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BASIS OF DESIGN REPORT

REMEDIATION OF PESTICIDE AND PCB-CONTAMINATED SOIL AT SITES 21 AND 78 MARINE CORPS BASE CAMP LEJEUNE, NORTH CAROLINA

CONTRACT TASK ORDER 0259

NOVEMBER 11, 1994

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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BASIS OF DESIGN
REMEDIATION OF PESTICIDE AND PCB-CONTAMINATED SOIL AT SITES 21 AND 78
MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA

INTRODUCTION

This document presents the Basis of Design for soil remediation at Sites 21 and 78, which are part of Operable Unit No. 1 (OU No. 1) at Marine Corps Base (MCB), Camp Lejeune, North Carolina. The report 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, and in accordance with LANTDIV's Scope of Work dated June 6, 1994. The scope of this soil remediation effort includes the removal, transportation, and disposal of pesticide- and polychlorinated biphenyl (PCB)-contaminated soils from four areas of concern (AOCs) within Sites 21 and 78. The AOCs were determined from the results of a remedial investigation (RI) and feasibility study (FS) conducted for OU No. 1 by Baker in 1993/1994.

The following sections of this Basis of Design describe the background of the sites and the proposed soil removal action. Appendix A presents the proposed construction schedule.

PURPOSE

The purpose of the Basis of Design is to present and describe the most important elements of the remedial design for review by LANTDIV. The Basis of Design is not intended to be part of plans and specifications to be utilized by the Remedial Action Contractor for the execution of the remedial action.

BACKGROUND

MCB, Camp Lejeune is a training base for the U.S. Marine Corps, located in Onslow County, North Carolina. The Base covers approximately 236 square miles and includes 14 miles of coastline. MCB, Camp Lejeune is bounded to the southeast by the Atlantic Ocean, to the northeast by State Route 24, and to the west by U.S. Route 17. The town of Jacksonville, North Carolina, is located north of the Base.

MCB, Camp Lejeune was placed on the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) National Priorities List (NPL) on October 4, 1989 (54 Federal Register 41015, October 4, 1989). The United States Environmental Protection Agency (USEPA) Region IV, the North Carolina Department of Environment, Health and Natural Resources (NC DEHNR) and the United States DON then entered into a Federal Facilities Agreement (FFA) for MCB, Camp Lejeune. The primary purpose of the FFA was to ensure that environmental impacts associated with past and present activities at MCB, Camp Lejeune were thoroughly investigated and appropriate CERCLA response/Resource Conservation and Recovery Act (RCRA) corrective action alternatives were developed and implemented as necessary to protect public health and the environment.

Site Descriptions and Areas of Concern

OU No. 1 covers an area of approximately 690 acres and includes three sites: 21, 24, and 78. It is located approximately one mile east of the New River and two miles south of State Route 24. OU No. 1 is bordered by Holcomb Boulevard to the northwest, Sneads Ferry Road to the northeast, Main Service Road to the southwest, and woodlands and Cogdels Creek to the southeast. As previously stated, this removal action involves contaminated soils at Sites 21 and 78, which are two of the three sites included within OU No. 1. Descriptions of these two sites and the AOCs included within both sites are presented below.

Site 21 is located within the northwest section of Site 78. The site is bordered by Ash Street to the southwest, Center Road to the southeast, and a wooded area to the northwest. A dirt road surrounds most of the site along with surface drainage ditches. The southern and central portions of the site (approximately 220 feet by 900 feet) include several fenced-in areas, while the northern section (approximately 500 feet long) is an open area. A water tower is located in the fenced portion of the site. Surface cover within the site consists of gravel, sandy soil, and concrete with a few vegetated areas. The southern portion of the site is periodically utilized for storage by Marine Corps Reserve units. Currently this portion of the site is being used for storage of military vehicles.

Three primary AOCs were identified at Site 21. They are the Former PCB Transformer Disposal Area (AOC 1) and the Former Pesticide Mixing/Disposal Area (AOCs 2 and 3). Drawing C-1 shows the location of these three AOCs. The Former Transformer PCB Disposal Area is located in the northeastern portion of the site, and the Former Pesticide Mixing/Disposal Area is located in the southwestern portion of the site. With the exception of a small, slightly depressed area at the northern portion of the site, which may have been the former transformer oil disposal pit, there are no visual signs of waste disposal throughout the site. The contaminants of concern (COCs) at AOC 1 and AOC 2 are PCBs. The COCs at AOC 3 are pesticides, including 4,4'-DDD, 4,4'-DDT, and chlordane.

Site 78 encompasses the industrial area of MCB, Camp Lejeune and is bordered by Holcomb Boulevard, Sneads Ferry Road, Duncan Street, and Main Service Road. This area is comprised of maintenance shops, warehouses, painting shops, printing shops, auto body shops, and other similar industrial facilities. Site 78 covers approximately 590 acres. With the exception of buildings, the majority of the site area is paved (e.g., roadways, parking lots, loading dock areas, and storage lots), however, there are many small lawn areas associated with individual buildings within the site and along lengthy stretches of roadways. In addition, there are several acres of woods in the southern portion of the site. Recreational ballfields and a parade ground are located in the southwest corner of the site.

One soil AOC has been identified within Site 78, a grassed area on the northeast side of Building 1502 (AOC 4). Drawing C-1 shows the location of AOC 4. The COCs at AOC 4 are pesticides.

Site History

Site 21 has had a history of pesticide usage and reported transformer oil disposal. The site was used as a pesticide mixing area and as a cleaning area for pesticide application equipment from 1958 to 1977. This area, the Former Pesticide Mixing/Disposal Area, was reported to be located in the southeast corner of the lot (the exact location is not documented). Chemicals reportedly stored and handled at this site included diazinon, chlordane, lindane, DDT, malathion (46 percent solution), mirex, 2,4-D, silvex, dalapon and dursban. Small spills, discharge of washout fluids, and indiscriminate disposal are believed to have occurred in this area. In 1977, before these mixing/cleaning activities were moved to a different location, overland discharge of washout fluids was estimated to be approximately 350 gallons per week. It is not clear for how long this discharge of washout fluids occurred.

The Former Transformer Oil Disposal Pit was located in the northeastern portion of the site. The pit was reportedly used as a disposal area for transformer oil during a one year period between 1950 and 1951. The pit reportedly measured 25 to 30 feet long by 6 feet wide by 8 feet deep. Sand was occasionally placed in the pit when oil was found standing in the bottom of the pit. The total quantity of oil disposed in this pit is unknown. A small area, slightly depressed in elevation, which may be the former oil pit, is evident in the northern portion of Site 21.

Site 78, constructed in the late 1930s, was the first developed area at MCB, Camp Lejeune. It was comprised of approximately 75 buildings and facilities including maintenance shops, gas stations, administrative offices, commissaries, snack bars, warehouses, and storage yards. There is presently no known uncontrolled disposal of wastes related to the various industrial activities at the site. Due to the industrial nature of the site, many spills and leaks have occurred over the years. Most of these spills and leaks have consisted of petroleum-related products and solvents from underground storage tanks (USTs), drums, and uncontained waste storage areas. It appears that several general building areas within Site 78 may be potential source areas of contamination.

1.0 MOBILIZATION AND PREPARATORY WORK

Mobilization includes the acquisition, delivery, and setup of the necessary construction equipment, materials, and personnel to the work site that are necessary to accomplish the Removal Action scope of work. Mobilization will also include establishing contamination reduction zones and constructing a decontamination pad and a tire wash area as indicated.

2.0 MONITORING, SAMPLING, TESTING, AND ANALYSIS

The Remedial Action Contractor (RAC) shall submit to LANTDIV, for approval, a work plan (WP) and a site sampling and analysis plan (SAP) describing the Contractor's sampling, analytical, and quality control procedures for the chemical data collected during the performance of work required under the specifications. The WP shall include a summary of work to be performed, an Environmental Protection Plan, a Quality Control (QC) Plan, the project organization, and any required manufacturer's data. The QC Plan contains the procedures to be followed to ensure that data generated are scientifically accurate and legally defensible. The SAP shall detail sample quantities, acquisition procedures and data collection methods to be employed during the removal action. The type and quantity of testing shall 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 shall be carried out during the project only with the approval of the Navy's Technical Representative (NTR).

The Contractor shall also submit documentation that certifies that the testing laboratory satisfies the requirements set forth in the Basic Contract and be Naval Facilities Engineering Service Center (NFESC) certified.

The Contractor shall adhere to USEPA chain-of-custody procedures during the collection, transport, and analyses of samples. The Contractor will arrange laboratory analyses of samples to conform with NFESC Level C Quality Assurance Requirements.

3.0 SITE WORK

Site work includes, but is not limited to, clearing and grubbing, construction of the decontamination area, and fencing. Clearing and grubbing will be limited to the area of the proposed excavation areas, as indicated on Drawing C-1.

The AOCs are either vegetated with grass, or graveled, therefore, the clearing and grubbing task is anticipated to be minimal. Site 21 (near AOC 1) has large concrete weights on the ground surface which will have to be moved if the soil contamination is determined to extend underneath the weights (Drawing C-1). Arrangements will have to be made with MCB, Camp Lejeune's Forestry Division to remove equipment, if present, from the fenced-in area near AOC 3 at Site 21. Mobile trash dumpsters are located at AOC 4 at Site 78 and will need to be relocated prior to soil removal activities. Excavation activities will not include the removal of the stationary air compressors or their associated concrete pad at AOC 4. Excavation activities will be conducted as close to the concrete pad as possible without destroying the pad. A 55-gallon kerosene drum located at AOC 4 shall be temporarily relocated.

Site work will include excavation of the delineated areas to a depth of one foot. The final lateral and vertical extents of the excavations will be based on confirmation sampling and laboratory analysis. The confirmatory testing and analyses methods will be as indicated in the approved SAP.

Safety fencing will be installed, as indicated, around construction areas not currently enclosed by a chain link fence. Lighted barricades will be placed along streets where excavation activities are adjacent to the edge of pavement.

Temporary surface water runoff controls, in accordance with the specifications, will be installed around excavations to divert surface water from entering the excavations and to reduce the possibility of sediment-laden runoff draining from the construction area.

4.0 SURFACE WATER COLLECTION AND CONTROL

The Contractor will be required to provide devices or facilities as necessary to prevent surface water from contacting contaminated materials (i.e., soil, equipment, etc.) during the removal activities. The Contractor shall construct berms around the excavations to divert surface water runoff from entering the excavations. Sediment laden surface water runoff shall be controlled by grading and

silt fencing. The Contractor shall be required to keep all excavated areas dry during construction and to collect, sample, analyze, and dispose of any water accumulated in these areas.

5.0 GROUNDWATER COLLECTION AND CONTROL

Based on the results of the hydrogeologic information obtained during the remedial investigation, the proposed excavations should not encounter groundwater.

6.0 AIR POLLUTION CONTROL

The excavation, loading, transportation, and backfilling activities may potentially generate some dust emissions; therefore, photoionization detector (PID) monitoring shall be required to be performed by the Contractor. Soil, haul roads, and other areas disturbed by remediation operations will be treated with water as a dust suppressant. Use of water will be limited to reduce the development of mud on the MCB roads.

7.0 SOLIDS COLLECTION AND CONTAINMENT

The excavation of contaminated soil will be performed with earth-moving equipment. Removal of the contaminated soil is the only type of removal expected.

The areas of contamination to be excavated are based on the results of the Remedial Investigation/Feasibility Study conducted in 1993/1994 by Baker Environmental, Inc. The estimated in-place volume of contaminated soil at each of the four AOCs is as follows:

AOC	Area of Excavation (square feet)	Depth of Excavation (feet)	Volume (cubic yards)
1	3,070	1	115
2	610	1	25
3	5,660	1	210
4	130	1	5

Once the Contractor has excavated to the specified limits of the excavation, confirmation samples will be collected and analyzed on site and/or sent to an analytical laboratory for analysis. Additional soil will be excavated if the analytical results from the off-site laboratory indicate that the remediation levels established for PCBs and pesticides have been exceeded. Drawing C-1 lists the remediation levels. Any additional excavation activities will first be approved by the LANTDIV NTR.

Excavated soil will be considered contaminated and will be placed directly into dump trucks or roll-off boxes. General construction debris shall be stockpiled for subsequent disposal at the base sanitary landfill.

8.0 DECONTAMINATION WATER COLLECTION AND CONTAINMENT

The Contractor shall provide a decontamination pad and a tire wash area, as indicated, to collect liquids from the decontamination of personnel, earth-moving equipment, transportation trucks, and sampling equipment. The resulting fluids will be collected in a tanker truck, drums, or other appropriate container for analysis and appropriate disposal or treatment subject to LANTDIV and MCB, Camp Lejeune approval.

9.0 STABILIZATION, FIXATION, AND ENCAPSULATION

Contaminated soil and debris to be disposed must not contain free liquids. The Contractor may be required to dewater the soil by applying a drying agent such as kiln dust to the excavated material.

10.0 OFF-SITE DISPOSAL (COMMERCIAL)

Contaminated soil shall be loaded onto trucks and transported to an approved off-site disposal facility. The soil will be properly manifested if the soil is a characteristic hazardous waste or a Toxic Substance Control Act (TSCA) waste (as determined by the pre-excavation characterization samples taken in accordance with the approved SAP). It is anticipated that the excavated soils will not be a hazardous or TSCA-waste, and therefore will be disposed at an off-site landfill permitted to accept soils contaminated with pesticides and PCBs. Miscellaneous noncontaminated waste (i.e., refuse and spent personal protective equipment) shall be loaded onto trucks or roll-off containers and transported to a North Carolina-permitted solid waste landfill or other appropriate facility subject to LANTDIV and MCB, Camp Lejeune approval.

11.0 SITE RESTORATION

The excavated areas will be backfilled with suitable backfill material from the borrow area at Camp Lejeune, or if necessary, from an off-site source, and regraded to the contours shown on the reference drawings. The backfilled areas will be revegetated, or paved with gravel, according to pre-construction conditions.

12.0 DEMOBILIZATION

Temporary facilities, equipment, and supplies acquired for this contract will be removed from MCB, Camp Lejeune property at the project's conclusion.

Other demobilization activities will require the Contractor to submit several post-construction items. These submittals shall include: (1) a punch list showing completion of the listed items; (2) a letter from the Contractor certifying completion of contracted work in accordance with the contract conditions, applicable regulations, and standards of practice; (3) a completed project current condition report with as-built drawings for the site; (4) submittal, in one collated document, of quality control daily reports, samples, sample analysis results, corrective actions (if required, performed to remedy unacceptable deviations from required quality standards), results of corrective actions; problems encountered and resolved, and lessons learned; and, (5) submittal in one collated

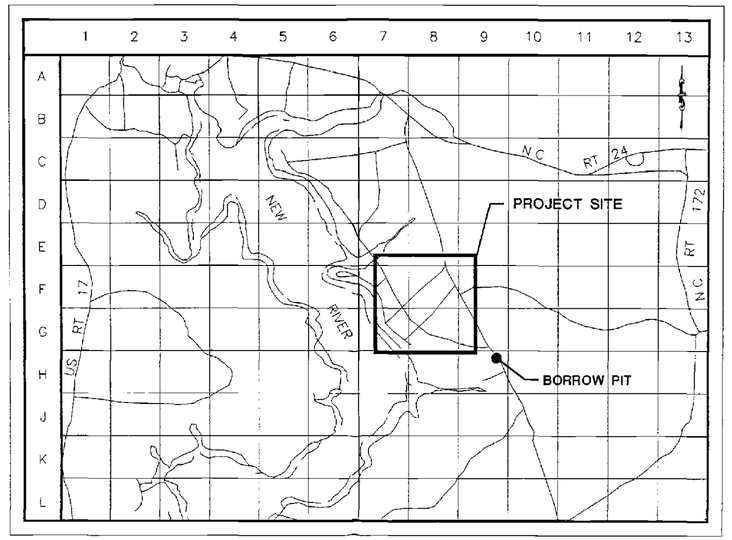
document of quality assurance samples, results of analysis of the samples, and actions performed to remedy unacceptable deviations from required quality standards.

The submittal requirements for the Contractor are presented in Section 01010 of the specifications included in this design package.

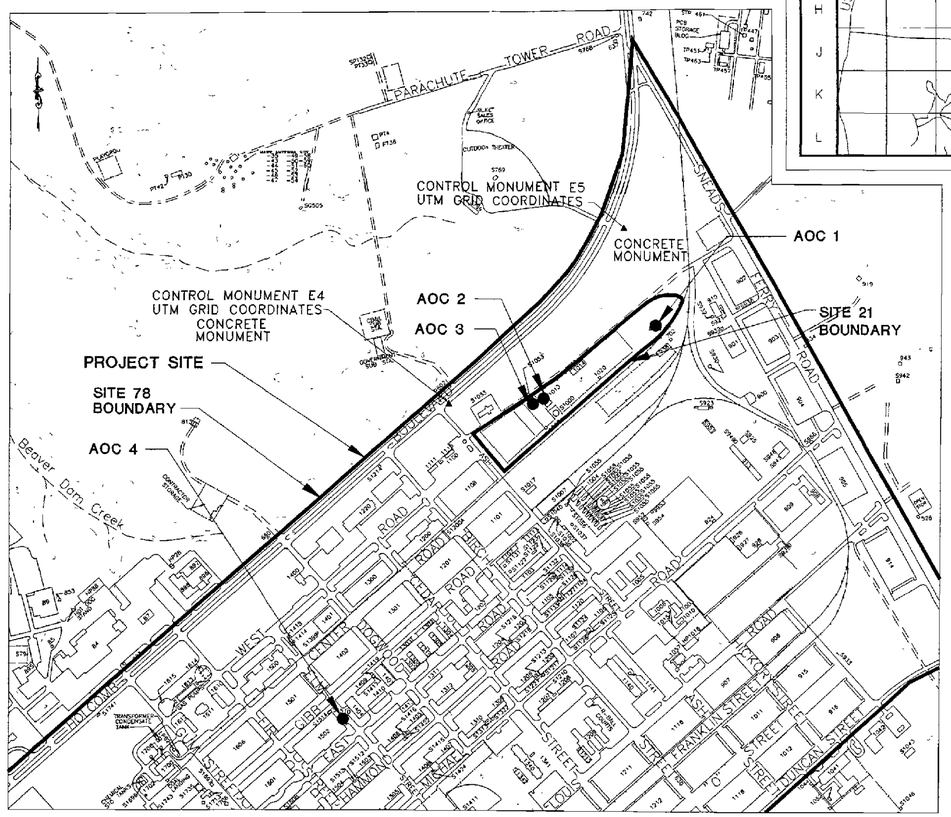
The Contractor will submit a detailed report summarizing the removal action, lessons learned, and recommendations for inclusion in future similar contracts.

REMEDIATION OF PESTICIDE AND PCB CONTAMINATED SOIL
SITES 21 AND 78, OPERABLE UNIT NO. 1

MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA



8600 0 4300 8600
1 INCH = 8600 FEET
VICINITY MAP



500 0 250 500
1 INCH = 500 FEET
LOCATION MAP

INDEX OF SHEETS

EFD DWG NO	NAVFAC DWG NO	SHEET NO	TITLE
385305	4285305	T-1	COVER SHEET AND GENERAL NOTES
385306	4285306	C-1	EXISTING SITE PLAN
385307	4285307	C-2	SITE RESTORATION PLAN AND DETAILS
385308	4285308	C-3	BORING LOGS
385309	4285309	C-4	BORING LOGS

GENERAL NOTES

1 ELEVATIONS SHOWN ARE IN FEET AND REFER TO NATIONAL GEODETIC VERTICAL DATUM UNIVERSAL

2 APPROXIMATE LIMITS AND DEPTHS OF CONTAMINATED SOIL ARE AS INDICATED REMOVE CONTAMINATED SOIL AS SPECIFIED

3 MAPPING WAS PREPARED BY W K DICKSON OF RALEIGH, NORTH CAROLINA AND IS DATED JULY 22, 1994

4 INSPECT SITE PRIOR TO CONSTRUCTION TO VERIFY EXISTING SITE CONDITIONS AND UTILITY LOCATIONS

5 CLEAR AND GRUB LOW BRUSH AND GRASSES IN AND ADJACENT TO THE WORK AREAS AS NECESSARY

6 PROVIDE SILT FENCE AS INDICATED

7 LIMIT ALL WORK TO THE IMMEDIATE PROJECT AREA RESTORE ALL AREAS DISTURBED OUTSIDE THE LIMITS OF WORK TO THEIR ORIGINAL CONDITION AT NO EXPENSE TO THE GOVERNMENT

8 GRADE ALL AREAS TO DRAIN

9 FERTILIZE AND SEED ALL DISTURBED AREAS PREVIOUSLY VEGETATED IMMEDIATELY UPON ESTABLISHING FINAL GRADE

10 REMOVE CONSTRUCTION SITE FENCING, EROSION AND SEDIMENT CONTROL MEASURES AND ANY OTHER TEMPORARY FACILITIES AFTER CONSTRUCTION AND DISPOSE OF IN ACCORDANCE WITH THE SPECIFICATIONS

11 COMPLY WITH ALL FEDERAL, STATE, AND LOCAL ORDINANCES

QUALITY CONTROL REVIEW

SIGNATURE DATE

REVISIONS

SYMBOL	DESCRIPTION	DATE	APPROVED BY

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

DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND
NAVAL STATION ATLANTIC DIVISION NORFOLK, VIRGINIA
MARINE CORPS BASE CAMP LEJEUNE, NORTH CAROLINA
REMEDIATION OF PESTICIDE AND PCB CONTAMINATED SOIL SITES 21 AND 78, OU NO 1
COVER SHEET AND GENERAL NOTES

CODE ID NO 83091	SIZE D
SCALE AS NOTED	
EFD NO 385305	
STA PROJ NO	
SPEC NO 05944827	
CONSTR CONTR NO N62470-94-B-4827	
NAVFAC DRAWING NO 4285305	
SHEET 1 OF 5	
T-1	

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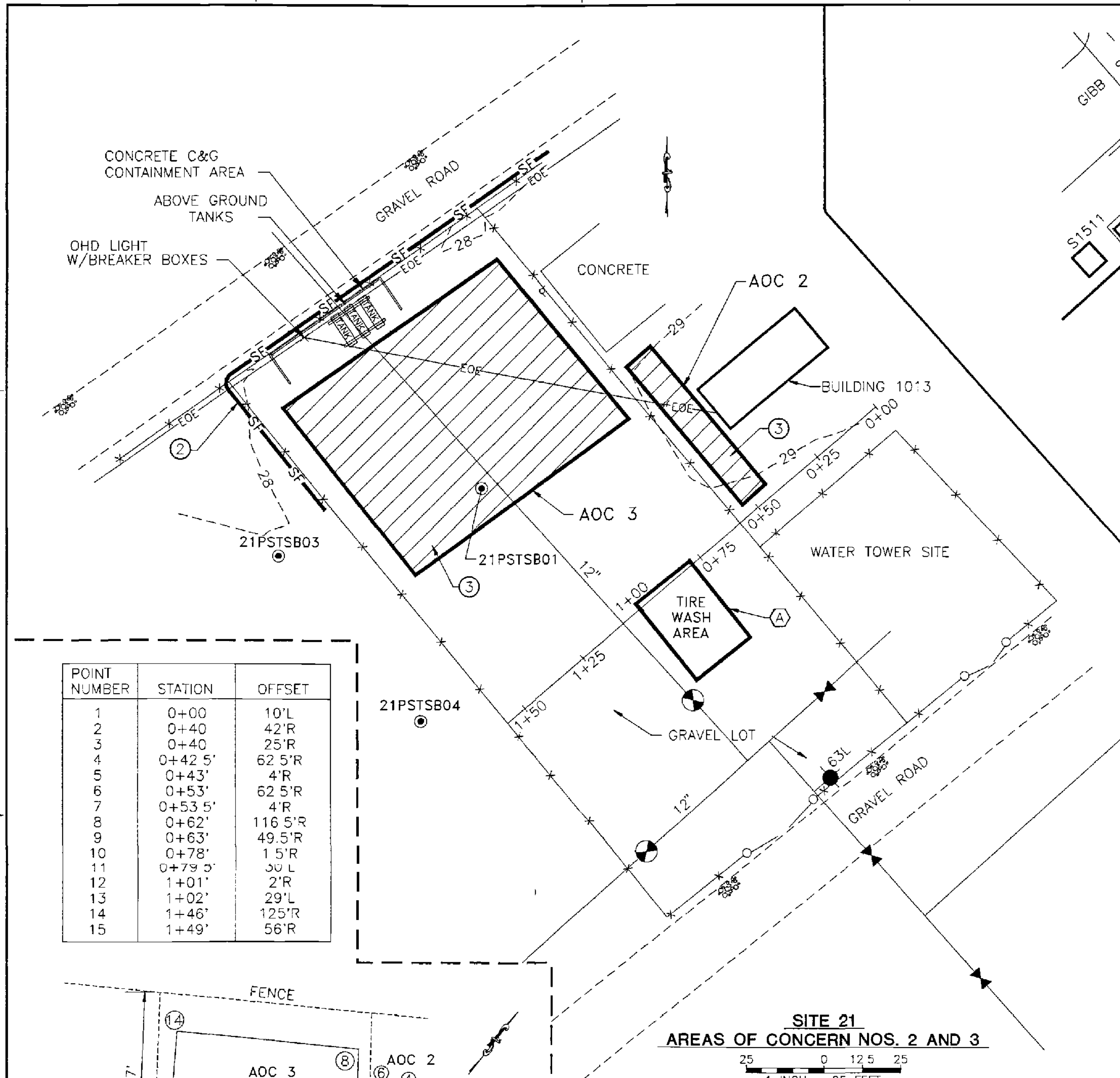
25900190

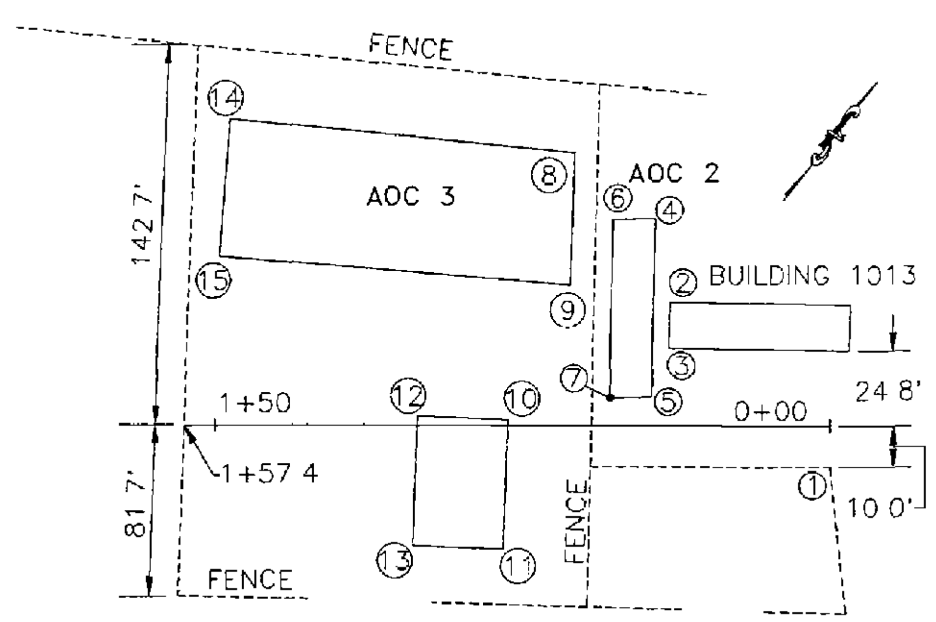
00316 BB BIX



SITE 21
AREAS OF CONCERN NOS. 2 AND 3

25 0 12.5 25
1 INCH = 25 FEET

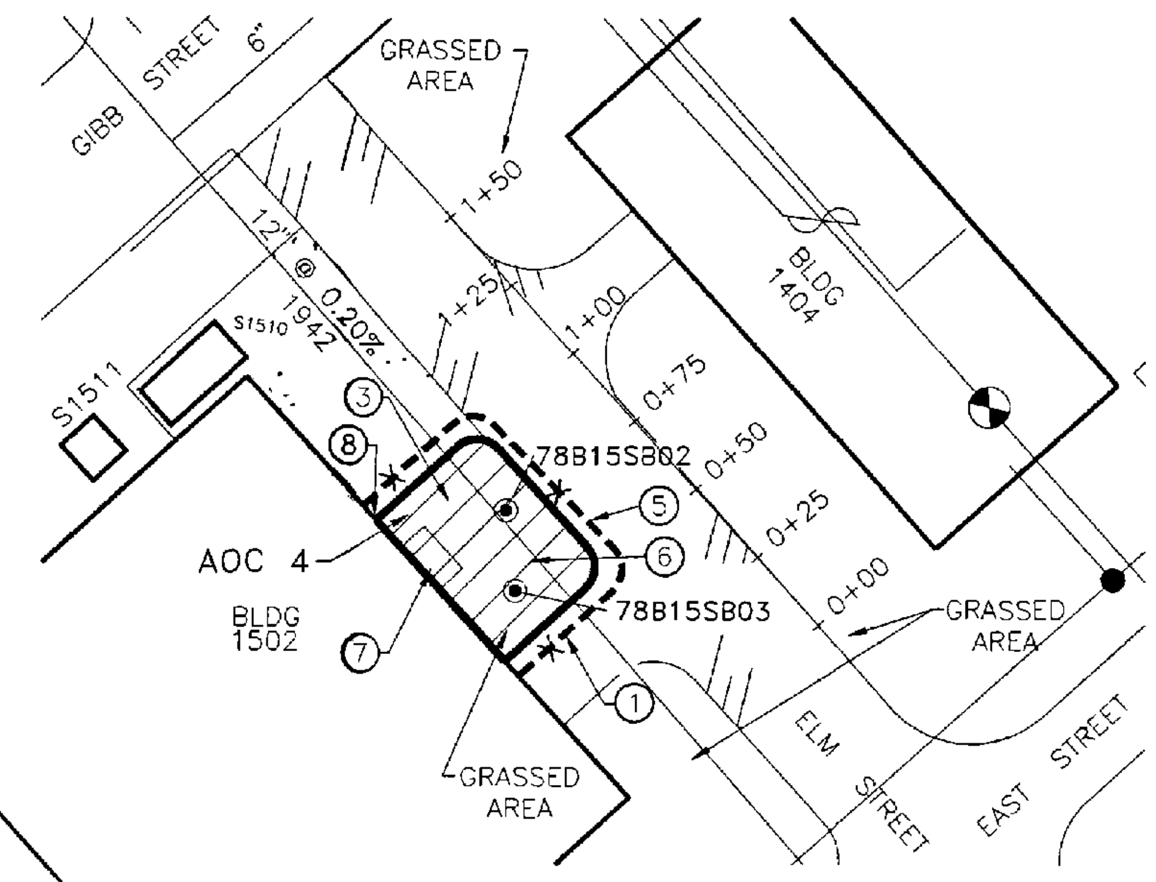
POINT NUMBER	STATION	OFFSET
1	0+00	10'L
2	0+40	42'R
3	0+40	25'R
4	0+42.5'	62.5'R
5	0+43'	4'R
6	0+53'	62.5'R
7	0+53.5'	4'R
8	0+62'	116.5'R
9	0+63'	49.5'R
10	0+78'	1.5'R
11	0+79.5'	30'L
12	1+01'	2'R
13	1+02'	29'L
14	1+46'	125'R
15	1+49'	56'R



LAYOUT DIAGRAM
SITE 21
AREAS OF CONCERN NOS. 2 AND 3

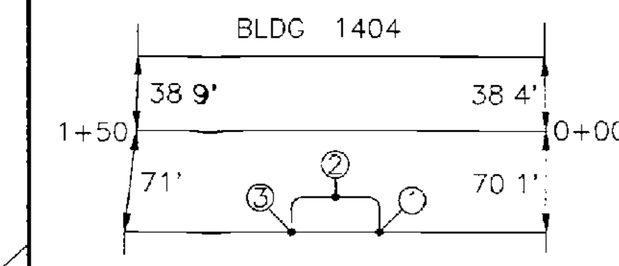
NTS

REMEDIATION CLEANUP LEVELS
PCBs (TOTAL) 370 ug/kg
4,4'-DDD 12,000 ug/kg
4,4'-DDT 8,400 ug/kg
CHLORDANE (TOTAL) 2,200 ug/kg



SITE 78
AREA OF CONCERN NO. 4

40 0 20 40
1 INCH = 40 FEET



LAYOUT DIAGRAM
SITE 78
AREA OF CONCERN NO. 4

NTS

POINT NUMBER	STATION	OFFSET
1	0+50'	70'L
2	0+76'	33'L
3	1+02'	70'L

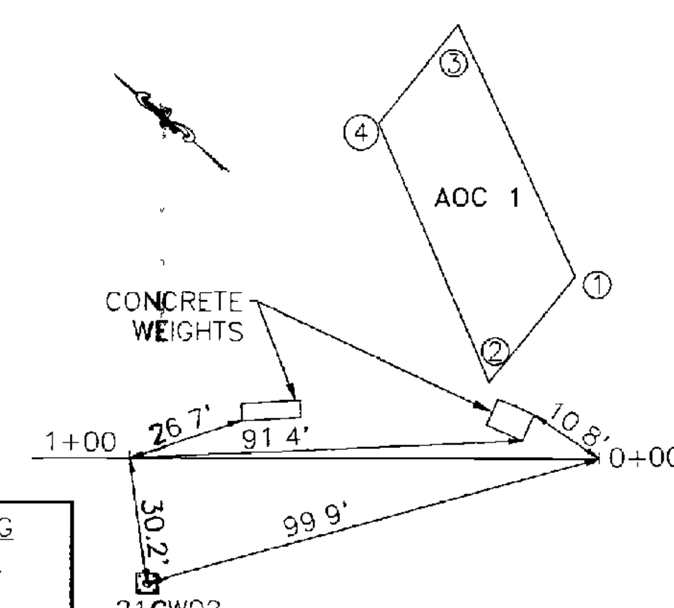
WORK NOTES

1. PROVIDE SAFETY FENCING
2. PROVIDE SILT FENCING
3. EXCAVATE DELINEATED AREAS AS MARKED
4. EXERCISE CAUTION DURING SOIL REMOVAL IN AREAS ADJACENT TO EXISTING SURFACE AND SUBSURFACE UTILITIES AND RELATED STRUCTURES. CONTRACTOR SHALL VERIFY EXACT DEPTHS AND LOCATIONS OF ALL UTILITIES PRIOR TO THE COMMENCEMENT OF CONSTRUCTION ACTIVITIES
5. PLACE LIGHTED BARRICADES ALONG PERIMETER OF EXCAVATION AREA
6. DUMPSTERS TO BE RELOCATED ON SOUTHEAST SIDE OF BUILDING 1502 PRIOR TO EXCAVATION
7. EXCAVATE AROUND AIR COMPRESSORS AND COMPRESSOR STORAGE BUILDING
8. REMOVE AND RELOCATE 55-GALLON KEROSENE TANK

DEMOLITION NOTES

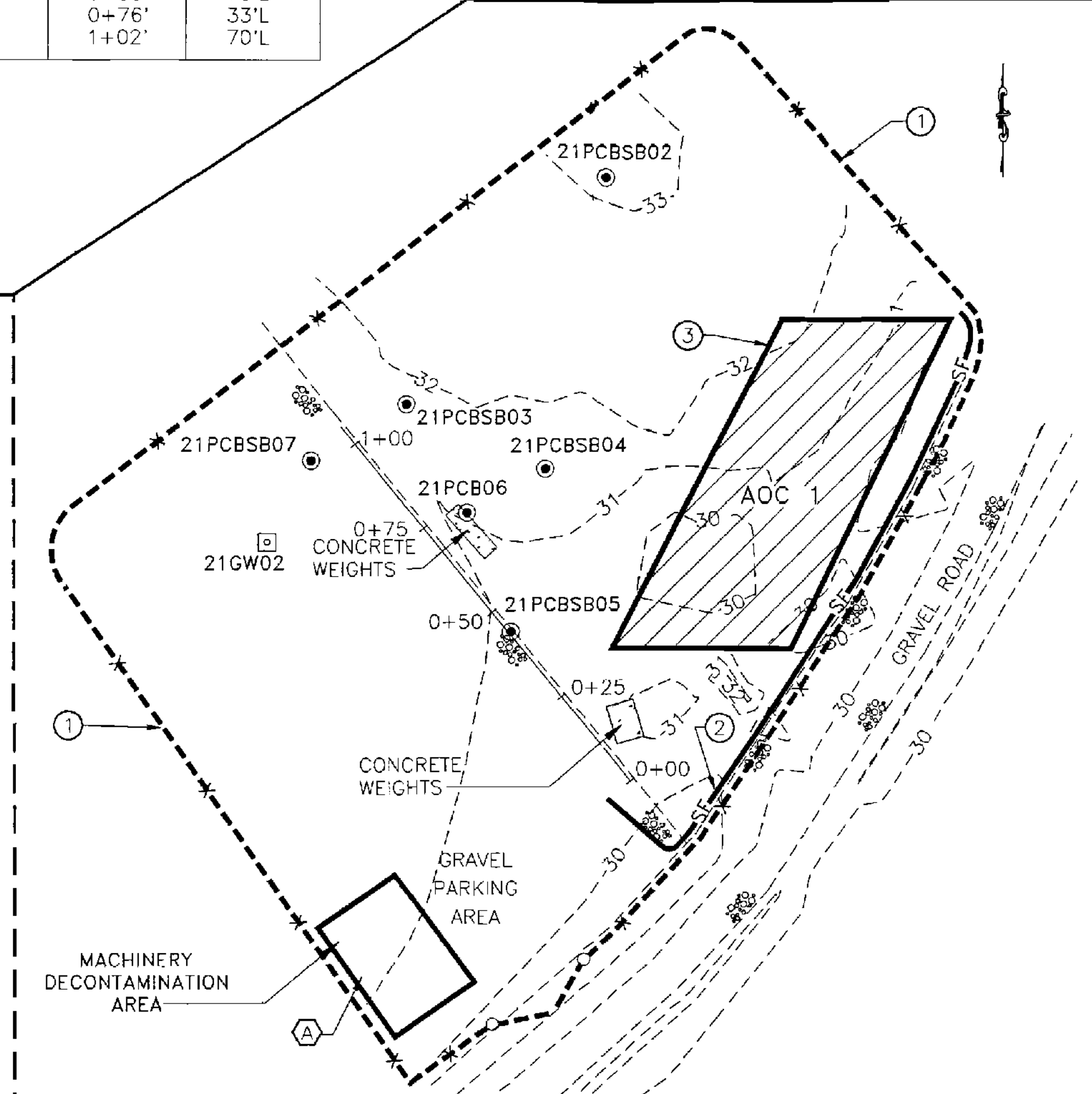
A. DIMENSIONS SHOWN FOR CONTRACTOR DECONTAMINATION AND CONTAINMENT AREAS ARE SUGGESTED. CONTRACTOR TO ADJUST THE DIMENSIONS OF THE AREA TO MINIMIZE SIZE REQUIRED TO COMPLETE THE WORK. LOCATE ALL TEMPORARY FACILITIES APPROXIMATELY TO MINIMIZE ENVIRONMENTAL DISTURBANCE

POINT NUMBER	STATION	OFFSET
1	0+00	48'R
2	0+26.5'	16.5'R
3	0+35'	125'R
4	0+60'	94'R



LAYOUT DIAGRAM
SITE 21
AREA OF CONCERN NO. 1

NTS



SITE 21
AREA OF CONCERN NO. 1

25 0 12.5 25
1 INCH = 25 FEET

LEGEND

DESCRIPTION	EXISTING	NEW	DEMOLISH
OVERHEAD ELECTRIC	—EOE—		
BENCH MARK			
TREE			
FLOW DIRECTION			
TREELINE			
BITUMINOUS CONCRETE PAVEMENT			
CONCRETE			
EDGE OF GRAVEL			
VEGETATION			
SPOT ELEVATION		11.33	
6' HIGH CHAIN LINK FENCE			
SAFETY FENCE			
SILT FENCE		—SF—	
SOIL BORING	21PCBSB02		
CONTOUR LINE			
MONITORING WELL			
BOLLARD			
EXCAVATE DELINEATED AREA TO A DEPTH ONE FOOT BELOW GROUND SURFACE			
VALVE AND IRON CAST WATER MAIN			
AIR RELEASE VALVE			
OVERHEAD PRIMARY POLE LINE 3 PHASE			
FUSED CUTOUT (CLOSED BY POSITION UNLESS INDICATED BY N.O.)			
VALVE FIELD LOCATED / HYDRANT FIELD LOCATED			
FIRE HYDRANT	63L		

REVISIONS

SYMBOL	DESCRIPTION	DATE	APPROVED BY

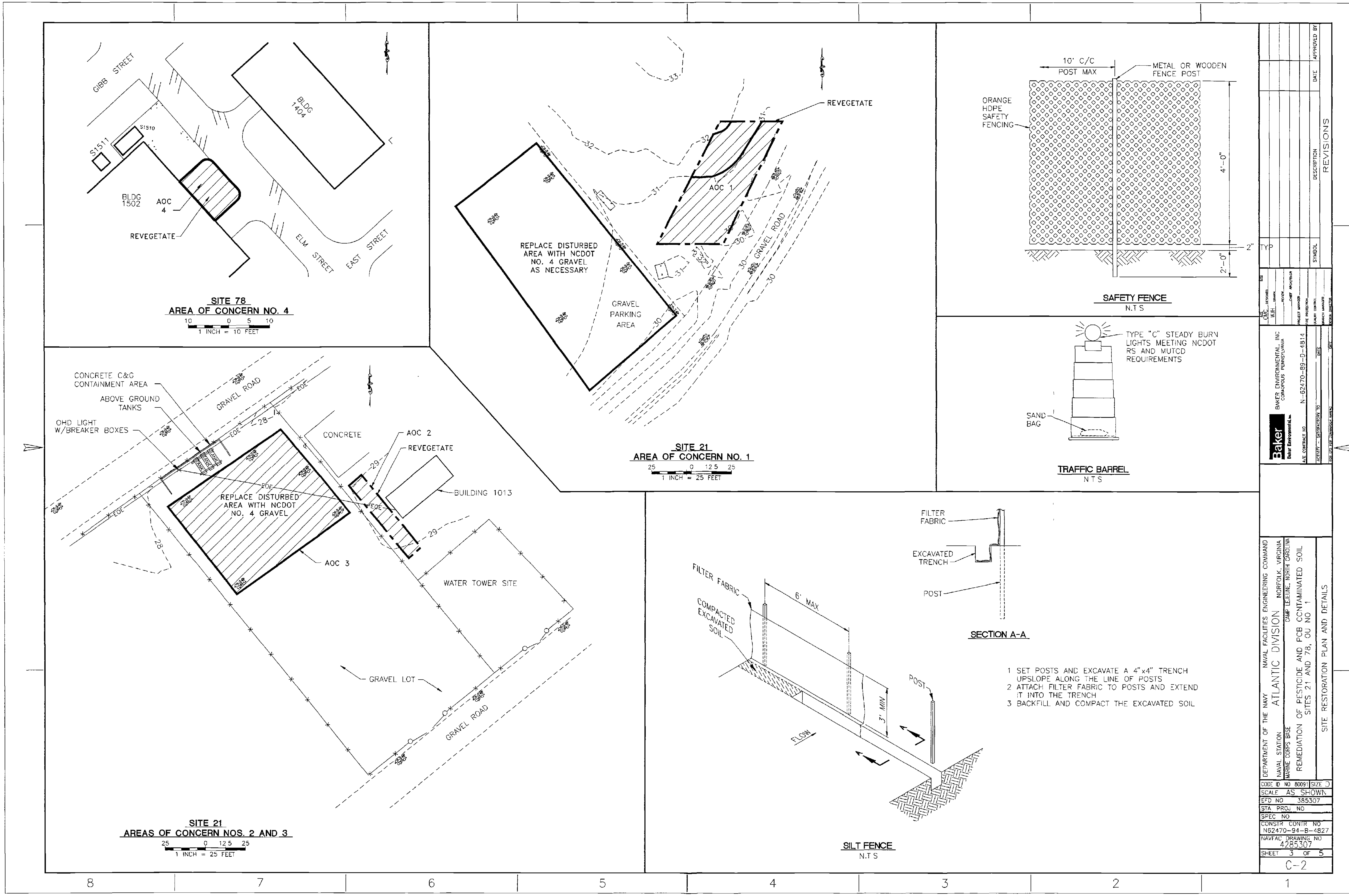
Baker — BAKER ENVIRONMENTAL, INC. CORAOPOLIS, PENNSYLVANIA

A/E CONTRACT NO. N-62470-89-D-4814

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

REMEDIATION OF PESTICIDE AND PCB CONTAMINATED SOIL
SITES 21 AND 78, OU NO. 1
EXISTING SITE PLAN

CODE ID. NO. 80091	SIZE D
SCALE:	AS SHOWN
EFD NO.	385306
STA. PROJ. NO.	
SPEC. NO.	05944827
CONSTR. CONTR. NO.	N62470-94-B-4827
NAVFAC DRAWING NO.	4285306
SHEET 2 OF 5	
	C-1



SITE 78
AREA OF CONCERN NO. 4
1 INCH = 10 FEET
GIBB STREET
BLDG 1404
S1511
S1510
BLDG 1502
AOC 4
REVEGETATE
ELM STREET
EAST STREET
SITE 21
AREA OF CONCERN NO. 1
1 INCH = 25 FEET
REVEGETATE
AOC 1
REPLACE DISTURBED AREA WITH NCDOT NO. 4 GRAVEL AS NECESSARY
GRAVEL PARKING AREA
GRAVEL ROAD
SITE 21
AREAS OF CONCERN NOS. 2 AND 3
1 INCH = 25 FEET
CONCRETE C&G CONTAINMENT AREA
ABOVE GROUND TANKS
OHD LIGHT W/BREAKER BOXES
GRAVEL ROAD
CONCRETE
AOC 2
REVEGETATE
BUILDING 1013
REPLACE DISTURBED AREA WITH NCDOT NO. 4 GRAVEL
AOC 3
WATER TOWER SITE
GRAVEL LOT
GRAVEL ROAD
SAFETY FENCE
N.T.S
10' C/C POST MAX
METAL OR WOODEN FENCE POST
ORANGE HDPE SAFETY FENCING
4'-0"
2"
2'-0"
TYP
TRAFFIC BARREL
N.T.S
TYPE "C" STEADY BURN LIGHTS MEETING NCDOT RS AND MUTCD REQUIREMENTS
SAND BAG
SILT FENCE
N.T.S
FILTER FABRIC
COMPACTED EXCAVATED SOIL
6' MAX
3' MIN
POST
FLOW
SECTION A-A
FILTER FABRIC
EXCAVATED TRENCH
POST
1 SET POSTS AND EXCAVATE A 4"x4" TRENCH UPSLOPE ALONG THE LINE OF POSTS
2 ATTACH FILTER FABRIC TO POSTS AND EXTEND IT INTO THE TRENCH
3 BACKFILL AND COMPACT THE EXCAVATED SOIL
REVISIONS
SYMBOL
DESCRIPTION
DATE
APPROVED BY
BAKER ENVIRONMENTAL, INC
CORAOPOLIS, PENNSYLVANIA
N-62470-89-D-4814
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL STATION
ATLANTIC DIVISION
NORFOLK, VIRGINIA
MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA
REMEDIATION OF PESTICIDE AND PCB CONTAMINATED SOIL
SITES 21 AND 78, OU NO 1
SITE RESTORATION PLAN AND DETAILS
CODE ID NO 80091
SIZE D
SCALE AS SHOWN
EFD NO 385307
STA PROJ NO
SPEC NO
CONSTR CONTR NO N62470-94-B-4827
NAVFAC DRAWING NO 4285307
SHEET 3 OF 5
C-2

1. ALL BORINGS WERE ADVANCED BY HOLLOW STEM AUGERS

2. "SS" IN THE SAMPLE METHOD COLUMN INDICATES SAMPLES COLLECTED BY SPLIT SPOON

3. "BLOWS/0 5'" INDICATES STANDARD PENETRATION TEST DATA FOR THE PENETRATION OF THE SPLIT SPOON SAMPLER ADVANCED IN 0 5' (6") INCREMENTS

   A STANDARD PENETRATION TEST (ASTM D-1586) – DRIVING A 2 0" O D, 1-3/8" I D, SAMPLER A DISTANCE OF 1 0' INTO UNDISTURBED SOIL WITH A 140 POUND HAMMER FREE FALLING A DISTANCE OF 30 INCHES IT IS CUSTOMARY TO DRIVE THE SPOONAN INITIAL 0 5' TO SEAT THWE SAMPLER IN UNDISTURBED SOIL, THEN PERFORM THE TEST THE NUMBER OF HAMMER BLOWS FOR SEATING THE SAMPLER AND PERFORMING THE TEST ARE RECORDED FOR EACH 0 5' OF PENETRATION IN THE FIELD LOGBOOK AND THE TEST BORING LOG THE STANDARD PENETRATION TEST RESULT CAN BE OBTAINED BY ADDING THE LAST TWO RECORDED NUMBERS (FROM 6 TO 12 INCHES AND 12 TO 18 INCHES) "WOR" INDICATES THE WEIGHT OF THE RODS ALONE ALLOWED THE SAMPLER TO PENETRATE THE SOIL "WOH" INDICATES THE WEIGHT OF HAMMER ALLOWED THE SAMPLER TO PENETRATE THE SOIL

   B CONTINUOUS PENETRATION TESTING AND SAMPLING WAS PERFORMED AT ALL TEST BORING LOCATIONS THE TESTING/SAMPLING WAS INITIATED BELOW THE GROUND SURFACE

4. THE "RECOVERY" COLUMN INDICATES THE LENGTH OF SAMPLE (IN FEET) RECOVERED FROM THE SAMPLER FOR A GIVEN SAMPLING INTERVAL

5. IN THE "DESCRIPTION" COLUMN, THE HORIZONTAL LINE INDICATES STRATA CHANGES SOLID LINES REPRESENT AN OBSERVED CHANGE, WHEREAS A DASHED LINE REPRESENTS AND INFERRED LITHOLOGY CHANGE

6. ALL DEPTHS AND ELEVATIONS ARE APPROXIMATE BORING DEPTHS ARE REFERENCED TO THE GROUND SURFACE EXISTING AT THE TIME THE TEST BORING WAS DRILLED

7. FOR BORING LOCATIONS REFER TO DRAWING C-1 OF THIS PACKAGE

8. ALL TEST BORINGS WERE DRILLED BY HARDIN-HUBER, INC

9. SOILS WERE CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) DESCRIPTION AND CLASSIFICATION OF SOILS ARE BASED ON VISUAL OBSERVATIONS

10. FOR SOIL SAMPLES CONSISTING OF TWO OR MORE TYPES, RELATIVE PROPORTIONS OF SECONDARY COMPONENTS ARE INDICATED AS FOLLOWS

DESCRIPTIVE TERM	PERCENT
TRACE	1–10
LITTLE	11–20
SOME	21–35
AND	36–50

11. WATER LEVEL OBSERVATIONS WERE MADE AT THE TIME OF THE SUBSURFACE INVESTIGATIONS AND DO NOT NECESSARILY REPRESENT GROUNDWATER ELEVATIONS AT THE TIME OF CONSTRUCTION GROUNDWATER LEVELS MAY FLUCTUATE WITH SEASONAL CHANGE, TEMPERATURE VARIATION, RAINFALL, AND TIDAL INFLUENCES, AND THEREFORE SHOULD NOT BE CONSTRUED AS ABSOLUTE

BAKER — TEST BORING LOG — BOREHOLE NUMBER 21-PCB-SB02 — SHEET 1 OF 4

PROJECT NUMBER 62470-177
PROJECT NAME SITE 21 - TRANSFORMER STORAGE LOT 140
LOCATION MCB CAMP LEJEUNE - CAMP LEJEUNE NC
DRILLING COMPANY HARDIN HUBER, INC
RIG TYPE & NUMBER TRUCK RIG
DRILLING METHOD HOLLOW STEM AUGERS
WEATHER SUNNY
GEOLOGIST K TUA
ENV SCIENTIST -
DATE BEGUN 5/5/93 DATE COMPLETED 5/5/93
GROUND SURFACE ELEVATION 33 80 msl
TOTAL DEPTH 14 0 bgs

SAMPLE NO	SAMPLE METHOD	BLOWS/6	RECOVERY
S-1	SS	6, 8, 15, 20	0 83
S-2	SS	4, 9, 13, 6	0 50
S-3	SS	6, 9, 12, 9	2 00
S-4	SS	6, 9, 6, 5	1 25

DESCRIPTION
- SAND and SILT fine grained, trace clay, very rocky, black, dry, medium dense
- CLAY little fine grained sand, brown with orange mottling, dry, stiff
- SAND fine grained, little silt, gray and brown, damp, medium dense
- SAND fine grained, trace silt, brown, wet, medium dense

BOTTOM OF BOREHOLE @ 14 0'

NOTES
1) Groundwater encountered at 12' during drilling
2) No PID readings taken

BAKER — TEST BORING LOG — BOREHOLE NUMBER 78-B15-SB02 — SHEET 1 OF 1

PROJECT NUMBER 62470-177
PROJECT NAME SITE 78 - HADNOT POINT INDUSTRIAL AREA
LOCATION MCB CAMP LEJEUNE - CAMP LEJEUNE, NC
DRILLING COMPANY HARDIN HUBER, INC
RIG TYPE & NUMBER TRUCK RIG
DRILLING METHOD HOLLOW STEM AUGERS
WEATHER SUNNY
GEOLOGIST K TUA
ENV SCIENTIST -
DATE BEGUN 5/8/93 DATE COMPLETED 5/8/93
GROUND SURFACE ELEVATION 0 00' msl
TOTAL DEPTH 10 0 bgs

SAMPLE NO	SAMPLE METHOD	BLOWS/6	RECOVERY
S-1	SS	4, 3, 1, 2	1 50
S-2	SS	3, 2, 2, 2	1 00
S-3	SS	5, 3, 5, 4	1 00
S-4	SS	6, 6, 5, 8	1 33

DESCRIPTION
- SAND fine grained, little silt, brown, dry, loose
- CLAY trace fine grained sand, brown, damp, soft
- SAND fine grained, trace silt, white, damp
- SAND fine grained, little silt, white and brown, wet, medium dense

BOTTOM OF BOREHOLE @ 10 0'

NOTES
1) Groundwater encountered at 9' during drilling
2) No PID readings taken

BAKER — TEST BORING LOG — BOREHOLE NUMBER 21-PCB-SB03 — SHEET 1 OF 1

PROJECT NUMBER 62470-177
PROJECT NAME SITE 21 - TRANSFORMER STORAGE LOT 140
LOCATION MCB CAMP LEJEUNE - CAMP LEJEUNE, NC
DRILLING COMPANY HARDIN HUBER INC
RIG TYPE & NUMBER TRUCK RIG
DRILLING METHOD HOLLOW STEM AUGERS
WEATHER
GEOLOGIST K TUA
ENV SCIENTIST -
DATE BEGUN 5/5/93 DATE COMPLETED 5/5/93
GROUND SURFACE ELEVATION 30 70 msl
TOTAL DEPTH 12 0 bgs

SAMPLE NO	SAMPLE METHOD	BLOWS/6	RECOVERY
S-1	SS	2, 3, 4, 5	1 33
S-2	SS	7, 5, 7, 7	1 60
S-3	SS	2, 4, 2, 2	1 16
S-4	SS	14, 20, 20, 21	1 16

DESCRIPTION
- SAND fine grained, little clay, gray, dry, loose
- SAND fine grained, trace silt, gray, damp, medium dense
- SAND fine grained, trace silt, gray, damp, loose
- SAND fine grained, little silt, gray and brown, wet, dense

BOTTOM OF BOREHOLE @ 12 0'

NOTES
1) Groundwater encountered at 10' during drilling
2) No PID readings taken

BAKER — TEST BORING LOG — BOREHOLE NUMBER 78-B15-SB03 — SHEET 1 OF 1

PROJECT NUMBER 62470-177
PROJECT NAME SITE 78 - HADNOT POINT INDUSTRIAL AREA
LOCATION MCB CAMP LEJEUNE - CAMP LEJEUNE NC
DRILLING COMPANY HARDIN HUBER, INC
RIG TYPE & NUMBER TRUCK RIG
DRILLING METHOD HOLLOW STEM AUGERS
WEATHER SUNNY
GEOLOGIST K TUA
ENV SCIENTIST -
DATE BEGUN 5/9/93 DATE COMPLETED 5/9/93
GROUND SURFACE ELEVATION 0 00 msl
TOTAL DEPTH 10 0 bgs

SAMPLE NO	SAMPLE METHOD	BLOWS/6"	RECOVERY
S-1	SS	3, 5, 5, 4	1 06
S-2	SS	2, 1, 2, 2	1 67
S-3	SS	3, 4, 3, 3	2 00
S-4	SS	5, 3, 2, 2	1 50

DESCRIPTION
- SAND and SILT fine grained, brown, dry, loose
- SAND and SILT fine grained, gray, damp, very loose
- SAND and SILT fine grained, white with yellow mottling, damp, loose
- SAND and SILT fine grained, light gray with yellow mottling, wet, loose

BOTTOM OF BOREHOLE @ 10 0'

NOTES
1) Groundwater encountered at 8' during drilling
2) No PID readings taken

BAKER — TEST BORING LOG — BOREHOLE NUMBER 21-PCB-SB04 — SHEET 1 OF 1

PROJECT NUMBER 62470-177
PROJECT NAME SITE 21 - TRANSFORMER STORAGE LOT 140
LOCATION MCB CAMP LEJEUNE - CAMP LEJEUNE NC
DRILLING COMPANY HARDIN HUBER INC
RIG TYPE & NUMBER TRUCK RIG
DRILLING METHOD HOLLOW STEM AUGERS
WEATHER SUNNY
GEOLOGIST K TUA
ENV SCIENTIST -
DATE BEGUN 5/5/93 DATE COMPLETED 5/5/93
GROUND SURFACE ELEVATION 30 00 msl
TOTAL DEPTH 12 0 bgs

SAMPLE NO	SAMPLE METHOD	BLOWS/6"	RECOVERY
S-1	SS	7, 6, 6, 4	1 25
S-2	SS	4, 5, 7, 9	1 67
S-3	SS	5, 6, 11, 9	1 50

DESCRIPTION
- SAND and SILT fine grained, light gray with orange mottling, damp, medium dense
- SAND fine grained, some clay, light gray damp, medium dense
- SAND fine grained, some silt, light gray, wet, medium dense

BOTTOM OF BOREHOLE @ 12 0'

NOTES
1) Groundwater encountered at 10' during drilling
2) No PID readings taken

Baker Environmental, Inc
BAKER ENVIRONMENTAL, INC
CORAOPOLIS, PENNSYLVANIA
N-62470-89-D-4814

DEPARTMENT OF THE NAVY
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CAMP LEJEUNE, NORTH CAROLINA
REMEDIATION OF PESTICIDE AND PCB CONTAMINATED SOIL
SITES 21 AND 78, OU NO 1
BORING LOGS

CODE ID NO 80091	SIZE D
SCALE	NTS
EFD NO	385308
STA PROJ NO	
SPEC NO	05944827
CONSTR CONTR NO	N62470-94-B-4827
NAVFAC DRAWING NO	4285308
SHEET 4 OF 5	

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TEST BORING LOG — BAKER

BOREHOLE NUMBER: 21-PCB-SB05 — SHEET 1 OF 1

PROJECT NUMBER: 62470-177
PROJECT NAME: SITE 21 - TRANSFORMER STORAGE LOT 140
LOCATION: MCB CAMP LEJEUNE - CAMP LEJEUNE, NC
DRILLING COMPANY: HARDIN HUBER, INC
RIG TYPE & NUMBER: TRUCK RIG
DRILLING METHOD: HOLLOW STEM AUGERS
WEATHER: SUNNY
GEOLOGIST: K TUA
ENV SCIENTIST: -
DATE BEGUN: 5/5/93 DATE COMPLETED: 5/5/93
GROUND SURFACE ELEVATION: 30.00 msl
TOTAL DEPTH: 12.0' bgs

Sample No	Sample Method	Blows/6	Recovery
S-1	SS	2, 2, 4, 3	1.25
S-2	SS	6, 7, 6, 5	1.08
S-3	SS	8, 10, 11, 9	1.33
S-4	SS	6, 8, 7, 9	1.75

Depth	Description
0.0–6.0	SAND and SILT fine grained, light gray with orange mottling, dry, loose
6.0–8.6	CLAY trace fine grained sand, gray, damp, stiff
8.6–10.3	SAND fine grained, trace silt, orange, wet
10.3–12.0	SAND fine grained, little silt, gray, wet, medium dense

BOTTOM OF BOREHOLE @ 12.0'
NOTES
1) Groundwater encountered at 9' during drilling
2) No PID readings taken

TEST BORING LOG — BAKER

BOREHOLE NUMBER: 21-PCB-SB06 — SHEET 1 OF 1

PROJECT NUMBER: 62470-177
PROJECT NAME: SITE 21 - TRANSFORMER STORAGE LOT 140
LOCATION: MCB CAMP LEJEUNE - CAMP LEJEUNE, NC
DRILLING COMPANY: HARDIN HUBER, INC
RIG TYPE & NUMBER: TRUCK RIG
DRILLING METHOD: HOLLOW STEM AUGERS
WEATHER: SUNNY
GEOLOGIST: K TUA
ENV SCIENTIST: -
DATE BEGUN: 5/5/93 DATE COMPLETED: 5/5/93
GROUND SURFACE ELEVATION: 30.30 msl
TOTAL DEPTH: 12.0' bgs

Sample No	Sample Method	Blows/6"	Recovery
S-1	SS	5, 4, 7, 4	0.50
S-2	SS	5, 5, 6, 6	1.33
S-3	SS	6, 7, 7, 9	1.83
S-4	SS	2, 2, 5, 6	0.42
S-5	SS	6, 3, 1, 1	2.00

Depth	Description
0.0–4.0	SAND fine grained, little clay, gray with orange mottling, dry, medium dense
4.0–6.0	SAND and CLAY fine grained, mottled yellow, dry, medium stiff
6.0–8.0	SAND and SILT fine grained, gray and yellow, damp, medium dense
8.0–10.0	SAND and SILT fine grained, orange, damp, loose
10.0–11.0	SAND fine grained, little silt, orange, wet, soft
11.0–12.0	CLAY trace fine grained sand, orange and gray, wet, soft

BOTTOM OF BOREHOLE @ 12.0'
NOTES 1) Groundwater encountered at 10' during drilling
2) No PID readings taken

TEST BORING LOG — BAKER

BOREHOLE NUMBER: 21-PCB-SB07 — SHEET 1 OF 1

PROJECT NUMBER: 62470-177
PROJECT NAME: SITE 21 - TRANSFORMER STORAGE LOT 140
LOCATION: MCB CAMP LEJEUNE - CAMP LEJEUNE, NC
DRILLING COMPANY: HARDIN HUBER, INC
RIG TYPE & NUMBER: TRUCK RIG
DRILLING METHOD: HOLLOW STEM AUGERS
WEATHER: SUNNY
GEOLOGIST: K TUA
ENV SCIENTIST: -
DATE BEGUN: 5/5/93 DATE COMPLETED: 5/5/93
GROUND SURFACE ELEVATION: 31.1 msl
TOTAL DEPTH: 12.0 bgs

Sample No	Sample Method	Blows/6"	Recovery
S-1	SS	5, 7, 6, 5	1.16
S-2	SS	2, 4, 2, 5	0.83
S-3	SS	3, 4, 8, 9	1.25
S-4	SS	7, 9, 8, 8	1.00
	SS		

Depth	Description
0.0–6.0	CLAY and SAND and GRAVEL fine grained, gray, dry, stiff
6.0–8.0	CLAY and SAND fine grained, orange, dry, medium stiff
8.0–10.0	CLAY trace fine grained sand, gray, moist, stiff
10.0–12.0	SAND fine grained, trace silt, dark yellow, wet

BOTTOM OF BOREHOLE @ 12.0'
NOTES
1) Groundwater encountered at 9' during drilling
2) No PID readings taken

TEST BORING LOG — BAKER

BOREHOLE NUMBER: 21-PST-SB01 — SHEET 1 OF 1

PROJECT NUMBER: 62470-177
PROJECT NAME: SITE 21 - TRANSFORMER STORAGE LOT 140
LOCATION: MCB CAMP LEJEUNE - CAMP LEJEUNE, NC
DRILLING COMPANY: HARDIN HUBER, INC
RIG TYPE & NUMBER: TRUCK RIG
DRILLING METHOD: HOLLOW STEM AUGERS
WEATHER: SUNNY
GEOLOGIST: K TUA
ENV SCIENTIST: -
DATE BEGUN: 5/7/93 DATE COMPLETED: 5/7/93
GROUND SURFACE ELEVATION: 28.80 msl
TOTAL DEPTH: 10.0 bgs

Sample No	Sample Method	Blows/6	Recovery
S-1	SS	9, 8, 5, 5	0.75
S-2	SS	3, 4, 4, 5	1.33
S-3	SS	3, 2, 2, 1	2.0
S-4	SS	2, 3, 4, 3	2.0

Depth	Description
0.0–4.0	SAND fine grained, some silt, light gray, dry, medium dense
4.0–6.0	SAND fine grained, little silt, light gray, dry, loose or soft
6.0–8.0	CLAY trace fine sand, gray, dry, loose or soft
8.0–10.0	SAND fine grained, silt, trace clay, gray, wet, loose

BOTTOM OF BOREHOLE @ 10.0'
NOTES
1) Groundwater encountered at 8' during drilling
2) No PID readings taken

TEST BORING LOG — BAKER

BOREHOLE NUMBER: 21-PST-SB03 — SHEET 1 OF 1

PROJECT NUMBER: 62470-177
PROJECT NAME: SITE 21 - TRANSFORMER STORAGE LOT 140
LOCATION: MCB CAMP LEJEUNE - CAMP LEJEUNE, NC
DRILLING COMPANY: HARDIN HUBER, INC
RIG TYPE & NUMBER: TRUCK RIG
DRILLING METHOD: HOLLOW STEM AUGERS
WEATHER: SUNNY
GEOLOGIST: K TUA
ENV SCIENTIST: -
DATE BEGUN: 5/7/93 DATE COMPLETED: 5/7/93
GROUND SURFACE ELEVATION: 28.30 msl
TOTAL DEPTH: 8.0 bgs

Sample No	Sample Method	Blows/6	Recovery
S-1	SS	1, 2, 1, 2	-
S-2	SS	2, 3, 2, 2	-
S-3	SS	2, 3, 4, 2	-
	SS		

Depth	Description
0.0–4.0	CLAY trace sand, gray, damp, soft
4.0–6.0	SAND fine grained, little silt, trace clay, damp, medium stiff
6.0–8.0	SILT little fine sand, gray, moist, loose

BOTTOM OF BOREHOLE @ 8.0'
NOTES 1) Groundwater encountered at 6' during drilling
2) No PID readings taken

TEST BORING LOG — BAKER

BOREHOLE NUMBER: 21-PST-SB04 — SHEET 1 OF 1

PROJECT NUMBER: 62470-177
PROJECT NAME: SITE 21 - TRANSFORMER STORAGE LOT 140
LOCATION: MCB CAMP LEJEUNE - CAMP LEJEUNE, NC
DRILLING COMPANY: HARDIN HUBER, INC
RIG TYPE & NUMBER: TRUCK RIG
DRILLING METHOD: HOLLOW STEM AUGERS
WEATHER: SUNNY
GEOLOGIST: K TUA
ENV SCIENTIST: -
DATE BEGUN: 5/7/93 DATE COMPLETED: 5/7/93
GROUND SURFACE ELEVATION: 29.10 msl
TOTAL DEPTH: 8.0 bgs

Sample No	Sample Method	Blows/6"	Recovery
S-1	SS	5, 5, 4, 3	1.67
S-2	SS	4, 3, 1, 1	1.50
S-3	SS	2, 2, 2, 2	1.16

Depth	Description
0.0–4.0	SAND and SILT fine grained, dark gray and black, dry, loose
4.0–6.0	SAND fine grained, some clay, light gray with orange mottling, damp, loose
6.0–8.0	SAND fine grained, some silt, some clay, light gray, moist, loose

BOTTOM OF BOREHOLE @ 8.0'
NOTES
1) Groundwater encountered at 5' during drilling
2) No PID readings taken

A/E	CMC DESIGNED, WJH DRAWN
REVISIONS	SYMBOL / DESCRIPTION / DATE / APPROVED BY

Baker — BAKER ENVIRONMENTAL, INC, CORAOPOLIS, PENNSYLVANIA
A/E CONTRACT NO N-62470-89-D-4814

DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND
NAVAL STATION — ATLANTIC DIVISION — NORFOLK, VIRGINIA
MARINE CORPS BASE — CAMP LEJEUNE, NORTH CAROLINA
REMEDIATION OF PESTICIDE AND PCB CONTAMINATED SOIL
SITES 21 AND 78, OU NO 1
BORING LOGS

CODE ID NO	80091 SIZE D
SCALE	NTS
EFD NO	385309
STA PROJ NO	
SPEC NO	05944827
CONSTR CONTR NO	N62470-94-B-4827
NAVFAC DRAWING NO	4285309
SHEET	5 OF 5

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TEST BORING LOG — BAKER

BOREHOLE NUMBER: 21-PCB-SB05 — SHEET 1 OF 1

PROJECT NUMBER	62470-177
PROJECT NAME	SITE 21 - TRANSFORMER STORAGE LOT 140
LOCATION	MCB CAMP LEJEUNE - CAMP LEJEUNE, NC
DRILLING COMPANY	HARDIN HUBER, INC
RIG TYPE & NUMBER	TRUCK RIG
DRILLING METHOD	HOLLOW STEM AUGERS
WEATHER	SUNNY
GEOLOGIST	K TUA
ENV SCIENTIST	-
DATE BEGUN	5/5/93
DATE COMPLETED	5/5/93
GROUND SURFACE ELEVATION	30.00 msl
TOTAL DEPTH	12.0' bgs

SAMPLE NO	SAMPLE METHOD	BLOWS/6"	RECOVERY
S-1	SS	2, 2, 4, 3	1.25
S-2	SS	6, 7, 6, 5	1.08
S-3	SS	8, 10, 11, 9	1.33
S-4	SS	6, 8, 7, 9	1.75

DEPTH	DESCRIPTION
0.0–6.0	SAND and SILT fine grained, light gray with orange mottling, dry, loose
6.0–8.5	CLAY trace fine grained sand, gray, damp, stiff
8.5–10.3	SAND fine grained, trace silt, orange, wet
10.3–12.0	SAND fine grained, little silt, gray, wet, medium dense
12.0–15.0	BOTTOM OF BOREHOLE @ 12.0' NOTES 1) Groundwater encountered at 9' during drilling 2) No PID readings taken

TEST BORING LOG — BAKER

BOREHOLE NUMBER: 21-PCB-SB06 — SHEET 1 OF 1

PROJECT NUMBER	62470-177
PROJECT NAME	SITE 21 - TRANSFORMER STORAGE LOT 140
LOCATION	MCB CAMP LEJEUNE - CAMP LEJEUNE NC
DRILLING COMPANY	HARDIN HUBER, INC
RIG TYPE & NUMBER	TRUCK RIG
DRILLING METHOD	HOLLOW STEM AUGERS
WEATHER	SUNNY
GEOLOGIST	K TUA
ENV SCIENTIST	-
DATE BEGUN	5/5/93
DATE COMPLETED	5/5/93
GROUND SURFACE ELEVATION	30.30 msl
TOTAL DEPTH	12.0' bgs

SAMPLE NO	SAMPLE METHOD	BLOWS/6"	RECOVERY
S-1	SS	5, 4, 7, 4	0.50
S-2	SS	5, 5, 6, 6	1.33
S-3	SS	6, 7, 7, 9	1.83
S-4	SS	2, 2, 5, 6	0.42
S-5	SS	6, 3, 1, 1	2.00

DEPTH	DESCRIPTION
0.0–4.0	SAND fine grained, little clay, gray with orange mottling, dry, medium dense
4.0–6.0	SAND and CLAY fine grained, mottled yellow, dry, medium stiff
6.0–8.0	SAND and SILT fine grained, gray and yellow, damp, medium dense
8.0–10.0	SAND and SILT fine grained, orange, damp, loose
10.0–12.0	SAND fine grained, little silt, orange, wet, soft
12.0–14.0	CLAY trace fine grained sand, orange and gray, wet, soft
14.0–17.0	BOTTOM OF BOREHOLE @ 12.0' NOTES 1) Groundwater encountered at 10' during drilling 2) No PID readings taken

TEST BORING LOG — BAKER

BOREHOLE NUMBER: 21-PCB-SB07 — SHEET 1 OF 1

PROJECT NUMBER	62470-177
PROJECT NAME	SITE 21 - TRANSFORMER STORAGE LOT 140
LOCATION	MCB CAMP LEJEUNE - CAMP LEJEUNE NC
DRILLING COMPANY	HARDIN HUBER, INC
RIG TYPE & NUMBER	TRUCK RIG
DRILLING METHOD	HOLLOW STEM AUGERS
WEATHER	SUNNY
GEOLOGIST	K TUA
ENV SCIENTIST	-
DATE BEGUN	5/5/93
DATE COMPLETED	5/5/93
GROUND SURFACE ELEVATION	31.1 msl
TOTAL DEPTH	12.0 bgs

SAMPLE NO	SAMPLE METHOD	BLOWS/6"	RECOVERY
S-1	SS	5, 7, 6, 5	1.16
S-2	SS	2, 4, 2, 5	0.83
S-3	SS	3, 4, 8, 9	1.25
S-4	SS	7, 9, 8, 8	1.00
	SS		

DEPTH	DESCRIPTION
0.0–6.0	CLAY and SAND and GRAVEL fine grained, gray, dry, stiff
6.0–8.0	CLAY and SAND fine grained, orange, dry, medium stiff
8.0–10.0	CLAY trace fine grained sand, gray, moist, stiff
10.0–12.0	SAND fine grained, trace silt, dark yellow, wet
12.0–16.0	BOTTOM OF BOREHOLE @ 12.0' NOTES 1) Groundwater encountered at 9' during drilling 2) No PID readings taken

TEST BORING LOG — BAKER

BOREHOLE NUMBER: 21-PST-SB01 — SHEET 1 OF 1

PROJECT NUMBER	62470-177
PROJECT NAME	SITE 21 - TRANSFORMER STORAGE LOT 140
LOCATION	MCB CAMP LEJEUNE - CAMP LEJEUNE, NC
DRILLING COMPANY	HARDIN HUBER, INC
RIG TYPE & NUMBER	TRUCK RIG
DRILLING METHOD	HOLLOW STEM AUGERS
WEATHER	SUNNY
GEOLOGIST	K TUA
ENV SCIENTIST	-
DATE BEGUN	5/7/93
DATE COMPLETED	5/7/93
GROUND SURFACE ELEVATION	28.80 msl
TOTAL DEPTH	10.0 bgs

SAMPLE NO	SAMPLE METHOD	BLOWS/6"	RECOVERY
S-1	SS	9, 8, 5, 5	0.75
S-2	SS	3, 4, 4, 5	1.33
S-3	SS	3, 2, 2, 1	2.0
S-4	SS	2, 3, 4, 3	2.0

DEPTH	DESCRIPTION
0.0–4.0	SAND fine grained, some silt, light gray, dry, medium dense
4.0–6.0	SAND fine grained, little silt, light gray, dry, loose or soft
6.0–8.0	CLAY trace fine sand, gray, dry, loose or soft
8.0–10.0	SAND fine grained, silt, trace clay, gray, wet, loose
10.0–13.0	BOTTOM OF BOREHOLE @ 10.0' NOTES 1) Groundwater encountered at 8' during drilling 2) No PID readings taken

TEST BORING LOG — BAKER

BOREHOLE NUMBER: 21-PST-SB03 — SHEET 1 OF 1

PROJECT NUMBER	62470-177
PROJECT NAME	SITE 21 - TRANSFORMER STORAGE LOT 140
LOCATION	MCB CAMP LEJEUNE - CAMP LEJEUNE NC
DRILLING COMPANY	HARDIN HUBER INC
RIG TYPE & NUMBER	TRUCK RIG
DRILLING METHOD	HOLLOW STEM AUGERS
WEATHER	SUNNY
GEOLOGIST	K TUA
ENV SCIENTIST	-
DATE BEGUN	5/7/93
DATE COMPLETED	5/7/93
GROUND SURFACE ELEVATION	28.30 msl
TOTAL DEPTH	8.0 bgs

SAMPLE NO	SAMPLE METHOD	BLOWS/6"	RECOVERY
S-1	SS	1, 2, 1, 2	-
S-2	SS	2, 3, 2, 2	-
S-3	SS	2, 3, 4, 2	-
	SS		

DEPTH	DESCRIPTION
0.0–4.0	CLAY trace sand, gray, damp, soft
4.0–6.0	SAND fine grained, little silt, trace clay, damp, medium stiff
6.0–8.0	SILT little fine sand, gray, moist, loose
8.0–11.0	BOTTOM OF BOREHOLE @ 8.0' NOTES 1) Groundwater encountered at 6' during drilling 2) No PID readings taken

TEST BORING LOG — BAKER

BOREHOLE NUMBER: 21-PST-SB04 — SHEET 1 OF 1

PROJECT NUMBER	62470-177
PROJECT NAME	SITE 21 - TRANSFORMER STORAGE LOT 140
LOCATION	MCB CAMP LEJEUNE - CAMP LEJEUNE, NC
DRILLING COMPANY	HARDIN HUBER INC
RIG TYPE & NUMBER	TRUCK RIG
DRILLING METHOD	HOLLOW STEM AUGERS
WEATHER	SUNNY
GEOLOGIST	K TUA
ENV SCIENTIST	-
DATE BEGUN	5/7/93
DATE COMPLETED	5/7/93
GROUND SURFACE ELEVATION	29.10 msl
TOTAL DEPTH	8.0 bgs

SAMPLE NO	SAMPLE METHOD	BLOWS/6"	RECOVERY
S-1	SS	5, 5, 4, 3	1.67
S-2	SS	4, 3, 1, 1	1.50
S-3	SS	2, 2, 2, 2	1.16

DEPTH	DESCRIPTION
0.0–4.0	SAND and SILT fine grained, dark gray and black, dry, loose
4.0–6.0	SAND fine grained, some clay, light gray with orange mottling, damp, loose
6.0–8.0	SAND fine grained, some silt, some clay, light gray, moist, loose
8.0–11.0	BOTTOM OF BOREHOLE @ 8.0' NOTES 1) Groundwater encountered at 5' during drilling 2) No PID readings taken

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REVISIONS — SYMBOL | DESCRIPTION | DATE | APPROVED BY

A/E CMC DESIGNED — WJH 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 N-62470-89-D-4814
ACTIVITY - SATISFACTORY TO — DATE
FOR EFD FOR COMMANDER NAVFAC — DATE

DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND
NAVAL STATION — ATLANTIC DIVISION — NORFOLK, VIRGINIA
MARINE CORPS BASE — CAMP LEJEUNE, NORTH CAROLINA
REMEDIATION OF PESTICIDE AND PCB CONTAMINATED SOIL
SITES 21 AND 78, OU NO 1
BORING LOGS

CODE ID NO 80091	SIZE D
SCALE	NTS
EFD NO	385309
STA PROJ NO	
SPEC NO	05944827
CONSTR CONTR NO	N62470-94-B-4827
NAVFAC DRAWING NO	4285309
SHEET 5 OF 5	

C-4

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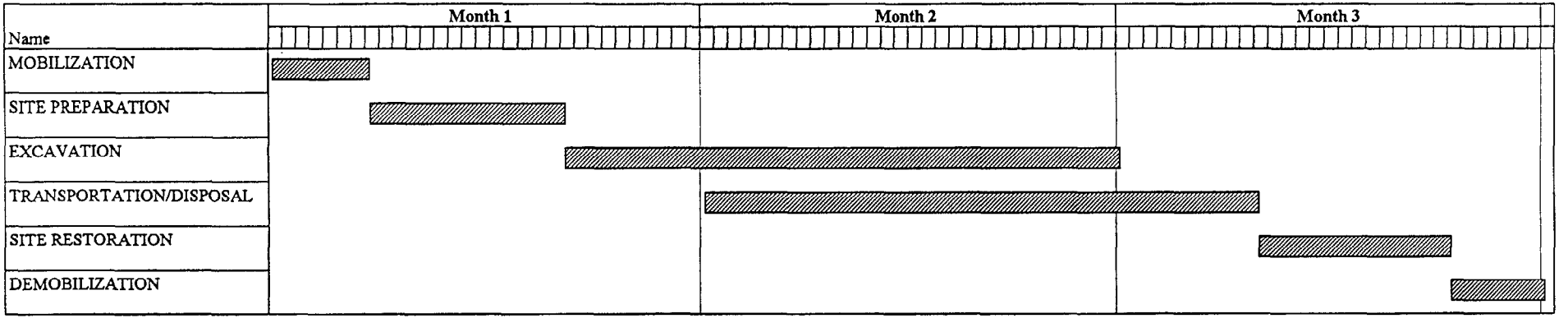
APPENDIX A
PROPOSED CONSTRUCTION SCHEDULE

APPENDIX A
PROPOSED CONSTRUCTION SCHEDULE



FINAL

DEPARTMENT OF THE NAVY

ATLANTIC DIVISION, NAVAL FACILITIES ENGINEERING COMMAND

NAVAL STATION, NORFOLK, VIRGINIA

LANTDIV RAC Contract No. N62470-93-D-3032	N62470-94-B-4827 NAVFAC Specification No. 05-94-4827 Appropriation: DERA

REMEDIATION OF PESTICIDE AND PCB-CONTAMINATED SOIL AT SITES 21 AND 78, OU NO. 1

MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA

Design by:

BAKER ENVIRONMENTAL, INC.
CORAOPOLIS, PENNSYLVANIA 15108

Specification Prepared by:

BAKER ENVIRONMENTAL, INC.

NOVEMBER 11, 1994

Specification Approved by:

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

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

Environmental Quality Division Director: for W.H. Russell, P.E.

Date: 11 January 1995

PROJECT TABLE OF CONTENTS

-- End of Project Table of Contents --

SECTION 01010

GENERAL PARAGRAPHS

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.

CORPS OF ENGINEERS (COE)

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

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 241	1989 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

Within 60 days of issuance of the delivery order, 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, site work and excavation procedures, construction requirements, and storage, transportation, and removal requirements.

b. Technical Specifications

Provide, in an amendment format, any additions and 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, (804)444-9906, 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 all 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 include but not be limited to: 1) an Erosion Control Plan in accordance with State and local regulations, consisting of site plans indicating locations of erosion control features during the various states of construction, details of erosion control features, and applicable notes, and 2) civil/structural drawings providing details of site work.

d. Environmental Protection Plan

Within 15 days of issue of delivery order, meet with the Navy's Technical Representative (NTR) to discuss environmental protection requirements for the project. After meeting with the NTR, prepare, and submit an Environmental Protection Plan in accordance with Section C, Part 4.0, of the Basic Contract.

e. Site Health and Safety Plan

Provide a site specific Site Health and Safety Plan in accordance with Section C, Part 3.0, of the Basic Contract.

f. QC Plan

Provide a QC Plan in accordance with Section C, Part 6.0, of the Basic Contract.

(1) 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 attached at the end of this section.

(2) Testing Laboratory Qualifications

As part of the QC Plan, submit qualifications for each laboratory which will be used in accordance with Section C, Part 6.0, of the Basic Contract.

g. Sampling and Analysis Plan

— Provide a Sampling and Analysis Plan describing all sampling and analyses requirements and procedures for the delivery order. The Plan shall contain a field sampling plan and a quality assurance plan.

1.2.2 Forwarding Preconstruction Submittals

Within 60 days of issuance of the delivery order, and before procurement, fabrication, or mobilization, submit to the Architect-Engineer: Baker Environmental, Inc., Airport Office Park, Building 3, 420 Rouser Road, Coraopolis, PA 15108, and to distribution as directed by the NTR, the

preconstruction submittals required in this specification. The Architect-Engineer for this project will 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 will be reviewed. The NTR will compile and coordinate all Government review comments, and forward consolidated review comments to the Contractor. Review comments on the Work Plan shall be resolved, and submittals modified as required. After the correction of the submittals, submit one corrected final copy of the Work Plan to the Commander, LANTNAVFACENGCOM, Code 183, 1510 Gilbert Street, Norfolk, Virginia 23511-2699 for 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 Condition Report

c. Network Analysis Diagram

d. Status Reports

e. QC Meeting Minutes

f. Test Results Summary Report

g. Contractor Production Report

h. QC Report

i. Rework Items List

j. Permits

k. Contractor's Closeout Report

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 final areas of excavation and 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. Show the size, manufacturer's name, model number, capacity, and electrical power characteristics of the equipment installed.

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. Contractor shall incorporate all shop drawing deviations, and deliver one complete set of reproducible sepias of the shop drawings to the NTR.

1.3.1.2 Environmental Condition Report

Prior to starting work, perform a preconstruction survey with the NTR. Take photographs showing existing environmental conditions on and adjacent to the site. 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. Network Analysis Diagram

Within 30 days of approval of the Contractor's Work Plan, submit a Network Analysis Diagram in accordance with the Basic Contract and any subsequent Delivery Orders.

b. Status Reports

All Status Reports shall comply with the Basic Contract and any subsequent Deliver Orders. Submit a Technical Progress Report, Cost Performance Report, Modification Log, Time-Scaled Logic Diagram, Government Materials Tracking Report, Variance Analysis Report, and Waste Materials Report to the NTR. Submit the first delivery order Status Report to the NTR approximately 30 days after approval of the Contractor's Work Plan. 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 all 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 all field tests containing both "required" and "actual" results plus "passed" or "failed" for conforming, non-conforming and repeated test results shall be submitted to the NTR at the end of each month in accordance with Section C, Part 6.0 of the Basic Contract.

1.3.1.6 Contractor Production Report (CPR)

The CPR shall be prepared and submitted daily to the Contractor's QC Representative 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 to the NTR draft copies of the following permit required for onsite activities:

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

1.3.1.10 Contractor's Closeout Report

Submit to the NTR 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, Summary of Chemical and Geotechnical Testing, Offsite Disposition of Materials, and QC Summary report.

1.3.2 Forwarding Submittals

As soon as practicable after award of the contract, and before procurement or fabrication, submit, except as specified otherwise, to the NTR, the submittals required in this specification. The Architect-Engineer for this project will review and provide surveillance for the NTR to determine if Contractor-approved submittals comply with the contract requirements, and will 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 GENERAL INTENTION

It is the declared and acknowledged intention and meaning to provide and secure pesticide and PCB contaminated soils excavation and disposal at Operable Unit No. 1, Sites 21 and 78, Marine Corps Base, Camp Lejeune, North Carolina complete and ready for use.

1.5 GENERAL DESCRIPTION

The work includes excavation and disposal of pesticide and PCB contaminated soils, filling and backfilling, erosion control, site restoration, and incidental related work.

1.6 DESCRIPTION OF CONTAMINANTS PRESENT

The analytical results of the 1993/1994 RI conducted for OU No. 1 indicated that volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides, PCBs, and inorganics were detected in the soil at Site 21. Detected VOCs included toluene, ethylbenzene, and xylenes. The detected SVOCs included several polyaromatic hydrocarbons (PAHs). The detected pesticides included 4,4'-DDE, 4,4'-DDD, 4,4'-DDT, and chlordane. PCB-1260 was the PCB compound detected at the site. Twenty different inorganics were detected in the site soils (only manganese and calcium were detected at levels significantly exceeding base-specific background levels). Based on the risk assessment conducted for Site 21, the detected concentrations of the abovementioned parameters do not pose an unacceptable risk to human health. Based on an ecological standpoint, the contaminants of concern (COCs) at Site 21 include PCBs, 4,4'DDD, 4,4'-DDT, and chlordane.

At Building 1502 within Site 78, VOCs, SVOCs, pesticides, and inorganics were detected in soil samples collected during the 1993/1994 RI. The detected VOCs included 1,1-dichloroethene (1,1-DCE), chloromethane, and bromomethane. The detected SVOCs included PAHs. The detected pesticides included dieldrin, 4,4'-DDE, 4,4'-DDD, and 4,4'-DDT. Four inorganics were detected at concentrations significantly exceeding base-specific background levels: barium, lead, mercury, and zinc. Based on the results of the risk assessment, the detected concentrations of the abovementioned parameters do not pose an unacceptable risk to human health. Based on an ecological standpoint, the only COCs at Building 1502 include pesticides (4,4'-DDT).

1.7 LOCATION

The work shall be located at the Marine Corps Base, Camp Lejeune, North Carolina approximately as shown. The exact location will be indicated by the NTR.

1.8 PROJECT INFORMATION

1.8.1 Drawings, Maps and Specifications

Four sets of contract drawings, maps and specifications will be furnished to the Contractor without charge, except applicable publications incorporated into the technical provisions by reference. Additional sets will be furnished on request at no charge. The work shall conform to the following contract drawings and maps, all of which form a part of these specifications and are available in the office of the NTR.

EFD Dwg No.	NAVFAC Dwg No.	Title	Sheet No.
385305	4285305	Cover Sheet and General Notes	T-1

385306	4285306	Existing Site Plan	C-1
385307	4285307	Site Restoration Plan and Details	C-2
385308	4285308	Boring Logs	C-3
385309	4285309	Boring Logs	C-4

1.8.2 Reference Report

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. Baker Environmental, Inc., Final Remedial Investigation for Operable Unit No. 1 (Sites 21, 24, and 78), Marine Corps Base, Camp Lejeune, June 1994.

b. Baker Environmental, Inc., Final Feasibility Study for Operable Unit No. 1 (Sites 21, 24, and 78), Marine Corps Base, Camp Lejeune, North Carolina, July 1994.

1.9 PROJECT SCHEDULE AND TIME CONSTRAINTS

The Contractor shall be required to (a) commence work under this contract within 10 calendar days after the date the Contractor receives the notice to proceed, (b) prosecute the work diligently, and (c) complete the entire work ready for use not later than 90 calendar days after the approval of the work plan. The time stated for completion shall include final cleanup of the premises. The time stated for completion does not include the maintenance period for the seeding of disturbed areas.

1.10 SAFETY PROGRAM

In addition to safety requirements in the Basic Contract, the Contractor shall implement a safety program conforming to the requirements of Federal, state, and local laws, rules and regulations as specifically related to contaminated soil removal and treatment operations. The program shall include, but is not limited to, the following:

a. Occupational Safety and Health Standards

b. COE EM-385-1-1

c. NFPA 241

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 FACILITIES AND SERVICES

3.1.1 Availability of Utilities Services

Government utilities will be made available without charge. The Contractor will be responsible for making connections, providing transformers and meters, and making disconnections; and for providing backflow preventer devices on connections to domestic water lines. Under no circumstances will taps to base fire hydrants be allowed for obtaining domestic water.

3.1.2 Storage in Existing Buildings

Storage in existing buildings will not be allowed.

3.1.3 Trailers, Storage, and Temporary Buildings

Locate these where directed. Trailers or storage buildings will be permitted, where space is available subject to the approval of the NTR. The trailers or buildings shall be in good condition, free from visible damage, rust and deterioration, and meet all applicable safety requirements. Trailers shall comply with all appropriate state and local vehicle requirements. Failure of the Contractor to maintain the trailers or storage buildings in good condition will be considered sufficient reason to require their removal. A sign not smaller than 24 inches by 24 inches shall be conspicuously placed on the trailer depicting the company name, business phone number, and emergency phone number. Trailers shall be anchored to resist high winds and must meet applicable state or local standards for anchoring mobile trailers.

3.1.3.1 Storage and Office Trailers

Provide a trailer of sufficient size for an office trailer work area and floor area for the exclusive use of the Contractor's Quality Control Representative. Also provide room in the same trailer for the Quality Control Records. Provide the Quality Control representative with a 4-foot by 8-foot plan table, a standard size office desk and chair, and telephone service. Quality control records shall be filed in the office and available at all times to the Government.

a. Trailers must meet state station requirements and must be in good condition.

b. Trailers shall be lockable and shall be locked when not in use.

c. Trailers shall have a sign in the lower left hand corner of left door of trailer with the following information: company name, address, registration number of trailer or vehicle identification number, location on base, duration of contract or stay on-base, contract number, local on-base phone number, off base phone number

of main office, and emergency recall person and phone number.

3.2 RESTRICTIONS ON OPERATIONS

3.2.1 Scheduling

3.2.1.1 General Scheduling Requirements

MCB, Camp Lejeune, North Carolina will remain in operation during the entire construction period. 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.

3.2.1.2 Regular Work Hours

The regular work hours for the MCB, Camp Lejeune, North Carolina are 0645 to 1615, Monday through Friday.

3.2.1.3 Work Outside Regular Hours

If the Contractor desires to carry on work outside regular hours or on Saturdays, Sundays or holidays, the Contractor shall submit an application to the NTR. The Contractor shall 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.

3.2.2 Security Requirements

Contractor shall comply with general security requirements in accordance with Section C of the Basic Contract. No employee or representative of the Contractor will be admitted to the work site without satisfactory proof of United States citizenship or is specifically authorized admittance to the work site by the NTR.

3.3 ACTIONS REQUIRED OF THE CONTRACTOR

The Contractor shall comply with all requirements stated in Section C, Part 2.0, of the Basic Contract.

3.3.1 Base Permits

Permits are required for, but not necessarily limited to, welding, digging, and burning. Allow 7 calendar days for processing of the application. One copy of all applicable permits shall be posted at the job site.

3.4 PUBLIC RELEASE OF INFORMATION

The Contractor shall comply with all requirements stipulated in Section C, Part 2.0, of the Basic Contract.

3.5 ENVIRONMENTAL PROTECTION REQUIREMENTS

Provide and maintain, during the life of the contract, environmental protection as defined in Section C of the Basic Contract.

3.6 REQUIRED INSURANCE

Insurance requirements from Section H of the Basic Contract are enforced in their entirety.

-- End of Section --

SUBMITTAL REGISTER (PART A)

Contract Number: 62470-94-B-4827 | Project Title: Remediation of Pesticide/PCB Contaminated

SPEC SECTION NO.	SD NO, AND TYPE OF SUBMITTAL MATERIAL OR PRODUCT	SPEC PARA NO.	CLASSIF/ APPR BY CO *	GOVT OR A/E REVIEWER	TRANS CONTROL NO.	PLANNED SUBMITTAL DATE
(a)	(b)	(c)	(d)	(e)	(f)	(g)
1) 01010	SD-09, Reports	1.2.1				
2)	Work Plan	1.2.1.1	G			
3) 01010	SD-18, Records	1.3.1				
4)	As-Built Records	1.3.1.1	G			
5)	Environmental Condition Report	1.3.1.2				
6)						
7)	Network Analysis Diagram	1.3.1.3				
8)	Status Reports	1.3.1.3				
9)	QC Meeting Minutes	1.3.1.4				
10)	Test Results Summary Report	1.3.1.5				
11)	Contractor Production Report	1.3.1.6				
12)	QC Report	1.3.1.7				
13)	Rework Items List	1.3.1.8				
14)	Permits	1.3.1.9				
15)	Contractor's Closeout Report	1.3.1.10				
16) 01430	SD-08, Statements	1.2.1				
17)	Sample Log	1.2.1.1				
18) 01430	SD-12, Field Test Reports	1.2.2				
19)	Confirmatory Sample Analyses	1.2.2.1				
20)	Results					

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

* NASA Notes:
Approved by:
Blank: Contracting Officer

* Army Notes:
Classification:
GA: Gov't Approval
FIO: For Information Onl

Contract Number: 62470-94-B-4827 | Project Title: Remediation of Pesticide/PCB Contaminated

SPEC SECTION NO.	SD NO, AND TYPE OF SUBMITTAL MATERIAL OR PRODUCT	SPEC PARA NO.	CLASSIF/ APPR BY CO *	GOVT OR A/E REVIEWER	TRANS CONTROL NO.	PLANNED SUBMITTAL DATE
(a)	(b)	(c)	(d)	(e)	(f)	(g)
1)	Waste Characterization Sample	1.2.2.2				
2)	Analyses Results					
3) 01560	SD-08, Statements	1.3.1				
4)	Class I ODS prohibition	1.4	G			
5)	Safety program	1.6	G			
6)	MSDS	1.6	G			
7)	Health and safety plan	1.6.4	G			
8) 01560	SD-12, Field Test Reports	1.3.2				
9) 01560	SD-18, Records	1.3.3				
10)	Solid waste disposal permit	1.3.3.1				
11)	Disposal permit for hazardous	1.3.3.2	G			
12)	waste					
13) 02220	SD-12, Field Test Reports	1.3.1				
14)	Fill and backfill	3.9.2.1				
15)	Density tests	3.9.2.2				
16) 02223	SD-08, Statements	1.2.1				
17)	Disposal Facility Permit	1.2.1.1				
18) 02223	SD-18, Records	1.2.2				
19)	Shipment manifests	1.2.2.1				
20)	Delivery and disposal	1.2.2.2				

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

* NASA Notes:
Approved by:
Blank: Contracting Officer

* Army Notes:
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Contract Number: 62470-94-B-4827 | Project Title: Remediation of Pesticide/PCB Contaminated

SPEC SECTION NO.	SD NO, AND TYPE OF SUBMITTAL MATERIAL OR PRODUCT	SPEC PARA NO.	CLASSIF/ APPR BY CO *	GOVT OR A/E REVIEWER	TRANS CONTROL NO.	PLANNED SUBMITTAL DATE
(a)	(b)	(c)	(d)	(e)	(f)	(g)
1)	certificates					
2)	Disposal Site Decontamination	1.2.2.3				
3)	certificate					
4)	Work Site Decontamination	1.2.2.4				
5)	certificate					
6) 02610	SD-13, Certificates	1.3.1				
7)	Gravel	2.1.1				

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

* NASA Notes:
Approved by:
Blank: Contracting Officer

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

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 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, Part 7.0, of the Basic Contract.

1.2.1 SD-08, Statements

a. Sample Log

1.2.1.1 Sample Log

Provide a detailed summary of all of the confirmatory and waste characterization samples collected. The Sample Log should include the type of sample collected, the location of the sample, the analyses performed, and the location of the analyses results.

1.2.2 SD-12, Field Test Reports

a. Confirmatory Sample Analyses Results

b. Waste Characterization Sample Analyses Results

1.2.2.1 Confirmatory Sample Analyses Results

Provide all confirmatory analyses results in a neat and organized manner. The Confirmatory Sample Analyses Result Report shall contain the media sampled, the date and time of sample collection, the sample location, the analyses conducted on the samples, and the results of the analyses.

1.2.2.2 Waste Characterization Sample Analyses Results

Provide all waste characterization sample analyses results in a neat and organized manner. The Waste Characterization Sample Analyses Result Report shall contain the media sampled, the date and time of sample collection, the sample location, the analyses conducted on the samples, and the results of the analyses.

1.3 DEFINITIONS

1.3.1 *Incidental Wastes*

Incidental 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 Contaminated Soil

Contaminated soil shall include all contaminated soils 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.

1.4 DESCRIPTION OF WORK

1.4.1 Incidental Wastes

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

1.4.2 Contaminated Soil

Collect and analyze environmental samples from the excavated areas after contaminated soil 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 Naval Facilities Engineering Service Center (NFESC)-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 Level C requirements for waste characterization sampling and shall also be in accordance with federal, local and state 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 QA/QC procedures shall be included in the Sampling and Analysis Plan indicated in Section 01010. Data validation results shall be provided in the Contractor's Closeout Report as indicated in Section 01010, "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 to characterize the wastes.

3.1.1 Sample Acquisition

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

3.1.1.1 Confirmation Samples

Confirmation samples shall be collected from the walls and the bottom of the open excavations. One sample 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 wall of the excavation shall be collected. ENSYS test kits or similar regulatory-approved on-site screening tests may be used in conjunction with the confirmation sampling. The confirmatory samples for off-site laboratory analyses shall be placed in the appropriate sample containers for shipment. The samples shall be analyzed for pesticides/PCBs by EPA Method 8080.

If detected concentrations exceed the following levels, notify the Navy's Technical Representative (NTR). If the concentrations are less than the following levels, or if the concentrations are below the analytical detection level, no further excavation is required.

COC	Soils
4,4'-DDD	12,000
4,4'-DDT	8,400
Chlordane (total)	2,200
PCBs (total)	370

All concentrations are in parts per billion (ppb).

3.1.1.2 Waste Characterization Samples

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

Characterization samples shall be collected from the soils to be disposed of. To expedite the remediation process, characterization samples shall be collected and submitted for laboratory analysis prior to excavation activities. One thoroughly mixed composite sample shall be collected from each of the four Areas of Concern (AOC). Each characterization sample shall consist of a composite of six 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

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

3.1.1.3 Incidental Waste Samples

Collect samples from incidental generated waste to determine applicable transportation and disposal requirements. Analyze incidental generated waste samples 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

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 01560

TEMPORARY CONTROLS

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 1910.120	Hazardous Waste Operations and Emergency
29 CFR 1926	Safety and Health Regulations for Construction
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 300	National Oil and Hazardous Substances Pollution Contingency Plan
49 CFR 178	Shipping Container Specification

CORPS OF ENGINEERS (COE)

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

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 241	1993 Safeguarding Construction, Alteration, and Demolition Operations

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION (NCDOT)

NCDOT RS	1990 Roads and Structures

MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD)

MUTCD	1988 Edition of MUTCD, Revision 3, September 1993 - Part IV Standards and Guides for Traffic Control for Street and Highway

1.2 DEFINITIONS

1.2.1 Sediment

Soil and other debris that have eroded and have been transported by runoff water or wind.

1.2.2 Solid Waste

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.

1.2.3 Rubbish

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

1.2.4 Debris

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

1.2.5 Chemical Wastes

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

1.2.6 Garbage

Refuse and scraps resulting from preparation, cooking, dispensing, and consumption of food.

1.2.7 Hazardous Waste

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

1.2.8 Oily Waste

Petroleum products and bituminous materials.

1.2.9 Class I Ozone Depleting Substance (ODS)

Class I ODS is defined in Section 602(a) of The Clean Air Act and includes the following chemicals:

chlorofluorocarbon-11 (CFC-11)	chlorofluorocarbon-213 (CFC-213)
chlorofluorocarbon-12 (CFC-12)	chlorofluorocarbon-214 (CFC-214)
chlorofluorocarbon-13 (CFC-13)	chlorofluorocarbon-215 (CFC-215)

chlorofluorocarbon-111 (CFC-111)	chlorofluorocarbon-216 (CFC-216)
chlorofluorocarbon-112 (CFC-112)	chlorofluorocarbon-217 (CFC-217)
chlorofluorocarbon-113 (CFC-113)	halon-1211
chlorofluorocarbon-114 (CFC-114)	halon-1301
chlorofluorocarbon-115 (CFC-115)	halon-2402
chlorofluorocarbon-211 (CFC-211)	carbon tetrachloride
chlorofluorocarbon-212 (CFC-212)	methyl chloroform

1.2.10 Industrial Hygienist

An Industrial Hygienist must be certified by the American Board of Industrial Hygiene.

1.3 SUBMITTALS

Submit the following in accordance with Section C, Part 4.0 of the Basic Contract.

1.3.1 SD-08, Statements

a. Class I ODS prohibition G

b. Safety program G

c. Material Safety Data Sheets (MSDS) G

g. Health and safety plan G

1.3.2 SD-12, Field Test Reports

Submit a copy of approved laboratory analyses of materials collected as a result of excavation of pesticide and PCB contaminated soil before disposing of soil at an approved disposal facility.

1.3.3 SD-18, Records

a. Solid waste disposal permit

b. Disposal permit for hazardous waste G

1.3.3.1 Solid Waste Disposal Permit

Submit one copy of a state and local permit or license showing such agencies' approval of the disposal plan.

1.3.3.2 Disposal Permit for Hazardous Waste

Submit a copy of the applicable EPA and state permits, manifests, or licenses for transportation, treatment, storage, and disposal of hazardous waste by permitted facilities.

1.4 CLASS I ODS PROHIBITION

Class I ODS as defined and identified herein shall not be used in the performance of this contract, nor be provided as part of the equipment.

This prohibition shall be considered to prevail over any other provision, specification, drawing, or referenced documents.

1.5 ENVIRONMENTAL PROTECTION REQUIREMENTS

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

1.6 SAFETY PROGRAM

COE EM-385-1-1. Submit safety program, including Accident Prevention Plan, for review and approval 15 calendar days prior to start of work at job site. Conform to the requirements of Federal, state and local laws, rules, and regulations. Work can not proceed until the Safety Program has been approved. The program shall include:

a. 29 CFR 1910.

b. 29 CFR 1926.

c. 29 CFR 1926-SUBPART V, tagout and lockout procedures.

d. COE EM-385-1-1.

e. Contract Clause "FAR 52.236-1, Accident Prevention." In this clause, the date of COE EM-385-1-1 should be 1 October 1992.

f. Contract Clause "FAR 52.223-3, Hazardous Material Identification and Material Safety Data."

g. MSDS, supply Material Safety Data Sheet for all hazardous materials brought on-site.

h. NFPA 241.

1.6.1 Safety Plan Including Accident Prevention

1.6.1.1 Hazardous Material Use

With respect to hazardous materials, safety program shall include provisions to deal with hazardous materials, pursuant to the Contract Clause "FAR 52.223-3, Hazardous Material Identification and Material Safety Data." In addition to FAR 52.223-3, the plan shall consist of:

a. An index of hazardous materials to be introduced to the site;

b. Plan for protecting personnel and property during the transport, storage and use of the materials;

c. Procedures for spill response and disposal;

d. Material Safety Data Sheets for materials listed in the index of the plan and not required in the technical section of the specification. Post Material Safety Data Sheets at the worksite where the products will be used.

e. Approved labelling system to identify contents on all containers on site;

f. Personnel training plan.

Each hazardous material must receive approval prior to bringing onto the job site or prior to any other use in conjunction with this contract. Allow a minimum of 10 working days for processing of the request for use of a hazardous material.

1.6.1.2 Hazardous Material Exclusions

Notwithstanding any other hazardous material permitted used in this contract, radioactive materials or instruments capable of producing ionizing radiation as well as materials which contain asbestos, mercury, or PCBs are prohibited. Exceptions to the use of any of the above excluded materials may be considered by the NTR upon written request by the Contractor.

1.6.2 Unforeseen Hazardous Material

All known hazardous materials are indicated on the drawings. If additional material that is not indicated on the drawings is encountered that may be dangerous to human health upon disturbance during construction operations, stop that portion of work and notify the NTR immediately. Intent is to identify materials such as PCB, lead paint, construction debris (communication wire, scrap metal, batteries, etc.), and friable and nonfriable asbestos. Within 14 calendar days the Government will determine if the material is hazardous. If the material is not hazardous or poses no danger, the Government will direct the Contractor to proceed without change. If the material is hazardous and handling of the material is necessary to accomplish the work, the Government will issue a modification pursuant to "FAR 52.243-4, Changes" and "FAR 52.236-2, Differing Site Conditions."

1.6.3 Station Permits

Permits are required for, but are not necessarily limited to, welding, digging, and burning. Allow 14 calendar days for processing of the application.

1.6.4 Health and Safety Plan (HASP)

COE EM-385-1-1. Perform a Hazard Analysis, and submit a detailed job-specific HASP for the work procedures to be used in the removal, demolition, and disposal of materials. A certified industrial hygienist shall prepare, sign, and seal the plan. The industrial hygienist shall be retained by the Contractor for the duration of the contract. Prior to

beginning the work, obtain approval of the plan and meet with the NTR to discuss work procedures and safety precautions. The HASP shall include:

a. Location, size, and details of control areas.

b. Location and details of decontamination systems.

c. Interface of trades involved in the construction.

d. Sequencing of work.

e. Disposal plan.

f. Sampling protocols and testing labs.

g. Protective equipment.

h. Detailed description of method of controlling pollution.

i. Evidence of compliance with 29 CFR 1910.120 and other Federal, state or local requirements.

PART 2 PRODUCTS

2.1 SAFETY FENCING

Safety fencing shall be orange, high density, ultra violet stabilized polyethylene, at least four feet in height, as indicated.

2.2 DRUMS

Drums shall be made of orange ultra violet stabilized plastic impact resistant material meeting the requirements of North Carolina Standard Specifications for Roads and Structures and the Manual on Uniform Traffic Control Devices (MUTCD). Drums shall be a minimum of 36 inches in height and have at least 18 inches minimum width. Each drum shall have a minimum of two orange and two white stripes. Drums shall have to closed tops that will not allow collection of water or debris.

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.

3.1.1 Land Resources

Except in areas to be cleared, do not remove, cut, deface, injure, or destroy trees or shrubs without the NTR's permission. Do not fasten or attach ropes, cables, or guys to existing nearby trees for anchorages unless authorized by the 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

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.

3.1.1.2 Replacement

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

3.3 EROSION AND SEDIMENT CONTROL MEASURES

3.3.1 Burnoff

Burnoff of the ground cover is not permitted.

3.3.2 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 remove during the borrow pit operation, and use as part of restoring the borrow pit area.

3.3.3 Protection of Erodible Soils

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

3.3.4 Temporary Protection of Erodible Soils

Use the following methods to prevent erosion and control sedimentation:

3.3.4.1 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.

3.3.4.2 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. Seeding: Provide new seeding where ground is disturbed. Include topsoil and nutriment during the seeding operation necessary to establish a suitable stand of grass. The seeding operation shall be as specified in Section 02220, "General Excavation, Filling, and Backfilling".

3.4 PUBLIC SAFETY MEASURES

3.4.1 Safety Fencing

Safety fencing shall be installed as indicated around active construction areas not currently enclosed by a chain link fence.

3.4.2 Drums

Drums shall be installed along the edge of pavement surrounding the excavation to prevent local traffic from entering the excavation area.

3.5 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.

3.5.1 Disposal of Rubbish and Debris

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

3.5.1.1 Removal From Government Property

Remove and dispose rubbish and debris from Government property.

3.5.2 Garbage Disposal

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

3.6 CONTROL AND DISPOSAL OF HAZARDOUS WASTE

3.6.1 Hazardous Waste Generation

Handle generated hazardous waste in accordance with 40 CFR 262.

3.6.2 Hazardous Waste Disposal

Dispose of hazardous waste in accordance with 40 CFR 263, 40 CFR 264, and 40 CFR 265.

3.6.3 Hazardous Waste Storage

Store hazardous waste in containers in accordance with 49 CFR 178. Hazardous waste shall be identified in accordance with 40 CFR 261 and 40 CFR 262.

3.6.4 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 DUST CONTROL

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

3.8 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 the designated times.

3.9 FIRE PROTECTION

3.9.1 Compliance

COE EM-385-1-1, NFPA 241, and activity fire regulations. Obtain approval from the activity Fire Chief prior to commencement of hot work operations.

3.9.2 Notification of Fire

Post the activity fire poster in conspicuous locations and at telephones in construction shacks.

3.10 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 Quarantine No. 81 dated 9 October 1970, and USDA Publication 301.81-2A of 23 July 1976, 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 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, APHIS, PPQ, Box 83, Goldsboro, North Carolina, 27530, Attn: Mr. Haywood Cox, 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

GENERAL EXCAVATION, FILLING, AND BACKFILLING

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 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	1992 Classification of Soils for Engineering Purposes
ASTM D 2922	1991 Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017	1988 Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
ASTM D 4318	1984 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 C, Part 7.0 of the Basic Contract.

1.3.1 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.

1.5 CRITERIA FOR BIDDING

Base bids on the following criteria:

a. Surface elevations are as indicated.

b. Pipes or other artificial obstructions, except those indicated, will not be encountered.

c. Ground water is not expected to be encountered due to the shallow depth of the proposed excavations.

d. Material character is indicated by the boring logs.

e. Blasting will not be permitted. Remove material in an approved manner.

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. Common fill shall consist of uncontaminated material removed from the excavation areas or material obtained from the base borrow pit.

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

Obtain borrow materials required from the Government borrow pit, or if necessary from sources outside of Government property. The Government borrow pit is located as indicated. If the Government borrow pit is used, the Contractor shall perform clearing, grubbing, and stripping, if required, for providing access to suitable borrow material. Dispose of materials from clearing and grubbing operations at MCB Camp Lejeune landfill for staging and shreading, or as directed by the Navy's Technical Representative (NTR). Strip top 12 inches of soil material from borrow area and stockpile, if necessary or as directed by the NTR. After removal of borrow material, regrade borrow pit using stockpiled soil material to contours which will blend in with adjacent topography. Maximum side slopes shall be two horizontal to one vertical. Excavation and backfilling of borrow pit shall ensure proper drainage.

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 limits of excavation, as indicated. 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 Unsuitable Material

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

3.2 PROTECTION

3.2.1 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 GENERAL EXCAVATION

Excavate to contours, elevation, and dimensions indicated. 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 common fill material and compact as specified in the following sections. Unless specified otherwise, refill excavations cut below indicated depth with common fill material.

3.4 EXCAVATION OF CONTAMINATED MATERIALS

3.4.1 Materials and Equipment

3.4.1.1 General

a. Provide all labor, materials, and equipment necessary to accomplish the work specified in these paragraphs.

b. The Contractor shall notify the NTR at least 48 hours prior to the start of excavation of contaminated soils. The Contractor shall stage operations to minimize the time the contaminated soil is exposed to the weather. Provide protective measures around the area of contaminated soils to divert runoff of surface water within the excavation boundaries.

3.4.1.2 Unclassified Excavation

Excavation is unclassified. All excavations shall be completed regardless of the type, nature, or condition of the materials encountered.

3.4.2 Limits of Excavation

a. Excavations shall be to a depth of 1 foot in the areas delineated on the construction drawings.

b. Once the Contractor has excavated to the specified limits of the excavation, confirmation samples shall be collected and sent to an analytical laboratory for analysis as specified in Section 01430, "Waste Sampling Requirements". A 48 hour turn around time shall be required to prevent the excavations from remaining open for extended periods of time.

c. If the confirmation sample results are below the specified remediation levels or below the analytical method detection limits, no additional excavation activities shall be conducted. Otherwise, additional excavation and confirmation sampling activities shall be conducted as per the direction of the NTR.

d. Contaminated materials shall be loaded into covered containers or vehicles designed to transport such materials without spillage. Care shall be taken during loading operations to minimize the potential for spillage, tracking, or other means of deposition of contaminated materials outside the work area. Contaminated

materials which become spilled on roads or other areas outside the limits of excavation during the loading operation shall be immediately cleaned up to the satisfaction of the NTR.

e. Backfilling of excavated areas shall begin only after the approval of the NTR.

f. The Contractor and the NTR shall work together closely to coordinate excavation, sampling, and analyses to minimize downtime. The Contractor shall schedule work to minimize downtime.

3.5 FILLING AND BACKFILLING

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

3.5.1 Common Fill Placement

Provide for general site. Place in 6-inch lifts. Compact areas not accessible to rollers or compactors with mechanical hand tampers. Aerate material excessively moistened by rain to a satisfactory moisture content. Finish to a smooth surface by blading, rolling with a smooth roller, or both.

3.6 COMPACTION

Expressed as a percentage of maximum density. Determine in-place density of existing subgrade; if required density exists, no compaction of existing subgrade will be required.

3.6.1 General Site

Compact underneath areas designated for vegetation and areas outside the 5-foot line of the structure to 85 percent of ASTM D 698.

3.6.2 Adjacent Area

Compact areas within 5 feet of structures and under gravel surfaces to 95 percent of ASTM D 698.

3.7 FINISH OPERATIONS

3.7.1 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.

3.7.2 Seed

Scarify existing subgrade. Provide 4 inches of topsoil for newly graded finish earth surfaces and areas disturbed by the Contractor. 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.

3.7.3 Protection of Surfaces

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

3.8 DISPOSITION OF SURPLUS MATERIAL

Remove from Government property surplus or other soil material not required or suitable for filling or backfilling, and brush, refuse, stumps, roots, and timber.

3.9 FIELD QUALITY CONTROL

3.9.1 Sampling

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

3.9.2 Testing

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

3.9.2.1 Fill and Backfill Material Testing

Test fill and backfill material in accordance with ASTM C 136 for conformance to ASTM D 2487 gradation limits; ASTM D 1140 for material finer than the No. 200 sieve; ASTM D 4318 for liquid limit and for plastic limit; ASTM D 698 for moisture density relations, as applicable.

3.9.2.2 Density Tests

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 every 2000 square feet of existing grade in fill areas.

-- End of Section --

SECTION 02223

TRANSPORTATION AND DISPOSAL OF CONTAMINATED MATERIAL

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.

CODE OF FEDERAL REGULATIONS 40 CFR Part 148

40 CFR Parts 260 to 280	Standards Applicable to Generators of Hazardous Waste
49 CFR Parts 100 to 199	Transportation

1.2 SUBMITTALS

1.2.1 SD-08, Statements

a. Disposal Facility Permit

1.2.1.1 Disposal Facility Permit

a. Written verification that the proposed disposal site is permitted to accept the contaminated materials specified, prior to the start of excavation. All disposal facilities shall be identified. Permitting and licensing information shall be provided for each facility along with a contact person, address, and a telephone number. The specific waste types to be disposed must be clearly identified.

1.2.2 SD-18, Records

a. Shipment manifests

b. Delivery and disposal certificates

c. Disposal Site Decontamination certificate

d. Work Site Decontamination certificate

1.2.2.1 Shipment Manifests

Copies of manifests and other documentation required for shipment of waste materials within 24 hours after removal of waste from the site.

1.2.2.2 Delivery and Disposal Certificates

Verification that the wastes were actually delivered and disposed of at the disposal site, within 7 days of disposal.

1.2.2.3 Disposal Site Decontamination Certificate

Verification that all vehicles and containers were decontaminated prior to leaving the disposal site, within 3 days of disposal.

1.2.2.4 Work Site Decontamination Certificate

Verification that all vehicles and containers were decontaminated prior to leaving the sites, were properly operating, and were covered, within 24 hours after removal of waste from the site.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 GENERAL

3.1.1 Materials and Equipment

Furnish all labor, materials, and equipment necessary to transport and dispose of contaminated soils in accordance with applicable Federal, State, and local requirements.

3.1.2 Waste Disposal

3.1.2.1 Processing Sampling Wastes

Wastes generated during hazard characterization and compatibility testing, which shall include but not be limited to, all surplus samples, glass jars, sampling devices, and chemical materials, shall be packed in overpack drums and labeled for off-site disposal.

3.1.2.2 Processing Rinsate Solutions

Containerize in compatible drums all rinsate solutions for sampling and disposal. The drums containing rinsate solution shall be placed in the final staging area.

3.1.3 Transportation and Disposal Records

Provide and prepare all waste shipment records/manifests for hazardous (if applicable) and nonhazardous wastes, required by the Resource Conservation and Recovery Act (RCRA) and the U.S. Department of Transportation (DOT). The Contractor shall complete all labels, profile sheets, and disposal restriction forms as necessary, including all DOT, USEPA, and state classifications. The Contractor shall provide a 5-day notification to MCB Environmental Management Division for required signatures on waste manifests. Following completion of all paperwork, the Contractor shall submit this material and supporting documentation to the Navy's Technical Representative.

3.1.4 Transportation

The Contractor shall be solely responsible for complying with all federal, state, and local requirements for transporting hazardous (if applicable) 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. The Contractor shall weigh all containers for disposal prior to leaving MCB, Camp Lejeune. The Contractor may use MCB landfill scales if the scales operator is provided with a 24 hour notification.

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

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

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

3.1.5 Disposal

All contaminated materials classified as nonhazardous that are removed from the sites shall be disposed of in an industrial landfill permitted to accept the materials.

All contaminated materials classified as hazardous under RCRA (40 CFR Part 261) that are removed from the sites shall be disposed of in a RCRA hazardous waste treatment/disposal facility permitted to accept such materials. All contaminated soil classified as a TSCA waste that is removed from the sites shall be disposed of in a TSCA-permitted disposal facility. It is not anticipated that the soils excavated from Sites 21 and 78 will be a hazardous or a TSCA waste.

-- End of Section --

SECTION 02610

GRAVEL PAVING

PART 1 - GENERAL

1.1 REFERENCES

The references listed below form a part of this specification to the extent indicated by the references thereto (where a number is suffixed to the specification number, it denotes the effective amendment to the specification):

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO-T96	1983 Resistance to Abrasion of Small Size Coarse Aggregate by Use of the Los Angeles Machine

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION AND HIGHWAY SAFETY (NCDOT)

NCDOT-SSRS	Jan. 1990 Standard Specifications for Roads and Structures

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) PUBLICATIONS

ASTM D698	1978 Moisture-Density Relations of Soils and Aggregate Mixtures Using 5-lb (4.54 kg) and 12-inch (457 mm) Drop

1.2 MATERIAL TESTS AND TEST REPORTS

The testing requirements for materials incorporated in referenced documents will be waived provided the manufacturer submits certificates stating that previously manufactured materials have been tested by recognized laboratories, that such materials meet testing requirements specified, and that the materials furnished for this project are of the same type, quality, manufacture and make as that tested. Copies of the test reports need not be submitted except as specifically requested by the Navy's Technical Representative (NTR).

1.3 SUBMITTALS

1.3.1 SD-13, Certificates

Submit certificates from the manufacturer attesting that the following products conform to all requirements of this specification and of reference documents:

a. Gravel

1.4 REQUIREMENTS

The work includes installation and replacement of gravel paving surface course. Preparation of the subgrade shall be as specified under the section of this specification entitled "Earthwork." Except as specified herein or indicated on the drawings, all work and materials shall be in accordance with the NCDOT "Standard Specifications for Roads and Structures". The provisions therein for method of measurement and payment do not apply.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Gravel

Materials shall be in accordance with the NCDOT "Standard Specifications for Roads and Structures," Sections 905, size No. 4.

PART 3 EXECUTION

3.1 Gravel Paving Course

Spreading of the gravel material shall begin at the point nearest the source of supply. Hauling shall be done and traffic permitted over the gravel to assist in compaction. Any ruts formed by the traffic shall be carefully filled and re-rolled. After the gravel course is in place, machining and rolling shall continue until the surface is smooth, hard, well bonded, and true to the designed cross section. Compaction to 95 percent of maximum density, as determined by ASTM D 698, Method D, shall be obtained in the gravel course. The gravel shall be machined as often as necessary to maintain it smooth and true to grade.

3.2 TESTS

The following minimum number of tests shall be performed to insure compliance with the thickness and compaction requirements for gravel paving course:

a. Thickness of gravel paving course - one measurement for each 500 square yards or fraction thereof.

b. Density of gravel paving course - one laboratory test for the project and one field test for each 1000 square yards or fraction thereof of each lift.

-- End of Section --