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CORRECTIVE ACTION PLAN FOR ZONE K BUILDING 2513 ABOVEGROUND STORAGE
TANKS 2513-A AND 2513-B CNC CHARLESTON SC
2/1/2001
J A JONES ENVIRONMENTAL SERVICES

**CORRECTIVE ACTION PLAN
FOR
ZONE K/ BUILDING 2513
(ABOVEGROUND STORAGE TANKS 2513-A and 2513-B)**

SITE IDENTIFICATION # 00960

**Charleston Naval Complex
Charleston, South Carolina**

**SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND**

Contract Number N62467-99-C-0960

February 2001



2600 Bull Street
Columbia, SC 29201-1708

Mr. Gabriel L. Magwood
Southern Division NFEC
P.O. Box 190010
2155 Eagle Drive
North Charleston, South Carolina 29419-9010

Re: Aboveground Storage Tank Assessment Report dated July 11, 1997
Building 2513 (AST 2513A and 2513B) (Site Identification # 00960)
Charleston Naval Complex/Charleston Naval Base
Charleston, SC
Charleston County

Date: October 24, 1997

Dear Mr. Magwood:

The author has completed technical review of the referenced document. As submitted, the report provides a narrative describing closure activities, site conditions and analytical results of environmental sampling conducted to determine if releases have occurred from operation of the referenced vessels and/or associated piping systems. The results presented indicate levels of PAH (polynuclear aromatic hydrocarbons) were detected in soil grab samples obtained from the original piping run excavation (sample SPORT0304-3). Subsequent excavation was conducted with additional clearance sampling performed. These results demonstrated a marked decrease in PAH compounds, however, naphthalene was reported at 493 micrograms per kilogram (ug/kg). Further, analytical results for samples SPORT0304-1, 0304-2 were reported as BDL (below detection limits) with detection limits elevated due to matrix interference. As identified in previous correspondence (Bristol to Amey, September 2, 1997), when detection limits are elevated and CoC's (contaminants of concern) are reported as zero (0) or BDL it will be assumed that the chemical constituent is equal to the elevated detection limit. With this consideration, these results approach or exceed levels proposed in the SCAP (Soil Corrective Action Plan, amended July 30, 1997) for the Charleston Naval Complex and appear to indicate that additional remedial actions are warranted in the areas of the referenced sample locations. In this regard, assessment/corrective action activities provided in the Tank Management Plan (dated October 18, 1996) should be implemented in an appropriate and timely manner.

**CORRECTIVE ACTION PLAN
FOR
ZONE K/ BUILDING 2513
(Aboveground Storage Tanks 2513-A and 2513-B)**

SITE IDENTIFICATION # 09960

**Charleston Naval Complex
Charleston, South Carolina**

**Submitted to:
Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
Charleston, South Carolina 29406**

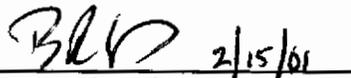
**Submitted by:
CH2M-JONES, LLC.
115 Perimeter Center Place NE
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Atlanta, Georgia 30346-1278**



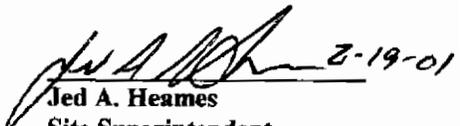
Contract Number: N62467-99-C-0960

February 2001

PREPARED BY:


Brian R. Crawford
Engineer
CH2M-JONES, LLC.

APPROVED BY:


Jed A. Heames
Site Superintendent
CH2M-JONES, LLC.

CERTIFICATION

I certify that the information contained in this report is true, and complete to the best of my knowledge, information, and belief.

Approved By: *R. G. Jones* No 14222 *1/21/01* /J.A. Jones

South Carolina Registration No. 14220

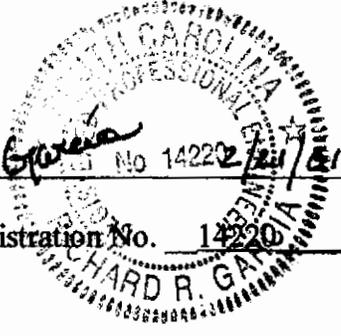


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FIGURES

FIG 1..... SITE LOCATION MAP 1

FIG 2.....SITE LOCATION MAP 2

FIG 3..... SITE LOCATION MAP 3

FIG 4..... SITE LOCATION MAP 4

ACRONYMS

AST	Aboveground Storage Tank
bls	below land surface
CAP	Corrective Action Plan
CNC	Charleston Naval Complex
COC	Chemical of Concern
DRO	Diesel Range Organics
EISOPQAM	Environmental Investigations Standard Operating Procedures and Quality Assurance Manual
EPA	Environmental Protection Agency
mg/kg	microgram per kilogram
mg/L	microgram per liter
OVA	Organic Vapor Analyzer
QA	Quality Assurance
QC	Quality Control
RBSL	Risk-Based Screening Level
RDA	Redevelopment Authority
SCDHEC	South Carolina Department of Health and Environmental Control
SOUTHDIV	Southern Division Naval Facilities Engineering Command
SSTL	Site-Specific Target Level
TTNUS	Tetra Tech NUS

1.0 INTRODUCTION

This Corrective Action Plan (CAP) has been prepared by CH2M-JONES, LLC. The plan is designed for Zone K/ Building 2513 (Aboveground Storage Tanks [AST] 2513-A and 2513-B); located at the Charleston Naval Complex (CNC), Charleston, South Carolina.

The South Carolina Department of Health and Environmental Control (SCDHEC) has designated this site as Identification Number: 09960. This CAP provides methods for corrective actions by re-sampling. If the sample analysis does not provide evidence for no further action, then active remediation will be implemented by removing contaminated soils around the former AST 2513-A and 2513-B. Monitoring well abandonment in accordance with SCDHEC Corrective Action Guidance, June 1997 will also be a part of the corrective actions at this site.

1.1 General Site Description

The CNC is located in the city of North Charleston, on the west bank of the Cooper River in Charleston County, South Carolina. This installation consists of two major areas: an undeveloped dredge materials area on the east bank of the Cooper River on Daniel Island in Berkeley County, and a developed area on the west bank of the Cooper River. The developed portion of the base is on the peninsula bounded on the west by the Ashley River and on the east by the Cooper River. The site is located just north west of the main base area, within the developed portion of the base.

The area surrounding CNC is "mature urban", having long been developed with commercial, industrial, and residential land use. Commercial areas are primarily west of CNC; industrial areas are primarily to the north of the base along Shipyard Creek.

On December 5, 1996 the Environmental Detachment Charleston (DET) completed an AST Assessment Report (AR) for Building 2513 which includes ASTs 2513-A and 2513-B. Building 2513 is located at the Naval Station Annex. The tanks at Building 2513 (2513-A and 2513-B) were used to provide heating oil to Building 2513. Both tanks were 42,000 gallon tanks which were located in a three (3) foot earthen berm. The tanks rested on a concrete footer. Inside the footer was a layer of sand approximately six (6) inches deep, below the sand was a substratum of clay. The area surrounding the tanks within the berm was covered with gravel (SPORTENVDETCHASN, 1997).

The Assessment Report completed by the DET sampled soils around the two tanks on January 29, 1997 and found that only two soil samples had levels of naphthalene above RBSLs. Each soil sample that had levels of naphthalene above the RBSLs are discussed below:

TANK 2513-A:

On January 29, 1997, soil sample SPORT0304-3 was collected just north of AST 2513-A with levels of naphthalene at 0.914 mg/kg (see Site Map 3). The RA indicates that the contaminated

soils were removed by excavation and clean soil was used to fill the area. After the excavation was complete, a confirmation sample (SPORT333-2) was collected on February 20, 1997 indicating that although levels of naphthalene had decreased, levels were still at 0.493 mg/kg, which is above the RBSLs.

TANK 2513-B:

On January 29, 1997 soil sample SPORT0304-2 was collected with levels of naphthalene at 0.426 mg/kg (See site Map 3). The South Carolina Department of Health and Environmental Control (SCDHEC) letter dated October 24, 1997 indicates that the sample results for sample number SPORT0304-2 was elevated due to matrix interference. The letter also states that when detection limits are elevated and COCs are reported as zero or Below Detection Limits (BDL) it will be assumed that the chemical constituent is equal to the elevated detection limit. With this in consideration, limits for SPORT0304-2 are greater than the Risk Based Screening Levels (RBSLs). No active measures were taken at the time.

1.2 Objective

TANK 2513-A

CH2M-Jones, LLC recommends that additional soil sampling be implemented around soil sample SPORT0333-2, located at the former AST 2513-A, in order to delineate the area for excavation of the contaminated soils.

TANK 2513-B

CH2M-Jones, LLC will resample the areas around soil sample SPORT0304-2 located at the former AST 2513-B the analytical indicated that the sample had matrix interference, in accordance with Section 2.0 (refer to SCDHEC letter dated 24 October 1997). In the event that the analytical results from the resample indicate that levels of COCs are above RBSLs, active measures will be taken as discussed in Sections 3.0 and 4.0.

2.0 PROPOSED SAMPLING PLAN

The Assessment Report showed that soils at AST 2513-A and 2513-B were above the RBSLs. The only soil samples showing concentrations above RBSLs was sample SPORT0333-2 located just north of AST 2513-A and sample SPORT0304-2 just east of AST 2513-B. CH2M-Jones, LLC will resample soils at AST 2513-A and 2513-B as measures for the sampling plan.

2.1 Surveying

No new monitoring wells are scheduled to be installed as a part of the sampling plan. Surveying of any new well locations will be conducted if warranted.

All new soil borings will be surveyed.

2.2 Soil Boring Schedule

Soil borings will be collected at and around the two areas of concern (see Site Map 3).

2.3 Monitoring Well Abandonment

All monitoring wells will be abandoned upon receiving approval by SCDHEC. The wells will be abandoned following the South Carolina Well Standards and Regulations R.61-71. The well abandonment will include grouting wells, removing stick-ups and removing all guard posts. Any well casing and screen removed will be decontaminated and disposed of as general refuse.

2.4 Sampling and Analysis Plan

Ten soil samples will be collected as a part of the sampling plan. The samples will be collected at and around the previous sample locations SPORT 0333-2 and SPORT 0304-2. Two of the ten soil samples will be collected at the previous locations SPORT 0333-2 and SPORT 0304-2. Four soil borings will be collected in a circular pattern approximately five feet north, south, east and west of the former SPORT 0333-2 soil boring. An additional four soil borings will be collected in a circular pattern approximately five feet north, south, east, and west of the former SPORT 0304-2 soil boring. If the soil samples collected don't clearly delineate the area, additional soil samples will be collected prior to excavation in order to establish the contaminated area. Samples will be collected from two intervals. The first interval will be from 0-1 foot bls and the second interval will be from 3 to 5 foot bls, stopping before penetrating ground water. All intervals collected will be screened in the field using a Photo Ionization Detector (PID) prior to submitting samples to the certified laboratory. Samples collected will be analyzed for BTEX and Naphthalene using method 8260 and PAH using method 8270. All historical groundwater samples show no contamination at this site (SPORTENVDETHASN 1997).

All sampling procedures will be conducted in accordance with EPA EISOPQAM, and Ensafé/Allen & Hoshall, Comprehensive Sampling and Analysis Plan, 1996.

2.5 Reporting

A report will be submitted to SCDHEC upon performing corrective actions. The reports will summarize and include copies of field and laboratory analytical data, field activities, and disposition of soils.

3.0 PROPOSED CORRECTIVE ACTION

The corrective actions recommended in this section will be implemented only if the sampling plan recommended in Section 2.0 shows evidence that the soils at AST 2513-A and 2413-B are contaminated.

The proposed corrective action is; if an area contains levels of any COCs above the RBSLs then soil removal will be considered as a corrective action (see Section 4.0). However, if COCs are below the RBSLs, intrinsic remediation or No Further Action may be recommended for the site.

3.1 Soil Remediation

CH2M-Jones, LLC plans on implementing excavation (soil removal) at this site in order to remove contaminants from the soil. All past soil samples indicate levels of COCs below RBSLs except for sample number SPORT3333-2 and SPORT0304-2, which, will be used as the source areas when delineating the area.

3.2 Groundwater Remediation

Because the initial assessment indicates that no groundwater analytical indicated any COCs in groundwater, no additional sampling will be collected at this time.

4.0 PROPOSED ACTIVE REMEDIATION

If the soil sampling events reveal that soils in an area are above the RBSLs, the following active measures will be followed:

Based on the results of the sampling for AST 2513-A and AST 2513-B, a dig and haul approach will be performed at this site to remove the COCs if any are found. After defining the clean boundaries, soils from approximately 0 to 6 ft bls at the former AST pit will be excavated.

4.1 Soil Removal

After delineating clean boundaries with investigation sampling, CH2M-Jones, LLC will excavate up to those clean boundary areas. As mentioned in Section 2.0, ten soil samples will be collected in two (2) intervals starting at surface level until reaching soils just above the water table (approximately six feet). Because sample number SPORT333-02 and SPORT0304-2 was the only two soil samples that had COCs above the RBSLs, these areas will be used as the source area while delineating the extent of the plume.

If the COCs are below the RBSLs after resampling, a NFA should be warranted for this site. As stated in the SCDHEC correspondence letter dated 24 October 1997, matrix interference was a factor in the first round of sampling for sample SPORT0304-2. If the COCs are above the RBSLs after sampling, then CH2M-Jones, LLC will proceed with the excavation.

4.2 Monitoring Well Installation

No additional permanent monitoring wells are scheduled to be installed at site 2524.

If any wells are unusable or new wells are warranted for any other reason, the wells will be installed to the same specification as existing monitoring wells unless site conditions change and warrant otherwise. The wells will be installed in accordance with South Carolina Well Standards and Regulations R.61-71. A utility locate will be completed prior to any well installation activities. Any necessary permits will be acquired prior to well installation activities.

4.3 Surveying

Surveying of any new well locations will be conducted as a part of this CAP, if warranted.

All new soil borings will be surveyed as a part of this plan.

4.4 Soil Boring Schedule

Soil borings will be taken and collected around the former SPORT333-2 and SPORT 0304-2 samples in order to delineate the contaminated areas.

4.5 System Operation and Maintenance

After initial soil sampling, no additional system operation and maintenance will be needed at this site.

4.6 . Sampling and Analysis Plan

See Section 2.4 for sampling schedule for Active Remediation

All sampling procedures will be conducted in accordance with EPA Environmental Investigations Standard Operating Procedures and Quality Assurance Manual (EISOPQAM), 1996, and Ensafec/ Allen & Hoshall, Comprehensive Sampling and Analysis Plan, 1996. Any contaminated soil collected during the soil sampling events or excavation will be containerized in DOT-approved (Specification 7H) 55-gallon drums and disposed of at a later date pending fluid contents analysis.

4.7 Reporting

Semi-annual monitoring reports will be submitted to SCDHEC. The reports will summarize and include copies of field and laboratory analytical data. Upon completion of active remediation, a Performance Evaluation Report will also be submitted to SCDHEC to summarize the remediation activities, evaluate the soil quality data, and provide recommendations for the site.

4.8 Equipment Decontamination

All drilling equipment, augers, well casing and screens, and soil and groundwater sampling equipment involved in field sampling activities will be decontaminated according to the EPA EISOPQAM.

4.9 Sample Handling

Sample handling will be conducted in accordance to the following references: EPA EISOPQAM, Code of Federal Regulations 136, 1990, and EPA Users Guide to Contract Laboratory Program, 1988. The following forms will be completed for packing/shipping process: sample labels, chain-of-custody labels, appropriate labels applied to shipping coolers, and chain-of-custody forms.

4.10 Quality Control

In addition to periodic calibration of field equipment and the completions of the appropriate documentation, quality control (QC) samples will be collected during sampling events. QC samples may include field blanks, field duplicates, and trip blanks. Definitions of each can be found below as described by the EPA EISOPQAM:

- **Field Blank:** A sample collected using organic-free water, which has been run over/through sample collection equipment. These samples are used to determine if contaminants have been introduced by contact of the sample medium with sampling equipment. Equipment field blanks are often associated with collecting rinse blanks of equipment that has been field cleaned.
- **Field Duplicates:** Two or more samples collected from a common source. The purpose of a duplicate sample is to estimate the variability of a given characteristic or contamination associated with a population.
- **Trip Blank:** A sample, which is prepared prior to the sampling event in the actual container and is stored with the investigative samples throughout the sampling event. They are often packaged for shipment with the other samples and submitted for analysis. At no time after their preparation are trip blanks to be opened before they reach the laboratory. Trip blanks are used to determine if samples were contaminated during storage and/or transportation back to the laboratory (a measure of sample handling variability resulting in positive bias in contaminant concentration). If samples are to be shipped, trip blanks are to be provided with each shipment but not for each cooler.

4.11 Field Quality Assurance / Quality Control (QA/QC)

All sampling procedures will be conducted in accordance with EPA EISOPQAM. More information on field QC can be found in Sections 4.8 through 4.10.

QA/QC specifications for selected field measurements are summarized below.

Analysis	Control Parameter	Control Limit	Corrective Action
Air Monitoring	Check Calibration of OVA daily	Calibrate to manufactures specifications	Recalibrate. If unable to calibrate, replace.
pH of water	Continuing calibration check of pH 7.0 buffer	pH = 7.0	Recalibrate. If unable to calibrate, replace electrode.
Specific Conductance of water	Continuing calibration check of standard solution	> 1% of standard	Recalibrate.

4.12 Record keeping

In addition to required sampling documentation (see Section 4.9), standardized forms, log sheets and logbooks will be completed during all field activities.

6.0 REFERENCES

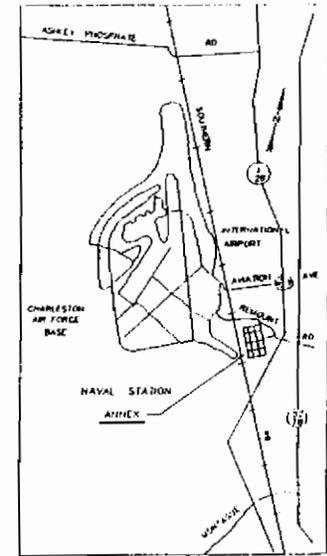
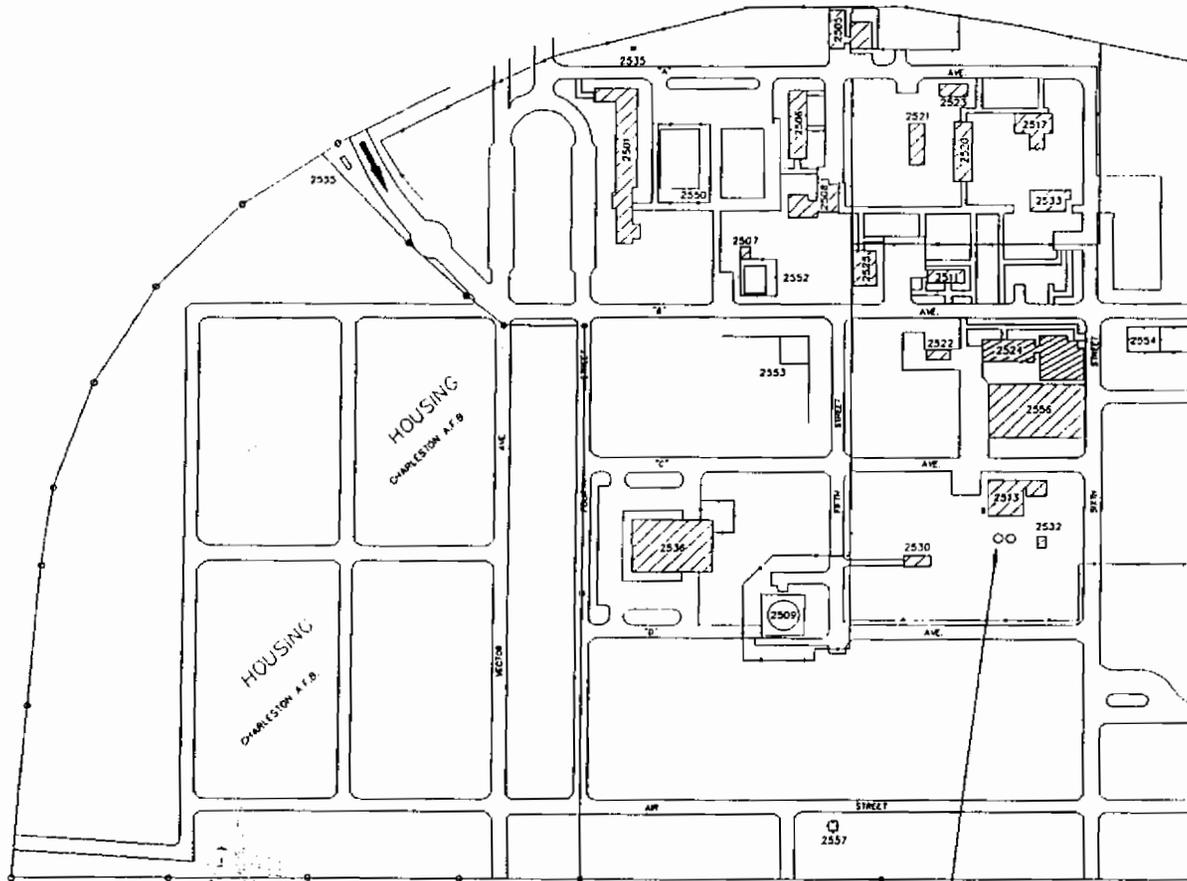
Environmental Detachment Charleston. 1997. Assessment Report for AST 2513-A and AST 2513-B.

South Carolina Department of Health and Environmental Control. 1997. Corrective Action Guidance.

United States Environmental Protection Agency. 1990. Code of Federal Regulations 136.

United States Environmental Protection Agency. 1988. EPA Users Guide to Contract Laboratory Program.

United States Environmental Protection Agency. 1996. EPA Environmental Investigations Standard Operating Procedures for Quality Assurance Manual.

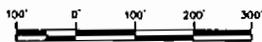


LOCATION MAP

N.T.S.

FORMER ASTs
2513A AND 2513B

GRAPHIC SCALE:



LEGEND:

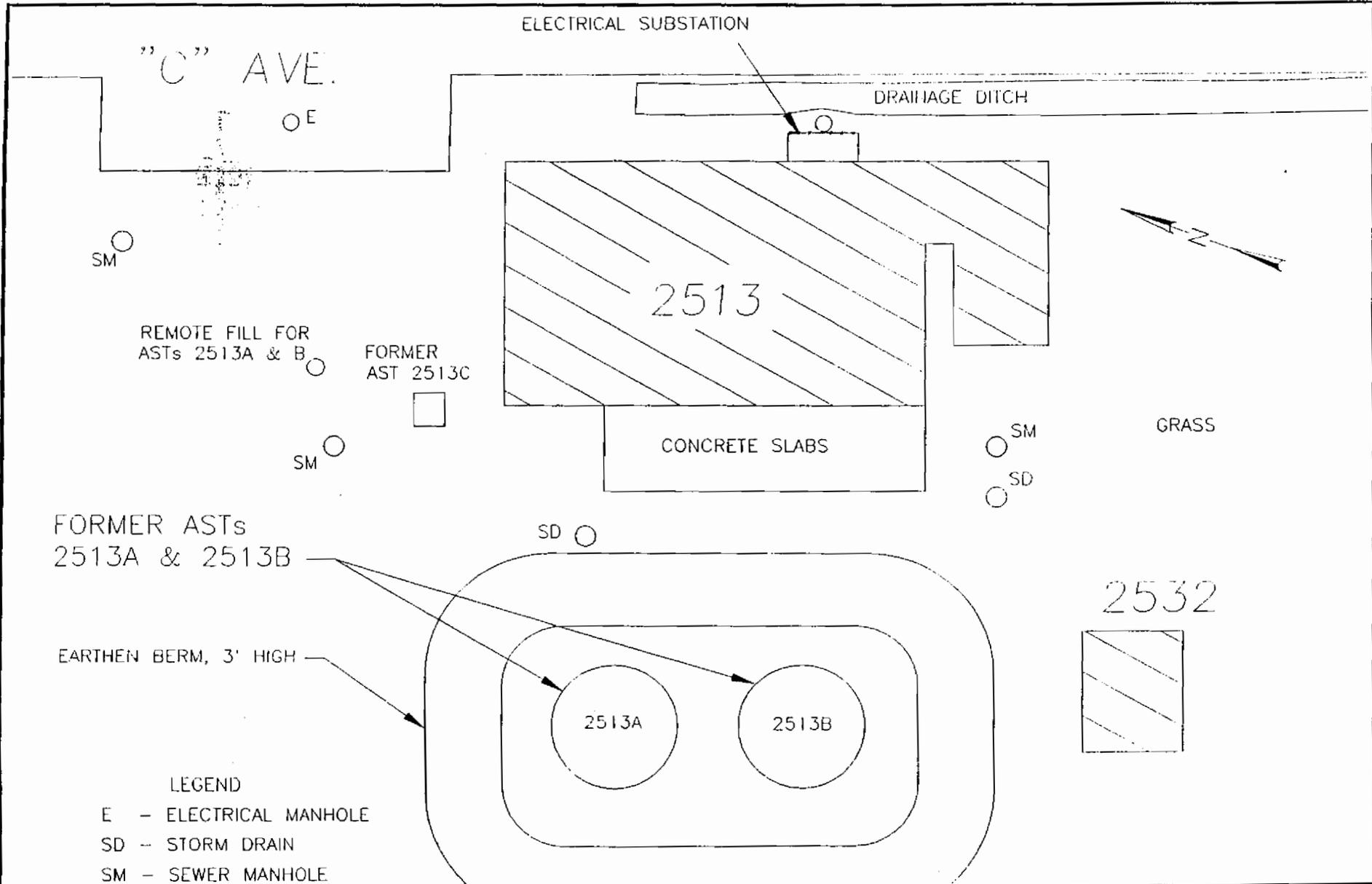
- BLDG OR STRUCTURE
- ROADS, WALKS OR PAVED AREAS
- PROPERTY BOUNDARY
- PROPERTY BOUNDARY (BY OTHERS)
- SECURITY FENCE

SPORTENVDE'TCHASN
 1899 North Hobson Ave.
 North Charleston, SC
 29405-2106
 Ph. (803) 743-6777

Site Map 1
 ASTs 2513A & 2513B
 Naval Station Annex
 Charleston, SC

DWG DATE: 7 MAY 97

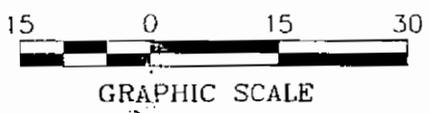
DWG NAME: 2513AB_1



FORMER ASTs
2513A & 2513B

EARTHEN BERM, 3' HIGH

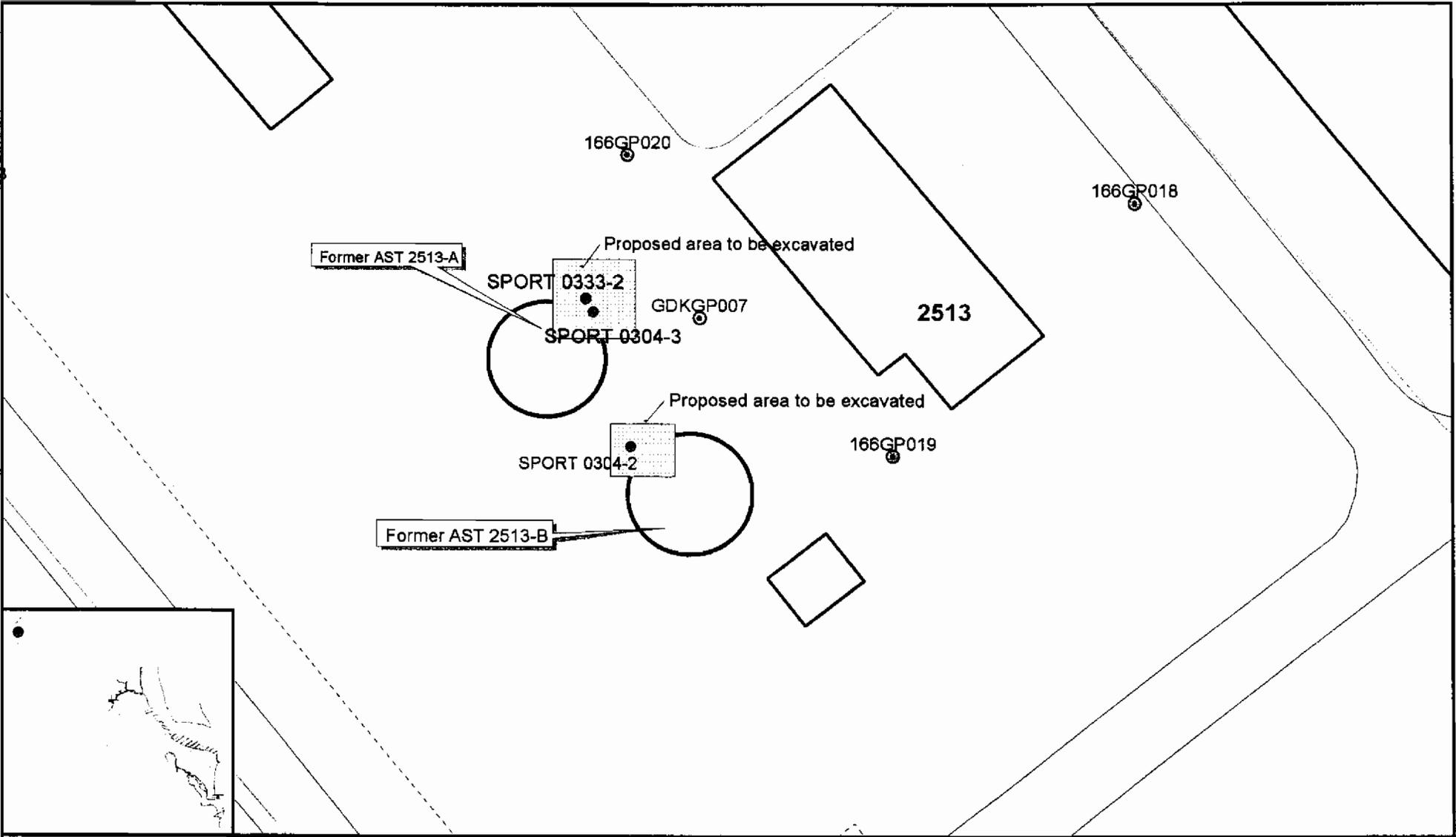
- LEGEND
- E - ELECTRICAL MANHOLE
 - SD - STORM DRAIN
 - SM - SEWER MANHOLE



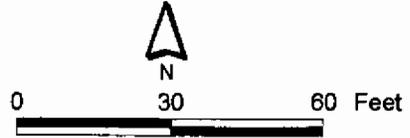
SPORTENVDETHASN
1899 North Hobson Ave.
North Charleston, SC
29405-2106
Ph. (803) 743-6777

Site Map 2
ASTs 2513A & 2513B
Naval Station Annex
Charleston, SC

DWG DATE: 7 MAY 97 DWG NAME: 2513AB_2



- ⊙ Groundwater Probe
- Former Soil Borings



Site Map 3
 ASTs 2513-A and 2513-B
 Zone K; Site ID No: 00960
 Charleston Naval Complex

CH2M-JONES LLC