depths were established by ecological risk assessment.

Confirmation samples will be collected and analyzed for the cadmium and lead. At a minimum, the confirmation samples shall be analyzed for the following parameters:

- Lead 96 mg/kg

- Cadmium 1.8 mg/kg

Confirmation samples are not required for the sediment excavation. The removal of the upper one foot of drainage ditch sediment removes the potential pathways to ecological receptors.

A maximum turnaround time of 24 hours for sample analyses for confirmation samples shall be required.

3.1.2 Waste Characterization Samples

Waste characterization samples shall be collected for the purpose of determining handling, transportation, and disposal requirements and for determining personal and environmental protection and monitoring requirements. Collect soil and sediment characterization samples from each excavation area. One thoroughly mixed composite sample shall be collected for every 25 cubic yards or fraction thereof of material. The composite sample shall consist of six (6) grab samples representative of the material being sampled. The grab samples shall thoroughly mixed to obtain a relatively homogeneous mixture. At a minimum, the characterization samples shall be analyzed for the following parameters (additional analyses may be required by the disposal facility):

1. TCLP Metals - EPA Methods 7060, 7080, 7130, 7190, 7420, 7470, 7760, 7741
2. TCLP Volatiles - EPA Method 8240
3. TCLP Semi-Volatiles - EPA Method 8270
4. Pesticides/PCBs - EPA Method 8081/8082
5. RCRA Characteristics - SW-84 9010, 1010, 9012, 9030

The soil shall contain no free liquid as demonstrated by EPA SW-846 Method 9095, paint filter liquids test. The excavated sediment will be dewatered by placing it on polyethylene sheeting and allowing the excess water to drain or evaporate. The drained water will be containerized and samples will be collected for hazardous waste characterization.

In addition to the above analyses, the Contractor shall be responsible for performing any additional analyses required by the off-site soil disposal facility. These additional analyses shall be identified in the Contractor's Sampling and Analysis Plan.

3.1.3 Incidental Waste Samples

Collect samples from incidental wastes generated by the Contractor during normal construction activities (except general refuse) to determine applicable

transportation and disposal requirements. Also included under this category is all water generated during the remedial action including, but not limited to, water from decontamination of personnel and equipment, groundwater encountered during excavation, and rainfall and surface water runoff accumulated in the open excavations. Analyze incidental waste samples for the following parameters and any additional analyses required by the off-site disposal facility:

1. TCLP Metals - EPA Methods 7060, 7080, 7130, 7190, 7420, 7470, 7741, 7760
2. TCLP VOAs - EPA Method 8240

3.1.4 Sample Handling

Sampling, sample handling, and sampling containers must be consistent with the chemicals expected, the matrix of the sample, and planned analytical procedures. The Contractor shall describe in the Sampling and Analysis Plan strict chain-of-custody procedures to be used during collection, transport, and analysis of all samples.

3.1.5 Sampling Documentation

Maintain a sample log containing, at a minimum, the following information:

a. Date and Time of Sampling
b. Sample Locations
c. Sample Matrix
d. Sample Identification Number
e. QA/QC Sample Identification
f. Analyses to be Performed
g. Type and Number of Sample Containers
h. Signatures of Individuals Performing Sampling

3.2 QUALITY CONTROL PLAN

3.2.1 Additional Requirements

In addition to the quality control requirements, the CQC Plan shall incorporate the qualifications, authority and responsibilities of all chemical quality management and support personnel. Chemical measurements including sampling and/or chemical parameter measurement will not be permitted to begin until after production and acceptance of the CQC Plan, and Government approval of the SAP.

3.2.2 Chemistry Elements of the CQC Plan

To cover contract related chemical measurements by the Contractor and all subcontractors, the CQC Plan shall include the following as a minimum.

3.2.2.1 Qualifications

Names, education, experience qualifications, authorities, and decision-making responsibilities of all chemical quality management and support personnel. The CQC Plan shall contain a copy of a letter from the project QC manager designating and authorizing a Chemical Quality Control Officer and chemical quality control organization staff.

3.2.2.2 Authority and Responsibility

A diagram, flow chart, or figure clearly depicting the chemical data quality management and support staff and the authority and responsibility of each for chemical sampling and analysis, procedures for corrective actions, deliverables and submittals, deviations and changes, chemical quality documentation, data validation, minimum data reporting requirements, and DQO for chemical parameter measurement by the Contractor and subcontractors. The contents of this section of the CQC Plan shall be included in the applicable "Project Organization" elements of the FSP and the QAPP.

3.3 SAMPLING AND ANALYSIS PLAN

The SAP shall be prepared in accordance with CDQC requirements and EM 200-1-3. The SAP shall be a single document that contains two distinct elements: FSP and QAPP. Sections of the FSP and QAPP shall be cross referenced. The SAP shall confirm the Contractor's understanding of the contract requirements for chemical data quality control, and shall describe procedures for field sampling and sample submittal for analysis, field chemical parameter measurement, data documentation, data assessment and data reporting requirements. The SAP shall delineate the methods the Contractor intends to use to accomplish the chemical quality control items to assure accurate, precise, representative, complete, legally defensible and comparable data. The SAP shall describe all chemical parameter measurements for all matrices for all phases of the remediation contract. As a single interrelated document, the SAP shall be provided to field and laboratory personnel. The Contractor may propose original/innovative approaches to chemical parameter measurements for cost reduction and remediation efficiency by abbreviated sampling, contingency sampling and/or contingency analysis, indicator or tracer analysis, onsite analytical services, equivalency or screening methods. The SAP shall clearly identify the Contractor obtained laboratories. Furnish copies of the Government approved SAP to all laboratories and the Contractor's field sampling crew. The SAP shall address all levels of the investigation with enough detail to become a document which may be used as an audit guide for field and laboratory

work.

3.3.1 Field Sampling Plan

The FSP shall contain necessary technical detail and direction for the field personnel to understand sampling and field measurement requirements. The FSP shall provide a comprehensive description and full detail for personnel to perform all onsite activities required to attain project DQO, including: locations of samples, sampling procedures for onsite and offsite chemical analysis, summaries of analyses to be performed on samples, shipment of samples for offsite analyses, performance of onsite and offsite instrumental parameter measurements, data documentation and reporting requirements.

3.3.2 Quality Assurance Project Plan

The QAPP shall contain necessary technical detail and direction for field and laboratory personnel to understand project sample analysis, quality control and data reporting requirements, analytical methods, required detection limits, QC requirements, and data validation and reporting requirements.

3.4 CHEMISTRY DATA PACKAGE

The chemistry data package shall be produced and provided through USACE CO at the end of the project.

The chemistry data package shall contain information to demonstrate that the project's DQO have been fulfilled. The QA function will compare QA sample results to corresponding primary sample results, will assess the Contractor's compliance with the SAP, and will recommend corrective action as necessary.

3.5 CONTROL OF CHEMICAL DATA QUALITY

Contractor chemical data quality control shall ensure that a quality control program is in place that assures sampling and analytical activities and the resulting chemical parameter measurement data comply with the DQO and the requirements of the SAP. Utilize the three-phase control system that includes a preparatory, initial and follow-up phase for each definable feature of work.

3.6 ANALYTICAL TESTING LABORATORIES

Propose the analytical laboratories to be used for the primary samples analyses. Laboratory validation requirements shall be in accordance with paragraph Laboratory Validation Requirements. The Contractor may utilize its own laboratory or utilize subcontract laboratories to achieve the primary required sample analyses.

3.6.1 Laboratory Analytical Requirements

Provide the specified chemical analyses by the Contractor's laboratory. Provide chemical analyses to achieve the project DQO for all parameters specified by the methods. To give the USACE programs the greatest flexibility in the execution of its projects, the EPA SW-846.3-3 methods are generally the methods employed for the analytical testing of environmental samples. These methods are flexible and shall be adapted to individual project-specific requirements.

3.6.2 Laboratory Performance

Provide continued acceptable analytical performance and shall establish a procedure to address data deficiencies noted by review and/or quality assurance sample results. Provide and implement a mechanism for providing analytical labs with the SAP or QAPP portion of the SAP, for monitoring the lab's performance and for performing corrective action procedures. Acquire analytical services with additional USACE validated laboratories in the event a project lab loses its validation status during the project.

3.7 CHEMICAL DATA FINAL REPORT

The CDFR shall be produced including a summary of quality control practices employed and all chemical parameter measurement activities after project completion. As a minimum, the CDFR shall contain the following:

a. Summary of project scope and description.

b. Summary of any deviations from the design chemical parameter measurement specifications.

c. Summary of chemical parameter measurements performed as contingent measurements.

d. Summary discussion of resulting data including achieving data reporting requirements.

e. Summary of achieving project specific DQO.

e. Presentation and evaluation of the data to include an overall assessment on the quality of the data for each method and matrix.

g. Internal QC data generated during the project, including tabular summaries correlating sample identifiers with all blank, matrix spikes, surrogates, duplicates, laboratory control samples, and batch identifiers.

h. A list of the affected sample results for each analyte (indexed by method and matrix) including the appropriate data qualifier flag (J, B, R, etc.), where sample results are negatively impacted by adverse quality control criteria.

i. Summary of field and laboratory oversight activities, providing a discussion of the reliability of the data, QC problems encountered, and a summary of the evaluation of data quality for each analysis and matrix as indicated by the laboratory QC data and any other relevant findings.

j. Conclusions and recommendations.

k. Appendices containing: (1) Chemistry data package, and (2) Results of the Chemical Quality Assurance Report (CQAR). The CQAR is a Government produced document achieved through the inspection and analysis of QA samples and corresponding project sample data. The CQAR will include review of all QC parameters such as holding times, detection limits, method blanks, surrogate recoveries, matrix spikes and duplicates, and inter-laboratory and intra-laboratory data comparisons.

3.8 DOCUMENTATION

Documentation records shall be provided as factual evidence that required chemical data has been produced and chemical data quality has been achieved. The documentation shall comply with the requirements specified in paragraphs SAMPLING AND ANALYSIS PLAN, CHEMISTRY DATA PACKAGE, and CHEMICAL DATA FINAL REPORT. Documentation requirements shall be in accordance with Section 01 20 01.00 10 COST AND PERFORMANCE REPORT.

3.9 NOTIFICATION OF NON-COMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the foregoing requirements. Take immediate corrective action after receipt of such notice.

-- End of Section --

SECTION 01 57 19.00 20

TEMPORARY ENVIRONMENTAL CONTROLS
11/11

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 530/F-93/004	(1993; Rev O; Updates I, II, IIA, IIB, and III) Test Methods for Evaluating Solid Waste (Vol IA, IB, IC, and II) (SW-846)
EPA 833-R-060-04	(2000) Developing Your Storm Water Pollution Prevention Plan, a Guide for Construction Sites

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910.120	Hazardous Waste Operations and Emergency Response
40 CFR 112	Oil Pollution Prevention
40 CFR 122.26	Storm Water Discharges (Applicable to State NPDES Programs, see section 123.25)
40 CFR 241	Guidelines for Disposal of Solid Waste
40 CFR 243	Guidelines for the Storage and Collection of Residential, Commercial, and Institutional Solid Waste
40 CFR 258	Subtitle D Landfill Requirements
40 CFR 260	Hazardous Waste Management System: General
40 CFR 261	Identification and Listing of Hazardous Waste

40 CFR 262	Standards Applicable to Generators of Hazardous Waste
40 CFR 263	Standards Applicable to Transporters of Hazardous Waste
40 CFR 264	Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 265	Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 266	Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities
40 CFR 268	Land Disposal Restrictions
40 CFR 270	EPA Administered Permit Programs: The Hazardous Waste Permit Program
40 CFR 271	Requirements for Authorization of State Hazardous Waste Programs
40 CFR 272	Approved State Hazardous Waste Management Programs
40 CFR 273	Standards For Universal Waste Management
40 CFR 279	Standards for the Management of Used Oil
40 CFR 280	Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks (UST)
40 CFR 300	National Oil and Hazardous Substances Pollution Contingency Plan
40 CFR 355	Emergency Planning and Notification
40 CFR 372-SUBPART D	Specific Toxic Chemical Listings

40 CFR 761	Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions
40 CFR 82	Protection of Stratospheric Ozone
49 CFR 171	General Information, Regulations, and Definitions
49 CFR 172	Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements
49 CFR 173	Shippers - General Requirements for Shipments and Packagings
49 CFR 178	Specifications for Packagings

1.2 DEFINITIONS

1.2.1 Sediment

Soil and other debris that have eroded and have been transported by runoff water or wind.

1.2.2 Solid Waste

Garbage, refuse, debris, sludge, or other discharged material, including solid, liquid, semisolid, or contained gaseous materials resulting from domestic, industrial, commercial, mining, or agricultural operations. Types of solid waste typically generated at construction sites may include:

a. Green waste: The vegetative matter from landscaping, land clearing and grubbing, including, but not limited to, grass, bushes, scrubs, small trees and saplings, tree stumps and plant roots. Marketable trees, grasses and plants that are indicated to remain, be re-located, or be re-used are not included.

b. Surplus soil: Existing soil that is in excess of what is required for this work, including aggregates intended, but not used, for on-site mixing of concrete, mortars and paving. Contaminated soil meeting the definition of hazardous material or hazardous waste is not included.

c. Debris: Non-hazardous solid material generated during the construction, demolition, or renovation of a structure which exceeds 2.5 inch particle size that is: a manufactured object; plant or animal matter; or natural geologic material (e.g. cobbles and boulders), broken or removed concrete, masonry, and rock asphalt paving; ceramics; roofing paper and shingles. Inert materials may not be reinforced with or contain ferrous wire, rods, accessories and weldments. A mixture of debris and other material such as soil or sludge is also subject to regulation as debris if the mixture is comprised primarily of debris by volume, based on visual inspection.

d. Wood: Dimension and non-dimension lumber, plywood, chipboard, hardboard. Treated and/or painted wood that meets the definition of lead contaminated or lead based contaminated paint is not included.

e. Scrap metal: Scrap and excess ferrous and non-ferrous metals such as reinforcing steel, structural shapes, pipe and wire that are recovered or collected and disposed of as scrap. Scrap metal meeting the definition of hazardous material or hazardous waste is not included.

f. Paint cans: Metal cans that are empty of paints, solvents, thinners and adhesives. If permitted by the paint can label, a thin dry film may remain in the can.

g. Recyclables: Materials, equipment and assemblies such as doors, windows, door and window frames, plumbing fixtures, glazing and mirrors that are recovered and sold as recyclable. Metal meeting the definition of lead contaminated or lead based paint contaminated may not be included as recyclable if sold to a scrap metal company. Paint cans may not be included as recyclable if sold to a scrap metal company.

h. Hazardous Waste: By definition, to be a hazardous waste a material must first meet the definition of a solid waste. Hazardous waste and hazardous debris are special cases of solid waste. They have additional regulatory controls and must be handled separately. They are thus defined separately in this document.

Material not regulated as solid waste are: nuclear source or byproduct materials regulated under the Federal Atomic Energy Act of 1954 as amended; suspended or dissolved materials in domestic sewage effluent or irrigation return flows, or other regulated point source discharges; regulated air emissions; and fluids or wastes associated with natural gas or crude oil exploration or production.

1.2.3 Hazardous Debris

As defined in Solid Waste paragraph, debris that contains listed hazardous waste (either on the debris surface, or in its interstices, such as pore structure) per 40 CFR 261; or debris that exhibits a characteristic of hazardous waste per 40 CFR 261.

1.2.4 Chemical Wastes

This includes salts, acids, alkalizes, herbicides, pesticides, and organic chemicals.

1.2.5 Garbage

Refuse and scraps resulting from preparation, cooking, dispensing, and consumption of food.

1.2.6 Hazardous Waste

Any discarded material, liquid, solid, or gas, which meets the definition of hazardous material or is designated hazardous waste by the Environmental Protection Agency or State Hazardous Control Authority as defined in 40 CFR 260, 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, 40 CFR 265, 40 CFR 266, 40 CFR 268, 40 CFR 270, 40 CFR 271, 40 CFR 272, 40 CFR 273, 40 CFR 279, and 40 CFR 280.

1.2.7 Hazardous Materials

Hazardous materials as defined in 49 CFR 171 and listed in 49 CFR 172.

Hazardous material is any material that:

a. Is regulated as a hazardous material per 49 CFR 173, or

b. Requires a Material Safety Data Sheet (MSDS) per 29 CFR 1910.120, or

c. During end use, treatment, handling, packaging, storage, transpiration, or disposal meets or has components that meet or have potential to meet the definition of a hazardous waste as defined by 40 CFR 261 Subparts A, B, C, or D.

Designation of a material by this definition, when separately regulated or controlled by other instructions or directives, does not eliminate the need for adherence to that hazard-specific guidance which takes precedence over this instruction for "control" purposes. Such material include ammunition, weapons, explosive actuated devices, propellants, pyrotechnics, chemical and biological warfare materials, medical and pharmaceutical supplies, medical waste and infectious

materials, bulk fuels, radioactive materials, and other materials such as asbestos, mercury, and polychlorinated biphenyls (PCBs). Nonetheless, the exposure may occur incident to manufacture, storage, use and demilitarization of these items.

1.2.8 Waste Hazardous Material (WHM)

Any waste material which because of its quantity, concentration, or physical, chemical, or infectious characteristics may pose a substantial hazard to human health or the environment and which has been so designated. Used oil not containing any hazardous waste, as defined above, falls under this definition.

1.2.9 Oily Waste

Those materials which are, or were, mixed with used oil and have become separated from that used oil. Oily wastes also means materials, including wastewaters, centrifuge solids, filter residues or sludges, bottom sediments, tank bottoms, and sorbents which have come into contact with and have been contaminated by, used oil and may be appropriately tested and discarded in a manner which is in compliance with other State and local requirements.

This definition includes materials such as oily rags, "kitty litter" sorbent clay and organic sorbent material. These materials may be land filled provided that:

a. It is not prohibited in other State regulations or local ordinances

b. The amount generated is "de minimus" (a small amount)

c. It is the result of minor leaks or spills resulting from normal process operations

d. All free-flowing oil has been removed to the practical extent possible

Large quantities of this material, generated as a result of a major spill or in lieu of proper maintenance of the processing equipment, are a solid waste. As a solid waste, a hazardous waste determination must be performed prior to disposal. As this can be an expensive process, it is recommended that this type of waste be minimized through good housekeeping practices and employee education.

1.2.10 Regulated Waste

Those solid waste that have specific additional Federal, state, or local controls for handling, storage, or disposal.

1.2.11 Class I Ozone Depleting Substance (ODS)

Class I ODS is defined in Section 602(a) of The Clean Air Act and includes the following chemicals:

chlorofluorocarbon-11 (CFC-11)
chlorofluorocarbon-12 (CFC-12)
chlorofluorocarbon-13 (CFC-13)
chlorofluorocarbon-111 (CFC-111)
chlorofluorocarbon-112 (CFC-112)
chlorofluorocarbon-113 (CFC-113)
chlorofluorocarbon-114 (CFC-114)
chlorofluorocarbon-115 (CFC-115)
chlorofluorocarbon-211 (CFC-211)
chlorofluorocarbon-212 (CFC-212)
chlorofluorocarbon-213 (CFC-213)
chlorofluorocarbon-214 (CFC-214)
chlorofluorocarbon-215 (CFC-215)
chlorofluorocarbon-216 (CFC-216)
chlorofluorocarbon-217 (CFC-217)
chlorofluorocarbon-500 (CFC-500)
chlorofluorocarbon-502 (CFC-502)
chlorofluorocarbon-503 (CFC-503)
halon-1211
halon-1301
halon-2402
carbon tetrachloride
methyl bromide
methyl chloroform

Class II ODS is defined in Section 602(s) of The Clean Air Act and includes the following chemicals:

hydrochlorofluorocarbon-21 (HCFC-21)
hydrochlorofluorocarbon-22 (HCFC-22)
hydrochlorofluorocarbon-31 (HCFC-31)
hydrochlorofluorocarbon-121 (HCFC-121)
hydrochlorofluorocarbon-122 (HCFC-122)
hydrochlorofluorocarbon-123 (HCFC-123)

hydrochlorofluorocarbon-124 (HCFC-124)
hydrochlorofluorocarbon-131 (HCFC-131)
hydrochlorofluorocarbon-132 (HCFC-132)
hydrochlorofluorocarbon-133 (HCFC-133)
hydrochlorofluorocarbon-141 (HCFC-141)
hydrochlorofluorocarbon-142 (HCFC-142)
hydrochlorofluorocarbon-221 (HCFC-221)
hydrochlorofluorocarbon-222 (HCFC-222)
hydrochlorofluorocarbon-223 (HCFC-223)
hydrochlorofluorocarbon-224 (HCFC-224)
hydrochlorofluorocarbon-225 (HCFC-225)
hydrochlorofluorocarbon-226 (HCFC-226)
hydrochlorofluorocarbon-231 (HCFC-231)
hydrochlorofluorocarbon-232 (HCFC-232)
hydrochlorofluorocarbon-233 (HCFC-233)
hydrochlorofluorocarbon-234 (HCFC-234)
hydrochlorofluorocarbon-235 (HCFC-235)
hydrochlorofluorocarbon-251 (HCFC-251)
hydrochlorofluorocarbon-252 (HCFC-252)
hydrochlorofluorocarbon-253 (HCFC-253)
hydrochlorofluorocarbon-261 (HCFC-261)
hydrochlorofluorocarbon-262 (HCFC-262)
hydrochlorofluorocarbon-271 (HCFC-271)

1.2.11.1 Universal Waste

The universal waste regulations streamline collection requirements for certain hazardous wastes in the following categories: batteries, pesticides, mercury-containing equipment (e.g., thermostats) and lamps (e.g., fluorescent bulbs). The rule is designed to reduce hazardous waste in the municipal solid waste (MSW) stream by making it easier for universal waste handlers to collect these items and send them for recycling or proper disposal. These regulations can be found at 40 CFR 273.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL

PROCEDURES:

SD-01 Preconstruction Submittals

Preconstruction Survey; G

Solid Waste Management Plan and Permit; G

Regulatory Notifications; G

Environmental Management Plan; G

Storm Water Pollution Prevention Plan; G

Storm Water Notice of Intent (for NPDES coverage under the general permit for construction activities); G

Dirt and Dust Control Plan

Contractor Hazardous Material Inventory Log; G

SD-06 Test Reports

Laboratory Analysis

Disposal Requirements

Erosion and Sediment Control Inspection Reports

Storm Water Inspection Reports for General Permit

Contractor 40 CFR employee training records

Solid Waste Management Report; G

SD-11 Closeout Submittals

Some of the records listed below are also required as part of other submittals. For the "Records" submittal, maintain on-site a separate three-ring Environmental Records binder and submit at the completion of the project. Make separate parts to the binder corresponding to each of the applicable sub items listed below.

Storm Water Pollution Prevention Plan compliance notebook; G

Waste Determination Documentation

Disposal Documentation for Hazardous and Regulated Waste

Contractor 40 CFR Employee Training Records

Solid Waste Management Permit

Solid Waste Management Report

Contractor Hazardous Material Inventory Log; G

Hazardous Waste/Debris Management

Regulatory Notifications

1.4 ENVIRONMENTAL PROTECTION REQUIREMENTS

Provide and maintain, during the life of the contract, environmental protection as defined. Plan for and provide environmental protective measures to control pollution that develops during normal construction practice. Plan for and provide environmental protective measures required to correct conditions that develop during the construction of permanent or temporary environmental features associated with the project. Comply with Federal, State, and local regulations pertaining to the environment, including water, air, solid waste, hazardous waste and substances, oily substances, and noise pollution.

The Contractor may be required to promptly conduct tests and procedures for the purpose of assessing whether construction operations are in compliance with Applicable Environmental Laws. Analytical work shall be done by qualified laboratories; and where required by law, the laboratories shall be certified.

1.4.1 Environmental Compliance Assessment Training and Tracking System (ECATTS)

The QC Manager is responsible for environmental compliance on projects unless an Environmental Manager is named. The QC Manager (and alternative QC Manager) or Environmental Manager shall complete ECATTS training prior to starting respective portions of on-site work under this contract. If personnel changes occur for any of these positions after starting work, replacement personnel shall complete ECATTS training within 14 days of assignment to the project

Submit an ECATTS certificate of completion for personnel who have completed the required "Environmental Compliance Assessment Training and Tracking System

(ECATTS)" training. This training is web-based and can be accessed from any computer with Internet access using the following instructions.

Register for NAVFAC Environmental Compliance Training and Tracking System, by logging on to http://navfac.ecatts.com/. Obtain the password for registration from the Contracting Officer.

This training has been structured to allow contractor personnel to receive credit under this contract and also to carry forward credit to future contracts. Contractors shall ensure that the QC Manager (and alternate QC Manager) or Environmental Manager review their training plans for new modules or updated training requirements prior to beginning work. Some training modules are tailored for specific State regulatory requirements; therefore, Contractors working in multiple states will be requires to re-take modules tailored to the state where the contract work is being performed.

ECATTS is available for use by all contractor and subcontractor personnel associated with this project. These other personnel are encouraged (but not required) to take the training and may do so at their discretion.

1.4.2 Conformance with the Environmental Management System

The Contractor shall perform work under this contract consistent with the policy and objectives identified in the installation's Environmental Management System (EMS). The Contractor shall perform work in a manner that conforms to objectives and targets, environmental programs and operational controls identified by the EMS. The Contractor will provide monitoring and measurement information as necessary to address environmental performance relative to environmental, energy, and transportation management goals. In the event an EMS nonconformance or environmental noncompliance associated with the contracted services, tasks, or actions occurs, the Contractor shall take corrective and/or preventative actions. In addition, the Contractor shall ensure that its employees are aware of their roles and responsibilities under the EMS and how these EMS roles and responsibilities affect work performed under the contract.

The Contractor is responsible for ensuring that their employees receive applicable environmental and occupational health and safety training, and keep up to date on regulatory required specific training for the type of work to be conducted onsite. All on-site Contractor personnel, and their subcontractor personnel, performing tasks that have the potential to cause a significant environmental impact shall be competent on the basis of appropriate education, training or experience. Upon contract award, the Contracting Officer's Representative will notify the installation's EMS coordinator to arrange EMS training. Refer to Section 01 57 19.01 20, SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS for additional site

specific EMS requirements related to construction. The installation's EMS coordinator shall identify training needs associated with environmental aspects and the EMS, and arrange training or take other action to meet these needs. The Contractor shall provide training documentation to the Contracting Officer. The EMS coordinator shall retain associated records.

1.5 QUALITY ASSURANCE

1.5.1 Preconstruction Survey

Perform a Preconstruction Survey of the project site with the Contracting Officer, and take photographs showing existing environmental conditions in and adjacent to the site. Submit a report for the record.

1.5.2 Regulatory Notifications

The Contractor is responsible for all regulatory notification requirements in accordance with Federal, State and local regulations. In cases where the Navy must also provide public notification (such as storm water permitting), the Contractor must coordinate with the Contracting Officer. The Contractor shall submit copies of all regulatory notifications to the Contracting Officer prior to commencement of work activities. Typically, regulatory notifications must be provided for the following (this listing is not all inclusive): demolition, renovation, NPDES defined site work, remediation of controlled substances (asbestos, hazardous waste, lead paint).

1.5.3 Environmental Brief

Attend an environmental brief to be included in the preconstruction meeting. Provide the following information: types, quantities, and use of hazardous materials that will be brought onto the activity; types and quantities of wastes/wastewater that may be generated during the contract. Discuss the results of the Preconstruction Survey at this time.

Prior to initiating any work on site, meet with the Contracting Officer and activity environmental staff to discuss the proposed Environmental Management Plan. Develop a mutual understanding relative to the details of environmental protection, including measures for protecting natural resources, required reports, required permits, permit requirements, and other measures to be taken.

1.5.4 Environmental Manager

Appoint in writing an Environmental Manager for the project site. The Environmental Manager will be directly responsible for coordinating contractor

compliance with Federal, State, local, and station requirements. The Environmental Manager will ensure compliance with Hazardous Waste Program requirements (including hazardous waste handling, storage, manifesting, and disposal); implement the Environmental Management Plan; ensure that all environmental permits are obtained, maintained, and closed out; ensure compliance with Storm Water Program Management requirements; ensure compliance with Hazardous Materials (storage, handling, and reporting) requirements; and coordinate any remediation of regulated substances (lead, asbestos, PCB transformers). This can be a collateral position; however the person in this position must be trained to adequately accomplish the following duties: ensure waste segregation and storage compatibility requirements are met; inspect and manage Satellite Accumulation areas; ensure only authorized personnel add wastes to containers; ensure all Contractor personnel are trained in 40 CFR requirements in accordance with their position requirements; coordinate removal of waste containers; and maintain the Environmental Records binder and required documentation, including environmental permits compliance and close-out.

1.5.5 Contractor 40 CFR Employee Training Records

Prepare and maintain employee training records throughout the term of the contract meeting applicable 40 CFR requirements. The Contractor will ensure every employee completes a program of classroom instruction or on-the-job training that teaches them to perform their duties in a way that ensures compliance with Federal, State and local regulatory requirements for RCRA Large Quantity Generator. The Contractor will provide a Position Description for each employee, by subcontractor, based on the Davis-Bacon Wage Rate designation or other equivalent method, evaluating the employee's association with hazardous and regulated wastes. This Position Description will include training requirements as defined in 40 CFR 265 for a Large Quantity Generator facility. Submit these training records to the Contracting Officer at the conclusion of the project, unless otherwise directed.

PART 2 PRODUCTS

(Not Used)

PART 3 EXECUTION

3.1 ENVIRONMENTAL MANAGEMENT PLAN

Prior to initiating any work on site, the Contractor will meet with the Contracting Officer to discuss the proposed Environmental Protection Plan and develop a mutual understanding relative to the details of environmental protection, including measures for protecting natural resources, required reports, and other measures to be taken. The Contractor's Environmental Plan shall incorporate construction

related objectives and targets from the installation's Environmental Management System. The Environmental Management Plan will be submitted in the following format and shall include the elements specified below.\

a. Description of the Environmental Management Plan

(1) General overview and purpose

(a) A brief description of each specific plan required by environmental permit or elsewhere in this contract.

(b) The duties and level of authority assigned to the person(s) on the job site that oversee environmental compliance.

(c) A copy of any standard or project specific operating procedures that will be used to effectively manage and protect the environment on the project site.

(d) Communication and training procedures that will be used to convey environmental management requirements to contractor employees and subcontractors.

(e) Emergency contact information contact information (office phone number, cell phone number, and e-mail address).

(2) General site information

(3) A letter signed by an officer of the firm appointing the Environmental Manager and stating that he/she is responsible for managing and implementing the Environmental Program as described in this contract. Include in this letter the Environmental Manager's authority to direct the removal and replacement of non-conforming work.

b. Management of Natural Resources

(1) Land resources

(2) Tree protection

(3) Replacement of damaged landscape features

(4) Temporary construction

(5) Stream crossings

(6) Fish and wildlife resources

(7) Wetland areas

c. Protection of Historical and Archaeological Resources

(1) Objectives

(2) Methods

d. Storm Water Management and Control

(1) Ground cover

(2) Erodible soils

(3) Temporary measures

(a) Mechanical retardation and control of runoff

(b) Vegetation and mulch

(4) Effective selection, implementation and maintenance of Best Management Practices (BMPs).

e. Protection of the Environment from Waste Derived from Contractor Operations

(1) Control and disposal of solid and sanitary waste.

(2) Control and disposal of hazardous waste (Hazardous Waste Management Section)

This item will consist of the management procedures for all hazardous waste to be generated. The elements of those procedures will coincide with the Activity Hazardous Waste Management Plan. A copy of the Activity Hazardous Waste Management Plan will be provided by the Contracting Officer. As a minimum, include the following:

(a) Procedures to be employed to ensure a written waste determination is made for appropriate wastes which are to be generated;

(b) Sampling/analysis plan;

(c) Methods of hazardous waste accumulation/storage (i.e., in tanks and/or containers);

(d) Management procedures for storage, labeling, transportation, and disposal of waste (treatment of waste is not allowed unless specifically noted);

(e) Management procedures and regulatory documentation ensuring disposal of hazardous waste complies with Land Disposal Restrictions (40 CFR 268);

(f) Management procedures for recyclable hazardous materials such as lead-acid batteries, used oil, and the like;

(g) Used oil management procedures in accordance with 40 CFR 279;

(h) Pollution prevention\hazardous waste minimization procedures;

(i) Plans for the disposal of hazardous waste by permitted facilities;

(j) Procedures to be employed to ensure all required employee training records are maintained.

f. Prevention of Releases to the Environment

(1) Procedures to prevent releases to the environment

(2) Notifications in the event of a release to the environment

g. Regulatory Notification and Permits

List what notifications and permit applications must be made. Demonstrate that those permits have been obtained by including copies of all applicable, environmental permits.

3.1.1 Environmental Protection Plan Review

Within thirty days after the Contract award date, submit the proposed Environmental Management Plan for further discussion, review, and approval. Commencement of work will not begin until the environmental management plan has been approved.

3.1.2 Licenses and Permits

No permits will be obtained by the Contracting Officer.

Where required by the State regulatory authority, the inspections and certifications will be provided through the services of a Professional Engineer (PE), registered in the State where the work is being performed. Where a PE is not required, the individual must be otherwise qualified by other current State licensure, specific training and prior experience (minimum 5 years). As a part of the quality control plan, which is required to be submitted for approval by the quality control section, provide a sub item containing the name, appropriate professional registration or license number, address, and telephone number of the professionals or other qualified persons who will be performing the inspections and certifications for each permit.

3.2 PROTECTION OF NATURAL RESOURCES

Preserve the natural resources within the project boundaries and outside the limits of permanent work. Restore to an equivalent or improved condition upon completion of work. Confine construction activities to within the limits of the work indicated or specified. If the work is near streams, lakes, or other waterways, conform to the national permitting requirements of the Clean Water Act.

Do not disturb fish and wildlife. Do not alter water flows or otherwise significantly disturb the native habitat adjacent to the project and critical to the survival of fish and wildlife, except as indicated or specified.

Except in areas to be cleared, do not remove, cut, deface, injure, or destroy trees or shrubs without the Contracting Officer's permission. Do not fasten or attach ropes, cables, or guys to existing nearby trees for anchorages unless authorized by the Contracting Officer. Where such use of attached ropes, cables, or guys is authorized, the Contractor will be responsible for any resultant damage.

Protect existing trees which are to remain and which may be injured, bruised, defaced, or otherwise damaged by construction operations. Remove displaced rocks from uncleared areas. By approved excavation, remove trees with 30 percent or more of their root systems destroyed. Remove trees and other landscape features scarred or damaged by equipment operations, and replace with equivalent, undamaged trees and landscape features. Obtain Contracting Officer's approval before replacement.

The Contracting Officer's approval is required before any equipment will be permitted to ford live streams. In areas where frequent crossings are required, install temporary culverts or bridges. Obtain Contracting Officer's approval prior to installation. Remove temporary culverts or bridges upon completion of work, and repair the area to its original condition unless otherwise required by the

Contracting Officer.

3.2.1 Erosion and Sediment Control Measures

3.2.1.1 Burnoff

Burnoff of the ground cover is not permitted.

3.2.1.2 Protection of Erodible Soils

Immediately finish the earthwork brought to a final grade, as indicated or specified. Immediately protect the side slopes and back slopes upon completion of rough grading. Plan and conduct earthwork to minimize the duration of exposure of unprotected soils.

3.2.1.3 Temporary Protection of Erodible Soils

Use the following methods to prevent erosion and control sedimentation:

a. Mechanical Retardation and Control of Runoff

Mechanically retard and control the rate of runoff from the construction site. This includes construction of diversion ditches, benches, berms, and use of silt fences and straw bales to retard and divert runoff to protected drainage courses.

b. Sediment Basins

(1) Trap sediment in temporary sediment basins. Select a basin size to accommodate the runoff of a local 10-year storm. Pump dry and remove the accumulated sediment, after each storm. Use a paved weir or vertical overflow pipe for overflow. Remove collected sediment from the site. Institute effluent quality monitoring programs.

(2) Install, inspect, and maintain best management practices (BMPs) as required by the general permit. Prepare BMP Inspection Reports as required by the general permit. If required by the permit, include those inspection reports.

c. Vegetation and Mulch

(1) Provide temporary protection on sides and back slopes as soon as rough grading is completed or sufficient soil is exposed to require

erosion protection. Protect slopes by accelerated growth of permanent vegetation, temporary vegetation, mulching, or netting. Stabilize slopes by hydroseeding, anchoring mulch in place, covering with anchored netting, sodding, or such combination of these and other methods necessary for effective erosion control.

(2) Seeding: Provide new seeding where ground is disturbed. Include topsoil or nutriment during the seeding operation necessary to establish or reestablish a suitable stand of grass. The seeding operation will be as specified in Section 32 92 19.

3.2.2 Erosion and Sediment Control Inspection Reports

Submit "Erosion and Sediment Control Inspection Reports" (E&S) (form provided at the pre-construction conference) and Storm Water Inspection Reports for General Permit for General Permit to the Contracting Officer once every 7 calendar days and within 24 hours of a storm event that produces 0.5 inch or more of rain.

Note erosion control inspection reports may be compiled as part of a storm water pollution prevention plan inspection reports if applicable.

3.2.2.1 Storm Water Notice of Intent for Construction Activities and Storm Water Pollution Prevention Plan

The Contractor shall submit a Storm Water Notice of Intent (for NPDES coverage under the general permit for construction activities) and a Storm Water Pollution Prevention Plan (SWPPP) for the project to the Contracting Officer prior and gain approval prior to the commencement of work. The SWPPP will meet the requirements of the EPA or State general permit for storm water discharges from construction sites. Submit the SWPPP along with any required Notice of Intents, Notice of Termination, and appropriate permit fees, via the Contracting Officer, to the appropriate Federal or State agency for approval, a minimum of 30 calendar days prior to the start of any land disturbing activities. The Contractor shall maintain an approved copy of the SWPPP at the construction on-site office, and continually update as regulations require, reflecting current site conditions. Additional requirements may be found in UFGS Section 01 57 19.01 20, SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS.

Coverage under this permit requires the contractor prepare a Storm Water Pollution Prevention Plan (SWPPP), prepare and submit a Registration Statement as a co-permittee with the Construction Officer, and provide the permit fee to the responsible state agency before any land disturbing activities begin. The contractor shall file for permit coverage on behalf Construction Officer and himself and file a Notice of Termination once construction is complete and the site is

stabilized with a final sustainable cover.

Under the terms and conditions of the permit, the Contractor may be required to install, inspect, maintain best management practices (BMPs), and submit storm water BMP inspection reports and storm water pollution prevention plan inspection reports. The Contractor shall ensure construction operations and management are constantly in compliance with the terms and conditions of the general permit for storm water discharges from construction activities.

a. The SWPPP shall:

(1) Identify potential sources of pollution which may be reasonably expected to affect the quality of storm water discharge from the site.

(2) Describe and ensure implementation of practices which will be used to reduce the pollutants in storm water discharge from the site.

(3) Ensure compliance with terms of the EPA or State general permit for storm water discharge.

(4) Select applicable best management practices from EPA 833-R-060-04.

(5) Include a completed copy of the Registration Statement, BMP Inspection Report Template and Notice of Termination except for the effective date.

(6) Storm Water Pollution Prevention Measures and Notice of Intent 40 CFR 122.26, EPA 833-R-060-04. Provide a "Storm Water Pollution Prevention Plan" (SWPPP) for the project. The SWPPP will meet the requirements of the EPA or State general permit for storm water discharges from construction sites. Submit the SWPPP along with any required Notice of Intents, Notice of Termination, and appropriate permit fees, via the Contracting Officer, to the appropriate Federal or State agency for approval, a minimum of 14 calendar days prior to the start of construction. A copy of the approved SWPPP will be kept at the construction on-site office, and continually updated as regulations require reflecting current site conditions.

3.2.2.2 Storm Water Pollution Prevention Plan Compliance Notebook

The contractor shall create and maintain a three binder of documents that demonstrate compliance with the Storm water Construction Activity permit. The binder shall include a copy of the permit Registration Statement, proof of permit

fee payment, SWPPP and SWPPP update amendments, inspection reports, copies of correspondence with the Puerto Rico Environmental Quality Board and a copy of the permit Notice of Termination. At the completion of the project the folder shall become the property of the Government. The compliance notebook shall be provided to Contracting Officer. An advance copy of the Registration Statement shall be provided to the Contracting Officer immediately after the form is presented to the permitting agency.

3.2.3 Storm water Drainage and Construction Dewatering

There will be no discharge of excavation ground water to the sanitary sewer, storm drains, or to the river without prior specific authorization of the Environmental Division in writing. Discharge of hazardous substances will not be permitted under any circumstances.

Construction site runoff will be prevented from entering any storm drain or the river directly by the use of straw bales or other method suitable to the Environmental Division. Contractor will provide erosion protection of the surrounding soils.

Construction Dewatering shall not be discharged to the sanitary sewer. If the construction dewatering is noted or suspected of being contaminated, it may only be released to the storm drain system if the discharge is specifically permitted. Authorization for any contaminated groundwater release shall be obtained in advance from the base Environmental Officer. Discharge of hazardous substances will not be permitted under any circumstances.

3.3 HISTORICAL AND ARCHAEOLOGICAL RESOURCES

Carefully protect in-place and report immediately to the Contracting Officer historical and archaeological items or human skeletal remains discovered in the course of work. Upon discovery, notify the Contracting Officer. Stop work in the immediate area of the discovery until directed by the Contracting Officer to resume work. The Government retains ownership and control over historical and archaeological resources.

3.4 SOLID WASTE MANAGEMENT PLAN AND PERMIT

Provide to the contracting officer written notification of the quantity of solid waste/debris that is anticipated to be generated by construction. Include in the report the locations where various types of waste will be disposed or recycled. Include letters of acceptance or as applicable, submit one copy of a State and local Solid Waste Management Permit or license showing such agency's approval of the disposal plan before transporting wastes off Government property.

3.4.1 Solid Waste Management Report

Monthly, submit a solid waste disposal report to the Contracting Officer. For each waste, the report will state the classification (using the definitions provided in this section), amount, location, and name of the business receiving the solid waste.

The Contractor will include copies of the waste handling facilities' weight tickets, receipts, bills of sale, and other sales documentation. In lieu of sales documentation, the Contractor may submit a statement indicating the disposal location for the solid waste which is signed by an officer of the Contractor firm authorized to legally obligate or bind the firm. The sales documentation or Contractor certification will include the receiver's tax identification number and business, EPA or State registration number, along with the receiver's delivery and business addresses and telephone numbers. For each solid waste retained by the Contractor for his own use, the Contractor will submit on the solid waste disposal report the information previously described in this paragraph. Prices paid or received will not be reported to the Contracting Officer unless required by other provisions or specifications of this Contract or public law.

3.4.2 Control and Management of Solid Wastes

Pick up solid wastes, and place in covered containers which are regularly emptied. Do not prepare or cook food on the project site. Prevent contamination of the site or other areas when handling and disposing of wastes. At project completion, leave the areas clean. Recycling is encouraged and can be coordinated with the Contracting Officer and the activity recycling coordinator. Remove all solid waste (including non-hazardous debris) from Government property and dispose off-site at an approved landfill. Solid waste disposal off-site must comply with most stringent local, State, and Federal requirements including 40 CFR 241, 40 CFR 243, and 40 CFR 258.

Manage spent hazardous material used in construction, including but not limited to, aerosol cans, waste paint, cleaning solvents, contaminated brushes, and used rags, as per environmental law.

3.4.2.1 Dumpsters

Equip dumpsters with a secure cover and paint the standard base color. Keep cover closed at all times, except when being loaded with trash and debris. Locate dumpsters behind the construction fence or out of the public view. Empty site dumpsters at least once a week. or as needed to keep the site free of debris and trash. If necessary, provide 55 gallon trash containers painted the darker base color to collect debris in the construction site area. Locate the trash containers behind the construction fence or out of the public view. Empty trash containers at

least once per day. For large demolitions, large dumpsters without lids are acceptable but should not have debris higher than the sides before emptying.

3.5 WASTE DETERMINATION DOCUMENTATION

Complete a Waste Determination form (provided at the pre-construction conference) for all contractor derived wastes to be generated. Base the waste determination upon either a constituent listing from the manufacturer used in conjunction with consideration of the process by which the waste was generated, EPA approved analytical data, or laboratory analysis (Material Safety Data Sheets (MSDS) by themselves are not adequate). Attach all support documentation to the Waste Determination form. As a minimum, a Waste Determination form must be provided for the following wastes (this listing is not all inclusive): oil and latex based painting and caulking products, solvents, adhesives, aerosols, petroleum products, and all containers of the original materials.

3.6 CONTRACTOR HAZARDOUS MATERIAL INVENTORY LOG

Submit the "Contractor Hazardous Material Inventory Log"(found at: http://www.wbdg.org/ccb/NAVGRAPH/graphtoc.pdf), which provides information required by (EPCRA Sections 312 and 313) along with corresponding Material Safety Data Sheets (MSDS) to the Contracting Officer at the start and at the end of construction (30 days from final acceptance), and update no later than January 31 of each calendar year during the life of the contract. Documentation for any spills/releases, environmental reports or off-site transfers may be requested by the Contracting Officer.

3.6.1 Disposal Documentation for Hazardous and Regulated Waste

Manifest, pack, ship and dispose of hazardous or toxic waste and universal waste that is generated as a result of construction in accordance with the generating facilities generator status under the Recourse Conservation and Recovery Act. Contact the Contracting Officer for the facility RCRA identification number that is to be used on each manifest.

Submit a copy of the applicable EPA and or State permit(s), manifest(s), or license(s) for transportation, treatment, storage, and disposal of hazardous and regulated waste by permitted facilities. Hazardous or toxic waste manifest must be reviewed, signed, and approved by the Navy before the Contractor may ship waste. To obtain specific disposal instructions the Contractor must coordinate with the Activity environmental office. Refer to Section 20 SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS for the Activity Point of Contact information.

3.7 POLLUTION PREVENTION/HAZARDOUS WASTE MINIMIZATION

Minimize the use of hazardous materials and the generation of hazardous waste. Include procedures for pollution prevention/ hazardous waste minimization in the Hazardous Waste Management Section of the Environmental Management Plan. Consult with the activity Environmental Office for suggestions and to obtain a copy of the installation's pollution prevention/hazardous waste minimization plan for reference material when preparing this part of the plan. If no written plan exists, obtain information by contacting the Contracting Officer. Describe the types of the hazardous materials expected to be used in the construction when requesting information.

3.8 WHM/HW MATERIALS PROHIBITION

No waste hazardous material or hazardous waste shall be disposed of on government property. No hazardous material shall be brought onto government property that does not directly relate to requirements for the performance of this contract. The government is not responsible for disposal of Contractor's waste material brought on the job site and not required in the performance of this contract. The intent of this provision is to dispose of that waste identified as waste hazardous material/hazardous waste as defined herein that was generated as part of this contract and existed within the boundary of the Contract limits and not brought in from offsite by the Contractor. Incidental materials used to support the contract including, but not limited to aerosol cans, waste paint, cleaning solvents, contaminated brushes, rags, clothing, etc. are the responsibility of the Contractor. The list is illustrative rather than inclusive. The Contractor is not authorized to discharge any materials to sanitary sewer, storm drain, or to the river or conduct waste treatment or disposal on government property without written approval of the Contracting Officer.

3.9 HAZARDOUS MATERIAL MANAGEMENT

No hazardous material shall be brought onto government property that does not directly relate to requirements for the performance of this contract.

Include hazardous material control procedures in the Safety Plan. Address procedures and proper handling of hazardous materials, including the appropriate transportation requirements. Submit a MSDS and estimated quantities to be used for each hazardous material to the Contracting Officer prior to bringing the material on base. Typical materials requiring MSDS and quantity reporting include, but are not limited to, oil and latex based painting and caulking products, solvents, adhesives, aerosol, and petroleum products. At the end of the project, provide the Contracting Officer with the maximum quantity of each material that was present at the site at any one time, the dates the material was present, the amount of each material that was used during the project, and how the material was used. Ensure that hazardous materials are utilized in a manner that will minimize the amount of

hazardous waste that is generated. Ensure that all containers of hazardous materials have NFPA labels or their equivalent. Keep copies of the MSDS for hazardous materials on site at all times and provide them to the Contracting Officer at the end of the project. Certify that all hazardous materials removed from the site are hazardous materials and do not meet the definition of hazardous waste per 40 CFR 261.

3.10 PETROLEUM PRODUCTS AND REFUELING

Conduct the fueling and lubricating of equipment and motor vehicles in a manner that protects against spills and evaporation. Manage all used oil generated on site in accordance with 40 CFR 279. Determine if any used oil generated while on-site exhibits a characteristic of hazardous waste. Used oil containing 1000 parts per million of solvents will be considered a hazardous waste and disposed of at Contractor's expense. Used oil mixed with a hazardous waste will also be considered a hazardous waste.

3.10.1 Oily and Hazardous Substances

Prevent oil or hazardous substances from entering the ground, drainage areas, or navigable waters. In accordance with 40 CFR 112, surround all temporary fuel oil or petroleum storage tanks with a temporary berm or containment of sufficient size and strength to contain the contents of the tanks, plus 10 percent freeboard for precipitation. The berm will be impervious to oil for 72 hours and be constructed so that any discharge will not permeate, drain, infiltrate, or otherwise escape before cleanup occurs.

3.10.2 Inadvertent Discovery of Petroleum Contaminated Soil or Hazardous Wastes

If petroleum contaminated soil or suspected hazardous waste is found during construction that was not identified in the contract documents, the contractor shall immediately notify the contracting officer. The contractor shall not disturb this material until authorized by the contracting officer.

3.11 FUEL TANKS

Petroleum products and lubricants required to sustain up to 30 days of construction activity may be kept on site. Storage and refilling practices shall comply with 40 CFR Part 112. Secondary containment shall be provided and be no less than 110 percent of the tank volume plus five inches of free-board. If a secondary berm is used for containment then the berm shall be impervious to oil for 72 hours and be constructed so that any discharge will not permeate, drain, infiltrate, or otherwise escape before cleanup occurs. Drips pans are required and the tanks must be covered during inclement weather.

3.12 RELEASES/SPILLS OF OIL AND HAZARDOUS SUBSTANCES

Exercise due diligence to prevent, contain, and respond to spills of hazardous material, hazardous substances, hazardous waste, sewage, regulated gas, petroleum, lubrication oil, and other substances regulated by environmental law. Maintain spill cleanup equipment and materials at the work site. In the event of a spill, take prompt, effective action to stop, contain, curtail, or otherwise limit the amount, duration, and severity of the spill/release. In the event of any releases of oil and hazardous substances, chemicals, or gases; immediately (within 15 minutes) notify the Base or Activity Fire Department, the activity's Command Duty Officer, and the Contracting Officer. If the contractor's response is inadequate, the Navy may respond. If this should occur, the contractor will be required to reimburse the government for spill response assistance and analysis.

The Contractor is responsible for verbal and written notifications as required by the federal 40 CFR 355, State, local regulations and Navy Instructions. Spill response will be in accordance with 40 CFR 300 and applicable State and local regulations. Contain and clean up these spills without cost to the Government. If Government assistance is requested or required, the Contractor will reimburse the Government for such assistance. Provide copies of the written notification and documentation that a verbal notification was made within 20 days.

Maintain spill cleanup equipment and materials at the work site. Clean up all hazardous and non-hazardous (WHM) waste spills. The Contractor shall reimburse the government for all material, equipment, and clothing generated during any spill cleanup. The Contractor shall reimburse the government for all costs incurred including sample analysis materials, equipment, and labor if the government must initiate its own spill cleanup procedures, for Contractor responsible spills, when:

a. The Contractor has not begun spill cleanup procedure within one hour of spill discovery/occurrence, or

b. If, in the government's judgment, the Contractor's spill cleanup is not adequately abating life threatening situation and/or is a threat to any body of water or environmentally sensitive areas.

3.13 CONTROL AND MANAGEMENT OF HAZARDOUS WASTES

3.13.1 Facility Hazardous Waste Generator Status

Puerto Rico Ports Authority is designated as a Conditionally Exempt-Small Quantity Generator. All work conducted within the boundaries of this activity must meet the regulatory requirements of this generator designation. The Contractor will comply with all provisions of Federal, State and local regulatory requirements applicable to

this generator status regarding training and storage, handling, and disposal of all construction derived wastes.

3.13.2 Hazardous Waste/Debris Management

Identify all construction activities which will generate hazardous waste/debris. Provide a documented waste determination for all resultant waste streams. Hazardous waste/debris will be identified, labeled, handled, stored, and disposed of in accordance with all Federal, State, and local regulations including 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, 40 CFR 265, 40 CFR 266, and 40 CFR 268.

Hazardous waste will also be managed in accordance with the approved Hazardous Waste Management Section of the Environmental Protection Plan. Store hazardous wastes in approved containers in accordance with 49 CFR 173 and 49 CFR 178. Hazardous waste generated within the confines of Government facilities will be identified as being generated by the Government.

Prior to removal of any hazardous waste from Government property, all hazardous waste manifests must be signed by activity personnel from the Station Environmental Office. No hazardous waste will be brought onto Government property. Provide to the Contracting Officer a copy of waste determination documentation for any solid waste streams that have any potential to be hazardous waste or contain any chemical constituents listed in 40 CFR 372-SUBPART D. For hazardous wastes spills, verbally notify the Contracting Officer immediately.

3.13.2.1 Regulated Waste Storage/Satellite Accumulation/90 Day Storage Areas

If the work requires the temporary storage/collection of regulated or hazardous wastes, the Contractor will request the establishment of a Regulated Waste Storage Area, a Satellite Accumulation Area, or a 90 Day Storage Area at the point of generation. The Contractor must submit a request in writing to the Contracting Officer providing the following information:

Contract Number	
Contractor	
Haz/Waste or Regulated Waste POC	
Phone Number	
Type of Waste	
Source of Waste	
Emergency POC	
Phone Number	
Location of the Site	

(Attach Site Plan to the Request)

Attach a waste determination form. Allow ten working days for processing this request. The designated area where waste is being stored shall be barricaded and a sign identifying as follows:

"DANGER - UNAUTHORIZED PERSONNEL KEEP OUT"

3.13.2.2 Sampling and Analysis of HW

a. Waste Sampling

Sample waste in accordance with EPA 530/F-93/004. Each sampled drum or container will be clearly marked with the Contractor's identification number and cross referenced to the chemical analysis performed.

b. Laboratory Analysis

Follow the analytical procedure and methods in accordance with the 40 CFR 261. The Contractor will provide all analytical results and reports performed to the Contracting Officer

c. Analysis Type

Identify waste hazardous material/hazardous waste by analyzing for the following properties as a minimum: ignitability, corrosiveness, total chlorides, BTU value, PCBs, TCLP for heavy metals, and cyanide.

3.13.2.3 Asbestos Certification
(Not Used)

3.13.2.4 Hazardous Waste Disposal

No hazardous, toxic, or universal waste shall be disposed or hazardous material abandoned on government property. And unless otherwise noted in this contract, the government is not responsible for disposal of Contractor generated waste material. The disposal of incidental materials used to accomplish the work including, but not limited to aerosol cans, waste paint, cleaning solvents, contaminated brushes, rags, clothing, etc. are the responsibility of the Contractor. The list is illustrative rather than inclusive.

The Contractor is not authorized to discharge any materials to sanitary sewer, storm drain, or water way or conduct waste treatment or disposal on government property without written approval of the Contracting Officer.

Control of stored waste, packaging, sampling, analysis, and disposal will be determined by the details in the contract. The requirements for jobs in the following paragraphs will be used as the guidelines for disposal of any hazardous waste generated.

a. Responsibilities for Contractor's Disposal

Contractor responsibilities include any generation of WHM/HW requiring Contractor disposal of solid waste or liquid.

(1) The Contractor agrees to provide all service necessary for the final treatment/disposal of the hazardous material/waste in accordance with all local, State and Federal laws and regulations, and the terms and conditions of the contract within sixty (60) days after the materials have been generated. These services will include all necessary personnel, labor, transportation, packaging, detailed analysis (if required for disposal, and/or transportation, including manifesting or completing waste profile sheets, equipment, and the compilation of all documentation is required).

(2) Contain all waste in accordance with 40 CFR 260, 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, 40 CFR 265, 40 CFR 266, 40 CFR 268, 40 CFR 270, 40 CFR 272, 40 CFR 273, 40 CFR 279, 40 CFR 280, and 40 CFR 761.

(3) Obtaining a representative sample of the material generated for each job done to provide waste stream determination.

(4) Analyzing for each sample taken and providing analytical results to the Contracting Officer. Provide two copies of the results.

(5) Determine the DOT proper shipping names for all waste (each container requiring disposal) and will demonstrate how this determination is developed and supported by the sampling and analysis requirements contained herein to the Contracting Officer.

<u>Contractor Disposal Turn-In Requirements</u>

For any waste hazardous materials or hazardous waste generated which requires the Contractor to dispose of, the following conditions must be complied with in order to be acceptable for disposal:

a. Drums compatible with waste contents and drums meet DOT requirements for 49 CFR 173 for transportation of materials.

b. Drums banded to wooden pallets. No more than three (3) 55 gallon drums to a pallet, or two (2) 85 gallon over packs.

c. Band using 1-1/4 inch minimum band on upper third of drum.

d. Recovery materials label (provided by Code 106.321) located in middle of drum, filled out to indicate actual volume of material, name of material manufacturer, other vendor information as available.

e. Always have three (3) to five (5) inches of empty space above volume of material. This space is called 'outage'.

3.13.3 Class I and II ODS Prohibition

Class I and II ODS as defined and identified herein will not be used in the performance of this contract, nor be provided as part of the equipment. This prohibition will be considered to prevail over any other provision, specification, drawing, or referenced documents. Regulations related to the protection of stratosphere ozone may be found in 40 CFR 82.

Heating and air conditioning technicians must be certified through an EPA-approved program. Copies of certifications shall be maintained at the employees' place of business and be carried as a wallet card by the technician, as provided by environmental law. Accidental venting of a refrigerant is a release and shall be reported to the Contracting Officer.

3.13.3.1 Universal Waste/e-Waste Management

Universal waste including but not limited to some mercury containing building products such florescent lamps, mercury vapor lamps, high pressure sodium lamps, CRTs, batteries, aerosol paint containers, electrical equipment containing PCBs, and consumed electronic devices, shall be managed in accordance with applicable environmental law and installation instructions.

3.14 DUST CONTROL

Keep dust down at all times, including during nonworking periods. Sprinkle or treat, with dust suppressants, the soil at the site, haul roads, and other areas disturbed by operations. Dry power brooming will not be permitted. Instead, use vacuuming, wet mopping, wet sweeping, or wet power brooming. Air blowing will be permitted only for cleaning nonparticulate debris such as steel reinforcing bars. Only wet cutting will be permitted for cutting concrete blocks, concrete, and bituminous concrete. Do not unnecessarily shake bags of cement, concrete mortar, or plaster.

3.14.1 Dirt and Dust Control Plan

Submit truck and material haul routes along with a plan for controlling dirt, debris, and dust on base roadways. As a minimum, identify in the plan the subcontractor and equipment for cleaning along the haul route and measures to reduce dirt, dust, and debris from roadways.

3.15 ABRASIVE BLASTING

(Not Used)

3.16 NOISE

Make the maximum use of low-noise emission products, as certified by the EPA. Blasting or use of explosives will not be permitted without written permission from the Contracting Officer, and then only during the designated times. Confine pile-driving operations to the period between 8 a.m. and 4 p.m., Monday through Friday, exclusive of holidays, unless otherwise specified.

3.17 MERCURY MATERIALS

Mercury is prohibited in the construction of this facility, unless specified otherwise, and with the exception of mercury vapor lamps and fluorescent lamps. Dumping of mercury-containing materials and devices such as mercury vapor lamps, fluorescent lamps, and mercury switches, in rubbish containers is prohibited. Remove without breaking, pack to prevent breakage, and transport out of the activity in an unbroken condition for disposal as directed. Immediately report to the Environmental Office and the Contracting Officer instances of breakage or mercury spillage. Clean mercury spill area to the satisfaction of the Contracting Officer.

Cleanup of a mercury spill shall not be recycled and shall be managed as a hazardous waste for disposal.

-- End of Section --

SECTION 02 61 13

EXCAVATION AND HANDLING OF CONTAMINATED MATERIAL 02/10

PART 1 GENERAL

1.1 MEASUREMENT AND PAYMENT

1.1.1 Measurement

Measurement for excavation and onsite transportation shall be based on the actual number of cubic yards of contaminated material in-place prior to excavation. Determination of the volume of contaminated material excavated shall be based on cross-sectional volume determination reflecting the differential between the original elevations of the top of the contaminated material and the final elevations after removal of the contaminated material. Measurement for backfilling of excavated areas shall be based on in-place cubic yards of compacted fill. Measurement for construction of stockpile areas shall be based on the number of square yards of stockpile liner constructed.

1.1.2 Payment

1.1.2.1 Excavation and Transportation

Compensation for excavation and onsite transportation of contaminated material will be paid as a unit cost. This unit cost shall include any other items incidental to excavation and handling not defined as having a specific unit cost.

1.1.2.2 Backfilling

Compensation for backfill soil, transportation of backfill, backfill soil conditioning, backfilling, compaction, and geotechnical testing will be paid as a single unit cost.

1.1.2.3 Stockpiling

Compensation for construction of stockpile areas will be paid for as a unit cost. This unit cost shall include all aspects of grading, preparation, handling, placement, maintenance, removal, treatment, and disposal of stockpile cover materials and liner materials and all other items incidental to construction of stockpiles.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D1556	(2007) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D2167	(2008) Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D2487	(2011) Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D5434	(2012) Field Logging of Subsurface Explorations of Soil and Rock
ASTM D6938	(2010) Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
ASTM D698	(2012) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft. (600 kN-m/cu. m.))

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2008; Errata 1-2010; Changes 1-3 2010; Changes 4-6 2011) Safety and Health Requirements Manual

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1926	Safety and Health Regulations for Construction
40 CFR 302	Designation, Reportable Quantities, and Notification

1.3 DESCRIPTION OF WORK

The work consists of excavation and temporary storage of approximately 700 cubic yards of contaminated material. Approximate locations of contaminated material are shown on the drawings. Characterization data on the nature and extent of the

contaminated material is shown in Appendix A. Subsurface conditions are shown in Appendix A. Submit a Work Plan as specified below. Notify the Contracting Officer within 24 hours, and before excavation, if contaminated material is discovered that has not been previously identified or if other discrepancies between data provided and actual field conditions are discovered. Backfill material is not available onsite. Ground water is approximately 0.61 to 4.04 feet below pre-excavation ground surface. Required sampling and chemical analysis shall be conducted in accordance with Section 01 35 45.00 10 CHEMICAL DATA QUALITY CONTROL.

1.3.1 Scheduling

Notify the Contracting Officer 10 calendar days prior to the start of excavation of contaminated material. The Contracting Officer will be responsible for contacting regulatory agencies in accordance with the applicable reporting requirements.

1.3.2 Work Plan

(Not Used)

1.3.3 Other Submittal Requirements

Submit separate cross-sections of each area before and after excavation and after backfilling, test results, and 3 copies of the Closure Report within 14 calendar days of work completion at the site.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Surveys; G

SD-03 Product Data

Work Plan; G
Closure Report; G

SD-06 Test Reports

Backfill; G
Surveys; G
Confirmation Sampling and Analysis; G

Sampling of Stored Material; G
Sampling Liquid; G
Compaction; G

1.5 REGULATORY REQUIREMENTS

1.5.1 Permits and Licenses

Obtain required federal, state, and local permits for excavation and storage of contaminated material. Permits shall be obtained at no additional cost to the Government.

1.5.2 Air Emissions

Air emissions shall be monitored and controlled in accordance with Section 01 57 20.00 10 ENVIRONMENTAL PROTECTION.

PART 2 PRODUCTS

2.1 SPILL RESPONSE MATERIALS

Provide appropriate spill response materials including, but not limited to the following: containers, adsorbents, shovels, and personal protective equipment. Spill response materials shall be available at all times when contaminated materials/wastes are being handled or transported. Spill response materials shall be compatible with the type of materials and contaminants being handled.

2.2 BACKFILL

Backfill material shall be obtained from offsite sources approved by the Contracting Officer. Backfill shall be classified in accordance with ASTM D2487 as GW, GP, GM, GC, SW, SP, SM, SC, ML, MH, CL, or CH and shall be free from roots and other organic matter, trash, debris, snow, ice or frozen materials. Backfill material shall be tested for the parameters listed below at a frequency of once per 500 cubic yards. A minimum of one set of classification tests shall be performed per borrow source. Clean backfill material shall be sampled at a frequency of one sample for every 500 cubic yards.

Do not use material for backfill until borrow source chemical and physical test results have been submitted and approved.

PART 3 EXECUTION

3.1 SURVEYS

Surveys shall be performed immediately prior to and after excavation of contaminated material to determine the volume of contaminated material removed. Surveys shall also be performed immediately after backfill of each excavation. Provide cross-sections on 25 foot intervals and at break points for all excavated areas. Locations of confirmation samples shall also be surveyed and shown on the drawings.

3.2 EXISTING STRUCTURES AND UTILITIES

No excavation shall be performed until site utilities have been field located. Take the necessary precautions to ensure no damage occurs to existing structures and utilities. Damage to existing structures and utilities resulting from the Contractor's operations shall be repaired at no additional cost to the Government. Utilities encountered that were not previously shown or otherwise located shall not be disturbed without approval from the Contracting Officer.

3.3 CLEARING

Clearing shall be performed to the limits shown on the drawings in accordance with Section 31 11 00 CLEARING AND GRUBBING.

3.4 CONTAMINATED MATERIAL REMOVAL

3.4.1 Excavation

Areas of contamination shall be excavated to the depth and extent shown on the drawings and not more than 0.2 ft beyond the depth and extent shown on the drawings unless directed by the Contracting Officer. Excavation shall be performed in a manner that will limit spills and the potential for contaminated material to be mixed with uncontaminated material. An excavation log describing visible signs of contamination encountered shall be maintained for each area of excavation. Excavation logs shall be prepared in accordance with ASTM D5434.

3.4.2 Shoring

If workers must enter the excavation, it shall be evaluated, shored, sloped or braced as required by EM 385-1-1 and 29 CFR 1926 section 650.

3.4.3 Dewatering

Surface water shall be diverted to prevent entry into the excavation. No dewatering shall be performed without prior approval of the Contracting Officer.

3.5 CONFIRMATION SAMPLING AND ANALYSIS

The Contracting Officer shall be present to inspect the removal of contaminated material from each site. After all material suspected of being contaminated has been removed, the excavation shall be examined for evidence of contamination. After all suspected contaminated material is removed, confirmation samples for soil shall be collected and analyzed for the following contaminants:

Chemical Parameter	**Action Level**
Lead	96 milligram/kilogram
Cadmium	1.8 milligram/kilogram

Samples shall be collected at a frequency of one per 25 linear feet and from each of the side walls or as directed by the Contracting Officer. Based on test results, propose any additional excavation which may be required to remove material which is contaminated above action levels. Additional excavation shall be subject to approval by the Contracting Officer. Locations of samples shall be marked in the field and documented on the as-built drawings.

No confirmation samples will be collected for sediment excavation areas.

3.6 CONTAMINATED MATERIAL STORAGE

Material shall be placed in temporary storage immediately after excavation. The following paragraphs describe acceptable methods of material storage. Storage units shall be in good condition and constructed of materials that are compatible with the material or liquid to be stored. If multiple storage units are required, each unit shall be clearly labeled with an identification number and a written log shall be kept to track the source of contaminated material in each temporary storage unit.

3.6.1 Stockpiles

Stockpiles shall be constructed to isolate stored contaminated material from the environment. The maximum stockpile size shall be 100 cubic yards. Stockpiles shall be constructed to include:

a. A chemically resistant geomembrane liner free of holes and other damage. Non-reinforced geomembrane liners shall have a minimum thickness of 20 mils. Scrim reinforced geomembrane liners shall have a minimum weight of 40 lbs/1000 square feet. The ground surface on which the geomembrane is to be placed shall be free of rocks greater than 0.5 inches in diameter and any other object which could damage the membrane. .

b. Berms surrounding the stockpile, a minimum of 12 inches in height. Vehicle access points shall also be bermed.

c. The liner system shall be sloped to allow collection of leachate. Storage and removal of liquid which collects in the stockpile, in accordance with paragraph Liquid Storage.

3.6.2 Roll-Off Units

(Not Used)

3.6.3 Liquid Storage

Liquid collected from excavations and stockpiles shall be temporarily stored in 55 gallon barrels or 500 gallon tanks. Liquid storage containers shall be water-tight.

3.7 SAMPLING

3.7.1 Sampling of Stored Material

Samples of stored material shall be collected at a frequency of once per removed truck load of soil. Samples shall be tested for the following:

1. TCLP Metals EPA Methods 7060, 7080, 7130, 7190, 7420, 7470, 7760, 7741
2. TCLP Volatiles - EPA Methods 8240
3. RCRA Characteristics - SW-846 9010, 1010, 9012, 9030

The soil shall contain no free liquid as demonstrated by EPA SW-846 Method 9095, plant filter liquids test.

Stored material with contaminant levels that exceed the action levels shall be treated offsite. Analyses for contaminated material to be taken to an offsite treatment facility shall conform to local, state, and federal criteria as well as to the requirements of the treatment facility. Documentation of all analyses performed shall be furnished to the Contracting Officer. Additional sampling and analyses to the extent required by the approved offsite treatment, storage or disposal (TSD) facility shall be the responsibility of the Contractor and shall be subject to approval by the Contracting Officer.

3.7.2 Sampling Liquid

Liquid collected from storage areas shall be sampled at a frequency of once for every 500 gal of liquid collected. Samples shall be tested for the following:

Barium, Cadmium, Chromium, Lead, Zinc, and Title 22 metals.

Liquid with contaminant levels that exceed action levels shall be treated offsite.

Analyses for contaminated liquid to be taken to an offsite treatment facility shall conform to local, state, and federal criteria as well as to the requirements of the treatment facility. Documentation of all analyses performed shall be furnished to the Contracting Officer. Additional sampling and analysis to the extent required by the approved offsite treatment, storage or disposal (TSD) facility receiving the material shall be the responsibility of the Contractor and shall be subject to approval by the Contracting Officer.

3.7.3 Sampling Beneath Storage Units
(Not Used)

3.8 SPILLS

In the event of a spill or release of a hazardous substance (as designated in 40 CFR 302), pollutant, contaminant, or oil (as governed by the Oil Pollution Act (OPA), 33 U.S.C. 2701 et seq.), notify the Contracting Officer immediately. If the spill exceeds the reporting threshold, follow the pre-established procedures as described in the Base Wide Contingency Plan for immediate reporting and containment. Immediate containment actions shall be taken to minimize the effect of any spill or leak. Cleanup shall be in accordance with applicable federal, state, and local regulations. As directed by the Contracting Officer, additional sampling and testing shall be performed to verify spills have been cleaned up. Spill cleanup and testing shall be done at no additional cost to the Government.

3.9 BACKFILLING

3.9.1 Confirmation Test Results

Excavations shall be backfilled immediately after all contaminated materials have been removed and confirmation test results have been approved. Backfill shall be placed and compacted to the lines and grades shown on the drawings.

3.9.2 Compaction

Approved backfill shall be placed in lifts with a maximum loose thickness of 8 inches. Soil shall be compacted to 90 percent of ASTM D698 maximum dry density. Density tests shall be performed at a frequency of once per 10,000 square feet per lift. A minimum of one density test shall be performed on each lift of backfill placed. Field in-place dry density shall be determined in accordance with ASTM D1556, ASTM D2167, or ASTM D6938. If ASTM D6938 is used, a minimum of one in ten tests shall be checked using ASTM D1556 or ASTM D2167. Test results from ASTM D1556 or ASTM D2167 shall govern if there is a discrepancy with the ASTM D6938 test results.

3.10 DISPOSAL REQUIREMENTS

Offsite disposal of contaminated material shall be in accordance with Section 02 81 00 TRANSPORTATION AND DISPOSAL OF HAZARDOUS MATERIALS.

3.11 CLOSURE REPORT

3 copies of a Closure Report shall be prepared and submitted within 14 calendar days of completing work at the site. The report shall be labeled with the contract number, project name, location, date, name of general Contractor, and the Corps of Engineers District contracting for the work. The Closure Report shall include the following information as a minimum:

a. A cover letter signed by the Program Manager certifying that all services were performed according to the project requirements

b. A narrative report including, but not limited to, the following:

(1) site conditions, ground water elevation, and cleanup criteria;

(2) excavation logs;

(3) field screening readings;

(4) quantity of materials removed from each area of contamination;

(5) quantity of water/product removed during dewatering;

(6) sampling locations and sampling methods;

(7) sample collection data such as time of collection and method of preservation;

(8) sample chain-of-custody forms; and

(9) source of backfill.

c. Copies of all chemical and physical test results.

d. Copies of all manifests and land disposal restriction notifications.

e. Copies of all certifications of final disposal signed by the responsible disposal facility official.

f. Waste profile sheets.

g. Scale drawings showing limits of each excavation, limits of contamination, and known underground utilities within 50 feet of excavation, sample locations, and sample identification numbers. On-site stockpile, storage, treatment, loading, and disposal areas shall also be shown on the drawings.

h. Progress Photographs. Color photographs shall be used to document progress of the work. A minimum of four views of the site showing the location of the area of contamination, entrance/exit road, and any other notable site conditions shall be taken before work begins. After work has been started, activities at each work location shall be photographically recorded daily. Photographs shall be a minimum of 3 by 5 inches and shall include:

(1) Soil removal and sampling.

(2) Dewatering operations.

(3) Unanticipated events such as spills and the discovery of additional contaminated material.

(4) Contaminated material/water storage, handling, treatment, and transport.

(5) Site or task-specific employee respiratory and personal protection.

(6) Fill placement and grading.

(7) Post-construction photographs. After completion of work at each site, take a minimum of four views of each excavation site.

A digital version of all photos shown in the report shall be included with the Closure Report. Photographs shall be a minimum of 3 inches by 5 inches and shall be mounted back-to-back in double face plastic sleeves punched to fit standard three ring binders. Each print shall have an information box attached. The box shall be typewritten and arranged as follows:

Project Name:	Direction of View:
Location:	Date/Time:
Photograph No.:	Description of View:

-- End of Section --

SECTION 02 81 00

TRANSPORTATION AND DISPOSAL OF HAZARDOUS MATERIALS 02/10

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA)

IATA DGR	(2004) Dangerous Goods Regulations

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 262	Standards Applicable to Generators of Hazardous Waste
40 CFR 263	Standards Applicable to Transporters of Hazardous Waste
40 CFR 264	Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 265	Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 266	Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities
40 CFR 268	Land Disposal Restrictions
40 CFR 270	EPA Administered Permit Programs: The Hazardous Waste Permit Program

40 CFR 300	National Oil and Hazardous Substances Pollution Contingency Plan
40 CFR 302	Designation, Reportable Quantities, and Notification
49 CFR 107	Hazardous Materials Program Procedures
49 CFR 172	Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements
49 CFR 173	Shippers - General Requirements for Shipments and Packagings
49 CFR 178	Specifications for Packagings

1.2 DEFINITIONS

1.2.1 Hazardous Material

A substance or material which has been determined by the Secretary of Transportation to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce, and which has been so designated pursuant to the Hazardous Materials Transportation Act, 49 U.S.C. Appendix Section 1801 et seq. The term includes materials designated as hazardous materials under the provisions of 49 CFR 172, Sections .101 and .102 and materials which meet the defining criteria for hazard classes and divisions in 49 CFR 173. EPA designated hazardous wastes are also hazardous materials.

1.2.2 Hazardous Waste

A waste which meets criteria established in RCRA or specified by the EPA in 40 CFR 261 or which has been designated as hazardous by a RCRA authorized program.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Onsite Hazardous Waste Management; G
Notices of Non-Compliance and Notices of Violation
Packaging Notifications

SD-06 Test Reports

Recordkeeping; G
Spill Response
Exception Report; G

SD-07 Certificates

Certification
Security Plan
Transportation and Disposal Coordinator; G
Training; G
EPA Offsite Policy
Certificates of Disposal
Shipping Documents and Packagings Certification; G
Waste Minimization; G

1.4 QUALITY ASSURANCE

1.4.1 Transportation and Disposal Coordinator

Designate, by position and title, one person to act as the Transportation and Disposal Coordinator (TDC) for this contract. The TDC shall serve as the single point of contact for all environmental regulatory matters and shall have overall responsibility for total environmental compliance at the site including, but not limited to, accurate identification and classification of hazardous waste and hazardous materials; determination of proper shipping names; identification of marking, labeling, packaging and placarding requirements; completion of waste profiles, hazardous waste manifests, asbestos waste shipment records, PCB manifests, bill of ladings, exception and discrepancy reports; and all other environmental documentation. The TDC shall have, at a minimum, one year of specialized experience in the management and transportation of hazardous waste and have been Department of Transportation certified under 49 CFR 172, Subpart H.

1.4.2 Training

The Contractor's hazardous materials employees shall be trained, tested, and certified to safely and effectively carry out their assigned. The Contractor's employees transporting hazardous materials or preparing hazardous materials for

transportation, including samples, shall be trained, tested, and certified in accordance with 49 CFR 172, Subpart H, including security awareness and any applicable security plans. Where shipment of hazardous materials by air may be occurring, such as for sample shipments, the Contractor's hazardous material employees shall also be trained on IATA DGR. Contractor employees making determinations that shipments do not constitute DOT regulated hazardous materials shall also be trained, tested, and certified in accordance with 49 CFR 172, Subpart H.

1.4.3 Certification

The Contractor and/or subcontractors transporting hazardous materials shall possess a current certificate of registration issued by the Research and Special Programs Administration (RSPA), U.S. Department of Transportation, when required by 49 CFR 107, Subpart G. Submit copies of the certificates or written statements certifying exemption from these requirements.

1.4.4 Laws and Regulations Requirements

Work shall meet or exceed the minimum requirements established by Federal, state, and local laws and regulations which are applicable. These requirements are amended frequently and compliance with amendments is required as they become effective. In the event that compliance exceeds the scope of work or conflicts with specific requirements of the contract, notify the Contracting Officer immediately.

PART 2 PRODUCTS

2.1 MATERIALS

Provide all the materials required for the packaging, labeling, marking, placarding and transportation of hazardous wastes and hazardous materials in conformance with Department of Transportation standards and all applicable Federal and Local requirements. Details in this specification shall not be construed as establishing the limits of the Contractor's responsibility.

2.1.1 Packagings

Provide bulk and non-bulk containers for packaging hazardous materials/wastes consistent with the authorizations referenced in the Hazardous Materials Table in 49 CFR 172, Section 101, Column 8. Bulk and non-bulk packaging shall meet the corresponding specifications in 49 CFR 173 referenced in the Hazardous Materials Table, 49 CFR 172, Section .101. Each packaging shall conform to the general packaging requirements of Subpart B of 49 CFR 173, to the requirements of 49 CFR 178 at the specified packing group performance level, to the requirements of

special provisions of column 7 of the Hazardous Materials Table in 49 CFR 172, Section .101, and shall be compatible with the material to be packaged as required by 40 CFR 262. Also provide other packaging related materials such as materials used to cushion or fill voids in overpacked containers, etc. Sorbent materials shall not be capable of reacting dangerously with, being decomposed by, or being ignited by the hazardous materials being packaged. Additionally, sorbents used to treat free liquids to be disposed of in landfills shall be non-biodegradable as specified in 40 CFR 264, Section .314. In addition, packaging notifications will be provided to the Government in accordance with 49 CFR 172, Section .178.2(c) regarding type and dimensions of closures, including gaskets, needed to satisfy performance test requirements.

2.1.2 Markings

Provide markings for each hazardous material/waste package, freight container, and transport vehicle consistent with the requirements of 49 CFR 172, Subpart D and 40 CFR 262, Section 32 (for hazardous waste) . Markings shall be capable of withstanding, without deterioration or substantial color change, a 180 day exposure to conditions reasonably expected to be encountered during container storage and transportation.

2.1.3 Labeling

Provide primary and subsidiary labels for hazardous materials/wastes consistent with the requirements in the Hazardous Materials Table in 49 CFR 172, Section .101, Column 6. Labels shall meet design specifications required by 49 CFR 172, Subpart E including size, shape, color, printing, and symbol requirements. Labels shall be durable and weather resistant and capable of withstanding, without deterioration or substantial color change, a 180 day exposure to conditions reasonably expected to be encountered during container storage and transportation.

2.1.4 Placards

For each offsite shipment of hazardous material/waste, provide primary and subsidiary placards consistent with the requirements of 49 CFR 172, Subpart F. Placards shall be provided for each side and each end of bulk packaging, freight containers, transport vehicles, and rail cars requiring such placarding. Placards may be plastic, metal, or other material capable of withstanding, without deterioration, a 30 day exposure to open weather conditions and shall meet design requirements specified in 49 CFR 172, Subpart F.

2.1.5 Spill Response Materials

Provide spill response materials including, but not limited to, containers, adsorbent, shovels, and personal protective equipment. Spill response materials shall be available at all times in which hazardous materials/wastes are being handled or transported. Spill response materials shall be compatible with the type of material being handled.

2.2 EQUIPMENT AND TOOLS

Provide miscellaneous equipment and tools necessary to handle hazardous materials and hazardous wastes in a safe and environmentally sound manner.

PART 3 EXECUTION

3.1 ONSITE HAZARDOUS WASTE MANAGEMENT

These paragraphs apply to Government owned waste only. Contractors are prohibited by 10 U.S.C. 2692 from storing Contractor owned waste onsite for any length of time. The Contractor is responsible for ensuring compliance with all Federal, state, and local hazardous waste laws and regulations and shall verify those requirements when preparing reports, waste shipment records, hazardous waste manifests, or other documents. Identify hazardous wastes using criteria set forth in 40 CFR 261 or all applicable state and local laws, regulations, and ordinances. When accumulating hazardous waste onsite, comply with generator requirements in 40 CFR 262 and any applicable state or local law or regulations. Onsite accumulation times shall be restricted to applicable time frames referenced in 40 CFR 262, Section 34 and any applicable state or local law or regulation. Accumulation start dates shall commence when waste is first generated (i.e. containerized or otherwise collected for discard). Only use containers in good condition and compatible with the waste to be stored. Ensure containers are closed except when adding or removing waste, and immediately mark all hazardous waste containers with the words "hazardous waste" and other information required by 40 CFR 262, Section 32 and any applicable state or local law or regulation as soon as the waste is containerized. An additional marking shall be placed on containers of "unknowns" designating the date sampled, and the suspected hazard. Inspect containers for signs of deterioration and for responding to any spills or leaks. Inspect all hazardous waste areas weekly and provide written documentation of the inspection. Include date and time of inspection, name of individual conducting the inspection, problems noted, and corrective actions taken on the inspection logs.

3.1.1 Hazardous Waste Classification

Identify, in consultation with the Contracting Officer and waste generator , all waste codes applicable to each hazardous waste stream based on requirements in

40 CFR 261 or any applicable local law or regulation. Also identify all applicable treatment standards in 40 CFR 268 and state land disposal restrictions and make a determination as to whether or not the waste meets or exceeds the standards. Waste profiles, analyses, classification and treatment standards information shall be submitted to Contracting Officer for review and approval.

3.1.2 Management Plan

Prepare a plan detailing the manner in which hazardous wastes will be managed and describing the types and volumes of hazardous wastes anticipated to be managed as well as the management practices to be utilized. The plan shall identify the method to be used to ensure accurate piece counts and/or weights of shipments; shall identify waste minimization methods; shall propose facilities to be utilized for treatment, storage, and/or disposal; shall identify areas onsite where hazardous wastes are to be handled; and shall identify whether transfer facilities are to be utilized; and if so, how the wastes will be tracked to ultimate disposal. Submit the plan prior to start of work. Written documentation of weekly hazardous waste inspections shall be submitted on a monthly basis.

3.2 OFFSITE HAZARDOUS WASTE MANAGEMENT

Use RCRA Subtitle C permitted facilities which meet the requirements of 40 CFR 264 or facilities operating under interim status which meet the requirements of 40 CFR 265. Offsite treatment, storage, and/or disposal facilities with significant RCRA violations or compliance problems (such as facilities known to be releasing hazardous constituents into ground water, surface water, soil, or air) shall not be used. Submit Notices of Non-Compliance and Notices of Violation by a Federal, state, or local regulatory agency issued to the Contractor in relation to any work performed under this contract. Immediately provide copies of such notices to the Contracting Officer. Also furnish all relevant documents regarding the incident and any information requested by the Contracting Officer, and coordinate its response to the notice with the Contracting Officer or the designated representative prior to submission to the notifying authority. Also furnish a copy to the Contracting Officer of all documents submitted to the regulatory authority, including the final reply to the notice, and all other materials, until the matter is resolved.

3.2.1 Treatment, Storage, and/or Disposal Facility and Transporter

Provide the Contracting Officer with EPA ID numbers, names, locations, and telephone numbers of TSD facilities and transporters. This information shall be contained in the Hazardous Waste Management Plan and shall be approved by the Contracting Officer prior to waste disposal.

3.2.2 Status of the Facility

Facilities receiving hazardous waste shall be permitted in accordance with 40 CFR 270 or operating under interim status in accordance with 40 CFR 265 requirements, or permitted by a state authorized by the Environmental Protection Agency to administer the RCRA permit program. Additionally, prior to using a TSD Facility, contact the EPA Regional Offsite Coordinator specified in 40 CFR 300, Section .440, to determine the facility's status, and document all information necessary to satisfy the requirements of the EPA Offsite policy and submit this information to the Contracting Officer.

3.2.3 Shipping Documents and Packagings Certification

Prior to shipment of any hazardous material offsite and a minimum of 14 days prior to anticipated pickup, the Contractor's TDC shall provide for review written certification to the Contracting Officer that hazardous materials have been properly packaged, labeled, and marked in accordance with Department of Transportation and EPA requirements. Packaging assurances shall be furnished by the designated disposal facility not later than 35 days after acceptance of the shipment. The Contractor's TDC shall also provide written certification regarding waste minimization efforts documenting that efforts have been taken to reduce the volume and toxicity of waste to the degree economically practicable and that the method of treatment, storage, or disposal selected minimizes threats to human health and the environment.

3.2.4 Transportation

Prior to conducting hazardous materials activities, the Contractor responsible for pre-transportation activities shall either certify to the Government that a Security Plan is in place which meets the requirements of 49 CFR 172, Subpart I or in the event that the types or amounts of hazardous materials are excluded from the security planning requirements, a written statement to that effect detailing the basis for the exception. Use manifests for transporting hazardous wastes as required by 40 CFR 263 or any applicable state or local law or regulation. Transportation shall comply with all requirements in the Department of Transportation referenced regulations in the 49 CFR series. Prepare hazardous waste manifests for each shipment of hazardous waste shipped offsite. Manifests shall be completed using instructions in 40 CFR 262, Subpart B and any applicable state or local law or regulation. Submit manifests and waste profiles to Contracting Officer for review and approval. Prepare land disposal restriction notifications as required by 40 CFR 268 or any applicable state or local law or regulation for each shipment of hazardous waste. Submit notifications with the manifest to the Contracting Officer for review and approval.

3.2.5 Treatment and Disposal of Hazardous Wastes

The hazardous waste shall be transported to an approved hazardous waste treatment, storage, or disposal facility within 90 days of the accumulation start date on each container. Ship hazardous wastes only to facilities which are properly permitted to accept the hazardous waste or operating under interim status. Ensure wastes are treated to meet land disposal treatment standards in 40 CFR 268 prior to land disposal. Propose TSD facilities via submission of the Hazardous Waste Management Plan, subject to the approval of the Contracting Officer. Submit Certificates of Disposal documenting the ultimate disposal, destruction or placement of hazardous wastes and CERCLA remediation waste, within 180 days of initial shipment. Receipt of these certificates will be required for final payment.

3.3 RADIOACTIVE MATERIALS MANAGEMENT

(Not Used)

3.4 OBTAINING EPA ID NUMBERS

Complete EPA Form 8700-12, Notification of Hazardous Waste Activity, and submit to the Contracting Officer for review and approval. Allow a minimum of 30 days for processing the application and assigning the EPA ID number. Shipment shall be made no earlier than one week after receipt of the EPA ID number.

3.5 SPECIAL REQUIREMENTS FOR ASBESTOS WASTES

(Not Used)

3.6 WASTE MINIMIZATION

Minimize the generation of hazardous waste to the maximum extent practicable and take all necessary precautions to avoid mixing clean and contaminated wastes. Identify and evaluate recycling and reclamation options as alternatives to land disposal. Requirements of 40 CFR 266 shall apply to: hazardous wastes recycled in a manner constituting disposal; hazardous waste burned for energy recovery; lead-acid battery recycling; and hazardous wastes with economically recoverable precious metals. Submit written certification that waste minimization efforts have been undertaken to reduce the volume and toxicity of waste to the degree economically practicable and that the method of treatment, storage, or disposal selected minimizes threats to human health and the environment.

3.7 RECORDKEEPING

The Contractor is responsible for maintaining adequate records to support information provided to the Contracting Officer regarding exception reports, annual reports, and biennial reports; maintaining asbestos waste shipment records for a minimum of 3 years from the date of shipment or any longer period required by any applicable law or regulation or any other provision of this contract; and

maintaining bill of ladings for a minimum of 375 days from the date of shipment or any longer period required by any applicable law or regulation or any other provision of this contract. Submit information necessary to file state annual or EPA biennial reports for all hazardous waste transported, treated, stored, or disposed of under this contract. Do not forward these data directly to the regulatory agency but to the Contracting Officer at the specified time. The submittal shall contain all the information necessary for filing of the formal reports in the form and format required by the governing Federal or state regulatory agency. A cover letter shall accompany the data to include the contract number, Contractor name, and project location. In the events that a manifest copy documenting receipt of hazardous waste at the treatment storage and disposal facility is not received within 35 days of shipment initiation, or that a manifest copy documenting receipt of PCB waste at the designated facility is not received within 35 days of shipment initiation, prepare and submit an exception report to the Contracting Officer within 37 days of shipment initiation.

3.8 SPILL RESPONSE

In the event of a spill or release of a hazardous substance (as designated in 40 CFR 302), or pollutant or contaminant, or oil (as governed by the Oil Pollution Act (OPA), 33 U.S.C. 2701 et seq.), notify the Contracting Officer immediately. Any direction from the Contracting Officer concerning a spill or release shall not be considered a change under the contract. If the spill exceeds a reporting threshold, follow the pre-established procedures for immediate reporting to the Contracting Officer. Comply with all applicable requirements of Federal, state, or local laws or regulations regarding any spill incident.

3.9 EMERGENCY CONTACTS

The Contractor is responsible for complying with the emergency contact provisions in 49 CFR 172, Section .604. Whenever the Contractor ships hazardous materials, provide a 24 hr emergency response contact and phone number of a person knowledgeable about the hazardous materials being shipped and who has comprehensive emergency response and incident mitigation information for that material, or has immediate access to a person who possesses such knowledge and information. The phone shall be monitored on a 24 hour basis at all times when the hazardous materials are in transportation, including during storage incidental to transportation. Ensure that information regarding this emergency contact and phone number are placed on all hazardous material shipping documents. Designate an emergency coordinator and post the following information at areas in which hazardous wastes are managed:

a. The name of the emergency coordinator.

b. Phone number through which the emergency coordinator can be contacted on a 24 hour basis.

c. The telephone number of the local fire department.

d. The location of fire extinguishers and spill control materials.

Attachment A SAMPLE OFF-SITE POLICY CERTIFICATION MEMO	
Project/Contract #:	
Waste Stream:	
Primary TSD Facility, EPA ID # and Location:	
Alter TSD Facility, EPA ID # and Location:	
EPA Region	Contact
I	(617) 918-1752
II	(212) 637-4130
III	(214) 814-5267
IV	(404) 562-8591
V	(312) 353-8207
VI	(214) 665-2282
VII	(913) 551-7154
VIII	(303) 312-6419
IX	(415) 972-3304
X	(206) 553-2859
EPA representative contacted:	
EPA representative phone number:	
Date contacted:	
Comment:	
The above EPA representative was contacted on _____. As of that date the above sites were considered acceptable in accordance with the Off-Site Policy in 40 CFR 300.440.	
Date:	Signature:
Phone number:	

-- End of Section --

SECTION 31 05 19

GEOTEXTILE
08/08

PART 1 GENERAL

1.1 MEASUREMENT

Measure the as-built surface area, covered by geotextile, in square yards. Allowance will be made for geotextile in anchor and/or drainage trenches but no allowance will be made for waste, overlaps, damaged materials, repairs, or materials used for the convenience of the Contractor.

1.2 PAYMENT

Geotextile installed and accepted will be paid for at the respective contract unit price in the bidding schedule. This unit price will include the cost of materials, equipment, installation, testing, and other costs associated with placement of the geotextile.

1.3 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D4354	(1999; R 2009) Sampling of Geosynthetics for Testing
ASTM D4355	(2007) Deterioration of Geotextiles from Exposure to Light, Moisture and Heat in a Xenon-Arc Type Apparatus
ASTM D4491	(1999a; R 2009) Water Permeability of Geotextiles by Permittivity
ASTM D4533	(2011) Trapezoid Tearing Strength of Geotextiles
ASTM D4632	(2008) Grab Breaking Load and Elongation of Geotextiles

ASTM D4751	(2004) Determining Apparent Opening Size of a Geotextile
ASTM D4759	(2011) Determining the Specification Conformance of Geosynthetics
ASTM D4833	(2007) Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products
ASTM D4873	(2002; R 2009) Identification, Storage, and Handling of Geosynthetic Rolls and Samples

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Thread
Manufacturing Quality Control Sampling and Testing

SD-04 Samples

Quality Assurance Samples and Tests; G

SD-07 Certificates

Geotextile; G

1.5 DELIVERY, STORAGE, AND HANDLING

Deliver, store, and handle geotextile in accordance with ASTM D4873.

1.5.1 Delivery

Notify the Contracting Officer a minimum of 24 hours prior to delivery and unloading of geotextile rolls packaged in an opaque, waterproof, protective plastic wrapping. The plastic wrapping shall not be removed until deployment. If quality assurance samples are collected, immediately rewrap rolls with the plastic wrapping. Geotextile or plastic wrapping damaged during storage or handling shall be repaired or replaced, as directed. Label each roll with the manufacturer's name, geotextile type, roll number, roll dimensions (length, width, gross weight), and

date manufactured.

1.5.2 Storage

Protect rolls of geotextile from construction equipment, chemicals, sparks and flames, temperatures in excess of 160 degrees F, or any other environmental condition that may damage the physical properties of the geotextile. To protect geotextile from becoming saturated, either elevate rolls off the ground or place them on a sacrificial sheet of plastic in an area where water will not accumulate.

1.5.3 Handling

Handle and unload geotextile rolls with load carrying straps, a fork lift with a stinger bar, or an axial bar assembly. Rolls shall not be dragged along the ground, lifted by one end, or dropped to the ground.

PART 2 PRODUCTS

2.1 RAW MATERIALS

A minimum of 7 days prior to scheduled use, submit manufacturer's certificate of compliance stating that the geotextile meets the requirements of this section. For needle punched geotextiles, the manufacturer shall also certify that the geotextile has been continuously inspected using permanent on-line full-width metal detectors and does not contain any needles which could damage other geosynthetic layers. The certificate of compliance shall be attested to by a person having legal authority to bind the geotextile manufacturer.

2.1.1 Geotextile

Provide geotextile that is a woven pervious sheet of polymeric material consisting of long-chain synthetic polymers composed of at least 95 percent by weight polyolefins, polyesters, or polyamides. The use of woven slit film geotextiles (i.e. geotextiles made from yarns of a flat, tape-like character) will not be allowed. Add stabilizers and/or inhibitors to the base polymer, as needed, to make the filaments resistant to deterioration by ultraviolet light, oxidation, and heat exposure. Regrind material, which consists of edge trimmings and other scraps that have never reached the consumer, may be used to produce the geotextile. Post-consumer recycled material shall not be used. Geotextile shall be formed into a network such that the filaments or yarns retain dimensional stability relative to each other, including the edges. Geotextiles shall meet the requirements specified in Table 1. Where applicable, Table 1 property values represent minimum average roll values (MARV) in the weakest principal direction. Values for AOS represent maximum average roll values.

TABLE 1 MINIMUM PHYSICAL REQUIREMENTS FOR DRAINAGE GEOTEXTILE			
PROPERTY	**UNITS**	**ACCEPTABLE VALUES**	**TEST METHOD**
GRAB STRENGTH	N LBS	700 160	ASTM D4632
SEAM STRENGTH	N LBS		ASTM D4632
PUNCTURE	N LBS	250 55	ASTM D4833
TRAPEZOID TEAR	N LBS	250 55	ASTM D4533
APPARENT OPENING SIZE	U.S. SIEVE		ASTM D4751
PERMITTIVITY	SEC -1		ASTM D4491
ULTRAVIOLET DEGRADATION	PERCENT	50 AT 500 HRS	ASTM D4355

2.1.2 Thread

A minimum of 7 days prior to scheduled use, submit proposed thread type for sewn seams along with data sheets showing the physical properties of the thread. Construct sewn seams with high-strength polyester, nylon, or other approved thread type. Thread shall have ultraviolet light stability equivalent to the geotextile and the color shall contrast with the geotextile.

2.2 MANUFACTURING QUALITY CONTROL SAMPLING AND TESTING

The Manufacturer is responsible for establishing and maintaining a quality control program to assure compliance with the requirements of the specification. A minimum of 7 days prior to scheduled use, submit manufacturer's quality control manual. Documentation describing the quality control program shall be made available upon request. Perform manufacturing quality control sampling and testing in accordance with the manufacturer's approved quality control manual. As a minimum, geotextiles shall be randomly sampled for testing in accordance with ASTM D4354, Procedure A. Acceptance of geotextile shall be in accordance with ASTM D4759. Tests not meeting the specified requirements will result in the rejection of applicable rolls.

PART 3 EXECUTION

3.1 QUALITY ASSURANCE SAMPLES AND TESTS

3.1.1 Quality Assurance Samples

Provide assistance to the Contracting Officer in the collection of quality assurance samples for quality assurance testing; assign 7 days in the schedule to allow for testing. Collect samples upon delivery to the site at the request of the Contracting Officer. Identify samples with a waterproof marker by manufacturer's name, product identification, lot number, roll number, and machine direction. The date and a unique sample number shall also be noted on the sample. Discard the outer layer of the geotextile roll prior to sampling a roll. Samples shall then be collected by cutting the full-width of the geotextile sheet a minimum of 3 feet long in the machine direction. Rolls which are sampled shall be immediately resealed in their protective covering.

3.1.2 Quality Assurance Tests

The Contractor shall provide quality assurance samples to an Independent Laboratory. Samples will be tested to verify that geotextile meets the requirements specified in Table 1. Test method ASTM D4355 shall not be performed on the collected samples. Geotextile product acceptance shall be based on ASTM D4759. Tests not meeting the specified requirements will result in the rejection of applicable rolls.

3.2 INSTALLATION

3.2.1 Subgrade Preparation

The surface underlying the geotextile shall be smooth and free of ruts or protrusions which could damage the geotextile. Subgrade materials and compaction requirements shall be in accordance with Section 31 23 00.00 20.

3.2.2 Placement

Notify the Contracting Officer a minimum of 24 hours prior to installation of geotextile. Geotextile rolls which are damaged or contain imperfections shall be repaired or replaced as directed. The geotextile shall be laid flat and smooth so that it is in direct contact with the subgrade. The geotextile shall also be free of tensile stresses, folds, and wrinkles. On slopes steeper than 10 horizontal on 1 vertical, lay the geotextile with the machine direction of the fabric parallel to the slope direction.

3.3 SEAMS

3.3.1 Overlap Seams

Continuously overlap geotextile panels a minimum of 12 inches at all longitudinal and transverse joints. Where seams must be oriented across the slope, lap the

upper panel over the lower panel. If approved, sewn seams may be used instead of overlapped seams.

3.3.2 Sewn Seams

Factory and field seams shall be continuously sewn on all slopes steeper than 1 vertical on 4 horizontal The stitch type used shall be a 401 locking chain stitch or as recommended by the manufacturer. . Seam strength shall meet the minimum requirements specified in Table 1. The thread at the end of each seam run shall be tied off to prevent unraveling. Skipped stitches or discontinuities shall be sewn with an extra line of stitching with a minimum of 18 inches of overlap.

3.4 PROTECTION

Protect the geotextile during installation from clogging, tears, and other damage. Damaged geotextile shall be repaired or replaced as directed. Use adequate ballast (e.g. sand bags) to prevent uplift by wind. The geotextile shall not be left uncovered for more than 14 days after installation.

3.5 REPAIRS

Repair torn or damaged geotextile. Clogged areas of geotextile shall be removed. Perform repairs by placing a patch of the same type of geotextile over the damaged area. The patch shall extend a minimum of 12 inches beyond the edge of the damaged area. Patches shall be continuously fastened using approved methods. The machine direction of the patch shall be aligned with the machine direction of the geotextile being repaired. Remove and replace geotextile rolls which cannot be repaired. Repairs shall be performed at no additional cost to the Government

3.6 PENETRATIONS

Construct engineered penetrations of the geotextile by methods recommended by the geotextile manufacturer.

3.7 COVERING

Do not cover geotextile prior to inspection and approval by the Contracting Officer. Place cover soil in a manner that prevents soil from entering the geotextile overlap zone, prevents tensile stress from being mobilized in the geotextile, and prevents wrinkles from folding over onto themselves. On side slopes, soil backfill shall be placed from the bottom of the slope upward. Cover soil shall not be dropped onto the geotextile from a height greater than 3 feet. No equipment shall be operated directly on top of the geotextile without approval of the Contracting Officer. Use

equipment with ground pressures less than 7 psi to place the first lift over the geotextile. A minimum of 12 inches of soil shall be maintained between full-scale construction equipment and the geotextile. Cover soil material type, compaction, and testing requirements are described in Section 31 23 00.00 20. Equipment placing cover soil shall not stop abruptly, make sharp turns, spin their wheels, or travel at speeds exceeding 5 mph.

-- End of Section --

SECTION 31 11 00

CLEARING AND GRUBBING
08/08

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Nonsaleable Materials; G

SD-04 Samples

Tree wound paint
Herbicide (not used)

1.2 DELIVERY, STORAGE, AND HANDLING

Deliver materials to store at the site, and handle in a manner which will maintain the materials in their original manufactured or fabricated condition until ready for use.

PART 2 PRODUCTS

2.1 TREE WOUND PAINT

Submit samples in cans with manufacturer's label of bituminous based paint of standard manufacture specially formulated for tree wounds.

2.2 HERBICIDE

(Not Used)

PART 3 EXECUTION

3.1 PROTECTION

3.1.1 Roads and Walks

Keep roads and walks free of dirt and debris at all times.

3.1.2 Trees, Shrubs, and Existing Facilities

Protection shall be in accordance with Section 01 57 19.00 20, TEMPORARY ENVIRONMENTAL CONTROLS.

3.1.3 Utility Lines

Protect existing utility lines that are indicated to remain from damage. Notify the Contracting Officer immediately of damage to or an encounter with an unknown existing utility line. The Contractor is responsible for the repairs of damage to existing utility lines that are indicated or made known to the Contractor prior to start of clearing and grubbing operations. When utility lines which are to be removed are encountered within the area of operations, notify the Contracting Officer in ample time to minimize interruption of the service. Refer to Section 01 30 00, ADMINISTRATIVE REQUIREMENTS and Section 01 57 19.00 20, TEMPORARY ENVIRONMENTAL CONTROLS for additional utility protection.

3.2 CLEARING

Clearing shall consist of the felling, trimming, and cutting of trees into sections and the satisfactory disposal of the trees and other vegetation designated for removal, including downed timber, snags, brush, and rubbish occurring within the areas to be cleared. Clearing shall also include the removal and disposal of structures that obtrude, encroach upon, or otherwise obstruct the work. Trees, stumps, roots, brush, and other vegetation in areas to be cleared shall be cut off flush with or below the original ground surface, except such trees and vegetation as may be indicated or directed to be left standing. Trees designated to be left standing within the cleared areas shall be trimmed of dead branches 1-1/2 inches or more in diameter and shall be trimmed of all branches the heights indicated or directed. Limbs and branches to be trimmed shall be neatly cut close to the bole of the tree or main branches. Cuts more than 1-1/2 inches in diameter shall be painted with an approved tree-wound paint.

3.3 TREE REMOVAL

(Not Used)

3.4 PRUNING

(Not Used)

3.5 GRUBBING

Grubbing shall consist of the removal and disposal of stumps, roots larger than 3

inches in diameter, and matted roots from the designated grubbing areas. Material to be grubbed, together with logs and other organic or metallic debris not suitable for foundation purposes, shall be removed to a depth of not less than 18 inches below the original surface level of the ground in areas indicated to be grubbed and in areas indicated as construction areas under this contract, such as areas for buildings, and areas to be paved. Depressions made by grubbing shall be filled with suitable material and compacted to make the surface conform with the original adjacent surface of the ground.

3.6 DISPOSAL OF MATERIALS

3.6.1 Saleable Timber

(Not Used)

3.6.2 Nonsaleable Materials

Written permission to dispose of such products on private property shall be filed with the Contracting Officer. Logs, stumps, roots, brush, rotten wood, and other refuse from the clearing and grubbing operations, except for salable timber, shall be disposed of in the designated waste disposal area , except when otherwise directed in writing. Such directive will state the conditions covering the disposal of such products and will also state the areas in which they may be placed.

-- End of Section --

SECTION 31 23 00.00 20

EXCAVATION AND FILL
02/11

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM C136	(2006) Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C33/C33M	(2011a) Standard Specification for Concrete Aggregates
ASTM D1140	(2000; R 2006) Amount of Material in Soils Finer than the No. 200 (75-micrometer) Sieve
ASTM D1556	(2007) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D2216	(2010) Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
ASTM D2487	(2011) Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D4318	(2010) Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D6938	(2010) Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
ASTM D698	(2012) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft. (600 kN-m/cu. m.))

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 530/F-93/004	(1993; Rev O; Updates I, II, IIA, IIB, and III) Test Methods for Evaluating Solid Waste (Vol IA, IB, IC, and II) (SW-846)
EPA 600/4-79/020	(1983) Methods for Chemical Analysis of Water and Wastes

1.2 DEFINITIONS

1.2.1 Capillary Water Barrier

(Not Used)

1.2.2 Degree of Compaction

Degree of compaction is expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D698, for general soil types, abbreviated as percent laboratory maximum density.

1.2.3 Hard Materials

Weathered rock, dense consolidated deposits, or conglomerate materials which are not included in the definition of "rock" but which usually require the use of heavy excavation equipment, ripper teeth, or jack hammers for removal.

1.2.4 Rock

Solid homogeneous interlocking crystalline material with firmly cemented, laminated, or foliated masses or conglomerate deposits, neither of which can be removed without systematic drilling and blasting, drilling and the use of expansion jacks or feather wedges, or the use of backhoe-mounted pneumatic hole punchers or rock breakers; also large boulders, buried masonry, or concrete other than pavement exceeding 1/2 cubic yard in volume. Removal of hard material will not be considered rock excavation because of intermittent drilling and blasting that is performed merely to increase production.

1.2.5 Pile Supported Structure

As used herein, a structure where both the foundation and floor slab are pile supported.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Dewatering work plan

Submit 15 days prior to starting work.

SD-06 Test Reports

Borrow Site Testing; G

Fill and backfill test

Select material test

Porous fill test for capillary water barrier

Density tests

Copies of all laboratory and field test reports within 24 hours of the completion of the test.

1.4 DELIVERY, STORAGE, AND HANDLING

Perform in a manner to prevent contamination or segregation of materials.

1.5 CRITERIA FOR BIDDING

Base bids on the following criteria:

a. Surface elevations are as indicated.

b. Pipes or other artificial obstructions, except those indicated, will not be encountered.

c. Ground water elevations indicated by the boring log were those existing at the time subsurface investigations were made and do not necessarily represent ground water elevation at the time of construction.

d. Material character is indicated by the boring logs.

e. Suitable backfill in the quantities required is not available at the project site

f. Blasting will not be permitted. Remove material in an approved manner.

1.6 REQUIREMENTS FOR OFF SITE SOIL

Soils brought in from off site for use as backfill shall be tested for the following parameters using SW-846 (or other appropriate) methods to characterize if the soil is clean: full suite of VOCs, SVOCs, pesticides, herbicides, polychlorinated biphenyls (Aroclors), TPH GRO, TPH DRO, and Appendix IX Metals. Backfill shall contain less than 100 parts per million (ppm) of total petroleum hydrocarbons (TPH) and less than 10 ppm of the sum of Benzene, Toluene, Ethyl Benzene, and Xylene (BTEX). Provide Borrow Site Testing for full suite of VOCs, SVOCs, pesticides, herbicides, polychlorinated biphenyls (Aroclors), TPH GRO, TPH DRO, and Appendix IX Metals from a composite sample of material from the borrow site, with at least one test from each borrow site. Material shall not be brought on site until tests have been approved by the Contracting Officer.

1.7 QUALITY ASSURANCE

1.7.1 Dewatering Work Plan

Submit procedures for accomplishing dewatering work.

1.7.2 Utilities

Movement of construction machinery and equipment over pipes and utilities during construction shall be at the Contractor's risk. Report damage to utility lines or subsurface construction immediately to the Contracting Officer.

PART 2 PRODUCTS

2.1 SOIL MATERIALS

2.1.1 Satisfactory Materials

Any materials classified by ASTM D2487 as GW, GP, GM, GP-GM, GW-GM, GC, GP-GC, GM-GC, SW, SP, SM, SW-SM, SC, SW-SC, SP-SM, SP-SC, CL, ML, CL-ML, CH, MH free of debris, roots, wood, scrap material, vegetation, refuse, soft unsound particles, and deleterious, or objectionable materials. Unless specified otherwise, the maximum particle diameter shall be one-half the lift thickness at the intended location.

2.1.2 Unsatisfactory Materials

Materials which do not comply with the requirements for satisfactory materials. Unsatisfactory materials also include man-made fills, trash, refuse, or backfills from previous construction. Unsatisfactory material also includes material classified as satisfactory which contains root and other organic matter, frozen material, and stones larger than 6 inches. The Contracting Officer shall be notified of any contaminated materials.

2.1.3 Cohesionless and Cohesive Materials

Cohesionless materials include materials classified in ASTM D2487 as GW, GP, SW, and SP. Cohesive materials include materials classified as GC, SC, ML, CL, MH, and CH. Materials classified as GM, GP-GM, GW-GM, SW-SM, SP-SM, and SM shall be identified as cohesionless only when the fines are nonplastic (plasticity index equals zero). Materials classified as GM and SM will be identified as cohesive only when the fines have a plasticity index greater than zero.

2.1.4 Common Fill

Approved, unclassified soil material with the characteristics required to compact to the soil density specified for the intended location.

2.1.5 Backfill and Fill Material

ASTM D2487, classification GW, GP, GM, GC, SW, SP, SM, SC with a maximum ASTM D4318 liquid limit of 35, maximum ASTM D4318 plasticity index of 12, and a maximum of 25 percent by weight passing ASTM D1140, No. 200 sieve.

2.1.6 Select Material

Provide materials classified as GW, GP, SW, SP, or SM by ASTM D2487 where indicated.

2.1.7 Topsoil

Provide as specified in Section 19 SEEDING.

2.2 POROUS FILL FOR CAPILLARY WATER BARRIER

(Not Used)

2.3 UTILITY BEDDING MATERIAL

(Not Used)

2.4 SEWAGE ABSORPTION TRENCHES OR PITS

(Not Used)

2.4.1 Cover

(Not Used)

2.5 BORROW

(Not Used)

2.6 BACKFILL FOR UNDERDRAINAGE SYSTEMS

(Not Used)

2.7 FILTER FABRIC

(Not Used)

2.8 MATERIAL FOR PIPE CASING

(Not Used)

2.9 MATERIAL FOR RIP-RAP

Bedding material and Grout and rock conforming to these requirements State Standard for construction indicated.

2.9.1 Bedding Material

Consisting of sand, gravel, or crushed rock, well graded, or poorly graded with a maximum particle size of 2 inches. Material shall be composed of tough, durable particles. Fines passing the No. 200 standard sieve shall have a plasticity index less than six.

2.9.2 Grout

Composed of cement, water, an air-entraining admixture, and sand mixed in proportions of one part portland cement to two parts of sand, sufficient water to produce a workable mixture, and an amount of admixture which will entrain sufficient air to produce durable grout, as determined by the Contracting Officer. Mix grout in a concrete mixer. Mixing time shall be sufficient to produce a mixture having a consistency permitting gravity flow into the interstices of the rip-rap with limited spading and brooming.

2.9.3 Rock

Rock fragments sufficiently durable to ensure permanence in the structure and the environment in which it is to be used. Rock fragments shall be free from cracks, seams, and other defects that would increase the risk of deterioration from natural causes. The size of the fragments shall be such that no individual fragment exceeds a weight of 150 pounds and that no more than 10 percent of the mixture,

by weight, consists of fragments weighing 2 pounds or less each. Specific gravity of the rock shall be a minimum of 2.50 . The inclusion of more than trace 1 percent quantities of dirt, sand, clay, and rock fines will not be permitted.

2.10 BURIED WARNING AND IDENTIFICATION TAPE

(Not Used)

2.11 DETECTION WIRE FOR NON-METALLIC PIPING

(Not Used)

PART 3 EXECUTION

3.1 PROTECTION

(Not Used)

3.2 SURFACE PREPARATION

3.2.1 Clearing and Grubbing

Execute as specified in Section 31 11 00.

3.2.2 Stripping

(Not Used)

3.2.3 Unsuitable Material

Remove vegetation, debris, decayed vegetable matter, sod, mulch, and rubbish underneath paved areas or concrete slabs.

3.3 EXCAVATION

Excavate to contours, elevation, and dimensions indicated. Reuse excavated materials that meet the specified requirements for the material type required at the intended location. Keep excavations free from water. Excavate soil disturbed or weakened by Contractor's operations, soils softened or made unsuitable for subsequent construction due to exposure to weather. Excavations below indicated depths will not be permitted except to remove unsatisfactory material. Unsatisfactory material encountered below the grades shown shall be removed as directed. Refill with backfill and fill material and compact to 95 percent of ASTM D698 maximum density. Unless specified otherwise, refill excavations cut below indicated depth with backfill and fill material and compact to 95 percent of ASTM D698 maximum density. Satisfactory material removed below the depths indicated, without specific direction of the Contracting Officer, shall be replaced with satisfactory materials to the indicated excavation grade; except as specified

for spread footings. Determination of elevations and measurements of approved overdepth excavation of unsatisfactory material below grades indicated shall be done under the direction of the Contracting Officer.

3.3.1 Structures With Spread Footings
(Not Used)

3.3.2 Pile Cap Excavation and Backfilling
(Not Used)

3.3.3 Pipe Trenches
(Not Used)

3.3.4 Hard Material and Rock Excavation
(Not Used)

3.3.5 Excavated Materials

Satisfactory excavated material required for fill or backfill shall be placed in the proper section of the permanent work required or shall be separately stockpiled if it cannot be readily placed. Satisfactory material in excess of that required for the permanent work and all unsatisfactory material shall be disposed of as specified in Paragraph "DISPOSITION OF SURPLUS MATERIAL."

3.3.6 Final Grade of Surfaces to Support Concrete
(Not Used)

3.4 SUBGRADE PREPARATION

Unsatisfactory material in surfaces to receive fill or in excavated areas shall be removed and replaced with satisfactory materials as directed by the Contracting Officer. The surface shall be scarified to a depth of 6 inches before the fill is started. Sloped surfaces steeper than 1 vertical to 4 horizontal shall be plowed, stepped, benched, or broken up so that the fill material will bond with the existing material. When subgrades are less than the specified density, the ground surface shall be broken up to a minimum depth of 6 inches, pulverized, and compacted to the specified density. When the subgrade is part fill and part excavation or natural ground, the excavated or natural ground portion shall be scarified to a depth of 12 inches and compacted as specified for the adjacent fill. Material shall not be placed on surfaces that are muddy, frozen, or contain frost. Compaction shall be accomplished by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, or other approved equipment well suited to the soil being compacted. Material shall be moistened or aerated as necessary to provide the moisture content that will readily facilitate obtaining the specified compaction with the equipment used.

Minimum subgrade density shall be as specified herein.

3.5 SUBGRADE FILTER FABRIC

(Not Used)

3.6 FILLING AND BACKFILLING

Fill and backfill to contours, elevations, and dimensions indicated. Compact each lift before placing overlaying lift.

3.6.1 Common Fill Placement

Provide for general site and under porous fill of pile-supported structures.Use satisfactory materials. Place in 6 inch lifts. Compact areas not accessible to rollers or compactors with mechanical hand tampers. Aerate material excessively moistened by rain to a satisfactory moisture content. Finish to a smooth surface by blading, rolling with a smooth roller, or both.

3.6.2 Backfill and Fill Material Placement

Provide for paved areas and under concrete slabs, except where select material is provided. Place in 6 inch lifts. Do not place over wet areas. Place backfill material adjacent to structures as the structural elements are completed and accepted. Backfill against concrete only when approved. Place and compact material to avoid loading upon or against the structure.

3.6.3 Select Material Placement

Provide under porous fill of structures not pile supported. Place in 6 inch lifts. Do not place over wet areas. Backfill adjacent to structures shall be placed as structural elements are completed and accepted. Backfill against concrete only when approved. Place and compact material to avoid loading upon or against structure.

3.6.4 Backfill and Fill Material Placement Over Pipes and at Walls

(Not Used)

3.6.5 Porous Fill Placement

(Not Used)

3.6.6 Trench Backfilling

(Not Used)

3.7 BORROW

Where satisfactory materials are not available in sufficient quantity from required excavations, approved borrow materials shall be obtained as specified herein.

3.8 BURIED WARNING AND IDENTIFICATION TAPE

(Not Used)

3.9 BURIED DETECTION WIRE

(Not Used)

3.10 COMPACTION

Determine in-place density of existing subgrade; if required density exists, no compaction of existing subgrade will be required.

3.10.1 General Site

Compact underneath areas designated for vegetation and areas outside the 5 foot line of the paved area or structure to 85 percent of ASTM D698.

3.10.2 Structures, Spread Footings, and Concrete Slabs

(Not Used)

3.10.3 Adjacent Area

Compact areas within 5 feet of structures to 90 percent of ASTM D698.

3.10.4 Paved Areas

Compact top 12 inches of subgrades to 95 percent of ASTM D698. Compact fill and backfill materials to 95 percent of ASTM D698.

3.11 PIPELINE CASING UNDER RAILROAD AND PAVEMENT

(Not Used)

3.12 SPECIAL EARTHWORK REQUIREMENTS FOR SUBSURFACE DRAINS

(Not Used)

3.13 EARTHWORK REQUIREMENTS FOR SEWAGE ABSORPTION TRENCHES

(Not Used)

3.14 RIP-RAP CONSTRUCTION

Construct rip-rap on bedding material in the areas indicated.

3.14.1 Preparation

Trim and dress indicated areas to conform to cross sections, lines and grades shown within a tolerance of 0.1 foot.

3.14.2 Bedding Placement

Spread bedding material uniformly to a thickness of at least 3 inches on prepared subgrade as indicated. Bedding will consist of a geotextile overlain with 6 inches of low permeability compacted soil.

3.14.3 Stone Placement

Place rock for rip-rap on prepared bedding material to produce a well graded mass with the minimum practicable percentage of voids in conformance with lines and grades indicated. Distribute larger rock fragments, with dimensions extending the full depth of the rip-rap throughout the entire mass and eliminate "pockets" of small rock fragments. Rearrange individual pieces by mechanical equipment or by hand as necessary to obtain the distribution of fragment sizes specified above.

3.14.4 Grouting
(Not Used)

3.15 FINISH OPERATIONS

3.15.1 Grading

Finish grades as indicated within one-tenth of one foot. Grade areas to drain water away from structures. Maintain areas free of trash and debris. For existing grades that will remain but which were disturbed by Contractor's operations, grade as directed.

3.15.2 Topsoil and Seed

Provide as specified in Section 32 92 19 SEEDING.

3.15.3 Protection of Surfaces

Protect newly backfilled, graded, and top soiled areas from traffic, erosion, and settlements that may occur. Repair or reestablish damaged grades, elevations, or slopes.

3.16 DISPOSITION OF SURPLUS MATERIAL

Remove from Government property surplus or other soil material not required or suitable for filling or backfilling, and brush, refuse, stumps, roots, and timber.

3.17 FIELD QUALITY CONTROL

3.17.1 Sampling

Take the number and size of samples required to perform the following tests.

3.17.2 Testing

Perform one of each of the following tests for each material used. Provide additional tests for each source change.

3.17.2.1 Fill and Backfill Material Testing

Test fill and backfill material in accordance with ASTM C136 for conformance to ASTM D2487 gradation limits; ASTM D1140 for material finer than the No. 200 sieve; ASTM D4318 for liquid limit and for plastic limit; ASTM D698 for moisture density relations, as applicable.

3.17.2.2 Select Material Testing

Test select material in accordance with ASTM C136 for conformance to ASTM D2487 gradation limits; ASTM D1140 for material finer than the No. 200 sieve; ASTM D698 for moisture density relations, as applicable.

3.17.2.3 Porous Fill Testing

Test porous fill in accordance with ASTM C136 for conformance to gradation specified in ASTM C33/C33M.

3.17.2.4 Density Tests

Test density in accordance with ASTM D1556, or ASTM D6938. When ASTM D6938 density tests are used, verify density test results by performing an ASTM D1556 density test at a location already ASTM D6938 tested as specified herein. Perform an ASTM D1556 density test at the start of the job, and for every 10 ASTM D6938 density tests thereafter. Test each lift at randomly selected locations every 2000 square feet of existing grade in fills for structures and concrete slabs, and every 2500 square feet for other fill areas and every 2000 square feet of subgrade in cut. Include density test results in daily report.

Bedding and backfill in trenches: One test per 50 linear feet in each lift.

3.17.2.5 Moisture Content Tests

In the stockpile, excavation or borrow areas, a minimum of two tests per day per type of material or source of materials being placed is required during stable weather conditions. During unstable weather, tests shall be made as dictated by local conditions and approved moisture content shall be tested in accordance with ASTM D2216. Include moisture content test results in daily report.

-- End of Section --

SECTION 31 32 11

SOIL SURFACE EROSION CONTROL
08/08

PART 1 GENERAL

1.1 MEASUREMENT AND PAYMENT

1.1.1 Standard and Geosynthetic Binder

Measure the standard and geosynthetic binder by the square yard of surface area covered. No measurement for payment will be made for fine grading, trenching or other miscellaneous materials necessary for placement of the binder.

1.1.2 Mulch and Compost

Measure mulch and compost by the square yard of surface area covered. No measurement for payment will be made for binder, dye or other miscellaneous materials or equipment necessary for placement of the mulch or compost.

1.1.3 Hydraulic Mulch

Measure hydraulic mulch by the square yard of surface area covered. Measurement for payment will include binder, dye or both. No measurement for payment will be made for other miscellaneous materials or equipment necessary for placement of the hydraulic mulch.

1.1.4 Geotextile Fabric

Measure geotextile fabrics by the square yard of surface area covered. No measurement for payment will be made for fine grading, trenching or other miscellaneous materials necessary for placement of the fabric.

1.1.5 Erosion Control Blankets

Measure erosion control blankets by the square yard of surface area covered. No measurement for payment will be made for fine grading, trenching or other miscellaneous materials necessary for placement of the erosion control blankets.

1.1.6 Synthetic Grid/Sheet Systems

Measure synthetic grid/sheet system by the square yard of surface area covered.

No measurement for payment will be made for fine grading, trenching, geotextile, seams, grout, rock, topsoil or other miscellaneous materials necessary for placement of the articulating cellular concrete block system.

1.1.7 Cellular Concrete Block Systems

Measure articulating cellular concrete block system by the square yard of surface area covered. No measurement for payment will be made for fine grading, trenching, geotextile, seams, grout, rock, topsoil or other miscellaneous materials necessary for placement of the articulating cellular concrete block system.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D4972	(2001; R 2007) pH of Soils
ASTM D5268	(2007) Topsoil Used for Landscaping Purposes
ASTM D5852	(2000; R 2007) Standard Test Method for Erodibility Determination of Soil in the Field or in the Laboratory by the Jet Index Method
ASTM D6629	(2001; R 2007) Selection of Methods for Estimating Soil Loss by Erosion
ASTM D698	(2012) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft. (600 kN-m/cu. m.))

1.3 SYSTEM DESCRIPTION

The work consists of furnishing and installing temporary and permanent soil surface erosion control materials to prevent the pollution of air, water, and land, including fine grading, blanketing, stapling, mulching, vegetative measures, structural measures, and miscellaneous related work, within project limits and in areas outside the project limits where the soil surface is disturbed from work under this contract at the designated locations. This work includes all necessary materials, labor, supervision and equipment for installation of a complete system. Submit a listing of equipment to be used for the application of erosion control

materials. Coordinate this section with the requirements of Section 31 23 00.00 20 EXCAVATION AND FILL and Section 32 92 19 SEEDING,. Complete backfilling the openings in synthetic grid systems and articulating cellular concrete block systems a maximum 7 days after placement to protect the material from ultraviolet radiation.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Work sequence schedule; G
Erosion control plan; G;

SD-02 Shop Drawings

Layout;
Erosion Control;
Seed Establishment Period

SD-03 Product Data

Local/Regional Materials;
Biobased Materials
Geosynthetic Binders;
Recycled Plastic;
Wood Cellulose Fiber;
Paper Fiber;
Geotextile Fabrics; G
Aggregate;
Equipment
Finished Grade

SD-04 Samples

Materials

SD-06 Test Reports

Geotextile Fabrics; G

SD-07 Certificates

Fill Material
Geotextile Fabrics; G
Installer's Qualification
Seed

SD-10 Operation and Maintenance Data

Maintenance Instructions

SD-11 Closeout Submittals

Local/Regional Materials;
Geotextile Fabrics; G
Aggregate;

1.5 QUALITY ASSURANCE

1.5.1 Installer's Qualification

The installer shall be certified by the manufacturer for training and experience installing the material. Submit the installer's company name and address, and/or certification.

1.5.2 Erosion Potential

Assess potential effects of soil management practices on soil loss in accordance with ASTM D6629. Assess erodibility of soil with dominant soil structure less than 2.8 to 3.1 inches in accordance with ASTM D5852.

1.5.3 Substitutions

Substitutions will not be allowed without written request and approval from the Contracting Officer.

1.5.4 SUSTAINABLE DESIGN REQUIREMENTS

1.5.4.1 Local/Regional Materials

Submit LEED documentation relative to local/regional materials credit in accordance with LEED GBDC. Submit documentation indicating distance between manufacturing facility and the project site. Indicate distance of raw material origin from the project site. Indicate relative dollar value of local/regional materials to

total dollar value of products included in project. Use materials or products extracted, harvested, or recovered, as well as manufactured, within a 500 mile radius from the project site, if available from a minimum of three sources.

1.5.4.2 Biobased Materials

Submit documentation indicating type of biobased material in product and biobased content. Use biobased materials when feasible and as specified.

1.6 DELIVERY, STORAGE, AND HANDLING

Prior to delivery of materials, submit certificates of compliance attesting that materials meet the specified requirements. Store materials in designated areas and as recommended by the manufacturer protected from the elements, direct exposure, and damage. Do not drop containers from trucks. Material shall be free of defects that would void required performance or warranty. Deliver geosynthetic binders and synthetic soil binders in the manufacturer's original sealed containers and stored in a secure area.

a. Furnish erosion control blankets and geotextile fabric in rolls with suitable wrapping to protect against moisture and extended ultraviolet exposure prior to placement. Label erosion control blanket and geotextile fabric rolls to provide identification sufficient for inventory and quality control purposes.

b. All synthetic grids, synthetic sheets, and articulating cellular concrete block grids shall be sound and free of defects that would interfere with the proper placing of the block or impair the strength or permanence of the construction. Minor cracks in synthetic grids and concrete cellular block, incidental to the usual methods of manufacture, or resulting from standard methods of handling in shipment and delivery, will not be deemed grounds for rejection.

c. Inspect seed upon arrival at the jobsite for conformity to species and quality. Seed that is wet, moldy, or bears a test date five months or older, shall be rejected.

d. Submit the following materials and items in the quantities specified:

(1) Geotextile fabrics; 6 inch square.

e. For items listed in this section, certified copies of the material certificates shall include the following:

(1) Certification of recycled content or,

(2) Statement of recycled content.

(3) Certification of origin including the name, address and telephone number of manufacturer.

1.7 SCHEDULING

Submit a construction work sequence schedule, with the approved erosion control plan a minimum of 30 days prior to start of construction. The work schedule shall coordinate the timing of land disturbing activities with the provision of erosion control measures to reduce on-site erosion and off-site sedimentation. Coordinate installation of temporary erosion control features with the construction of permanent erosion control features to assure effective and continuous control of erosion, pollution, and sediment deposition. Include a vegetative plan with planting and seeding dates and fertilizer, lime, and mulching rates. Distribute copies of the work schedule and erosion control plan to site subcontractors. Address the following in the erosion control plan:

a. Statement of erosion control and storm water control objectives.

b. Description of temporary and permanent erosion control, storm water control, and air pollution control measures to be implemented on site.

c. Description of the type and frequency of maintenance activities required for the chosen erosion control methods.

d. Comparison of proposed post-development storm water runoff conditions with predevelopment conditions.

1.8 WARRANTY

Erosion control material shall have a warranty for use and durable condition for project specific installations. Temporary erosion control materials shall carry a minimum eighteen month warranty. Permanent erosion control materials shall carry a minimum three year warranty.

PART 2 PRODUCTS

2.1 RECYCLED PLASTIC

(Not Used)

2.2 BINDERS

2.2.1 Synthetic Soil Binders
(Not Used)

2.2.2 Geosynthetic Binders
(Not Used)

2.3 MULCH
(Not Used)

2.3.1 Straw

Straw shall be stalks from oats, wheat, rye, barley, or rice, furnished in air-dry condition and with a consistency for placing with commercial mulch-blowing equipment.

2.3.2 Hay

Hay shall be native hay, sudan-grass hay, broomsedge hay, or other herbaceous mowings, furnished in an air-dry condition suitable for placing with commercial mulch-blowing equipment.

2.3.3 Wood Cellulose Fiber
(Not Used)

2.3.4 Paper Fiber
(Not Used)

2.3.5 Shredded Bark
(Not Used)

2.3.6 Wood By-Products
(Not Used)

2.3.7 Coir
(Not Used)

2.3.8 Asphalt Adhesive
(Not Used)

2.3.9 Mulch Control Netting and Filter Fabric
(Not Used)

2.3.10 Hydraulic Mulch
(Not Used)

2.3.11 Tackifier

(Not Used)

2.3.12 Dye

(Not Used)

2.4 GEOTEXTILE FABRICS

See Section 31 05 19.

2.5 EROSION CONTROL BLANKETS

(Not Used)

2.5.1 Seed

Submit classification, botanical name, common name, percent pure live seed, minimum percent germination and hard seed, maximum percent weed seed content, and date tested.

2.5.1.1 Seed Classification

See Section 32 92 19.

2.6 SYNTHETIC GRID AND SHEET SYSTEMS

(Not Used)

2.7 SEDIMENT FENCING

Wood or burlap.

2.8 COMPOST FILTER BERMS

(Not Used)

2.9 AGGREGATE

Aggregate shall be offsite material generated from grading and demolition operations, as available.] Crushed rock shall be crushed run between a minimum 2 inches and a maximum 6 inches. Gravel shall be river run between a minimum 2 inches and a maximum 6 inches. Submit sieve test results for both gravel and sand. Sand shall be uniformly graded.

2.10 ARTICULATING CELLULAR CONCRETE BLOCK SYSTEMS

(Not Used)

2.11 WATER

Unless otherwise directed, water is the responsibility of the Contractor. Water shall be potable or supplied by an existing irrigation system.

PART 3 EXECUTION

3.1 WEATHER CONDITIONS

Perform erosion control operations under favorable weather conditions; when excessive moisture, frozen ground or other unsatisfactory conditions prevail, the work shall be stopped as directed. When special conditions warrant a variance to earthwork operations, submit a revised construction schedule for approval. Do not apply erosion control materials in adverse weather conditions which could affect their performance.

3.1.1 Finished Grade

Provide condition of finish grade status prior to installation, location of underground utilities and facilities. Verify that finished grades are as indicated on the drawings; complete finish grading and compaction in accordance with Section 31 00 00 EARTHWORK, prior to the commencement of the work. Verify and mark the location of underground utilities and facilities in the area of the work. Repair damage to underground utilities and facilities at the Contractor's expense.

3.1.2 Placement of Erosion Control Blankets

Before placing the erosion control blankets, ensure the subgrade has been graded smooth; has no depressed, void areas; is free from obstructions, such as tree roots, projecting stones or other foreign matter. Verify that mesh does not include invasive species. Vehicles will not be permitted directly on the blankets.

3.1.3 Synthetic Grid

Before placing the grid system, ensure that the subgrade has been properly grubbed of large roots and rocks; compacted; has been graded smooth; has no depressed, void, soft or uncompacted areas; is free from obstructions, such as tree roots, projecting stones or other foreign matter; and has been seeded.

3.1.4 Concrete Cellular Block

Before placing geotextile fabric under cellular block, ensure that the subgrade has been properly compacted; has been graded smooth; has no depressed, void, soft or uncompacted areas; is free from obstructions, such as tree roots, projecting

stones or other foreign matter; and has been seeded. Compact subgrade compaction to at least 90 percent of the maximum dry density at optimum moisture content, as determined by ASTM D698, with a tolerance of plus or minus 1 inch of the design elevation.

3.2 SITE PREPARATION

3.2.1 Soil Test

Test soil in accordance with ASTM D5268 and ASTM D4972 for determining the particle size and mechanical analysis. Sample collection onsite shall be random over the entire site. The test shall determine the soil particle size as compatible for the specified material.

3.2.2 Layout

Erosion control material locations may be adjusted to meet field conditions. When soil tests result in unacceptable particle sizes, a shop drawing shall be submitted indicating the corrective measures. Submit scale drawings defining areas to receive recommended materials as required by federal, state or local regulations.

3.2.3 Protecting Existing Vegetation

When there are established lawns in the work area, the turf shall be covered and/or protected or replaced after construction operations. Identify existing trees, shrubs, plant beds, and landscape features that are to be preserved on site by appropriate tags and barricade with reusable, high-visibility fencing along the dripline. Mitigate damage to existing trees at no additional cost to the Government. Damage shall be assessed by a state certified arborist or other approved professional using the National Arborist Association's tree valuation guideline.

3.2.4 Obstructions Below Ground

When obstructions below ground affect the work, submit shop drawings showing proposed adjustments to placement of erosion control material for approval.

3.3 INSTALLATION

Immediately stabilize exposed soil using fabric, and seed. Stabilize areas for construction access immediately as specified in the paragraph Construction Entrance. Install principal sediment basins and traps before any major site grading takes place. Provide additional sediment traps and sediment fences as grading progresses. Provide inlet and outlet protection at the ends of new drainage

systems. Remove temporary erosion control measures at the end of construction and provide permanent seeding.

3.3.1 Construction Entrance

Provide as indicated on drawings, a minimum of 6 inches thick, at points of vehicular ingress and egress on the construction site. Construction entrances shall be cleared and grubbed, and then excavated a minimum of 3 inches prior to placement of the filter fabric and aggregate. The aggregate shall be placed in a manner that will prevent damage and movement of the fabric. Place fabric in one piece, where possible. Overlap fabric joints a minimum of 12 inches.

3.3.2 Compost Filter Berms

(Not Used)

3.3.3 Synthetic Binders

(Not Used)

3.3.4 Seeding

When seeding is required prior to installing mulch on synthetic grid systems verify that seeding will be completed in accordance with Sections 31 23 00.00 20 EXCAVATION AND FILL and 32 92 19 SEEDING.

3.3.5 Mulch Installation

(Not Used)

3.3.6 Mulch Control Netting

(Not Used)

3.3.7 Mechanical Anchor

(Not Used)

3.3.8 Asphalt Adhesive Tackifier

(Not Used)

3.3.9 Non-Asphaltic Tackifier

(Not Used)

3.3.10 Asphalt Adhesive Coated Mulch

(Not Used)

3.3.11 Wood Cellulose Fiber, Paper Fiber, and Recycled Paper

(Not Used)

3.3.12 Hydraulic Mulch Application
(Not Used)

3.3.13 Erosion Control Blankets
(Not Used)

3.3.14 Synthetic Sheet System
(Not Used)

3.3.15 Grids
(Not Used)

3.3.16 Articulated Cellular Concrete Box System Installation
(Not Used)

3.3.17 Sediment Fencing

Install posts at the spacing indicated on drawings and at an angle between 2 degrees and 20 degrees towards the potential silt load area. Sediment fence height shall be approximately 16 inches. Do not attach filter fabric to existing trees. Secure filter fabric to the post and wire fabric using staples, tie wire, or hog rings. Imbed the filter fabric into the ground as indicated on drawings. Splice filter fabric at support pole using a 6 inches overlap and securely seal.

3.4 CLEAN-UP

Dispose of excess material, debris, and waste materials offsite at an approved landfill or recycling center. Clear adjacent paved areas. Immediately upon completion of the installation in an area, protect the area against traffic or other use by erecting barricades and providing signage as required, or as directed.

3.5 WATERING SEED

Start watering immediately after installing erosion control blanket type XI (revegetation mat). Apply water to supplement rainfall at a sufficient rate to ensure moist soil conditions to a minimum 1 inch depth. Prevent run-off and puddling. Do no drive watering trucks over turf areas, unless otherwise directed. Prevent watering of other adjacent areas or plant material.

3.6 MAINTENANCE RECORD

Furnish a record describing the maintenance work performed, record of measurements and findings for product failure, recommendations for repair, and products replaced.

3.6.1 Maintenance

Maintenance shall include eradicating weeds; protecting embankments and ditches from surface erosion; maintaining the performance of the erosion control materials and mulch; protecting installed areas from traffic.

3.6.2 Maintenance Instructions

Furnish written instructions containing drawings and other necessary information, describing the care of the installed material; including, when and where maintenance should occur, and the procedures for material replacement. Submit instruction for year-round care of installed material. Include manufacturer supplied spare parts.

3.6.3 Patching and Replacement

Unless otherwise directed, material shall be placed, seamed or patched as recommended by the manufacturer. Remove material not meeting the required performance as a result of placement, seaming or patching from the site. Replace the unacceptable material at no additional cost to the Government.

3.7 SATISFACTORY STAND OF GRASS PLANTS

When erosion control blanket type XI (revegetation mat) is installed, evaluate the grass plants for species and health when the grass plants are a minimum 1 inch high. A satisfactory stand of grass plants from the revegetation mat area shall be a minimum 10 grass plants per square foot. The total bare spots shall not exceed 2 percent of the total revegetation mat area.

-- End of Section --

SECTION 32 92 19

SEEDING
10/06

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D4972	(2001; R 2007) pH of Soils

U.S. DEPARTMENT OF AGRICULTURE (USDA)

AMS Seed Act	(1940; R 1988; R 1998) Federal Seed Act
DOA SSIR 42	(1996) Soil Survey Investigation Report No. 42, Soil Survey Laboratory Methods Manual, Version 3.0

1.2 DEFINITIONS

1.2.1 Stand of Turf

95 percent ground cover of the established species.

1.3 RELATED REQUIREMENTS

Section 31 23 00.00 20 EXCAVATION AND FILL, , applies to this section for pesticide use and plant establishment requirements, with additions and modifications herein.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval.

The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL

PROCEDURES:

SD-03 Product Data

Wood cellulose fiber mulch

Fertilizer

Include physical characteristics, and recommendations.

SD-06 Test Reports

Topsoil composition tests (reports and recommendations).

SD-07 Certificates

State certification and approval for seed

SD-08 Manufacturer's Instructions

Erosion Control Materials

1.5 DELIVERY, STORAGE, AND HANDLING

1.5.1 Delivery

1.5.1.1 Seed Protection

Protect from drying out and from contamination during delivery, on-site storage, and handling.

1.5.1.2 Fertilizer Delivery

Deliver to the site in original, unopened containers bearing manufacturer's chemical analysis, name, trade name, trademark, and indication of conformance to state and federal laws. Instead of containers, fertilizer may be furnished in bulk with certificate indicating the above information.

1.5.2 Storage

1.5.2.1 Seed, Fertilizer Storage

Store in cool, dry locations away from contaminants.

1.5.2.2 Topsoil

Prior to stockpiling topsoil, treat growing vegetation with application of appropriate specified non-selective herbicide. Clear and grub existing vegetation three to four weeks prior to stockpiling topsoil.

1.5.2.3 Handling

Do not drop or dump materials from vehicles.

1.6 TIME RESTRICTIONS AND PLANTING CONDITIONS

1.6.1 Restrictions

Do not plant when the ground is muddy, or when air temperature exceeds 90 degrees Fahrenheit.

1.7 TIME LIMITATIONS

1.7.1 Seed

Apply seed within twenty four hours after seed bed preparation.

PART 2 PRODUCTS

2.1 SEED

2.1.1 Classification

Provide State-certified seed of the latest season's crop delivered in original sealed packages, bearing producer's guaranteed analysis for percentages of mixtures, purity, germination, weedseed content, and inert material. Label in conformance with AMS Seed Act and applicable state seed laws. Wet, moldy, or otherwise damaged seed will be rejected. Field mixes will be acceptable when field mix is performed on site in the presence of the Contracting Officer.

2.2 TOPSOIL

2.2.1 On-Site Topsoil

Surface soil stripped and stockpiled on site and modified as necessary to meet the requirements specified for topsoil in paragraph entitled "Composition." When available, topsoil shall be existing surface soil stripped and stockpiled on-site in accordance with Section 31 23 00.00 20 EXCAVATION AND FILL.

2.2.2 Off-Site Topsoil

Conform to requirements specified in paragraph entitled "Composition." Additional topsoil shall be furnished by the Contractor.

2.2.3 Composition

Containing from 5 to 10 percent organic matter as determined by the topsoil composition tests of the Organic Carbon, 6A, Chemical Analysis Method described in DOA SSIR 42. Maximum particle size, 3/4 inch, with maximum 3 percent retained on 1/4 inch screen. The pH shall be tested in accordance with ASTM D4972. Topsoil shall be free of sticks, stones, roots, and other debris and objectionable materials. Other components shall conform to the following limits:

Silt	25-50 percent
Clay	10-30 percent
Sand	20-35 percent
pH	5.5 to 7.0
Soluble Salts	600 ppm maximum

2.3 SOIL CONDITIONERS

(Not Used)

2.4 FERTILIZER

2.4.1 Granular Fertilizer

Organic granular controlled release fertilizer containing the following minimum percentages, by weight, of plant food nutrients:

16 percent available nitrogen
7 percent available phosphorus
12 percent available potassium
2 percent iron

2.4.2 Hydroseeding Fertilizer

(Not Used)

2.5 MULCH

Mulch shall be free from noxious weeds, mold, and other deleterious materials.

2.5.1 Straw

Stalks from oats, wheat, rye, barley, or rice. Furnish in air-dry condition and of proper consistency for placing with commercial mulch blowing equipment. Straw shall contain no fertile seed.

2.5.2 Hay

Air-dry condition and of proper consistency for placing with commercial mulch blowing equipment. Hay shall be sterile, containing no fertile seed.

2.5.3 Wood Cellulose Fiber Mulch

Use recovered materials of either paper-based (100 percent) or wood-based (100 percent) hydraulic mulch. Processed to contain no growth or germination-inhibiting factors and dyed an appropriate color to facilitate visual metering of materials application. Composition on air-dry weight basis: 9 to 15 percent moisture, pH range from 5.5 to 8.2 . Use with hydraulic application of grass seed and fertilizer.

2.6 WATER

Source of water shall be approved by Contracting Officer and of suitable quality for irrigation, containing no elements toxic to plant life.

2.7 EROSION CONTROL MATERIALS

Erosion control material shall conform to the following:

2.7.1 Erosion Control Blanket

100 percent agricultural straw stitched with a degradable nettings, designed to degrade within 12 months.

2.7.2 Erosion Control Material Anchors

Erosion control anchors shall be as recommended by the manufacturer.

PART 3 EXECUTION

3.1 PREPARATION

3.1.1 EXTENT OF WORK

Provide soil preparation (including soil conditioners as required), fertilizing, seeding, and surface topdressing of all newly graded finished earth surfaces, unless

indicated otherwise, and at all areas inside or outside the limits of construction that are disturbed by the Contractor's operations.

3.1.1.1 Topsoil

Provide 4 inches of off-site topsoil to meet indicated finish grade. After areas have been brought to indicated finish grade, incorporate fertilizer into soil a minimum depth of 4 inches by disking, harrowing, tilling or other method approved by the Contracting Officer. Remove debris and stones larger than 3/4 inch in any dimension remaining on the surface after finish grading. Correct irregularities in finish surfaces to eliminate depressions. Protect finished topsoil areas from damage by vehicular or pedestrian traffic.

3.2 SEEDING

3.2.1 Seed Application Seasons and Conditions

Immediately before seeding, restore soil to proper grade. Do not seed when ground is muddy or in an unsatisfactory condition for seeding. If special conditions exist that may warrant a variance in the above seeding dates or conditions, submit a written request to the Contracting Officer stating the special conditions and proposed variance. Apply seed within twenty four hours after seedbed preparation. Sow seed by approved sowing equipment. Sow one-half the seed in one direction, and sow remainder at right angles to the first sowing.

3.2.2 Seed Application Method

Seeding method shall be broadcasted and drop seeding.

3.2.2.1 Broadcast and Drop Seeding

Sow one-half the seed in one direction, and sow remainder at right angles to the first sowing. Cover seed uniformly to a maximum depth of 1/4 inch in clay soils and 1/2 inch in sandy soils by means of spike-tooth harrow, cultipacker, raking or other approved devices.

3.2.3 Mulching

3.2.3.1 Hay or Straw Mulch

Hay or straw mulch shall be spread uniformly at the rate of 2 tons per acre. Mulch shall be spread by hand, blower-type mulch spreader, or other approved method. Mulching shall be started on the windward side of relatively flat areas or on the upper part of steep slopes, and continued uniformly until the area is covered. The

mulch shall not be bunched or clumped. Sunlight shall not be completely excluded from penetrating to the ground surface. All areas installed with seed shall be mulched on the same day as the seeding. Mulch shall be anchored immediately following spreading.

3.2.5 Watering

Start watering areas seeded as required by temperature and wind conditions. Apply water at a rate sufficient to insure thorough wetting of soil to a depth of 2 inches without run off. During the germination process, seed is to be kept actively growing and not allowed to dry out.

3.3 PROTECTION OF TURF AREAS

Immediately after turfing, protect area against traffic and other use.

3.4 RENOVATION OF EXISTING TURF AREA

(Not Used)

3.5 RESTORATION

Restore to original condition existing turf areas which have been damaged during turf installation operations at the Contractor's expense. Keep clean at all times at least one paved pedestrian access route and one paved vehicular access route to each building. Clean other paving when work in adjacent areas is complete.

-- End of Section --

Appendix F
Erosion Control Plan

1.0 EXPLANATORY STATEMENT

This document provides information for the Erosion Control and Sedimentation Prevention Plan to be implemented during activities related to the completion of the Interim Corrective Measures Work Plan at Solid Waste Management Unit (SWMU) 56 Naval Activity Puerto Rico (NAPR), Ceiba, Puerto Rico. NAPR occupies over 8,800 acres on the northern side of the east coast of Puerto Rico along Vieques Passage, with Vieques Island lying to the east about 10 miles off the harbor entrance. Ownership of the airfield parcel at NAPR (Ofstie Airfield) was transferred from the United States Navy to the Puerto Rico Ports Authority on 7 February 2008. The Puerto Rico Ports Authority developed the airfield into an operational regional airport. However, in accordance with the Administrative Order, the Covenant Deferral Request, and the Quitclaim Deed of Transfer, the United States Navy maintains responsibility for the investigation and cleanup of SWMU 56.

Work will be completed at SWMU 56, which covers an area of approximately 1.3 acres and is located on the south side of Ofstie Field, just off of the aircraft apron on the northwest side of Hangar 200.

The selected remedy to be executed at the site includes excavation along the entire impacted length of the drainage ditch. The drainage ditch will be excavated to a maximum depth of 1.0 feet below ground surface (bgs) or to the concrete ditch lining or the culvert invert. Additionally, two upland areas will be excavated to one foot bgs. Excavation and offsite disposal of approximately 238 cubic yards of contaminated sediment and 465 cubic yards of contaminated soil was selected as the cleanup alternative or interim corrective measure. In addition to excavation and offsite disposal, the corrective measure also includes an institutional control restricting future residential land and groundwater use.

Erosion Control and Sedimentation Prevention Checklists are provided.

2.0 CERTIFICATION

This Plan has been prepared within the requirements of applicable regulations. I hereby certify that, based on the information provided by the owner of the project and his representatives, the existing facility site drawings, and information of recognized expertise and official information of the Government of Puerto Rico available at the time of writing this document, that the provided information is certain, correct, and complete to the my best of my knowledge and understanding.

_____ _____

Date

( )

ESTADO LIBRE ASOCIADO DE PUERTO RICO
Oficina del Gobernador
Junta de Calidad Ambiental
35 Años de Gestión Ambiental

Área de Calidad de Agua

REQUISITOS PARA EL PERMISO GENERAL OTRAS OBRAS

PG-CES-____-_____-_____-____
PARA USO OFICIAL

Anejos	Documentos Solicitados	Sometido (Solicitante)	Recibido (Uso Oficial)
1.	Formulario de Solicitud de Permiso General para Otras Obras debidamente completado (Un original y una copia) **(Forma PG-CES-002)**	☑	☐
2.	Evidencia de haber cumplido con el Artículo 4. B(3) de la Ley Sobre Política Pública Ambiental (Ley Número 416 del 22 de septiembre de 2004, según enmendada)	☑	☐
3.	Plano Topográfico en escala de 1 en 20,000 identificando el proyecto	☑	☐
4.	Identificación de accesos o vías públicas desde o hacia el lugar del proyecto (Mapa, Croquis o Escrito)	☑	☐
5.	Documento de Plan CES (firmado y sellado en original por el proyectista) que incluya de manera rotulada cada una de estas secciones:	☑	☐
	a) Memorial Explicativo		
	b) Localización y representación gráfica de las áreas afectadas y colindantes	☐	☐
	c) Plano de niveles actuales y niveles propuestos(Firmado y sellado en original por el profesional licenciado que lo preparó)	☐	☐
	d) Plano de drenaje que incluya la localización de los sistemas de drenajes existentes o partes de éste (naturales o hechos por el hombre), cálculos de escorrentías, cuerpos de agua (perennes e intermitentes) y sistemas naturales (humedales, sumideros y otros) (Firmado y sellado en original por el profesional licenciado que lo preparó)	☐	☐
	e) Plano Pluvial con la localización del sistema de drenaje final incluyendo sus puntos de descarga (Si Aplica) (Firmado y sellado en original por el profesional licenciado que lo preparó)		
	f) Plano del proyecto con las medidas de control de erosión y prevención de la sedimentación a implantarse en el predio (Plano CES) (Firmado y sellado en original por el proyectista)	☑	☐
	g) Descripción de medidas de control de erosión y prevención de la sedimentación provisionales y permanentes, incluyendo diseño, especificaciones e itinerario de mantenimiento	☑	☐
	h) Identificación del lugar donde se almacenarán los componentes de la corteza terrestre (Si Aplica)	☑	☐
N/A	i) Estimado de costos de Implantación y Mantenimiento	☐	☐
N/A	j) Documento escrito donde se detalle las actividades de forestación y/o la estabilización de las áreas impactadas	☑	☐
	k) Certificación, firmada y sellada en original, subscrita por el proyectista que preparó el Documento y el Plano de Plan CES y copia de sus respectivas licencias **(Forma PG-CES-003)**	☑	☐
N/A	l) Certificación, firmada y sellada en original, suscrita por el **(los)** profesional**(es)** a cargo de la preparación de cualquier otro documento o planos que sea incluido como parte del Plan CES y copia de sus respectivas licencias (Si Aplica) **(Forma PG-CES-004)**	☐	☐

Dirección Física: Ave. Ponce de León 1308, Carr. Estatal 8838, Sector el Cinco, Río Piedras, PR 00926
Dirección Postal: Apartado 11488, Santurce, PR 00910-1488
Tel. (787) 767-8181 • Fax (787) 767-1962

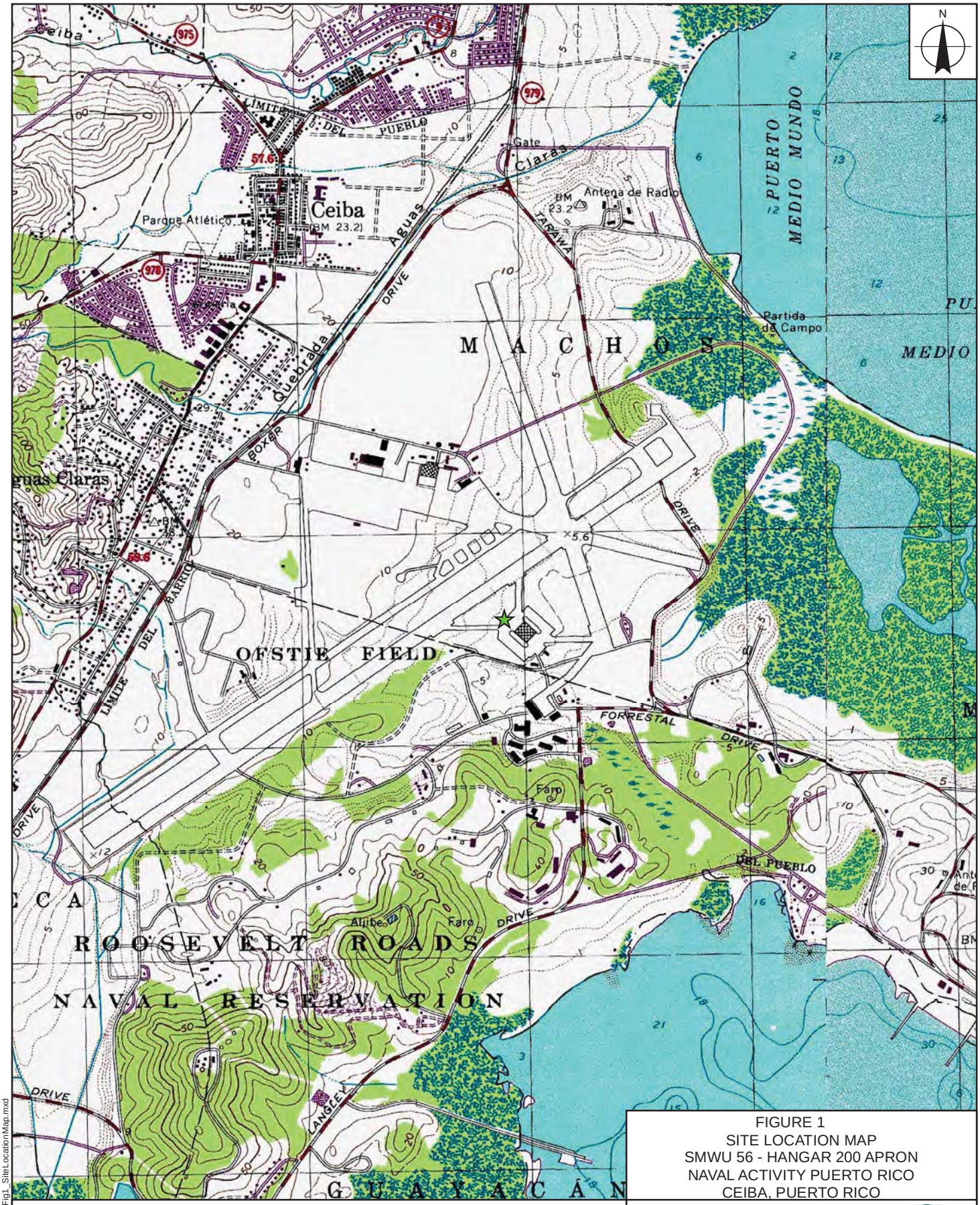
PG-CES-____-_____-_____-____
PARA USO OFICIAL

Anejos	Documentos Solicitados	Sometido (Solicitante)	Recibido (Uso Oficial)
6. N/A	Certificación de que el lugar de disposición de componentes de la corteza terrestre fuera del proyecto tiene vigente un Permiso CES, Permiso Consolidado o Permiso General para recibir material de la corteza terrestre (Si Aplica) **(Forma PG-CES-005)**	☐	☐
7. N/A	Copia de la Resolución o Permiso de la Agencia gubernamental con jurisdicción primaria (DRNA, ARPE, Junta de Planificación, Municipio Autónomo u otros)	☐	☐
8. N/A	Documento escrito de Plan de Operación que incluya de manera rotulada cada una de estas secciones:	☐	☐
	a) Área donde se realizará la actividad y duración de ésta	☐	☐
	b) Tipo y cantidad de desperdicios sólidos que se anticipa generar	☐	☐
	c) Procedimientos, equipo y personal que será utilizado para la recolección y almacenamiento de los desperdicios sólidos	☐	☐
	d) Procedimientos para la disposición final y lugar donde se efectuará	☐	☐
	e) Copia del Permiso para Operar Servicios de Recolección o Transportación de Desperdicios Sólidos No Peligrosos (DS-1)	☐	☐
	f) Carta en original de la empresa que ofrecerá el servicio de recolección y transportación de los desperdicios sólidos no peligrosos generados en el proyecto, incluyendo información de la instalación de disposición final	☐	☐
	g) Copia del manifiesto para la disposición final de los desperdicios sólidos no peligrosos generados en el proyecto. Deberá completar todos los encasillados del generador y el mismo estará firmado en original por el dueño, representante autorizado u operador	☐	☐
9. N/A	Para plantas dosificadoras de hormigón que no conlleven proceso y que no estén afectadas por reglamentación federal bajo la Ley Federal de Aire Limpio deberá someter de manera rotulada cada una de estas secciones:	☐	☐
	a) El costo estimado de la obra preparado, sellado y firmado por el profesional autorizado, en el cual indique el costo de la obra en proyecto, desglosado y detallado por partidas de construcción.	☐	☐
	b) Si el costo del proyecto es $3,000 o más, los sellos de Rentas Internas (arancel) y CIAPR para ser cancelados por la Junta o una certificación (carta) de la agencia que canceló los sellos donde desglose el total de sellos cancelados para el proyecto.	☐	☐
	c) Especificaciones de la fuente de emisión y medidas de control.	☐	☐
	d) Cálculos de emisiones sellado y firmado por un ingeniero, arquitecto o químico licenciado.	☐	☐
	e) Evidencia de que el profesional ha cumplido con la cuotas del Colegio correspondiente (CIAPR, CAAPPR, CQPR).	☐	☐
10. N/A	Documento escrito en el que se describa la actividad u obras a realizarse que emite contaminantes atmosféricos, tipo de contaminante y medida de mitigación a utilizarse para controlar el mismo (Si Aplica)	☐	☐
11.	Documento escrito estableciendo razones de no-aplicabilidad de cualquier información requerida en los anejos y/o en la Solicitud de Permiso (**Forma PG-CES-002**) (Si Aplica)	☑	☐
12.	Copia del Permiso vigente que interesa renovar, modificar o transferir (Si Aplica)	☑	☐
13.	Evidencia de pago de cuotas de radicación **(Forma PG-CES-008)**	☑	☐

PARA USO OFICIAL

Recibido por: _____
Representante autorizado JCA que recibe el documento

Fecha de Presentación: _____/_____/_____
(Día/ Mes/ Año)



Site Location

0 600 1,200 1,800 2,400 Feet

Basemap Source: Ceiba County Topo Map Puerto Rico
http://datagateway.nrcs.usda.gov/

FIGURE 1
SITE LOCATION MAP
SMWU 56 - HANGAR 200 APRON
NAVAL ACTIVITY PUERTO RICO
CEIBA, PUERTO RICO

NAVFAC Naval Facilities Engineering Command

RESOLUTION CONSULTANTS

REQUESTED BY: A. GARDINER	DATE: 4/24/2013
DRAWN BY: M. SENNE	TASK ORDER NUMBER: JM41

X:\Navy\Puerto_Rico\Fig1_SiteLocationMap.mxd

ESTADO LIBRE ASOCIADO DE PUERTO RICO
Oficina del Gobernador
Junta de Calidad Ambiental
35 Años de Gestión Ambiental

Forma PG-CES-002

Área de Calidad de Agua

SOLICITUD DE PERMISO GENERAL PARA OTRAS OBRAS

☑ **NUEVA** ☐ **MODIFICACION**
☐ **RENOVACIÓN** ☐ **TRANSFERENCIA**

PG-CES-____-_____-_____-_____
PARA USO OFICIAL

I. IDENTIFICACION DE PERSONAS Y ENTIDADES RESPONSABLES

Entidad	Nombre y Seg. Soc. Patronal	Dirección Física	Dirección Postal
Dueño	SS _____ - _____ - _____ Correo Electrónico	Teléfono:	Fax:
Agente o Representante Autorizado	SS _____ - _____ - _____ Correo Electrónico	Teléfono:	Fax:
Contratista	SS _____ - _____ - _____ Correo Electrónico	Teléfono:	Fax:

II. INFORMACION DEL PROYECTO

A. Nombre del Proyecto: Interim Corective Measure SWMU 56

B. Localización Física: Jose Aponte de la Torre Airport (former Naval Activity Puerto Rico)
(Calle o Carretera) (Num. o Km)
Ceiba, Puerto Rico
(Barrio) (Pueblo)

C. Localización del proyecto en Coordenadas Lambert (Stateplane NAD83): **x: 931841 .328** **y: 806590 .556**

D. Cuerpo(s) de Agua Receptor(es): Ensenada Honda, Atlantic Ocean de la escorrentía del proyecto.

E. Número de Documento Ambiental: _____

F. Tipo de proyecto: ☐ Extracción con Fines Comerciales ☑ Extracción Simples ☐Dosificadora de Hormigón
☐ Instalación de Tuberías ☐ Depósito de Relleno ☐Fábrica de Bloques ☐ Asfaltera
☐ Instalación, Reemplazo y Cierre de Tanques Soterrado ☐ Procesamiento de Material de Corteza Terrestre
☐ Otras Obras: _____

G. Tipo de Permiso solicitado:
☑ Permiso para el Control de la Erosión y Prevención de la Sedimentación (**Permiso CES**)
☑ Permiso de Construcción de una Fuente de Emisión de Contaminantes Atmosféricos (**PFE**) (Polvo Fugitivo)
☐ Permiso de Construcción / Operación de una Fuente de Emisión de Contaminantes Atmosféricos (**PFE**) (Dosificadora de Hormigón)
☐ Permiso para una Actividad Generante de Desperdicios Sólidos No-Peligrosos (**DS-3**)

H. Fecha estimada: Inicio de obras: ___/___/___ (Día / Mes / Año) Terminación de las obras: ___/___/___ (Día / Mes / Año)

I. Área Total: Lugar del proyecto: 46,903 m^2 Obras a realizarse: 1,738 m^2

J. Volumen total de componentes de la corteza terrestre a: remover 538 m^3 rellenar 538 m^3
almacenar _____ m^3 disponer 538 m^3 extraer _____ m^3 (Total Extracción durante vigencia del Permiso de DRNA)

K. Cantidad total de desperdicios sólidos a generarse en el proyecto: 15 yd^3

L. Volumen de material a generarse en la demolición: N/A m^3

M. Distancia lineal de la instalación de tuberías y/o cables soterrados a ser instalados: en áreas previamente construidas, fuera de los límites de la propiedad: N/A pies

III. CERTIFICACION DE LA INFORMACION Y AUTORIZACION POR EL DUEÑO

Yo, _____ mayor de edad, _____, y vecino de _____
(Nombre, Inicial, Apellido) (Estado Civil) (Municipio)

Certifico que:

1. Mi nombre y demás circunstancias personales son las antes indicadas.
2. Toda la información vertida en esta solicitud y en los documentos que acompañan esta solicitud es cierta, correcta y completa a mi mejor saber y entender.
3. Afirmo y reconozco las consecuencias de incluir y someter información falsa o incompleta en dichos documentos.
4. Autorizo a _____ a radicar y llevar a cabo gestiones necesarias relacionadas con este permiso, en mi nombre y representación ante la junta.
(Agente o Representante Autorizado)

Y para que así conste, firmo la presente certificación en _____ de Puerto Rico.
(Municipio)

_____ _____
(Fecha) Firma (en original)

Dirección Física: Ave. Ponce de León 1308, Carr. Estatal 8838, Sector el Cinco, Río Piedras, PR 00926
Dirección Postal: Apartado 11488, Santurce, PR 00910-1488
Tel. (787) 767-8181 • Fax (787) 767-1962

PG-CES-____-_____-_____-_____
PARA USO OFICIAL

IV. DETERMINACIÓN ADMINISTRATIVA (PARA USO OFICIAL)

La JCA podrá revocar este Permiso antes de la fecha de vencimiento si se violan las condiciones de permiso o las disposiciones del Reglamento para el Control de la Erosión y Prevención de la sedimentación, el Reglamento para el Control de la Contaminación Atmosférica, el Reglamento para el Manejo de los Desperdicios Sólidos No Peligrosos y el Reglamento para el Tramite de los Permisos Generales. Además podrá emitir una Orden de Cese y Desistimiento y Mostrar Causa.

Fecha de Expedición: _____/_____/_____
(Día / Mes / Año)

Fecha de Expiración: _____/_____/_____
(Día / Mes / Año)

_____
Firma Representante JCA

V. CONDICIONES ESPECIALES PARA EL PERMISO GENERAL PARA OTRAS OBRAS

Generales

1. **De continuar la actividad para la cual se expidió este Permiso con posterioridad a la fecha de expiración de éste, deberá someter la correspondiente Solicitud de Renovación a tenor con las disposiciones reglamentarias aplicables. Esta solicitud deberá presentarse utilizando la Forma provista por la JCA para estos fines, por lo menos treinta (30) días antes de la fecha de expiración de este Permiso.**
2. **En el caso de las extracciones, el Permiso otorgado quedará automáticamente anulado si la agencia con jurisdicción primaria sobre la actividad propuesta no emite los permisos, autorizaciones o endosos necesarios para la realización de la misma.**
3. **Cada condición de este Permiso es considerada independientemente de las demás. Si la aplicación de cualquier condición de este Permiso quedara sin efecto debido a cualquier circunstancia, las restantes condiciones de este Permiso no se verán afectadas.**
4. **Toda información y especificación sometida en esta solicitud forman parte de su Permiso General para Otras Obras.**
5. **La JCA, al emitir este Permiso, no releva al solicitante de su responsabilidad de obtener permisos o autorizaciones adicionales de la JCA, según requerido por ley. La emisión del Permiso no debe considerarse como una autorización para llevar a cabo actividades que no están específicamente cubiertas en el mismo, las cuales pueden causar contaminación del agua, aire o terreno.**
6. **La JCA podrá solicitar al poseedor de este permiso que dentro de un término razonable provea cualquier información para determinar si existe causa para modificar o revocar, o para determinar si se está cumpliendo con sus términos.**
7. **El poseedor del permiso permitirá a la JCA o representante autorizado por ésta, la entrada a la instalación para inspeccionar y verificar el cumplimiento con este Reglamento.**
8. **La JCA se reserva el derecho de intervenir con este proyecto en otros aspectos no cubiertos en este permiso.**

☑Permiso CES

9. **El dueño u operador deberá mantener copia de este formulario, el cual constituye su Permiso General para Otras Obras y copia del Plan CES autorizado por este permiso en el lugar del proyecto.**
10. **Se deberá instalar un rótulo en la entrada del proyecto con un tamaño mínimo de 4 pies por 8 pies que incluya el nombre del proyecto y el número de Permiso General para Otras Obras de la JCA. El tamaño mínimo de las letras será de 3 pulgadas.**
11. **El dueño u operador de las obras deberá implantar en todas sus partes el Plan CES autorizado por este Permiso y mantener en buenas condiciones de operación todas las medidas de control de erosión y sedimentación y otras medidas de protección identificadas en el Plan CES.**
12. **Los sedimentos de las trampas de sedimentos y charcas de sedimentación deberán ser removidos cuando se alcance el 50% de la capacidad de diseño de las mismas.**
13. **Todas las medidas de control de erosión y sedimentación deberán ser seleccionadas, instaladas y mantenidas de acuerdo al Manual de Puerto Rico para el Control de la Erosión y Sedimentación en Áreas de Desarrollo y a cualquier especificación relevante del manufacturero y las mejores prácticas de la ingeniería. Excepto para las Plantas Dosificadoras de Hormigón que en su fase de operación las medidas implantadas son fijas y permanentes.**
14. **Se deberán instalar medidas de control en aquellas áreas donde se hayan cesado temporera o permanentemente de realizar las actividades.**
15. **De ser necesario realizar una modificación mayor según definida en el Reglamento para el Control de la Erosión y Prevención de la Sedimentación, el dueño, agente o representante autorizado deberá someter a la JCA una Solicitud de Modificación de Permiso General para Otras Obras acompañada de todos los documentos correspondientes que requieren reflejar la modificación antes de implantar la misma.**
16. **El inspector designado deberá ser un ingeniero o arquitecto autorizado a ejercer la profesión en Puerto Rico. Deberá someter informes periódicos sobre la implantación del Plan CES y el desarrollo de sus actividades. El primer informe deberá ser sometido no más tarde del quinto (5to) día laborable a partir de la fecha de inicio de las obras. El mismo deberá ser acompañado de la Certificación del Inspector, utilizando la Forma provista por la JCA para estos fines, firmada y sellada en original, copia de su licencia profesional y la del Departamento de Estado. Los informes subsiguientes deberán someterse mensualmente a partir de la fecha en que sea sometido el 1er informe.**
17. **Todos los informes sometidos, según requeridos en las condiciones de este Permiso deberán incluir fotografías con un tamaño mínimo de 4 pulgadas por 6 pulgadas a colores que evidencien las medidas de control de erosión provisionales y permanentes implantadas. Los mismos se someterán utilizando la Forma provista por la JCA para estos fines, la cual debe ser certificada y sellada en original por el inspector del proyecto. No se aceptarán informes radicados por correo, sin fotos o sin su correspondiente número de Permiso.**
18. **Una vez finalicen las actividades autorizadas mediante este Permiso deberá someter un informe final que evidencie la culminación de las mismas y la implantación de las medidas de control de erosión permanentes aplicables.**
19. **Ninguna persona podrá mantener una propiedad o sitio de construcción en forma tal que se exponga a los vehículos a recoger lodo, polvo, sustancias pegajosas, basura, o material viscoso o extraño en las ruedas u otras partes del vehículo, los cuales a su vez puedan ser depositados en las calles, callejones u otro sitio público.**
20. **El dueño, agente o representante autorizado deberá someter a la JCA una Solicitud de Modificación al Permiso General para Otras Obras si durante la vigencia del mismo, el Permiso para la Extracción de la Corteza Terrestre es renovado por una cantidad mayor a lo autorizado previamente el Permiso General para Otras Obras.**

☑Permiso DS-3

21. **Todo cargamento de desperdicios sólidos no peligrosos producido por una actividad generadora, será enviado única y exclusivamente a una instalación de disposición final (Relleno Sanitario) acompañado de un manifiesto, el cual será provisto por la JCA. Ninguna finca privada deberá ser utilizada para disponer finalmente tales desperdicios.**
22. **Todo desperdicio generado será transportado para su disposición final por una compañía o empresa debidamente autorizada por la JCA.**
23. **Ninguna persona podrá mantener una propiedad o sitio de construcción en forma tal que se exponga a los vehículos a recoger lodo, polvo, sustancias pegajosas, basura, o material viscoso o extraño en las ruedas u otras partes del vehículo, los cuales a su vez puedan ser depositados en las calles, callejones u otro sitio público.**
24. **De ser necesario modificar el Plan de Operación, el dueño, agente o representante autorizado deberá someter a la JCA una Solicitud de Modificación de Permiso General Consolidado junto al Plan enmendado antes de implantar la modificación.**

☑Permiso PFE

25. **Deberán proveer y utilizar un sistema para controlar las emisiones de polvo fugitivo en todo el proyecto para evitar en todo momento que materia particulada gane acceso al aire más allá de la colindancia de este proyecto.**
26. **No se permitirá las emisiones visibles de polvo fugitivo más allá de la colindancia de la propiedad en donde se originaron las emisiones.Deberán cubrir con toldos o encerrar los camiones de acarreo de material de relleno y escombros durante los viajes de carga y descarga.**
27. **No se permitirá la quema de arbustos, árboles o la quema de basura en el proceso de limpieza de los predios de la construcción.**
28. **No se permitirá la emisión visible de contaminación de aire provenientes de vehículos de motor (equipo pesado) impulsados por combustible diesel, estando fijos y estacionados con una opacidad mayor al 20% por más de cinco (5) segundos consecutivos.**

PG-CES-____-_____-_____-_____
PARA USO OFICIAL

V. CONDICIONES ESPECIALES PARA EL PERMISO GENERAL PARA OTRAS OBRAS (continuación)

☑Permiso PFE (continuación)

☐ **Para Plantas Dosificadoras de Hormigón que no conlleven proceso y que no estén o sean localizadas en una instalación afectada por reglamentación federal bajo la Ley Federal de Aire Limpio:**

29. **Mantendrá un registro diario de la cantidad de hormigón producido en yardas cúbicas por día. Este registro estará disponible para el personal de la Junta lo solicite para evaluación.**

30. **Los colectores de polvo deberán tener una eficiencia mínima de 95% de remoción de materia particulada.**

31. **Dará mantenimiento preventivo a los colectores de polvo que le dan servicio a la planta dosificadora. Mantendrá un registro que incluya limpieza, inspecciones diarias y reemplazo de sacos. Además, diariamente deberá revisar el contenedor de polvo y vaciarlos, tal como recomienda el manufacturero.**

32. **No se permitirá la emisión visible de contaminantes del aire provenientes de los equipos de control con una opacidad mayor al 20 porciento (promedio de 6 minutos).**

33. **Malfuncionamientos: Deberá notificar a la Junta cualquier mal funcionamiento en la fuente, los equipos de control de contaminación de aire o equipos relacionados como sigue:**

(A) En caso que cualquier fuente, equipo de control de contaminación de aire o equipo relacionado, se descomponga, funcione mal, se rompa, permita escapes, o quede parcial o totalmente inoperante, el dueño u operador de tal equipo deberá informar inmediatamente a la Junta de tal falla o incidente y ofrecerá los datos pertinentes, incluyendo el tiempo que se estima durará tal condición. Deberá notificar por escrito a la Junta no más tarde de una semana después del incidente. Este informe incluirá los datos específicos relacionadas con la fuente afectada, equipo de control de contaminación de aire u otro equipo relacionado afectado; fecha y hora del suceso, las causas del incidente y las medidas correctivas tomadas o a ser tomadas. En caso de que el mal funcionamiento hubiese sido corregido dentro de dicho período, la información requerida en el párrafo E también deberá someterse con el informe escrito.

(B) Si el mal funcionamiento se extiende o pudiera extenderse por más de 24 horas, la instalación o fuente notificará por teléfono y por escrito vía facsímil a la Junta o al Programa de Aire y podrá ser operada solo hasta la conclusión de un ciclo ó 48 horas, lo que ocurra antes, en cuyo momento deberá cesar para ser reparada. No obstante, si el mal funcionamiento causa la emisión de sustancias tóxicas o peligrosas a la atmósfera, la fuente afectada deberá cesar inmediatamente sus operaciones o deberá actuar según se especifique en su Plan de Respuesta a Emergencias en conformidad con la Regla 107 (C) del Reglamento para el Control de la Contaminación Atmosférica (RCCA).

(C) La instalación o fuente no podrá ser operada más allá de las limitaciones de la sección (B) a menos que se le conceda una dispensa de emergencia por parte de la Junta, según la Regla 302 del RCCA.

(D) El acontecimiento de un mal funcionamiento no relevará al dueño u operador de cumplir con cualquier disposición substantiva de estos Reglamentos.

(E) No más tarde de una semana luego de que un mal funcionamiento causante de violación haya sido corregido, el dueño u operador deberá someter otro informe escrito a la Junta incluyendo:

(1) Una certificación de que el mal funcionamiento ha sido corregido, especificando el día de corrección y dando prueba de cumplimiento;

(2) Una descripción de las medidas correctivas tomadas para evitar un mal funcionamiento similar en el futuro;

(3) Un estimado de las emisiones totales que fueron generadas durante el mal funcionamiento; y

(4) Fotografías del equipo o sistema de control que falló, si están disponibles.

(F) En caso de que una unidad de emisión este equipada con más de un equipo de control o pueda utilizar más de un control en una instalación y dichos controles alternos operen de manera independiente cada uno, poseen cada uno la capacidad total y eficiencia de los equipos de control restantes para los contaminantes emitidos, en cumplimiento con los requisitos aplicables y el permiso, la fuente no tendrá que descontinuar la operación de su proceso de ocurrir un mal funcionamiento siempre que se garantice a la Junta que la unidad o medida de control que sea operada durante el mal funcionamiento rinde igual o mayor beneficio ambiental (igual o mejor control de los contaminantes).

34. **Equipo de Control:**

(A) Todo equipo o medida para el control de contaminación de aire deberá proveer el control necesario para asegurar cumplimiento continuo con las reglas y reglamentaciones aplicables. Dicho equipo o medidas deberán instalarse, conservarse y operarse de acuerdo con las condiciones impuestas por este permiso dentro de los límites operacionales especificados por el fabricante.

(B) El material que se recoja del equipo para el control de la contaminación de aire deberá ser desechado de acuerdo con las reglas y reglamentos aplicables. La remoción, manejo, transportación, almacenaje, tratamiento o disposición se hará de modo que no cause degradación ambiental y en conformidad con las reglas y reglamentos aplicables.

(C) La JCA podrá requerir, cuando lo considere apropiado, para salvaguardar la salud y el bienestar de las personas, la instalación y mantenimiento de un equipo de control de contaminación de aire adicional, completo y separado de una capacidad que pudiera ser hasta igual a la capacidad del equipo de control primario. Más aún, podrá ser requerido que dicho equipo de control de contaminación de aire adicional sea operado continuamente y en serie con el equipo de control de contaminación de aire regularmente requerido.

(D) Todo equipo de control de contaminación de aire deberá ser operado en todo momento en que la fuente de emisión bajo control esté en operación.

(E) En caso de que se descontinúe la operación del equipo para el control de la contaminación de aire para darle mantenimiento programado, la intención de descontinuar la operación de dicho equipo se informará a la Junta, con por lo menos 3 días de antelación. Dicha notificación previa deberá incluir, pero no se limitará a lo siguiente:

1.) Identificación de la fuente específica que será sacada de servicio, así como su localización y número de permiso.

2.) El tiempo que se espera que el equipo para el control de contaminación de aire esté fuera de uso.

3.) La naturaleza y cantidad de contaminantes de aire que probablemente se emitirán durante el período que cese el uso del equipo de control.

4.) Aquellas medidas especiales que se tomarán para acortar el período de desuso del equipo de control, tales como el uso de personal irregular y el uso de equipo adicional.

5.) Las razones por las que sería imposible o no recomendable cesar las operaciones de la instalación de emisión durante el período de reparaciones.

(F) Deberá hasta donde sea posible, mantener y operar todo el tiempo, incluyendo los períodos de inicio de operaciones, paro de operaciones y malfuncionamientos, cualesquiera fuente afectada, incluyendo equipos asociados al control de contaminación atmosférica, de forma consistente con las especificaciones de diseño del manufacturero original y en cumplimiento con las reglas y reglamentos aplicables y condiciones de permisos.

(G) El tenedor del permiso mantendrá copias de los informes de calibración e inspecciones de los equipos de control tales como colectores de polvo y lavadores de gases. El tenedor del permiso mantendrá en un registro todos los incidentes de apagado del equipo de control si los procesos continúan su operación. Los registros deben estar disponibles para el personal de la JCA de ser requerido.

ESTADO LIBRE ASOCIADO DE PUERTO RICO
Oficina del Gobernador
Junta de Calidad Ambiental
35 Años de Gestión Ambiental

Área de Calidad de Agua

HOJA DE PAGO DE CUOTAS PERMISO GENERAL PARA OTRAS OBRAS

PG-CES-____-_____-_____-____
PARA USO OFICIAL

Nombre del Proyecto: _____
Municipio: _____

I Cuotas de Radicación

A. Radicación de Solicitud (cargo fijo $500.^{00})---------- $ ☐☐☐☐☐.☐☐

B. Otros Cargos (se determinarán acumulativamente dependiendo de las actividades a realizarse)

1. Extracción con Fines Comerciales-(Total Extracción durante vigencia del Permiso DRNA)--- $ ☐☐☐☐☐.☐☐
a. igual o mayor de 40 m^3 hasta 15,000 m^3 - $3,000.00
b. mayor de 15,000 m^3 hasta 30,000 m^3 -$6,000.00
c. mayor de 30,000 m^3 - $10,000.00

2. Extracción Simple--(Total Extracción durante vigencia del Permiso DRNA)---------- $ ☐☐☐☐☐.☐☐
a. igual o mayor de 40 m^3 hasta 2,500 m^3 - $750.00
b. mayor de 2,500 m^3 hasta 5,000 m^3 -$1,000.00

3. Depósito de Relleno---------- $ ☐☐☐☐☐.☐☐
a. igual o mayor de 40 m^3 hasta 250 m^3 - $500.00
b. mayor de 250 m^3 hasta 500 m^3 -$1,500.00
c. mayor de 500 m^3 - $4,000.00

4. Dosificadora de Hormigón (cargo fijo $5,000.00)---------- $ ☐☐☐☐☐.☐☐

5. Asfalteras (cargo fijo $5,000.00) ---------- $ ☐☐☐☐☐.☐☐

6. Fábricas de Bloques (cargo fijo $5,000.00)---------- $ ☐☐☐☐☐.☐☐

7. Instalación de tuberías y cables soterrados, en proyectos previamente construidos-$0.25 por pie lineal---------- $ ☐☐☐☐☐.☐☐

8. Instalación, Reemplazo y Cierre de Tanques Soterrados (cargo fijo $1,500.00)-- $ ☐☐☐☐☐.☐☐

9. Cargos por Otras Obras (cargo fijo $1,500.00)---------- $ ☐☐☐☐☐.☐☐
(Obras o Actividades no cubiertas en los incisos anteriores)

TOTAL---------- $ ☐☐☐☐☐.☐☐

II Cuotas de Transferencia (cargo fijo $300.^{00})---------- $ ☐☐☐☐☐.☐☐

III Cuotas de Renovación (50% de los otros cargos + cargos fijo de radicación)----- $ ☐☐☐☐☐.☐☐

IV Cuotas por Modificaciones (cargo fijo total de $200.^{00})---------- $ ☐☐☐☐☐.☐☐

	Tipo De Modificación (Aumento)	Aprobado en Permiso Vigente	Cargo Pagado (A)	Propuesto	Cargo Requerido (B)	Cargo a Pagarse (B-A)
☐	En volumen	m^3	$	m^3	$	$

TOTAL---------- $ ☐☐☐☐☐.☐☐

PARA USO OFICIAL SOLAMENTE

SECRETARIA

Cotejado por: _____ Fecha:_____ Cantidad a pagar: $ _____

DIVISION DE FINANZAS

Efectivo ☐ Giro ☐ Cheque ☐ Recibo # ☐☐☐☐☐☐☐☐☐☐

_____ ____/____/____
Firma Recaudador Oficial Día Mes Año

Dirección Física: Ave. Ponce de León 1308, Carr. Estatal 8838, Sector el Cinco, Río Piedras, PR 00926
Dirección Postal: Apartado 11488, Santurce, PR 00910-1488
Tel. (787) 767-8181 • Fax (787) 767-1962

Appendix G
Quality Control Plan

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.

RWEC

DAILY QUALITY CONTROL REPORT

Daily Report No. Date:

Contract No.:

Contract Title:

Weather: Precipitation: Temp.: Min. Max.

1. Contract/Subcontractors and Area of Responsibility:

NUMBER	TRADE	HOURS	EMPLOYER	LOCATION/DESCRIPTION WORK

2. Equipment: (Not hand tools)

Plant/Equipment	Arrival Date	Departure Date	Date of Safety Check	Hours Used	Hours Idle	Hours Repair

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

4. Control Activities Performed:

Preparatory Inspections: (Identify feature of work and attach minutes).

Initial Inspection: (Identify feature of work and attach minutes). All equipment inspections are performed upon arrival.

Follow-up Inspection: (List inspections performed, results of inspection compared to 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:**

(a) **Submittal No.** (b) **Spec/Plan Reference** (c) **By Whom** (d) **Action**

8. **Offsite Surveillance Activities, Including Action Taken:**

9. **Job Safety:** (List items checked, results, instructions and corrective actions taken). Standard operation procedures were used. RWEC:

10. **Remarks:** (Instructions received or given. Conflict(s) in plans and /or specifications. Delays encountered). RWEC anticipates delays during and after every rainstorm.

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

_____ _____

Name and Title 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**

RWEC **HC 72 Box 3744** **Naranjito, P.R. 00719** Phone: 787-857-8832 Fax: 787-857-6068	Variance No: Date of Issue: Page 1 of 1
Project Name:	Contract Number:

- Field Variance Report -

I. Type of Variance:

	Differing Site Condition		Error/Omission on Drawings/Specifications
	Change in Regulatory Requirement		Design Change
	Change in Quantity		Factors Affecting Completion Date
	Other:		

II. Drawing/Specification:

III. Description:

Originated by:	Date Prepared:
To Be Performed by:	Date:
To be Verified by:	Date:

IV. Justification for Variance:

V. Impact to Schedule	VI. Estimated Cost Variance: Estimated Fee Adjustment: Estimated Cost + Fee Variance:

VII. Reference Documents:

- Signatures -

Requested by: Date	Project Manager Approval: Date
Approved by: Date	QA Approval: Date

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	POSITON	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:

_____

_____

_____

C. 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

Sheet ___ of ____ DATE: _____

PROJECT TITLE: _____ CONTRACTOR: _____

LOCATION: _____ CQC REPORT #: _____ CONTRACT # _____

SPEC REF OR DWG #	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:_____

Non-Conformance:

Identified by: _____ Date: _____

Corrective Action Required to Rectify
and to Prevent Recurrence:

Prepared By: _____
Date: _____

To Be Performed By: _____ Date: _____

Must Correction by Verified? Yes _____ No _____
To Be Verified By: _____

Corrective Action Taken:

Performed By: _____ Date: _____

Verified By: _____ Date: _____

_____
Name

Quality Control Officer
Title

_____
Signature

PREPARATORY INSPECTION OUTLINE

Contract No.: _____ **Date:** _____

Title and No. of Technical Section: _____

Reference Contract Drawings: _____

A. PLANNED ATTENDANTS:

NAME	POSITION	COMPANY

B. SUBMITTALS REQUIRED TO BEGIN WORK:

ITEM	SUBMITTAL #	ACTION CODE

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 Inspection	Type of Inspection	Definable Feature of Work (Describe)	Report Numbers		Persons Attending Inspection	Was Material and/or Equipment Physically Inspected?
			QA	QA		

Note: This form shall be used by the Contractor to track prep/init inspections. Attach additional results or comments as required.

TRANSMITTAL OF SHOPDRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE (*Read instructions on page two prior to initiating this form*)	DATE: Mo / Day / Yr / /	TRANSMITTAL NO --

SECTION I - REQUEST FOR APPROVAL OF THE FOLLOWING ITEMS (*This section will be initiated by the contractor*)

TO:	FROM:	CONTRACT NO . DAC	CHECK ONE: ☐ THIS IS A NEW SUBMITTAL ☐ THIS IS A RESUBMITTAL OF TRANSMITTAL
SPECIFICATION SEC NO.(Cover only one section with each transmittal)	PROJECT TITLE AND LOCATION		

ITEM NO. a.	DESCRIPTION OF ITEM SUBMITTED (Type size, model number/etc.) b.	MFG OR CONTR. CAT., CURVE DRAWING OR BROCHURE NO. (See instruction no. 8) c.	NO. OF COPIES d.	CONTRACT DOCU SPEC. PARA NO. e.	REFERENCE MENT DRAWING SHEET NO. f.	FOR CONTRACTOR USE CODE g.	VARIATION (See instruction No. 6) h.	FOR CE USE CODE i.

REMARKS

I certify that the above submitted items have been reviewed in detail and are correct and in strict compliance with the contract drawings and specifications except as other wise stated.

_____

NAME AND SIGNATURE OF THE CONTRACTOR

SECTION II - APPROVAL ACTION

ENCLOSURES RETURNED (List by Item No.)	NAME, TITLE OF APPROVING AUTHORITY	DATE

INSTRUCTIONS

1. Section I will be initiated by the Contractor in the required numbers 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 under 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 transmitting, letter of transmittal is not required.

8. When a sample of a material or Manufacturer’s Certificate of Compliance is transmitted, indicate “Sample” or “Certificate” in column c, Section I

9. U.S. Army Corps of Engineers approving authority will assign action codes as indicated below in space provided in 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 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.

Appendix H
Submittal Register

TRANSMITTAL OF SHOPDRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE (*Read instructions on page two prior to initiating this form*)	DATE: Mo / Day / Yr / /	TRANSMITTAL NO --

SECTION I - REQUEST FOR APPROVAL OF THE FOLLOWING ITEMS (*This section will be initiated by the contractor*)

TO:	FROM:	CONTRACT NO . DAC	CHECK ONE: ☐ THIS IS A NEW SUBMITTAL ☐ THIS IS A RESUBMITTAL OF TRANSMITTAL
SPECIFICATION SEC NO.(Cover only one section with each transmittal)	PROJECT TITLE AND LOCATION		

ITEM NO. a.	DESCRIPTION OF ITEM SUBMITTED (Type size, model number/etc.) b.	MFG OR CONTR. CAT., CURVE DRAWING OR BROCHURE NO. (See instruction no. 8) c.	NO. OF COPIES d.	CONTRACT DOCUMENT SPEC. PARA NO. e.	REFERENCE DRAWING SHEET NO. f.	FOR CONTRACTOR USE CODE g.	VARIATION (See instruction No. 6) h.	FOR CE USE CODE i.

REMARKS

I certify that the above submitted items have been reviewed in detail and are correct and in strict compliance with the contract drawings and specifications except as other wise stated.

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NAME AND SIGNATURE OF THE CONTRACTOR

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ENCLOSURES RETURNED (List by Item No.)	NAME, TITLE OF APPROVING AUTHORITY	DATE

INSTRUCTIONS

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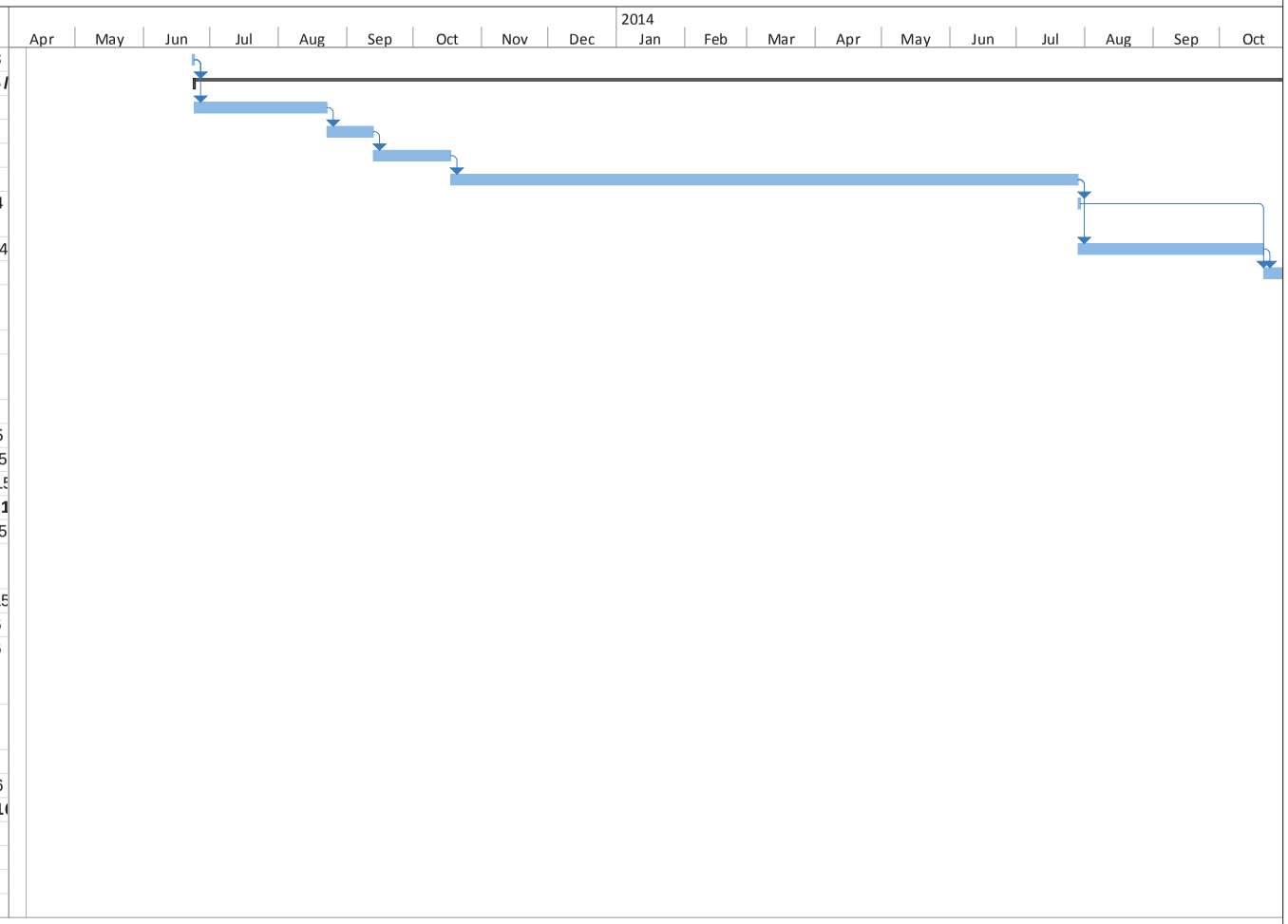
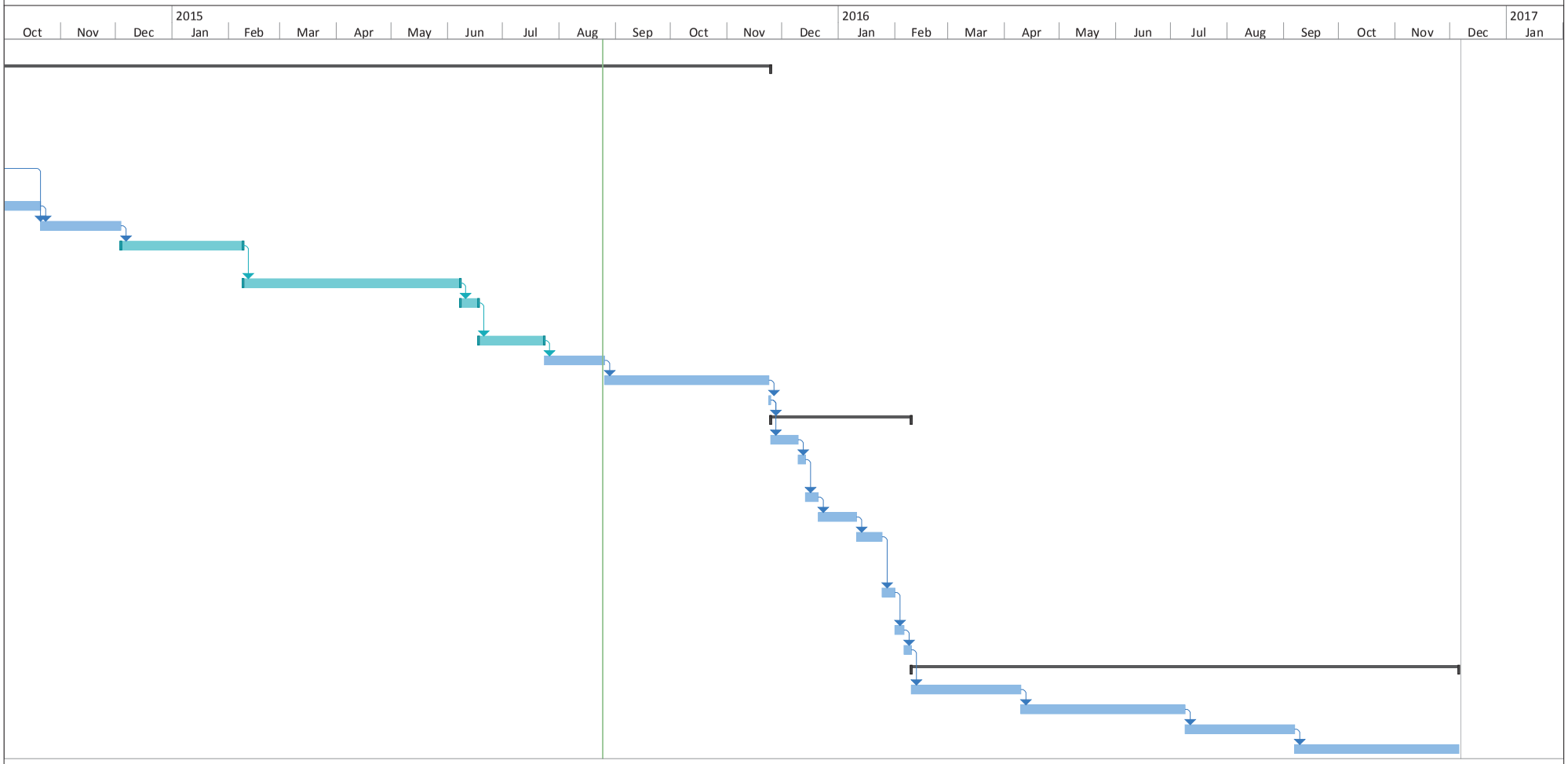
G -- Other (*Specify)*

10. Approval of items does not relieve the contractor from complying with all the requirements of the contract plans and specifications.

Appendix I
Project Schedule

APPENDIX I
Project Schedule
Interim Corrective Measures Work Plan - SWMU 56, Hangar 200 Apron
Naval Activity Puerto Rico, Ceiba, Puerto Rico

ID	Task Name	Duration	Start	Finish
1	Notice to Proceed	1 eday	Sun 6/23/13	Mon 6/24/13
2	**ICM Project Plans**	**632 days**	**Mon 6/24/1**	**Wed 11/25/**
3	Pre-Draft ICM Project Plans	60 edays	Mon 6/24/13	Fri 8/23/13
4	Navy Review	21 edays	Fri 8/23/13	Fri 9/13/13
5	Draft ICM Project Plans	35 edays	Fri 9/13/13	Fri 10/18/13
6	Regulator Review	284 edays	Fri 10/18/13	Tue 7/29/14
7	Address Regulators Comments on Draft	1 eday	Tue 7/29/14	Wed 7/30/14
8	Draft Final ICM Project Plans	84 edays	Tue 7/29/14	Tue 10/21/14
9	Regulator Review	44 edays	Tue 10/21/14	Thu 12/4/14
10	Revised Responses to PREQB Comments	67 edays	Thu 12/4/14	Mon 2/9/15
11	Regulator Review	119 edays	Mon 2/9/15	Mon 6/8/15
12	Revised Draft Final ICM Work Plan	10 edays	Mon 6/8/15	Thu 6/18/15
13	Regulator Review	36 edays	Thu 6/18/15	Fri 7/24/15
14	Final ICM Project Plans	33 edays	Fri 7/24/15	Wed 8/26/15
15	Regulator Review and Appro	90 edays	Wed 8/26/15	Tue 11/24/15
16	Notice to Proceed	1 eday	Tue 11/24/15	Wed 11/25/15
17	**Corrective Action**	**55 days**	**Wed 11/25/**	**Wed 2/10/1**
18	Mobilization	15 edays	Wed 11/25/15	Thu 12/10/15
19	Field Staking of Contaminated Areas	4 edays	Thu 12/10/15	Mon 12/14/15
20	Approval of Field Staked Are	7 edays	Mon 12/14/15	Mon 12/21/15
21	Excavation and Staging	21 edays	Mon 12/21/15	Mon 1/11/16
22	Confirmation and Characterization Sampling and Analysis	14 edays	Mon 1/11/16	Mon 1/25/16
23	Transportation and Off-Site Disposal	7 edays	Mon 1/25/16	Mon 2/1/16
24	Backfill and Revegetation	5 edays	Mon 2/1/16	Sat 2/6/16
25	Demobilization	4 edays	Sat 2/6/16	Wed 2/10/16
26	**ICM Closeout Report**	**214 days**	**Wed 2/10/1**	**Tue 12/6/1**
27	Draft Closeout Report	60 edays	Wed 2/10/16	Sun 4/10/16
28	Regulator Review	90 edays	Sun 4/10/16	Sat 7/9/16
29	Final Closeout Report	60 edays	Sat 7/9/16	Wed 9/7/16
30	Regulator Review and Appro	90 edays	Wed 9/7/16	Tue 12/6/16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