✓ 04.09-4/9/98-00291

100%
BASIS OF DESIGN

REMEDIATION OF PAH-CONTAMINATED SOIL
OPERABLE UNIT NO. 12 (SITE 3)

MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

CONTRACT TASK ORDER 0368

APRIL 9, 1998

Prepared For:

DEPARTMENT OF THE NAVY
ATLANTIC DIVISION
NAVAL FACILITIES
ENGINEERING COMMAND
Norfolk, Virginia

Under:

LANTDIV CLEAN Program
Contract N62470-89-D-4814

Prepared by:

BAKER ENVIRONMENTAL, INC.
Coraopolis, Pennsylvania

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1.0 INTRODUCTION

This document presents the Basis of Design for the remediation of polynuclear aromatic hydrocarbon (PAH)-contaminated soil at Operable Unit (OU) No. 12 (Site 3), Marine Corps Base (MCB), Camp Lejeune, North Carolina. The remedial action includes the excavation of a subsurface soil area of concern and disposal of the contaminated soil at a Resource Conservation and Recovery Act (RCRA)-permitted facility. For the purposes of this design, it is assumed that the soil is non-hazardous and may be disposed of at a Subtitle D facility. This assumption is based on preliminary toxicity characteristics leachate procedure (TCLP) testing conducted in October 1997. Appendix A contains these results.

The draft (60%) design for Site 3 included the construction of a biocell for treatment of the PAH-contaminated soil. However, biocell treatment was removed from the design based on the results of a pilot-scale test conducted from October 1997 to March 1998 by OHM Remediation Services Corporation.

This Basis of Design has been prepared by Baker Environmental, Inc. (Baker) for presentation to the Department of the Navy (DoN), Naval Facilities Engineering Command, Atlantic Division (LANTDIV), under Navy CLEAN Contract Number N62470-89-D-4814 (Contract Task Order 0368). The Remedial Action Contracts Delivery Order Requirements Package Guide, NEESA 20.2-062 dated June 1992 was used as a guidance.

Please note that LANTDIV intends to use a Remedial Action Contractor (RAC) to implement the remediation plan. In this document, the terms "RAC" and "Contractor" are used interchangeably.

1.1 Purpose of the Basis of Design

The purpose of the Basis of Design is to present LANTDIV with background data on the project, describe the primary elements of the remedial design, recommend design criteria, and present assumptions and any special requirements that may affect the design. This document is not intended to be part of construction plans or specifications to be utilized by the RAC for execution of the remedial action. Baker assumes no responsibility for any purpose other than the intended uses stated above.

2.0 BACKGROUND INFORMATION

This section presents background information relevant to the remedial action including: 1) a description of Site 3 and its history, 2) results from the Remedial Investigation, 3) a summary of the human health and ecological risks at Site 3, 4) the remediation levels and the areas of concern, and 5) a brief description of the remedial action.

2.1 Site Description and History

Located within the Mainside Supply and Storage areas at MCB, Camp Lejeune, Site 3 encompasses an area of approximately five acres and is generally flat and unpaved. Open Storage Lots 201 and 203 (i.e., Site 6) are located approximately 1-1/2 miles south of Site 3 along Holcomb Boulevard.

Figure 2-1 identifies the location of Site 3 within MCB, Camp Lejeune, and Figure 2-2 presents a map of Site 3.

As shown in Figure 2-2, the site is intersected by two roadways: a dirt path that runs north-south and forms a loop in the southern portion of the site, and a gravel road that runs east-west and leads directly to Holcomb Boulevard. Access to the site via these roadways is currently unrestricted. In addition, the Camp Lejeune Railroad line runs parallel to the site's western edge and intersects an old railroad spur line at the site's southern extreme. The intersection of these two lines creates a spike formation that points south. Wooded areas lie north and east of the site. The northern portion of the site is currently being used for storage of fallen timber that has been collected from scattered locations throughout the Base. The timber is the result of hurricanes that occurred during the summer of 1996.

The old creosote plant reportedly operated from 1951 to 1952 to supply treated lumber during construction of the Base railroad. Reportedly, an on site sawmill, located in the northern portion of the site, was used to trim logs into railroad ties. The ties were then treated with hot creosote in pressure cylinder chambers. Records show that preservatives, including creosote, were stored for reuse in a railroad tank car.

In typical pressure treatment processes, wood ties are placed inside cylindrical chambers which are filled with wood-treating preservatives. Then, hydrostatic or pneumatic pressures, ranging from 50 to 200 pounds per square inch (psi), are applied within the treatment chamber until the wood absorbs the desired amount of preservatives. When the treatment process is complete, a pump removes the excess preservative from the chamber and sends it to a storage vessel for reuse. Excess preservative is then removed from the wood by applying a vacuum, or by allowing the wood to drip dry onto the ground surface. In the past, treated wood lay in open areas for several days, allowing preservative to drip. Today, treated wood is typically placed on lined and covered drip pads to collect excess preservative (USEPA, 1992).

The main treatment area at Site 3 was most likely located within and immediately surrounding the dirt path loop in the southern portion of the site. This area contains an abandoned chimney that was probably associated with creosote heating/thinning activities. (Creosote is heated and mixed with fuel oil to create a less viscous consistency.) The 240 foot long concrete pad encircled by the dirt path loop was probably used as a drip track for pressure cylinder chambers or treated wood ties. However, the concrete pad does not contain visual evidence of contamination. South of the pad, evidence of rail lines was observed indicating that a railroad connection may have been located in this area. The railroad connection may have transported creosote or ties to and from the treatment area. Several concrete pads, which may also be remnants of the former creosote plant, are scattered throughout the northern and southern portions of Site 3. However, these pads do not contain visual evidence of contamination. The portable steel bridge identified in Figure 2-2 is not associated with the former creosote plant. It was more recently stationed in the area by Base personnel.

2.2 Results from the Remedial Investigation

From 1994 through 1995, Baker conducted field activities for a Remedial Investigation (RI) at Site 3 (Baker, 1995). The most frequently detected organic contaminants were PAHs, which was detected

in both soil and groundwater. Because creosote is made up of PAH compounds, the PAHs detected at Site 3 are believed to be associated with operations at the former creosote plant. The highest PAH concentrations in soil occurred in the assumed treatment area encircled by the dirt path loop. Fuel constituents, such as ethylbenzene and xylene, were also detected in surface and subsurface soil at the former treatment area.

In the shallow aquifer, benzene was detected above federal and/or state standards in the central portion of the treatment area during the first and third groundwater sampling rounds, but not during the second round. Several PAHs, including naphthalene, phenanthrene, benzo(a)anthracene, chrysene, and benzo(a)pyrene, were detected above federal and/or state standards during the first sampling round. However, naphthalene was the only PAH that was detected above standards during the subsequent sampling rounds. Naphthalene was detected in the treatment area and in the rail spur area, but the locations and concentrations of detections were not consistent between the three groundwater sampling rounds.

In the Castle Hayne aquifer, volatile organic compounds (VOCs), including fuel constituents, and semivolatile organic compounds (SVOCs), including PAHs and phenols, were detected during all three sampling rounds. Benzene, chloroform, naphthalene, and phenol were the only organic contaminants detected above federal and/or state standards. Benzene was detected above standards in intermediate well 03-MW02IW during the first sampling round. During the second sampling round, benzene, phenol, and naphthalene were detected above standards in deep well 03-MW02DW, located in the treatment area. During the third sampling round, no contaminants were detected above federal and state standards in the Castle Hayne aquifer.

2.3 Summary of Risks

As part of the RI, a human health risk assessment (RA) and an ecological RA were conducted to determine the potential risks associated with the chemical constituents detected at Site 3.

Table 2-1 presents the incremental cancer risk (ICR) and hazard index (HI) values calculated during the human health RA. The contaminants of potential concern (COPCs) and risk values for groundwater were generated under two approaches: (1) the evaluation of Round 2 groundwater data, and (2) the evaluation of Rounds 1, 2, and 3 groundwater data combined (referred to as the "Worst Case" approach). A shaded block in Table 2-1 indicates an ICR value that exceeds the USEPA acceptable limit of 1E-04 for carcinogens, or an HI value that exceeds the USEPA acceptable limit of 1.0 for noncarcinogens. As shown, unacceptable risk values were generated for future child and future adult residents upon exposure to groundwater.

During the ecological RA, several COPCs, including some SVOCs and the inorganic chromium, exceeded surface soil screening values (SSSVs) in open grass areas or along tree lines. However, most of the studies used to develop SSSVs do not take into account the soil type, which may have a large influence on the toxicity of contaminants. In addition, most of the SSSVs are based on one or two studies which limits their reliability for a wide range of site-specific circumstances. Overall, the SSSVs have a high degree of uncertainty associated with them and are not well-established. Consequently, potential ecological risks based on these SSSVs may not be completely accurate and most likely err on the conservative side. In addition, none of the quotient indices (QIs) generated for terrestrial receptors exceeded the acceptable limit of 1.0, so potential impacts to terrestrial

mammals or birds are not expected. No threatened or endangered species are known to inhabit Site 3, and no wetlands were identified.

2.4 Remediation Levels and the Area of Concern

Based on the results of the RI and the human health and ecological RAs, PAH-contaminated subsurface soil was determined to be the main source of contamination at Site 3. The following remediation levels were selected based on the findings of the risk assessment and to assure that subsurface soil concentrations are protective of groundwater:

Contaminant of Concern	Remediation Level (ppb)	Maximum Concentration (ppb)	Basis
Naphthalene	584	95,000	NC DENR (S3-G1)
2-Methylnaphthalene	30,000	31,000	USEPA
Carbazole	500	4,900	USEPA
Benzo(a)anthracene	343	8,000	NC DENR (S3-G1)
Chrysene	38,150	8,400	NC DENR (S3-G1)
N-nitrosodiphenylamine	1,100	200	USEPA

Why are these on list if max conc not in excess of remediation level?

The remediation levels for naphthalene, benzo(a)anthracene, and chrysene are based on the North Carolina Risk Framework (NC DENR, 1996). The remediation levels for 2-methylnaphthalene, carbazole, and n-nitrosodiphenylamine are based on USEPA Region III Soil Screening Levels. The Feasibility Study (FS) report for Site 3 details the development of the remediation levels.

Figure 2-3 identifies the contaminant concentrations in subsurface soil that exceeded remediation levels. Based on these exceedences, a subsurface soil area of concern was delineated as shown in Figure 2-4. This area of concern extends from approximately 3 to 9 feet below ground surface (bgs) (just above the water table), and encompasses approximately 1,340 cubic yards of PAH-contaminated soil. The PAH-contaminated soil is believed to be a source of the semivolatile organic contamination detected in the shallow aquifer at Site 3. Removal of the contaminated soil is expected to remediate the shallow aquifer. The groundwater contamination will be further addressed by a long-term monitoring plan and aquifer use restrictions as described in the OU No. 12 (Site 3) Record of Decision (Baker, 1997).

Add reference to Others ts results and fact that results show soil cannot be adequately remediated in biocell.

2.5 Description of the Remedial Action

The remedial action plan for PAH-contaminated soil at Site 3 includes the following components:

- Excavation of the soil located from zero to three feet bgs (approximately 660 cubic yards). This soil will be stockpiled at Site 3, tested for TCLP characteristics, and used later as backfill for the excavation provided the soil is non-hazardous and does not contain PAHs in excess of the remediation levels. (Why? Is this necessary why not just test for PAH's?)
- Excavation of the subsurface soil area of concern from three to nine feet bgs, or to just above the water table (approximately 1,340 cubic yards). This soil will be temporarily stockpiled at Site 3 and tested for TCLP characteristics. Upon receipt of the TCLP sampling results, the soil will be transported to a RCRA-permitted

disposal facility. Based on preliminary TCLP testing conducted in October 1997 (see Appendix A), the soil appears to be non-hazardous and may be disposed of at a Subtitle D facility. can this be the base landfill?

- Confirmatory soil sampling for TCL semivolatiles to ensure that all contaminated soil above the water table has been removed to acceptable limits. When all contaminated soil has been removed, the excavation will be backfilled with the stockpiled soil that was located from zero to three feet bgs, and clean soil from an on-Base borrow pit (see Figure 2-1).

3.0 REMEDIAL ACTION WORK BREAKDOWN STRUCTURE

The following sections of this Basis of Design describe the removal action by hazardous, toxic, and radiological waste (HTRW) account numbers, as defined by the Remedial Action Delivery Order Requirements Package Guide, NEESA 20.2-062 of June 1992. In addition, Appendix B presents a construction schedule estimate, and a cost estimate is provided under separate cover.

33.01 Mobilization and Preparatory Work

Mobilization involves the acquisition, delivery, and setup of equipment, material, and personnel to the work site that are necessary to accomplish the remedial action scope of work.

During the mobilization period, the Contractor will prepare all necessary pre-construction submittals as described in Section 01115, "General Paragraphs" of the contract specifications. These specifications allow the Contractor up to sixty (60) days to prepare and submit the necessary pre-construction submittals. These submittals include:

- Work Plan
- Environmental Protection Plan
- Site Health and Safety Plan
- Sampling and Analysis Plan

The Contractor will provide temporary facilities, including equipment staging areas, decontamination areas, soil stockpile areas, and temporary utilities, as necessary to complete the work.

The Contractor will be required to coordinate and obtain any necessary permits and clearances. This includes permits and clearances required for excavation and transportation activities. The Contractor will be responsible for coordinating all required inspections by the Base's Public Works Department.

33.02 Monitoring, Sampling, Testing, and Analysis

The Contractor will be required to submit to LANTDIV for approval a Sampling and Analysis Plan (SAP) describing the proposed sampling, analytical, and quality control procedures for the chemical data collected during the performance of work (see Section 01115, "General Paragraphs" of the contract specifications). The SAP will ensure that all analytical data generated are scientifically

accurate and legally defensible. The SAP will describe the quantity, frequency, and location of samples to be collected and analyses to be performed.

The type and quantity of testing will be based on the requirements set forth in the specifications, the Contractor's Health and Safety Plan (HASP), and the Contractor's Air Monitoring Plan. Additional monitoring, sampling, testing and analyses will be carried out as required during the project with the approval from the Navy's Technical Representative (NTR).

Soil Sampling

Characterization samples will be collected from the excavated, PAH-contaminated soil located from three to nine feet bgs. These samples will be analyzed for full TCLP and will determine the RCRA classification of the soil (i.e., hazardous or non-hazardous). One characterization sample will be collected for every 500 cubic yards of soil. Based on preliminary TCLP testing conducted in October 1997, the soil appears to be non-hazardous and may be disposed of at a RCRA-permitted Subtitle D facility.

Characterization samples will also be collected from all topsoil and backfill material, including the soil that was located from 0 to 3 feet bgs. These samples will be analyzed for full TCLP.

Confirmatory soil samples will be collected from the floor and sidewalls of the excavation area below three feet bgs, and analyzed for target compound list (TCL) semivolatiles (EPA Method 3550/EPA Method 8270). One confirmation sample will be collected for every 50 feet, or fraction thereof, along each excavation sidewall, and one sample for every 500 square feet, or fraction thereof, along the base of the excavation. If the water table is contacted before the excavation reaches 9 feet bgs, sampling of the excavation floor will not be required. The analytical results will be compared to the specified remediation levels to confirm that the contaminated soil has been removed to acceptable limits. The NTR will be immediately notified of all analytical results before excavation proceeds. The NTR will determine when excavation is complete and when the excavation area may be backfilled.

Contractor-Generated Waste

Characterization samples will be collected from all Contractor-generated waste (e.g., decontamination fluids and ponded water in the excavation area) generated during the remedial action. These characterization samples will determine the appropriate transportation and disposal requirements. The samples will be analyzed for full TCL organics and TAL metals.

Testing and Analysis

The Contractor will perform analytical testing of samples collected during remedial action activities. The Contractor will adhere to EPA chain-of-custody procedures during the collection, transport, and analysis of all samples. Laboratory analyses of all samples will conform with accepted Quality Assurance (QA) requirements. If possible, soil samples may be analyzed with a maximum of 48 hours turnaround time to minimize the amount of time the excavations must remain open.

33.03 Site Work

Site work includes all clearing and grubbing, decontamination/equipment staging area preparation, soil stockpile area preparation, safety fencing installation, and silt fencing installation. Site work also includes the removal of the concrete pad that is located above the area of concern. The concrete debris will be disposed of at the Base sanitary landfill.

33.05 Surface Water Collection and Control

The Contractor will be required to provide devices and facilities as necessary to prevent surface water from contacting contaminated materials during construction activities, and from flowing off-site. The Contractor will be required to keep all excavated areas dewatered during construction and to collect, sample, analyze, and dispose of any water accumulated in the excavation and staging areas.

33.07 Air Pollution Collection and Control

Dirt roads and other areas disturbed by remediation operations will be treated with water as a dust suppressant. Use of water will be minimized to prevent the development of mud.

33.08 Solids Collection and Containment

The majority of soil excavation will be performed with earth moving equipment, such as excavators and front-end loaders. The horizontal extent of excavation coincides with the area of concern identified in Figure 2-4, but confirmatory soil sampling may increase this extent. The total vertical extent of excavation will be from the ground surface to 9 feet bgs or until contact is made with the water table. Contact with the water table, however, should be avoided. Both the horizontal and vertical extents of excavation are also indicated on the design drawings.

The estimated in-place volume of soil that will be excavated from the 0 to 3 foot bgs interval is 660 cubic yards. The estimated in-place volume of soil that will be excavated from the 3 to 9 foot bgs interval is 1,340 cubic yards. Excavation beyond the designated area of concern will only be conducted with NTR approval. Appendix C provides boring logs for Site 3.

The excavated soil located from 0 to 3 feet bgs will be stockpiled at Site 3, tested for TCLP characteristics, and later used as backfill for the excavation area provided the soil is non-hazardous and does not contain PAHs in excess of the remediation levels. The excavated soil located from 3 to 9 feet bgs will be temporarily stockpiled at Site 3 and tested for TCLP characteristics. Upon receipt of the TCLP results, this soil will be loaded into approved storage containers that are transportable and leak-proof, and transported to a RCRA-permitted facility.

why need to test?

possibly base landfill?

Once the Contractor has excavated to the specified limits, an on-site analysis consisting of a visual inspection will be performed on the surrounding soil at the excavation area. If the visual inspection reveals evidence of PAH-contaminated soil, the Contractor will consult with the NTR to determine the extent of additional excavation. When the exposed excavation surfaces do not contain visual evidence of contaminated soil, confirmation samples will be collected and sent for TCL semivolatile analyses.

Use of on site screening tools (e.g. Ensys Kits) encouraged for preliminary analyses.

If the analytical results of confirmation sampling exceed remediation levels, the NTR will determine the next appropriate action to take. If the analytical results do not exceed remediation levels, the excavation of soil within that area will be considered complete and site restoration will begin.

33.09 Liquid, Sediment, and Sludge Collection and Containment

The Contractor will provide decontamination pads to collect liquids from the decontamination of personnel and construction equipment. The Contractor will also collect ponded water that may occur in the excavation areas. The resulting fluids will be sent for treatment at the Lot 203 groundwater treatment plant. All sludge will be containerized, manifested, and transported to an approved disposal or treatment facility.

33.19 Disposal (Commercial)

The excavated soil that was located from three to nine feet bgs will be transported to a RCRA-permitted disposal facility. Based on the results of preliminary TCLP testing conducted in October 1997, this soil appears to be non-hazardous and may be disposed of at a Subtitle D facility. The nearest Subtitle D facility is located on the Base along Piney Green Road about one mile from Site 3 (see Figure 2-1). Most likely, the soil will be disposed of at this on-Base landfill. However, if on-Base disposal is not possible, the soil will be disposed of at an off-Base facility. Cost estimates for both disposal locations are provided under separate cover. ✓

Leachate and Contractor-generated waste fluids will be treated at the Lot 203 groundwater treatment plant. General construction debris will be stockpiled for subsequent disposal at the Base sanitary landfill.

33.20 Site Restoration

why?

If sample results indicate that the soil located from 0 to 3 feet bgs is non-hazardous and does not contain PAHs in excess of the remediation levels, this soil will be used as backfill for the excavation. Clean backfill from an on-Base borrow pit will also be used for the excavation. The area will then be regraded to the original contours and revegetated.

33.21 Demobilization

All temporary facilities, equipment, and supplies acquired for this contract will be decontaminated and removed from the site upon completion of the remedial action.

Post-construction submittals will include: 1) a punch list showing correction of all listed items; 2) a letter from the Contractor certifying completion of all contracted work in accordance with the contract conditions, applicable regulations, and standards of practice; 3) a completed project current condition report with an as-built survey for the entire site; 4) submittal, in one collated document, of all quality control daily reports, samples, results of the sample analyses, corrective actions (if required, taken to correct unacceptable deviations from required quality standards), results of corrective actions; problems encountered and resolved, and lessons learned; and, 5) submittal in one collated document of all quality assurance samples, sample analyses results, and corrective actions (if required, taken to correct unacceptable deviations from required quality standards).

The Contractor will submit a detailed report summarizing the remedial action, lessons learned, and recommendations for inclusion in future similar contracts.

4.0 REFERENCES

Baker Environmental, Inc., 1996. Feasibility Study for Operable Unit No. 12 (Site 3), Marine Corps Base, Camp Lejeune, North Carolina. Final. Prepared for the Department of the Navy, Naval Facilities Engineering Command, Atlantic Division, Norfolk, Virginia.

Baker Environmental, Inc., 1996. Remedial Investigation Report, Operable Unit No. 12 (Site 3), Marine Corps Base, Camp Lejeune, North Carolina. Final. Prepared for the Department of the Navy, Naval Facilities Engineering Command, Atlantic Division, Norfolk, Virginia.

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Naval Energy and Environmental Support Activity (NEESA), and Naval Facilities Engineering Command Contractor's Office, June 1992. Remedial Action Contracts Delivery Order Requirements Package Guide, Parts 1 and 2. NEESA 20.2-062.

North Carolina Department of Environment and Natural Resources (NC DENR), December 1996. North Carolina Risk Analysis Framework - Methods for Determining Contaminant Target Concentrations in Soil and Groundwater. Draft.

OHM Remediation Services Corp., 1995. Work Plan and Permit Application for Land Treatment of Petroleum Contaminated Soils for MCB Camp Lejeune, North Carolina. Prepared for the Department of the Navy.

Is this still a reference? I don't think so.

TABLES

TABLE 2-1

SUMMARY OF HUMAN HEALTH RISKS
OPERABLE UNIT NO. 12 (SITE 3)
MCB CAMP LEJEUNE, NORTH CAROLINA

Receptors	Soil		Round 2 Groundwater		Worst Case Groundwater		Total with Round 2 Groundwater Contamination		Total with Worst Case Groundwater Contamination	
	ICR	HI	ICR	HI	ICR	HI	ICR	HI	ICR	HI
Military Personnel	1.7E-06 (100)	NA	NE	NE	NE	NE	1.7E-06	NA	1.7E-06	NA
Future Child Resident	1.4E-05 (70)/(<1)	NA	5.3E-06 (30)	1.7 (100)	7.5E-04 (100)	2.3 (100)	1.9E-05	1.7	7.6E-04	2.3
Future Adult Resident	5.4E-06 (39)/(<1)	NA	1.1E-05 (61)	0.7 (100)	1.8E-03 (100)	3.7 (100)	1.7E-05	0.7	1.8E-03	3.7
Future Construction Worker	1.0E-07 (100)	<0.01 (100)	NE	NE	NE	NE	1.7E-07	<0.01	1.0E-07	<0.01

Notes:

ICR = Incremental Lifetime Cancer Risk
HI = Hazard Index
Total = Soil + Groundwater
NE = Not evaluated for potential receptor
NA = Not applicable (no noncarcinogenic COPCs)
( ) = Percent contribution to total risk
( )/( ) = First is percent contribution to total risk with round 2 groundwater results; Second is percent contribution to total risk with worst case groundwater results (combined Rounds 1, 2, 3)

Shaded blocks indicate an ICR value that exceeds the acceptable limit of 1E-04, or an HI value that exceeds the acceptable limit of 1.0.

FIGURES

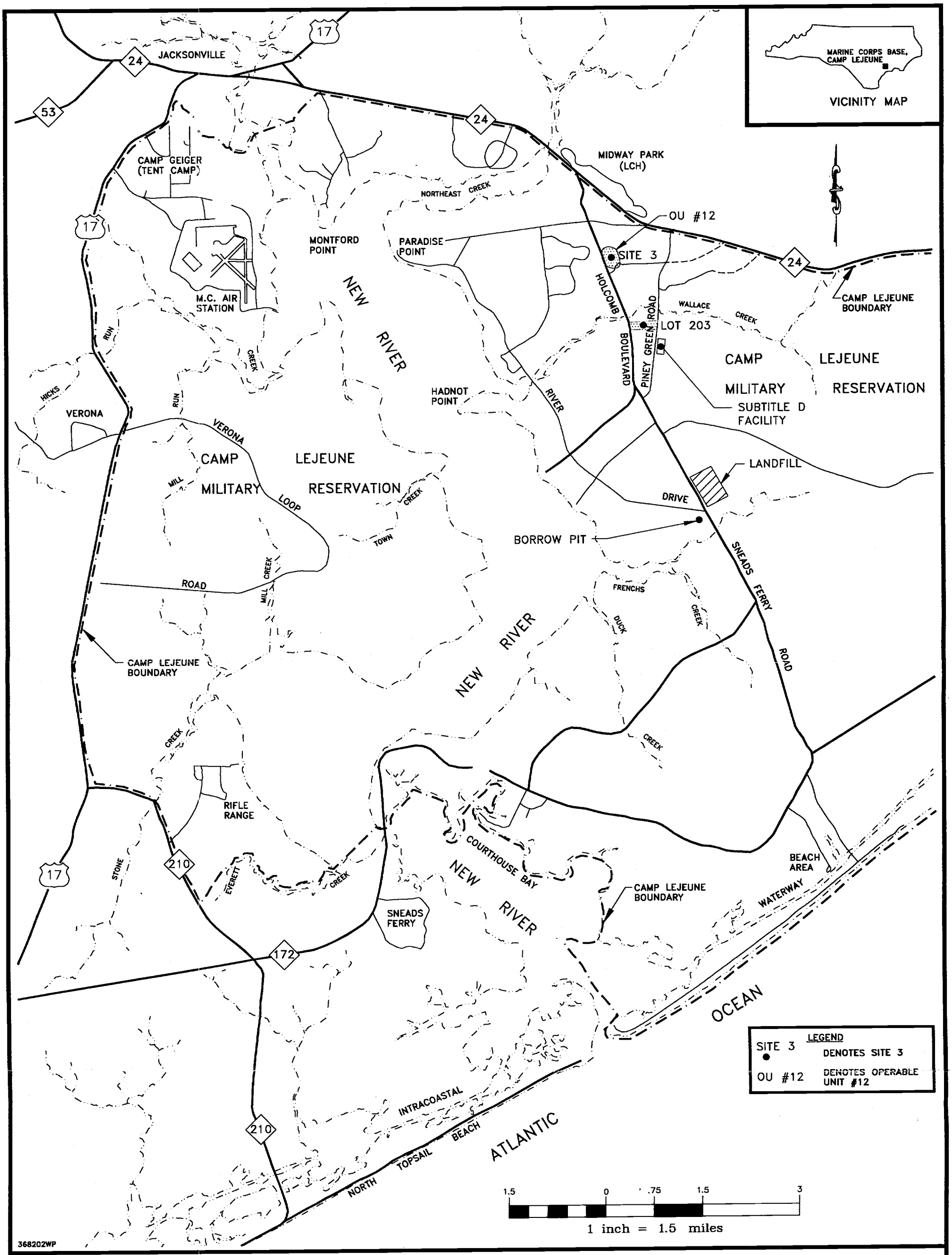
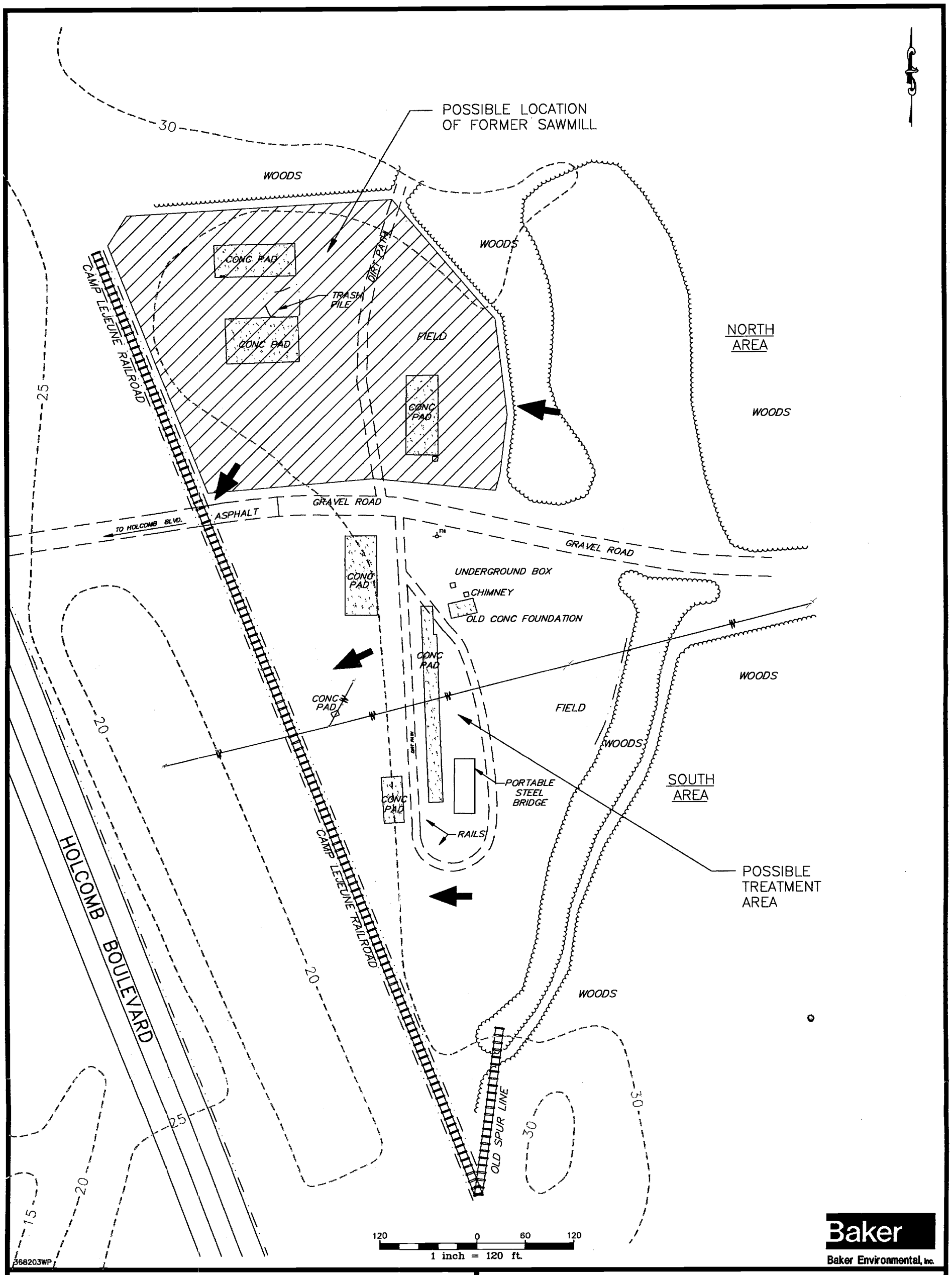


FIGURE 2-1
OPERABLE UNIT NO. 12 (SITE 3)
MARINE CORPS BASE, CAMP LEJEUNE

MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

00291BBB12



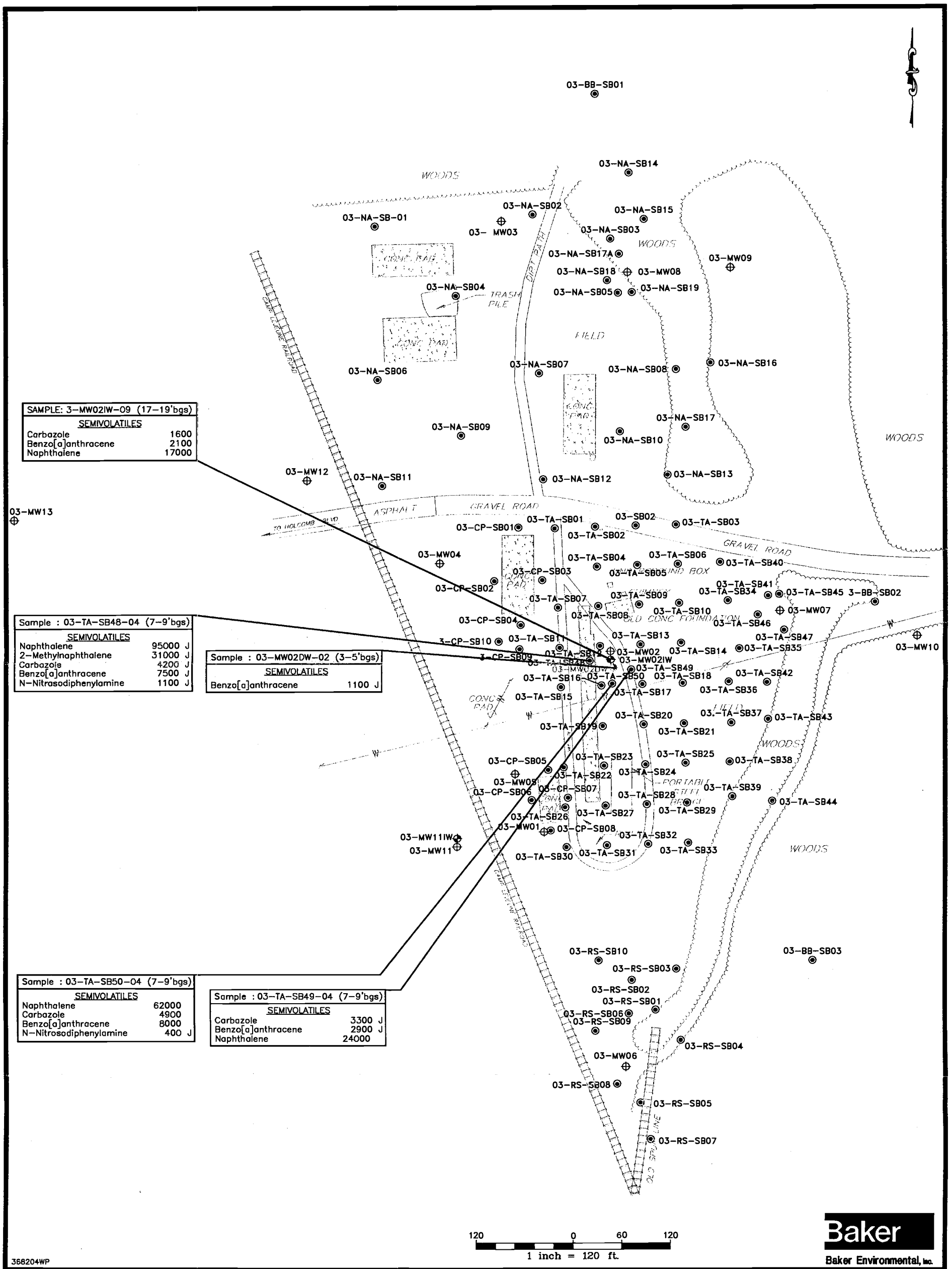
LEGEND

- DRAINAGE PATH
- GRAVEL ROAD/DIRT PATH
- GROUNDWATER FLOW DIRECTION IN THE SHALLOW AQUIFER
- --15-- TOPOGRAPHIC ELEVATION LINE (FEET, MSL)
- AREA USED FOR STORAGE OF FALLEN TIMBER

SOURCE: W.K. DICKSON & Co., INC., JANUARY 1995

FIGURE 2-2
SITE MAP
SITE 3 - OLD CREOSOTE PLANT

MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA



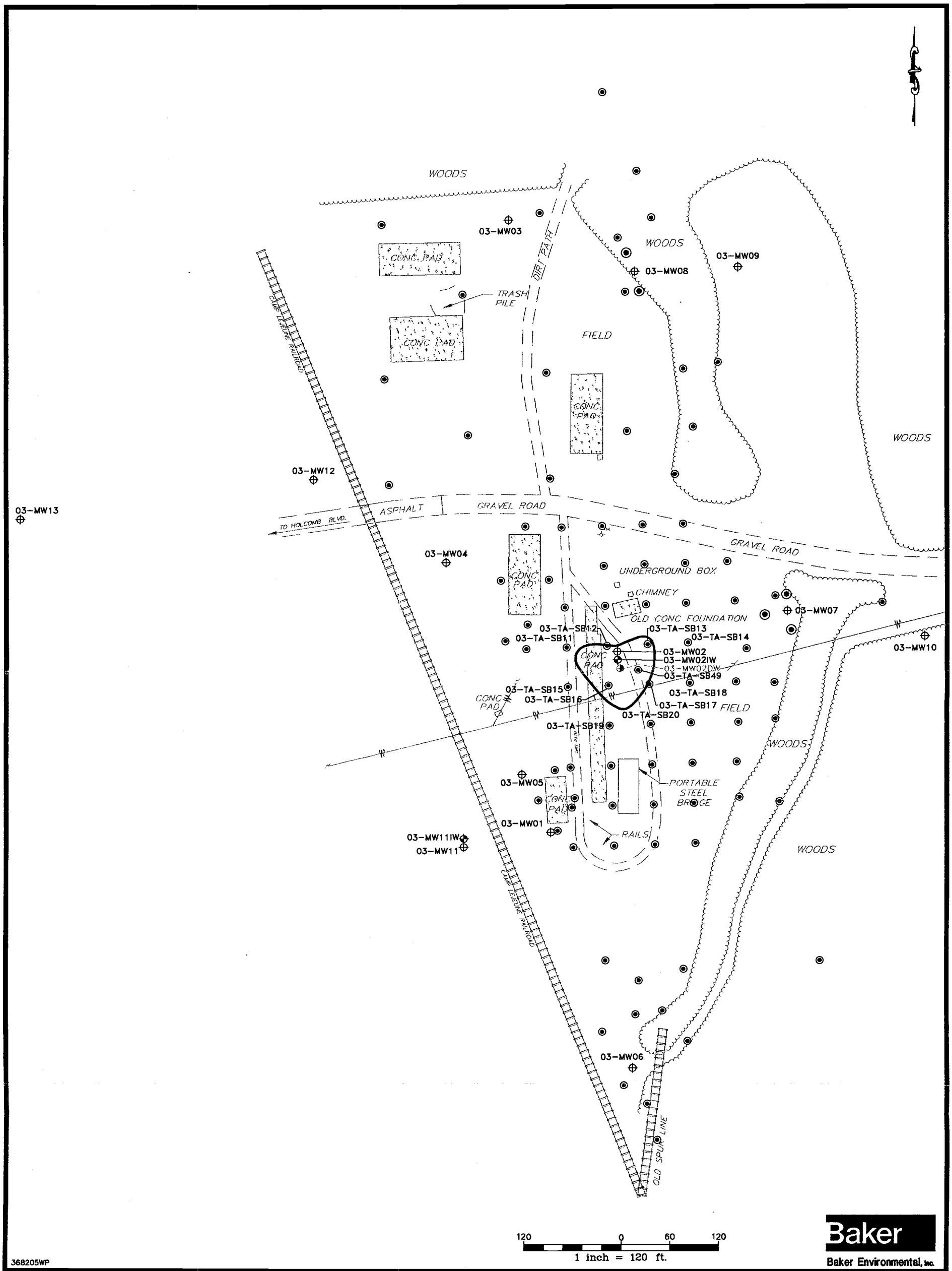
LEGEND

- 03-MW01 — SHALLOW MONITORING WELL LOCATION
- 03-MW02IW — INTERMEDIATE MONITORING WELL LOCATION
- 03-MW02DW — DEEP MONITORING WELL LOCATION
- 03-RS-SB01 — SOIL BORING LOCATION

NOTE:
-CONCENTRATIONS ARE EXPRESSED IN MICROGRAMS PER KILOGRAM (ug/kg).
SOURCE: W.K. DICKSON & Co., INC., JANUARY 1995

FIGURE 2-3
CONTAMINANT CONCENTRATIONS EXCEEDING REMEDIATION LEVELS SUBSURFACE SOIL SITE 3 - OLD CREOSOTE PLANT

MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA



LEGEND

- 03-MW01 — SHALLOW MONITORING WELL LOCATION
- 03-MW02IW — INTERMEDIATE MONITORING WELL LOCATION
- 03-MW02DW — DEEP MONITORING WELL LOCATION
- SOIL BORING LOCATION
- SUBSURFACE SOIL AREA OF CONCERN

SOURCE: W.K. DICKSON & Co., INC., JANUARY 1995

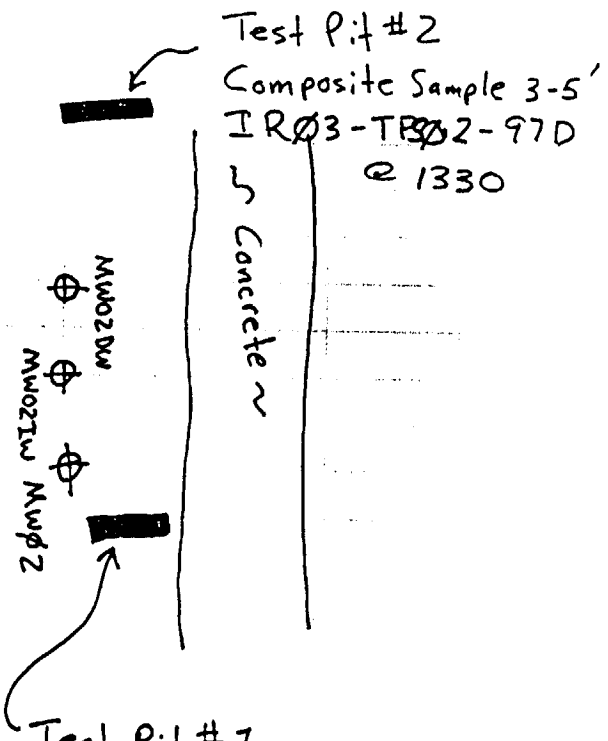
FIGURE 2-4
SUBSURFACE SOIL AREA OF CONCERN
SITE 3 – OLD CREOSOTE PLANT

MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

APPENDIX A
PRELIMINARY TCLP SAMPLING RESULTS

10-23-97

Test Pit Sampling Site 3



IRØ3-TBØ1-97D @ 1400 Trip Blank

10-23-97 FedEx #
525 3096144

Soil Test Pit #1- Grayish clayey soil from 6" to 2'. Brown sandy soil from 2'-6' with bands of loamy brown material which may have contained wood debris. Creosote odor noted during excavation.

Soil Test Pit #2- Dark Brown with gray sandy soil from 6" to 3'. From 3' to 5' medium brown soil consisting mostly of sand with darker brown bands of loamy material.

QUANTERRA INCORPORATED

PRELIMINARY DATA SUMMARY

← can we use final summary instead of prelim results?

The results shown below may still require additional laboratory review and are subject to change. Actions taken based on these results are the responsibility of the data user.

Lot #: H7J240121

Baker Environmental, Inc.
Camp LeJeune
Project Number: CTO-274

Date Reported: 10/31/97

Client Sample ID: IR03-TPS01-97D
Sample #: 001 Date Sampled: 10/23/97 13:15 Date Received: 10/24/97 Matrix: SOLID

PARAMETER		RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD	
Inductively Coupled Plasma (ICP) Metals TCLP						In Review
Silver	TCLP	ND	0.50	mg/L	SW846 6010A	
Arsenic	TCLP	ND	0.50	mg/L	SW846 6010A	
Barium	TCLP	ND	10.0	mg/L	SW846 6010A	
Cadmium	TCLP	ND	0.10	mg/L	SW846 6010A	
Chromium	TCLP	ND	0.50	mg/L	SW846 6010A	
Lead	TCLP	ND	0.50	mg/L	SW846 6010A	
Selenium	TCLP	ND	0.25	mg/L	SW846 6010A	
Mercury in Liquid Waste (Manual Cold-Vapor) TCLP						In Review
Mercury	TCLP	ND	0.0020	mg/L	SW846 7470A	
Organochlorine Pesticides and PCBs TCLP						In Review
Chlordane (technical)		ND	0.0050	mg/L	SW846 8080	
Endrin		ND	0.00050	mg/L	SW846 8080	
Heptachlor		ND	0.00050	mg/L	SW846 8080	
Heptachlor epoxide		ND	0.00050	mg/L	SW846 8080	
Lindane		ND	0.00050	mg/L	SW846 8080	
Methoxychlor		ND	0.0010	mg/L	SW846 8080	
Toxaphene		ND	0.020	mg/L	SW846 8080	
Chlorinated Herbicides by GC TCLP						In Review
IN PROGRESS						
Volatile Organics by GC/MS TCLP						Reviewed
Benzene		ND	0.025	mg/L	SW846 8260A	
Carbon tetrachloride		ND	0.025	mg/L	SW846 8260A	
Chlorobenzene		ND	0.025	mg/L	SW846 8260A	
Chloroform		ND	0.025	mg/L	SW846 8260A	
1,2-Dichloroethane		ND	0.025	mg/L	SW846 8260A	
1,1-Dichloroethylene		ND	0.025	mg/L	SW846 8260A	
Methyl ethyl ketone		ND	0.12	mg/L	SW846 8260A	
Tetrachloroethylene		ND	0.025	mg/L	SW846 8260A	
Trichloroethylene		ND	0.025	mg/L	SW846 8260A	
Vinyl chloride		ND	0.050	mg/L	SW846 8260A	

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QUANTERRA INCORPORATED

PRELIMINARY DATA SUMMARY

The results shown below may still require additional laboratory review and are subject to change. Actions taken based on these results are the responsibility of the data user.

Lot #: H7J240121

Baker Environmental, Inc.
Camp LeJeune
Project Number: CTO-274

Date Reported: 10/31/97

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD	
Client Sample ID: IR03-TPS01-97D					
Sample #: 001 Date Sampled: 10/23/97 13:15 Date Received: 10/24/97 Matrix: SOLID					
Semivolatile Organic Compounds by GC/MS TCLP					Reviewed
o-Cresol	ND	0.050	mg/L	SW846 8270B	
m Cresol & p Cresol	ND	0.10	mg/L	SW846 8270B	
1,4-Dichlorobenzene	ND	0.050	mg/L	SW846 8270B	
2,4-Dinitrotoluene	ND	0.050	mg/L	SW846 8270B	
Hexachlorobenzene	ND	0.050	mg/L	SW846 8270B	
Hexachlorobutadiene	ND	0.050	mg/L	SW846 8270B	
Hexachloroethane	ND	0.050	mg/L	SW846 8270B	
Nitrobenzene	ND	0.050	mg/L	SW846 8270B	
Pentachlorophenol	ND	0.25	mg/L	SW846 8270B	
Pyridine	ND	0.10	mg/L	SW846 8270B	
2,4,5-Trichlorophenol	ND	0.050	mg/L	SW846 8270B	
2,4,6-Trichlorophenol	ND	0.050	mg/L	SW846 8270B	
Inorganic Analysis					In Review
Reactive Cyanide	ND	200	mg/kg	SW846 7.3.3	
Corrosivity	**7.5**	**1.0**	**No Units**	**SW846 9045A**	
Method for Flash and Fire Points	**>180**		**deg F**	**ASTM D 92-90**	
Reactive Sulfide	ND	200	mg/kg	SW846 7.3.4	
Client Sample ID: IR03-TPS02-97D					
Sample #: 002 Date Sampled: 10/23/97 13:30 Date Received: 10/24/97 Matrix: SOLID					
Inductively Coupled Plasma (ICP) Metals TCLP					In Review
Silver TCLP	ND	0.50	mg/L	SW846 6010A	
Arsenic TCLP	ND	0.50	mg/L	SW846 6010A	
Barium TCLP	ND	10.0	mg/L	SW846 6010A	
Cadmium TCLP	ND	0.10	mg/L	SW846 6010A	
Chromium TCLP	ND	0.50	mg/L	SW846 6010A	
Lead TCLP	ND	0.50	mg/L	SW846 6010A	
Selenium TCLP	ND	0.25	mg/L	SW846 6010A	
Mercury in Liquid Waste (Manual Cold-Vapor) TCLP					In Review
Mercury TCLP	ND	0.0020	mg/L	SW846 7470A	

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QUANTERRA INCORPORATED

PRELIMINARY DATA SUMMARY

The results shown below may still require additional laboratory review and are subject to change. Actions taken based on these results are the responsibility of the data user.

Baker Environmental, Inc.
Camp LeJeune
Project Number: CTO-274

Lot #: H7J240121 **Date Reported:** 10/31/97

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD	
Client Sample ID: IR03-TPS02-97D					
Sample #: 002 Date Sampled: 10/23/97 13:30 Date Received: 10/24/97 Matrix: SOLID					
Organochlorine Pesticides and PCBs TCLP					In Review
Chlordane (technical)	ND	0.0050	mg/L	SW846 8080	
Endrin	ND	0.00050	mg/L	SW846 8080	
Heptachlor	ND	0.00050	mg/L	SW846 8080	
Heptachlor epoxide	ND	0.00050	mg/L	SW846 8080	
Lindane	ND	0.00050	mg/L	SW846 8080	
Methoxychlor	ND	0.0010	mg/L	SW846 8080	
Toxaphene	ND	0.020	mg/L	SW846 8080	
Chlorinated Herbicides by GC TCLP					In Review
IN PROGRESS					
Volatile Organics by GC/MS TCLP					Reviewed
Benzene	ND	0.025	mg/L	SW846 8260A	
Carbon tetrachloride	ND	0.025	mg/L	SW846 8260A	
Chlorobenzene	ND	0.025	mg/L	SW846 8260A	
Chloroform	ND	0.025	mg/L	SW846 8260A	
1,2-Dichloroethane	ND	0.025	mg/L	SW846 8260A	
1,1-Dichloroethylene	ND	0.025	mg/L	SW846 8260A	
Methyl ethyl ketone	ND	0.12	mg/L	SW846 8260A	
Tetrachloroethylene	ND	0.025	mg/L	SW846 8260A	
Trichloroethylene	ND	0.025	mg/L	SW846 8260A	
Vinyl chloride	ND	0.050	mg/L	SW846 8260A	
Semivolatile Organic Compounds by GC/MS TCLP					Reviewed
o-Cresol	ND	0.050	mg/L	SW846 8270B	
m-Cresol & p-Cresol	ND	0.10	mg/L	SW846 8270B	
1,4-Dichlorobenzene	ND	0.050	mg/L	SW846 8270B	
2,4-Dinitrotoluene	ND	0.050	mg/L	SW846 8270B	
Hexachlorobenzene	ND	0.050	mg/L	SW846 8270B	
Hexachlorobutadiene	ND	0.050	mg/L	SW846 8270B	
Hexachloroethane	ND	0.050	mg/L	SW846 8270B	
Nitrobenzene	ND	0.050	mg/L	SW846 8270B	
Pentachlorophenol	ND	0.25	mg/L	SW846 8270B	

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QUANTERRA INCORPORATED

PRELIMINARY DATA SUMMARY

The results shown below may still require additional laboratory review and are subject to change. Actions taken based on these results are the responsibility of the data user.

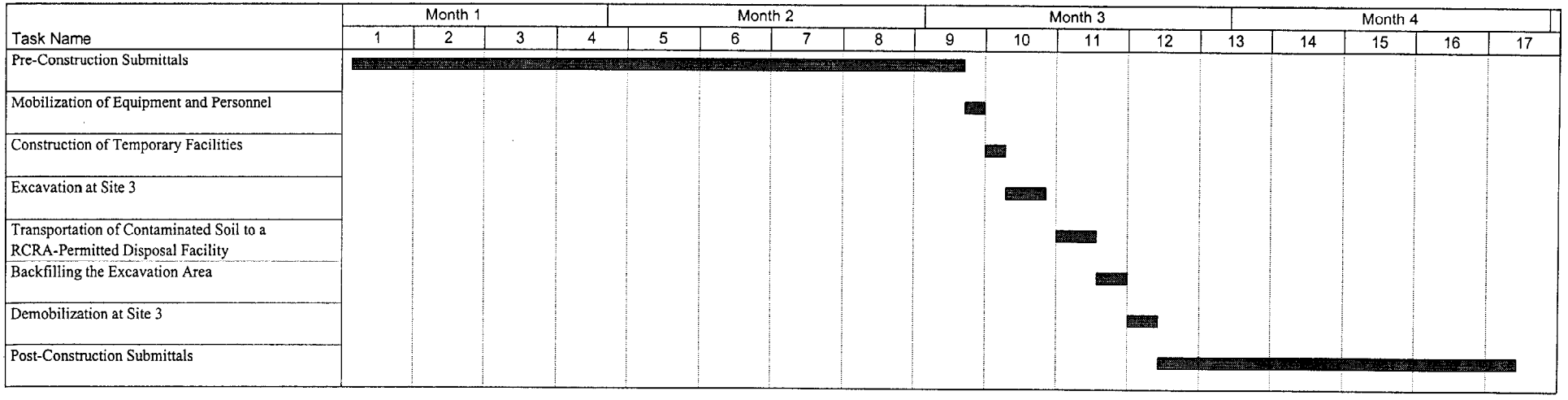
Baker Environmental, Inc.
Camp LeJeune
Project Number: CTO-274

Lot #: H7J240121 **Date Reported:** 10/31/97

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD	
Client Sample ID: IR03-TPS02-97D					
Sample #: 002 Date Sampled: 10/23/97 13:30 Date Received: 10/24/97 Matrix: SOLID					
Semivolatile Organic Compounds by GC/MS TCLP					Reviewed
Pyridine	ND	0.10	mg/L	SW846 8270B	
2,4,5-Trichlorophenol	ND	0.050	mg/L	SW846 8270B	
2,4,6-Trichlorophenol	ND	0.050	mg/L	SW846 8270B	
Inorganic Analysis					In Review
Reactive Cyanide	ND	200	mg/kg	SW846 7.3.3	
Corrosivity	**7.9**	**1.0**	**No Units**	**SW846 9045A**	
Method for Flash and Fire Points	**110**		**deg F**	**ASTM D 92-90**	
Reactive Sulfide	ND	200	mg/kg	SW846 7.3.4	
Client Sample ID: IR03-TB01-97D					
Sample #: 003 Date Sampled: 10/23/97 14:00 Date Received: 10/24/97 Matrix: WATER					
Volatile Organics by GC/MS TCLP					Reviewed
Benzene	ND	0.025	mg/L	SW846 8260A	
Carbon tetrachloride	ND	0.025	mg/L	SW846 8260A	
Chlorobenzene	ND	0.025	mg/L	SW846 8260A	
Chloroform	ND	0.025	mg/L	SW846 8260A	
1,2-Dichloroethane	ND	0.025	mg/L	SW846 8260A	
1,1-Dichloroethylene	ND	0.025	mg/L	SW846 8260A	
Methyl ethyl ketone	ND	0.12	mg/L	SW846 8260A	
Tetrachloroethylene	ND	0.025	mg/L	SW846 8260A	
Trichloroethylene	ND	0.025	mg/L	SW846 8260A	
Vinyl chloride	ND	0.050	mg/L	SW846 8260A	

APPENDIX B
CONSTRUCTION SCHEDULE ESTIMATE

Construction Schedule Estimate
Remediation of PAH-Contaminated Soil
Operable Unit No. 12 (Site 3)



Project: tara_OU12
Date: 4/6/98

Task

APPENDIX C
BORING LOGS

BAKER

TEST BORING LOG

BOREHOLE NUMBER: 3-TA-SB08

SHEET: 1 OF 1

PROJECT NUMBER: 62470-274
PROJECT NAME: SITE 3 - OLD CREOSOTE PLANT
LOCATION: MCB CAMP LEJEUNE, NC
DRILLING COMPANY: HARDIN-HUBER, INC
RIG TYPE & NUMBER: ATV
DRILLING METHOD: HOLLOW STEM AUGERS
WEATHER: SUNNY
GEOLOGIST: R.M. LEWIS
ENV. SCIENTIST: A.M. BERNHARDT
DATE BEGUN: 11/14/94 DATE COMPLETED: 11/14/94

GROUND SURFACE ELEVATION: 32.56' msl
TOTAL DEPTH: 11.0' bgs

ELEVATION	DEPTH	SOIL SAMPLES	SAMPLE NO.	SAMPLE METHOD	BLOWS/6"	RECOVERY	PID (PPM) BG	PID (PPM) PS	LITHOLOGY	DESCRIPTION	DEPTH
	0.0		S-1	SS	-	-	-	-		SAND: Fine grained, trace to little silt, black/brown/light gray, dry to moist to wet, loose to dense	0.0
32.00	1.0				4						1.0
31.00	2.0		S-2	SS	4 4 4 4	2.0	0.2	3.5			2.0
30.00	3.0				2						3.0
29.00	4.0		S-3	SS	4 5 10	2.0	0.2	0.2			4.0
28.00	5.0				2						5.0
27.00	6.0		S-4	SS	12 17 20	2.0	0.2	0.2			6.0
26.00	7.0				12						7.0
25.00	8.0		S-5	SS	14 17 20	2.0	0.2	0.2			8.0
24.00	9.0				5						9.0
23.00	10.0		S-6	SS	7 8 6	1.5	0.2	1.2			10.0
22.00	11.0									BOTTOM OF BOREHOLE @ 11.0'	11.0
21.00	12.0									NOTES: 1) Groundwater encountered at 9' during drilling	12.0
20.00	13.0										13.0
19.00	14.0										14.0
18.00	15.0										15.0
17.00	16.0										16.0
16.00	17.0										17.0
15.00	18.0										18.0
14.00	19.0										19.0
13.00	20.0										20.0
12.00	21.0										21.0
11.00	22.0										22.0
10.00	23.0										23.0
9.00	24.0										24.0
8.00	25.0										25.0
7.00	26.0										26.0
6.00	27.0										27.0
5.00	28.0										28.0

BAKER

TEST BORING LOG

BOREHOLE NUMBER: 3-TA-S810

SHEET: 1 OF: 1

PROJECT NUMBER: 62470-274
PROJECT NAME: SITE 3 - OLD CREOSOTE PLANT
LOCATION: MCB CAMP LEJEUNE, NC
DRILLING COMPANY: HARDIN-HUBER, INC
RIG TYPE & NUMBER: ATV
DRILLING METHOD: HOLLOW STEM AUGERS
WEATHER: SUNNY
GEOLOGIST: R.M. LEWIS
ENV. SCIENTIST: A.M. BERNHARDT
DATE BEGUN: 11/14/94 DATE COMPLETED: 11/14/94

GROUND SURFACE ELEVATION: 30.94' msl
TOTAL DEPTH: 11.0' bgs

ELEVATION	DEPTH	SOIL SAMPLES	SAMPLE NO	SAMPLE METHOD	BLOWS/6"	RECOVERY	PID (PPM) BG	PID (PPM) PS	LITHOLOGY	DESCRIPTION	DEPTH
	0.0		S-1	SS	-	-	-	-		SAND AND SILT: fine grained, black to dark brown, damp to wet, medium dense to loose	0.0
30.00	1.0				5						1.0
29.00	2.0		S-2	SS	6 6 6	2.0	0.2	0.2			2.0
28.00	3.0				2						3.0
27.00	4.0		S-3	SS	3 5 5	2.0	0.2	0.2			4.0
26.00	5.0				3						5.0
25.00	6.0		S-4	SS	4 5 7	2.0	0.2	0.2			6.0
24.00	7.0				5						7.0
23.00	8.0		S-5	SS	6 8 12	2.0	0.2	0.2			8.0
22.00	9.0				4						9.0
21.00	10.0		S-6	SS	6 8 16	2.0	0.2	0.3			10.0
20.00	11.0									BOTTOM OF BOREHOLE @ 11.0' NOTES 1) Groundwater encountered at 9' during drilling	11.0
19.00	12.0										12.0
18.00	13.0										13.0
17.00	14.0										14.0
16.00	15.0										15.0
15.00	16.0										16.0
14.00	17.0										17.0
13.00	18.0										18.0
12.00	19.0										19.0
11.00	20.0										20.0
10.00	21.0										21.0
9.00	22.0										22.0
8.00	23.0										23.0
7.00	24.0										24.0
6.00	25.0										25.0
5.00	26.0										26.0
4.00	27.0										27.0
3.00	28.0										28.0

BAKER

TEST BORING LOG

BOREHOLE NUMBER: 3-TA-SB14

SHEET 1 OF 1

PROJECT NUMBER: 62470-274
PROJECT NAME: SITE 3 - OLD CREOSOTE PLANT
LOCATION: MCB CAMP LEJEUNE, NC
DRILLING COMPANY: HARDIN-HUBER, INC.
RIG TYPE & NUMBER: ATV
DRILLING METHOD: HOLLOW STEM AUGERS
WEATHER: SUNNY
GEOLOGIST: R.M. LEWIS
ENV. SCIENTIST: A.M. BERNHARDT
DATE BEGUN: 11/14/94 DATE COMPLETED: 11/14/94

GROUND SURFACE ELEVATION: 30.97' msl
TOTAL DEPTH: 11.0' bgs

ELEVATION	DEPTH	SOIL SAMPLES	SAMPLE NO.	SAMPLE METHOD	BLOWS/6"	RECOVERY	PID (PPM) BG	PID (PPM) PS	LITHOLOGY	DESCRIPTION	DEPTH
	0.0		S-1	SS	-	-	-	-		SAND AND SILT/SILT AND SAND: Fine grained, black to dark brown and gray, damp to wet, loose to very loose	0.0
30.00	1.0		S-2	SS	5 5 3 5	1.5	0.4	0.4			1.0
29.00	2.0										2.0
28.00	3.0		S-3	SS	5 / 2 4"	1.0	0.5	0.5			3.0
27.00	4.0										4.0
26.00	5.0		S-4	SS	1/ 12" 1/ 12"	1.0	2.7	3.0			5.0
25.00	6.0										6.0
24.00	7.0		S-5	SS	W O R	0.1	1.4	1.4			7.0
23.00	8.0										8.0
22.00	9.0		S-6	SS	1 2 2 3	2.0	1.2	1.2			9.0
21.00	10.0										10.0
20.00	11.0									BOTTOM OF BOREHOLE @ 11.0'	11.0
19.00	12.0									NOTES: 1) Groundwater encountered at 5' during drilling	12.0
18.00	13.0										13.0
17.00	14.0										14.0
16.00	15.0										15.0
15.00	16.0										16.0
14.00	17.0										17.0
13.00	18.0										18.0
12.00	19.0										19.0
11.00	20.0										20.0
10.00	21.0										21.0
9.00	22.0										22.0
8.00	23.0										23.0
7.00	24.0										24.0
6.00	25.0										25.0
5.00	26.0										26.0
4.00	27.0										27.0
3.00	28.0										28.0

BAKER

TEST BORING LOG

BOREHOLE NUMBER: 3-TA-SB21

SHEET 1 OF 1

PROJECT NUMBER: 62470-274
PROJECT NAME: SITE 3 - OLD CREOSOTE PLANT
LOCATION: MCB CAMP LEJEUNE, NC
DRILLING COMPANY: HARDIN-HUBER, INC
RIG TYPE & NUMBER: ATV
DRILLING METHOD: HOLLOW STEM AUGERS
WEATHER: SUNNY
GEOLOGIST: R.M. LEWIS
ENV. SCIENTIST: A.M. BERNHARDT
DATE BEGUN: 11/15/94 DATE COMPLETED 11/15/94

GROUND SURFACE ELEVATION: 30.71' msl
TOTAL DEPTH: 9.0' bgs

ELEVATION	DEPTH	SOIL SAMPLES	SAMPLE NO.	SAMPLE METHOD	BLOWS/6"	RECOVERY	PID (PPM) BG	PID (PPM) PS	LITHOLOGY	DESCRIPTION	DEPTH
30.00	0.0		S-1	SS	-	-	-	-		SAND AND SILT: Fine grained, black, damp (Possible Fill)	0.0
29.00	1.0		S-2	SS	15 15 18 6	2.0	0.4	0.4		SAND: Fine grained, trace silt, black to gray, damp to wet, dense to medium denser	1.0
28.00	2.0										2.0
27.00	3.0		S-3	SS	5 8 9 11	2.0	0.4	0.4			3.0
26.00	4.0										4.0
25.00	5.0		S-4	SS	5 4 6 9	2.0	0.4	0.4			5.0
24.00	6.0										6.0
23.00	7.0		S-5	SS	6 6 11 10	2.0	0.4	0.4			7.0
22.00	8.0										8.0
21.00	9.0									BOTTOM OF BOREHOLE @ 9.0'	9.0
20.00	10.0									NOTES:	10.0
19.00	11.0									1) Groundwater encountered at 7' during drilling	11.0
18.00	12.0										12.0
17.00	13.0										13.0
16.00	14.0										14.0
15.00	15.0										15.0
14.00	16.0										16.0
13.00	17.0										17.0
12.00	18.0										18.0
11.00	19.0										19.0
10.00	20.0										20.0
9.00	21.0										21.0
8.00	22.0										22.0
7.00	23.0										23.0
6.00	24.0										24.0
5.00	25.0										25.0
4.00	26.0										26.0
3.00	27.0										27.0
2.00	28.0										28.0

BAKER

TEST BORING LOG

BOREHOLE NUMBER: 3-TA-SB23

SHEET: 1 OF: 1

PROJECT NUMBER: 62470-274
PROJECT NAME: SITE 3 - OLD CREOSOTE PLANT
LOCATION: MCB CAMP LEJEUNE, NC
DRILLING COMPANY: HARDIN-HUBER, INC.
RIG TYPE & NUMBER: ATV
DRILLING METHOD: HOLLOW STEM AUGERS
WEATHER: SUNNY
GEOLOGIST: R.M. LEWIS
ENV. SCIENTIST: A.M. BERNHARDT
DATE BEGUN: 11/15/94 DATE COMPLETED: 11/15/94

GROUND SURFACE ELEVATION: 31.63' msl
TOTAL DEPTH: 11.0' bgs

ELEVATION	DEPTH	SOIL SAMPLES	SAMPLE NO.	SAMPLE METHOD	BLOWS/6"	RECOVERY	PID (PPM) BG	PID (PPM) PS	LITHOLOGY	DESCRIPTION	DEPTH
31.00	0.0		S-1	SS	-	-	-	-		SAND: fine grained, and silt to trace silt, occasional trace of clay, black to dark brown and gray, damp to wet, loose to medium dense	0.0
30.00	1.0				8					Probable fill from 0 to 3'	1.0
29.00	2.0		S-2	SS	9 13 10	2.0	0.3	0.3			2.0
28.00	3.0				4						3.0
27.00	4.0		S-3	SS	3 4 7	2.0	0.3	0.7			4.0
26.00	5.0				5						5.0
25.00	6.0		S-4	SS	7 3 7	2.0	0.3	0.4			6.0
24.00	7.0				6						7.0
23.00	8.0		S-5	SS	5 7 6	2.0	0.4	0.4			8.0
22.00	9.0				5						9.0
21.00	10.0		S-6	SS	3 3 6	2.0	0.4	0.5			10.0
20.00	11.0									BOTTOM OF BOREHOLE @ 11.0'	11.0
19.00	12.0									NOTES	12.0
18.00	13.0									1) Groundwater encountered at 5' during drilling	13.0
17.00	14.0										14.0
16.00	15.0										15.0
15.00	16.0										16.0
14.00	17.0										17.0
13.00	18.0										18.0
12.00	19.0										19.0
11.00	20.0										20.0
10.00	21.0										21.0
9.00	22.0										22.0
8.00	23.0										23.0
7.00	24.0										24.0
6.00	25.0										25.0
5.00	26.0										26.0
4.00	27.0										27.0
	28.0										28.0

BAKER

TEST BORING LOG

BOREHOLE NUMBER: 3-TA-SB25

SHEET: 1 OF: 1

PROJECT NUMBER: 62470-274
PROJECT NAME: SITE 3 - OLD CREOSOTE PLANT
LOCATION: MCB CAMP LEJEUNE, NC
DRILLING COMPANY: HARDIN-HUBER, INC
RIG TYPE & NUMBER: ATV
DRILLING METHOD: HOLLOW STEM AUGERS
WEATHER: SUNNY
GEOLOGIST: R.M. LEWIS
ENV SCIENTIST: A.M. BERNHARDT
DATE BEGUN: 11/15/94 DATE COMPLETED: 11/15/94

GROUND SURFACE ELEVATION: 30.72' msl
TOTAL DEPTH: 9.0' bgs

ELEVATION	DEPTH	SOIL SAMPLES	SAMPLE NO.	SAMPLE METHOD	BLOWS/6"	RECOVERY	PID (PPM) BG	PID (PPM) PS	LITHOLOGY	DESCRIPTION	DEPTH
	0.0		S-1	SS	-	-	-	-		SAND AND SILT: Fine grained, dark gray to black, damp to moist, loose. (Possible Fill)	0.0
30.00	1.0				6 3 2 4						1.0
29.00	2.0		S-2	SS		2.0	0.5	0.5			2.0
28.00	3.0				1 2 3 3						3.0
27.00	4.0		S-3	SS		2.0	0.5	0.5			4.0
26.00	5.0				1 1 3 16						5.0
25.00	6.0		S-4	SS		2.0	0.5	0.5			6.0
24.00	7.0				6 13 13 8						7.0
23.00	8.0		S-5	SS		2.0	0.5	0.5		SAND: Fine grained, some silt, black to brown, moist to wet, loose	8.0
22.00	9.0									BOTTOM OF BOREHOLE @ 9.0'	9.0
21.00	10.0									NOTES:	10.0
20.00	11.0									1) Groundwater encountered at 6' during drilling.	11.0
19.00	12.0										12.0
18.00	13.0										13.0
17.00	14.0										14.0
16.00	15.0										15.0
15.00	16.0										16.0
14.00	17.0										17.0
13.00	18.0										18.0
12.00	19.0										19.0
11.00	20.0										20.0
10.00	21.0										21.0
9.00	22.0										22.0
8.00	23.0										23.0
7.00	24.0										24.0
6.00	25.0										25.0
5.00	26.0										26.0
4.00	27.0										27.0
3.00	28.0										28.0

BAKER

TEST BORING LOG

BOREHOLE NUMBER: 3-TA-SB29

SHEET: 1 OF: 1

PROJECT NUMBER: 62470-274
PROJECT NAME: SITE 3 - OLD CREOSOTE PLANT
LOCATION: MCB CAMP LEJEUNE, NC
DRILLING COMPANY: HARDIN-HUBER, INC.
RIG TYPE & NUMBER: ATV
DRILLING METHOD: HOLLOW STEM AUGERS
WEATHER: SUNNY
GEOLOGIST: R.M. LEWIS
ENV. SCIENTIST: A.M. BERNHARDT
DATE BEGUN: 11/15/94 DATE COMPLETED: 11/15/94

GROUND SURFACE ELEVATION: 33.80' msl
TOTAL DEPTH: 9.0' bgs

ELEVATION	DEPTH	SOIL SAMPLES	SAMPLE NO	SAMPLE METHOD	BLOWS/6"	RECOVERY	PID (PPM) BG	PID (PPM) PS	LITHOLOGY	DESCRIPTION	DEPTH
	0.0		S-1	SS	-	-	-	-		SAND AND SILT: Fine grained, black, damp, medium dense to loose	0.0
33.00	1.0				12						1.0
32.00	2.0		S-2	SS	8 8 6	2.0	0.7	0.7			2.0
31.00	3.0				2						3.0
30.00	4.0		S-3	SS	2 4 12	2.0	0.7	0.7			4.0
29.00	5.0				11					SAND: Fine grained, little silt, gray, wet, dense	5.0
28.00	6.0		S-4	SS	12 18 20	2.0	0.7	0.7			6.0
27.00	7.0				5						7.0
26.00	8.0		S-5	SS	10 7 4	2.0	0.7	0.7			8.0
25.00	9.0									BOTTOM OF BOREHOLE @ 9.0'	9.0
24.00	10.0									NOTES	10.0
23.00	11.0									1) Groundwater encountered at 6' during drilling	11.0
22.00	12.0										12.0
21.00	13.0										13.0
20.00	14.0										14.0
19.00	15.0										15.0
18.00	16.0										16.0
17.00	17.0										17.0
16.00	18.0										18.0
15.00	19.0										19.0
14.00	20.0										20.0
13.00	21.0										21.0
12.00	22.0										22.0
11.00	23.0										23.0
10.00	24.0										24.0
9.00	25.0										25.0
8.00	26.0										26.0
7.00	27.0										27.0
6.00	28.0										28.0

BAKER

TEST BORING LOG

BOREHOLE NUMBER: 3-TA-SB34

SHEET: 1 OF: 1

PROJECT NUMBER: 62470-274
PROJECT NAME: SITE 3 - OLD CREOSOTE PLANT
LOCATION: MCB CAMP LEJEUNE, NC
DRILLING COMPANY: HARDIN-HUBER, INC
RIG TYPE & NUMBER: ATV
DRILLING METHOD: HOLLOW STEM AUGERS
WEATHER: SUNNY
GEOLOGIST: R.M. LEWIS
ENV SCIENTIST: A.M. BERNHARDT
DATE BEGUN: 11/17/94 DATE COMPLETED: 11/17/94

GROUND SURFACE ELEVATION: 30.78' msl
TOTAL DEPTH: 9.0' bgs

ELEVATION	DEPTH	SOIL SAMPLES	SAMPLE NO.	SAMPLE METHOD	BLOWS/6"	RECOVERY	PID (PPM) BG	PID (PPM) PS	LITHOLOGY	DESCRIPTION	DEPTH
	0.0		S-1	SS	-	-	-	-		SILT AND SAND: Fine grained, black, moist	0.0
30.00	1.0				3						1.0
29.00	2.0		S-2	SS	4 5 9	2.0	0.3	0.3		SAND Fine grained, some clay, brown to gray, moist, medium dense	2.0
28.00	3.0				3						3.0
27.00	4.0		S-3	SS	5 9 6	2.0	0.3	0.3		SAND: Fine grained, little silt, gray, moist, medium dense	4.0
26.00	5.0				1						5.0
25.00	6.0		S-4	SS	3 4 4	2.0	0.3	0.3		SAND Fine grained, some clay, gray, damp to wet, loose to medium dense	6.0
24.00	7.0				3						7.0
23.00	8.0		S-5	SS	10 7 10	2.0	0.3	0.3			8.0
22.00	9.0									BOTTOM OF BOREHOLE @ 9.0'	9.0
21.00	10.0									NOTES 1) Groundwater encountered at 7' during drilling	10.0
20.00	11.0										11.0
19.00	12.0										12.0
18.00	13.0										13.0
17.00	14.0										14.0
16.00	15.0										15.0
15.00	16.0										16.0
14.00	17.0										17.0
13.00	18.0										18.0
12.00	19.0										19.0
11.00	20.0										20.0
10.00	21.0										21.0
9.00	22.0										22.0
8.00	23.0										23.0
7.00	24.0										24.0
6.00	25.0										25.0
5.00	26.0										26.0
4.00	27.0										27.0
3.00	28.0										28.0

BAKER

TEST BORING LOG

BOREHOLE NUMBER: 3-TA-SB37

SHEET: 1 OF: 1

PROJECT NUMBER: 62470-274
PROJECT NAME: SITE 3 - OLD CREOSOTE PLANT
LOCATION: MCB CAMP LEJEUNE, NC
DRILLING COMPANY: HARDIN-HUBER, INC
RIG TYPE & NUMBER: ATV
DRILLING METHOD: HOLLOW STEM AUGERS
WEATHER: SUNNY
GEOLOGIST: R.M. LEWIS
ENV. SCIENTIST: A.M. BERNHARDT
DATE BEGUN: 11/15/94 DATE COMPLETED: 11/15/94

GROUND SURFACE ELEVATION: 31.11' msl
TOTAL DEPTH: 9.0' bgs

ELEVATION	DEPTH	SOIL SAMPLES	SAMPLE NO	SAMPLE METHOD	BLOWS/6"	RECOVERY	PID (PPM) BG	PID (PPM) PS	LITHOLOGY	DESCRIPTION	DEPTH
31.00	0.0		S-1	SS	-	-	-	-		SAND AND SILT: Fine grained, black to dark gray, damp, medium dense	0.0
30.00	1.0				12						1.0
29.00	2.0		S-2	SS	11 10 14	2.0	0.4	0.4			2.0
28.00	3.0				4						3.0
27.00	4.0		S-3	SS	6 7 6	2.0	0.4	0.4			4.0
26.00	5.0				4						5.0
25.00	6.0		S-4	SS	7 4 10	2.0	0.4	0.4		SAND Fine grained, trace silt, gray, wet, medium dense	6.0
24.00	7.0				6						7.0
23.00	8.0		S-5	SS	5 5 6	2.0	0.4	0.4			8.0
22.00	9.0									BOTTOM OF BOREHOLE @ 9.0'	9.0
21.00	10.0									NOTES: 1) Groundwater encountered at 6' during drilling	10.0
20.00	11.0										11.0
19.00	12.0										12.0
18.00	13.0										13.0
17.00	14.0										14.0
16.00	15.0										15.0
15.00	16.0										16.0
14.00	17.0										17.0
13.00	18.0										18.0
12.00	19.0										19.0
11.00	20.0										20.0
10.00	21.0										21.0
9.00	22.0										22.0
8.00	23.0										23.0
7.00	24.0										24.0
6.00	25.0										25.0
5.00	26.0										26.0
4.00	27.0										27.0
3.00	28.0										28.0

BAKER

TEST BORING LOG

BOREHOLE NUMBER: 3-TA-SB39

SHEET: 1 OF: 1

PROJECT NUMBER: 62470-274
PROJECT NAME: SITE 3 - OLD CREOSOTE PLANT
LOCATION: MCB CAMP LEJEUNE, NC
DRILLING COMPANY: HARDIN-HUBER, INC.
RIG TYPE & NUMBER: ATV
DRILLING METHOD: HOLLOW STEM AUGERS
WEATHER: SUNNY
GEOLOGIST: R.M. LEWIS
ENV. SCIENTIST: A.M. BERNHARDT
DATE BEGUN: 11/15/94 DATE COMPLETED: 11/15/94

GROUND SURFACE ELEVATION: 31.19' msl
TOTAL DEPTH: 11.0' bgs

ELEVATION	DEPTH	SOIL SAMPLES	SAMPLE NO	SAMPLE METHOD	BLOWS/6"	RECOVERY	PID (PPM) BG	PID (PPM) PS	LITHOLOGY	DESCRIPTION	DEPTH
31.00	0.0		S-1	SS	-	-	-	-		SAND AND SILT: Fine grained, brown to black, damp, dense (Possible Fill)	0.0
30.00	1.0				8						1.0
29.00	2.0		S-2	SS	15 13 20	2.0	0.1	0.1			2.0
28.00	3.0				5					SAND AND SILT: Fine grained, black to dark gray, occasional trace clay, damp to wet, medium dense	3.0
27.00	4.0		S-3	SS	9 8 9	2.0	0.1	0.1			4.0
26.00	5.0				5						5.0
25.00	6.0		S-4	SS	9 8 6	2.0	0.1	0.1			6.0
24.00	7.0				5						7.0
23.00	8.0		S-5	SS	6 8 12	2.0	0.1	0.1			8.0
22.00	9.0				5						9.0
21.00	10.0		S-6	SS	9 5 9	2.0	0.1	0.1			10.0
20.00	11.0									BOTTOM OF BOREHOLE @ 11.0'	11.0
19.00	12.0									NOTES:	12.0
18.00	13.0									1) Groundwater encountered at 9' during drilling	13.0
17.00	14.0										14.0
16.00	15.0										15.0
15.00	16.0										16.0
14.00	17.0										17.0
13.00	18.0										18.0
12.00	19.0										19.0
11.00	20.0										20.0
10.00	21.0										21.0
9.00	22.0										22.0
8.00	23.0										23.0
7.00	24.0										24.0
6.00	25.0										25.0
5.00	26.0										26.0
4.00	27.0										27.0
3.00	28.0										28.0

BAKER

TEST BORING LOG

BOREHOLE NUMBER: 3-TA-SB41

SHEET: 1 OF: 1

PROJECT NUMBER: 62470-274
PROJECT NAME: SITE 3 - OLD CREOSOTE PLANT
LOCATION: MCB CAMP LEJEUNE, NC
DRILLING COMPANY: HARDIN-HUBER, INC
RIG TYPE & NUMBER: ATV
DRILLING METHOD: HOLLOW STEM AUGERS
WEATHER: SUNNY
GEOLOGIST: R.M. LEWIS
ENV. SCIENTIST: A.M. BERNHARDT
DATE BEGUN: 11/15/94 DATE COMPLETED: 11/15/94

GROUND SURFACE ELEVATION: 30.98' msl
TOTAL DEPTH: 9.0' bgs

ELEVATION	DEPTH	SOIL SAMPLES	SAMPLE NO.	SAMPLE METHOD	BLOWS/6"	RECOVERY	PID (PPM) BG	PID (PPM) PS	LITHOLOGY	DESCRIPTION	DEPTH
	0.0		S-1	SS	-	-	-	-		SAND AND SILT: Fine grained, black, damp	0.0
30.00	1.0				12						1.0
29.00	2.0		S-2	SS	13 14 12	2.0	0.4	0.4			2.0
28.00	3.0				4					SAND: fine grained, some silt, occsional trace clay, gray, damp/wet, medium dense	3.0
27.00	4.0		S-3	SS	4 3 3	2.0	0.4	0.4			4.0
26.00	5.0										5.0
25.00	6.0		S-4	SS	1 2 2 3	2.0	0.4	0.4			6.0
24.00	7.0										7.0
23.00	8.0									BOTTOM OF BOREHOLE @ 7.0'	8.0
22.00	9.0									NOTES	9.0
21.00	10.0									1) Groundwater encountered at 5' during drilling.	10.0
20.00	11.0										11.0
19.00	12.0										12.0
18.00	13.0										13.0
17.00	14.0										14.0
16.00	15.0										15.0
15.00	16.0										16.0
14.00	17.0										17.0
13.00	18.0										18.0
12.00	19.0										19.0
11.00	20.0										20.0
10.00	21.0										21.0
9.00	22.0										22.0
8.00	23.0										23.0
7.00	24.0										24.0
6.00	25.0										25.0
5.00	26.0										26.0
4.00	27.0										27.0
3.00	28.0										28.0

BAKER

TEST BORING LOG

BOREHOLE NUMBER: 3-TA-SB43

SHEET: 1 OF: 1

PROJECT NUMBER: 62470-274
PROJECT NAME: SITE 3 - OLD CREOSOTE PLANT
LOCATION: MCB CAMP LEJEUNE, NC
DRILLING COMPANY: HARDIN-HUBER, INC
RIG TYPE & NUMBER: ATV
DRILLING METHOD: HOLLOW STEM AUGERS
WEATHER: SUNNY
GEOLOGIST: R.M. LEWIS
ENV. SCIENTIST: A.M. BERNHARDT
DATE BEGUN: 11/15/94 DATE COMPLETED: 11/15/94

GROUND SURFACE ELEVATION: 31.18' msl
TOTAL DEPTH: 9.0' bgs

ELEVATION	DEPTH	SOIL SAMPLES	SAMPLE NO.	SAMPLE METHOD	BLOWS/6"	RECOVERY	PID (PPM) BG	PID (PPM) PS	LITHOLOGY	DESCRIPTION	DEPTH
31.00	0.0		S-1	SS	-	-	-	-		SAND AND SILT: Fine grained, dark brown, damp, medium dense	0.0
30.00	1.0				9						1.0
29.00	2.0		S-2	SS	11	2.0	0.4	0.4			2.0
28.00	3.0				16 19						3.0
27.00	4.0		S-3	SS	9 12	2.0	0.4	0.4		SAND AND SILT: fine grained, gray, moist to wet, medium dense	4.0
26.00	5.0				14 12						5.0
25.00	6.0		S-4	SS	4 5	2.0	0.4	0.4			6.0
24.00	7.0				8 6						7.0
23.00	8.0		S-5	SS	5 3	2.0	0.4	0.4			8.0
22.00	9.0				3 3					BOTTOM OF BOREHOLE @ 9.0'	9.0
21.00	10.0									NOTES	10.0
20.00	11.0									1) Groundwater encountered at 7' during drilling	11.0
19.00	12.0										12.0
18.00	13.0										13.0
17.00	14.0										14.0
16.00	15.0										15.0
15.00	16.0										16.0
14.00	17.0										17.0
13.00	18.0										18.0
12.00	19.0										19.0
11.00	20.0										20.0
10.00	21.0										21.0
9.00	22.0										22.0
8.00	23.0										23.0
7.00	24.0										24.0
6.00	25.0										25.0
5.00	26.0										26.0
4.00	27.0										27.0
3.00	28.0										28.0

BAKER

TEST BORING LOG

BOREHOLE NUMBER: 3-TA-SB45/46/47

SHEET 1 OF 1

PROJECT NUMBER: 62470-274
PROJECT NAME: SITE 3 - OLD CREOSOTE PLANT
LOCATION: MCB CAMP LEJEUNE, NC
DRILLING COMPANY: PARRATT-WOLFF, INC
RIG TYPE & NUMBER: TRUCK RIG - CME 55
DRILLING METHOD: HOLLOW STEM AUGERS
WEATHER: SUNNY, HOT
GEOLOGIST: M.K. DEJOHN
ENV. SCIENTIST: -
DATE BEGUN: 6/15/95 DATE COMPLETED: 6/15/95

GROUND SURFACE ELEVATION: 32.19' msl
TOTAL DEPTH: 5.0' bgs

ELEVATION	DEPTH	SOIL SAMPLES	SAMPLE NO	SAMPLE METHOD	BLOWS/6"	RECOVERY	PID (PPM) BG	PID (PPM) PS	LITHOLOGY	DESCRIPTION	DEPTH
31.00	0.0		S-1	HA	-	-	0.7	0.7			0.0
30.00	1.0				19					SILT: little fine grained sand, trace clay, black/gray, damp, medium dense	1.0
29.00	2.0		S-2	SS	10	2.0	0.7	0.7			2.0
28.00	3.0				8 8					SAND: fine grained, some silt, trace to little clay, gray/tan, moist to wet, loose	3.0
27.00	4.0		S-3	SS	6 4 4 5	1.3	0.6	0.6			4.0
26.00	5.0									BOTTOM OF BOREHOLE @ 5.0'	5.0
25.00	6.0									NOTES: 1) Groundwater encountered at 5' during drilling.	6.0
24.00	7.0										7.0
23.00	8.0										8.0
22.00	9.0										9.0
21.00	10.0										10.0
20.00	11.0										11.0
19.00	12.0										12.0
18.00	13.0										13.0
17.00	14.0										14.0
16.00	15.0										15.0
15.00	16.0										16.0
14.00	17.0										17.0
13.00	18.0										18.0
12.00	19.0										19.0
11.00	20.0										20.0
10.00	21.0										21.0
9.00	22.0										22.0
8.00	23.0										23.0
7.00	24.0										24.0
6.00	25.0										25.0
5.00	26.0										26.0
4.00	27.0										27.0
3.00	28.0										28.0

BAKER

TEST BORING LOG

BOREHOLE NUMBER: 3-TA-SB48/49/50

SHEET: 1 OF 1

PROJECT NUMBER: 62470-274
PROJECT NAME: SITE 3 - OLD CREOSOTE PLANT
LOCATION: MCB CAMP LEJEUNE, NC
DRILLING COMPANY: PARRATT-WOLFF, INC
RIG TYPE & NUMBER: TRUCK RIG - CME 55
DRILLING METHOD: HOLLOW STEM AUGERS
WEATHER: SUNNY, HOT
GEOLOGIST: M.K. DEJOHN
ENV. SCIENTIST: -
DATE BEGUN: 6/15/95 DATE COMPLETED: 6/15/95

GROUND SURFACE ELEVATION: 32.19' msl
TOTAL DEPTH: 9.0' bgs

ELEVATION	DEPTH	SOIL SAMPLES	SAMPLE NO	SAMPLE METHOD	BLOWS/6"	RECOVERY	PID (PPM) BG	PID (PPM) PS	LITHOLOGY	DESCRIPTION	DEPTH
32.00	0.0		S-1	HA	-	-	-	-		SAND: Fine grained, little to some silt, layers of stones and clay, dark gray, damp, dense to medium dense	0.0
31.00	1.0										1.0
30.00	2.0		S-2	SS	17 13 17 15	1.7	0.9	2.0			2.0
29.00	3.0										3.0
28.00	4.0		S-3	SS	5 7 5 6	1.6	0.7	1.0			4.0
27.00	5.0										5.0
26.00	6.0		S-4	SS	4 4 5 6	2.0	0.7	1.1		SANDY CLAY: Fine grained, little silt, gray, damp, medium dense; strong creasote odor	6.0
25.00	7.0										7.0
24.00	8.0		S-5	SS	10 13 14 12	2.0	0.7	8.0		SAND: Fine grained, some silt, trace to little clay, gray w/brown staining, moist to wet, medium dense; strong odor and free product floating on water surface	8.0
23.00	9.0										9.0
22.00	10.0									BOTTOM OF BOREHOLE @ 9.0'	10.0
21.00	11.0									NOTES:	11.0
20.00	12.0									1) Groundwater encountered at 9' during drilling.	12.0
19.00	13.0										13.0
18.00	14.0										14.0
17.00	15.0										15.0
16.00	16.0										16.0
15.00	17.0										17.0
14.00	18.0										18.0
13.00	19.0										19.0
12.00	20.0										20.0
11.00	21.0										21.0
10.00	22.0										22.0
9.00	23.0										23.0
8.00	24.0										24.0
7.00	25.0										25.0
6.00	26.0										26.0
5.00	27.0										27.0
4.00	28.0										28.0

BAKER

WELL CONSTRUCTION LOG

BOREHOLE NUMBER
3-MW02IW
SHEET 1 OF 4

PROJECT NUMBER: 62470-212
PROJECT NAME: SITE 3 - OLD CREOSTE PLANT
LOCATION: MCB CAMP LEJEUNE, NC
DRILLING COMPANY: HARDIN-HUBER, INC.
RIG TYPE & NUMBER: MOBILE B-80
DRILLING METHOD: MUD ROTARY
WEATHER: SUNNY, HOT, HUMID
GEOLOGIST: J.E. ZIMMERMAN
ENV. SCIENTIST: M.D. SMITH
DATE BEGUN: 1/16/94 DATE COMPLETED: 1/16/94

GROUND SURFACE ELEVATION: 32.50' msl
TOP OF CASING ELEVATION: 35.19' msl

WELL DETAILS (FT)

STICKUP:	2.5
INNER CASING (10"I.D.)	20.0
LENGTH OF RISER (2"I.D.)	71.5
LENGTH OF SCREEN (2"I.D.)	15.0
THICKNESS OF GROUT:	61.0
THICKNESS OF SEAL:	5.5
THICKNESS OF SAND PACK:	20.0

ELEVATION	DEPTH	SOIL SAMPLES	SAMPLE NO	SAMPLE	BLOWS/0.5'	RECOVERY	PID (PPM) BG	PID (PPM) PS	LITHOLOGY	DESCRIPTION	DEPTH	WELL INSTALLATION
36.00	4.0											
35.00	3.0											
34.00	2.0											
33.00	1.0											
32.00	0.0		S-1	SS	-	-	0.2	0.2		SILTY SAND: fine grained, trace root material/burnt soil/charcoal/wood, dark brown, damp, very loose.	0.0	
31.00	1.0										1.0	
30.00	2.0		S-2	SS	14 9 9 8	1.6	0.2	0.2		SILTY SAND: fine grained, trace clay, buff/light brown, damp, medium dense	2.0	
29.00	3.0		S-3	SS	5 7 7 8	1.6	0.2	0.2			3.0	
28.00	4.0										4.0	
27.00	5.0		S-4	SS	8 9 8 9	1.6	0.2	0.2		SAND: fine grained, trace silt, occasional trace clay, light gray, damp to wet, medium dense/loose	5.0	
26.00	6.0										6.0	
25.00	7.0		S-5	SS	5 7 7 8	1.5	0.2	0.2			7.0	
24.00	8.0										8.0	
23.00	9.0		S-6	SS	9 9 10 12	0.8	0.2	0.2			9.0	
22.00	10.0										10.0	
21.00	11.0		S-7	SS	5 5 7 8	1.4	0.2	0.2			11.0	
20.00	12.0										12.0	
19.00	13.0		S-8	SS	7 5 4 3	2.0	0.2	0.2			13.0	
18.00	14.0										14.0	
17.00	15.0		S-9	SS	3 7 12 16	1.2	0.2	0.2		creosote odor evident	15.0	
16.00	16.0										16.0	
15.00	17.0		S-10	SS	3 3 3 4	2.0	0.4	0.4		SILTY CLAY: trace fine grained sand, greenish gray, moist, soft/very soft, creosote odor and contamination present	17.0	
14.00	18.0										18.0	
13.00	19.0										19.0	
12.00	20.0		S-11	SS	WOH WOH 1 3	2.0	0.4	0.4			20.0	
11.00	21.0										21.0	
10.00	22.0										22.0	
9.00	23.0										23.0	
	24.0										24.0	

BAKER

WELL CONSTRUCTION LOG

BOREHOLE NUMBER: 3-MW02IW

SHEET 2 OF 4

ELEVATION	DEPTH	SOIL SAMPLES	SAMPLE NO	SAMPLE METHOD	BLOWS/0.5'	RECOVERY (FT)	PID (PPM) BG	PID (PPM) PS	LITHOLOGY	DESCRIPTION	DEPTH	WELL INSTALLATION
12:00	20.0									SILTY CLAY: trace fine grained sand, greenish gray, moist, soft/very soft, creosote odor and contamination present	20.0	
11:00	21.0										21.0	
10:00	22.0										22.0	
9:00	23.0										23.0	
8:00	24.0										24.0	
7:00	25.0		S-12	SS	7 7 8 9	0.6	0.4	0.4		SAND: fine to medium grained, trace silt, occasional some to little clay, gray/greenish gray, wet, medium dense/ loose/dense	25.0	
6:00	26.0										26.0	
5:00	27.0										27.0	
4:00	28.0										28.0	
3:00	29.0										29.0	
2:00	30.0		S-13	SS	3 3 3 5	1.2	0.4	0.4			30.0	
1:00	31.0										31.0	
0:00	32.0										32.0	
1:00	33.0										33.0	
2:00	34.0										34.0	
3:00	35.0		S-14	SS	2 3 10 13	1.1	0.3	0.3			35.0	
4:00	36.0										36.0	
5:00	37.0										37.0	
6:00	38.0										38.0	
7:00	39.0										39.0	
8:00	40.0		S-15	SS	3 6 6 14	1.8	0.3	0.3			40.0	
9:00	41.0										41.0	
10:00	42.0										42.0	
11:00	43.0										43.0	
12:00	44.0										44.0	
13:00	45.0		S-16	SS	13 13 15 20	1.6	0.3	0.3		Shell fragments w/micrite cement (0.8')	45.0	
14:00	46.0										46.0	
15:00	47.0										47.0	
16:00	48.0										48.0	
17:00	49.0										49.0	
18:00	50.0		S-17	SS	20 17 17 10	1.1	0.3	0.3			50.0	
19:00	51.0										51.0	
	52.0										52.0	

BAKER

WELL CONSTRUCTION LOG

BOREHOLE NUMBER
3-MW2IW
SHEET: 3 OF 4

ELEVATION	DEPTH	SOIL SAMPLES	SAMPLE NO	SAMPLE METHOD	BLOWS/0.5'	RECOVERY (FT)	PID (PPM) BG	PID (PPM) PS	LITHOLOGY	DESCRIPTION
-18:00	50.0									
	51.0		S-18	SS	20 17 17 40	1.1	0.3	0.3		SAND: Fine to medium grained, trace silt, trace shell fragments, gray to white/ greenish gray, wet, dense/very dense
-19:00	52.0									
-20:00	53.0									
-21:00	54.0									
-22:00	55.0									
-23:00	56.0		S-19	SS	30 71 100 /5"	1.1	-	-		
-24:00	57.0									
-25:00	58.0									
-26:00	59.0									
-27:00	60.0									
-28:00	61.0		S-20	SS	20 34 50 40	0.8	-	-		
-29:00	62.0									
-30:00	63.0									
-31:00	64.0									
-32:00	65.0									
-33:00	66.0		S-21	SS	42 100 /4"	0.7	0.7	0.7		
-34:00	67.0									
-35:00	68.0									
-36:00	69.0									
-37:00	70.0									
-38:00	71.0		S-22	SS	100 /5" 100 /1"	0.8	0.7	0.7		
-39:00	72.0									
-40:00	73.0									
-41:00	74.0									
-42:00	75.0									
-43:00	76.0		S-23	SS	46 100 /5"	0.8	0.7	0.7		
-44:00	77.0									
-45:00	78.0									
-46:00	79.0									
-47:00	80.0									
-48:00	81.0									
-49:00	82.0									

DEPTH	WELL INSTALLATION
50.0	
51.0	
52.0	
53.0	
54.0	
55.0	
56.0	
57.0	
58.0	
59.0	
60.0	
61.0	
62.0	
63.0	
64.0	
65.0	
66.0	
67.0	
68.0	
69.0	
70.0	
71.0	
72.0	
73.0	
74.0	
75.0	
76.0	
77.0	
78.0	
79.0	
80.0	
81.0	
82.0	

BAKER

WELL CONSTRUCTION LOG

BOREHOLE NUMBER: 3-MW02IW

SHEET: 1 OF: 1

ELEVATION	DEPTH	SOIL SAMPLES	SAMPLE NO	SAMPLE METHOD	BLOWS/0.5'	RECOVERY (FT)	PID (PPM) BG	PID (PPM) PS	LITHOLOGY	DESCRIPTION	DEPTH	WELL INSTALLATION
48:00	80.0										80.0	
49:00	81.0		S-23	SS	36 100 /5"	0.6	0.7	0.7		SAND: fine grained, trace silt, greenish gray, wet, very dense	81.0	
50:00	82.0										82.0	
51:00	83.0										83.0	
52:00	84.0										84.0	
53:00	85.0		S-24	SS	46 100 /9"	0.8	0.7	0.7			85.0	
54:00	86.0										86.0	
55:00	87.0									BOTTOM OF BOREHOLE @ 87.0'	87.0	
56:00	88.0									NOTES:	88.0	
57:00	89.0									1) Groundwater encountered @ 9.0' during drilling	89.0	
58:00	90.0										90.0	
59:00	91.0										91.0	
60:00	92.0										92.0	
61:00	93.0										93.0	
62:00	94.0										94.0	
63:00	95.0										95.0	
64:00	96.0										96.0	
65:00	97.0										97.0	
66:00	98.0										98.0	
67:00	99.0										99.0	
68:00	100.0										100.0	
69:00	101.0										101.0	
70:00	102.0										102.0	
71:00	103.0										103.0	
72:00	104.0										104.0	
73:00	105.0										105.0	
74:00	106.0										106.0	
75:00	107.0										107.0	
76:00	108.0										108.0	
77:00	109.0										109.0	
78:00	110.0										110.0	
79:00	111.0										111.0	
	112.0										112.0	

BAKER

WELL CONSTRUCTION LOG

BOREHOLE NUMBER
3-MW02DW
SHEET 1 OF 5

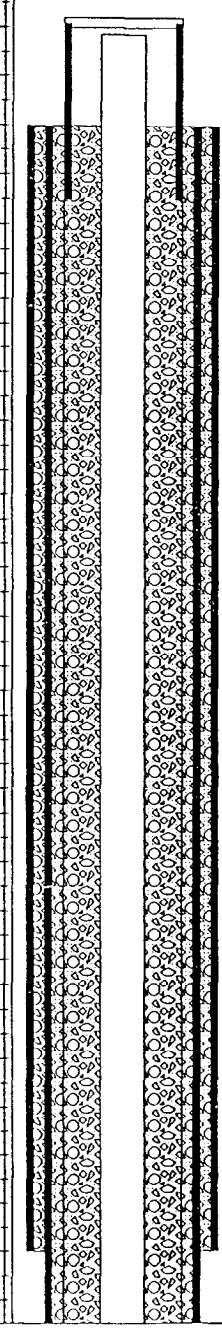
PROJECT NUMBER: 62470-274
PROJECT NAME: SITE 3 - OLD CREOSTE PLANT
LOCATION: MCB CAMP LEJEUNE, NC
DRILLING COMPANY: PARRATT-WOLFF, INC.
RIG TYPE & NUMBER: TRUCK RIG (I.D. "115)
DRILLING METHOD: MUD ROTARY
WEATHER: HOT, HUMID
GEOLOGIST: J.E. ZIMMERMAN/M.K. DEJOHN
ENV. SCIENTIST: M.D. SMITH
DATE BEGUN: 6/20/95 DATE COMPLETED: 6/28/95

GROUND SURFACE ELEVATION: 32.19' msl
TOP OF CASING ELEVATION: 34.06' msl

WELL DETAILS (FT)

STICKUP	1.87
OUTER CASING (6"I.D.)	
LENGTH OF RISER (2"I.D.)	125.0
LENGTH OF SCREEN (2"I.D.)	15.0
THICKNESS OF GROUT	108.0
THICKNESS OF SEAL	14.0
THICKNESS OF SAND PACK	18.0

ELEVATION	DEPTH	SOIL SAMPLES	SAMPLE NO.	SAMPLE METHOD	BLOWS/0.5'	RECOVERY (FT)	PID (PPM) BG	PID (PPM) PS	LITHOLOGY	DESCRIPTION	DEPTH	WELL INSTALLATION
36:00	4.0											
35:00	3.0											
34:00	2.0											
33:00	1.0											
32:00	0.0		S-1	SS	-	-	0.1	0.1		SILTY SAND: fine grained, trace root material, occasional trace clay, dark grayish brown, damp, very loose/medium dense; creosote odor detected at 1-3'	0.0	
31:00	1.0				9						1.0	
30:00	2.0		S-2	SS	8 8 7	1.6	0.1	0.1			2.0	
29:00	3.0				10					SAND: fine grained, trace silt, occasional trace clay, dark brownish gray/buff/light gray, damp/moist/wet, medium dense/loose; creosote odor present	3.0	
28:00	4.0		S-3	SS	10 8 8	1.6	0.4	0.4			4.0	
27:00	5.0				2						5.0	
26:00	6.0		S-4	SS	4 8 7	1.8	0.1	0.1			6.0	
25:00	7.0				3						7.0	
24:00	8.0		S-5	SS	5 7 7	1.5	0.1	0.1			8.0	
23:00	9.0				4						9.0	
22:00	10.0		S-6	SS	5 5 5	1.3	0.2	0.2			10.0	
21:00	11.0				3						11.0	
20:00	12.0		S-7	SS	5 7 3	1.5	0.2	0.2			12.0	
19:00	13.0				3						13.0	
18:00	14.0		S-8	SS	5 7 7	2.0	0.2	0.2			14.0	
17:00	15.0				2						15.0	
16:00	16.0		S-9	SS	2 2 2	1.6	0.2	0.2			16.0	
15:00	17.0				3						17.0	
14:00	18.0		S-10	SS	4 2 2	1.5	0.2	0.2			18.0	
13:00	19.0				3						19.0	
12:00	20.0		S-11	SS	2 1 1	1.4	0.2	0.2			20.0	
11:00	21.0				WOH						21.0	
10:00	22.0		S-12	SS	2 1 1	2.0	0.2	0.2		SILTY CLAY: dark greenish gray, damp, soft/very soft; creosote odor present	22.0	
9:00	23.0										23.0	
8:00	24.0										24.0	



BAKER

WELL CONSTRUCTION LOG

BOREHOLE NUMBER
3-MW02DW
SHEET 2 OF 5

ELEVATION	DEPTH	SOIL SAMPLES	SAMPLE NO.	SAMPLE METHOD	BLOWS/0.5'	RECOVERY (FT)	PID (PPM) BG	PID (PPM) PS	LITHOLOGY	DESCRIPTION	DEPTH	WELL INSTALLATION
12:00	20.0										20.0	
11:00	21.0									SAND: Fine grained, trace silt, occasional trace clay, dark brownish gray/buff/light gray, damp/moist/wet, medium dense/loose, creosote odor present	21.0	
10:00	22.0		S-12	SS	WOH 2 1 1	2.0	0.3	0.3			22.0	
9:00	23.0									SILTY CLAY: dark greenish gray, damp, soft/very soft, creosote odor present	23.0	
8:00	24.0										24.0	
7:00	25.0									SAND: fine grained, trace silt, occasional some to little clay, gray/greenish gray/ dark greenish gray, wet, very dense/loose/ medium dense/dense; creosote odor present to 47'	25.0	
6:00	26.0		S-13	SS	10 27 38 27	0.7	0.2	0.2			26.0	
5:00	27.0										27.0	
4:00	28.0										28.0	
3:00	29.0										29.0	
2:00	30.0										30.0	
1:00	31.0		S-14	SS	2 4 5 6	2.0	0.2	0.2			31.0	
0:00	32.0										32.0	
1:00	33.0										33.0	
2:00	34.0										34.0	
3:00	35.0										35.0	
4:00	36.0		S-15	SS	8 12 16 13	1.7	0.2	0.2			36.0	
5:00	37.0										37.0	
6:00	38.0										38.0	
7:00	39.0										39.0	
8:00	40.0										40.0	
9:00	41.0		S-16	SS	1 2 1 2	1.4	0.2	0.2			41.0	
10:00	42.0										42.0	
11:00	43.0										43.0	
12:00	44.0										44.0	
13:00	45.0										45.0	
14:00	46.0		S-17	SS	3 3 7 11	1.4	0.2	0.2			46.0	
15:00	47.0										47.0	
16:00	48.0										48.0	
17:00	49.0										49.0	
18:00	50.0										50.0	
19:00	51.0		S-18	SS	7 14 26 32	1.5	0.2	0.2			51.0	
20:00	52.0										52.0	

BAKER

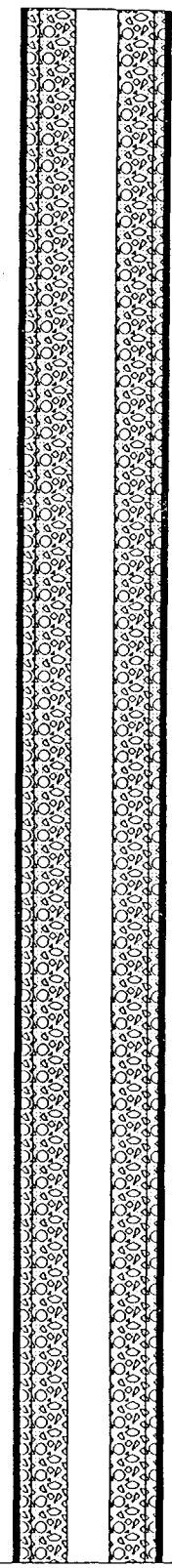
WELL CONSTRUCTION LOG

BOREHOLE NUMBER
3-MW020W

ELEVATION	DEPTH	SOIL SAMPLES	SAMPLE NO	SAMPLE METHOD	BLOWS/0.5'	RECOVERY (FT)	PID (PPM) BG	PID (PPM) PS	LITHOLOGY	DESCRIPTION
18-00	50.0		S-18	SS	7 14 26 32	1.4	0.2	0.2		SAND Fine to medium grained, trace silt, trace to little shell fragments, dark greenish gray/gray/white, wet, dense/ very dense
19-00	51.0									
20-00	52.0									
21-00	53.0									
22-00	54.0									
23-00	55.0		S-19	SS	14 34 53 63	1.3	0.2	0.2		
24-00	56.0									
25-00	57.0									
26-00	58.0									
27-00	59.0									
28-00	60.0		S-20	SS	14 18 18 23	1.2	0.2	0.2		
29-00	61.0									
30-00	62.0									
31-00	63.0									
32-00	64.0									
33-00	65.0		S-21	SS	24 60 82 100/4"	1.3	0.2	0.2		
34-00	66.0									
35-00	67.0									
36-00	68.0									
37-00	69.0									
38-00	70.0		S-22	SS	18 33 81 100/4"	1.3	0.2	0.2		
39-00	71.0									
40-00	72.0									
41-00	73.0									
42-00	74.0									
43-00	75.0		S-23	SS	18 34 63 92	1.4	0.3	0.3		
44-00	76.0									
45-00	77.0									
46-00	78.0									
47-00	79.0									
48-00	80.0		S-24	SS	22 56 98 100/4"	1.2	0.3	0.3		
49-00	81.0									
50-00	82.0									

DEPTH

WELL INSTALLATION



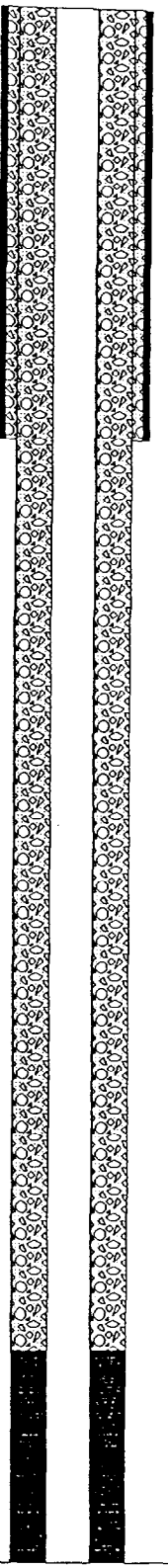
BAKER

WELL CONSTRUCTION LOG

BOREHOLE NUMBER 3-MW02DW

SHEET 4 OF 5

ELEVATION	DEPTH	SOIL SAMPLES	SAMPLE NO	SAMPLE METHOD	BLOWS/0.5'	RECOVERY (FT)	PID (PPM) BG	PID (PPM) PS	LITHOLOGY	DESCRIPTION	DEPTH	WELL INSTALLATION
48-00	80.0				22						80.0	
49-00	81.0		S-24	SS	56	1.2	0.3	0.3		SAND: fine to medium grained, trace silt, trace shell fragments, dark greenish gray/ gray/white, wet, very dense	81.0	
50-00	82.0				98						82.0	
51-00	83.0				100/4"						83.0	
52-00	84.0										84.0	
53-00	85.0				28						85.0	
54-00	86.0		S-25	SS	42	1.5	0.3	0.3			86.0	
55-00	87.0				96						87.0	
56-00	88.0				100/4"						88.0	
57-00	89.0										89.0	
58-00	90.0										90.0	
59-00	91.0										91.0	
60-00	92.0										92.0	
61-00	93.0									SAND and SILT: fine grained, little clay, trace shell fragments, dark green, damp, dense	93.0	
62-00	94.0				15						94.0	
63-00	95.0		S-26	SS	20	2.0	0.8	0.8			95.0	
64-00	96.0				25						96.0	
65-00	97.0				54						97.0	
66-00	98.0										98.0	
67-00	99.0				17						99.0	
68-00	100.0		S-27	SS	19	2.0	-	-		SHELL FRAGMENTS: some silt, little clay, gray, moist, very dense	100.0	
69-00	101.0				31					SILT: some shell fragments, little to some clay, gray, damp, hard	101.0	
70-00	102.0				54						102.0	
71-00	103.0										103.0	
72-00	104.0				27						104.0	
73-00	105.0		S-28	SS	28	2.0	0.1	0.1		SAND and SILT: little to some clay, trace shell fragments, taupe, moist, hard	105.0	
74-00	106.0				18						106.0	
75-00	107.0				32						107.0	
76-00	108.0										108.0	
77-00	109.0				-						109.0	
78-00	110.0		S-29	SS	27	2.0	0.1	0.1			110.0	
79-00	111.0				34						111.0	
80-00	112.0										112.0	

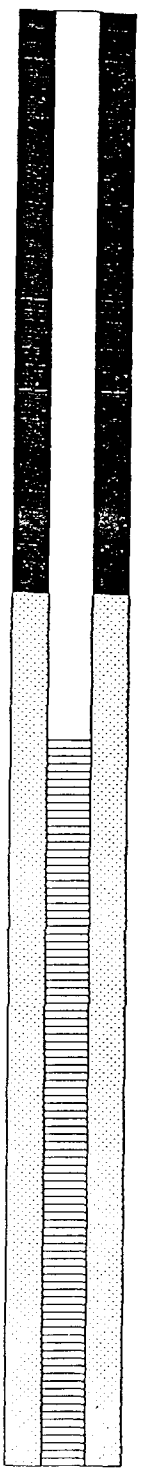


BAKER

WELL CONSTRUCTION LOG

BOREHOLE NUMBER
3-MW020W
SHEET 5 OF 5

ELEVATION	DEPTH	SOIL SAMPLES	SAMPLE NO	SAMPLE METHOD	BLOWS/0.5'	RECOVERY (FT)	PID (PPM) BG	PID (PPM) PS	LITHOLOGY	DESCRIPTION	DEPTH	WELL INSTALLATION
78.00	110.0										110.0	
79.00	111.0									SAND and SILT: fine grained, trace to some clay, trace shell fragments, taupe, moist, hard	111.0	
80.00	112.0										112.0	
81.00	113.0										113.0	
82.00	114.0										114.0	
83.00	115.0		S-30	SS	17 21 33 34	2.0	0.5	0.6		SHELL FRAGMENTS: little silt and clay, gray, wet, very dense	115.0	
84.00	116.0										116.0	
85.00	117.0										117.0	
86.00	118.0										118.0	
87.00	119.0										119.0	
88.00	120.0		S-31	SS	22 40 35 35	1.0	0.6	0.6			120.0	
89.00	121.0										121.0	
90.00	122.0										122.0	
91.00	123.0										123.0	
92.00	124.0										124.0	
93.00	125.0		S-32	SS	17 17 23 41	0.8	0.6	0.6		SAND Fine to medium grained, little silt, trace shell fragments and clay, dark gray, wet, dense to very dense	125.0	
94.00	126.0										126.0	
95.00	127.0										127.0	
96.00	128.0										128.0	
97.00	129.0		S-33	SS	100/4"	0.3	0.6	0.6			129.0	
98.00	130.0										130.0	
99.00	131.0										131.0	
100.00	132.0										132.0	
101.00	133.0										133.0	
102.00	134.0		S-34	SS	200/6"	0.5	0.6	0.6			134.0	
103.00	135.0										135.0	
104.00	136.0										136.0	
105.00	137.0										137.0	
106.00	138.0										138.0	
107.00	139.0										139.0	
108.00	140.0									BOTTOM OF BOREHOLE @ 140'	140.0	
109.00	141.0									NOTES	141.0	
110.00	142.0									1) Groundwater encountered @ 6.0' during drilling	142.0	



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DEPARTMENT OF THE NAVY

ATLANTIC DIVISION, NAVAL FACILITIES ENGINEERING COMMAND

NORFOLK, VIRGINIA

LANTDIV RAC Contract No.
N62470-89-D-3032

REMEDIATION OF PAH-CONTAMINATED SOIL
OPERABLE UNIT NO. 12 (SITE 3)
MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA

Designed by:

BAKER ENVIRONMENTAL, INC.
CORAOPOLIS, PENNSYLVANIA

Specification Prepared by:

Environmental:	**Civil:**
Tara L. Beckman	Kathy M. Chavara P.E.

Date: April 9, 1998

Specification Approved by:

Specification Branch Head: M. D. Mutter, P.E.

Engineering and Design Division Director: W. H. Crone IV, P.E.

Environmental Quality Division Director:

Date:_____

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
REMEDIATION OF PAH-CONTAMINATED SOIL, OU NO. 12 (SITE 3)

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	CLASSIFICATION GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY						
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01115	SD-18 Records														
			As-Built records	1.3.1.1	G												
			Environmental Conditions Report	1.3.1.2	G												
			Status reports	1.3.1.3	G												
			QC meeting minutes	1.3.1.4	G												
			Test Results Summary Report	1.3.1.5	G												
			Contractor Production Report	1.3.1.6	G												
			QC Report	1.3.1.7	G												
			Rework Items List	1.3.1.8	G												
			Permits	1.3.1.9	G												
			Contractor's Closeout Report	1.3.1.10	G												
		01430	SD-08 Statements														
			Sample Log	3.1.3													
			SD-12 Field Test Reports														
			Confirmation Sampling	1.3.3													
			Waste Characterization Sampling	1.3.4													
		01561	SD-02 Manufacturer's Catalog Data														
			Silt Fence	2.1													
			Dust Suppressors	2.3													
			SD-04 Drawings														
			Erosion Control Plan	1.3.2.1	G												
		01575	SD-08 Statements														
			Environmental protection plan	1.6.1	G												
			Preconstruction survey	1.6.4	G												
			Preconstruction brief		G												
			Work schedule		G												

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
REMEDIATION OF PAH-CONTAMINATED SOIL, OU NO. 12 (SITE 3)

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	CLASSIFICATION GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY					REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01575	SD-18 Records														
			Environmental training	1.2	G												
			documentation														
			Erosion and sediment control	1.4.2.1	G												
			inspection reports														
			Environmental Plan Review	1.6.3	G												
		02220	SD-08 Statements														
			Demolition plan	1.3.1.1													
		02223	SD-08 Statements														
			Treatment Facility Permit	1.1.1.1													
			SD-18 Records														
			Shipment Manifests	1.1.3													
			Delivery Certificates	1.1.4													
			Disposal Site Decontamination	1.2.5													
			Certificate														
			Work Site Decontamination	1.1.6													
			Certificate														
			Treatment and Disposal Certificates	1.1.7													
		02315	SD-04 Drawings														
			drawings	1.3.1.1													
			SD-05 Design Data														
			calculations	1.3.2.1													
			SD-08 Statements														
			Supporting systems	3.2.1													
			Dewatering														
			SD-12 Field Test Reports														

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
REMEDIATION OF PAH-CONTAMINATED SOIL, OU NO. 12 (SITE 3)

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	CLASSIFICATION GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY					MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)		(q)	(r)
		02315	Fill and backfill															
			Density tests	3.8.2.1														

SECTION 01115

GENERAL PARAGRAPHS (REMEDIAL ACTION CONTRACTS)

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

CODE OF FEDERAL REGULATIONS (CFR)

29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1926	Safety and Health Regulations for Construction
29 CFR 1926-SUBPART V	Power Transmission and Distribution

CORPS OF ENGINEERS (COE)

COE EP 1110-1-8	(1995) Construction Equipment Ownership and Operating Expense Schedule
COE EM-385-1-1	(1992) Safety and Health Requirements Manual

FEDERAL STANDARDS (FED-STD)

FED-STD-595	(Rev. B) Colors Used in Government Procurement

MILITARY STANDARDS (MIL-STD)

MIL-STD-461	(Rev. D) Control of Electromagnetic Interference Emissions and Susceptibility
MIL-STD-462	(Rev. D) Measurement of Electromagnetic Interference Characteristics

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 241	(1993) Safeguarding Construction, Alteration, and Demolition Operations

1.2 PRECONSTRUCTION SUBMITTALS

Submit the following in accordance with Section C, Part 7.0 of the basic contract.

1.2.1 SD-09, Reports

a. Work Plan G

1.2.1.1 Work Plan

Submit a Work Plan consisting of the following elements:

a. Narrative: Provide a brief description of the project objectives, scheduling, sampling and analysis requirements, decontamination procedures, removal and excavation procedures, and storage, transportation, and disposal requirements; and a detailed sequence of events for the construction, extraction, and treatment methods.

b. Technical Specifications: Provide, in an amendment format, any additional specifications and any modifications to the contract specifications required to accurately describe the materials and work procedures envisioned to satisfy the requirements of the delivery order. Contact Code 406, Specifications Branch, Engineering and Design Division, LANTNAVFACENGCOM, (757) 322-4301, for availability of guide specification sections for those sections required, but not included in the contract documents.

c. Shop drawings: Shop drawings shall detail and describe components of the project not currently indicated on the contract drawings such that the shop drawings and the contract drawings, when taken together, provide a complete representation of the project requirements. Shop drawings shall be prepared and sealed by a registered professional engineer. Shop drawings shall include:

(1) Erosion Control Plan in accordance with State and local regulations.

d. Environmental Protection Plan: At the preconstruction conference, meet with the Navy Technical Representative (NTR) to discuss environmental protection requirements for the project. Prepare and submit an Environmental Protection Plan in accordance with Section C, Part 4.0, of the basic contract, and as specified herein.

(1) Hazardous materials (HM) to be brought onto the Base: Any hazardous materials planned for use on the Base shall be included in the Base Hazardous Material Tracking Program maintained by the safety department. To assist in this effort, the Contractor shall submit a list (including quantities) of HM to be brought to the Base and copies of the corresponding material safety data sheets (MSDS). This list shall be submitted to the NTR. At project completion, any hazardous material brought onto the Base shall be removed from the site by the Contractor. The Contractor shall account for the quantity of HM brought to the Base, the quantity used or expended during the job, and the leftover quantity which (1) may have additional useful life as a HM and shall be removed by the Contractor, or (2) may be a hazardous waste, which shall then be removed as specified herein.

(2) Hazardous waste (HW) generated: The Environmental Protection Plan shall list and quantify any HW to be generated during the project.

(3) Storage of hazardous waste: In accordance with Base regulations, hazardous waste shall be stored near the point of generation up to a total quantity of 1 quart of acutely hazardous waste or 55 gallons of hazardous waste. Any volume exceeding

these quantities shall be moved to an HW permitted area within 3 days. Prior to generation of HW, contact the NTR for labeling requirements for storage of hazardous wastes.

(4) Minimization of hazardous waste: In accordance with Base regulations, the Contractor should substitute materials as necessary to reduce the generation of HW and include a statement to that effect in the Environmental Protection Plan.

(5) Environmental conditions likely to be encountered during this project: Contact the NTR for conditions in the area of the project which may be subject to special environmental procedures. Include this information in the Preconstruction Survey. Describe in the Environmental Protection Plan any permits required prior to working the area, and contingency plans in case an unexpected environmental condition is discovered.

(6) Permitting plans for any transportation and disposal, excavation, or construction of hazardous waste that will require an environmental permit from an issuing agency: The Contractor is responsible for generating the permits and delivering the completed documents to the NTR. The NTR will review the permits and the Contractor shall file the documents with the appropriate agency and complete disposal with the approval of the NTR. Correspondence with the State concerning the environmental permits and completed permits shall be delivered to the NTR.

(7) Environmental Protection Plan format

ENVIRONMENTAL PROTECTION PLAN

Contracting Organization

Address and Phone Numbers

1. Hazardous materials to be brought onto the Base
   2. MSDS package
   3. Employee training documentation
   4. HW storage plan
   5. HW to be generated
   6. Preconstruction Survey results
   7. Permitting requirements identified

e. Health and Safety Plan: Provide a site specific Health and Safety Plan (HASP) in accordance with Section C, Part 3.0, of the basic contract. The HASP shall include, but is not limited to, the following:

(1) Names of the health and safety officer and names of alternates responsible for health and safety.

(2) 29 CFR 1910.

(3) 29 CFR 1926.

(4) 29 CFR 1926-SUBPART V, tagout and lockout procedures.

(5) Contract Clause "FAR 52.236-13, Accident Prevention."

(6) Contract Clause "FAR 52.223-3, Hazardous Material Identification and Material Safety Data."

(7) NFPA 241.

f. QC Plan: Provide a QC Plan in accordance with Section C, Part 6.0, of the basic contract, and as specified herein.

(1) Table of Contents

I. QC ORGANIZATION
II. NAMES AND QUALIFICATIONS
III. DUTIES, RESPONSIBILITY, AND AUTHORITY OF QC PERSONNEL
IV. OUTSIDE ORGANIZATIONS
V. APPOINTMENT LETTERS
VI. SUBMITTAL PROCEDURES AND INITIAL SUBMITTAL REGISTER
VII. TESTING LABORATORY INFORMATION
VIII. TESTING PLAN AND LOG
IX. PROCEDURES TO COMPLETE REWORK ITEMS
X. DOCUMENTATION PROCEDURES

(2) Submittal Register: As part of the QC Plan, submit a completed Submittal Register to document quality control for materials, inspection, and testing in accordance with Section C, Part 7.0 of the basic contract. A copy of the Submittal Register is provided at the end of this section.

(3) Testing laboratory qualifications: As part of the QC Plan, submit qualifications for each laboratory which shall be used in accordance with Section C, Part 6.0, of the basic contract. Laboratories engaged in hazardous materials testing shall meet the requirements of Section C, Part 6.0 of the basic contract.

g. Sampling and Analysis Plan: Provide a Sampling and Analysis Plan describing sampling and analyses requirements for the delivery order, including sampling and analyses required during the operational period to verify the system is operating within required parameters. The plan shall contain a Field Sampling Plan and a Quality Assurance Plan.

1.2.2 Forwarding Preconstruction Submittals

Within 60 calendar days of issuance of the delivery order, and before procurement, fabrication, or mobilization, submit to LANTNAVFACENGCOM, 1510 Gilbert Street, Norfolk, VA 23511-2699, and to distribution as directed by the NTR, the Work Plan, complete as specified. The Architect-Engineer shall review the Work Plan for the NTR to determine compliance of the Contractor's Work Plan with the requirements of the contract documents for this delivery order.

1.2.3 Review Comments

The Contractor's Work Plan shall be reviewed. The NTR shall compile and coordinate Government review comments, and forward consolidated review comments to the Contractor. Review comments on the Work Plan shall be resolved, and Work Plan modified as required. After the correction of the Work Plan, submit one corrected final copy to the Commander, LANTNAVFACENGCOM, 1510 Gilbert Street, Norfolk, VA 23511-2699 for final review. The Work Plan shall be approved prior to commencement of any other

work associated with this delivery order.

1.3 SUBMITTALS

Submit the following in accordance with Section C, Part 7.0, of the basic contract.

1.3.1 SD-18, Records

a. As-Built records G

b. Environmental Conditions Report G

c. Status reports G

d. QC meeting minutes G

e. Test Results Summary Report G

f. Contractor Production Report G

g. QC Report G

h. Rework Items List G

i. Permits G

j. Contractor's Closeout Report G

1.3.1.1 As-Built Records

Maintain two sets of full size contract drawings and two sets of full size approved shop drawings marked to show any deviations which have occurred, including buried or concealed construction and utility features revealed during the course of construction. Record horizontal and vertical locations of buried utilities that differ from the contract drawings. These drawings shall be available for review by the NTR at any time. At the completion of the work, deliver marked sets of the contract drawings to the NTR. The Contractor shall indicate on the drawings the locations of confirmation samples. The Contractor shall incorporate shop drawing deviations, and deliver one complete set of the shop drawings to the NTR.

1.3.1.2 Environmental Conditions Report

Prior to starting work, perform a preconstruction survey with the NTR. Take photographs showing existing environmental conditions on and adjacent to Site 3. Prior to starting work, submit the results of the survey in an Environmental Condition Report to the NTR.

1.3.1.3 Contract Management System (CMS)

The CMS shall be a system able to provide, as a minimum, the activities in sorts or groups as specified in the basic contract and any subsequent delivery orders.

a. Status reports: Status reports shall comply with the basic contract and any subsequent delivery orders. Submit a Technical Progress Report, Cost Performance Report, modification log, time-scaled logic diagram, and Waste Materials Report. Submit the first delivery order status report approximately 15 days after the

end of the month in which the Contractor's Work Plan was approved. Thereafter, submit status reports every 30 days. Status report periods shall be consistent with the invoice reporting periods.

1.3.1.4 QC Meeting Minutes

The QC representative shall document QC meetings by delivering copies of the minutes to the NTR within 3 calendar days after each QC meeting. The submittals shall comply with Section C, Part 6.0 of the basic contract.

1.3.1.5 Test Results Summary Report

A summary report of field tests and laboratory analytical results shall be submitted to the NTR within 30 days after laboratory receipt of samples and in accordance with Section C, Part 6.0 of the basic contract. A separate report shall be required for each set of analytical data.

1.3.1.6 Contractor Production Report (CPR)

The CPR shall be prepared and submitted daily to the NTR in accordance with Section C, Part 6.0, of the basic contract.

1.3.1.7 QC Report

The QC Report shall be submitted by the QC representative to the NTR every day work is performed, material is delivered, direction is pending, or a labor force is present in accordance with Section C, Part 6.0, of the basic contract.

1.3.1.8 Rework Items List

The QC representative shall deliver a copy of the Rework Items List to the NTR on a monthly basis in accordance with Section C, Part 6.0, of the basic contract.

1.3.1.9 Permits

Fifteen days prior to beginning onsite work, submit draft copies of the following permits required for onsite activities:

a. Excavation Permit; from the Public Works Officer, Utilities Division.

1.3.1.10 Contractor's Closeout Report

Submit upon completion of the project. This report shall include: introduction, summary of action, final Health and Safety Report, summary of record documents, field changes and contract modification, final documents, complete set of field test and laboratory analytical results, complete set of data validation results, documentation of offsite transportation and treatment of materials, QC Summary Report, and final cost data. Report shall also include an evaluation of the system, including quantities of contaminated soil treated, contaminants removed, quality of effluent, problems encountered, and solutions implemented.

1.3.2 Forwarding Submittals

After approval of the work plan, and before procurement or fabrication, submit, except as specified otherwise, to the Commander, LANTNAVFACENGCOM, 1510 Gilbert Street, Norfolk, VA 23511-2699, the shop drawings and

technical data required in the technical sections of this specification. The Architect-Engineer for this project shall review and provide surveillance for the NTR to determine if Contractor-approved submittals comply with the contract requirements, and shall review and approve for the NTR those submittals not permitted to be Contractor approved to determine if submittals comply with the contract requirements. At each "Submittal" paragraph in the individual specification sections, a notation "G," following a submittal item, indicates the Architect-Engineer, acting as the agent for the NTR, is the approving authority for that submittal item. One copy of the transmittal form for submittals shall be forwarded to the NTR.

1.4 PROJECT DESCRIPTION

This work includes the excavation of polynuclear aromatic hydrocarbon (PAH)-contaminated subsurface soil, disposal of the soil at a RCRA-permitted facility, backfilling operations, site restoration, and other related work.

1.5 LOCATION

The work shall be located at Operable Unit No. 12 (Site 3) approximately as shown. The exact location for specified construction shall be as indicated by the NTR.

1.6 DESCRIPTION OF CONTAMINANTS PRESENT

Subsurface soils at Site 3 have been contaminated with PAHs. Site characterization activities conducted at the site have indicated the following contaminants of concern, remediation levels, and maximum concentrations:

Contaminant of Concern	Remediation Level (ppb)	Maximum Concentration (ppb)
Naphthalene	584	95,000
2-Methylnaphthalene	30,000	31,000
Carbazole	500	4,900
Benzo(a)anthracene	343	8,000
Chrysene	38,150	8,400
N-nitrosodiphenylamine	200	1,100

The results of the chemical analyses for the soil borings and monitoring wells installed at the site are indicated in the reference documents. The above list of contaminants may not be all inclusive.

Boring logs for soil borings performed at the project site during site characterization activities are shown on the contract drawings.

1.7 COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK

The Contractor shall be required to (a) commence work on the Work Plan within 5 calendar days after receiving the notice to proceed, (b) prosecute the work diligently, and (c) complete the entire work ready for use not later than 180 calendar days after receiving the notice to proceed. The time stated for completion shall include final cleanup of the premises and the restoration of the site. The 120 day operational period is included in this deadline.

1.8 PROJECT INFORMATION

1.8.1 Contract Drawings

Contract drawings are as follows:

T-1 Cover Sheet and General Notes
C-1 Site 3 Plan and Soil Contaminant Levels
C-2 Excavation Plan
C-3 Boring Logs
C-4 Boring Logs

1.8.2 Reference Reports

The following reference reports are available for examination in the office of the NTR and are intended only to show the existing conditions. The reports and drawings are the property of the Government and shall not be used for any purpose other than that intended by the specification.

Reports

a. "Feasibility Study for Operable Unit No. 12 (Site 3), Marine Corps Base, Camp Lejeune, North Carolina", Baker Environmental, Inc., 1996.

b. "Remedial Investigation Report, Operable Unit No. 12 (Site 3), Marine Corps Base, Camp Lejeune, North Carolina", Baker Environmental, Inc., 1996.

c. "Site Inspection Report for Site 3, Old Creosote Plant, Marine Corps Base, Camp Lejeune, North Carolina", Halliburton/NUS, 1991.

d. "Work Plan and Permit Application for Land Treatment of Petroleum Contaminated Soils, MCB Camp Lejeune, North Carolina", OHM Remediation Services Corp., 1996.

1.9 SCHEDULING

The Contractor shall schedule the work as to cause the least amount of interference with Base operations. Work schedules shall be subject to the approval of the NTR. Permission to interrupt Base roads shall be requested in writing a minimum of 15 calendar days prior to the desired date of interruption. Notify the NTR 48 hours prior to starting excavation.

1.9.1 Regular Work Hours

Regular working hours shall consist of an 8 1/2 hour period established by the NTR, Monday through Friday, excluding Government holidays.

1.9.2 Work Outside Regular Hours

Work outside regular hours requires NTR approval. Contractor shall submit an application to the NTR, 2 regular working days prior to the scheduled working date, to allow ample time to enable satisfactory arrangements to be made by the Government for inspecting the work in progress. At night, the Contractor shall light the different parts of the work in an approved manner.

1.10 SECURITY REQUIREMENTS

The Contractor shall comply with the general security requirements as stipulated in Section C, Part 2.0, of the basic contract.

1.11 STORAGE AND TEMPORARY BUILDINGS

1.11.1 Storage in Existing Buildings

Storage in existing buildings shall not be allowed.

1.11.2 Open Site Storage Size and Location

The open site available for storage, laydown, and decontamination shall be confined to the areas indicated by the NTR.

1.11.3 Trailers, Storage, and Temporary Buildings

Locate trailers, storage, and temporary buildings where directed and within the indicated operations area. Trailers or storage buildings shall be permitted where space is available subject to the approval of the NTR. The trailers or storage buildings shall be suitably painted and kept in a good state of repair. Failure of the Contractor to maintain the trailers or storage buildings in good condition shall be considered sufficient reason to require their removal. Trailers shall be anchored to resist high winds and shall meet applicable State or local standards for anchoring mobile trailers. A sign that conforms to the following requirements and shows the company name, phone number, and emergency phone number, shall be mounted on the trailer or building.

Graphic panel: Aluminum, painted blue; FED-STD-595 25053

Copy: Screen painted or vinyl die-cut, white, Univers 65 u/lc typeface.

1.12 LOCATION OF UNDERGROUND UTILITIES

Contractor shall comply with the requirements specified in Section C, Part 2.0 of the basic contract, and with requirements specified herein. Obtain Base digging permits prior to the start of excavation activities. Verify elevations of existing underground utilities and obstructions before installing new work closer than the nearest manhole or other structure at which an adjustment can be made.

1.13 UTILITY SERVICES

1.13.1 Temporary Utilities

Reasonable amounts of utilities shall be made available without charge. However, all of the necessary utilities may not be available at the work sites. The Contractor shall be responsible for making connections, providing transformers and meters, and making disconnections. Contractor shall provide backflow preventer devices on connections to domestic water lines. Under no circumstances will taps to Base fire hydrants be allowed for obtaining domestic water.

The Contractor shall contact Marine Corps Public Works Center in writing to obtain telephone connection. The Contractor shall provide equipment and labor necessary to connect the telephone service to the site. The Contractor shall make arrangements for connections and disconnections and payments.

The Contractor shall not operate nor disturb the setting of control devices in the Base utilities system, including water, sewer, electrical, and steam services. The Government shall operate the control devices as required for normal conduct of the work. The Contractor shall notify the NTR, giving 15 days advance notice when such operation is required.

1.13.2 Utility Cutovers and Interruptions

Make utility cutovers and interruptions outside regular working hours. Conform to procedures specified herein for work outside regular working hours. Ensure that new utilities are complete, except for the connection, before interrupting the existing service.

1.14 RESTRICTIONS ON EQUIPMENT

1.14.1 Radio Transmitter Restrictions

The Contractor shall conform to the restrictions and procedures for the use of radio transmitting equipment, as directed by the NTR. Do not use transmitters without prior approval.

1.15 EQUIPMENT OWNERSHIP AND OPERATING EXPENSE SCHEDULE

In conjunction with the Contract Clause "DFARS 252.236-7000, Modification Proposals-Price Breakdown," and where actual ownership and operating costs of construction equipment cannot be determined from Contractor accounting records, equipment use rates shall be based upon the applicable provisions of the COE EP 1110-1-8.

1.16 PUBLIC RELEASE OF INFORMATION

Contractor shall comply with requirements stated in Section C, Part 2.0, of the basic contract.

1.17 STORM PROTECTION

Contractor shall conduct storm protection measures in accordance with the requirements of Section C, Part 2.0, of the basic contract, and as specified herein.

1.17.1 Hurricane Condition of Readiness

Unless directed otherwise, comply with:

a. Condition ONE (sustained winds of 50 knots or greater expected within 12 hours): Secure the jobsite, and leave Government premises.

b. Condition TWO (sustained winds of 50 knots or greater expected within 24 hours): Curtail or cease routine activities until securing operation is complete. Reinforce or remove form work and scaffolding. Secure machinery, tools, equipment, materials, or remove from the jobsite. Expend every effort to clear missile hazards and loose equipment from general base areas. Contact NTR for weather and condition of readiness (COR) updates and completion of required actions.

c. Condition THREE (sustained winds of 50 knots or greater expected within 48 hours): Maintain Condition FOUR requirements and

commence securing operations necessary for Condition ONE which cannot be completed within 18 hours. Cease routine activities which might interfere with securing operations. Commence securing and stow gear and portable equipment. Make preparations for securing buildings. Review requirements pertaining to Condition TWO and continue action as necessary to attain Condition THREE readiness. Contact NTR for weather and COR updates and completion of required actions.

d. Condition FOUR (sustained winds of 50 knots or greater expected within 72 hours): Normal daily jobsite cleanup and good housekeeping practices. Collect and store in piles or containers scrap lumber, waste material, and rubbish for removal and disposal at the close of each work day. Maintain the construction site including storage areas, free of accumulation of debris. Stack form lumber in neat piles less than 4 feet high. Remove debris, trash, or objects that could become missile hazards. Contact NTR for COR updates and completion of required actions.

1.18 ENVIRONMENTAL PROTECTION REQUIREMENTS

Provide and maintain, during the life of the delivery order, environmental protection as defined in Section C, Part 4.0, of the basic contract, and as specified herein.

1.18.1 Quarantine for Imported Fire Ant

Onslow, Jones, and Cartaret Counties and portions of Duplin and Craven Counties have been declared a generally infested area by the United States Department of Agriculture (USDA) for the imported fire ant. Compliance with the quarantine regulations established by this authority as set forth in USDA Publication 301.81 of 31 December 1992, is required for operations hereunder. Pertinent requirements of the quarantine for materials originating on the Camp Lejeune reservation, the Marine Corps Air Station (Helicopter), New River and the Marine Corps Air Station, Cherry Point, which are to be transported outside Onslow County or adjacent suppression areas, include the following:

a. Certification is required for the following articles and articles shall not be moved from the reservation to any point outside Onslow County and adjacent designated areas unless accompanied by a valid inspection certificate issued by an Officer of the Plant Protection and Quarantine Program (PPQ) of the U.S. Department of Agriculture (USDA).

(1) Bulk soil

(2) Used mechanized soil-moving equipment. Used mechanized soil-moving equipment is exempt if cleaned of loose noncompacted soil.

(3) Other products, articles, or means of conveyances, if it is determined by an inspector that they present a hazard of transporting spread of the imported fire ant and the person in possession thereof has been so notified.

b. Authorization for movement of equipment outside the imported fire ant regulated area shall be obtained from USDA, Animal and Plant Health Inspection Service (APHIS), Plant Protection and Quarantine (PPQ), Box 83, Goldsboro, NC 27533, telephone (919) 735-1941.

Requests for inspection shall be made sufficiently in advance of the date of movement to permit arrangements for the services of authorized inspectors. The equipment shall be prepared and assembled so that it may be readily inspected. Soil on or attached to equipment, supplies, and materials shall be removed by washing with water or such other means as necessary to accomplish complete removal. Resulting spoil shall be wasted as necessary and as directed.

1.18.2 Fire Protection

Comply with COE EM-385-1-1, NFPA 241, and activity fire regulations. Post the activity fire poster in conspicuous locations and at telephones in construction trailers.

1.19 PRECONSTRUCTION CONFERENCE

After approval of the Work Plan, but prior to commencement of any work at the site, Contractor shall meet with the NTR to discuss and develop a mutual understanding relative to the administration of the HASP, preparation and submission of submittals, scheduling, programming, and prosecution of the work. Major subcontractors who will be engaged in the work shall also attend.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 CLEANING UP

During the progress of the remediation, the work area and adjacent areas shall be kept clean and free of rubbish, surplus materials, and unneeded construction equipment. No material or debris shall be allowed to flow or wash into watercourses, ditches, gutters, drains, or pipes. Upon completion of the work, sweep paved areas and rake clean landscaped areas. Remove waste and surplus materials, rubbish, and construction facilities from the site.

-- End of Section --

SECTION 01430

WASTE SAMPLING REQUIREMENTS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (USEPA)

EPA/540/P-91/008	Compendium of ERT Waste Sampling Procedures, 1991
EPA-540/G-90/007	Guidance on Remedial Actions for Superfund Sites with PCB Contamination, August 1990
EPA-560/5-86-017	Field Manual for Grid Sampling of PCB Spill Sites to Verify Cleanup, May 1986
EPA SW-846	Test Methods for Evaluating Solid Wastes (Nov. 1986)

NAVAL ENERGY AND ENVIRONMENTAL SUPPORT ACTIVITY (NEESA)

NEESA 20.2-047B	Sampling and Chemical Analysis Quality Assurance Requirements for the Navy Installation Restoration Program (June 1988)

1.2 SUBMITTALS

Submit the following in accordance with Section C of the basic contract.

1.2.1 SD-08, Statements

a. Sample Log

1.2.2 SD-12, Field Test Reports

a. Confirmation Sampling Analysis Results G

a. Waste Characterization Sampling Analysis Results G

1.3 DEFINITIONS

1.3.1 Contractor Generated Wastes

Contractor generated wastes shall include all materials which become contaminated with wastes as defined in the basic contract as a result of Contractor activity at the site after the commencement of contract work.

1.3.2 Government Generated Wastes

Government generated wastes shall include all contaminated materials existing at the site prior to the commencement of contract work.

1.3.3 Confirmation Sampling

Confirmation sampling shall include all sampling conducted in the open excavations during the post-removal stage to confirm the removal of all contaminated soil.

1.3.4 Waste Characterization Sampling

Waste characterization sampling shall include all sampling of the excavated soils to characterize the soils for disposal at a RCRA-permitted facility and for use as backfill material

1.4 DESCRIPTION OF WORK

1.4.1 Contractor Generated Wastes

Collect and analyze environmental samples from each Contractor generated waste stream to determine applicable transportation and disposal requirements.

1.4.2 Government Generated Waste

Collect and analyze environmental samples from the excavated areas after Government generated waste has been removed to confirm the removal of all contaminated soil.

1.5 QUALITY ASSURANCE

1.5.1 Waste Sampling

Adhere to all sample acquisition, handling, custody documentation, decontamination, and quality assurance/quality control (QA/QC) requirements and procedures as required by Federal, State and local regulations.

1.5.2 Analytical Laboratory

The Contractor shall be solely responsible for the execution and accuracy of the waste stream analyses. The Contractor shall use a NEESA-certified laboratory for all soil and waste analyses. All analytical standard methods shall meet, at a minimum, NEESA 20.2-047B QA/QC Level C requirements for confirmation sampling and shall also be in accordance with Federal, State and local regulations.

1.5.3 Data Validation

An independent firm shall be subcontracted for data validation. Samples collected shall be evaluated using Level C quality control. Data review procedures specified by NEESA 20.2-047B and the Functional Guidelines established by EPA Region IV shall be followed to ensure that raw data are not altered and that an audit trail is developed for those data which require reduction. Specific Quality Assurance/Quality Control (QA/QC) procedures shall be included in the Sampling and Analysis Plan indicated in Section 01115. Data validation results shall be provided in the Contractor's Closeout Report as indicated in Section 01115, "General Paragraphs."

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 GENERAL

Supply all personnel, equipment, and facilities to collect and analyze the environmental samples required.

3.1.1 Sample Acquisition

Sampling procedures shall be consistent with NEESA 20.2-047B Guidelines.

After the excavation has been completed:

a. Visually inspect the area for stained or discolored soil.

b. If no stained or discolored soil is visible, collect one (1) composite sample that represents five (5) grab samples for every part of or every 500 square feet of the bottom of the excavation, and one sample for any portion of or every 50 linear feet of each sidewall of each excavation. do not collect bottom samples if depth of excavation reaches water table.

c. Place the samples in an appropriate sample container for in-field and/or shipment for off-site confirmation analyses.

d. If stained soils are visible, or if PAH-contamination is suspected, notify the NTR and the Activity.

3.1.1.1 Confirmation Samples

Confirmation samples shall be collected from the walls and the bottom of the open excavations. One composite sample that represents five (5) grab samples for every 500 square feet or fraction thereof of soil along the bottom of the excavation and one sample for every 50 linear feet or fraction thereof of soil along each excavation sidewall shall be collected. All confirmation samples shall be analyzed for target compound list (TCL) semivolatile analyses (EPA Method 3550/EPA Method 8270).

If detected concentrations exceed the following levels, notify the NTR. If the concentrations are less than the following levels, no further excavation is required.

Contaminant of Concern	Remediation Level (ug/kg)
Naphthalene	584
2-Methylnaphthalene	30,000
Carbazole	500
Benzo(a)anthracene	343
Chrysene	38,150
4-Nitrophenol	0
N-nitrosodiphenylamine	200

consistent w/ plans basis of design, ROD?

3.1.1.2 Waste Characterization Samples

Waste characterization samples shall be collected for the purpose of determining handling, transportation, and disposal requirements and for determining personal and environmental protection and monitoring

requirements.

Characterization samples shall be collected from the excavated soil that was located from zero to three feet bgs. These samples will determine if this soil is clean and may be used as backfill for the excavation. One thoroughly mixed composite sample shall be collected for every 500 cubic yards or fraction thereof of material.

Characterization samples shall also be collected from the excavated soil that was located from three to nine feet bgs. These samples will determine where this soil may be disposed. One thoroughly mixed composite sample shall be collected for every 500 cubic yards or fraction thereof of material.

The composite samples shall consist of six (6) grab samples representative of the material being sampled. The grab samples shall be thoroughly mixed to obtain a relatively homogeneous mixture.

The characterization samples shall be analyzed for the following parameters:

1. TCLP Metals - EPA Methods 6010, 7060, 7080, 7131, 7191, 7421, 7470, 7760, 7740
2. TCLP Volatiles - EPA Method 3550/EPA Method 8240
3. TCLP Semi-Volatiles - EPA Method 3550/EPA Method 8270
4. TCLP Pesticides - EPA Method 3550/EPA Method 8080
5. TCLP Herbicides - EPA Method 3550/EPA Method 8080
6. TCL PCBs - EPA Method 8080
7. RCRA Characteristics - SW-846 9010, 1010, 9012, 9030
8. Moisture Content - ASTM D 2216

① need TCLP to "clean"?
② what about TCL Semi-Vocs?

The soil shall contain no free liquid as demonstrated by EPA SW-846 Method 9095, paint filter liquid test.

3.1.1.3 Contractor Generated Waste Samples

Collect samples from Contractor generated waste to determine applicable transportation and disposal requirements. Analyze Contractor generated waste samples for the following parameters:

1. TAL Metals - EPA Methods 6010, 7060, 7080, 7131, 7191, 7421, 7470, 7760, 7740
2. TCL Volatiles - EPA Method 3550/EPA Method 8240
3. TCL Semi-Volatiles - EPA Method 3550/EPA Method 8270
4. TCL Pesticides/PCBs - EPA Method 3550/EPA Method 8080

3.1.2 Sample Handling

Sampling, sample handling, and sampling containers must be consistent with the chemicals expected, the matrix of the sample, and planned analytical procedures. Precleaned glass sample containers with teflon lids are required.

The Contractor shall describe in the Sampling and Analysis Plan strict

chain-of-custody procedures to be used during collection, transport, and analysis of all samples.

3.1.3 Sampling Documentation

Maintain a sample log containing, at a minimum, the following information:

a. Date and Time of Sampling

b. Sample Locations

c. Sample Matrix

d. Sample Identification Number

e. QA/QC Sample Identification

f. Analyses to be Performed

g. Type and Number of Sample Containers

h. Signatures of Individuals Performing Sampling

-- End of Section --

SECTION 01561

EROSION AND SEDIMENT CONTROL
07/92

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

FEDERAL SPECIFICATIONS (FS)

FS O-F-241	(Rev.D) Fertilizers; Mixed, Commercial

U.S. ARMY CORPS OF ENGINEERS (CW) PUBLICATIONS

CW 02215	1977 Plastic Filter Fabric

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICALS (AASHTO)

AASHTO M182	1960 (Rev. 1982) Burlap Cloth Made From Jute or Kenaf

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A185	1985 Steel Welded Wire, Fabric, for Concrete Reinforcement
ASTM C33	1990 Concrete Aggregate
ASTM D98	1987 Calcium Chloride
ASTM D1682	1964 (Rev.1985) Breaking Load and Elongation of Textile Fabrics
ASTM D3786	1987 Hydraulic Bursting Strength of Knitted Goods and Nonwoven Fabrics - Diaphragm Bursting Strength Tester Method

1.2 DESCRIPTION OF WORK

The work includes the provision of temporary erosion control measures to prevent the pollution of air, water, and land within the project limits and in areas outside the project limits where work is accomplished in conjunction with the project. Installation of temporary erosion control features shall be coordinated with the construction of permanent erosion control features to assure effective and continuous control of erosion and pollution.

1.3 SUBMITTALS

Submit the following in accordace with Section C, Part 7, of the Basic Contract.

1.3.1 SD-02, Manufacturer's Catalog Data

a. Silt Fence

b. Dust Suppressors

1.3.2 SD-04, Drawings

a. Erosion Control Plan G

1.3.2.1 Erosion Control Plan

Submit, for approval, four copies of a Contractor furnished erosion and sediment control plan to the Navy's Technical Representative (NTR), a minimum of 14 days prior to start of construction. The plans shall not be a reproduction of the contract documents. The erosion and sediment control plan shown on the drawings indicates minimum erosion control requirements and shall be site adapted and modified to suit the sequence of construction operations. As a minimum, the Contractor furnished erosion and sediment control plan shall indicate the following:

a. Clearing limits

b. New construction and existing construction affected by new construction

c. Grading sequence shown with installation sequence of temporary and permanent erosion control features

d. Type, size, and location of temporary erosion control features

1.3.2.1 General Guidance

Design to accommodate the runoff of a local 10 year storm. The following publications shall be used as a guide for developing the Contractor furnished plan:

a. Guide for sediment control on construction sites - USDA Soil Conservation Service

b. Processes, Procedures, and Methods To Control Pollution Resulting From All Construction Activity - EPA

c. Guidelines for erosion and sediment control planning and implementation - EPA

d. Erosion and Sediment Control Handbook - DC Department of Consumer and Regulatory Affairs.

PART 2 - PRODUCTS

2.1 Silt Fence

2.1.1 Posts

4 inch by 4 inch wood posts, minimum 3 inch diameter wood, or 1.33 pound per linear foot steel posts. Posts shall be minimum 3 feet long.

2.1.2 Wire Fabric

ASTM A185, 6 by 6, minimum 14-1/2 gage.

2.1.3 Filter Fabric

A woven or nonwoven polypropylene, nylon, or polyster containing stabilizers and/or inhibitors to make the fabric resistant to deterioration from ultraviolet, and with the following properties:

a. Minimum grab tensile strength (ASTM D1682) 100 pounds

b. Minimum grab elongation (ASTM D1682) 25 percent

c. Minimum mullen burst strength (ASTM D3786) 210 psi

d. E.O.S. (CW 02215) 20-100

2.1.4 Standard Catalog Product

A manufacturer's standard catalog product for a preassembled silt fence may be provided in lieu of the indicated silt fence except that the filter fabric shall be as specified, and the height of the structure shall be as indicated.

2.2 TEMPORARY SEEDING

2.2.1 Seed

State certified seed of the latest season's crop. Provide seed as specified in Part 3 - Execution.

2.2.2 Fertilizer

FS O-F-241, Type I, Class 2, with 10 percent nitrogen, 20 percent available phosphoric acid, and 10 percent potash.

2.2.3 Mulch

Hay or straw. Provide in an air dried condition for placement with commercial mulch blowing equipment.

2.3 DUST SUPPRESSORS

ASTM D98 calcium chloride, magnesium chloride, or other standard manufacturer's products designed for dust suppression.

PART 3 - EXECUTION

3.1 SILT FENCE

Install posts a maximum of 6 feet on center, and at an angle between 2 degrees and 20 degrees towards the potential silt load area. The height of the silt fence shall not exceed 36 inches, and shall be driven a minimum of 16 inched into the ground. Do not attach filter fabric to existing tree. Secure filter fabric to the post and wire fabric using staples, tie wire, or hog rings. Imbed the filter fabric into the ground as indicated. Splice filter fabric at support pole using a 6 inch overlap and securely seal. Top of the filter fabric shall have a 1 inch tuck or a reinforced top end section.

3.3 TEMPORARY SEEDING

Within 48 hours after attaining the grading increment specified herein,

provide seed, fertilizer, and mulch on graded areas when any of the following conditions occur:

a. Grading operations stop for an anticipated duration of 30 days or more.

b. Provide on the slopes of cuts and fill slopes for every 5 foot increment of vertical height of the cut or fill.

c. When it is impossible or impractical to bring an area to finish grade so that permanent seeding operations can be performed without serious disturbance from additional grading.

d. When an immediate cover is required to minimize erosion, or when erosion has occurred.

3.3.1 General

Loosen subgrade to a minimum depth of 4 inches. Uniformly apply the seed, fertilizer, and mulch at the specified application rates. Roll the seeded area after applying seed and fertilizer. Do not seed or fertilize when the NTR determines conditions are unfavorable. Provide water to promote turf growth.

3.3.2 Seed

Provide seed type and quantity (pounds per acre) as follows:

SEED TYPE	Nov 16 - Jan 31	Feb 1 - Apr 15 Oct 16 - Nov 15	Apr 16 - Oct 15
Bermuda	100	100	

3.3.3 Fertilizer

Apply at the rate of 1000 pounds per acre.

3.3.4 Mulch

Spread mulch at the rate of 1.5 tons per acre and anchor by crimping mulch with a disc.

3.5 GRAVEL CONSTRUCTION ENTRANCE

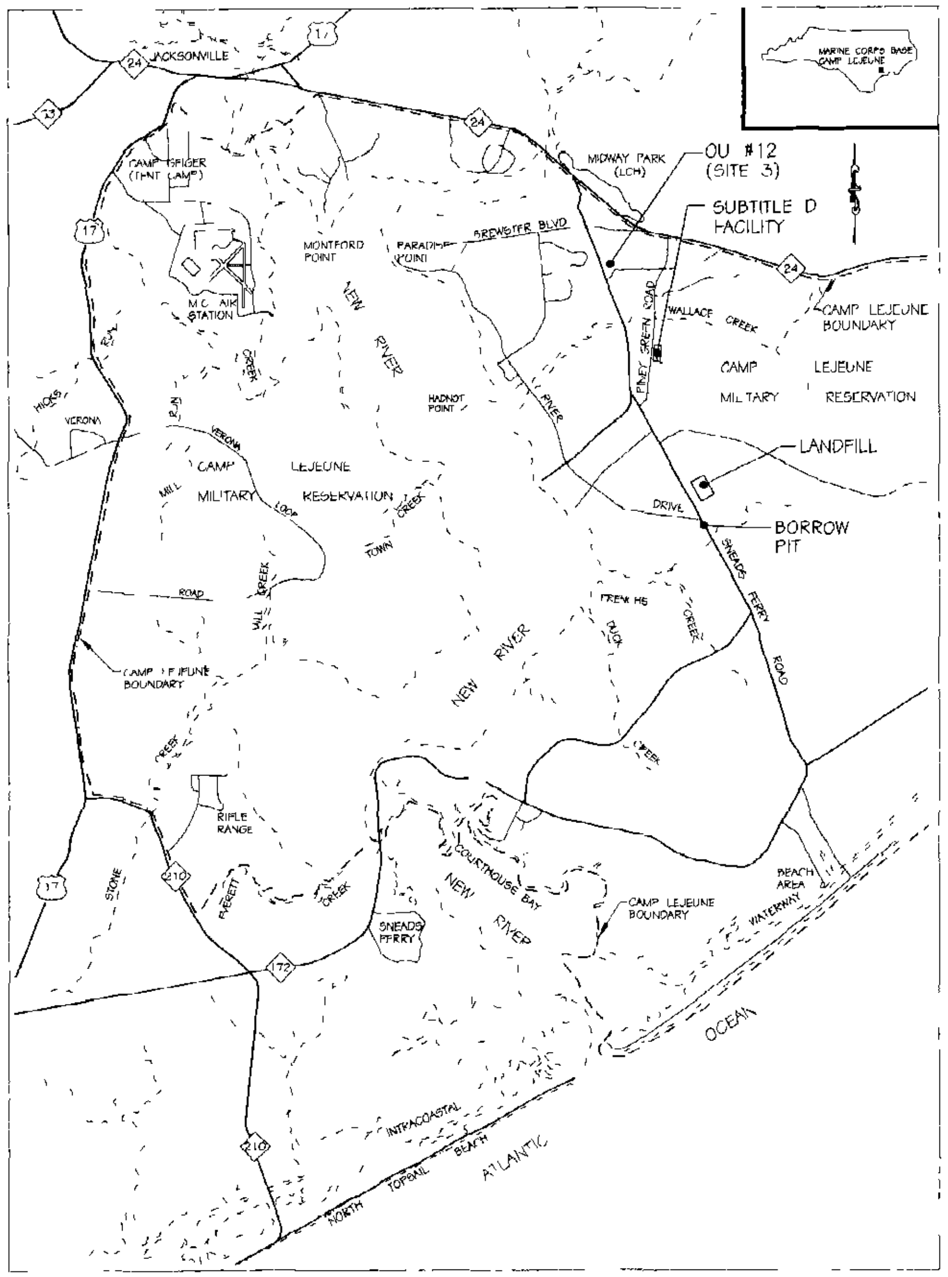
Provide a minimum 50 feet long, 20 feet wide entrance, a minimum of 6 inches thick, at points of vehicular ingress and egress on the construction site.

3.6 DUST SUPPRESSORS

Immediately dampen the surface before calcium chloride application. Apply dust suppressors on unsurfaced base, subbase and other unsurfaced travel ways at the rate between 1.0 and 1.25 pounds per square yard of surface for pellets for the initial application. For subsequent applications of dust suppressors, application rates may be approximately 75 percent of initial application rates. Do not apply when raining or the moisture conditions exceed that required for proper application. Apply other dust suppressors in accordance with manufacturers instructions. Protect treated surfaces from traffic for a minimum of 2 hours after treatment. Repeat application of dust suppressors as required to control dust emissions.

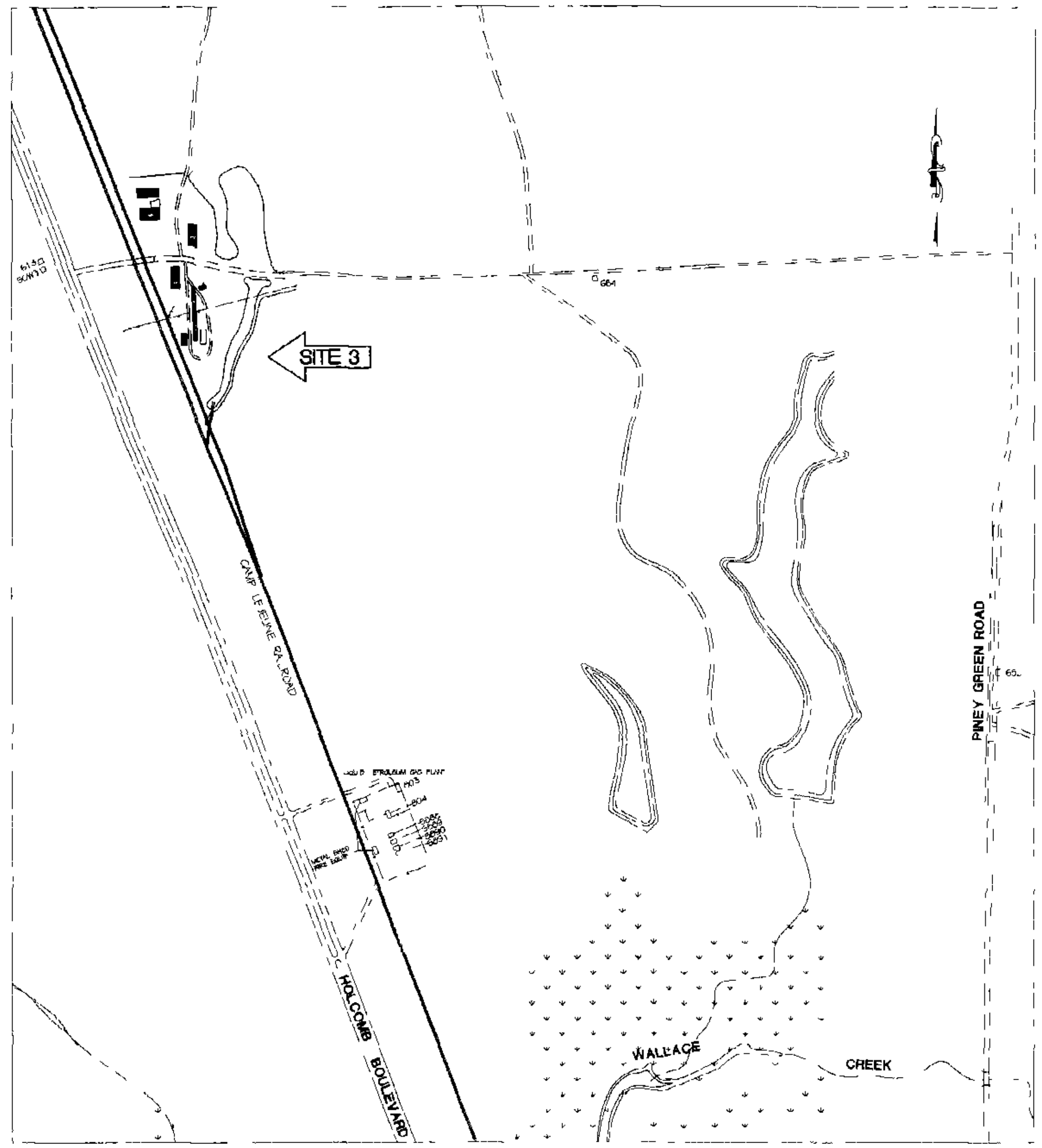
REMEDIATION OF PAH-CONTAMINATED SOIL OPERABLE UNIT NO. 12 (SITE 3)

MARINE CORPS BASE, CAMP LEJEUNE NORTH CAROLINA



VICINITY MAP

1" = 1.5 MILES 0 1.5 3 4.5 6 7.5



LOCATION MAP

1" = 400' 0' 400' 800' 1200' 1600' 2000'

INDEX OF SHEETS

SHEET NO	TITLE
T-1	COVER SHEET AND GENERAL NOTES
C-1	SITE 3 PLAN AND SOIL CONTAMINANT LEVELS
C-2	EXCAVATION PLAN
C-3	BORING LOGS
C-4	BORING LOGS

ABBREVIATIONS

BGS	BELOW GROUND SURFACE
E	EAST
EL	ELEVATION
'	FEET
"	INCHES
L	LEFT
MCB	MARINE CORPS BASE
N	NORTH
NAD	NORTH AMERICAN DATUM
NC	NORTH CAROLINA
W	WEST

GENERAL NOTES

1 MAPPING WAS PREPARED BY 1) W.K. DICKSON & CO. INC. OF RALEIGH NORTH CAROLINA DATED JANUARY 1995 AND 2) OHM REMEDIATION SERVICES CORP. JULY 1995

2 ELEVATIONS SHOWN ARE IN FEET AND ARE BASED ON SEA LEVEL NATIONAL VERTICAL GEODETIC DATUM 1929. VERTICAL CONTROL MONUMENT USED WAS A-32 ELEVATION = 31.93'

3 HORIZONTAL CONTROL WAS ESTABLISHED USING CONTROL MONUMENT A-32. A-32 HAS GRID COORDINATES OF X(E) = 2 498 390 690 Y(N) = 356 379 133

4 GRID IS BASED ON NORTH CAROLINA STATE PLANE COORDINATE SYSTEM (SOUTH ZONE NAD 83)

5 DEVELOP AND IMPLEMENT AN EROSION AND SEDIMENT CONTROL PLAN IN ACCORDANCE WITH STATE OF NORTH CAROLINA EROSION CONTROL LAW REGULATIONS AND HANDBOOK LATEST REVISION. THE CONTRACT PLANS AND SPECIFICATIONS INDICATE MINIMUM EROSION CONTROL REQUIREMENTS AND SHALL BE ADAPTED AND MODIFIED TO SUIT THE SEQUENCE OF CONSTRUCTION OPERATIONS

6 LOCATE UTILITIES PRIOR TO THE COMMENCEMENT OF FIELD ACTIVITIES. DAMAGE TO UTILITIES WILL BE REPAIRED AT NO EXPENSE TO THE GOVERNMENT

7 FIELD STAKE THE LOCATION OF ALL AREAS TO BE DISTURBED PRIOR TO ACTUAL WORK. FIELD LOCATIONS MUST BE REVIEWED BY THE NTR PRIOR TO CLEARING, GRUBBING, EXCAVATION AND CONSTRUCTION

8 LIMIT ALL WORK TO THE IMMEDIATE PROJECT AREA. RESTORE ALL AREAS DISTURBED OUTSIDE THE LIMITS OF WORK TO THEIR ORIGINAL CONDITION

9 SITE RESTORATION EFFORTS ARE NOT TO BE PERFORMED UNTIL CONFIRMATION OF CONTAMINANT REMOVAL HAS BEEN ACHIEVED

10 COMPLY WITH ALL FEDERAL, STATE AND LOCAL ORDINANCES UNLESS OTHERWISE NOTED IN THE CONTRACT DRAWINGS AND SPECIFICATIONS

QUALITY CONTROL REVIEW

Baker

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION NORFOLK, VIRGINIA

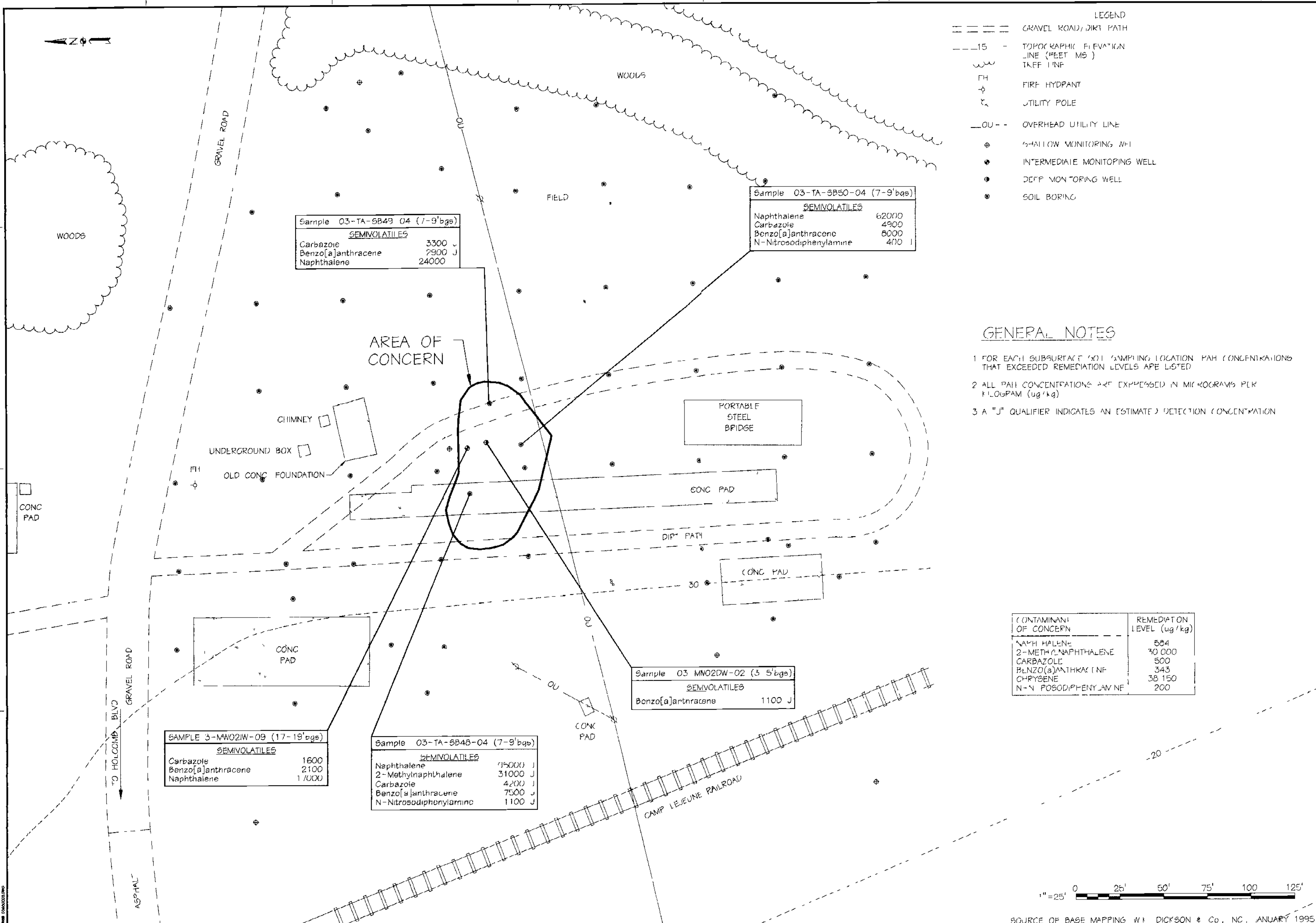
MARINE CORPS BASE CAMP LEJEUNE NORTH CAROLINA
OU #12 (SITE 3) - REMEDIATION OF PAH-CONTAMINATED SOIL
COVER SHEET AND GENERAL NOTES

SCALE: AS SHOWN

SHEET 1 OF 5

T-1

00291BBB2X


LEGEND
GRAVEL ROAD/DIRT PATH
TOPOGRAPHIC ELEVATION LINE (FEET MSL)
TREE LINE
FIRE HYDRANT
UTILITY POLE
OVERHEAD UTILITY LINE
SHALLOW MONITORING WELL
INTERMEDIATE MONITORING WELL
DEEP MONITORING WELL
SOIL BORING
WOODS
FIELD
GRAVEL ROAD
AREA OF CONCERN
CHIMNEY
UNDERGROUND BOX
OLD CONC FOUNDATION
FH
CONC PAD
PORTABLE STEEL BRIDGE
DIRT PATH
TO HOLCOMB BLVD
ASPHALT
CAMP LEJEUNE RAILROAD
OU
30
20
Sample 03-TA-SB49-04 (7-9'bgs)
SEMIVOLATILES
Carbazole 3300 J
Benzo[a]anthracene 2900 J
Naphthalene 24000
Sample 03-TA-SB50-04 (7-9'bgs)
SEMIVOLATILES
Naphthalene 62000
Carbazole 4900
Benzo[a]anthracene 8000
N-Nitrosodiphenylamine 400 J
Sample 03-MW02DW-02 (3-5'bgs)
SEMIVOLATILES
Benzo[a]anthracene 1100 J
SAMPLE 3-MW02IW-09 (17-19'bgs)
SEMIVOLATILES
Carbazole 1600
Benzo[a]anthracene 2100
Naphthalene 17000
Sample 03-TA-SB48-04 (7-9'bgs)
SEMIVOLATILES
Naphthalene 95000 J
2-Methylnaphthalene 31000 J
Carbazole 4200 J
Benzo[a]anthracene 7500 J
N-Nitrosodiphenylamine 1100 J
GENERAL NOTES
1. FOR EACH SUBSURFACE SOIL SAMPLING LOCATION, PAH CONCENTRATIONS THAT EXCEEDED REMEDIATION LEVELS ARE LISTED.
2. ALL PAH CONCENTRATIONS ARE EXPRESSED IN MICROGRAMS PER KILOGRAM (ug/kg).
3. A "J" QUALIFIER INDICATES AN ESTIMATED DETECTION CONCENTRATION.
CONTAMINANT OF CONCERN | REMEDIATION LEVEL (ug/kg)
NAPHTHALENE 584
2-METHYLNAPHTHALENE 30,000
CARBAZOLE 500
BENZO(a)ANTHRACENE 343
CHRYSENE 38,150
N-NITROSODIPHENYLAMINE 200
1"=25' 0 25' 50' 75' 100' 125'
SOURCE OF BASE MAPPING: W.K. DICKSON & Co., NC, JANUARY 1995

REVISIONS

Baker ENVIRONMENTAL, INC. CORAOPOLIS, PENNSYLVANIA

TLB DESIGN
WJH DRAWN

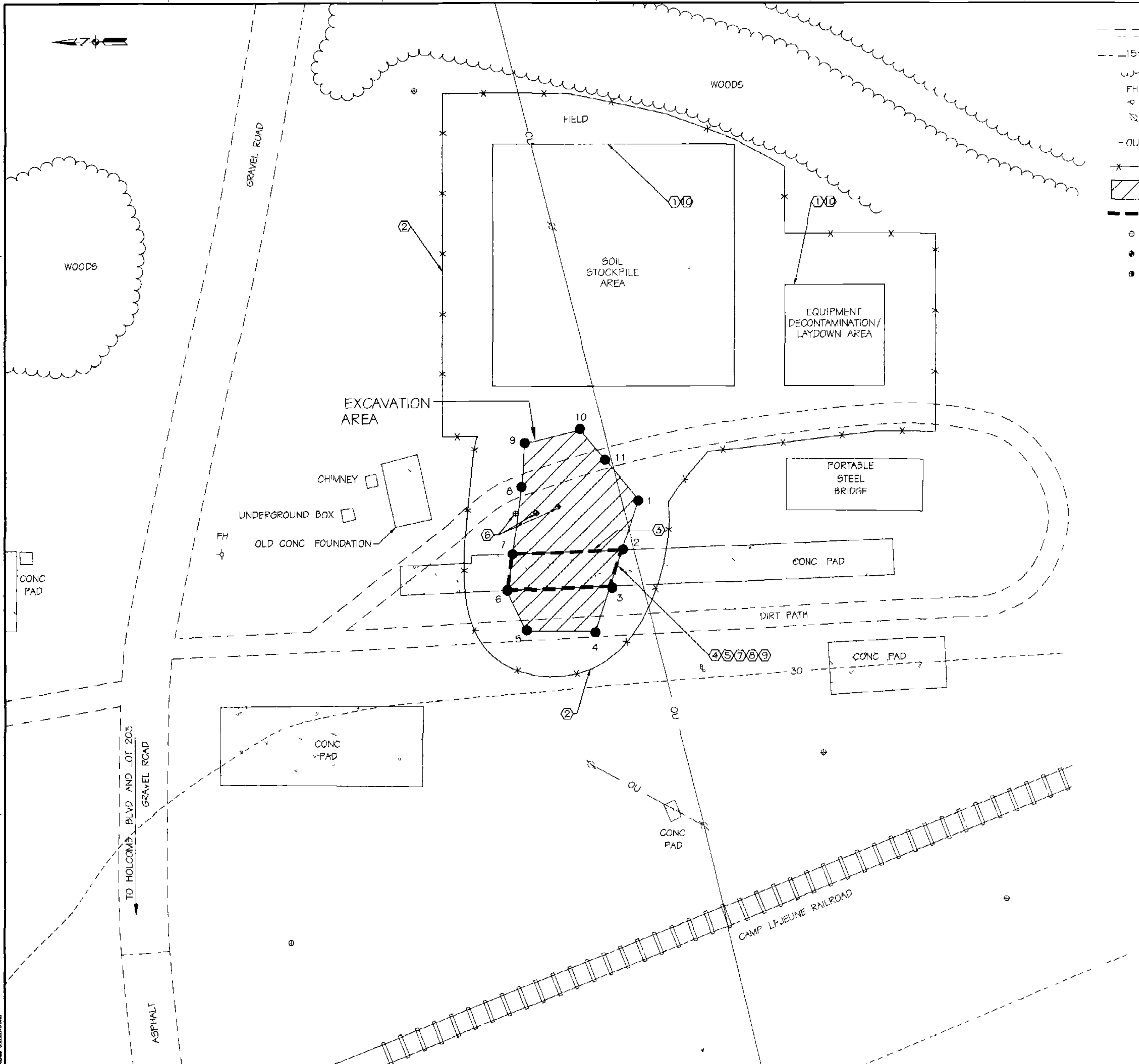
N62470-89-D-4814

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NORFOLK, VIRGINIA

MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA
OU #12 (SITE 3) - REMEDIATION OF PAH-CONTAMINATED SOIL
SITE 3 PLAN AND SOIL CONTAMINANT LEVELS

SCALE: 1"=25'
SHEET 2 OF 5
C-1

4/98



LEGEND

- GRAVEL ROAD/DIRT PATH
- TOPOGRAPHIC ELEVATION LINE (FEET MSL)
- TREE LINE
- FIRE HYDRANT
- UTILITY POLE
- OVERHEAD UTILITY LINE
- CONSTRUCTION SAFETY FENCE
- EXCAVATION AREA
- CONCRETE REMOVAL AREA
- SHALLOW MONITORING WELL
- INTERMEDIATE MONITORING WELL
- DEEP MONITORING WELL

WORK NOTES

1. CONSTRUCT THE SOIL STOCKPILE AREA AND THE DECONTAMINATION PAD/EQUIPMENT LAYDOWN AREA THE LOCATIONS OF THESE AREAS ARE SUGGESTED THE CONTRACTOR SHALL FIELD ADJUST SIZE SHAPE AND DESIGN OF THE AREAS WITHIN THE LIMITS SHOWN TO ACCOMMODATE THE WORK
2. PROVIDE SAFETY FENCING AS SHOWN IN ACCORDANCE WITH THE SPECIFICATIONS
3. REMOVE CONCRETE PAD AND DISPOSE OF AT BASE LANDFILL
4. EXCAVATE THE SOIL TO THE HORIZONTAL LIMITS INDICATED AND A DEPTH OF THREE FEET THIS SOIL WILL BE STOCKPILED ON-SITE TESTED FOR TCLP CHARACTERISTICS AND LATER USED AS BACKFILL FOR THE EXCAVATION PROVIDED IT IS NON-HAZARDOUS AND DOES NOT CONTAIN PAHs IN EXCESS OF THE REMEDIATION LEVELS
5. EXCAVATE THE PAH-CONTAMINATED SOIL FROM THREE FEET BELOW GROUND SURFACE TO NINE FEET BELOW GROUND SURFACE OR UNTIL JUST ABOVE THE WATER TABLE THIS SOIL WILL BE TEMPORARILY STOCKPILED ON-SITE TESTED FOR TCLP CHARACTERISTICS AND TRANSPORTED TO A RCRA PERMITTED DISPOSAL FACILITY BASED ON THE TCLP RESULTS
6. DURING EXCAVATION MAINTAIN THE INTEGRITY OF MONITORING WELLS MW02 MW02IW AND MW02DW
7. COLLECT CONFIRMATION SAMPLES FROM THE EXCAVATION AREA
8. UPON APPROVAL FROM THE NTR BACKFILL THE EXCAVATION AREA WITH THE STOCKPILED SOIL THAT WAS LOCATED FROM ZERO TO THREE FEET BELOW GROUND SURFACE AND WITH CLEAN FILL MATERIAL FROM AN ON-BASE BORROW PIT
9. REVEGETATE THE EXCAVATION AREA AS SPECIFIED
10. REMOVE THE SOIL STOCKPILE AREA AND THE DECONTAMINATION PAD/EQUIPMENT LAYDOWN AREA

COORDINATES FOR EXCAVATION AREA

PT #	NORTHING	EASTING
1	352 789 0878	2 500 066 0634
2	352,796 7394	2 500 041 5583
3	352 802 5545	2 500 023 1795
4	352 810 3261	2,500 000 9504
5	352 844 9298	2 500,001 4178
6	352 853 6666	2 500 021 0353
7	352,851 2181	2 500 039 4141
8	352 847 2394	2 500 072 4960
9	352 845 6909	2 500 093 5944
10	352,818 0417	2 500 100 3994
11	352 805 6151	2 500 085 9738

1" = 25' 0' 25' 50' 75' 100 125'

SOURCE OF BASE MAPPING W.K. DICKSON & Co. INC. JANUARY 1995

REVISIONS

Baker

BAKER ENVIRONMENTAL INC
CORAOPOLIS PENNSYLVANIA

N62470-89-D-4814

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NAVAL STATION NORFOLK VIRGINIA

MARINE CORPS BASE CAMP LEJEUNE NORTH CAROLINA
OU #12 (SITE 3) - REMEDIATION
OF PAH-CONTAMINATED SOIL
EXCAVATION PLAN

CODE ID NO 80091 SIZE D
SCALE 1" = 25'
EFD NO
STA. PROJ. NO
SPEC NO
CONSTR. CONTR. NO
NAVFAC DRAWING NO
SHEET 3 OF 5

C-2

BAKER — WELL CONSTRUCTION LOG

BOREHOLE NUMBER: 3-MW02IW — SHEET 1 OF 4

PROJECT NUMBER	62470-212
PROJECT NAME	SITE 3 OLD CREOSTE PLANT
LOCATION	MCB CAMP LEJEUNE, NC
DRILLING COMPANY	HARDIN-HUBER, INC
RIG TYPE & NUMBER	MOBILE B 80
DRILLING METHOD	MUD ROTARY
WEATHER	SUNNY HOT HUMID
GEOLOGIST	J E ZIMMERMAN
ENV SCIENTIST	M D SMITH
DATE BEGUN	1/16/94 DATE COMPLETED 1/16/94

GROUND SURFACE ELEVATION	32 50 msl
TOP OF CASING ELEVATION	35 19 msl

WELL DETAILS (FT)

STICKUP	2 5
OUTER CASING (6 I D)	
LENGTH OF RISER (2 I D)	71 5
LENGTH OF SCREEN (2 I D)	15 0
THICKNESS OF GROUT	61 0
THICKNESS OF SEAL	5 5
THICKNESS OF SAND PACK	20 0

ELEVATION | DEPTH | SOIL SAMPLES | SAMPLE NO | SAMPLE METHOD | BLOWS/0 5' | RECOVERY (FT) | PID (PPM) BS / BZ | LITHOLOGY | DESCRIPTION | DEPTH | WELL INSTALLATION

Sample No	Method	Blows/0.5'	Recovery (ft)	PID BS	PID BZ
S-1	SS			02	02
S-2	SS	14 9 9 8	16	02	02
S-3	SS	5 7 7 8	16	02	02
S-4	SS	8 9 9 9	16	02	02
S-5	SS	5 7 7 8	15	02	02
S-6	SS	3 9 16 12	08	02	02
S-7	SS	5 5 7 8	14	02	02
S-8	SS	7 5 4 3	20	02	02
S-9	SS	3 7 12 16	12	02	02
S-10	SS	1 3 2 2	20	04	04
S-11	SS	WOR WOR 2 3	20	04	04

SILTY SAND Fine grained, trace root material/burnt soil/charcoal/wood, dark brown, damp, very loose

SILTY SAND Fine grained, trace clay buff/light brown, damp medium dense

SAND Fine grained, trace silt occasional trace clay light gray damp to wet medium dense/loose

creosote odor evident

SILTY CLAY trace fine grained sand, greenish gray moist soft/very soft creosote odor and contamination present

BAKER — WELL CONSTRUCTION LOG

BOREHOLE NUMBER: 3-MW02IW — SHEET 2 OF 4

Sample No	Method	Blows/0.5'	Recovery (ft)	PID BS	PID BZ
S-12	SS	7 7 8 9	06	04	04
S-13	SS	3 3 3 5	12	04	04
S-14	SS	2 3 10 13	11	03	03
S-15	SS	3 6 6 14	18	03	03
S-16	SS	13 13 15 25	16	03	03
S-17	SS	20 17 17 40	11	03	03

SILTY CLAY trace fine grained sand, greenish gray moist soft/very soft creosote odor and contamination present

SAND Fine to medium grained trace silt occasional some to little clay gray/greenish gray wet medium dense/loose/dense

Shell fragments w/ calcite cement (?)

BAKER — WELL CONSTRUCTION LOG

BOREHOLE NUMBER: 3-MW21W — SHEET 3 OF 4

Sample No	Method	Blows/0.5'	Recovery (ft)	PID BS	PID BZ
S-18	SS	30 17 17 40	11	03	03
S-19	SS	30 74 100 75"	14		
S-20	SS	28 31 50 40"	08		
S-21	SS	40 100 74"	07	07	07
S-22	SS	100 75" 100 75"	08	07	07
S-23	SS	45 100 75"	08	07	07

SAND Fine to medium grained, trace silt trace shell fragments, gray to white/greenish gray wet dense/very dense

QUALITY CONTROL REVIEW

SIGNATURE ____ DATE ____

REVISIONS	
A/E	TLB DESIGN; REL DRAWN; REVIEW; CHIEF ARCH ENGR; PROJECT MANAGER; FIRE PROTECTION; QUALITY CONTROL; BRANCH MANAGER; DESIGN DIRECTOR
Baker	BAKER ENVIRONMENTAL INC, CORAOPOLIS PENNSYLVANIA
A/E CONTRACT NO	N62470-89-D-4814
ACTIVITY	SATISFACTORY TO
	FOR EFD FOR COMMANDER NAVFAC

DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION — NAVAL STATION NORFOLK VIRGINIA
MARINE CORPS BASE CAMP LEJEUNE NORTH CAROLINA
OU #12 (SITE 3) - REMEDIATION OF PAH-CONTAMINATED SOIL
BORING LOGS

CODE ID NO 80091	SIZE D
SCALE	NTS
EFD NO	
STA PROJ NO	
SPEC NO	
CONSTR CONTR NO	
NAVFAC DRAWING NO	
SHEET 4 OF 5	
C-3	

3/98

BAKER — WELL CONSTRUCTION LOG

BOREHOLE NUMBER: 3-MW02IW
SHEET 4 OF 4

ELEVATION	DEPTH	SAMPLE NO	SAMPLE METHOD	BLOWS/0.5	RECOVERY (FT)	PID (PPM) BG	PID (PPM) PS	DESCRIPTION
-48.00	80.0–82.0	S23	SS	35 / 100 /5"	0.6	0.7	0.7	SAND fine grained, trace silt greenish gray wet very dense
-53.00	85.0–87.0	S24	SS	46 / 100 /4"	0.8	0.7	0.7	

BOTTOM OF BOREHOLE @ 87.0
NOTE
1) Groundwater encountered @ 9.0 during drilling

BAKER — TEST BORING LOG

BOREHOLE NUMBER: 3-TA-SB48/49/50
SHEET 1 OF 1

PROJECT NUMBER: 62470-274
PROJECT NAME: SITE 3 OLD CREOSOTE PLANT
LOCATION: MCB CAMP LEJEUNE, NC
DRILLING COMPANY: PARRATT-WOLFF INC
RIG TYPE & NUMBER: TRUCK RIG CME 55
DRILLING METHOD: HOLLOW STEM AUGERS
WEATHER: SUNNY HOT
GEOLOGIST: M K DEJOHN
ENV SCIENTIST:
DATE BEGUN: 6/15/95 DATE COMPLETED: 6/15/95

GROUND SURFACE ELEVATION: 32.19 msl
TOTAL DEPTH: 9.0 bgs

ELEVATION	DEPTH	SAMPLE NO	SAMPLE METHOD	BLOWS/6"	RECOVERY	PID (PPM) BG	PID (PPM) PS
32.00	0.0–1.0	S1	HA				
31.00	1.0–3.0	S2	SS	17 / 13 / 17 / 15	1.7	0.9	2.0
29.00	3.0–5.0	S3	SS	5 / 7 / 5 / 6	1.6	0.7	1.0
27.00	5.0–7.0	S4	SS	4 / 4 / 5 / 6	2.0	0.7	1.1
25.00	7.0–9.0	S5	SS	10 / 13 / 14 / 12	2.0	0.7	8.0

DESCRIPTION

0.0–5.0: SAND fine grained, little to some silt layers of stones and clay dark gray damp, dense to medium dense

5.0–7.0: SANDY CLAY fine grained, little silt gray damp medium dense strong creosote odor

7.0–9.0: SAND fine grained some silt trace to little clay gray w/brwn staining, moist to wet medium dense strong odr and free product floating on water surface

BOTTOM OF BOREHOLE @ 9.0
NOTES
1) Groudwater encountered at 9 during drilling

QUALITY CONTROL REVIEW

SIGNATURE ____ DATE ____

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED

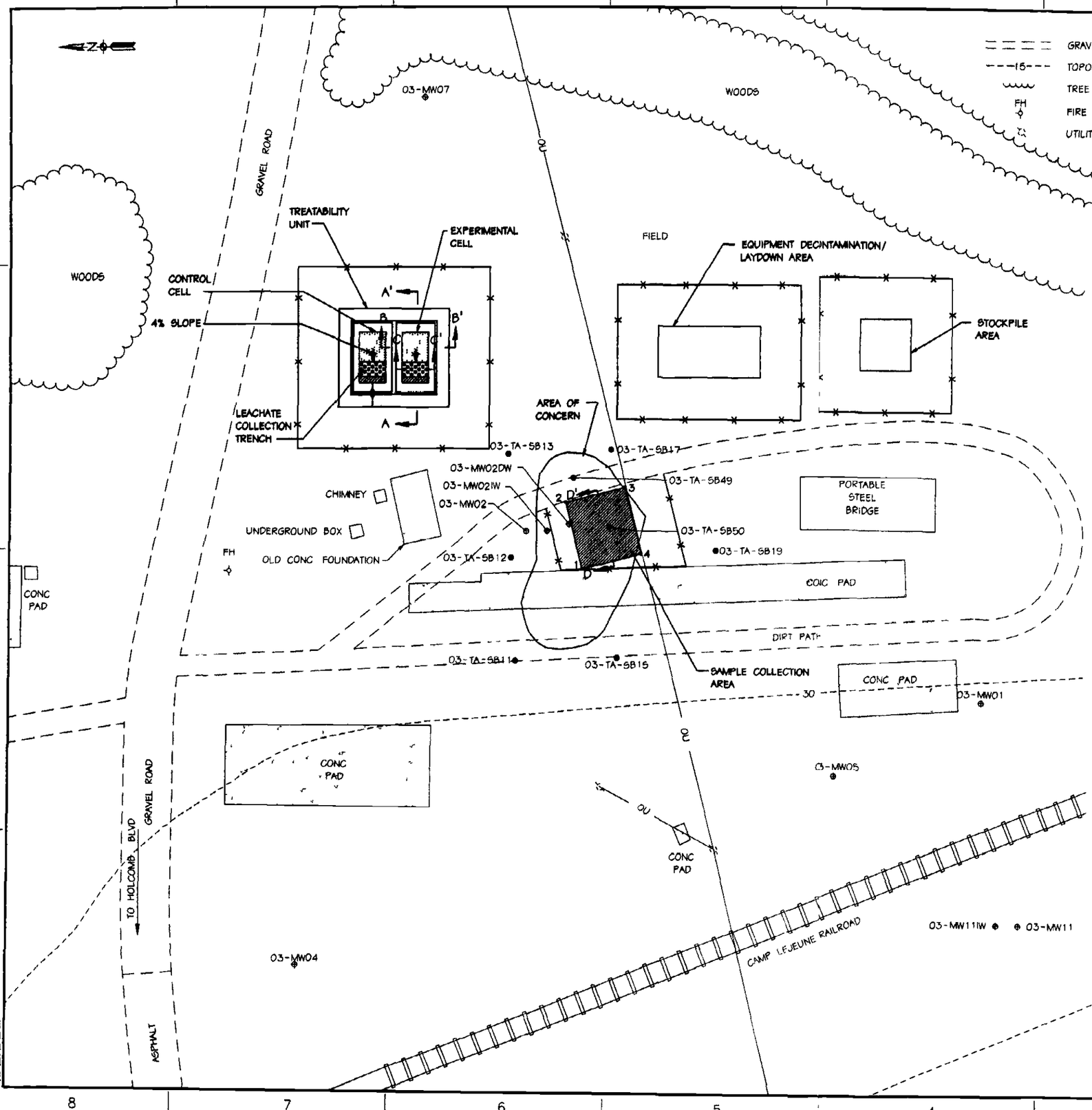
DESIGN TLB
DRAWN REL
REVIEW
CHIEF ARCH/ENGR
PROJECT MANAGER
FIRE PROTECTION
QUALITY CONTROL
BRANCH MANAGER
DESIGN DIRECTOR

Baker
BAKER ENVIRONMENTAL, INC
CORAOPOLIS PENNSYLVANIA
A/E CONTRACT NO. N62472-89-D-4814
APPROVED ____ DATE ____
ACTIVITY - SATISFACTORY TO
APPROVED ____ DATE ____
FOR EFD FOR COMMANDER NAVFAC

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NAVAL STATION NORFOLK VIRGINIA
MARINE CORPS BASE CAMP LEJEUNE NORTH CAROLINA
OU #2 (SITE 3) - REMEDIATION OF PAH-CONTAMINATED SOIL
BORING LOGS

CODE ID NO 80091 SIZE D
SCALE NTS
EFD NO
STA PROJ NO
SPEC NO
CONSTR CONTR NO
NAVFAC DRAWING NO
SHEET 5 OF 5
C-4

3/98



LEGEND

- GRAVEL ROAD/DIRT PATH
- 15 TOPOGRAPHIC ELEVATION LINE (FEET MSL)
- TREE LINE
- FH FIRE HYDRANT
- UTILITY POLE
- 03-MW02 SHALLOW MONITORING WELL
- 03-MW02IW INTERMEDIATE MONITORING WELL
- 03-MW02DW DEEP MONITORING WELL
- 03-TA-SB12 SUBSURFACE SOIL SAMPLING LOCATION
- —OU— OVERHEAD UTILITY LINE
- CONSTRUCT SAFETY FENCE

INDEX OF SHEETS

GENERAL NOTES

1. ELEVATIONS SHOWN ARE IN FEET AND ARE BASED ON SEA LEVEL NATIONAL VERTICAL GEODETIC DATUM 1929 VERTICAL CONTROL MONUMENT USED WAS A-32 ELEVATION = 31.93
2. HORIZONTAL CONTROL WAS ESTABLISHED USING CONTROL MONUMENT A-32 A-32 HAS GRID COORDINATES OF X(E) = 2,498,390.690, Y(N) = 356,379.133
3. GRID IS BASED ON NORTH CAROLINA STATE PLANE COORDINATE SYSTEM (SOUTH ZONE NAD 83)
4. UTILITIES SHOWN ARE BASED UPON FIELD LOCATION OF VISIBLE APPURTENANCES. LOCATE UTILITIES PRIOR TO THE COMMENCEMENT OF FIELD ACTIVITIES. DAMAGE TO UTILITIES WILL BE REPAIRED AT NO EXPENSE TO THE GOVERNMENT
5. FIELD STAKE THE LOCATION OF ALL AREAS TO BE DISTURBED PRIOR TO ACTUAL WORK. FIELD LOCATIONS MUST BE REVIEWED BY THE NTR PRIOR TO CLEARING, GRUBBING AND EXCAVATION
6. LIMIT ALL WORK TO THE IMMEDIATE PROJECT AREA. RESTORE ALL AREAS DISTURBED OUTSIDE THE LIMITS OF WORK TO THEIR ORIGINAL CONDITION
7. COMPLY WITH ALL FEDERAL, STATE AND LOCAL ORDINANCES UNLESS OTHERWISE NOTED IN THE CONTRACT DRAWINGS AND SPECIFICATIONS
8. REFER TO THE TREATABILITY STUDY WORK PLANS FOR THE SEQUENCE OF CONSTRUCTION EVENTS

COORDINATES FOR THE SAMPLE COLLECTION AREA

POINT	NORTHING	EASTING
1	2500040.9258	352822.5020
2	2500072.8945	352830.6880
3	2500080.3363	352801.6257
4	2500048.3678	352793.4397

REVISIONS

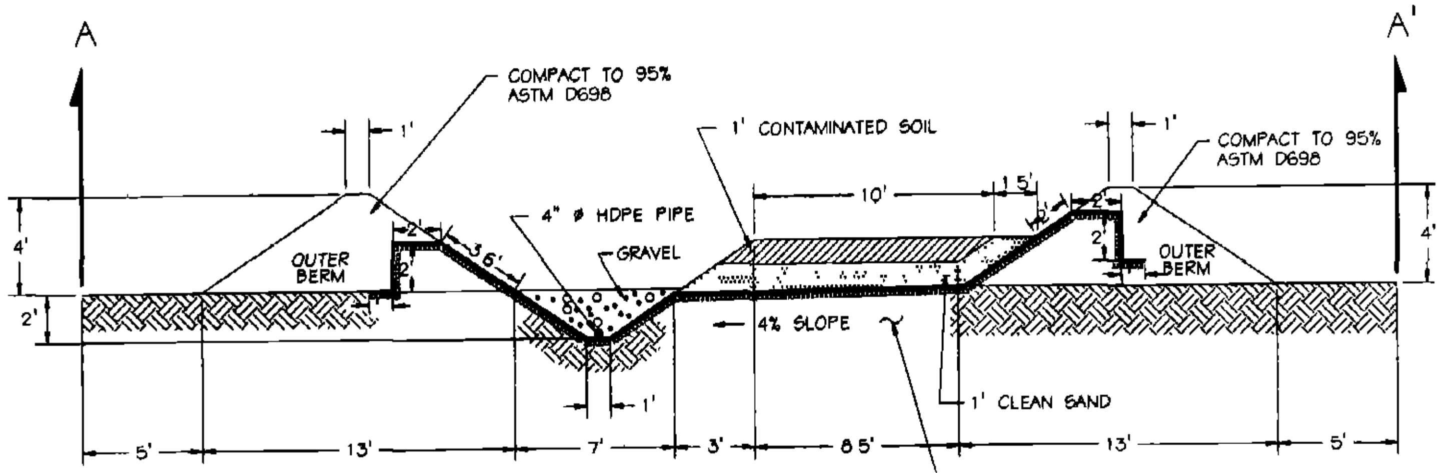
NO.	DESCRIPTION	DATE	APPROVED

BAKER ENVIRONMENTAL, INC. COraopolis, Pennsylvania
A/E CONTRACT NO. N62470-89-D-4814
ACTIVITY - SATISFACTORY TO
APPROVED / DATE

DEPARTMENT OF THE NAVY — ATLANTIC DIVISION — NAVAL FACILITIES ENGINEERING COMMAND — NORFOLK, VIRGINIA
NAVAL STATION — MARINE CORPS BASE CAMP LEJEUNE — NORTH CAROLINA
OU #12 (SITE 3) PILOT-SCALE BIOREMEDIATION TREATABILITY STUDY
SAMPLE COLLECTION AND CONSTRUCTION PLAN

CODE ID NO. 80091 — SIZE D
SCALE 1"=25'
DFS NO
STA. PROJ. NO.
SPEC NO
CONSTR. CONTR NO
MAP/AC DRAWING NO
SHEET 1 OF 2
C-1

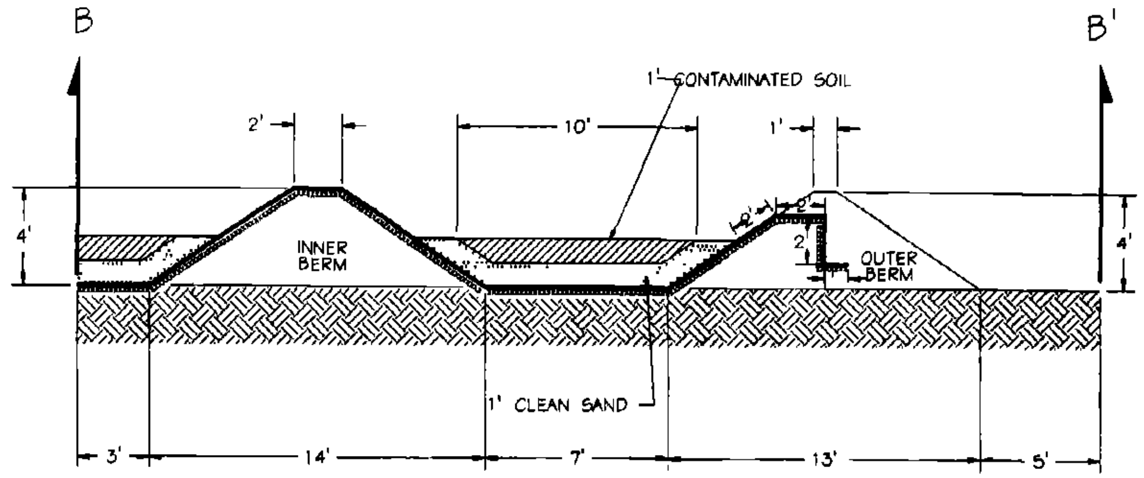
08/96



CROSS-SECTION A-A'
1" = 4'

NOTE ALL SLOPES ARE 1 1.5 UNLESS INDICATED OTHERWISE

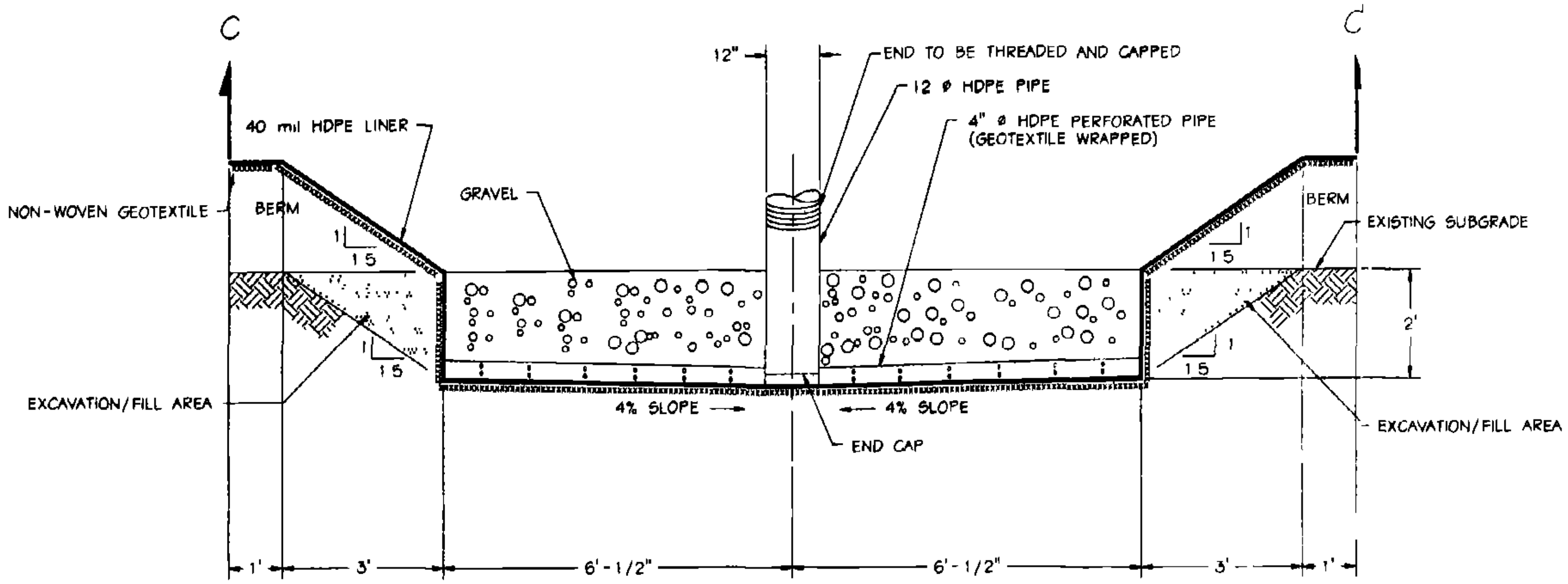
1" = 4' 0' 4' 8' 12' 16 20'



CROSS SECTION B-B'
1" = 4

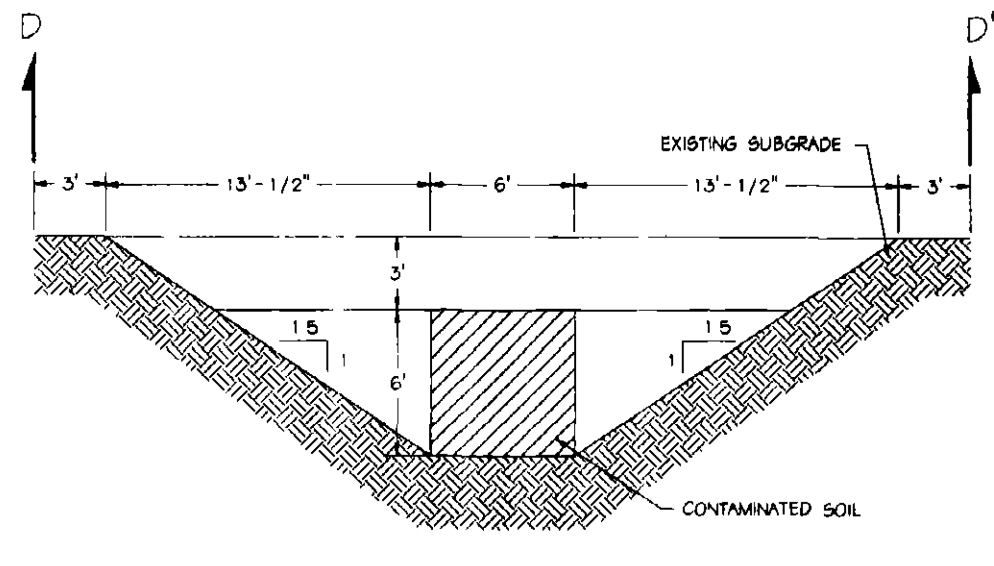
NOTE ALL SLOPES ARE 1 1.5

1" = 4 0' 4' 8 12 16 20'



CROSS-SECTION C-C'
1" = 10'

1" = 10' 0' 10' 20' 30' 40' 50'



CROSS-SECTION D-D'
1" = 4'

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REVISIONS

Baker
BAKER ENVIRONMENTAL, INC
CORAOPOLIS, PENNSYLVANIA
A/E CONTRACT NO. N62470-89-D-4814
ACTIVITY - SATISFACTORY TO
TLB DESIGN
WJH DRAWN

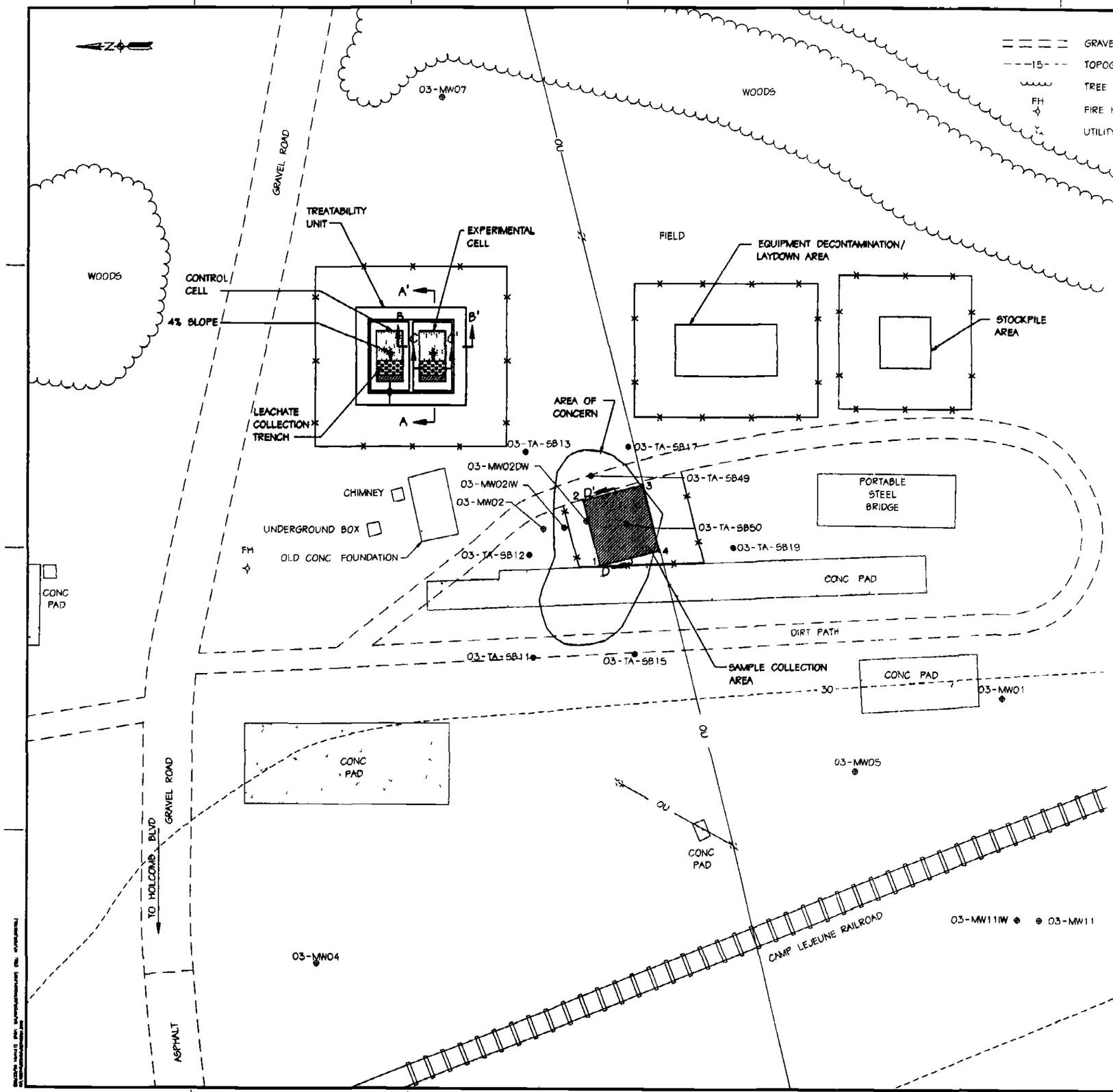
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NAVAL STATION NORFOLK, VIRGINIA
MARINE CORPS BASE CAMP LEJEUNE NORTH CAROLINA

OU #12 (SITE 3) PILOT-SCALE BIOREMEDIATION TREATABILITY STUDY

CROSS-SECTIONS

CODE ID NO 80091 SIZE D
SCALE AS SHOWN
SHEET 2 OF 2
C-2

08/96



LEGEND

GRAVEL ROAD/DIRT PATH	03-MW02 SHALLOW MONITORING WELL
15 TOPOGRAPHIC ELEVATION LINE (FEET MSL)	03-MW02IW INTERMEDIATE MONITORING WELL
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1	2500040 9259	352822 5020
2	2500072 8945	352830 6880
3	2500080 3363	352801 6257
4	2500048 3678	352793 4397

SOURCE OF BASE MAPPING W K DICKSON & Co, INC, JANUARY 1995

REVISIONS

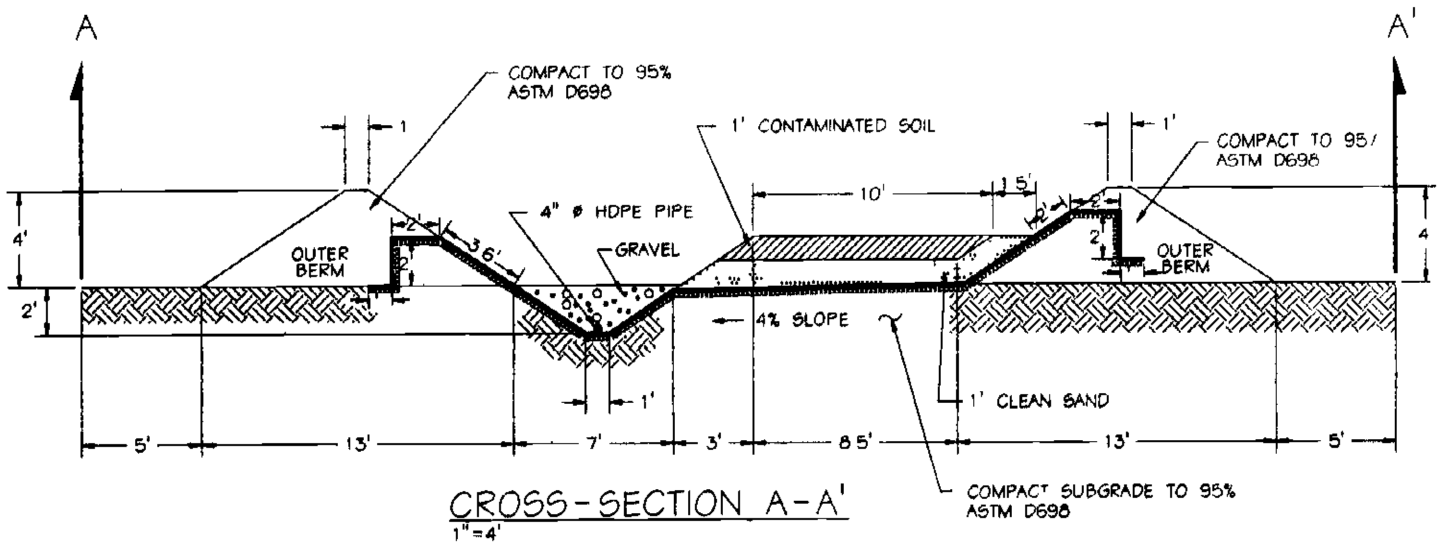
NO	DESCRIPTION	DATE	APPROVED

BAKER ENVIRONMENTAL INC COROPOLIS, PENNSYLVANIA
N62470-89-D-4814
ACTIVITY - SATISFACTORY NO

DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND ATLANTIC DIVISION NORFOLK, VIRGINIA
NAVAL STATION
MARINE CORPS BASE CAMP LEJEUNE NORTH CAROLINA
OU #12 (SITE 3) PILOT-SCALE BIOREMEDIATION TREATABILITY STUDY
SAMPLE COLLECTION AND CONSTRUCTION PLAN

CODE ID. NO. 80091 SIZE D
SCALE 1"=25'
CFO NO.
STA. PROJ. NO.
SPEC. NO
CONTR. CONTR. NO.
MANFAC DRAWING NO.
SHEET 1 OF 2
C-1

06/96

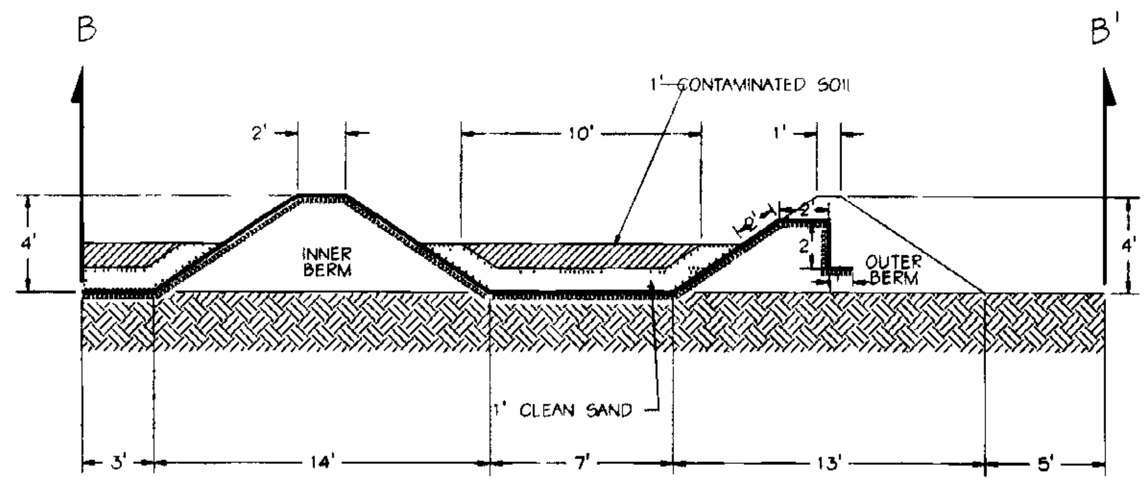


CROSS-SECTION A-A'

1"=4'

NOTE: ALL SLOPES ARE 1:1.5 UNLESS INDICATED OTHERWISE

1"=4' 0' 4' 8' 12' 16' 20'

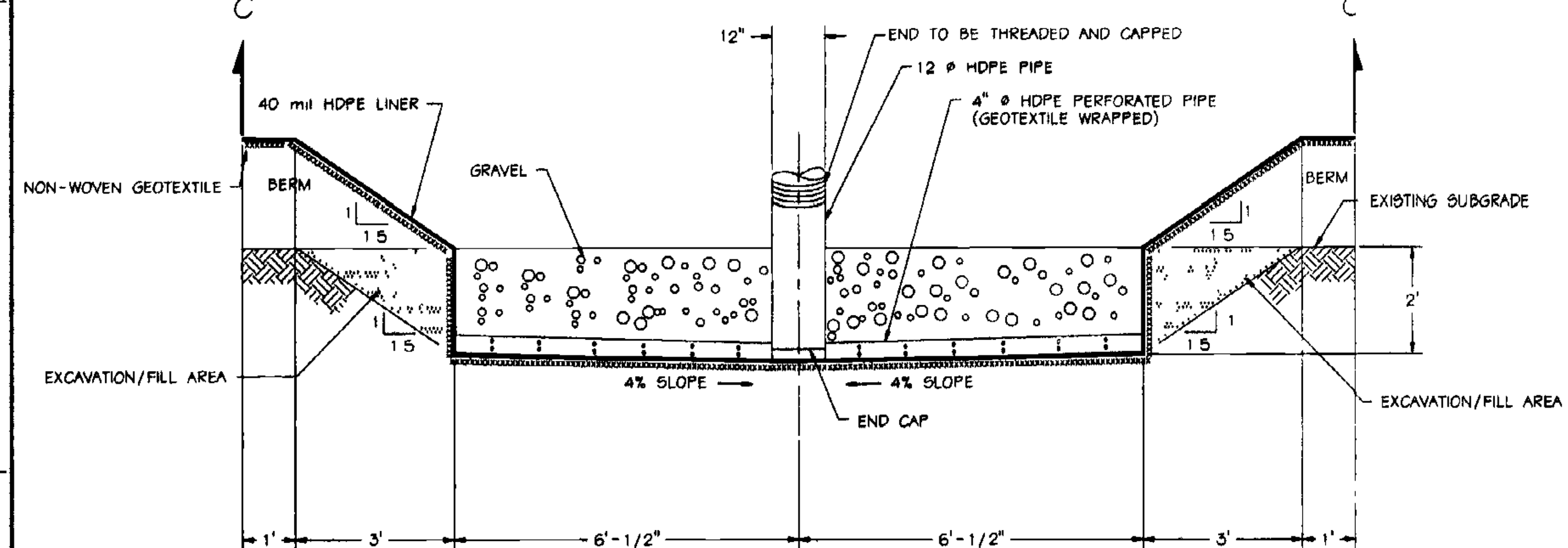


CROSS-SECTION B-B'

1"=4'

NOTE: ALL SLOPES ARE 1:1.5

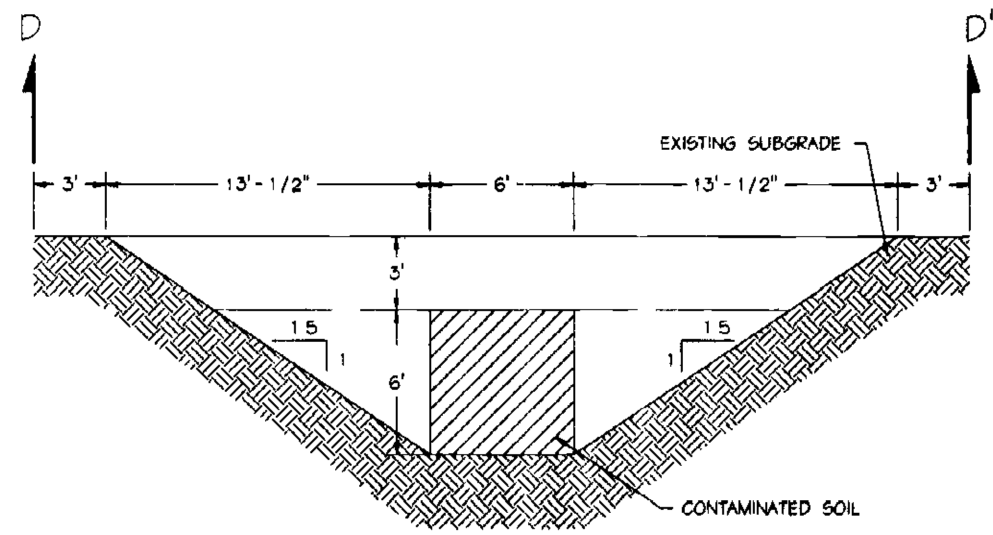
1"=4 0 4' 8' 12' 16 20'



CROSS-SECTION C-C'

1"=10'

1"=10' 0' 10' 20' 30' 40' 50'



CROSS-SECTION D-D'

1"=4'

1"=4' 0' 4' 8' 12' 16' 20'

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NAVAL STATION NORFOLK, VIRGINIA

MARINE CORPS BASE CAMP LEJEUNE NORTH CAROLINA
OU #12 (SITE 3) PILOT-SCALE
BIOREMEDIATION TREATABILITY STUDY
CROSS-SECTIONS

Baker
BAKER ENVIRONMENTAL, INC
CORAOPOLIS, PENNSYLVANIA
A/E CONTRACT NO. N62470-89-D-4814

DESIGN TLB
DRAWN WJH

CODE ID. NO. 80091 SIZE D
SCALE: AS SHOWN
SHEET 2 OF 2
C-2

REVISIONS

08/96

3.7 MAINTENANCE AND INSPECTION

Inspect erosion control devices after each rainfall and daily during prolonged rainfall. Remove sediment deposits after each rainfall or when sediment reaches approximately one-half the barrier height. Immediately repair damaged erosion control devices and damaged areas around and under neath the devices. Maintain erosion control devices to assure continued performance of their intended function. Modify the Contractor furnished erosion control plan as required to control problem areas noticed after each inspection.

3.8 CLEAN UP

At the completion of the job, or when directed or approved by the NTR, erosion control devices shall be removed. Erosion control devices and areas immediately adjacent to the device shall be filled (where applicable), shaped to drain and to blend into the surrounding contours. Erosion control devices may remain in place when approved by the NTR.

--End of Section--

SECTION 01575

TEMPORARY ENVIRONMENTAL CONTROLS
09/96

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

CODE OF FEDERAL REGULATIONS (CFR)

29 CFR 1910	Occupational Safety and Health Standards
40 CFR 122.26	EPA National Pollutant Discharge Elimination System Permit Regulations
40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 262	Generators of Hazardous Waste
40 CFR 263	Transporters of Hazardous Waste
40 CFR 264	Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 265	Interim Status Standard for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 300	National Oil and Hazardous Substances Pollution Contingency Plan
49 CFR 171	General Information, Regulations, and Definitions
49 CFR 172	Hazardous Materials, Tables, and Hazardous Materials Communications Regulations
49 CFR 178	Shipping Container Specification

CORPS OF ENGINEERS (COE)

COE EP 1165-2-304	(1976) Flood Plain Regulations for Flood Plain Management

ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 832-R-92-005	Storm Water Management for Construction Activities

MILITARY SPECIFICATIONS (MIL)

MIL-S-16165	(Rev. E) Shielding Harnesses, Shielding Items and Shielding Enclosures for Use in

	the Reduction of Interference from Engine Electrical Systems

MILITARY STANDARDS (MIL-STD)

MIL-STD-461	(Rev. D) Control of Electromagnetic Interference Emissions and Susceptibility
MIL-STD-462	Electromagnetic Interference Characteristics

1.2 Contractor Liabilities for Environmental Protection

Contractors shall complete and provide environmental training documentation for training required by Federal, State, and local regulations.

1.3 DEFINITIONS

1.3.1 Solid Waste

Rubbish, debris, garbage, and other discarded solid materials, except hazardous waste as defined in paragraph entitled "Hazardous Waste," resulting from industrial, commercial, and agricultural operations and from community activities.

1.3.2 Rubbish

Combustible and noncombustible wastes such as paper, boxes, glass, crockery, metal, lumber, cans, and bones.

1.3.3 Debris

Combustible and noncombustible wastes such as ashes and waste materials resulting from construction or maintenance and repair work, leaves, and tree trimmings.

1.3.4 Chemical Wastes

This includes salts, acids, alkalies, herbicides, pesticides, and organic chemicals.

1.3.5 Hazardous Waste

Hazardous substances as defined in 40 CFR 261 or as defined by applicable State and local regulations.

1.3.6 Hazardous Materials

Hazardous materials as defined in 49 CFR 171 and listed in 49 CFR 172.

1.3.7 Landscape Features

Trees, plants, shrubs, and ground cover.

1.3.8 Oily Waste

Petroleum products and bituminous materials.

1.4 SUBMITTALS

Submit the following in accordance with Section entitled "Submittal Procedures."

1.4.1 SD-08, Statements

a. Environmental protection plan G

b. Preconstruction survey report for Site 3G

c. Preconstruction brief G

d. Work schedule G

1.4.2 SD-18, Records

a. Environmental training documentation G

b. Erosion and sediment control inspection reports G

c. Environmental Plan Review G

1.4.2.1 Erosion and Sediment Control Inspection Reports

Submit to the NTR once every 7 calendar days and within 24 hours of a storm event that produces 0.5 inch of rain.

1.5 ENVIRONMENTAL PROTECTION REGULATORY REQUIREMENTS

Provide and maintain, during the life of the contract, environmental protection as defined in this Section. Plan for and provide environmental protective measures to control pollution that develops during normal construction practice. Plan for and provide environmental protective measures required to correct conditions that develop during the construction of permanent or temporary environmental features associated with the project. Comply with Federal, State, and local regulations pertaining to the environment, including but not limited to water, air, solid waste, and noise pollution.

1.6 ENVIRONMENTAL PROTECTION PLAN

1.6.1 Contents of Environmental Protection Plan

a. Include any hazardous materials (HM) planned for use on the Base shall be included in the Base HM Tracking Program maintained by the Safety Department. To assist this effort, submit a list (including quantities) of HM to be brought to the Base and copies of the corresponding material safety data sheets (MSDS). Submit this list to the NTR. At project completion, remove any hazardous material brought onto the Base. Account for the quantity of HM brought to the Base, the quantity used or expended during the job, and the leftover quantity which (1) may have additional useful life as a HM and shall be removed by the Contractor, or (2) may be a hazardous waste, which shall then be removed as specified herein.

b. The Environmental Protection Plan shall list and quantify any Hazardous Waste (HW) to be generated during the project.

c. In accordance with Base regulations, store HW near the point of

generation up to a total quantity of one quart of hazardous waste or 55 gallons of hazardous waste. Move any volume exceeding these quantities to a HW permitted area within 3 days. Prior to generation of HW, contact the NTR for labeling requirements for storage of hazardous wastes.

d. In accordance with Base regulations, substitute materials as necessary to reduce the generation of HW and include a statement to that effect in the Environmental Plan.

e. Contact the NTR for conditions in the area of the project which may be subject to special environmental procedures. Include this information in the Preconstruction Survey. Describe in the Environmental Protection Plan any permits required prior to working the area, and contingency plans in case an unexpected environmental condition is discovered.

f. Obtain permits for handling HW, and deliver completed documents to NTR for review. File the documents with the appropriate agency, and complete disposal with the approval of the NTR. Deliver correspondence with the State concerning the environmental permits and completed permits to the MNTR.

1.6.2 Environmental Protection Plan Format

The Environmental Protection Plan shall follow the following format:

ENVIRONMENTAL PROTECTION PLAN

Contractor Organization

Address and Phone Numbers

1. Hazardous materials to be brought onto the Base
2. MSDS package
3. Employee training documentation
4. HW storage plan
5. HW to be generated
6. Preconstruction survey results
7. Permitting requirements identified

1.6.3 Environmental Plan Review

Fourteen days after the environmental protection meeting, submit the proposed environmental plan for further discussion, review, and approval.

1.6.4 Preconstruction Survey

Perform a preconstruction survey of the project site with the NTR, and take photographs showing existing environmental conditions in and adjacent to the site.

1.7 STORMWATER POLLUTION PREVENTION PLAN

40 CFR 122.26, EPA 832-R-92-005. Provide "Stormwater Pollution Prevention Plan."

a. Identify potential sources of pollution which may reasonably be expected to affect the quality of storm water discharge from the

site.

b. Describe and ensure implementation of practices which will be used to reduce the pollutants in storm water discharge associated with industrial activity at the construction site.

c. Ensure compliance with terms of EPA general permit for storm water discharge.

d. Select applicable management practices from EPA 832-R-92-005.

1.8 ADMINISTRATIVE REQUIREMENTS

1.8.1 Licenses and Permits

Obtain licenses and permits pursuant to "FAR 52.236-7, Permits and Responsibilities".

For permits obtained by the NTR, whether or not required by the permit, perform inspections of the work in progress, and submit certifications to the applicable regulatory agency, via the NTR, that the work conforms to the contract and permit requirements. The inspections and certifications shall be provided through the services of a Professional Engineer, registered in the State where the work is being performed. As a part of the quality control plan, which is required to be submitted for approval by the quality control section, provide a subitem containing the name, P.E. registration number, address, and telephone number of the professional engineer(s) who will be performing the inspections and certifications for each permit listed above.

1.8.2 Licenses, Permits, and Other Responsibilities

Environmental compliance obligations under "FAR 52.236-7, Permits and Responsibilities" include, but are not limited to, the following:

a. Understand and perform all requirements under Federal, State, interstate, and local environmental laws, regulations and ordinance that are applicable to the work being performed under this Contract. This responsibility extends to securing all permits as required under such laws, regulations, and ordinances.

b. Advising Contractor's agents, employees, and subcontractor's, who will perform operations, activities, or services under this contract of these requirements.

c. Further:

(1) Notify the Government promptly upon receipt of regulatory notices, orders, or requests for information, and promptly supply copies to the Government.

(2) Comply with environmental regulatory notices or orders to the extent attributable to the Contractor's conduct, regardless of whether or not the Contractor is the name recipient of the notice or order.

(3) Correct conditions of environmental noncompliance identified by the Government in the absence of regulatory noncompliance notices. This includes cleaning up any contamination released from contractor operations, whether such contamination is on or

off Government property.

d. Upon Government request, provide the Government and any regulatory agency with information that may be required regarding the actual or potential environmental impacts of Contractor's operations. The information shall be timely and complete and in a form acceptable to the Government and/or the regulatory agency.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 PROTECTION OF NATURAL RESOURCES

Preserve the natural resources within the project boundaries and outside the limits of permanent work. Restore to an equivalent or improved condition upon completion of work. Confine construction activities to within the limits of the work indicated or specified. Conform to the national and state permitting requirements of the Clean Water Act.

3.1.1 Land Resources

Except in areas to be cleared, do not remove, cut, deface, injure, or destroy trees or shrubs without NTR's permission. Do not fasten or attach ropes, cables, or guys to existing nearby trees for anchorages unless authorized by NTR. Where such use of attach ropes, cables, or guys is authorized, the Contractor shall be responsible for any resultant damage.

3.1.1.1 Protection of Trees

Protect existing trees which are to remain and which may be injured, bruised, defaced, or otherwise damaged by construction operations. Remove displaced rocks from uncleared areas. By approved excavation, remove trees with 30 percent or more of their root systems destroyed. Removal of trees and the procedure for removal requires approval of the NTR.

3.1.1.2 Landscape Replacement

Remove trees and other landscape features scarred or damaged by equipment operations, and replace with equivalent, undamaged trees and landscape features. Obtain the NTR's approval before removal or replacement.

3.1.2 Water Resources

3.1.2.1 Oily Wastes

Prevent oily or other hazardous substances from entering the ground, drainage areas, or local bodies of water. Surround all temporary fuel oil or petroleum storage tanks with a temporary earth berm of sufficient size and strength to contain the contents of the tanks in the event of leakage or spillage.

3.1.3 Fish and Wildlife Resources

Do not disturb fish and wildlife. Do not alter water flows or otherwise significantly disturb the native habitat adjacent to the project and critical to the survival of fish and wildlife, except as indicated or specified.

3.2 HISTORICAL AND ARCHAEOLOGICAL RESOURCES

Carefully protect in-place and report immediately to the NTR historical and archaeological items or human skeletal remains discovered in the course of work. Stop work in the immediate area of the discovery until directed by the NTR to resume work. The Government retains ownership and control over historical and archaeological resources.

3.3 NOISE

Make the maximum use of low-noise emission products, as certified by the EPA. Blasting or use of explosives will not be permitted without written permission from the NTR, and then only during designated times.

3.4 RESTRICTIONS ON EQUIPMENT

3.4.1 Electromagnetic Interference Suppression

a. Electric motors must comply with MIL-STD-461 relative to radiated and conducted electromagnetic interference. A test for electromagnetic interference will not be required for motors that are identical physically and electrically to those that have previously met the requirements of MIL-STD-461. An electromagnetic interference suppression test will not be required for electric motors without commutation or sliprings having no more than one starting contact and operated at 3,600 revolutions per minute or less.

b. Equipment used by the Contractor shall comply with MIL-S-16165for internal combustion engines and MIL-STD-461 for other devices capable of producing radiated or conducted interference.

c. Conduct tests for electromagnetic interference on electric motors and Contractor's construction equipment in accordance with MIL-STD-461 and MIL-STD-462. Test location shall be reasonably free from radiated and conducted interference. Furnish testing equipment, instruments, and personnel for making the tests; a test location; and other necessary facilities.

3.4.2 Radio Transmitter Restrictions

Conform to the restrictions and procedures for the use of radio transmitting equipment, as directed. Do not use transmitters without prior approval.

3.5 EROSION AND SEDIMENT CONTROL MEASURES

3.5.1 Local Erosion and Sediment Control Plan

Follow the approved storm water management, erosion and sediment control plan.

3.5.2 Burnoff

Burnoff of the ground cover is not permitted.

3.5.3 Borrow Pit Areas

Manage and control borrow pit areas to prevent sediment from entering

nearby streams or lakes. Restore areas, including those outside the borrow pit, disturbed by borrow and haul operations. Restoration includes grading, replacement of topsoil, and establishment of a permanent vegetative cover. Uniformly grade side slopes of borrow pit to not more than a slope of 1 part vertical to 2 parts horizontal. Uniformly grade the bottom of the borrow pits to provide a flat bottom and drain by outfall ditches or other suitable means. Stockpile topsoil removed during the borrow pit operation, and use as part of restoring the borrow pit area.

3.5.4 Protection of Erodible Soils

Immediately finish the earthwork brought to a final grade, as indicated or specified. Immediately protect side and back slopes upon completion of rough grading. Plan and conduct earthwork to minimize duration of exposure of unprotected soils.

3.5.5 Temporary Protection of Erodible Soils

Use the following methods to prevent erosion and control sedimentation:

3.5.5.1 Mechanical Retardation and Control of Runoff

Mechanically retard and control the rate of runoff from the construction site. This includes construction of diversion ditches, benches, berms, and use of silt fences and strawbales to retard and divert runoff to protected drainage courses.

3.5.5.2 Borrow

Permit only in areas where suitable environmental controls are possible.

3.5.5.3 Vegetation and Mulch

Provide temporary protection on sides and back slopes as soon as rough grading is completed or sufficient soil is exposed to require erosion protection. Protect slopes by accelerated growth of permanent vegetation, temporary vegetation, mulching, or netting. Stabilize slopes by hydroseeding, anchoring mulch in place, covering with anchored netting, sodding, or such combination of these and other methods necessary for effective erosion control.

a. Provide new seeding where ground is disturbed. Include topsoil or nutriment during the seeding operation necessary to establish a suitable stand of grass.

3.6 CONTROL AND DISPOSAL OF SOLID WASTES

Pick up solid wastes, and place in covered containers which are regularly emptied. Do not prepare or cook food on the project site. Prevent contamination of the site or other areas when handling and disposing of wastes. At project completion, leave the areas clean. Dispose of solid waste generated at locations as directed.

3.6.1 Disposal of Solid Waste, Debris, Chemical or Hazardous Substances

Disposal of chemical or hazardous substances at the Base Sanitary Landfill and Hardfill area is prohibited. Dispose of solid waste, debris and metal containers in accordance with the requirements specified herein.

a. Base sanitary landfill and hardfill areas. Only authorized solid

waste approved for deposit by the landfill attendant or equipment operator will be permitted to be dumped at a designated area in the sanitary landfill. Prepare a Landfill Authorization form prior to first delivery for approval by the Landfill Supervisor (366-6159). Place large or bulky items in the hardfill area only with prior approval of the Base Civil Engineer or DEM Chief (366-3244). Deposit construction material such as grading or excavated materials at the hardfill area provided such material does not contain segregated metals. There is no charge for disposal. Landfill and hardfill hours of operation are Monday through Friday, 7:30 a.m. to 11:00 a.m and 12:30 p.m. to 3:00 p.m.

3.6.2 Disposal of Rubbish and Debris

Dispose of rubbish and debris in accordance with the requirements specified below.

3.6.2.1 Removal From Site

Remove and dispose rubbish and debris from site.

3.6.2.2 Removal to a Government Landfill

Haul concrete debris to the Government landfill site indicated or specified. Cover deposited material after each day's operation.

3.6.2.3 Removal From Camp Lejeune, NC

Remove and dispose of general rubbish and debris from Government property.

a. Provide 24 hour advance written notice to the Contracting Office of Contractor's intention to dispose of off-base.

b. Disposal at sites or landfills not holding a valid State of North Carolina permit is specifically prohibited. The prohibition also applies to sites where a permit may have been applied for but not yet obtained.

c. Off-base disposal of construction debris outside the parameters of this paragraph at sites without State permits and/or not in accordance with regulatory requirements shall require the Contractor at his own expense to remove, transport and relocate the debris to a State approved site. The Contractor shall also be required to pay any fines, penalties, or fees related to the illegal disposal of construction debris.

d. Metals will not be accepted at the Base Sanitary Landfill. Materials which may be deposited in the landfill include:

CATEGORY	CONSTRUCTION DEBRIS DISPOSAL - BASE SANITARY LANDFILL EXAMPLE/GENERAL INFORMATION FOR DEPOSIT IN THE LANDFILL
Mixed Debris	The following materials may be placed in the landfill in a location designated by the landfill operator. These items may be mixed together. Sheetrock - plaster - glass (broken).

CATEGORY	CONSTRUCTION DEBRIS DISPOSAL - BASE SANITARY LANDFILL EXAMPLE/GENERAL INFORMATION FOR DEPOSIT IN THE LANDFILL
	Non-asbestos insulation - (fiberglass and mineral wool shall be bagged). Packing paper, styrofoam, and pasteboard boxes. Non-asbestos roofing materials such as shingles built-up and single roofing. Painted wood such as doors, windows, siding, and trim. Plastic/fiberglass such as pipe, electrical boxes, cover plates, etc. Ceramic and vinyl flooring or tile - ceiling tile.
Masonry and Concrete	Deliver concrete, block, brick, mortar to the landfill separate from any other items, and place in a location designated by the landfill operator. Reinforcement wire and Reinforcement wire and rebar shall be removed flush with exposed surfaces.
Untreated/Unpainted Wood	Deliver lumber, trees, stumps, limbs, tops, tops, and shrubs to the landfill separated from any other items, and place in locations as designated by the landfill operator.
Organic Matter	Deliver leaves, pine straw, grass clippings, and shrub clippings to the landfill separated from any other items, and place in locations as designated by the landfill operator. No bags or containers are allowed.
Asphalt Pavement	Remove pavement from Government property and deliver to an asphalt recycling establishment. Provide a record of the total tons of asphalt recycled and the corporate name and location of the recycling establishment receiving the removed asphalt.
*****	Separate each category of construction debris at the construction site and deliver separately to the landfill.
*****	Place each category of construction debris in the landfill at a location designated by the landfill operator.
*****	Weigh each and every vehicle delivering debris upon entrance and exit. Cover debris.
Metals	Metals will not be accepted at the landfill. Remove metals from each and every category before delivery to landfill. (Example: Remove hardware from doors and windows.)

CATEGORY	CONSTRUCTION DEBRIS DISPOSAL - BASE SANITARY LANDFILL EXAMPLE/GENERAL INFORMATION FOR DEPOSIT IN THE LANDFILL
	Dispose of metal construction debris at Defense Reutilization Maintenance Office (DRMO), Building TC-861, Camp Geiger.
	Aluminum, brass, copper, lead, other metal, electrical wiring, cable (cut in 3 foot or less sections)

3.6.2.5 Landfill Modifications

Protect the landfill located in a flood plain against at least the 100-year design flood by impervious dikes and other means to prevent floodwaters from contacting deposited rubbish and debris as indicated in accordance with COE EP 1165-2-304.

3.6.3 Garbage Disposal

Place garbage in approved containers, and move to a pickup point or disposal area, where directed.

3.7 CONTROL AND DISPOSAL OF HAZARDOUS WASTE

3.7.1 Hazardous Waste Generation

Handle generated hazardous waste in accordance with 40 CFR 262.

3.7.2 Hazardous Waste Disposal

Dispose of hazardous waste in accordance with Federal, State, and local regulations, especially 40 CFR 263, 40 CFR 264, and 40 CFR 265. Removal of hazardous waste from Government property shall not occur without prior notification and coordination with the NTR. Transport hazardous waste by a permitted, licensed, or registered hazardous waste transported to a TSD facility. Hazardous waste shall be properly identified, packaged, and labeled in accordance with 49 CFR 172. Provide completed manifest for hazardous waste disposed of off-site to the NTR within 7 days of disposal. Hazardous waste shall not be brought onto the Base.

3.7.3 Hazardous Waste Storage

Store hazardous waste in containers in accordance with 49 CFR 178. Identify hazardous waste in accordance with 40 CFR 261 and 40 CFR 262. Identify hazardous waste generated within the confines of the station by the station's EPA generator identification number.

3.7.4 Spills of Oil and Hazardous Materials

Take precautions to prevent spills of oil and hazardous material. In the event of a spill, immediately notify the NTR. Spill response shall be in accordance with 40 CFR 300 and applicable State regulations.

3.7.5 Petroleum Products

Protect against spills and evaporation during fueling and lubrication of

equipment and motor vehicles. Dispose of lubricants to be discarded and excess oil.

3.8 DUST CONTROL

Keep dust down at all times, including nonworking periods. Sprinkle or treat, with dust suppressants, the soil at the site, haul roads, and other areas disturbed by operations. Dry power brooming will not be permitted. Instead, use vacuuming, wet mopping, wet sweeping, or wet power brooming. Air blowing will be permitted only for cleaning nonparticulate debris such as steel reinforcing bars. Only wet cutting will be permitted for cutting concrete blocks, concrete, and bituminous concrete. Do not shake bags of cement, concrete mortar, or plaster unnecessarily.

3.9 QUARANTINE FOR IMPORTED FIRE ANT (4/82)

Onslow, Jones, and Cartaret Counties and portions of Duplin and Craven Counties have been declared a generally infested area by the United States Department of Agriculture (USDA) for the imported fire ant. Compliance with the quarantine regulations established by this authority as set forth in USDA Publication 301.81 of 31 December 1992, is required for operations hereunder. Pertinent requirements of the quarantine for materials originating on the Camp Lejeune reservation, the Marine Corps Air Station (Helicopter), New River and the Marine Corps Air Station, Cherry Point, which are to be transported outside Onslow County or adjacent suppression areas, include the following:

a. Certification is required for the following articles and they shall not be moved from the reservation to any point outside Onslow County and adjacent designated areas unless accompanied by a valid inspection certificate issued by an Officer of the Plant Protection and Quarantine Program (PPQ) of the U.S. Department of Agriculture.

(1) Bulk soil

(2) Used mechanized soil-moving equipment. (Used mechanized soil-moving equipment is exempt if cleaned of loose noncompacted soil).

(3) Other products, articles, or means of conveyances, if it is determined by an inspector that they present a hazard of transporting spread of the imported fire ant and the person in possession thereof has been so notified.

b. Authorization for movement of equipment outside the imported fire and regulated area shall be obtained from USDA, Animal and Plant Health Inspection Service (APHIS), Plant Protection and Quarantine (PPQ), Box 83, Goldsboro, North Carolina, 27533, telephone (919) 735-1941. Requests for inspection shall be made sufficiently in advance of the date of movement to permit arrangements for the services of authorized inspectors. The equipment shall be prepared and assembled so that it may be readily inspected. Soil on or attached to equipment, supplies, and materials shall be removed by washing with water or such other means as necessary to accomplish complete removal. Resulting spoil shall be wasted as necessary and as directed.

-- End of Section --

SECTION 02220

SITE DEMOLITION
09/96

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A10.6 (1990) Demolition Operations

DEPARTMENT OF DEFENSE (DOD)

DOD 4000.25-1-M Requisitioning and Issue Procedures

MILITARY STANDARDS (MIL-STD)

MIL-STD-129 (Rev. M) Marking for Shipment and Storage

1.2 GENERAL REQUIREMENTS

Do not begin demolition until authorization is received from the NTR. Remove rubbish and debris from the project site; do not allow accumulations inside or outside the buildings. Store materials that cannot be removed daily in areas specified by the NTR.

1.3 SUBMITTALS

Submit the following in accordance with section entitled "Submittal Procedures."

1.3.1 SD-08, Statements

a. Demolition plan

Submit proposed demolition and removal procedures to the NTR for approval before work is started.

1.3.1.1 Required Data

Demolition plan shall include procedures for coordination with other work in progress, a disconnection schedule of utility services, and a detailed description of methods and equipment to be used for each operation and of the sequence of operations.

1.4 REGULATORY AND SAFETY REQUIREMENTS

Comply with federal, state, and local hauling and disposal regulations. In addition to the requirements of the "Contract Clauses," safety requirements shall conform with ANSI A10.6.

1.4.1 Notifications

Furnish timely notification of demolition projects to Federal, State, regional, and local authorities in accordance with 40 CFR 61-SUBPART M. Notify the NTR in writing 10 days prior to the commencement of work in accordance with 40 CFR 61-SUBPART M.

Ten working days prior to commencement of work, complete and submit Notification of Demolition and Renovation forms to Federal and State authorities and the NTR in accordance with 40 CFR 61-SUBPART M.

1.5 DUST AND DEBRIS CONTROL

Prevent the spread of dust and debris and avoid the creation of a nuisance or hazard in the surrounding area. Do not use water if it results in hazardous or objectionable conditions such as, but not limited to, ice, flooding, or pollution.

1.6 PROTECTION

1.6.1 Existing Work

Protect existing work which is to remain in place, be reused, or remain the property of the Government. Repair items which are to remain and which are damaged during performance of the work to their original condition, or replace with new.

1.6.2 Trees

Conform to Section 01575, "Temporary Environmental Controls," for protection of natural resources.

1.6.3 Facilities

Protect electrical and mechanical services and utilities. Where removal of existing utilities and pavement is specified or indicated, provide approved barricades, temporary covering of exposed areas, and temporary services or connections for electrical and mechanical utilities.

1.7 BURNING

Burning will not be permitted.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 EXISTING FACILITIES TO BE REMOVED

3.1.1 Paving and Slabs

Remove sawcut concrete and asphaltic concrete paving and slabs including aggregate base as indicated.

3.1.2 Concrete

Saw concrete along straight lines to a depth of not less than 2 inches. Make each cut in walls perpendicular to the face and in alignment with the

cut in the opposite face. Break out the remainder of the concrete.

3.2 DISPOSITION OF MATERIAL

3.3.1 Title to Materials

Except where specified in other sections, all materials and equipment removed, and not reused, shall become the property of the Contractor and shall be removed from Government property. Title to materials resulting from demolition, and materials and equipment to be removed, is vested in the Contractor upon approval by the NTR of the Contractor's demolition and removal procedures, and authorization by the NTR to begin demolition. The Government will not be responsible for the condition or loss of, or damage to, such property after contract award. Materials and equipment shall not be viewed by prospective purchasers or sold on the site.

3.4 CLEANUP

3.4.1 Debris and Rubbish

Remove and transport debris and rubbish in a manner that will prevent spillage on pavements, streets or adjacent areas. Clean up spillage from pavements, streets and adjacent areas.

-- End of Section --

SECTION 02223

TRANSPORTATION AND DISPOSAL OF CONTAMINATED MATERIAL
06/92

PART 1 GENERAL

1.1 SUBMITTALS

Submit the following in accordance with Section C of the basic contract.

1.1.1 SD-08, Statements

a. Treatment Facility Permit

1.1.1.1 Treatment Facility Permit

Verification that the proposed treatment facility is permitted to accept the contaminated materials specified, prior to the start of excavation.

1.1.2 SD-18, Records

a. Shipment Manifests

b. Delivery Certificates

c. Disposal Site Decontamination Certificate

d. Work Site Decontamination Certificate

e. Treatment and Disposal Certificates

1.1.3 Shipment Manifests

Copies of manifests and other documentation required for shipment of waste materials within 24 hours after removal of waste from Site 3. All shipment manifests shall be signed by the NTR.

1.1.4 Delivery Certificates

Verification that the wastes were actually delivered to Lot 203 the day they were excavateda RCRA-permitted disposal facility.

1.1.5 Disposal Site Decontamination Certificate

Verification that all vehicles and containers were decontaminated prior to leaving the disposal facilityLot 203, within 24 hours of disposal.

1.1.6 Work Site Decontamination Certificate

Verification that all vehicles, equipment, and containers were decontaminated prior to leaving the work site shall be submitted within 24 hours of vehicles, equipment, or containers leaving the work site. Verification that all trucks transporting contaminated materials were properly operating, and were covered, shall be submitted within 24 hours after removal of waste from the site.

1.1.7 Treatment and Disposal Certificates

Verification that the wastes were successfully treated and remediated to the levels specified herein.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.1 Materials and Equipment

The Contractor shall furnish all labor, materials, and equipment necessary to transport and dispose of Government and Contractor generated wastes in accordance with applicable Federal, State, and local requirements.

3.2 Records

The Contractor shall originate, use, and maintain the waste shipment records/manifests as required by the North Carolina Department of Environment, Health, and Natural Resources, and the U.S. Department of Transportation, as necessary.

3.3 Transportation

The Contractor shall be solely responsible for complying with all Federal, State, and local requirements for transporting contaminated and hazardous materials through the applicable jurisdictions and shall bear all responsibility and cost for any noncompliance. In addition to those requirements, the Contractor shall do the following:

a. Inspect and document all vehicles and containers for proper operation and covering.

b. Inspect all vehicles and containers for proper markings, manifest documents, and other requirements for waste shipment.

c. Perform and document decontamination procedures prior to leaving the worksite and again before leaving the disposal site.

-- End of Section --

SECTION 02231

CLEARING AND GRUBBING
03/96

PART 1 GENERAL

1.1 DELIVERY, STORAGE, AND HANDLING

Deliver materials to, store at the site, and handle in a manner which will maintain the materials in their original manufactured or fabricated condition until ready for use.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 PROTECTION

3.1.1 Roads and Walks

Keep roads and walks free of dirt and debris at all times.

3.1.2 Trees, Shrubs, and Existing Facilities

Protection shall be in accordance with Section 01575, "Temporary Environmental Controls."

3.1.3 Utility Lines

Protect existing utility lines that are indicated to remain from damage. Notify the NTR immediately of damage to or an encounter with an unknown existing utility line. The Contractor shall be responsible for the repairs of damage to existing utility lines that are indicated or made known to the Contractor prior to start of clearing and grubbing operations. When utility lines which are to be removed are encountered within the area of operations, the Contractor shall notify the NTR in ample time to minimize interruption of the service. Refer to Section 01575, "Temporary Environmental Controls," for additional utility protection.

3.2 CLEARING

Shall consist of the felling, trimming, and cutting of trees into sections and the satisfactory disposal of the trees and other vegetation designated for removal, including downed timber, snags, brush, and rubbish occurring within the areas to be cleared. Cut off flush with or below the original ground surface trees, stumps, roots, brush, and other vegetation in areas to be cleared, except for trees and vegetation indicated or directed to be left standing.

3.3 TREE REMOVAL

Where indicated, remove designated trees and stumps and grub roots.

3.4 PRUNING

Trim trees designated to be left standing within the cleared areas of dead branches 1 1/2 inches or more in diameter; and trim branches to heights and in a manner as indicated. Neatly cut limbs and branches to be trimmed close to the bole of the tree or main branches.

3.5 GRUBBING

Remove and dispose of roots larger than 3 inches in diameter, matted roots, and designated stumps from the indicated grubbing areas.

3.6 DISPOSAL OF CLEARED AND GRUBBED MATERIALS

3.6.1 Saleable Timber

Consider felled timber from which saw logs, pulpwood, posts, poles, ties, or fuelwood can be produced as saleable timber. Trim limbs and tops, and saw into saleable lengths and stockpile adjacent to Site 3. The stockpiled timber will remain the property of the Government.

3.6.2 Nonsaleable Materials

Remove from the project site and dispose of off ~~Base~~ & to Base landfill/composting fac. timber, scrub, vegetation, and debris considered as nonsaleable. Burning will not be permitted.

-- End of Section --

SECTION 02315

EXCAVATION AND FILL
06/96

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 136	(1995; Rev. A) Sieve Analysis of Fine and Coarse Aggregates
ASTM D 698	(1991) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft (600 kN-m/m))
ASTM D 1140	(1992) Amount of Material in Soils Finer Than the No. 200 (75-Micrometer) Sieve
ASTM D 1556	(1990) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 1557	(1991) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft (2,700 kN-m/m))
ASTM D 2487	(1993) Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 2922	(1991) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017	(1988; R 1993) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
ASTM D 4318	(1995) Liquid Limit, Plastic Limit, and Plasticity Index of Soils

COMMERCIAL ITEM DESCRIPTIONS (CID)

CID A-A-1909	Fertilizer

CORPS OF ENGINEERS (COE)

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

1.2 DEFINITIONS

1.2.1 Hard Materials

Weathered rock, dense consolidated deposits, or conglomerate materials which are not included in the definition of "rock" but which usually require the use of heavy excavation equipment, ripper teeth, or jack hammers for removal.

1.2.2 Cohesive Materials

Materials ASTM D 2487 classified as GC, SC, ML, CL, MH, and CH. Materials classified as GM and SM will be identified as cohesive only when the fines have a plasticity index greater than zero.

1.2.3 Cohesionless Materials

Materials ASTM D 2487 classified as GW, GP, SW, and SP. Materials classified as GM and SM will be identified as cohesionless only when the fines have a plasticity index of zero.

1.3 SUBMITTALS

Submit the following in accordance with section entitled "Submittal Procedures."

1.3.1 SD-04, Drawings

a. Supporting system drawings

1.3.1.1 Required Drawings G

Submit drawings and calculations by a registered professional engineer. Drawings shall include material sizes and types, arrangement of members, and the sequence and method of installation and removal.

1.3.2 SD-05, Design Data

a. Supporting system calculations

1.3.2.1 Required Data

Submit drawings and calculations by a registered professional engineer. Calculations shall include data and references used.

1.3.3 SD-08, Statements

a. Supporting systems work plan G

b. Dewatering work plan G

Submit 15 days prior to starting work.

1.3.4 SD-12, Field Test Reports

a. Fill and backfill test

b. Density tests

1.4 DELIVERY, STORAGE, AND HANDLING

Perform in a manner to prevent contamination or segregation of materials. The soil that was located from 0 to 3 feet bgs shall be stockpiled separately from the soil that was located from 3 to 9 feet bgs.

PART 2 PRODUCTS

2.1 SOIL MATERIALS

Free of debris, roots, wood, scrap material, vegetation, refuse, soft unsound particles, and frozen, deleterious, or objectionable materials. Unless specified otherwise, the maximum particle diameter shall be one-half the lift thickness at the intended location.

2.1.1 Common Fill

Approved, unclassified soil material with the characteristics required to compact to the soil density specified for the intended location.

2.1.2 Topsoil

Natural, friable soil representative of productive, well-drained soils in the area, free of subsoil, stumps, rocks larger than one inch diameter, brush, weeds, toxic substances, and other material detrimental to plant growth. Amend topsoil pH range to obtain a pH of 5.5 to 7.

2.2 BORROW

Borrow material obtained from the Government borrow pit shall be pit site crushed. Provide equipment to excavate and transport.

PART 3 EXECUTION

3.1 SURFACE PREPARATION

3.1.1 Clearing and Grubbing

Unless indicated otherwise, remove trees, stumps, logs, shrubs, and brush within the clearing limits. Remove stumps entirely. Grub out matted roots and roots over 2 inches in diameter to at least 18 inches below existing surface.

3.1.2 Stripping

Strip existing topsoil to a depth of 4 inches without causing contamination by subsoil material. Stockpile topsoil separately from other excavated material and locate convenient to finish grading at Site 3.

3.1.3 Unsuitable Material

Remove vegetation, debris, decayed vegetable matter, sod, mulch, and rubbish underneath paved areas or concrete slabs.

3.1.3.1 Proof Rolling

Proof rolling shall be done on an exposed subgrade free of surface water (wet conditions resulting from rainfall) which would promote degradation of an otherwise acceptable subgrade. After contaminated soil removal and

clean confirmation sampling, proof roll the existing subgrade. Operate the roller in a systematic manner to ensure the number of passes over all areas, and at speeds between 2 1/2 to 3 1/2 miles per hour. Notify the NTR a minimum of 3 days prior to proof rolling. Proof rolling shall be performed in the presence of the NTR. Rutting or pumping of material shall be undercut as directed by the NTR and replaced with fill and backfill material.

3.2 PROTECTION

3.2.1 Protection Systems

Provide shoring, bracing, cribbing, underpinning, and sheeting in accordance with COE EM-385-1-1 , except that banks may be sloped only when approved by the NTR. Provide additional supporting systems where indicated.

3.2.2 Drainage and Dewatering

Provide for the collection and disposal of surface and subsurface water encountered during construction.

3.2.2.1 Drainage

So that construction operations progress successfully, completely drain construction site during periods of construction to keep soil materials sufficiently dry. Provide temporary ditches, swales, and other drainage features and equipment as required to maintain dry soils. When unsuitable working platforms for equipment operation and unsuitable soil support for subsequent construction features develop, remove unsuitable material and provide new soil material as specified herein.

3.2.2.2 Dewatering

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 interference with orderly progress of construction. French drains, sumps, ditches or trenches will not be permitted within 3 feet of the foundation of any structure, except with specific written approval, and after specific contractual provisions for restoration of the foundation area have been made. Control measures shall be taken by the time the excavation reaches the water level in order to maintain the integrity of the in situ material. While the excavation is open, the water level shall be maintained continuously, at least 0.5 feet below the working level.

3.2.3 Underground Utilities

Location of the existing utilities indicated is approximate. The Contractor shall physically verify the location and elevation of the existing utilities indicated prior to starting construction. The Contractor shall also contact the Public Works Department for assistance in locating existing utilities.

3.2.4 Machinery and Equipment

Movement of construction machinery and equipment over pipes during construction shall be at the Contractor's risk. Repair, or remove and provide new pipe for existing or newly installed pipe that has been displaced or damaged.

3.3 EXCAVATION

Excavate to contours, elevation, and dimensions indicated. Reuse excavated materials that meet the specified requirements for the material type required at the intended location. Keep excavations free from water. Excavate soil disturbed or weakened by Contractor's operations, soils softened or made unsuitable for subsequent construction due to exposure to weather. Refill with backfill and fill material and compact to non-movement. Unless specified otherwise, refill excavations cut below indicated depth with backfill and fill material and compact to non-movement.

3.3.1 Hard Material Excavation

Remove hard material to elevations indicated in a manner that will leave foundation material in an unshattered and solid condition. Roughen level surfaces and cut sloped surfaces into benches for bond with concrete. Protect shale from conditions causing decomposition along joints or cleavage planes and other types of erosion. Removal of hard material beyond lines and grades indicated unless previously authorized by the NTR will not be grounds for a claim for additional payment.

3.4 FILLING AND BACKFILLING

Fill and backfill to contours, elevations, and dimensions indicated. Compact each lift before placing overlaying lift.

3.4.1 Common Fill Placement

Provide for general site. Place in 12 inch lifts. Compact areas not accessible to rollers or compactors with mechanical hand tampers. Aerate material excessively moistened by rain to a satisfactory moisture content. Finish to a smooth surface by blading, rolling with a smooth roller, or both.

3.5 COMPACTION

Determine in-place density of existing subgrade; if required density exists, no compaction of existing subgrade will be required.

3.5.1 General Site

Compact underneath areas designated for vegetation to non-movement under the weight of construction equipment.

3.6 FINISH OPERATIONS

3.6.1 Grading

Finish grades as indicated within one-tenth of one foot. Grade areas to drain water away from structures. For existing grades that will remain but which were disturbed by Contractor's operations, grade as directed.

3.6.2 Seed

Scarify existing subgrade. Provide 4 inches of topsoil for newly graded finish earth surfaces and areas disturbed by the Contractor. Additional topsoil will not be required if work is performed in compliance with stripping and stockpiling requirements. If there is insufficient on-site topsoil meeting specified requirements for topsoil, provide topsoil required in excess of that available. Seed shall match existing

vegetation. Provide seed at 5 pounds per 1000 square feet. Provide CID A-A-1909, Type I, Class 2, 10-10-10 analysis fertilizer at 25 pounds per 1000 square feet. Provide mulch and water to establish an acceptable stand of grass.

3.6.3 Protection of Surfaces

Protect newly graded areas from traffic, erosion, and settlements that may occur. Repair or reestablish damaged grades, elevations, or slopes.

3.7 DISPOSITION OF SURPLUS MATERIAL

Waste in Government disposal area indicated which is located within a haul distance of 4-5 miles. Remove from Government property and brush, refuse, stumps, roots, and timber.

3.8 FIELD QUALITY CONTROL

3.8.1 Sampling

Take the number and size of samples required to perform the following tests.

3.8.2 Testing

Perform one of each of the following tests for each material used. Provide additional tests for each source change.

3.8.2.1 Density Tests

If directed by the NTR, the Contractor shall test density in accordance with ASTM D 1556, or ASTM D 2922 and ASTM D 3017. When ASTM D 2922 and ASTM D 3017 density tests are used, verify density test results by performing an ASTM D 1556 density test at a location already ASTM D 2922 and ASTM D 3017 tested as specified herein. Perform an ASTM D 1556 density test at the start of the job, and for every 10 ASTM D 2922 and ASTM D 3017 density tests thereafter. Test each lift at randomly selected locations.

-- End of Section --