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REMEDATION WORK PLAN SITE 5 NAS CECIL FIELD FL
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BECHTEL ENVIRONMENTAL INC

REMEDIATION WORK PLAN
FOR SITE 5 - CECIL FIELD
FOR NAVAL AIR STATION - CECIL FIELD
JACKSONVILLE, FLORIDA

Prepared for

DEPARTMENT OF THE NAVY
SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND

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Prepared by

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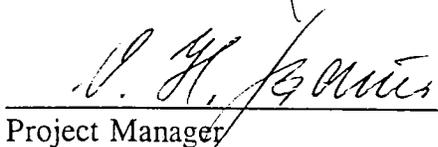
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DISCLAIMER

This Remediation Work Plan was prepared using background information including subsurface/geotechnical data, design basis, and other data provided to BEI by Southern Division Naval Facilities Engineering Command, the Navy's CLEAN Contractor, and/or third parties. Bechtel has relied on this information furnished.

FOREWORD

This Remediation Work Plan (RWP) has been prepared to document the scoping and planning process performed by the U.S. Navy to support remedial action activities at Site 5 of Operable Unit 2 located at the Naval Air Station (NAS) Cecil Field site in Jacksonville, Florida.

NAS Cecil Field is on the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) National Priorities List. A negotiated, signed Federal Facilities Agreement is in place for the site. Under CERCLA guidelines, an interim remedial action is planned at Site 5 in accordance with this RWP.

Remedial action is necessary in selected areas of contamination for the protection of human health and the environment. This RWP describes the approach that will be used to conduct the remedial action and describes the organization that will be employed.

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- A Final Design for Site 5 Bioremediation, NAS Cecil Field, Jacksonville, FL, prepared by ABB-ES, April 1995
- B Technical Specification for Clearing and Grubbing
- C Technical Specification for Contaminated Earthwork and Miscellaneous Demolition
- D Technical Specification for Transportation of Contaminated Materials
- E Technical Specification for Uncontaminated Earthwork

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ACRONYMS AND ABBREVIATIONS

ASL	Analytical Support Levels
CLEAN	Comprehensive Long-term Environmental Action Navy Contract
DQO	Data Quality Objectives
EPB	Environmental Protection Board
FDER	Florida Department of Environmental Regulation
HDPE	High density polyethylene
NAPL	Non-aqueous phase liquid
NAS	Naval Air Station
NEESA	Naval Energy and Environmental Support Activity
OWPT	Oily water treatment plant
O&M	Operations and Maintenance
PCB	Polychlorinated biphenyls
PPE	Personnel Protective Equipment
PSHP	Program Safety and Health Plan
QA	Quality Assurance
QAPP	Quality Assurance Program Plan
QC	Quality Control
RAO	Remedial Action Objectives
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RWP	Remediation Work Plan
SAP	Sampling Analysis Plan
SJUMP	Saint John's River Water Management District
SOPs	Standard operating procedures
SOUTHDIV	Southern Division Naval Facilities Engineering Command
SSHR	Site Safety and Health Representative
SVOC	Semivolatile organic compound
SWMU	Solid waste management unit
TCLP	Toxicity Characteristic Leaching Procedure
TPH	Total petroleum hydrocarbons
TRPH	Total recoverable petroleum hydrocarbons
TSCA	Toxic Substances Control Act
USEPA	United States Environmental Protection Agency
VOC	Volatile organic compound

1.0 INTRODUCTION

The U.S. Department of Navy, Southern Division, Naval Facilities Engineering Command intends to conduct remedial actions at the Naval Air Station (NAS) Cecil Field, Jacksonville, Florida. This Work Plan addresses Operable Unit 2, Site 5, which is the former Oil Disposal Area, Northwest, where waste oils, fuels, and grease were reportedly dumped in an unlined pit. Bechtel Environmental, Inc. (BEI), the Environmental Response Action Contractor, will perform the remedial action on this site. This remedial action is required to address contaminated soils acting as a source of contamination at Site 5 at NAS Cecil Field.

This Remediation Work Plan (RWP) is intended to document the scope of the remediation effort and the procedures to be used.

The activities described in this plan are based on the following:

- Observations made during a site visit by BEI and Navy personnel to NAS Jacksonville on July 12, 1994
- Discussion and conclusions from a meeting held between BEI, ABB Environmental Services, Inc. (ABB-ES), and Navy personnel in Jacksonville on July 12, 1994
- Information contained in the Focused Feasibility Study, Site 5, Operable Unit 2, Source Control Remedial Alternatives, NAS Cecil Field, Jacksonville, Florida, prepared by ABB-ES, April 1994
- Discussion and conclusions from a Teaming Meeting of BEI, ABB, EPA, FDEP and Navy personnel in Jacksonville on April 5, 1995
- Final Design for Site 5 Bioremediation, NAS Cecil Field, Jacksonville, FL, prepared by ABB-ES, April 1995

In implementing this Plan, BEI will supply qualified personnel and equipment to the project; coordinate, manage, and supervise construction and soil remediation activities onsite; ensure compliance with contract and regulatory requirements; and lastly, provide documentation to the Navy that will include a data summary. BEI's approach to complete these tasks is presented in the following sections of this plan.

The remainder of Section 1.0 provides general site information and the justification and objectives for the proposed remediation.

Section 2.0 presents the BEI organization and responsibilities for completing the work.

Section 3.0 provides a site history and a brief description of Site 5.

Section 4.0 provides the scope of work, the approach BEI will take to achieve the remedial objectives, and a description of the remedial action components and field activities.

Section 5.0 presents BEI's sampling and analysis plan and includes details on the surveys and remediation activities planned.

Sections 6.0, 7.0, and 8.0 address the Waste Management Plan, Safety and Health Plan, and Quality Control Plan, respectively.

1.1 GENERAL SITE INFORMATION

NAS Cecil Field is located in southwestern Duval County approximately fourteen miles southwest of downtown Jacksonville. The site encompasses approximately 31,000 acres. The primary mission of the site is to provide a work place, service, and managerial support for the operation and maintenance of naval weapons and aircraft to activities and units of the operating forces as designated by the Chief of Naval Operations.

1.2 JUSTIFICATION AND OBJECTIVES FOR THE PROPOSED ACTION

The primary threat to human health and the environment associated with Site 5 is related to the potential for uncontrolled releases of contaminants from exposed surfaces and subsurface disposal areas. Contaminants could be released from these sources via infiltration and percolation, wind dispersion, gaseous emissions, runoff, leaching to groundwater, and disturbance by humans or animals. Even though the soil contamination does not pose an immediate threat to human health, the cleanup of uncontained materials is necessary for the longterm protection of human health and the environment.

2.0 ORGANIZATION AND RESPONSIBILITIES

2.1 PROJECT ORGANIZATION

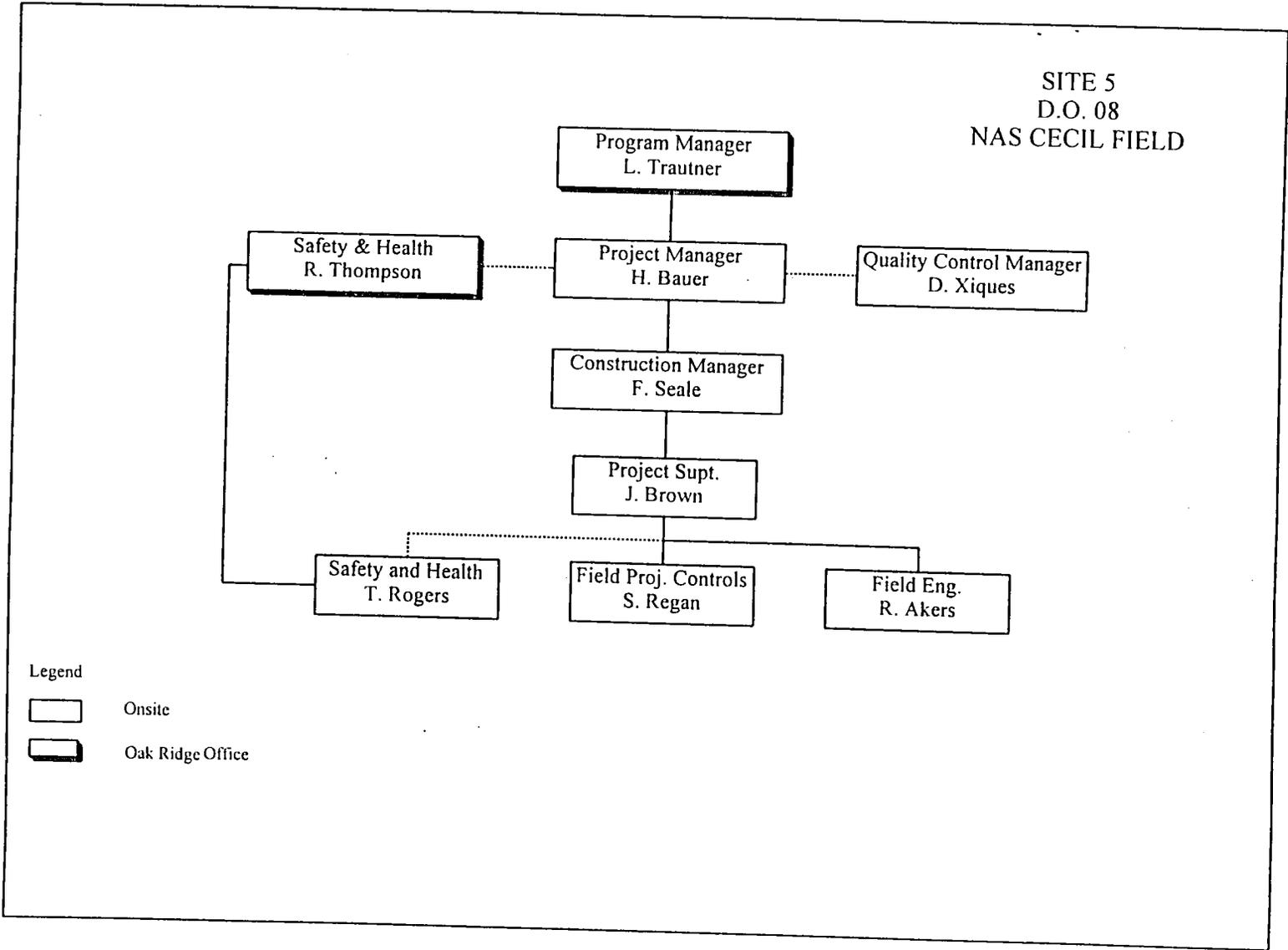
BEI is the Environmental Response Action Contractor for the Navy, Southern Division Naval Facilities Engineering Command. BEI will subcontract for necessary laboratory support and analyses required for NAS Cecil Field. A project organization chart is provided in Figure 2-1.

2.2 COORDINATION AND RESPONSIBILITIES FOR FIELD WORK

As the Environmental Response Action Contractor for the Navy, BEI provides support to the NAS Cecil Field and management of remedial action field activities, which includes all activities necessary to implement field work delineated in work plans. Typically, these activities include development and procurement of subcontract services; development, implementation, and overview of plans; collection and review of data, including sampling results, quality assurance/quality control submittals, and sample tracking and custody; technical guidance to onsite personnel; report preparation; cost management; and schedule control.

The BEI program manager is responsible to the Navy for the completion of all aspects of the work. The program manager is supported by a project manager and representatives from engineering, construction, environmental safety and health, contract administration, quality control, project administration, and project controls. A brief description of the responsibilities of the project manager and each group are described below.

2-1 Project Organization



2.2.1 Project Manager

- Implements overall guidance provided by the BEI program manager on a site-specific basis
- Manages a team of professionals from each of the disciplines described below to accomplish the goals of the Naval Facilities Engineering Command project managers and the BEI program manager
- Interfaces directly with Navy project managers to implement directions on a site-specific basis

2.2.2 Engineering

- Develops bid packages and technical specifications needed to subcontract any remedial action work
- Provides site interface/coordination with regulatory agencies
- Modifies technical specifications and drawings, as required
- Provides geotechnical field support to remedial action efforts
- Provides onsite waste management and identification
- Participates in technology selection
- Develops work plans for remedial action
- Manages and evaluates chemical data obtained during remedial action activities

2.2.3 Construction

- Reviews all site plans for constructibility
- Provides field engineering services to monitor onsite work
- Administers subcontracts to complete work plans (i.e., cost, completion)
- Obtains manual craft
- Directs craft to implement work plans
- The project superintendent is responsible to the BEI project manager for day-to-day operations at the site.

2.2.4 Environmental Safety and Health

- Develops plans, objectives, evaluations, and documentation for all environmental compliance, safety, and health matters

- Ensures that all applicable federal, state, and local regulatory requirements are met
- Supports onsite waste management
- Provides site-specific safety and health training
- Provides a site safety and health representative (SSHR)
- Performs audits of site activities to ensure implementation of the Safety and Health Plan and to assess the effectiveness of the program.

2.2.5 Contract Administration

- Identifies bidders for subcontract work
- Coordinates bid and subcontract bid and award process
- Manages revisions to subcontracts
- Ensures compliance with Prime Contract

2.2.6 Quality Control

- Prepares site-specific quality control (QC) plan
- Implements the QC plan
- Audits quality assurance system and performance
- Conducts periodic reviews of program plans

2.2.7 Project Controls

- Provides cost and schedule support, including budgeting and monitoring
- Provides site automation services

2.2.8 Project Administration

- Provides administrative services such as document control, reproduction, archival, and mail distribution
- Provides document editing services

3.0 SITE BACKGROUND AND SETTING

3.1 GENERAL SITE DESCRIPTION

This RWP focuses on Site 5, Operable Unit 2 (Figures 1-1 and 1-4, Appendix A) located east of Perimeter Road and to the west of Lake Fretwell. Site 5 covers an area of approximately 2 acres where waste oil and fuel were disposed in a pit. Visible staining of soils is evident at the site and a distinct petroleum odor exists when soils are disturbed. Additionally, it is estimated that 300 gallons of free product are contained within Site 5.

3.2 SITE HISTORY

Disposal was conducted at Site 5 in the 1950s. Unknown quantities of waste fuel and oil were dumped at the site. Based on the appearance of soils and odor still present at the site, waste liquids may have been disposed of at the site more recently than the 1950s. Solvents, paints, and paint thinners may have also been mixed with waste oils and disposed at the site; however, specific records of such disposal are not available. A disposal pit can be seen on 1969 aerial photographs (ABB-ES 1994).

Samples have been collected within the area of the historical pit. Samples were analyzed for selected organics, metals, pesticides, and polychlorinated biphenyls (PCBs). Soils were found to be contaminated with ethylbenzene, toluene, xylenes, trichloroethylene, phenols, PCBs, and polynuclear aromatic hydrocarbons. Total recoverable petroleum hydrocarbons (TRPHs) were detected in all samples.

4.0 SCOPE OF WORK

4.1 REMEDIAL ACTION OBJECTIVES, SOIL ACTION LEVELS, AND INTERIM ACTION DESCRIPTION

4.1.1 Remedial Action Objectives (RAOs)

Waste oils and fuels were disposed of at Site 5. As a result, contaminated soils and free product are acting as a source of groundwater contamination. Remediation of contaminated soil as identified in the "Final Design for Site 5 Soil Bioremediation" (ABB, 1995) and the free product present above the water table would reduce the source of groundwater contamination and reduce risks associated with direct contact exposure. Therefore, RAOs at Site 5 for this interim remedial action are (ABB-ES 1995):

- Remediation of approximately 16,300 cubic yards of contaminated soils to reduce the source of contaminants to groundwater
- Remove free product to the extent practicable to reduce the source of contamination to groundwater
- Remediate contaminated surface soils to reduce health risks from direct contact exposure

4.1.2 Soil Action Levels

The soil action levels that are the basis for defining the extent of soil removal and for establishing a soil treatment standard are 50 ppm TRPH or the limits of construction and 1 ppm PCBs, Focused Feasibility Study, Site 5, Operable Unit 2, Source Control Remedial Alternatives (ABB-ES 1994). TRPH data are extensive for the site and other contaminants including PCBs were found to be contained within the area of TRPH contamination.

4.1.3 Interim Action Description

The remedial alternative selected for the interim action to achieve the RAOs consists of excavation of contaminated soil from Site 5 with subsequent onsite biological treatment of contaminated soil Focused Feasibility Study, Site 5, Operable Unit 2, Source Control Remedial Alternatives (ABB-ES 1995). A process-flow diagram for this alternative is provided in Figure 4-3, Appendix A. A schedule showing estimated durations of the work described in this work plan is also provided in Appendix A. The following subsections are descriptions of the scope of specific work items required to implement the interim remedial action.

4.2 MOBILIZATION

Mobilization will include delivering to the jobsite and work areas all construction equipment, tools, materials, supplies, and miscellaneous articles and establishing a work force sufficient to commence and sustain construction and remediation activities as required.

4.3 CLEARING

Clearing will consist of removing all designated vegetation and debris within the established limits of areas to support the remedial action activities. Clearing will be performed in accordance with the Technical Specification for Clearing and Grubbing, Appendix B.

Clearing will be required for the area of soil designated to be excavated, an area for installation of the onsite soil treatment system, including sufficient area for O&M of the system, a temporary contaminated soil stockpile, and an area for storage of materials, supplies, and equipment.

4.4 WELL CLOSURE/INSTALLATION

4.4.1 Monitoring Well Closure

Prior to soil remediation, six monitoring wells within the limits of excavation will be removed and closed by ABB-ES. Appropriate replacement monitoring wells will be installed by ABB-ES.

If Bechtel is tasked with the abandonment of the wells in the area of the excavation, Bechtel will ensure that the abandonment is in accordance with FAC Chapter 40C-3, local requirements (e.g., Environmental Protection Board (EPB) Rule 8, Proposed Amendments, Groundwater Resource Management, City of Jacksonville, EPB September 8, 1990), and any requirements of the St. John's River Water Management District and Duval County requirements.

4.5 WINDROW TREATMENT AREA CONSTRUCTION

Contaminated soil will be excavated from the designated area of Site 5 using conventional equipment and placed on top of a newly-constructed treatment area. The windrow treatment area will be constructed adjacent to the Site 5 excavation. The purpose of the treatment area is to allow aboveground treatment of soil while preventing offsite migration of contaminated soil or water (ABB-ES 1994). The primary components of the treatment pad include a hydraulic barrier, a drainage layer (sand or gravel), and a treatment layer (contaminated soil). For additional information, see the "Final Design for Site 5 Soil Bioremediation" (ABB 1995). The hydraulic barrier and sand/gravel will be graded to allow adequate drainage. Surface water runoff controls (e.g., earthen berms, ditches, drainage piping, sumps, etc.) will be constructed as necessary to prevent off site migration of contaminants (see Section 4.6.4).

The dimensions of the treatment area and facilities are included in the "Final Design for Site 5 Soil Bioremediation" (ABB 1995).

4.5.1 Utilities

A water source and electrical generator will be provided for operation of the treatment system. Water will be necessary for moisture control of the soil windrows and electricity will be necessary for lighting, operation, maintenance of a storage facility, and equipment maintenance.

Water generated from the perforated drain pipe collection system within each windrow will be collected, stored, and used for future moisture control of the treatment windrows. The collected water will be applied to the treatment windrow area. Water, with the addition of rainfall, should be an adequate supply to control the treatment windrows. If sufficient water is not collected within the drainage system, a water tanker truck will be mobilized to supplement the recirculation and collection system.

4.6 CONTAMINATED SOIL EXCAVATION

4.6.1 Excavation Interferences

Prior to beginning excavation, the designated areas will be checked for existing utilities and other potential interferences. The BEI Construction Representative will perform a walkdown of the areas to be excavated to visually observe locations of manholes, hydrants, valves, open cuts, overhead obstructions, curbs, buildings, etc., and other unusual conditions. The NAS Cecil Field personnel will be consulted for as-built locations of underground utilities. In addition, the BEI Construction Representative will perform location surveys using standard field utility detection equipment. No excavation will be initiated until the subgrade interference survey is complete.

4.6.2 Limits of Excavation

The areal limits of excavation for Site 5 are indicated on the Figures presented in Appendix A. These boundaries are primarily based upon historical TRPH contamination data that indicate exceedance of 50 ppm TRPH (ABB-ES 1994). The corresponding figures in Appendix A present the limits of remediation (or limits of excavation) for depths of 0 to 2 ft, 2 to 4 ft, 4 to 6 ft, and 6 to 8 ft. The limits of remediation for the 0 to 2 ft depth range (Appendix A) encompass the

limits for the remaining depth ranges. Therefore, this boundary will define the areal limits of excavation on the ground surface. Excavation may proceed past the 0-2 ft depth range based on exceedance of the 50 ppm TRPH value in soil (using field test kits), however, not to exceed the limits of construction (Final Design for Site 5 Soil Bioremediation, ABB 1995). The vertical limits of excavation are based upon the estimated extent of TRPH exceeding 50 ppm. The total volume of unsaturated contaminated soil that will be addressed under this interim measure is estimated to be 16,300 yd³.

Approximately 15 to 20 percent of the total contaminated soil volume will be remediated as a batch. The excavated material will comprise the treatment windrows. Once the initial batch of contaminated soil is successfully treated, the remaining material would be placed within the treatment windrows in four to six additional batches. Treated (bioremediated) soil will be returned to the excavation.

Confirmatory soil sampling of the sidewalls of the excavation will be completed in accordance with Section 5.0. Sampling will take place once excavation in an area, as determined in the field, has been completed (TRPH field test kits reading less than 50 ppm) or the limits of construction have been reached.

Once all material has been excavated and the extent of contaminated material requiring removal is verified, a registered land surveyor will provide the necessary survey information (coordinates, cross-sections, elevations, etc.) to prepare as-built drawings for the excavation.

4.6.3 Method of Excavation

Excavation will be performed in accordance with the Technical Specification for Contaminated Earthwork and Miscellaneous Demolition, Appendix B and transported in accordance with the Technical Specification for Transport of Contaminated Material, Appendix D.

All excavation will be by backhoe and/or excavator where practical. In areas where interferences are present and preclude use of mechanized equipment, excavation will be by hand. All interferences such as existing utilities will be properly maintained while the excavation is in progress and remain protected until the excavation is backfilled.

4.6.4 Run-on and Run-off Controls

Run-on and run-off controls will be constructed to prevent stormwater runoff from entering the open excavation and soil treatment area. The controls will also prevent potentially contaminated stormwater or groundwater seepage that may pond inside the open excavation and soil treatment area from migrating offsite. These controls will consist of earthen berms, diversion ditches, stormwater drainage piping and inlets, and silt fences, as necessary.

4.6.5 Free Product Removal

Based upon results of past investigations, a non-aqueous phase liquid (NAPL) or free product, is present at Site 5 (observed in monitoring well CEF-5-6S and surrounding temporary wells) directly above the water table (Appendix A), estimated to be 10 in. thick, with an estimated

volume of 300 gallons (Focused Feasibility Study, Site 5, Operable Unit 2, Source Control Remedial Alternatives, ABB-ES 1994). Analysis of the free product indicated the presence of PCBs at 26 mg/l.

Any free product encountered as a result of excavation and observed standing or floating within the excavation will be removed to the extent practicable. Free product will be removed by total fluids pumping (water and free product). All pumps, hoses, and appurtenances will be set up to preclude leaks, spills, explosion, etc., and will be flushed with water prior to disconnection to eliminate residual material within internal surfaces of the equipment. The free product and any free product/groundwater mixture will be pumped and containerized at a location adjacent to Site 5.

Excavation of soils saturated with free product will be a continuation of the excavation of vadose zone soils. This saturated soil will be separated from unsaturated soil, as practicable, during excavation activities. Saturated soil will be segregated as necessary and placed on a drainage pad that will allow the free product to drain from the saturated material. The drained, liquid material will be collected, containerized, and transported offsite for proper disposal. Free product and associated saturated soil will be removed to the extent practicable as directed by the BEI Construction Representative. The volume of saturated soils is estimated to be 10 yd³ (ABB-ES 1994).

Absorbent media will also be used as necessary to remove free product. All free product recovered by pumping and expended absorbent media containing the recovered free product will be containerized and dispositioned in accordance with Section 6.0, Waste Management.

4.6.6 Material Transport

As contaminated soil is excavated, the material (unsaturated only) will be loaded into lined trucks for transport to the newly construction windrow treatment pad. All material will be loaded, transported, and off-loaded in accordance with the Technical Specification for Transportation of Contaminated Materials, Appendix D. The material will be off-loaded directly onto the treatment pad as directed by BEI Construction Representative, and as shown in Appendix A. Treated clean soil and clean backfill will be transported in accordance with the Technical Specification for Uncontaminated Earthwork, Appendix E.

4.7 SOIL STOCKPILE CONSTRUCTION

4.7.1 Contaminated Stockpile Construction

Contaminated soil excavated from Site 5 and awaiting treatment will be stored in the temporary contaminated soil stockpile, as necessary for staging.

The area designated for the contaminated soil stockpile will be cleared as indicated in Section 4.3. Once cleared, the site will be graded as required. A High Density Polyethylene (HDPE) liner will be placed to contain the material. The contaminated soil stockpile will be protected daily with a temporary, minimum 5 mil cover. The daily cover will be provided to totally contain the contaminated soil stockpile. The specified cover will be such that the effort to

remove and apply the cover is minimal. The cover will be held in place by nylon rope and steel drive anchors. The site, liner, and cover will be such that runoff resulting from the stockpile will be directed back into the excavation at Site 5.

The contaminated soil stockpile will be sized to provide containment for the excavated soil. A construction drawing for the contaminated stockpile is included in Appendix A.

4.8 OPERATION AND MAINTENANCE OF THE WINDROW COMPOSTING TREATMENT SYSTEM

Treatment of the unsaturated soil will be accomplished onsite using the windrow composting system or farming technique. This technique consists of creating optimal microbial conditions within the contaminated soil through the mechanical turning of the soil at regular intervals by mobile equipment. Initially, composting amendments including lime, animal manure, or other organic rich material will be added and mixed with the soil by mechanical means using conventional construction equipment (backhoe and/or front-end loader) or special windrow machinery. After initial mixing, the mixed materials will then be formed into windrows, as necessary.

The actual dimensions of the windrows are largely a function of the characteristics of the composting material and the equipment used for turning. Windrows are typically trapezoidal in shape (Appendix A). Windrow dimensions will be based on the "Final Design for Site 5 Soil Bioremediation (ABB 1995).

After the soil has been excavated, placed on the treatment pad, initial amendments added and mixed, and formed into a windrow fashion, operation and maintenance (O&M) of the treatment system will begin. O&M requirements will include periodic mechanical turning (mixing) of the soil windrows to provide oxygen, maintain proper soil pH, nutrient, and moisture levels. The frequency of soil mixing is estimated to be once every 5 to 7 days (ABB-ES 1994). Treatability testing by ABB-ES has been initiated to determine the optimum O&M parameters necessary to successfully treat the soil.

O&M will also include drainage and runoff control, placement of a cover (e.g., plastic sheeting) over the treatment area as necessary for rain infiltration control, dust and odor control, storage and maintenance of supplies, equipment and machinery maintenance, data evaluation, and progress reporting.

O&M of the composting treatment of soils will include periodic sampling and analysis to determine if treatment is being accomplished. Levels of TRPH and PCB concentrations and enumerations of total-and-petroleum-specific bacteria will be monitored. Decline in TRPH concentrations and increase in total and petroleum-specific bacteria over time are indications that removal of organic contaminants is occurring. ABB-ES will provide monitoring of the treatment system performance, including recommendations on adjustments of various nutrients and moisture levels.

The cleanup criteria established for Site 5 soil is to achieve reduction of TRPH to 50 ppm (ABB-ES 1994). Bioremediation of Site 5 soils would cease when the cleanup criteria (50 ppm TRPH and 1 ppm PCB) has been achieved or as directed by the Navy. It is estimated that it will

require approximately 120 days to treat one batch of Site 5 soil (ABB-ES 1994) or a total of approximately one year for total treatment time. More accurate predictions of treatment time can be made through treatability testing.

Because this treatment system is primarily aerobic, the treatment system developed for Site 5 is probably not conducive to PCB contamination (ABB-ES 1994). Soil monitoring for PCBs is required prior to backfilling treated soils into the excavation to ensure that PCB concentrations are below the PCB action level of 1 ppm established for this interim action.

4.9 BACKFILL

Backfill will be performed in accordance with the Technical Specification for Uncontaminated Earthwork, Appendix E.

Initially, the excavation will be backfilled, as required, with general fill from a borrow source reviewed and approved by BEI. Prior to obtaining treated soil, general fill will be used to bring the excavation up to within four feet of land surface. This will provide a safe, open excavation to accommodate the long treatment durations, and preclude water from filling the excavation during the treatment periods when the excavations is open. Additionally, the area of excavation remaining open will be protected using temporary fencing to avoid inadvertent intrusion until the areas are backfilled.

Backfill, consisting of the treated soil, will be used for the remaining areas of excavation once sampling of the treated soil meets cleanup criteria, or as directed otherwise by the Navy. Stormwater and/or groundwater seepage that may be present in the excavation will be removed by pumping and disposed of as directed by the Navy. Once sampling results indicate particular units of soil (e.g., one soil windrow) have been successfully treated, the treated soil will be used to backfill the open excavations. Sampling will be conducted in accordance with Section 5.0. All material placed within the excavation at Site 5 will be field compacted a minimum of four passes with the tracks of earth moving equipment. Material shall be compacted in lifts of approximately 1 ft.

4.10 SITE RESTORATION

After all disturbed areas of excavation have been successfully backfilled, the site will be graded to drain as required. The excavation grade will be raised above surrounding elevations and sloped from the center outward to a minimum slope of 50 horizontal to 1 vertical so that runoff will flow away from the backfill area. Runoff controls will be installed, as necessary, to control runoff into adjacent streams. If additional material is required to grade the area, general fill will be used from approved sources. At the completion of finish grading, all disturbed areas will be seeded.

4.11 TREATABILITY STUDY

As part of this interim action, a treatability study is presently being conducted by ABB-ES to optimize bioremediation treatment parameters at Site 5. Testing will involve simulation of

bioremediation of the Site 5 soils. Test results will be used to determine if conditions exist that inhibit bacterial activity and if windrow treatment is capable of reducing the levels of TRPH in soil. Treatability testing is not included as part of this Work Plan.

4.12 POST CLOSURE REPORTING

BEI will provide a final close-out report regarding the remedial action to Cecil Field personnel. This documentation will include as-built drawings of the excavation, sampling and analysis data, treatment results, etc. ABB-ES will prepare a final Remedial Action Report.

5.0 SAMPLING AND ANALYSIS PLAN

This section describes the sampling and analysis for field screening and laboratory testing of contaminated soils at the Site 5, Former Oil Disposal Area, Northwest. Sampling methodology and procedures described in this Sampling and Analysis Plan (SAP) are based on FDEP requirements as found in the Florida Department of Environmental Protection *Standard Operating Procedures for Laboratory Operations and Sample Collection Activities* (DERQA-001/92) and *Quality Assurance Standard Operating Procedures for Petroleum Storage System Closure Assessments* and will be performed by ABB-ES.

Field screening techniques (EPA DQO Level I) using TRPH field screening test kits will be used to delineate the area where soil remediation is required. EPA DQO Level III data will be required for post-excavation confirmatory analysis to determine that remediation and/or treatment goals have been achieved.

5.1 SAMPLING PROTOCOL

5.1.1 Decontamination

Sampling equipment will be decontaminated prior to collection of each sample. Decontamination will be completed in accordance with Section 4.1, "Decontamination," of FDEP's *Standard Operating Procedures for Laboratory Operations and Sample Collection Activities*. Used decontamination fluids will be containerized, stored and disposed of in accordance with the Navy Public Works Department.

5.1.2 Collection

Sampling, with the exception of field screening, will be performed in accordance with Section 4, "Sampling Procedures," of FDEP's *Standard Operating Procedures for Laboratory Operations and Sample Collection Activities*.

5.1.3 Sample Identification

Sample identification will be in accordance with NAVRAC Project Procedure 6003, "Sample Identification and Data Encoding."

5.1.4 Logbooks

Field logbooks will be used for recording all field activities. Entries will include sufficient detail to reconstruct all significant activities. Logbook entries will be completed in accordance with the minimum requirements for recordkeeping included in Section 5.0, "Sample Custody and Documentation," of the FDEP's *Standard Operating Procedures for Laboratory Operations and Sample Collection Activities*. This SOP includes the minimum requirements for recordkeeping.

5.1.5 Chain-of-Custody Records

In order to maintain sample traceability, each sample for offsite analysis will be properly documented on a chain-of-custody record. Chain-of-custody documentation will be completed in accordance with Section 5.3, "Custody Documentation Requirements for Field Operations," of the FDEP's *Standard Operating Procedures for Laboratory Operations and Sample Collection Activities*.

5.1.6 Packaging and Holding Times

Sample volume requirements, frequencies, preservation techniques, minimum holding times, and container material requirements for samples are given in Tables 5-1 (unsaturated soil), and 5-2 (saturated soil associated with free product and decontamination water). The BEI Field Engineer is responsible for ensuring that a sufficient volume of each sample is collected and placed in the appropriate container with the proper preservation.

The preparation of all sampling containers and the container types, preservatives, and holding times are specified in the FDEP's *Standard Operating Procedures for Laboratory Operations and Sample Collection Activities*. Section 4.4, "Sample Handling," of the FDEP standard operating procedures contains the recommended container, preservation, and holding times for water, wastewater, soil, and sediment samples. Sample containers will meet all specifications outlined in the above-mentioned procedures.

5.1.7 Verification

Any confirmation or biological treatment sample data collected by Bechtel will be subject to a 100 percent verification. This includes data generated by field activities or as a result of laboratory analyses. The verification process will begin with manual entry or electronic loading of the data. Printouts of this information from the project database will be compared with the original hard copy of the data and resolved.

Documentation of all verification activities will be performed by the individual performing the verification. This documentation will consist of a signature of the person who performed the verification in the hard copy printouts from the project database. These signed verification printouts will be forwarded to the database manager or designee.

Table 5-1
Data Requirements for Site 5 Sampling
Unsaturated Soil (Vadose Zone) Sampling

Sample Event	Analytical Method	DQO Level	Sample Frequency	Sample Volume	Sample Container	Preservative	Holding Time	QC Samples Required
Field Screening Sampling								
TRPH Test Kits		I	As required during excavation	fill jar 1/2 full	16 oz. canning jar	None	Analyze immediately following temperature equilibration	Dup: 1/10
Confirmatory Sampling								
TRPH ₁ (< or > 50 ppm)	modified EPA 418.1	III	12	fill jar	glass 8 oz. widemouth w/Teflon lined cap	Cool @ 4°C	14 days	Dup: 1/10 or 5 samples (whichever is >) Dup: 1/20 (TRPH) RB: 1/20 or weekly

¹ TRPH: Total recoverable petroleum hydrocarbons

**Table 5-2
Data Requirements for Site 5
Saturated Soil and Decontamination Water Sampling**

Sample Event	Analytical Method	DQO Level	Sample Volume	Sample Container	Preservative	Holding Time	QC Samples Required ¹
Saturated Soil							
TCLP Volatile Organics	SW-846	III	150 gms	4 oz. jar	Cool 4°C	14 days until extraction	N/A
TCLP BNAES	SW-846	III	800 gms	16 oz. jar	Cool 4°C	14 days until extraction	N/A
Flash Point	EPA 1010	I, III	400 gms	8 oz. jar	None	28 days	N/A
Paint Filter Test	EPA 9095	I, III	400 gms	8 oz. jar	None	None	N/A
PCBs	EPA 8080	III	150 gms	4 oz. jar	Cool 4°C	14 days until extraction	N/A
Decontamination Water							
As, Ba, Cd, Cr, Cu, Pb, Hg, Se, Ag, Zn, and Hexavalent Cr	EPA 6000 and 7000 series 7471 (Hg only)	III	fill container	1-gal amber glass w/Teflon lined cap	Cool @ 4°C	6 months (28 days for Hg)	N/A
Target Compound List, Semi-volatile Organic Compounds	EPA 8270	III	fill container	1-gal amber glass w/Teflon line cap	Cool @ 4°C	7 days until extraction, 40 days after extraction until analysis	N/A
Target Compound List, Volatile Organic Compounds	EPA 8240	III	fill container	(3) 40-ml vials w/Teflon septum seal	Cool @ 4°C	14 days	N/A
Total Organic Compounds	EPA 9060	III	100 ml	4 oz Amber glass	Cool @ 4°C pH<2	28 days	N/A
pH	EPA 9041	III	100 ml	4 oz plastic	Cool @ 4°C	Analyze immediately	N/A

5.2 FIELD SAMPLING AND ANALYSIS

Samples identified in this section will be collected in accordance with FDEP's standard operating procedures as outlined in Section 4.3.4, "Soil Sampling Procedures." Analysis of these samples will be in accordance with FDEP's *Standard Operating Procedures for Laboratory Operations and Sample Collection Activities*, Sections 5.0 through 10.0. Tables 5-1 and 5-2 provide a summary of the data requirements and analytical parameters for samples to be collected from the Site 5, Former Oil Disposal Area, Northwest.

5.2.1 Field Screening Sampling

Field screening of samples for TRPHs will be used to guide remediation activities. Soil samples will be collected and analyzed using a TRPH test kit.

Field screening will be performed at locations as specified in Section 4.6, to aid in establishing limits of excavation of soil over 50 ppm for TRPHs. Soil will be excavated in the areas identified as contaminated with over 50 ppm as discussed in Section 4.6, after which field screening will be used to guide additional excavation activities. If necessary, additional field sampling may be completed in the field, at the discretion of the BEI Field Representative.

5.2.2 Biological Treatment Sampling

ABB will monitor the effectiveness of the biological treatment. ABB will collect and analyze treatment samples as required. ABB will provide guidance to Bechtel to optimize the soil treatment process.

5.2.3 Confirmatory Soil Sampling

To confirm that soils contaminated with greater than 50 ppm TRPHs have been excavated, confirmatory soil sampling will be conducted. Samples will be collected on the sidewalls and at the bottom of the excavation above the water table. An estimated 16,300 yd³ of soil contaminated with TRPH concentrations greater than 50 ppm will be excavated from Site 5.

For confirmatory sampling, the number of required samples for the estimated 56,190 ft² (Focused Feasibility Study, Site 5, Operable Unit 2, Source Control Remedial Alternatives, ABB-ES 1994) of the area to be excavated is twelve (*Michigan Department of Natural Resources, Guidance Document for Verification of Soil Remediation*, April 1994). A biased approach, based on the source areas and preferential pathways of contamination, will be used to select the twelve (including a minimum of one sample from each of the sideslopes) sampling locations. Using this approach, samples will be collected where TRPH contamination exceeding 50 ppm will most likely be encountered. This minimizes the number of samples necessary to verify that a site is remediated. Table 5-1 includes the sample confirmation and analysis requirements for soils.

6.0 WASTE MANAGEMENT

Waste management will be performed as directed by the Navy. Waste management practices, as defined in the Program Hazardous Waste Management Plan, will be used as guidance and appropriately followed for this work.

Hazardous waste, if identified, will be managed in accordance with RCRA, 40 CFR Parts 260, 261, 262, 264, 265, 268, 270, 271, and 761. Hazardous waste will not be offered to any transporters or treatment, storage, or disposal facilities that do not have an EPA identification number.

To minimize the amount of materials that must eventually be disposed, waste minimization practices will be implemented during operations. These practices will include, but not be limited to:

- No extraneous materials taken into contamination control areas
- Decontamination and free release of equipment used to support onsite activities, to the extent practicable
- Use of consumables that can be compacted or otherwise volume reduced, to the extent practicable

Personal protective equipment (PPE) that is not visibly soiled will be disposed of as conventional waste. Contaminated portions of PPE will be managed as non-hazardous petroleum contaminated waste.

Stormwater runoff and runoff controls will be implemented to prevent offsite migration of sediment or contaminated stormwater during site activities.

Water generated during decontamination activities will be containerized in a temporary holding tank. Prior to release of the water, a representative sample for offsite laboratory analyses for required parameters will be collected (Section 5.0, Table 5-2). If the analytical results indicate that the water is not toxic, the water would be transported to the NAS Cecil Field wastewater treatment plant for management. If the analytical results indicate that the water is toxic, the water would be transported offsite for treatment in accordance with appropriate regulations.

All contaminated soil (unsaturated) excavated from Site 5 will be loaded into loose conveyance transport trucks and transported onsite to the windrow treatment pad for treatment.

Free product encountered during the excavation will be pumped into a portable tank and tested against disposal parameters. Any free product that is recovered with absorbent media will be containerized for subsequent transportation and disposal offsite. Saturated soil associated with free product will be placed on a drainage pad to separate as much as practicable, the free liquid from the soil. The saturated soil and free product will be sampled in accordance with Table 5-2.

If the concentration of PCBs in the saturated contaminated soil is less than 1 ppm, then the soil can undergo bio-treatment. If the concentration of PCBs is greater than 1 ppm but less than 50ppm, then the soil must be disposed of according to 40CFR 761.75 and 761.70 in a TSCA landfill. If the concentration of PCBs is greater than 50ppm but less than 500ppm, then the soil must be incinerated per 40 CFR 761.70. If the concentration of PCBs is greater than 500ppm, then the soil must be incinerated per 40 CFR 761.70.

Any nonhazardous solid waste that is generated as a result of mobilization and clearing activities will be properly disposed onsite or offsite as directed by the Navy.

7.0 SAFETY AND HEALTH

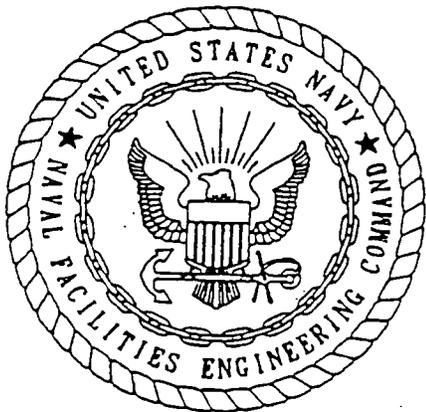
A Program Safety and Health Plan (PSHP) defines policies for work on the Navy RAC Project. A Site Safety and Health Plan (SSHP) has been prepared for Navy RAC bases. Addendum No. 6 to the SSHP, which is provided separately, defines task-specific requirements for remediation at Site 5.

8.0 QUALITY CONTROL PLAN

Quality control (QC) samples will be collected during sampling activities and will be used as a means of evaluating data quality in terms of precision and accuracy. QC checks also verify that sampling, handling, and analysis does not introduce contaminants in the sampling process. Section 5.0, Sampling and Analysis Plan, addresses the minimum field QC sampling frequency. A task specific quality control plan is provided separately.

APPENDIX A

**FINAL DESIGN FOR SITE 5 BIOREMEDIATION
NAS CECIL FIELD, JACKSONVILLE, FLORIDA
PREPARED BY ABB-ES
APRIL 1995**



**FINAL DESIGN FOR
SITE 5 BIOREMEDIATION**

**NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA**

CONTRACT NO. N62467-89-D-0317/090

APRIL 1995



**SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORTH CHARLESTON, SOUTH CAROLINA
29419-9010**

RECEIVED

APR 2 1995

V. HERMANN BAUER



April 17, 1995

Commanding Officer
ATTN: Brian Stockmaster
Engineer-in-Charge, Code 1876
Southern Division
Naval Facilities Engineering Command
P.O. Box 190010
North Charleston, S.C. 29418-9010

Subject: Final Design, Site 5 Bioremediation, NAS Cecil Field

Dear Mr. Stockmaster:

ABB Environmental Services, Inc. is pleased to forward one copy of the Final Design, Site 5 Bioremediation, recently completed for the Site 5 interim remedial action. D size drawings will be provided as indicated below.

Questions or comments should be directed to us at (904) 656-1293.

Sincerely,

ABB ENVIRONMENTAL SERVICES, INC.

Robert C. Lunardini, Jr., P.E.
Senior Engineer

Jack Pittman
Senior Task Order Manager

- cc: Mr. Bart Reedy, USEPA Region IV (3 copies)
- Mr. Mike Deliz, Florida Department of Environmental Protection (1 copy)
- Mr. John Dingwall, NAS Cecil Field (1 copy)
- Mr. Steve Wilson, SOUTHNAVFACENGCOCM (1 copy)
- Mr. Alan Shoultz, SOUTHNAVFACENGCOCM (1 copy)
- Mr. Wayne Oehlman, ROINC Office (2 copies w/D size)
- Mr. Herman Bauer, BEI (3 copies w/D size)
- file

enclosure

RECEIVED

APR 21 1995

ABB ENVIRONMENTAL SERVICES

ABB Environmental Services Inc.

**FINAL DESIGN FOR
SITE 5 SOIL BIOREMEDIATION**

**NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA**

CONTRACT NO. N62467-89-D-0317/090

Prepared by:

**ABB Environmental Services, Inc.
2590 Executive Center Circle, East
Tallahassee, Florida 32301**

Prepared for:

**Department of Navy, Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
North Charleston, South Carolina 29418**

April 1995

APR 21 1995

DEPARTMENT OF THE NAVY
SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORTH CHARLESTON, SOUTH CAROLINA
29419-9010

SPECIFICATION
NO. 18-89-0317

CONTRACT NO.
N62467-89-D-0317

APPROPRIATION:
ENVIR

SITE 5 SOIL BIOREMEDIATION

at the

NAVAL AIR STATION CECIL FIELD
JACKSONVILLE FLORIDA

DESIGN BY

ABB Environmental Services
2590 Executive Center Circle, East
Berkeley Building
Tallahassee, Florida 32301

SUBMITTED BY

Robert C. Lunardini, Jr.
Robert C. Lunardini, Jr., P.E.
Richard D. May
Rich May
Deputy Program Manager
April 17, 1995

SPECIFICATION PREPARED BY

Maureen McGlone, P.E.
Environmental

J.O. No.: _____ W/R: _____ SEIC: _____ EIC: _____

APPROVED BY

EFD Specification
Branch Head: _____ Design Director: _____

For Commander, NAVFAC: _____ Date: _____



The engineering design and professional opinions rendered in the set of planning documents that describes the Site 5 Soil Bioremediation, NAS Cecil Field, Jacksonville, Florida, were conducted or developed in accordance with commonly accepted procedures consistent with applicable standards of practice. These planning documents are intended to be implemented by Southern Division, Naval Facilities Engineering Command's Response Action Contract (RAC) Contractor.

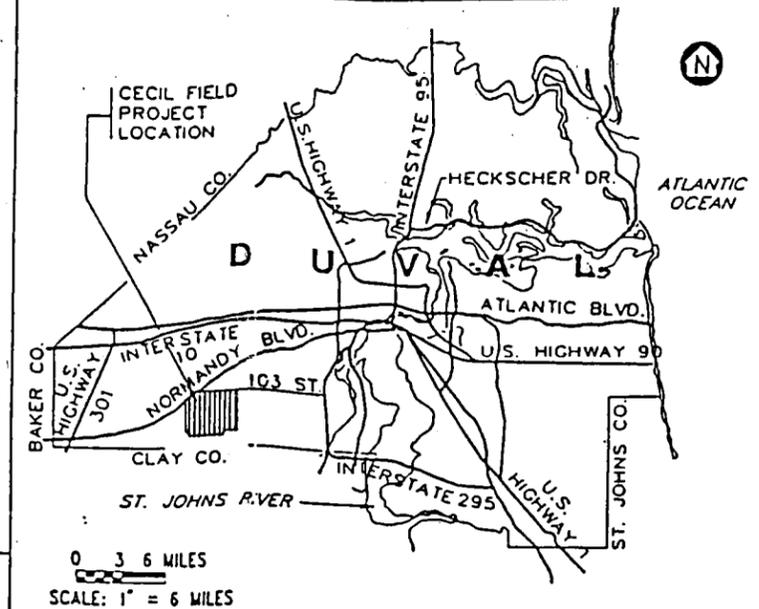
Robert C. Lunardini, Jr.

Professional Engineer No. 46657
Expires February 28, 1997

Robert C. Lunardini, Jr.
17 Apr 95

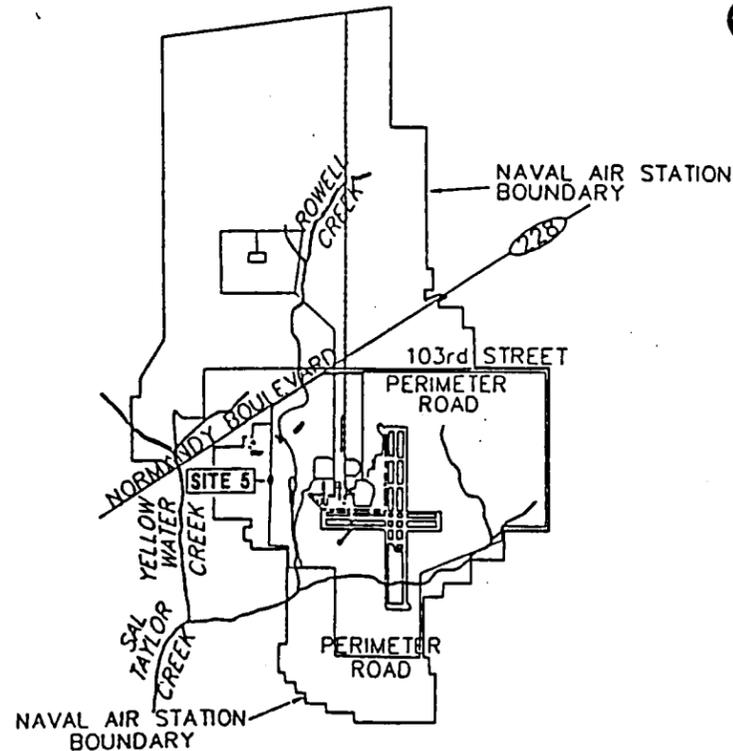
SITE 5 BIOREMEDIATION NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA

**CONSTRUCTION CONTRACT NO. N62467-89-D-0317
SPECIFICATION NO. 18-89-0317**



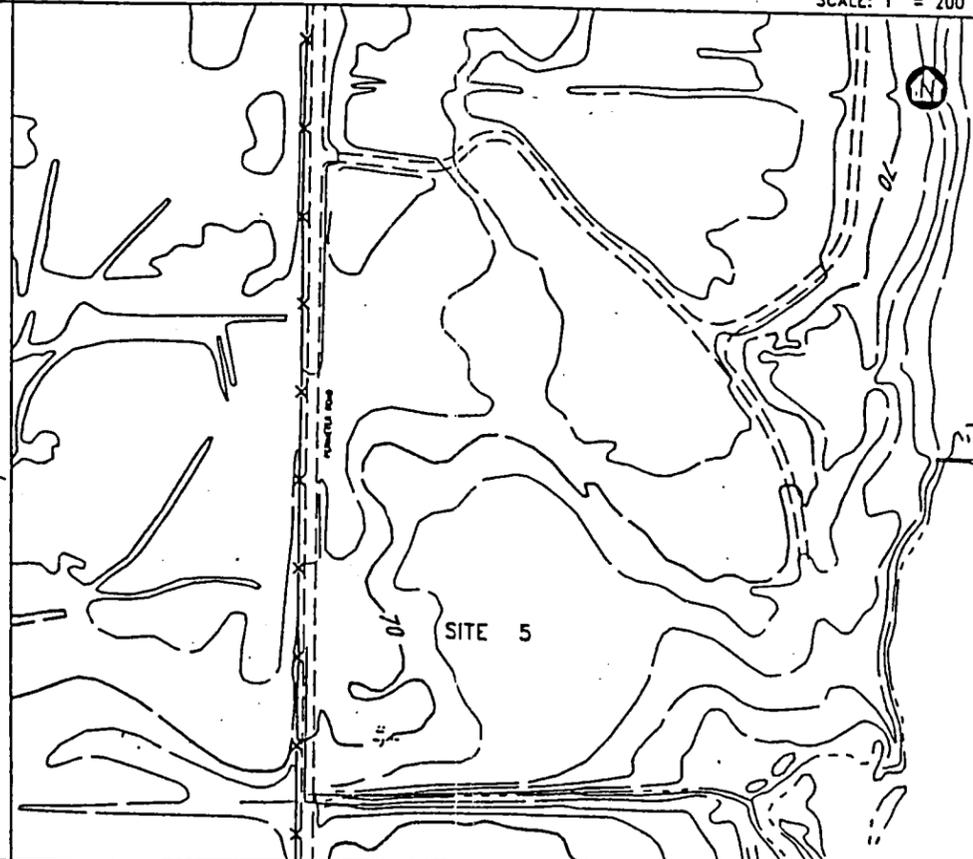
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LOCATION MAP

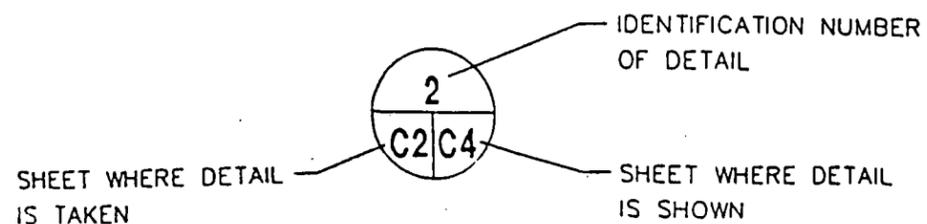
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VICINITY MAP

INDEX		
SHEET NO.	NAVFAC DRAWING NO.	TITLE
T-1	5294383	INDEX SHEET
C-1	5294384	SITE PLAN
C-2	5294385	SOIL TREATMENT FACILITY & DETAILS
C-3	5294386	WINDROW/PAD SECTIONS AND DETAILS
C-4	5294387	SOIL STOCKPILE LAYOUT AND DETAILS
C-5	5294388	EXCAVATION SEQUENCE
P-1	5294389	PROCESS FLOW

EXAMPLE - DETAIL SYMBOL



EXAMPLE - SECTION SYMBOL

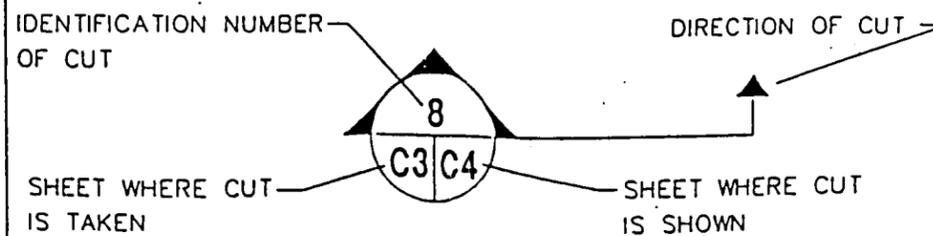
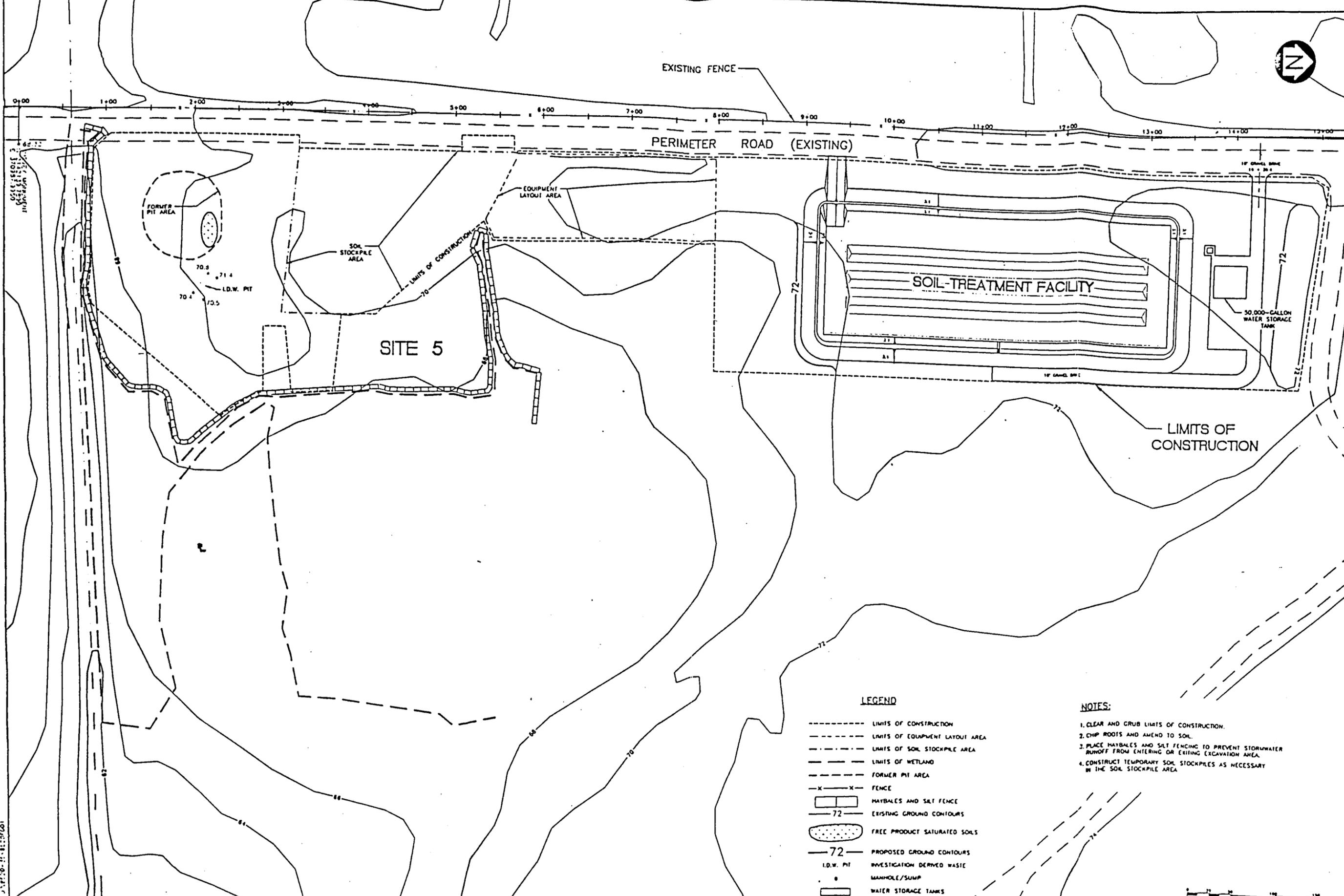


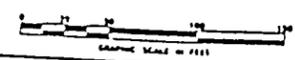
ABB Environmental Services, Inc.
 Jacksonville, Florida
 PREP BY: DATE APPROV
 LA: 3/21/95
 REV: 3/28/95
 7/11/95
 SOUTHERN DIVISION
 JACKSONVILLE, FLORIDA
 SITE 5 SOIL BIOREMEDIATION
 TITLE SHEET
 T-1



DATE: 10-11-89

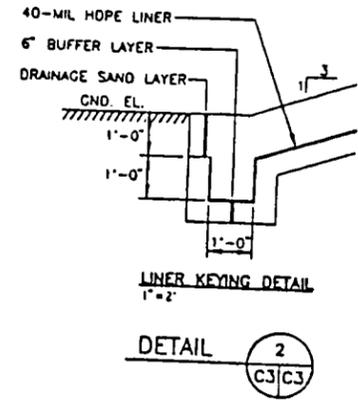
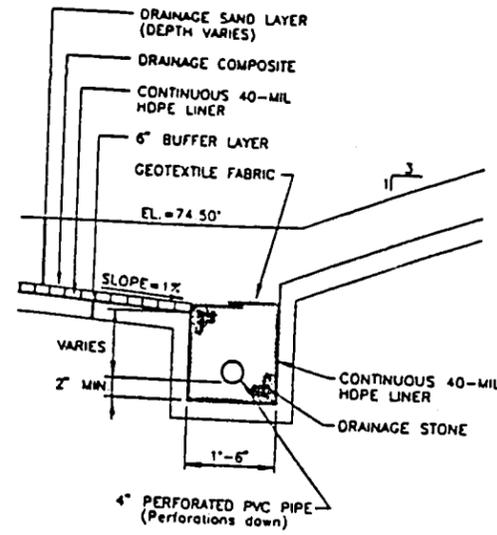
- LEGEND**
- LIMITS OF CONSTRUCTION
 - LIMITS OF EQUIPMENT LAYOUT AREA
 - LIMITS OF SOIL STOCKPILE AREA
 - LIMITS OF WETLAND
 - FORMER PIT AREA
 - x-x- FENCE
 - [] MAYBALES AND SILT FENCE
 - 72 EXISTING GROUND CONTOURS
 - [] FREE PRODUCT SATURATED SOILS
 - 72 PROPOSED GROUND CONTOURS
 - I.D.W. PIT
 - MANHOLE/SUMP
 - [] WATER STORAGE TANKS

- NOTES:**
1. CLEAR AND GRUB LIMITS OF CONSTRUCTION.
 2. CMP ROOFS AND AMEND TO SOIL.
 3. PLACE MAYBALES AND SILT FENCING TO PREVENT STORMWATER RUNOFF FROM ENTERING OR EXITING EXCAVATION AREA.
 4. CONSTRUCT TEMPORARY SOIL STOCKPILES AS NECESSARY IN THE SOIL STOCKPILE AREA.

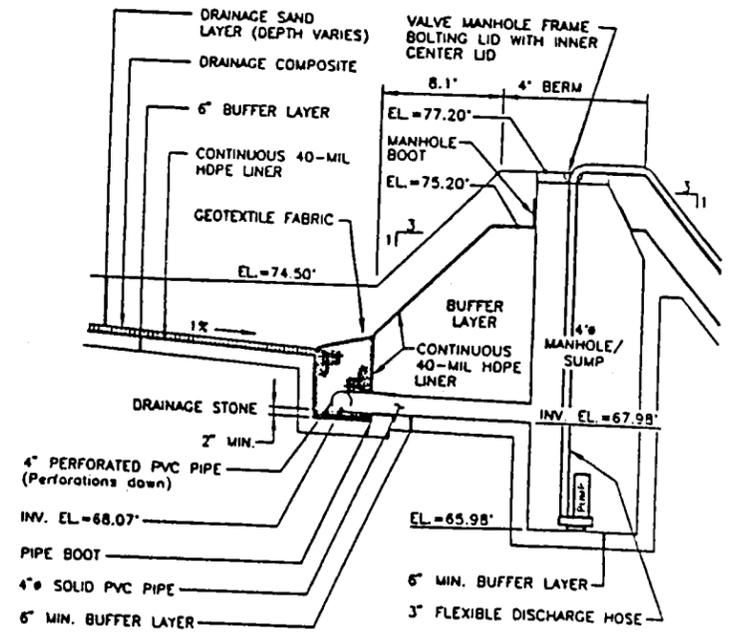


SOUTHERN DIVISION JACKSONVILLE, FLORIDA	LONG DISTANCE JACKSONVILLE, FLORIDA	PREP BY: [Signature] DATE: 3-21-93 REV. BY: [Signature] DATE: 3-28-93 REV. BY: [Signature] DATE: 4/14/93	IBB Environmental Services, Inc. Jacksonville, Florida PROJECT NO. 10-89-0317 DRAWING NO. M62167-89-D-0317 SHEET NO. 5294361 SCALE: 1" = 100' DATE: 10-11-89
SITE 5 SOIL BIOREMEDIATION SITE PLAN		APPROVED BY: [Signature] DATE: 10/11/89	





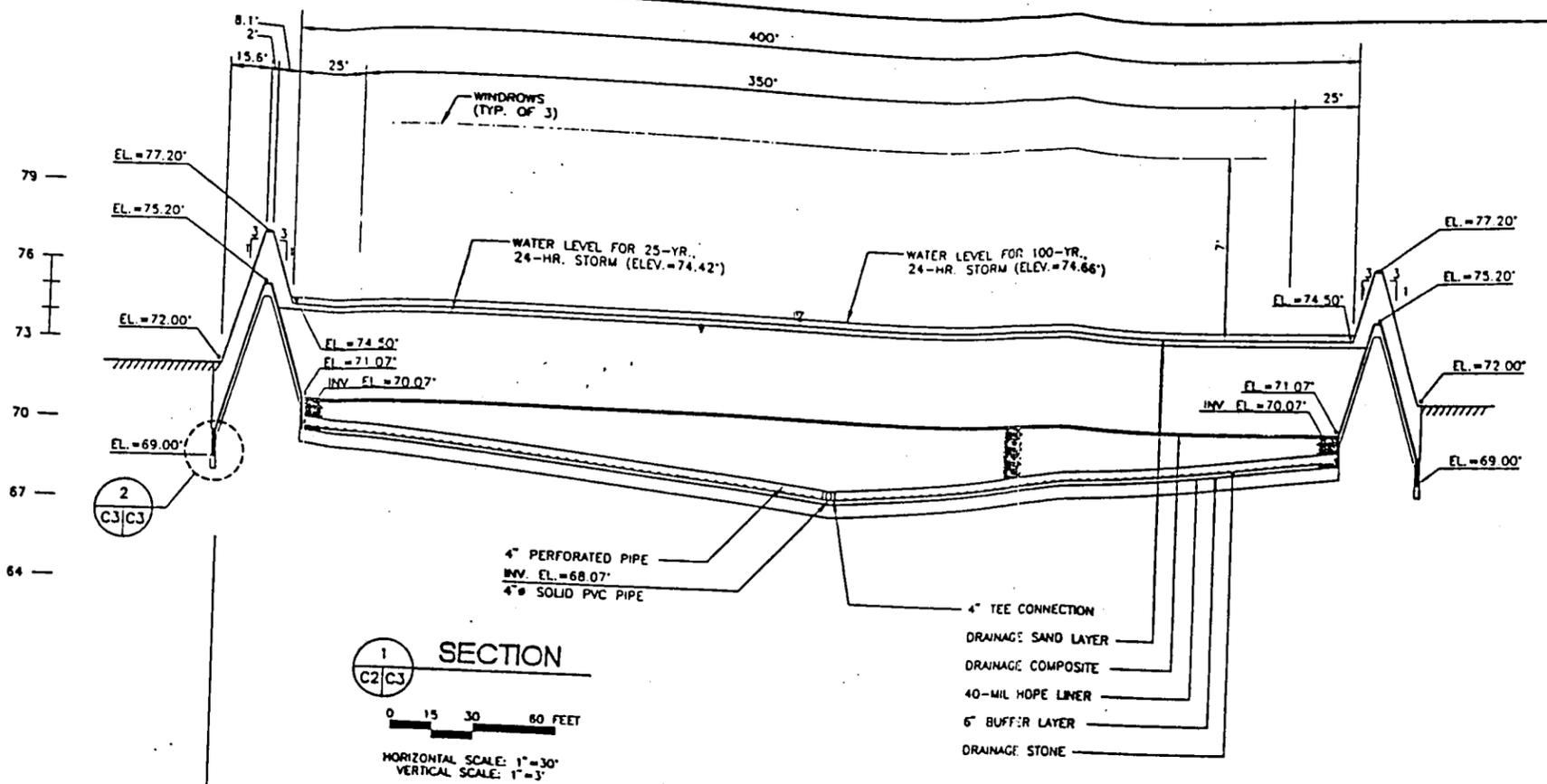
DRAINAGE TRENCH DETAIL
N.T.S.



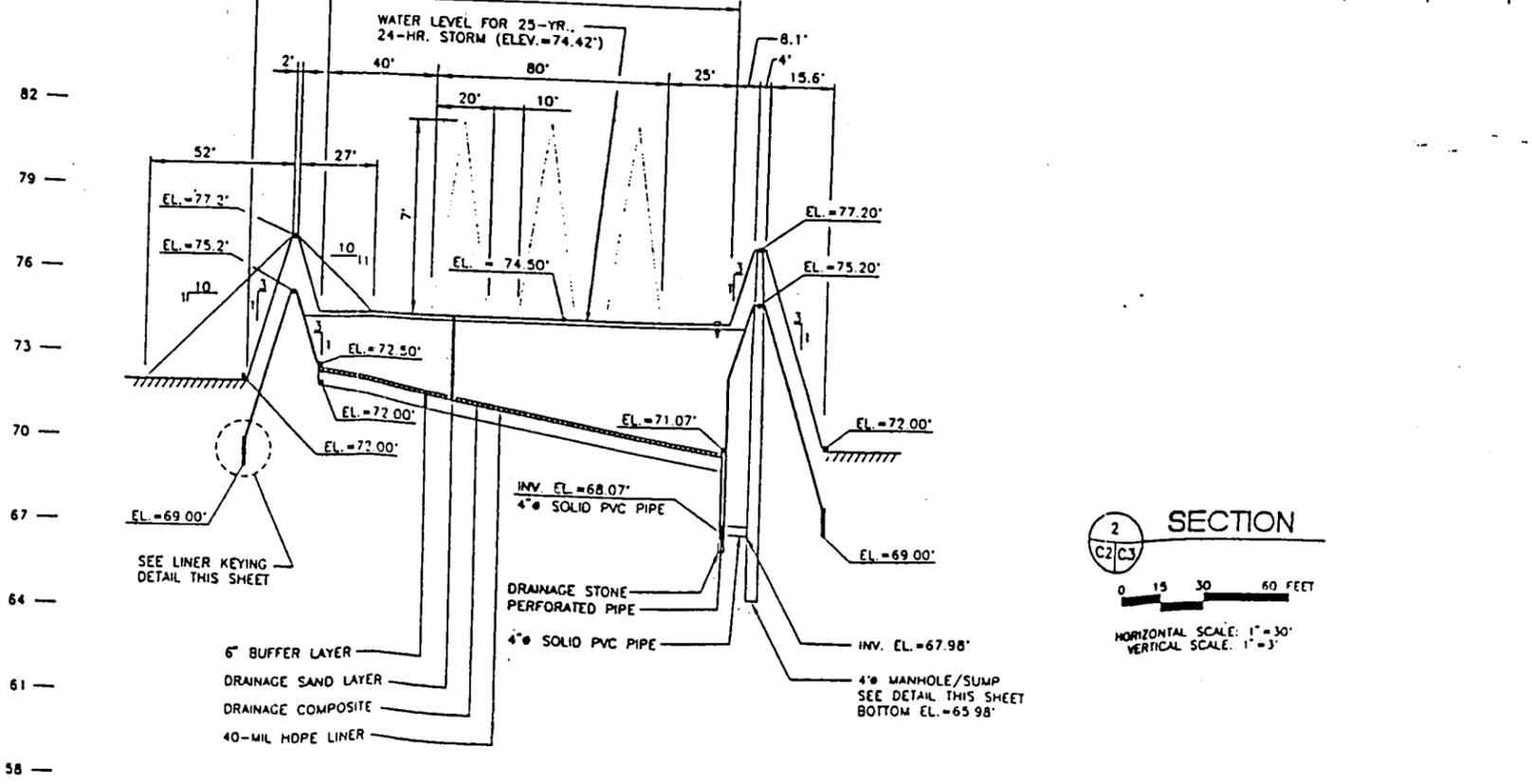
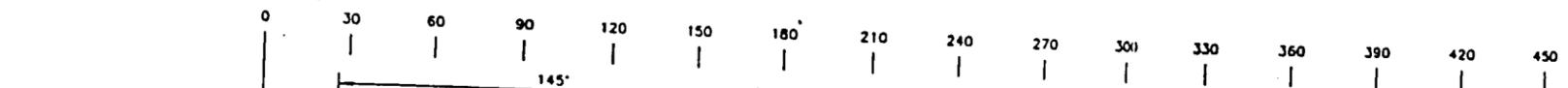
NOTES:
1. MATERIAL USED FOR PIPE AND MANHOLE BEDDING SHALL BE BUFFER LAYER MATERIAL.

4\"/>

DETAIL 1
C2/C3



SECTION 1
C2/C3
HORIZONTAL SCALE: 1\"/>



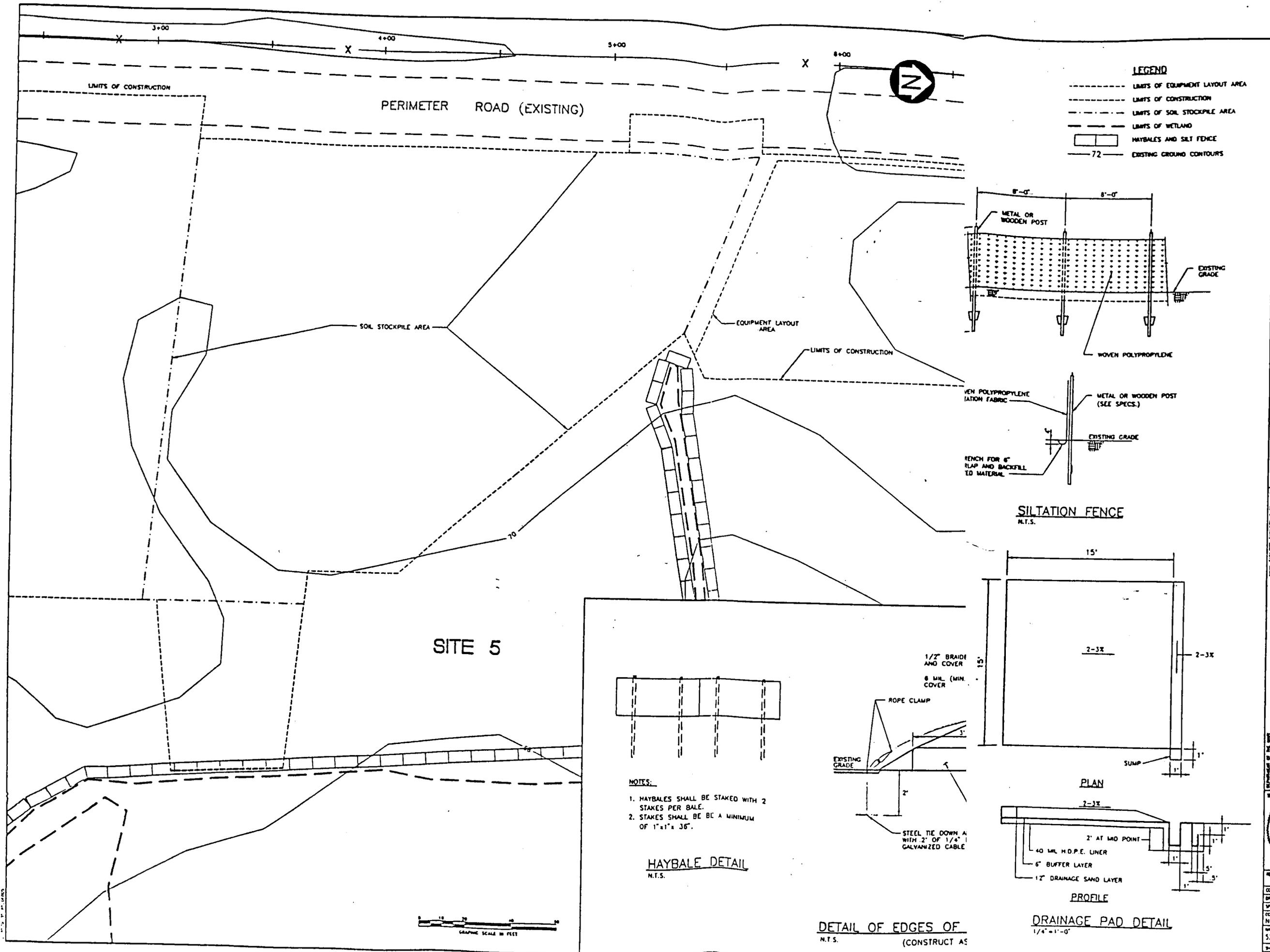
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C2/C3
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B	CLIENT AND REGULATORY REVIEW	RHM	3/28/93	
C	ISSUED FOR CONSTRUCTION	RHM	4/15/93	

SOUTHERN DIVISION
 JACKSONVILLE, FLORIDA
 SITE 5 SOIL BIOREMEDIATION
 WINDROW/PAD SECTIONS AND DETAILS

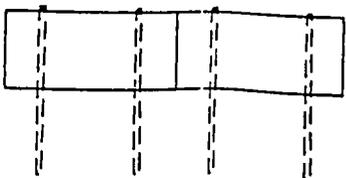
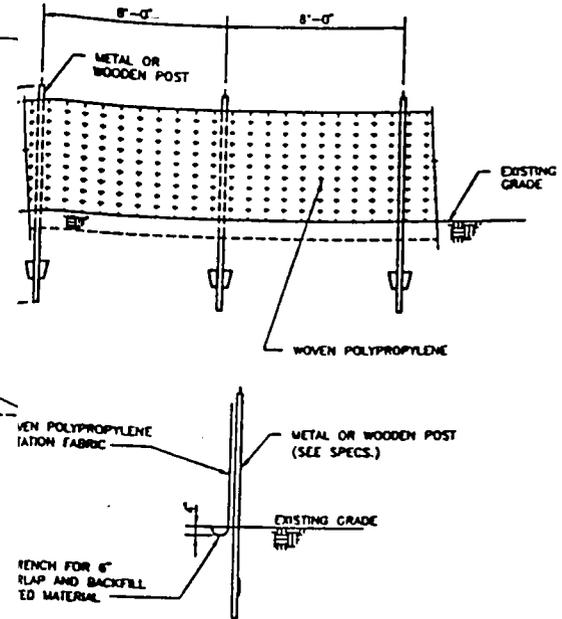
APPROVED BY THE STATE OF FLORIDA
 DEPARTMENT OF ENVIRONMENTAL PROTECTION
 DIVISION OF WATER
 DATE: 4/15/93
 SIGNATURE: [Signature]

PROJECT DRAWING NO.
 DRAWING SIZE
 SHEET NO. 18-00-0117
 CONTRACT NO. 1162467-89-0-0117
 DATE: 5/29/86
 SHEET 1 OF 1

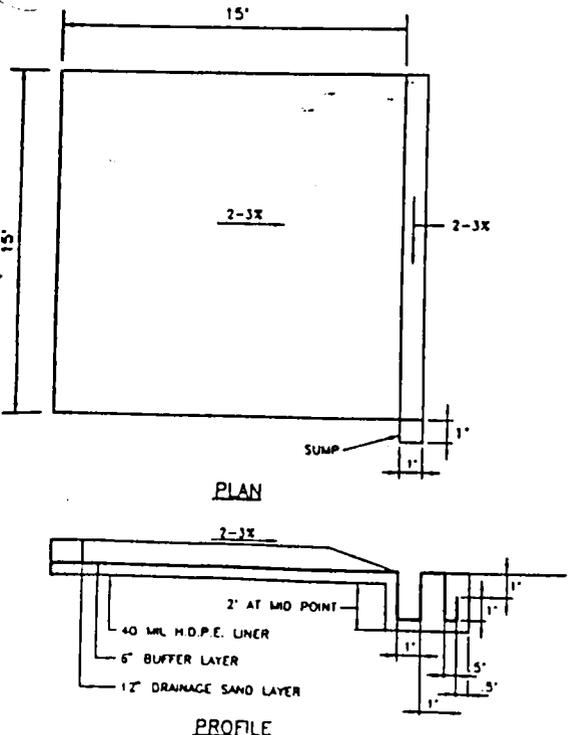
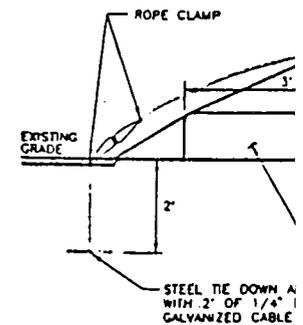


LEGEND

- LIMITS OF EQUIPMENT LAYOUT AREA
- LIMITS OF CONSTRUCTION
- LIMITS OF SOIL STOCKPILE AREA
- LIMITS OF WETLAND
- ▭ HAYBALES AND SILT FENCE
- 72--- EXISTING GROUND CONTOURS



- NOTES:**
- HAYBALES SHALL BE STAKED WITH 2 STAKES PER BALE.
 - STAKES SHALL BE A MINIMUM OF 1" x 1" x 36".

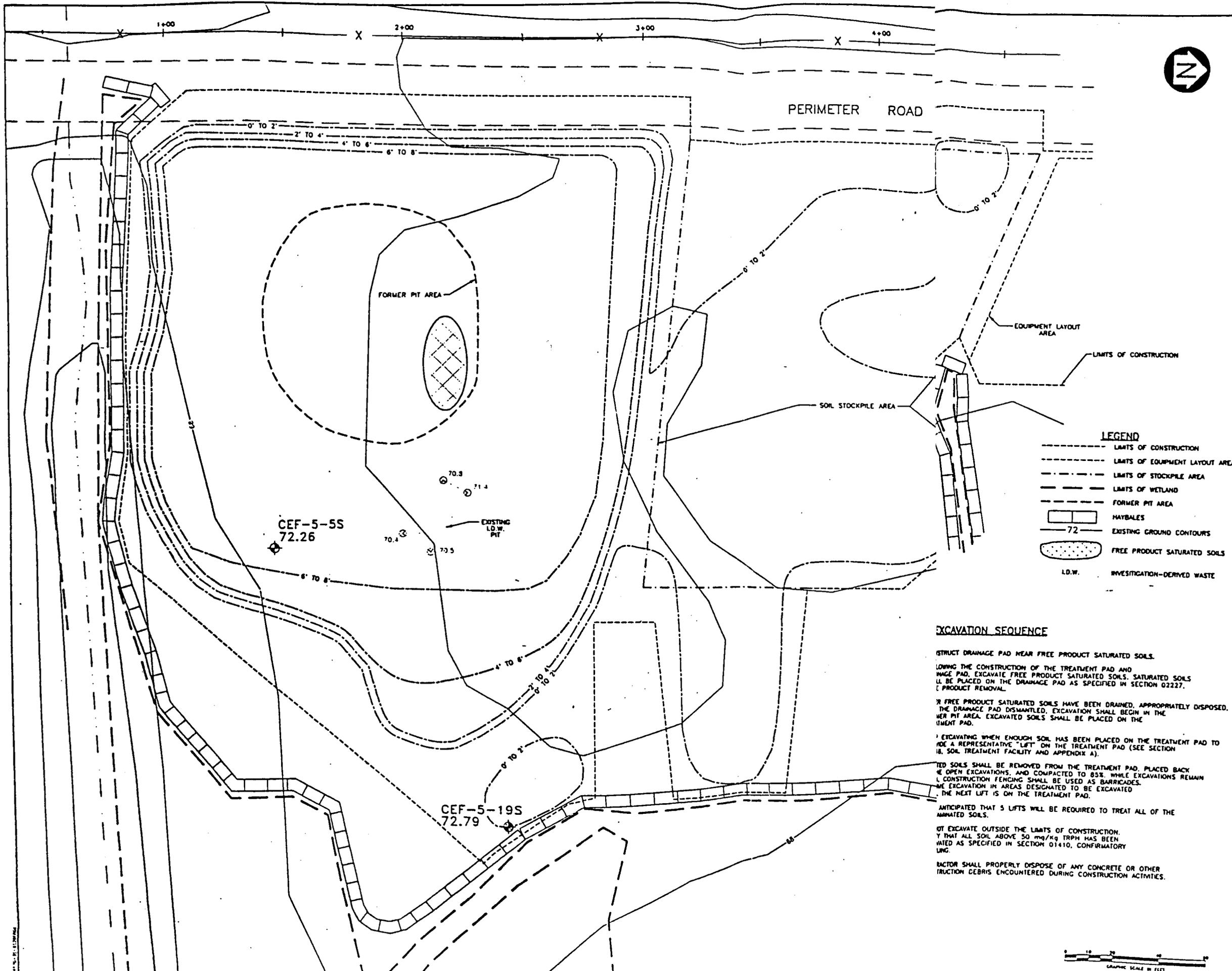


REV.	DESCRIPTION	PREP BY	DATE	APPROV
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B	CLIENT AND REGULATORY REVIEW	MM	3/28/85	
D	ISSUED FOR CONSTRUCTION	MM	4/14/85	

SOUTHERN DIVISION
 JACKSONVILLE, FLORIDA
SITE 5 SOIL BIOREMEDIATION
 SOIL STOCKPILE LAYOUT AND DETAILS

APPROVED FOR THE CLIENT
 APPROVED FOR THE DIVISION
 DATE OF ISSUE

REVISED DRAWING DATE
 CODE LB NO.
 SHEET NO.
 SCALE: 1/4" = 1'-0"
 5294387
 SHEET 1 OF 1
 C-4



LEGEND

- LIMITS OF CONSTRUCTION
- LIMITS OF EQUIPMENT LAYOUT AREA
- LIMITS OF STOCKPILE AREA
- LIMITS OF WETLAND
- FORMER PIT AREA
- ▭ HAYBALES
- 72 --- EXISTING GROUND CONTOURS
- ▭ FREE PRODUCT SATURATED SOILS
- ▭ I.D.W. INVESTIGATION-DERIVED WASTE

EXCAVATION SEQUENCE

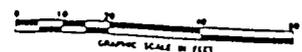
1. CONSTRUCT DRAINAGE PAD NEAR FREE PRODUCT SATURATED SOILS.
2. DURING THE CONSTRUCTION OF THE TREATMENT PAD AND DRAINAGE PAD, EXCAVATE FREE PRODUCT SATURATED SOILS. SATURATED SOILS SHALL BE PLACED ON THE DRAINAGE PAD AS SPECIFIED IN SECTION 02227, PRODUCT REMOVAL.
3. FREE PRODUCT SATURATED SOILS HAVE BEEN DRAINED, APPROPRIATELY DISPOSED, THE DRAINAGE PAD DISMANTLED, EXCAVATION SHALL BEGIN IN THE FORMER PIT AREA. EXCAVATED SOILS SHALL BE PLACED ON THE TREATMENT PAD.
4. EXCAVATING WHEN ENOUGH SOIL HAS BEEN PLACED ON THE TREATMENT PAD TO PROVIDE A REPRESENTATIVE "LIFT" ON THE TREATMENT PAD (SEE SECTION 18, SOIL TREATMENT FACILITY AND APPENDIX A).
5. EXCAVATED SOILS SHALL BE REMOVED FROM THE TREATMENT PAD, PLACED BACK IN OPEN EXCAVATIONS, AND COMPACTED TO 85%. WHILE EXCAVATIONS REMAIN OPEN, CONSTRUCTION FENCING SHALL BE USED AS BARRICADES.
6. THE EXCAVATION IN AREAS DESIGNATED TO BE EXCAVATED IN THE NEXT LIFT IS ON THE TREATMENT PAD.
7. ANTICIPATED THAT 5 LIFTS WILL BE REQUIRED TO TREAT ALL OF THE CONTAMINATED SOILS.
8. DO NOT EXCAVATE OUTSIDE THE LIMITS OF CONSTRUCTION.
9. VERIFY THAT ALL SOIL ABOVE 50 mg/kg TRPH HAS BEEN REMOVED AS SPECIFIED IN SECTION 01410, CONFIRMATORY TESTING.
10. CONTRACTOR SHALL PROPERLY DISPOSE OF ANY CONCRETE OR OTHER CONSTRUCTION DEBRIS ENCOUNTERED DURING CONSTRUCTION ACTIVITIES.

REV.	DESCRIPTION	PREP BY	DATE	APPROV
A	INTERNAL AND CLIENT REVIEW	E.A.	3/21/95	
B	CLIENT AND REGULATORY REVIEW	KMM	3/28/95	
D	ISSUED FOR CONSTRUCTION	KMM	4/14/95	

SOUTHERN DIVISION
 JACKSONVILLE, FLORIDA
SITE 5 SOIL BIOREMEDIATION
 EXCAVATION SEQUENCE

PROJECT NO. 10-99-0317
 SHEET NO. 5 OF 7

APP Environmental Services, Inc.
 Jacksonville, Florida



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01010 SUMMARY OF WORK
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DIVISION 02 -- SITE WORK

02248 SOIL TREATMENT FACILITY
02227 FREE PRODUCT REMOVAL

APPENDIX A

TREATMENT FACILITY STARTUP AND OPERATION AND MAINTENANCE

SPECIFICATION SECTIONS NOT INCLUDED

(assumed to be provided through the Response Action Contract Contractor's contract with Southern Division, Naval Facilities Engineering Command)

01025 MEASUREMENT AND PAYMENT
01041 PROJECT COORDINATION
01310 PROGRESS SCHEDULES
01400 QUALITY CONTROL
01500 CONSTRUCTION FACILITIES
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02057 EXCAVATED MATERIALS REMOVAL AND DISPOSAL
02102 CLEARING AND GRUBBING
02220 GENERAL EXCAVATION, FILLING, AND BACKFILLING
02229 VEHICLE AND EQUIPMENT DECONTAMINATION

manner described in the workplan prepared by BEI. All excavated materials shall be placed on the treatment pad as directed in the field by the Contracting Officer.

1.8.6 Treatment Facility Operation and Maintenance

Ex-situ bioremediation consists of creating optimal microbial conditions in excavated soil through the mechanical mixing of the soil and the addition of amendments. Soil shall be taken from the stockpile area and placed on the treatment pad as directed by the Contracting Officer. It is estimated that between 2,500 and 3,500 cubic yards (yds³) of soil can be treated in the treatment facility at one time. This corresponds to five treatment cycles. . Operation and maintenance of the treatment facility is discussed further in the Operation and Maintenance Plan included as Appendix A to these specifications.

1.8.7 Site Restoration

Treated soil shall be used to backfill excavations and shall be compacted to 85 percent dry density. The site shall be graded to match existing contours. Provide 4 inches of topsoil for newly graded surfaces and areas disturbed by the Contractor. Seed shall match existing vegetation. Provide seed at 5 pounds per 1,000 square feet. Provide CID A-A-1909, Type I, Class 2, 10-10-10 analysis fertilizer at 25 pounds per 1,000 square feet. Provide commercial agricultural lime of 94-80-14 analysis at 70 pounds per 1,000 square feet. Provide mulch and water to establish an acceptable stand of grass.

--End of Section--

- c. When acceptability of a submittal is dependent on conditions, items, or materials included in separate subsequent submittals, the submittal will be returned without review.
- d. Approval of a separate material, product, or component does not imply approval of the assembly in which the item functions.

1.3.3 Scheduling

- a. Coordinate scheduling, sequencing, preparing, and processing of submittals with performance of the work so that work will not be delayed by submittal processing. Allow for potential requirements to resubmit.
- b. Except as specified otherwise, allow a review period, beginning with receipt by the approving authority, that includes at least 15 working days for submittals for QC Manager approval and 25 working days for submittals for Contracting Officer approval. The period of review for submittals with Contracting Officer approval begins when the Government receives the submittal from the QC organization. The period of review for each resubmittal is the same as for the initial submittal.

1.3.4 Variations

Variations from contract requirements require Government approval pursuant to the contract clause entitled "Specifications and Drawings for Construction" and will be considered where advantageous to the Government. When proposing a variation, submit a 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 the Government. If lower cost is a benefit, also include an estimate of the cost saving. Identify the proposed variation separately and include the documentation for the proposed variation along with the required submittal for the item. When submitting a variation for approval, the Contractor warrants the following.

1.3.4.1 Variation Is Compatible

The Contract has been reviewed to establish that the variation, if incorporated, will be compatible with other elements of the work.

1.3.4.2 Contractor Is Responsible

The Contractor shall take actions and bear the additional costs, including review costs by the Government, necessary due to the proposed variation.

1.3.4.3 Review Schedule Is Modified

In addition to the normal submittal review period, a period of 15 working days will be allowed for consideration by the Government of submittals with variations.

- b. Submittals marked "approved" or "approved as submitted" authorize the Contractor to proceed with the work covered.
- c. Submittals marked "approved as noted" or "approved except as noted: resubmission not required" authorize the Contractor to proceed with the work as noted provided the Contractor takes no exception to the notations.
- d. Submittals marked "revise and resubmit" or "disapproved" indicate the submittal is incomplete or does not comply with the design concept or the requirements of the Contract documents and shall be resubmitted with appropriate changes.

1.4 FORMAT OF SUBMITTALS

1.4.1 Transmittal Form

Transmit each submittal, except sample installations and sample panels, to the office of the approving authority. Transmit submittals with a transmittal form prescribed by the Contracting Officer and standard for the project. The transmittal form shall identify the Contractor, indicate the date of the submittal, and include information prescribed by the transmittal form and required in the paragraph entitled "Identifying Submittals." Process transmittal forms to record actions regarding sample panels and sample installations.

1.4.2 Identifying Submittals

Identify submittals, except sample panel and sample installation, with the following information permanently adhered to or noted on each separate component of each submittal and noted on the transmittal form. Mark each copy of each submittal identically, with the following:

- a. project title and location;
- b. construction Contract number;
- c. the Section number of the specification Section by which the submittal is required;
- d. the submittal description (SD) number of each component of the submittal;
- e. when a resubmission, an alphabetic suffix on the submittal description, for example, SD-10A, to indicate the resubmission;
- f. the name, address, and telephone number of the subcontractor, supplier, manufacturer, and any other second tier contractor associated with the submittal; and
- g. product identification and location in project.

SD-07. Schedules

A 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. A type of shop drawing.

SD-08. Statements

A document, required of the Contractor, or through the Contractor by way of a supplier, installer, manufacturer, or other lower tier contractor, the purpose of which is to further the quality or orderly progression of a portion of the work by documenting procedures, acceptability of methods or personnel, or qualifications or other verification of quality. A type of shop drawing.

SD-09. Reports

Reports of inspection and laboratory test, including analysis and interpretation of test results. Each report shall be properly identified. Test methods used and compliance with recognized test standards shall be described.

SD-10. Test Reports

A report signed by an authorized official of a testing laboratory that a material, product, or system identical to the material, product, or system to be provided has been tested in accordance with requirements specified by naming the test method and material. The test report must state the test was performed in accordance with the test requirements, state the test results, and indicate whether the material, product, or system has passed or failed the test. Testing must have been within 3 years of the award of this Contract. A type of product data.

SD-11. Factory Test Reports

A written report that includes the findings of a test required to be performed by the Contractor on an actual portion of the work or prototype prepared for this project before it is shipped to the job site. The report must be signed by an authorized official of a testing laboratory and must state the test was performed in accordance with the test requirements, state the test results, and indicate whether the material, product, or system has passed or failed the test. A type of shop drawing.

SD-12. Field Test Reports

A written report that includes the findings of a test made at the jobsite, in the vicinity of the job site, or on a sample taken from the job site, on a portion of the work, or during or after installation. The report must be signed by an authorized official of a testing laboratory or agency and must state the test was performed in accordance with the test requirements, state the test results, and indicate whether the material, product, or system has passed or failed the test. A type of shop drawing.

Contract Number: _____

Project Title: _____

Spec Section No.	SD No. and Type of Submittal MATERIAL OR PRODUCT	Spec Para No.	Classif/ Appr By CO	Gov't or A/E Reviewer	Trans Control No.	Planned Submittal Date
(a)	(b)	(c)	(d)	(e)	(f)	(g)
51) APP. A	SD-13 Agricultural Lime Formulation	2.1	G			
52) APP. A	SD-13 Fertilizer Formulation	2.2	G			
53) APP. A	SD-13 Manure Type	2.3	G			
54) APP. A	SD-02 Gas Analysis Equipment	3.1	G			
55) APP. A	SD-02 Soil Moisture Probe	3.2	G			
56) APP. A	SD-02 Watering Equipment	3.2.1	G			

*Navy Notes:
Approved by: _____
G: Contracting Officer
Blank: CQC Manager

*NASA Notes:
Approved by: _____
Blank: Contracting Officer

*Army Notes:
Classification:
GA: Gov't Approval
FIO: for Information Only

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 SAMPLING REQUIREMENTS

3.1.1 Documentation

Maintain a permanently bound field notebook onsite consisting of the date and time each sample was collected, sample identification, sample location (written description and map), depth of sample, name of sampling personnel, preservation method, type of analyses requested, and name of laboratory to perform analyses. A chain of custody and analysis request form shall be completed for each sample submitted for chemical analysis.

3.1.2 Free Product Saturated Soil

The Contractor shall collect one composite soil sample per drainage pad lift. Samples collected shall be sent to an NEESA-certified laboratory for confirmatory analysis. These samples shall be analyzed for polychlorinated biphenyls (PCBs) using USEPA SW-846 Method 8080. The Contractor shall request 24- or 48-hour turnaround for the laboratory samples. Analytical results shall dictate final disposal of soil as follows:

PCBs <1 ppm	Site 5 Soil Bioremediation
PCBs >1 ppm but <50 ppm	TWA Chemical Waste Landfill per 40 CFR 761.75
PCBs >50 ppm but <500 ppm	Incinerate per 40 CFR 761.70
PCBs >500 ppm	Incinerate per 40 CFR 761.70

PCBs are defined as the sum of all Aroclors.

The Contractor shall also fulfill any other analytical requirements the approved disposal facility may have.

3.1.3 Free Product

Liquid wastes and free product shall be collected and drummed. The liquid waste and free product shall be incinerated per 40 CFR 761.75. The Contractor may manifest the drummed liquids based on knowledge of the waste or, if required, the Contractor shall sample liquids and free product to meet the analytical requirements of the disposal facility. The disposal facility analytical requirements shall be included in the Contractor prepared Sampling and Analysis Plan.

SECTION 02227

FREE PRODUCT REMOVAL

04/15/95

PART 1 GENERAL

1.1 SUMMARY

This section covers the Contractor's requirements for the handling of free product and free product contaminated soil. A drainage pad shall be constructed as shown on the Drawings to separate free product from saturated, contaminated soil. Activities conducted under this section shall be in accordance with the Contractor's approved Site Safety and Health Plan (SSHP).

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only. For all test methods, the most recent revision applies.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 638	1989 Test Method for Tensile Properties of Plastics
ASTM D 1004	1966 (R 1988) Test Method for Initial Tear Resistance of Plastic Film and Sheeting
ASTM D 1505	1985 Test Method for Density of Plastics by the Density-Gradient Method
ASTM D 1556	1986 Test Method for Density of Soil In Place by the Sand Cone Method
ASTM D 1557	1991 Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lb f/ft ³ (2,700 kN-m/m ³))
ASTM D 1621	1979 Test Method for Compressive Properties of Rigid Cellular Plastics
ASTM D 2167	1984 Test Method for Density and Unit Weight of Soil In Place by the Rubber Balloon Method
ASTM D 2434	1968 (R 1974) Test Method for Permeability of Granular Soils (Constant Head)

3.2 DRAINAGE PAD CONSTRUCTION

The drainage pad consists of a 15 feet by 15 feet lined pad with 12 inches of drainage layer material on top of the liner. The lined pad shall be sloped to a collection trench that shall transport drained liquids to a collection sump. Construction of the drainage pad shall be as shown on the Drawings and shall be placed in the vicinity of the free product removal area. The pad shall be located to allow placement of excavated, saturated soil without requiring equipment to travel across the site.

Soil stockpiled on the pad shall be covered by a 20-mil polyethylene sheet at all times; the soil shall be placed to promote positive drainage off of the cover. The cover shall be secured with sandbags to maintain the integrity of the cover and to prevent ripping, blowing, etc.

3.4 FREE PRODUCT REMOVAL

Excavated soil saturated with free product shall be placed on the drainage pad.

3.4.1 Free Product Disposal

Any liquid recovered from the sump of the drainage pad shall be pumped into Department of Transportation (DOT)-approved containers, manifested, and disposed as required in Section 01410. "Confirmatory Sampling."

3.4.2 PCB-Contaminated Soil

Soil placed on the pad shall be allowed to drain for a minimum of 24 hours, but may drain longer if deemed necessary by the Contracting Officer. This soil shall be sampled and disposed as required in Section 01-10. "Confirmatory Sampling."

3.4.3 Non-PCB-Contaminated Soil

Soil that is determined to contain PCB concentrations less than 1 mg/kg shall be removed from the drainage pad and placed in the soil stockpile area.

-- End of Section --

- ASTM D 4491 1989 Test Methods for Water Permeability of Geotextiles by Permittivity
- ASTM D 4533 1985 Test Method for Trapezoidal Tearing Strength of Geotextiles
- ASTM D 4595 1986 (R 1991) Determining the Integrity of Factory Seams Used in Joining Manufactured Flexible Sheet Geomembranes
- ASTM D 4632 1986 Test Method for Breaking Load and Elongation of Geotextiles (Grab Method)
- ASTM D 4751 1987 Test Method for Determining the Apparent Opening Size of a Geotextile
- ASTM D 4716 1987 Test Method for Constant Head Hydraulic Transmittivity (In-Plane Flow) of Geotextiles and Geotextile Related Products
- ASTM D 4718 1987 Practice for Correction of Unit Weight and Water Content for Soils Containing Oversize Particles
- ASTM D 4833 1988 Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products
- ASTM F 679 1989 Specification for Polyvinyl Chloride (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings
- ASTM F 789 1989 Specification for Type PS-46 Polyvinyl Chloride (PVC) Plastic Gravity Flow Sewer Pipe and Fittings

U.S. ARMY CORPS OF ENGINEERS (COE)

- EM 385-1-1 (October 1992) Safety and Health Requirements Manual

FLORIDA DEPARTMENT OF TRANSPORTATION (DOT)

- DOT SS-1 Road and Bridge Construction, 1991.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals having an "FIO" designation are for information only.

2.1.5 Preconstruction Phase Soil Borrow Source Testing

Soil shall be tested for compliance with specifications prior to removal from borrow sources and placement at the STF. The testing requirements for each material are as follows:

Soil Material	MINIMUM TESTING FREQUENCY		
	Gradation (ASTM C-117, C-136)	Moisture-Density (ASTM D 1557)	Remolded Permeability (ASTM D 2434)
Drainage Sand Layer	1 test per material	1 test per material	1 test per material ¹
Buffer Layer	1 test per material	1 test per material	NR ²
Drainage Stone	1 test per material	NR	NR

¹ Tests shall be conducted at 85, 90, and 95 percent of maximum dry density (ASTM D 1557) so as to determine the range in density that produces the required permeability.
² Not required.

2.1.6 Construction Phase Soil Borrow Source Testing

Collect soil samples at the borrow source(s) and test for specification compliance according to the following schedule:

Soil Material	MINIMUM TESTING FREQUENCY		
	Gradation (ASTM C-117, C-136)	Moisture-Density (ASTM D 1557)	Remolded Permeability (ASTM D 2434)
Drainage Sand Layer	1/2,000 yd ³	1 test per change in gradation	1 test per change in gradation and/or moisture and density
Buffer Layer	1 test	1 test per change in gradation	NR
Drainage Stone	1 test	NR	NR

Notes: yd³ = cubic yards.
 NR = not required.

2.5.1.1 Construction Requirements

The PVC pipe shall be suitable for use as a gravity drainage conduit. Standard installation lengths shall be 20 feet or 10 feet. Perforated pipe shall be installed with perforated side facing down. The Contractor shall provide for contraction and expansion at each joint with a rubber ring. The bell shall consist of an integral wall section with a solid cross-sectional rubber ring, factory assembled, securely locked in place to prevent displacement during assembly.

2.5.1.2 Fittings

Fittings shall be manufactured and furnished by the pipe supplier or approved equal having bell and spigot configurations compatible with that of the pipe. Fittings shall be of the same strength and quality as the pipe. Minimum "pipe stiffness" (F/AY) shall be 46 pounds per square inch gauge (psig) for all sizes when tested in accordance with ASTM D-2412. "External Loadings Properties of Plastic Pipe by Parallel-Plate Loadings." Pipe bedding shall consist of Buffer Layer, as specified in this section, in the zone 6 inches around the solid PVC pipe. Drainage stone, as specified in this section, shall be used to fill the collection trench and shall be used as pipe bedding in the zone 2 inches (minimum) around the pipe.

2.5.2 Precast Concrete Manhole

The precast concrete manhole shall consist of reinforced concrete riser sections, an eccentric or concentric top, and a monolithic base section conforming with the dimensions indicated on the Drawings, and shall be manufactured in accordance with ASTM C 478-89. The minimum compressive strength of the concrete shall be 4,000 psi. The circumferential steel reinforcement for riser pipe, cone sections, and base walls shall be 0.12 square inch per linear foot. Reinforcing shall extend into the tongue and groove of each manhole section wall. Casting methods must assure each unit to be very dense in structure and impervious to water.

A hole shall be cast in the base section for the 4-inch pipe so that there is a clear distance as shown on the Drawings between the inside bottom of the base section and the pipe invert. The tongue and groove shall be formed of concrete so as to receive gaskets. Sections shall be set so as to be vertical and in true alignment. The pipe to manhole joint shall be a rubber boot either cast-in-place or press-wedged in place, or otherwise must be approved by the Contracting Officer's representative. All precast sections and base shall have the date of manufacture and the name or trademark of the manufacturer impressed or indelibly marked on the inside wall.

Manhole steps shall be 1/2 inch steel reinforced polypropylene plastic manufactured to ASTM D 246-89 Type II grade 16906 and ASTM C 478-89 standards. The steps shall be cast into walls of the precast section so as to form a continuous ladder with a distance of 12 inches between steps. Provide 2 holes for the purpose of handling and laying. These

ground pressure placement equipment (contact pressure less than 5 psi) to place drainage sand layer. A minimum 12-inch buffer (1 lift) must be placed above the drainage composite prior to allowing low ground pressure construction equipment traffic. Routine construction equipment may traffic the drainage sand layer after a minimum of 2 feet has been placed.

3.3.2.4 Lift Thicknesses

Place fill materials in loose lifts of the following maximum thicknesses.

- a. Buffer Layer: 6 inches.
- b. Drainage Sand Layer: 12 inches.
- c. Drainage Stone: 6 inches.

3.3.3 Compaction

Compaction shall be expressed as a percentage of maximum density (ASTM D 1557). Control soil compaction during construction to meet required percent maximum dry density for each soil and condition.

3.3.3.1 Moisture Requirements

Provide moisture control to the extent that the soil mix remains in a workable state during placement. Where a layer of soil material must be moisture-conditioned before compaction, uniformly apply water to the surface of the layer of soil material at such a rate as to avoid free water from appearing on the surface during or subsequent to compaction operations.

Remove, or scarify and air dry, soil material that is too wet to permit compaction to the specified density. Excessively wet soil that has been removed may be stockpiled or spread and allowed to dry. Assist drying by disking, harrowing, or pulverizing until the moisture content is reduced to a satisfactory value as determined by moisture-density relation tests.

3.3.3.2 Compaction Requirements

Material shall be spread with bulldozer, other approved equipment, or by hand to form uniformly loose layers not greater than the thickness specified. Each layer of fill shall be compacted using a vibratory roller or hand-operated vibrating plate compactor or similar equipment, where necessary. Material compaction shall be expressed as a percent of maximum dry density (ASTM D-1557). Material compaction requirements are as follows.

- a. Drainage Sand Layer: Compact to an in-place density such that the sand meets the minimum permeability requirements of 5×10^{-3} cm/sec. The compaction requirements will be established from the results of the pre-construction phase soil borrow source testing.
- b. Buffer Layer: Compact to 90 percent of maximum dry density.

3.10 SOIL STOCKPILE AREA CONSTRUCTION

The soil stockpile area (if necessary) shall be as shown on the Drawings. A layer of 6-mil plastic shall be placed on top of surface contaminated soil. A berm shall be constructed on the outer edge of the plastic to contain excavated soil. Soil stockpiled on the pad shall be covered with 6-mil plastic and tied down at all times as shown on the Drawings. The soil shall be stockpiled to promote positive drainage off the cover, eliminating the need for a sump.

-- End of Section --

OPERATIONS AND MAINTENANCE

This section describes the activities required to operate the Biological Treatment system at Operable Unit 2, Site 5. Specific elements that are discussed include:

- Section 1. Windrow Construction;
- Section 2. Amendment Application;
- Section 3, Process Monitoring;
- Section 4, Water Storage and Management;
- Section 5, Sampling and Analysis; and
- Section 6, Communication.

1.0 WINDROW CONSTRUCTION

Windrows shall be constructed as follows:

- dimensions: 20 feet by 350 feet by 7 feet,
- Number windrows: three, and
- average total recoverable petroleum hydrocarbons (TRPH) concentration: 2,500 milligrams per kilogram (mg/kg).

and will include the following amendments at set-up:

- agricultural lime,
- fertilizer, and
- cow manure.

The estimated quantity of TRPH contaminated soil at Site 5 is 16,300 cubic yards (yd³). The soil shall be excavated and treated biologically in five lifts of approximately 3,400 yd³ each. Each lift shall be made up of three windrows of at least 1,100 yd³ each.

Efforts should be made to have all windrows at an average concentration of 2,500 mg/kg TRPH. The contractor shall mix the excavated soil accordingly to try to achieve this concentration.

The soil shall be loaded onto the treatment pad in a north to south line, constructing one windrow at a time working from one end of the pad to the other. Amendments shall be placed on top of the soil in the order: lime, fertilizer, and manure. The windrows shall be assembled using a SCAT tow-type bioremediation turner (or approved equivalent). The contractor shall till the soil until amendments are fully mixed and windrows are at the specified dimensions.

**Table 1
Process Monitoring Samples**

Operable Unit 2, Site 5
NAS Cecil Field
Jacksonville, Florida

Day	Analyses ¹				
	TPH-IR	TPH-GC/FID	N P, Ph	Moisture	Bacteria
0	9	3	3	9	3
10	3	3	3	3	3
30	3	3	3	3	3
60	3	3	3	3	3
90	9	3	3	3	3
100					
Subtotal	27	15	15	27	15
QC Samples	1 dup per batch	1 dup per batch	1 dup per batch	1 dup per batch	1 dup per batch
Subtotal	5	5	10	5	5
Total Per Lift	32	20	25	32	20
Program Total	160	100	125	160	100

¹ Nine samples = three composite samples will be prepared from each windrow; three samples = one composite sample will be prepared from each windrow.

Notes: This sample schedule was prepared under the assumption that there will be five lifts of 3,400 cubic yards each. All analyses will be performed in the ABB Environmental Services, Inc., laboratory in Wakefield, Massachusetts.

- TPH-IR = total petroleum hydrocarbons by infrared.
- TPH-GC/FID = total petroleum hydrocarbons by gas chromatograph and flame ionization detector
- N = nitrogen.
- P = phosphorus.
- Ph = expression of the intensity of the hydrogen ion concentration.
- QC = quality control.
- dup = duplicate.
- MS = matrix spike.

6.0 COMMUNICATION

Regular communication between the contractor and ABB-ES will be necessary to ensure the goals of this project are met. The contractor is responsible for construction and physical operations of the remedial operation; however, ABB-ES will assist with the operation by providing technical oversight. ABB-ES input to the project will include construction oversight. ABB-ES will provide input as it relates to amendment application, water management, and maintenance of TRPH degrading conditions. ABB-ES will also be responsible for sampling and analysis (process monitoring and treatment confirmation).

The schedule specified in the operation and maintenance plan will be used to establish initial maintenance schedules. As the project progresses, any recommendation or modification to the schedule will be communicated by ABB-ES directly to a person designated by the contractor. The contractor shall inspect the treatment operation daily and report any observations, particularly anything out of the ordinary, to either the ABB-ES oversight engineer or one of the designated ABB-ES technical staff located in Wakefield, Massachusetts.

Results from data analysis and recommendations made by ABB-ES will be summarized and distributed to the contractor and Southern Division, Naval Facilities Engineering Command, in a monthly progress report. Any progress reports prepared by the contractor shall in turn be distributed to ABB-ES.

DEPARTMENT OF THE NAVY
SOUTHERN DIVISION

TECHNICAL SPECIFICATION
FOR
CLEARING AND GRUBBING

0	7/2/94	Issued for use	KIK	RTJ	AK	YBK
NO.	DATE	REASON FOR REVISION	BY	CHECK	SUPV	PE
ORIGIN		CLEARING AND GRUBBING	JOB NO. 22567			
			TECHNICAL SPECIFICATION			Rev.
			001-SP000-002			0
			SHEET 1 OF 4			

TECHNICAL SPECIFICATION FOR CLEARING AND GRUBBING

1.0 GENERAL

This specification defines the technical requirements and establishes the quality and workmanship required for clearing and grubbing. Not all operations defined herein may be required. Reference is directed to applicable subcontract Scope of Work and engineering drawings for specific services required.

2.0 ABBREVIATIONS

None.

3.0 CODES AND STANDARDS

The Subcontractor shall control the quality of items and services to meet the requirements of this specification, applicable codes and standards, and other Subcontract documents.

4.0 SUBMITTALS

- 4.1 Engineering documentation requirements are summarized on the Subcontractor Submittal Requirements Summary, Exhibit F, and are augmented by detailed requirements listed herein. Bechtel Environmental, Inc., (BEI) will determine if documentation is complete as submitted by the Subcontractor, and reserves the right to reject and require resubmittal of any submittal that does not meet the Subcontract requirements.
- 4.2 Unless noted otherwise, all Subcontractor submittals shall be made to BEI at least two (2) weeks prior to use, fabrication, or implementation.
- 4.3 For those submittals needed within the two (2) weeks following Subcontract award, submittals shall be made no later than commencement of work; BEI will notify the Subcontractor of the status of the submittal by telephone within three (3) work days following receipt of the submittal.

APPENDIX C

**TECHNICAL SPECIFICATION FOR CONTAMINATED EARTHWORK
AND MISCELLANEOUS DEMOLITION**

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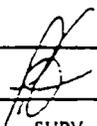
DEPARTMENT OF THE NAVY

SOUTHERN DIVISION

TECHNICAL SPECIFICATION

FOR

CONTAMINATED EARTHWORK AND MISCELLANEOUS DEMOLITION

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 CONTAMINATED EARTHWORK AND MISCELLANEOUS DEMOLITION			TECHNICAL SPECIFICATION			REV	
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**TECHNICAL SPECIFICATION
FOR
CONTAMINATED EARTHWORK AND MISCELLANEOUS DEMOLITION**

1.0 GENERAL

This Specification provides the technical requirements for the excavation of contaminated earthwork and miscellaneous demolition. Not all work defined herein is necessarily required for this contract; reference is directed to the Scope of Work and engineering drawings for specific services required.

Contaminated earthwork includes excavating, loading, placing, and compacting contaminated materials. Transporting and unloading of contaminated materials is covered in Specification 001-SP000-003, "Transport of Contaminated Material." Backfilling of excavation is covered in Specification 001-SP000-006, "Uncontaminated Earthwork".

2.0 QUALITY STANDARDS

Unless otherwise specified or shown, the latest edition at the time of bid of the following Codes and Standards shall apply to the extent indicated herein:

OSHA 29 CFR 1910 Occupational Safety and Health Regulations for General Industry

OSHA 29 CFR 1926 Occupational Safety and Health Regulations for Construction

3.0 SUBMITTALS

3.1 GENERAL

Not all submittals defined herein may be required. Only engineering document requirements as summarized in Exhibit F, Subcontractor Submittals Requirements Summary (SSRS), shall apply. Submittals identified shall meet the detailed requirements herein. BEI will determine if documentation is complete as submitted and reserves the right to require the resubmittal of any submittals that do not meet specified requirements. Unless indicated otherwise, submittals shall be made to BEI at least 2 weeks prior to delivery, implementation, or use.

3.2 LIST OF EQUIPMENT

Submit list of equipment for use in contaminated earthwork. The list shall include the type, size, and rated capacity of the equipment proposed.

4.3.2 Filter Fabric

Filter fabric shall be a material made expressly for the purpose of sediment control such as Exxon GTF 101S Silt Screen or approved equal.

4.4 EROSION CONTROL BLANKETS

Erosion control blankets shall be Curlex Blankets manufactured by American Excelsior Company, or approved equal.

5.0 FIELD OPERATIONS

5.1 EROSION AND SEDIMENT CONTROL

Potentially contaminated material shall be prevented from being eroded or otherwise transported into an uncontaminated area or an area that has a lower level of contamination.

Install temporary sediment barriers in accordance with the contract documents and shall be maintain during construction until permanent sediment barriers are in place.

Permanent sediment barriers shall be installed in accordance with the engineering drawings.

Erosion and sediment shall be controlled by the following techniques subject to BEI review on a case-by-case basis:

- Covering with synthetic liner material
- Covering with uncontaminated soil material
- Sediment barriers

5.2 DUST CONTROL

Dust shall be controlled by the following techniques subject to BEI review:

- Wetting with water
- Wetting with BEI-approved synthetic dust suppressant
- Establishing temporary vegetative cover
- Compaction
- Sealing by rolling with a smooth drum
- Maintaining slopes of exposed surfaces within defined limits

Areas being excavated shall be maintained in a clean condition, free from leaves, brush, sticks, trash and other debris. Excavations shall be inspected in accordance with OSHA 29 CFR 1910 and 1926 prior to commencing work each day. All daily inspections shall be documented.

5.6.2 Contamination Control

Dust generated during construction shall be controlled by water spraying with potable water or other approved methods.

Excavation shall be performed in such a manner that the spread of contamination is prevented. Unless indicated otherwise, the cutting edge of the excavator(s) shall be toothless and the excavation performed in the direction of surface run-off (i.e., from higher to lower elevation). Contamination spread through the improper execution of the subcontract documents shall be cleaned up to the satisfaction of BEI at the Subcontractor's expense.

Barriers (draped plastic sheeting, plastic mounted on wooden frame, or plywood) shall be placed against the sides of truckbeds to prevent contamination of the exteriors of transport vehicles while being loaded.

When transport vehicles are loaded in uncontaminated areas, those areas shall be protected from contamination with plastic overlain with plywood adjacent to the vehicle or with other BEI approved materials and arrangement.

Transport vehicles shall be maintained and used in accordance with Specification 001-SP000-003, "Transport of Contaminated Material."

At least 1 ft of freeboard shall be maintained between top of soil and sideboards on loaded haul trucks.

5.6.3 Excavation Slopes

Excavation slopes shall be established in strict accordance with Subpart P, "Excavation, Trenching, and Shoring," of 29 CFR 1926. Side slopes shall be protected to prevent materials from eroding or sloughing. Any additional material removal and handling caused by erosion or sloughing shall be performed at the expense of the Subcontractor.

5.6.4 Shoring

Shoring, including temporary sheet piling, shall be furnished and installed as necessary to protect workers, slopes, and adjacent paving, structures, and utilities. Shoring design and installation plans including engineering calculations shall be developed by the Subcontractor in accordance

5.7 DEMOLITION

5.7.1 General

Demolition shall consist of demolishing, rubblizing or scabbling and/or disposing of asphalt, concrete, or bituminous concrete surfaces within the limits to be excavated as shown on the engineering drawings and/or as directed by BEI.

Construction joints shall be saw cut in existing concrete or asphalt where new concrete or asphalt will be placed.

Demolished debris shall be reduced to a size no larger than 2 feet long, 2 feet wide and 2 feet thick.

Reinforcing bars encountered during concrete removal shall be cut with an approved method.

5.7.2 Inspection

Work areas shall be inspected in accordance with OSHA 29 CFR 1910 and 1926 when fuel powered tools are used indoors. No personnel shall enter the work area until required corrective measures are completed. Inspections shall include review of administrative and engineering controls and measurement of air quality in confined spaces. These daily inspections shall be documented.

5.8 LOADING

5.8.1 Onsite Disposal or Storage

All excavated materials shall be transported to and placed in areas indicated on the engineering drawings or as directed by BEI. Material shall be loaded into designated haul trucks using the contamination control techniques defined in this specification.

5.8.2 Offsite Disposal

Excavated contaminated soils designated for offsite disposal shall be loaded into designated haul trucks using the contamination control techniques defined in this specification. Haul trucks for offsite disposal will be provided by others.

5.10.4 Decontamination

Equipment that has been in contaminated areas shall be decontaminated. The decontamination facility shall be used only for light and final decontamination and not for operations that would require gross decontamination (i.e., removal of most visible materials by scrapers, brushes, etc). Gross decontamination, if required, shall be performed as part of the specified earthwork at the area where trucks are loaded or unloaded. Decontamination shall be repeated as required.

5.10.5 Inspection

Following decontamination, all equipment shall be made available for inspection by BEI. Equipment shall be cleaned to the satisfaction of BEI.

5.11 VEHICLE RELEASE

Subcontractor shall obtain written approval from BEI prior to removing trucks from the site.

5.12 PROTECTION OF WORK

Settlement or erosion that occurs in compacted materials prior to acceptance of the work shall be repaired to required conditions at Subcontractor's expense.

5.13 SECURITY

When necessary and practical, as determined by BEI, work areas shall be secured using barriers (e.g. rope, snow fence) to prevent inadvertent entry to work areas.

DEPARTMENT OF THE NAVY

SOUTHERN DIVISION

TECHNICAL SPECIFICATION

FOR

TRANSPORTATION OF CONTAMINATED MATERIALS

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No.	Date	REASON FOR REVISION	BY	CHECK	SUPV	PE
		Transportation of Contaminated Material	JOB NO. 22567			
			TECHNICAL SPECIFICATION		REV.	
			001-SP000-003		0	
			SHEET 1 OF 20			

TECHNICAL SPECIFICATIONS FOR TRANSPORTATION OF CONTAMINATED MATERIALS

1.0 GENERAL

1.1 PURPOSE

This Specification addresses requirements and conditions that apply to transportation of hazardous material(s) (HM), hazardous waste(s) (HW), and contaminated material(s) (CM) at U.S. Department of Navy sites under the Naval Facilities Engineering Command, Southern Division. The Subcontractor, Common Motor Carrier (if different), and motor vehicle operator(s) shall be knowledgeable of and comply with Federal Department of Transportation (DOT) regulations (49 CFR), and Environmental Protection Agency (EPA) regulations (40 CFR). Not all transport operations defined herein may be required. Reference is directed to applicable Subcontract Scope of Work and Design Drawings for specific services required.

1.2 ABBREVIATIONS

The abbreviations listed below, when used in this Specification, have the following meanings:

AAR	Association of American Railroads
BEI	Bechtel Environmental, Inc.
CDL	Commercial Driver's License
CFR	Code of Federal Regulations
CM	Contaminated Material
COFC	Container on flat car
DOT	Department of Transportation
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
HM	Hazardous Material
HW	Hazardous Waste
ICC	Interstate Commerce Commission
ISO	International Standards Organization
LSA	Low Specific Activity
OSHA	Occupational Safety and Health Administration
PCB	Polychlorinated Biphenyl
RCRA	Resource Conservation and Recovery Act
RQ	Reportable quantity
TSCA	Toxic Substance Control Act
TSDf	Treatment, Storage, and Disposal Facility

1.3 QUALITY STANDARDS

- 49 392 "Driving of Motor Vehicles"
- 49 393 "Parts and Accessories Necessary for Safe Operation"
- 49 395 "Hours of Service of Drivers"
- 49 396 "Inspection, Repair, and Maintenance"
- 49 397 "Transportation of Hazardous Materials; Driving and Parking Rules"
- 49 1300 "Passenger and Freight Tariffs and Schedules (of Subtitle B, "Other Regulations Relating to Transportation"; Subchapter D, "Tariffs and Schedules")

Quality, where standards are not identified in this Specification, will be reviewed by BEI for approval on a case-by-case basis. Replacement of material, equipment, or personnel (including time lost) due to failure to meet the Subcontract specified quality standards, or BEI approval when standards are not identified, shall be at the Subcontractor's expense. When requested, and at no cost to BEI, the Subcontractor shall provide material samples, manufacturer specifications, and documentation in support of quality standards.

1.4 EQUIPMENT, MATERIAL, AND PERSONNEL REQUIRED

Equipment, material, and personnel provided to BEI by the Subcontractor shall be as follows:

1.4.1 Transportation by Highway

- Transport vehicles (e.g., dry van, flatbed, roll-off, lowboy, and ocean style trailers; truck tractors; and roll-off and ocean style containers) that meet the requirements of Title 49 CFR 393 and 396.
- Securement systems, especially tiedown assemblies (e.g., chains, cables, steel straps, and fiber webbing); load binders and hardware (e.g., hooks, bolts, welds, or other connectors); and winches or other fastening devices that are without visual damage from wear or misuse and that meet the requirements of Title 49 CFR 393, Subpart I.
- Weatherproof tarpaulins that are without visual damage from wear or misuse and of a quality highly resistant to tears, rips, snags, punctures, abrasion, cracking, peeling, weathering, and that are suitable for use as an external cargo wrap.
- Side boards that are suitable as a frame for use with tarpaulins to form a closed transport vehicle.
- Motor vehicle operators who meet the requirements of Title 49 CFR 383, 391, 392, 395, 397, and 172 Subpart H, and 177. A signed affidavit stating that all vehicle operators handling Navy waste are HAZMAT trained in accordance with 49 CFR Part 172, Subpart H; and an outline of the course program may be submitted.

The Subcontractor shall provide written procedures for the bag liner installation and proper assembly of roll-on/roll-off bimodal containers to meet DOT requirements as strong-tight containers during transport.

1.4.3 Rail Freight Cars and Siding Requirements

Defects and Restrictions

The Subcontractor shall provide BEI with rail freight cars consisting of mainly gondola cars, some flat cars, and a few box cars. All rail freight shall be in good order and shall contain no defects in accordance with 49 CFR Part 215, Subpart B, or any restrictions at time of delivery as defined in 49 CFR Part 215, Subpart C.

Freight Car Load Ratings

The Subcontractor shall provide rail freight cars having a load capacity of not less than 75 tons nor more than 100 tons. The ratings of the rail gondola cars shall be mainly 95- and 100-ton cars. Written approval, in advance, shall be obtained from BEI in order to supply rail gondola cars having a load capacity rating of less than 90 tons.

Qualification of Rail Transportation Crew

All Subcontractor personnel who handle and process BEI loaded rail freight cars and intermodal packages shall be HAZMAT trained in accordance with 49 CFR 172.700, Subpart H. A signed affidavit stating that all railroad crew members handling rail freight cars containing Navy waste are HAZMAT trained and an outline of the course program may be submitted.

Freight Car Cleanliness

The rail freight cars provided by the Subcontractor shall be free of loose debris and be janitorially clean (broom clean).

Rail Gondola Car

The Subcontractor shall provide to BEI rail gondola cars that are free of internal appurtenances which could affect the integrity of sift-proof liners that BEI will provide and install.

The Subcontractor-provided rail gondola cars shall have an internal height of not less than 4.5 feet nor greater than 5.75 feet.

The Subcontractor shall provide cars whose internal surfaces, in BEI's opinion, are free of major rust or scale which could affect the ability to easily decontaminate the car in the event it became contaminated.

171, 172, and 173. These containers will be turned over to the Subcontractor for loading and shipment.

Schedule adjustments shall be made by BEI, when needed, that result from weather conditions that prevent loading of Navy waste into or onto rail freight cars. The BEI Site Superintendent or designee will notify the Subcontractor of all necessary schedule adjustments due to inclement weather.

The Subcontractor shall provide equipment, such as but not limited to, clevis, slings, cranes and bridges, lifting and handling procedures, training of workers and supervision in order to transfer BEI packages to rail flat cars and to provide blocking, bracing, and load securement for the packages such that the packages will not move or fall during conditions normally incident to transportation.

The Subcontractor shall provide BEI copies of the latest certification of load testing of all lifting equipment used for COFC services for BEI packages. The Subcontractor shall also provide BEI with copies of each load test of the equipment and reason for load test (e.g., maintenance repair, periodic retest).

BEI shall placard the rail freight cars and intermodal packages in accordance with 49 CFR Part 172, Subpart F. Subcontractor rail crew members shall replace placards and car certificates that become lost in transit at the next inspection point in accordance with 49 CFR Part 174.59.

2.0 MOTOR VEHICLE REQUIREMENTS

2.1 GENERAL

The Subcontractor shall provide equipment that is appropriate to accomplish successful transportation of HM, HW, or CM either from Navy sites or to or from the TSDf. Motor vehicles shall be maintained and operated in accordance with the manufacturer's recommendations, Occupational Safety and Health Administration (OSHA) requirements, federal regulations as specified in Title 49 CFR 393, 396, and 397, and applicable state and local regulations. The Subcontractor shall take all precautions necessary for safe operation of his equipment/vehicle and to safeguard the public and the environment from injury or accidental release of HM, HW, or CM.

The Subcontractor shall provide to BEI a list of the transport vehicles to be used, broken down by identification number, type, and size.

2.2 MOTOR VEHICLE INSPECTIONS

All vehicles shall be inspected by the Subcontractor in accordance to Title 49 CFR 393, "Parts and Accessories Necessary for Safe Operation," and shall conform to all applicable local, state, and federal requirements for registration, insurance, inspection, certification, and performance.

- A medical examiner's certificate, or a legible photographic copy of a certificate, or a statement attesting to a record on file with the Subcontractor of a medical examiner's certificate on each motor vehicle operator's physical qualifications to operate a motor vehicle in accordance with Title 49 CFR 391.43, "Medical examination; Certification of Physical Examination," and Title 49 CFR 391.41, "Physical Qualifications for Drivers."
- A statement certifying the Subcontractor, at least once every 12 months, reviews the driving record of each motor vehicle operator it employs in accordance with Title 49 CFR 391.25, "Annual Review of Driving Record." Included in this review shall be a list of all violations of motor vehicle traffic laws in accordance with Title 49 CFR 391.27, "Record of Violations."
- A valid commercial driver's license (CDL) for each motor vehicle operator provided to BEI (and a legible photographic copy of the CDL to be retained by BEI).

3.2 MOTOR VEHICLE OPERATORS NOT QUALIFIED

Motor vehicle operators may not be deemed qualified or acceptable in accordance with Title 49 CFR 391.51, "Disqualification of Drivers." Motor vehicle operators deemed not acceptable for transporting HW, HM, or CM shall be replaced at Subcontractor's expense, including time lost.

4.0 OTHER REQUIREMENTS

4.1 MOTOR VEHICLE WEIGHT REQUIREMENTS

Prior to arrival for loading, all Subcontractor motor vehicles provided to BEI, shall be weighed at an offsite certified (certified calibrated) scale. Upon arrival for loading, each vehicle operator shall provide BEI a legible copy of the certified tare (light) weight receipt for that motor vehicle.

Prior to releasing the loaded motor vehicle for transport, BEI will verify motor vehicle and load weight by requiring all loaded motor vehicles (truck, trailer, and load) to be weighed at an offsite certified scale located within 30 miles of the Navy site. The Subcontractor shall provide BEI with a legible copy of the certified loaded weight receipt for each motor vehicle.

BEI will only accept certified tare and loaded weight receipts containing the following information:

- Motor Vehicle identification number
- Date motor vehicle was weighed
- Name, address, and telephone number of offsite certified scale
- Weigh master's signature

The Subcontractor shall obtain all required permits and/or licenses and shall make all required notifications for transporting HM, HW, or CM from Navy sites to the TSDf (or to another Navy site), including any over-dimension/over-weight permits and/or notifications. The Subcontractor shall submit to BEI a legible copy of all required permits, licenses, and/or notifications made (or the Subcontractor may provide an affidavit attesting that all permits, licenses, and/or notifications shall be obtained or made with copies available at BEI's request).

4.8 DOCUMENTATION

The Subcontractor shall be responsible for all documents/shipping papers provided by BEI prior to shipment in accordance with 49 CFR 177.817 or 49 CFR 174.24, "Shipping Papers." The Subcontractor shall comply with the directions provided by BEI prior to shipment regarding documents/shipping papers. All documents/shipping papers shall be kept with BEI's shipments at all times. BEI documents will include the following when applicable:

- Signed Uniform Hazardous Waste Manifest/Bill of Lading
- Exclusive Use Control Instruction
- Vehicle Survey Release Form (completed at the site prior to vehicle release)
- TSDf specific forms
- Emergency Response Guide Information

A copy of the signed Bill of Lading, the Uniform Hazardous Waste Manifest (when required), and any TSDf specific forms shall be included with the Subcontractor's invoice for payment of transportation services.

4.9 TRANSPORTATION ROUTES AND EMERGENCY RESPONSE PLAN

4.9.1 Transportation by Highway

The Subcontractor shall meet all existing federal, state, and local regulations for traffic control and motor vehicle operation for transportation of HM, HW, or CM on public roads and highways.

The Subcontractor shall submit a written transportation Emergency Response Plan, which includes instructions for compliance with Title 49 CFR 171.15, "Immediate Notice of Certain Hazardous Materials Incidents," and 172, Subpart G, "Emergency Response Information." The plan shall include all aspects and considerations for HM, HW, or CM transportation hazards that may arise during transportation operations, and shall be submitted to BEI for review ten working days prior to any waste hauling. The plan shall include, at a minimum:

- Procedures for incident response

4.10 TRACKING AND NOTIFICATION

4.10.1 Transportation by Highway

The Subcontractor shall have in operation a satellite tracking system to be used on all BEI shipments. At least once a day, the motor vehicle/load shall be located with the time and location recorded. In conjunction with the satellite tracking system, the Subcontractor shall implement a procedure for daily contact with the motor vehicle operator. BEI will not consider messages forwarded, left with answering services, or on answering machines as daily contact. As an alternative, the Subcontractor may implement a scheduled daily telephone call-in/call-back location verification system and the call-in/call-back system require the Subcontractor to notify BEI immediately if the Subcontractor is unable to verify the motor vehicle/load location, or if the motor vehicle operator fails to make scheduled daily contacts. Motor vehicle/load location verification and motor vehicle operator daily contact information must be made available to BEI by telephone or facsimile transmittal with one hour of request. A written description of the tracking and notification system shall be submitted to BEI for approval.

The Subcontractor shall provide the capability to recall or reroute a shipment due to unforeseen events which may require the motor vehicle/load to return to the origination point or be rerouted to an alternate TSDF. This capability may be provided through the use of the satellite tracking/daily call-in system or the telephone call-in/call-back system. BEI shall be notified immediately if the Subcontractor is unable to recall or reroute a shipment.

The Subcontractor shall notify BEI immediately upon learning that a scheduled time of arrival, at either the TSDF or at a Navy site, has changed. BEI shall be notified immediately if the Subcontractor's motor vehicle is delayed due to equipment failure, accident, inclement weather, or any condition that prevents the motor vehicle/load from continuing on the approved route and/or transportation schedule. BEI shall be informed of the exact location and condition of the Subcontractor's motor vehicle and of BEI's load when a change of schedule or delay as described above occurs.

The Subcontractor shall contact the TSDF, or other destination, 24 hours in advance to schedule an arrival time. The Subcontractor shall be responsible for contacting the pickup and destination facilities before shipments begin, to identify appropriate procedures at the individual facilities (i.e., opening and closing times, pass requirements, etc.). Any cost incurred due to failure to comply with these procedures, or due to lack of appropriate planning, shall be the responsibility of the Subcontractor. The contact and telephone number for the pickup and destination facilities will be provided with the Work Release or as otherwise provided. BEI shall be notified within 24 hours of the scheduled delivery date if the shipment was not delivered to the TSDF on the scheduled delivery date.

If, during BEI's business day, the Subcontractor becomes aware of an inability to track, recall, or reroute BEI loads, or that the Subcontractor's motor vehicle is unable to maintain the approved transportation route and/or schedule, the Subcontractor shall notify BEI immediately, and if initially

Administrator the related information and restrictions imposed by the designated inspector in accordance with 49 CFR Part 215.9.

Reporting Hazardous Material Incidents and Abnormal Occurrences

The term *abnormal occurrences* means any of, or similar to, the following conditions noted during transport of hazardous materials, substances, or wastes:

- failure of the watertight, sift-proof liner
- broken tamper-indicating devices or package seals
- deviation from the designated routing maps
- any transportation condition that is not normally incident to transportation

As soon as practical, the Subcontractor shall notify BEI of an incident which occurs during transportation in which Navy wastes are involved, whether a report is or is not required by 49 CFR Parts 171.15 and 171.16.

Leaking Rail Freight Cars and/or Intermodal Packages

The Subcontractor shall notify BEI immediately of any noted leakage of Navy waste material from any rail freight car or intermodal package during transportation.

Emergency Response Plan

The Subcontractor shall submit a written transportation Emergency Response Plan. The plan shall include instructions for compliance with 49 CFR Part 171.15, "Immediate Notice of Certain Hazardous Material Incidents." The plan shall include all aspects and considerations arising from transport incidents involving hazardous substances, materials, or wastes. The plan shall be submitted to BEI for review at least 10 working days in advance of any waste transportation as scheduled. The plan shall include the name of the Subcontractor emergency response coordinator.

4.11 PUBLISHED TARIFF RATES

The Subcontractor shall submit to BEI proof that each subcontracted item listed in Part III, Pricing and Data, b. Schedule of Quantities and Prices, of the Subcontract has been submitted and published through the Interstate Commerce Commission (ICC) tariff system as defined in Title 49 CFR 1300 through 1319.

4.12 ADDITIONAL REQUIREMENTS FOR LOOSE CONVEYANCE LOADS

Vehicles used for loose conveyance transport of soil shall meet the following requirements:

Load configurations shall be a joint effort of BEI and the motor vehicle operator(s). After loading, and prior to leaving the site (or TSDF), the motor vehicle operator(s) shall perform an inspection to verify the load is arranged and secured properly (based on experience and training, and in accordance with Title 49 CFR 393, Subpart I, "Protection Against Shifting or Falling Cargo," and 392.9, "Safe Loading").

Upon acceptance of the load for transport, the Subcontractor shall be responsible for maintaining the integrity of the load, the load arrangement, and any security seals. The motor vehicle operator shall examine and periodically reexamine the load (load inspections during transit do not apply to sealed trailers, only to the inspection of security seals) and its load-securing devices as may be necessary to maintain the integrity of the load and the load arrangement in accordance with Title 49 CFR 392.9.

The Subcontractor shall be in compliance with the requirements of Section 6.0, "Accidents Involving Transport Vehicles," of the Specification upon discovery of a change in the condition of BEI's load, load arrangement, or security seals (e.g., changed due to equipment/package failure, motor vehicle accident, adverse weather conditions, vandalism, or theft) which involves a release of HM, HW, or CM.

6.0 ACCIDENTS INVOLVING TRANSPORT VEHICLES

In the event of an accident, the Subcontractor shall follow the procedures outlined in his Emergency Response Plan and shall be in compliance with the requirements of Title 49 CFR 390.15, "Assistance in Investigations and Special Studies, Subpart E, Accidents and License Revocation: Duties of Driver," and 172, Subpart G, "Emergency Response Information."

In the event of an accident involving a release of HM, HW, or CM, the Subcontractor shall notify BEI immediately upon learning of the accident, and if initially unsuccessful, will continue to attempt to contact BEI. The Subcontractor shall use a 24-hour telephone contact number for accident notification, when notification attempts are outside BEI's business day. BEI will provide the 24-hour telephone contact number for such notification prior to each shipment.

Notification of an accident shall include location, date and time of the accident, resultant damage or injury, person(s) involved, probable cause, condition of the load, if HM, HW, or CM was released and the amount, and any other pertinent information concerning the accident. Also to be included if applicable, are weather conditions, distance to water sources, government agencies on the scene and a telephone number where communications can be maintained.

The motor vehicle operator shall comply with all directions provided by BEI, unless counter to FHWA regulations, and/or the laws and ordinances of the jurisdiction in which the motor vehicle was in operation at the time of the accident. BEI will issue instructions regarding continued transportation of the load. The motor vehicle operator shall remain with the motor vehicle until assistance arrives or until otherwise directed.

APPENDIX E

**TECHNICAL SPECIFICATION FOR
UNCONTAMINATED EARTHWORK**

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TECHNICAL SPECIFICATION FOR UNCONTAMINATED EARTHWORK

1.0 GENERAL

This specification defines the technical requirements for uncontaminated earthwork. Not all operations defined herein are necessarily required for this Subcontract; reference is directed to the contract Scope of Work for specific services required.

This specification includes requirements for

- a) Filling and backfilling for general site work
- b) Building perimeter and site structure backfilling
- c) Consolidation and compaction
- d) Miscellaneous earthwork
- e) Trenching and backfilling for utilities

This specification does not provide requirements for construction of low-permeability clay liners and closure caps, roadway and railroad earthwork, and contaminated earthwork, except as referenced by specifications for those activities.

2.0 QUALITY STANDARDS

Publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only. The latest edition at the time of bid, including addendums, shall be effected as a part of this specification.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 1556 (1990) Density of Soil in Place by the Sand-Cone Method

ASTM D 1557 (1991) Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-lb (4.54-kg) Rammer and 18-in. (457-mm) Drop

ASTM D 2167 (1984) Density and Unit Weight of Soils in Place by the Rubber Balloon Method

ASTM D 2216 (1992) Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil-Aggregate Mixtures

ASTM D 2487 (1992) Classification of Soils for Engineering Purposes

3.5 UNYIELDING MATERIAL

Unyielding materials are rock and gravelly soils with stones greater than 6 inches in any dimension or as defined by the pipe manufacturer, whichever is smaller.

3.6 UNSTABLE MATERIAL

Unstable materials are materials too wet to properly support the utility pipe, conduit, or appurtenant structure.

3.7 ROCK

Rock shall consist of (1) boulders measuring approximately 1/2 cubic yard or more, (2) materials that cannot be removed without systematic drilling and blasting, such as rock material in ledges, bedded deposits, unstratified masses, and conglomerate deposits, and (3) below-grade concrete or masonry structures, exceeding 1/2 cubic yard in volume and greater than 9 inches in thickness. Asphaltic or portland cement pavements will not be considered as rock.

3.8 UNSATISFACTORY FILL AND BACKFILL

Unsatisfactory fill and backfill material is defined as material that is (1) too wet or too soft to properly support the associated construction as determined by Bechtel, (2) expansive soils (Section 1.3.4), (3) contaminated, or (4) materials classified in accordance with ASTM D 2487 as PT, OH, and OL (5) stones larger than 3 inches in any dimension, or (6) man-made fills, refuse, or backfills from previous construction.

3.9 BEDDING MATERIAL FOR UTILITIES

Bedding material for utilities shall consist of select granular material or satisfactory materials free from rocks 2 inches or larger in any dimension or free from rocks of such size as recommended by the pipe manufacturer, whichever is smaller. When the pipe is coated or wrapped for corrosion protection, the initial backfill material shall be free of stones larger than 1 inch in any dimension or as recommended by the pipe manufacturer, whichever is smaller.

4.0 SUBMITTALS

4.1 GENERAL

Not all submittals defined herein may be required. Only engineering document requirements as summarized in Exhibit F, Subcontractor Submittals Requirements Summary (SSRS), shall apply. Submittals identified shall meet the detailed requirements herein. Bechtel will determine if

4.8 PROTECTION OF EXISTING FOUNDATIONS

Submit proposed modifications to protect existing foundations in accordance with Section 6.7.4.

4.9 SHORING DESIGN AND CALCULATIONS

Submit proposed shoring design or alternate slope protection methods in accordance with Section 6.7.4.

4.10 SOILS LABORATORY TEST RESULTS

Submit the following laboratory tests results (1) Proctor curves, (2) soil classification test results, (3) relative density test results.

5.0 PRODUCTS

5.1 COARSE AGGREGATE

Coarse aggregate shall consist of clean, well-graded crushed stone with all particles passing the 3" sieve and no more than 5% passing the 1 $\frac{1}{2}$ " sieve. Fines shall be limited to not more than 2 percent by weight passing the No. 4 size sieve.

5.2 BACKFILL

5.2.1 General Backfill

General backfill shall include cohesive or cohesionless materials free of trash, debris, roots or other organic matter, frozen material, stones or other material larger than 4 inches in any dimension, and contamination.

5.2.2 Structural Backfill

Structural backfill shall include materials classified in accordance with ASTM D 2487 as GW, SW, GC, GM, SC, and SM and shall be free of trash, debris, roots or other organic matter, frozen material, and contamination. It shall have no more than 15 percent of the material passing a number 200 sieve, and no material shall exceed 2 inches in any dimension.

5.3 TEMPORARY SEDIMENT BARRIERS

Materials used for sediment barriers shall consist of straw bales, synthetic sediment fencing, geotextile filter fabric made expressly for use as a silt screen, or other suitable materials

their original condition. The Subcontractor shall obtain all applicable permits prior to commencing work, unless noted otherwise in the contract documents.

6.2 EROSION AND SEDIMENT CONTROL

Erosion and sediment control shall be provided and maintained in accordance with the engineering drawings.

Temporary sediment barriers shall be installed and maintained during the construction period until permanent sediment barriers are in place. Permanent sediment barriers shall be installed in accordance with the engineering drawings.

6.3 CLEARING AND GRUBBING

Clearing and grubbing shall be performed in accordance with specification 22567-001-SP000-002.

6.4 TOPSOIL REMOVAL

Topsoil within the designated excavations and grading lines shall be stripped and stockpiled in the designated onsite areas. The actual depth of stripping will be determined in the field by Bechtel. Measures (e.g., erosion control, stable slopes, adequate compaction, etc.) shall be taken to prevent loss of stockpiled topsoil.

6.5 DRAINAGE, DEWATERING, AND STREAM DIVERSION

6.5.1 Drainage

Surface water shall be directed away from excavation and construction areas. Diversion ditches, check dams, dikes, and/or grades shall be developed and maintained as necessary during construction. Excavated slopes and backfill surfaces shall be protected to prevent erosion and sloughing.

6.5.2 Dewatering

Unless noted otherwise, all excavations shall be kept in a dewatered condition. Groundwater flowing toward or into excavations shall be controlled to prevent sloughing of excavation slopes and walls; boils, uplift, and heave in the excavation; and to eliminate any interference with the orderly progress of excavation. French drains, sumps, ditches, or trenches will not be permitted within three feet of the foundation of any existing structure, and only with written Bechtel approval. Water control measures shall be taken prior to excavating to groundwater level in

specifically 29 CFR 1926 Subpart P, and submitted to Bechtel for review. Shoring, bracing, and sheeting shall be removed as excavations are backfilled in a manner to prevent cave-ins.

Alternate slope protection methods (e.g., benching, sloping, trench boxes, etc.) may be used where applicable. Proposed alternate methods, including plans and calculations, shall be developed by the Subcontractor in accordance with 29 CFR 1926 Subpart P and submitted to Bechtel for review prior to implementation.

Shoring inspections, including qualifications and frequency, shall be in accordance with 29 CFR 1926 Subpart P.

6.7.5 Excavation for Foundation Systems of Structures

Excavations shall extend a sufficient distance from walls and footings to allow for placement and removal of forms. Excavation to final grade shall be performed within 48 hours of subsequent concrete placement. Only excavation methods that will leave the foundation soils in a solid condition shall be used.

6.7.6 Excavation for Utilities

Trench Excavation

Trench walls below the top of the pipe shall be sloped or made vertical as recommended by the manufacturer of the pipe to be installed subject to conformance to OSHA 2207, specifically 29 CFR 1926, Subpart P, "Excavation, Trenching, and Shoring." Trench walls more than 5 feet deep shall be shored, cut back to a stable slope at least equal to the angle of repose, or provided with equivalent means of protection for employees who may be exposed to moving ground or cave in. Special attention shall be given to slopes that may be adversely affected by construction vibration forces, weather conditions, or moisture content. Slopes shall be protected to prevent erosion or sloughing. Remove and handle any additional material caused by erosion or sloughing.

Excavation Widths

The trench width below the top of pipe shall not exceed 24 inches plus pipe outside diameter (O.D.) for pipes of less than 24 inches inside diameter (I.D) and shall not exceed 36 inches plus pipe (O.D.) for pipes larger than 24 inches (I.D). Where recommended trench widths are exceeded, redesign, stronger pipe, or special installation procedures shall be utilized.

and or bottom of ditches, or gutters, and channel changes shall be trimmed and dressed or removed to conform to the slope, grade, and shape of the section indicated.

6.7.8 Overexcavation

Care shall be taken not to excavate outside the elevations, grades, and lines indicated. Overexcavation shall be backfilled to design grade with general backfill and compacted to a density equal to or greater than that required for the subsequent fill material.

6.7.9 Boulders

Unless otherwise directed by Bechtel, boulders shall be removed from excavations for drainage routes and areas of structural backfill.

6.7.10 Stockpiling and Stockpiles

Excavated materials satisfying the requirements of Section 5.2 for backfill shall be transported to and placed in designated fills or stockpiled at Bechtel designated onsite locations. All materials to be stockpiled (e.g., soil and aggregate from offsite sources) shall be placed in areas that have been cleared and grubbed.

Stockpiles shall be kept in a neat and well-drained condition, giving due consideration to drainage. Excavated satisfactory and unsatisfactory materials shall be stockpiled separately. Stockpiles of satisfactory materials shall be protected from contamination. If the material in the stockpile becomes unsatisfactory for use as backfill, such material shall be removed and replaced with satisfactory material from approved sources. Locations of stockpiles of satisfactory materials shall be subject to prior approval of Bechtel.

6.8 SUBGRADE PREPARATION

Subgrades in structural areas shall be proof-rolled prior to placement of fill. Unsatisfactory material identified by proof-rolling shall be removed and replaced with general backfill and compacted in accordance with this specification to meet the compaction requirements for subsequent fill material.

Slopes steeper than 1 vertical to 4 horizontal shall be stepped or benched during placement of lifts so that the fill material will bond with the existing material.

The subgrade material shall be scarified in accordance with Section 6.10.2.

Compacted subgrades that are disturbed by the Subcontractor's operations shall be repaired as specified herein to the required density prior to further construction thereon.

6.10.2 Scarifying

All subgrades and compacted lifts in the following applications shall be scarified 3 to 4 inches prior to placement of the subsequent lift: (a) embankments, (b) roadway routes, (c) railway routes, and (d) fill areas adjacent to and immediately below structural foundations.

In lieu of scarifying, compaction may be performed by sheepsfoot roller or similar equipment designed to compact the lift from the bottom to the top.

6.10.3 Additional Requirements for Structural Backfilling

Structural backfilling shall not begin until construction below finish grade has been inspected by Bechtel, forms removed, and the excavation cleaned of trash and debris.

Backfill adjacent to structures shall be placed and compacted uniformly in such manner as to prevent wedging action or eccentric loading upon or against the structures. Backfill shall not be placed against concrete or masonry foundation walls prior to 7 days after completion of the walls. To the extent practical, backfill shall be brought up evenly on both sides of walls and sloped to drain away from the wall. Construction equipment and methods that will overload immediate and adjacent structures during backfilling and embankment formation operations shall not be used.

6.10.4 Additional Requirements For Trench Backfilling

General

Trenches shall be backfilled to the grades shown on engineering drawings and in the following order. The bedding material shall be placed, followed by the initial backfill, and completed by the final backfill. Lift thickness shall be as specified in Section 6.10.1.

In compacting by rolling or operating heavy equipment parallel with the pipe, displacement of or injury to the pipe shall be avoided. Construction machinery shall not be moved over a culvert or storm drain at any stage of construction in a manner that might damage the culvert or drain. Any damaged pipe shall be repaired or replaced.

Bedding

Bedding shall be select granular material as described in Section 5.4. Care shall be taken to ensure thorough compaction of the bedding under the haunches of the pipe. Bedding material

6.13 PROTECTION OF WORK

Settlement or erosion that occurs in backfilled, filled, graded, or topsoiled areas prior to acceptance of the work shall be repaired to required conditions at Subcontractor's expense.

6.14 SECURITY

When necessary and practical, as determined by Bechtel, work areas shall be secured using barriers (e.g. rope, snow fence) to prevent inadvertent entry to work areas.

7.0 QUALITY CONTROL AND VERIFICATION

7.1 RESPONSIBILITY

The Subcontractor shall verify that placement of backfill meets the requirements of this specification. Unless noted otherwise, testing shall be the responsibility of the Subcontractor and shall be considered part of earthwork.

7.2 TESTING LABORATORY

Testing shall be performed by a Bechtel approved commercial testing laboratory.

7.3 MOISTURE-DENSITY RELATION

Moisture-density relation shall be determined in accordance with ASTM D 1557 for each type of material or source of material, including borrow materials, to determine the optimum moisture and laboratory maximum density values.

7.4 IN-PLACE MOISTURE CONTENT

In-place moisture content of soil backfill shall be determined in accordance with ASTM D 3017. Accuracy of the ASTM D 3017 tests shall be checked by performing ASTM D 2216 test for every ten ASTM D 3017 tests performed.

7.5 IN-PLACE DENSITY

Field in-place density shall be determined in accordance with ASTM D 2922. Accuracy of the ASTM D 2922 tests shall be checked by performing one ASTM D 1556 or ASTM D 2167 test for every ten ASTM D 2922 tests performed.

- b) One test per 10,000 square feet or minimum of 1 test per lift, whichever is greater, for general backfill areas compacted by hand or hand-operated machines.
- c) One test per 2,000 square feet or minimum of 2 tests per lift, whichever is greater, for structural backfill areas compacted by other than hand or hand-operated machines.
- d) One test per 1,000 square feet or minimum of 2 tests per lift, whichever is greater, for structural backfill areas compacted by hand or hand-operated machines.
- e) The density of each lift of backfill materials for trenches, pits, building perimeters, or other structures or areas less than 10 feet in width, and compacted with hand or hand-operated machines shall be tested with 1 test per each area less than 1,000 square feet, or one test for each 100 linear foot of length, whichever is greater.

7.6.4 Particle-Size Analysis

A minimum of one particle-size analysis shall be performed or data shall be provided for each different type of material to be used for bedding and backfill.

7.7 TEST RESULTS

Test results for a lift shall be submitted for review prior to placement of the next lift above that area. Approved lifts shall be covered by subsequent lifts within 24 hours of testing to protect the compacted condition of the fill. Any lift left exposed for longer than 24 hours shall be removed and replaced.