WORK AND SAFETY/CONTINGENCY PLAN

CONFIRMATION STUDY TO DETERMINE POSSIBLE DISPERSION AND MIGRATION OF SPECIFIC CHEMICALS

VERIFICATION STEP SAMPLING ROUND 2 AND PRELIMINARY CHARACTERIZATION

U.S. NAVAL STATION ROOSEVELT ROADS
Contract No. N62470-85-B-7972

ENVIRONMENTAL SCIENCE AND ENGINEERING, INC.
Gainesville, Florida

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TABLE OF CONTENTS

Section			Page
1.0	INTRODUCTION		1-1
2.0	WORK PLAN		2-1
	2.1	PLAN OF ACTION	2-1
		2.1.1 PRESITE ACTIVITIES	2-5
		2.1.2 ONSITE INVESTIGATION	2-7
		2.1.3 EVALUATION AND REPORTS	2-38
	2.2	PROJECT SCHEDULE	2-39
	2.3	PROJECT ORGANIZATION	2-39
		2.3.1 ESE	2-39
		2.3.2 CARIBBEAN SOIL TESTING COMPANY, INC.	2-39
		2.3.3 U.S. NAVY PERSONNEL	2-42
3.0	SAFETY PLAN		3-1
	3.1	PROJECT DESCRIPTION	3-1
	3.2	RESPONSIBILITY AND ORGANIZATION	3-1
	3.3	GENERAL SAFETY RULES	3-4
		3.3.1 ONSITE SAFETY	3-4
		3.3.2 LABORATORY SAFETY	3-5
	3.4	SITE CHARACTERISICS AND SITE SAFETY PLAN	3-7
		3.4.1 SITE CHARACTERIZATION	3-7
		3.4.2 SITE SAFETY/CONTINGENCY PLAN	3-8
APPENDIX A--SCOPE OF WORK			A-1

LIST OF FIGURES

Figure		Page
2-1	Site Map Showing Locations of Sites of Potential Contamination at Naval Station Roosevelt Roads, Puerto Rico	2-3
2-2	Site Map Showing Locations of Sites of Potential Contamination at Naval Ammunition Facility, Vieques	2-4
2-3	Proposed Sampling Locations at Site No. 1, Quebrada Disposal Site, Vieques	2-14
2-4	Proposed Sampling Locations at Site No. 2, Mangrove Disposal Site, Vieques	2-15
2-5	Proposed Sampling Locations at Site No. 3, IRFNA/MAF-4 Disposal Site, Vieques	2-16
2-6	Proposed Sampling Locations at Site No. 5, Army Cremator Disposal Area	2-17
2-7	Proposed Ground Water, Surface Water, and Sediment Sampling Locations at Site No. 6, Langley Drive Disposal Site	2-18
2-8	Proposed Soil Sampling Locations at Site No. 6, Langley Drive Disposal Site	2-19
2-9	Proposed Sampling Locations at Site No. 7, Station Landfill	2-20
2-10	Proposed Sampling Locations at Site No. 8, Drone Washdown	2-21
2-11	Proposed Sampling Locations at Site No. 10, Building 25 Storage Area	2-22
2-12	Proposed Ground Water, Surface Water, and Sediment Sampling Locations at Site No. 12, Tow Way Road Fuels Farm	2-23

LIST OF FIGURES
(Continued, Page 2 of 2)

Figure		Page
2-13	Proposed Soil Boring Locations at Site No. 12, Tow Way Road Fuels Farm	2-24
2-14	Proposed Sampling Locations at Site No. 13, Tanks 212 to 217	2-25
2-15	Proposed Sampling Locations at Site No. 15, Substation 2	2-26
2-16	Proposed Sampling Locations at Site No. 16, Old Power Plant, Building 38	2-28
2-17	Proposed Ground Water Sampling Locations at Site No. 18, Pest Control Shop	2-30
2-18	Proposed Surface Water and Sediment Sampling Locations at Site No. 18, Pest Control Shop	2-31
2-19	NAVSTA Roosevelt Roads, Confirmation Study Round 2 Schedule	2-40

LIST OF TABLES

Table		Page
2-1	Summary Table of Verification Step Round 2 Investigation and Preliminary Characterization	2-9
2-2	Soil Borings and Sediment Cores	2-12
2-3	Key to Soil Sample Station Identification Numbers at Site No. 15, Substation 2	2-27
2-4	Key to Soil Sample Station Identification Numbers at Site No. 16, Old Power Plant, Building 38	2-29
2-5	ESE Project Personnel	2-41
2-6	CST Project Personnel	2-43
2-7	U. S. Navy Personnel	2-44

1.0 INTRODUCTION

This report presents the Preliminary Work and Safety/Contingency Plans for the Confirmation Study at Naval Station (NAVSTA) Roosevelt Roads, Puerto Rico and Naval Ammunition Facility (NAF), Vieques. The objective of this Confirmation Study is to determine if specific toxic or hazardous materials have contaminated the environment at the Navy activities and may include consideration of various remedial alternatives. The Confirmation Study is part of the Navy Assessment and Control of Installation Pollutants (NACIP) program designed to identify contamination of Navy lands resulting from past operations and to institute corrective measures, as needed. The NACIP program consists of three distinct phases:

1. Initial Assessment--performing record searches and personnel interviews to collect and evaluate all evidence supporting the existence of a contamination problem at an installation.
2. Confirmation--performing onsite investigations including physical and analytical monitoring to confirm or refute the existence of contamination, and if necessary recommending both interim and long-term corrective measures.
3. Corrective Measures--instituting needed interim and/or long-term remedial measures to control and mitigate contamination.

The first phase, or the Initial Assessment Study (IAS) of NAVSTA Roosevelt Roads and NAF Vieques, was conducted in 1984.

Results of the IAS show that sufficient evidence exists to indicate the potential presence of contaminants that might pose an imminent health or environmental threat on or off the Naval facility. Sites recommended during the IAS will, therefore, be investigated in this Confirmation Study.

The study is performed in sequential efforts, termed Steps, and are defined below.

Step	Description
IA	Verification of existence of contamination.
IB	Characterization of extent and rate of migration of contaminants, geohydrological, geophysical, and other factors.
II	Evaluation of alternatives to achieve compliance, preparation of cost estimates, and project effectiveness of alternatives.
III	Preparation of site operation and draft Government project documentation with cost estimate(s) satisfactory for project funding requests.

The Verification Step of the study includes the installation of ground water monitor wells, and sampling and analysis of ground water, surface water, sediment, and soil. The Verification Step consists of three rounds of sampling and analysis to ensure that the data base will account for seasonal fluctuations in surface and ground water quality. The first round of Verification Step sampling and analysis was completed in May 1986.

The Work and Safety/Contingency Plans presented in this document cover the second round of Verification Step sampling and analysis. In addition, these plans cover Preliminary Characterization Step (Step IB) sampling and analysis for two sites sampled in the first round of the Verification Step.

These plans may be modified during the onsite investigations, as onsite conditions become more clearly defined or as warranted by unforeseen considerations.

The result of the Verification Step Round 2 sampling and analysis will be a general evaluation of contamination found, including geohydrological, health, safety, and regulatory aspects, and a recommendation as to whether or not to proceed with the Characterization Step (Step IB) of the Confirmation Study.

The results of the Preliminary Characterization Step sampling and analysis will be used to perform a remedial action alternatives analysis for the contamination at the two sites of concern.

2.0 WORK PLAN

The Work Plan consists of a task-by-task description of the plan of action for completing the Verification Step of the Confirmation Study at NAVSTA Roosevelt Roads and NAF Vieques. Also included is a project schedule and a brief discussion of the project organization that was developed to assure successful project completion. Specific components of the Work Plan are presented below.

2.1 PLAN OF ACTION

The plan of action was developed based on a thorough review of the scope of work detailed in the contract (Contract No. N62470-85-B-7972), the IAS Report for NAVSTA Roosevelt Roads, [Naval Energy and Environmental Suport Activity (NEESA) Report No. NEESA 13-051, September 1984], and the results of the first round of Verification Step sampling and analysis. The scope of work is contained in Appendix A.

The plan of action covers the Verification Step Round 2 investigation of 11 sites of potential contamination, and the Preliminary Characterization of 2 contaminated sites, which are listed below and shown in Figures 2-1 and 2-2.

NAVSTA ROOSEVELT ROADS AND NAF VIEQUES
(see Figures 2-1 and 2-2)

Verification Step Round 2 Investigation

Site Number	Name
1	Quebrada Disposal Site, Vieques
2	Mangrove Disposal Site, Vieques
3	IRFNA/MAF-4 Disposal Site, Vieques
5	Army Cremator Disposal Area
6	Langley Drive Disposal Site
7	Station Landfill
8	Drone Washdown
10	Building 25 Storage Area
12	Tow Way Roads Fuels Farm
13	Tanks 210 to 217
18	Pest Control Shop and Surrounding Area

Preliminary Characterization

15	Substation 2
16	Old Power Plant, Building 38

A task-by-task description of the plan of action for performing the Verification Step Round 2 investigation and the Preliminary Characterization follows.

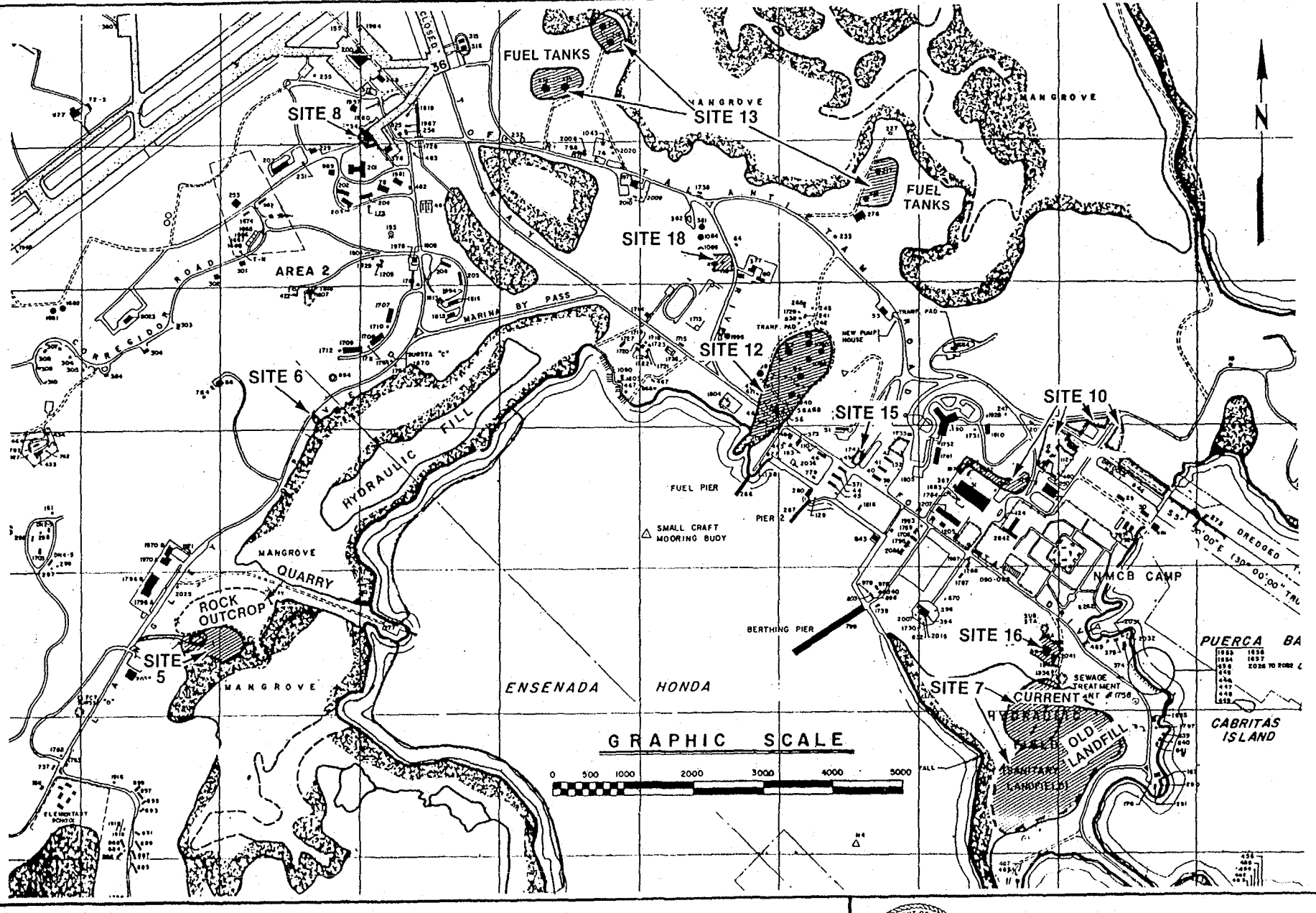
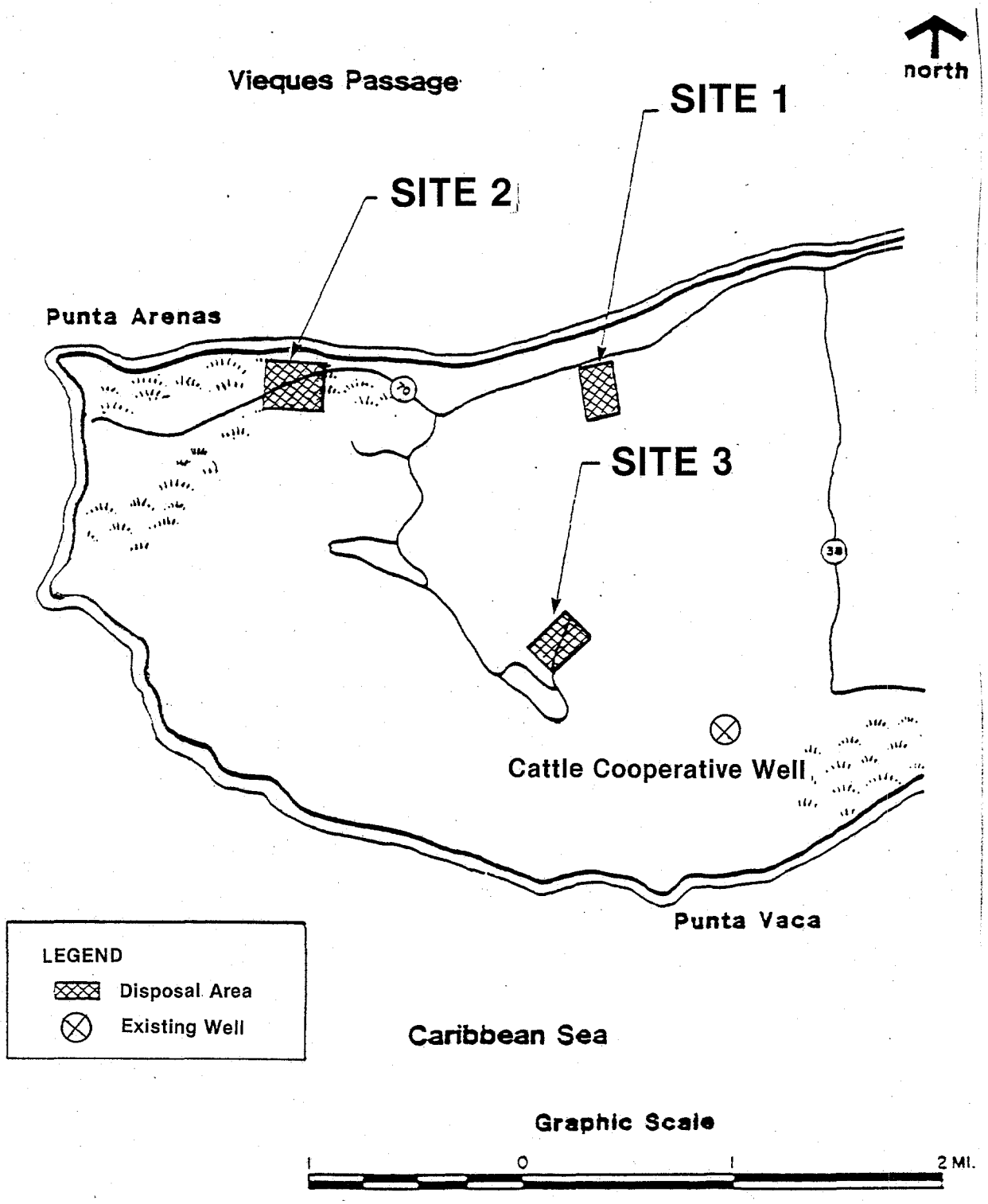


Figure 2-1
SITE MAP SHOWING LOCATIONS OF SITES OF POTENTIAL CONTAMINATION AT NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

CONFIRMATION STUDY
U.S. NAVAL COMPLEX
PUERTO RICO

USN PUERTO RICO 10/85



SOURCES: NEESA, 1984b; ESE, 1985.

Figure 2-2
SITE MAP SHOWING LOCATIONS OF SITES OF POTENTIAL CONTAMINATION AT NAVAL AMMUNITION FACILITY, VIEQUES

CONFIRMATION STUDY
U.S. NAVAL COMPLEX
PUERTO RICO

2.1.1 PRESITE ACTIVITIES

1. Update and Revise Quality Assurance/Quality Control Plan: Update and revise Quality Assurance/Quality Control (QA/QC) Plan for laboratory analysis of environmental samples to be collected during the onsite investigation. Forward the QA/QC Plan to the Martin Marietta Corporation and Engineer-in-Charge (EIC) for approval.

2. Development of Work Plan: Review scope of work for Verification Step Round 2 investigation and Preliminary Characterization, review results of Round 1 investigation, conduct site reconnaissance, and meet with EIC and NAVSTA Roosevelt Roads personnel to discuss the Work Plan and schedule. Prepare Work Plan and forward to EIC.

3. Update and Revise Safety/Contingency Plan: Update and revise the Safety/Contingency Plan from the Verification Step Round 1 investigation in accordance with the requirements of the Verification Step Round 2 investigation and Preliminary Characterization. Updates and revisions will be based primarily on a review of the Round 1 results to assess potential risks associated with the Round 2 investigation and Preliminary Characterization. Updates and revisions will also be based on coordination with NAVSTA Roosevelt Roads safety personnel. The plan will address safety precautions to be taken by contractor, subcontractor, and Naval personnel, to include protective clothing and training and emergency response procedures.

4. Well Drilling Specifications: Prepare specifications and subcontract for well drilling subcontractor.
5. Training: In accordance with the Safety Plan, an indoctrination of NAVSTA Roosevelt Roads personnel on all aspects of the contractor's safety requirements, including equipment, will be conducted. An onsite review of site-specific safety requirements for subcontractor personnel will be performed by the designated ESE Site Safety Officer.

2.1.2 ONSITE INVESTIGATION

1. Setup of Equipment Storage: Upon arrival of the field team at NAVSTA Roosevelt Roads, secure locations for storage of equipment and field supplies will be identified and utilized.

2. Drilling and Boring: Drilling and boring will be required for monitor well installation and for subsurface soil investigations. Table 2-1 presents the number of wells to be installed, the total number of ground water samples, surface water samples, sediment samples, and soil samples to be collected at each site, and the analytical constituents to be tested. Proposed well, soil, and sediment sample locations for each specific site are presented in Figures 2-3 through 2-18. Information pertaining to the number of soil borings and sediment cores, and the number of soil and sediment samples to be collected from each boring/core is presented in Table 2-2. One drill rig will be used to install one ground water monitor well at Site 6, and three monitor wells at Site 18. Following monitor well installation, the drill rig will proceed to Site 12 for the 52 soil borings. After the soil boring program at Site 12, the drill rig will proceed to Site 12 for the installation of two monitor wells. The locations of wells and borings, as well as the installation itinerary, may be modified by the senior ESE field geologist, based on site-specific requirements. In addition to siting the wells and borings, the primary responsibilities of the ESE field geologist include supervision of the drilling operation and monitor well

construction; preparation of boring logs which describe the soil type, stratification, consistency, and ground water level; and air monitoring/safety control.

Table 2-1. Summary Table of Verification Step Round 2 Investigation and Preliminary Characterization

Site Number	Wells to be Installed	Ground Water Samples	Surface Water Samples	Sediment Samples	Soil Samples	Analytical Constituents[a]
NAF Vieques Round 2 Investigation						
1	0	3	0	0	0	pH, Priority Pollutant scan, xylene, MEK, MIBK, EDB, Cr hexavalent
2	0	0	5	5	0	pH, Cr (total and hexavalent), Pb, VOA, xylene, MEK, MIBK
3	0	1	0	0	0	pH, Priority Pollutant scan
NAVSTA Roosevelt Roads Round 2 Investigation						
5	0	5	5	5	0	pH, Priority Pollutant scan, Cr hexavalent, xylene, MEK, MIBK, EDB
6	1	1	3	3	0	pH, Priority Pollutant scan, xylene, MEK, MIBK, EDB
	--	--	--	--	15	Pb
	--	--	--	--	1	EP Toxicity Test-Pb only
7	2	8	0	0	0	pH, Priority Pollutant scan, Cr hexavalent

Table 2-1. Summary Table of Verification Step Round 2 Investigation and Preliminary Characterization (Continued, page 2 of 3)

Site Number	Wells to be Installed	Ground Water Samples	Surface Water Samples	Sediment Samples	Soil Samples	Analytical Constituents[a]
8	0	0	5	3	0	Oil and grease, Pb, VOA, xylene, MEK, MIBK, EDB
10	0	8	0	0	0	pH, Priority Pollutant scan, Cr hexavalent, xylene, MEK, MIBK, EDB
12	0	6	1	--	--	pH, VOA,EDB, xylene, oil and grease, Pb, GC fingerprint
	--	--	--	1	--	pH, VOA, EDB, xylene, oil and grease, Pb
	--	--	--	--	52	No analyses. Only visual inspection for oil and measurement of thickness of oil layer
13	0	11	6	6	0	pH, VOA, Pb, oil and grease, EDB, xylene, MEK, MIBK
18	3	3	--	--	0	Pesticides, VOA
	--	--	6	6	--	Pesticides

Table 2-1. Summary Table of Verification Step Round 2 Investigation and Preliminary Characterization (Continued, page 3 of 3)

Site Number	Wells to be Installed	Ground Water Samples	Surface Water Samples	Sediment Samples	Soil Samples	Analytical Constituents[a]
NAVSTA Roosevelt Roads Preliminary Characterization						
15	0	0	0	0	99	PCBs
16	0	0	0	0	66	PCBs
	--	--	--	--	33	Pb
	--	--	--	--	14	EP Toxicity - Pb only

-- = not applicable
a = Key to Constituent Abbreviations:

Cr = chromium.
Pb = lead.
VOA = volatile organic analysis.
PCBs = polychlorinated biphenyls.
EDB = ethylene dibromide.
MEK = methyl ethyl ketone.
MIBK = methyl isobutyl ketone.

Priority Pollutant Scan = EPA Priority Pollutant list of 129 pollutants excluding asbestos, cyanide, and dioxin.
EP Toxicity Test = Extraction procedure (EP) toxicity test as described in 40 CFR Part 261.24, Appendix II.

Source: ESE, 1987.

Table 2-2. Soil Borings and Sediment Cores

Site Number	Type of Sample	Number of Borings/ Cores	Number of Samples per Boring	Total Number of Samples
NAF Vieques				
2	Sediment	5	1[a]	5
3	Ground Water	0	0	0
NAVSTA Roosevelt Roads				
5	Sediment	5	1[a]	5
6	Soil	12	1[a]	12
	Soil	1	3[b]	3
	Sediment	3	1[a]	3
8	Sediment	3	1[a]	3
12	Soil	52	0[c]	0
	Sediment	1	1[a]	1
13	Sediment	6	1[a]	6
15	Soil	33	3[b]	99
16	Soil	6	1[d]	6
	Soil	20	3[b]	60

Table 2-2. Soil Borings and Sediment Cores
(Continued, Page 2 of 2)

Site Number	Type of Sample	Number of Borings/ Cores	Number of Samples per Boring	Total Number of Samples
18	Sediment	6	1[a]	6

a = Composite sample from 0- to 1-foot depth.
b = Composite sample from 0- to 1-foot depth, 1- to 2- foot depth, and 2- to 3-foot depth.
c = No laboratory analyses. Only visual inspection for oil contamination to a depth of approximately 20 feet below the ground surface, and measurement of thickness of oil layer, if present.
d = Surficial soil sample collected in concrete-lined drainage ditch.

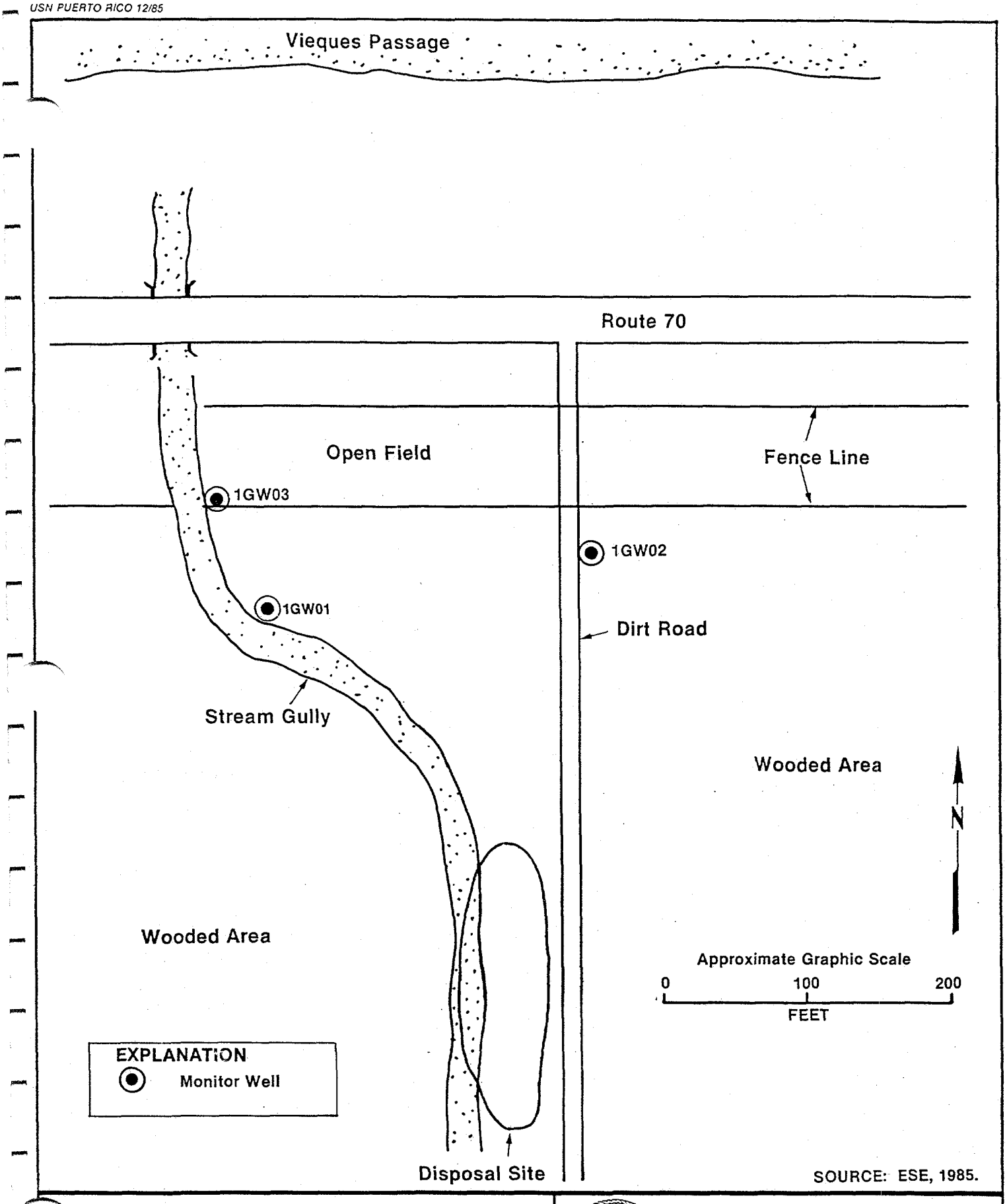


Figure 2-3
PROPOSED SAMPLING LOCATIONS AT SITE NO. 1, QUEBRADA DISPOSAL SITE, VIEQUES

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U.S. NAVAL COMPLEX
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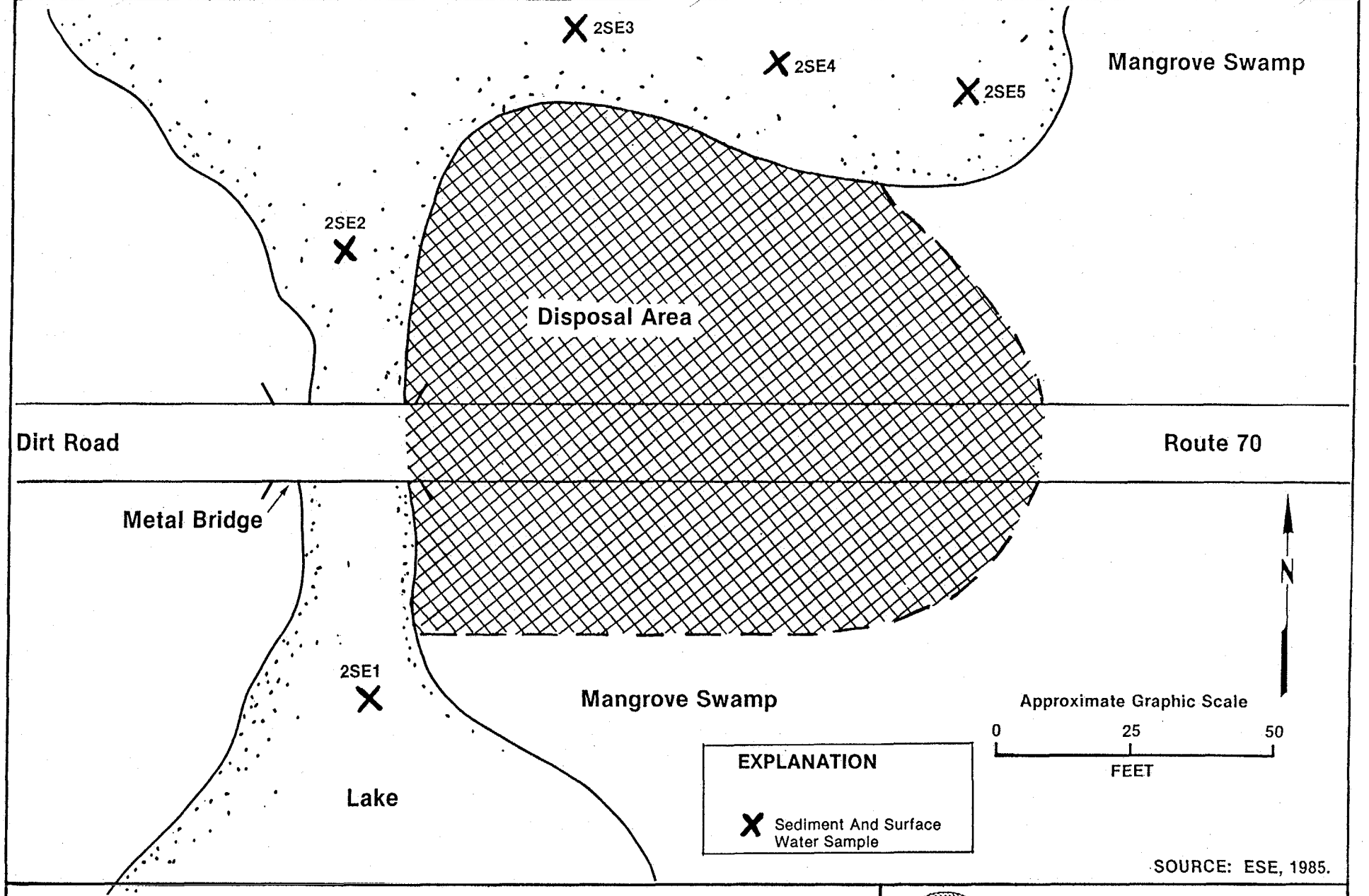

Figure 2-4
PROPOSED SAMPLING LOCATIONS AT SITE NO. 2, MANGROVE DISPOSAL SITE, VIEQUES

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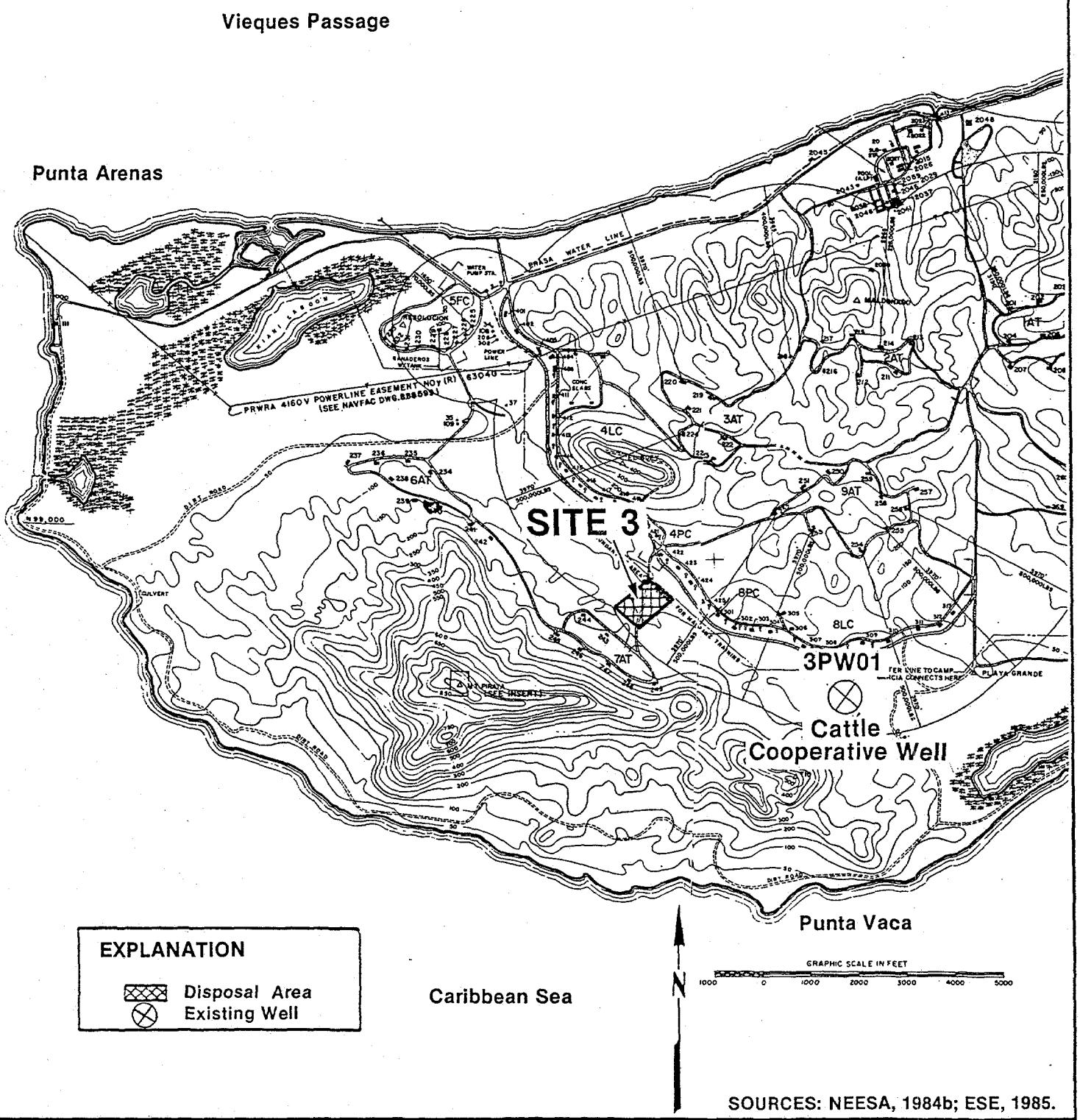

Figure 2-5
PROPOSED SAMPLING LOCATIONS AT SITE NO. 3, IRFNA/MAF-4 DISPOSAL SITE, VIEQUES

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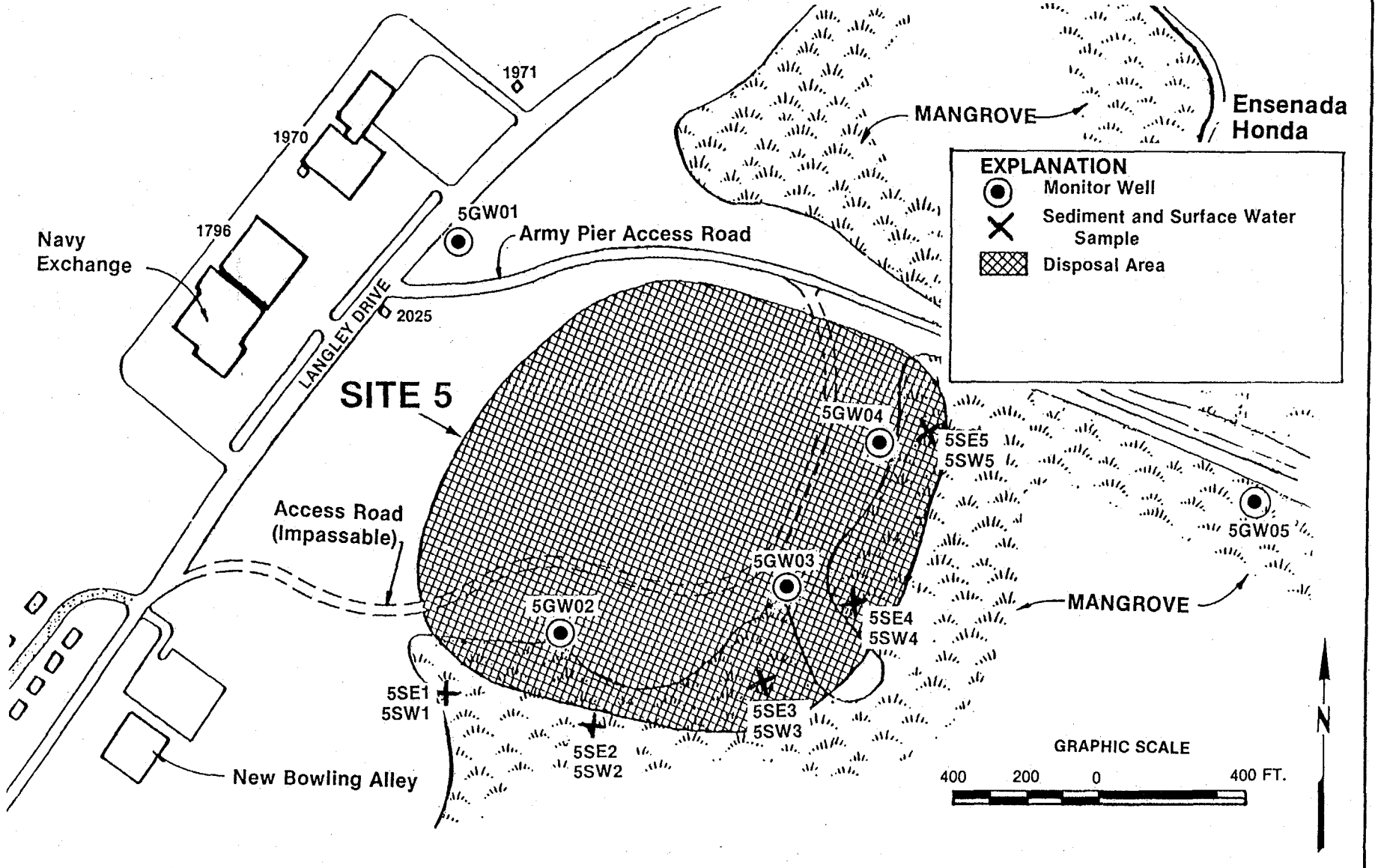

SOURCES: NEESA, 1984b; ESE, 1985.

Figure 2-6
PROPOSED SAMPLING LOCATIONS AT SITE NO. 5, ARMY CREMATOR DISPOSAL AREA

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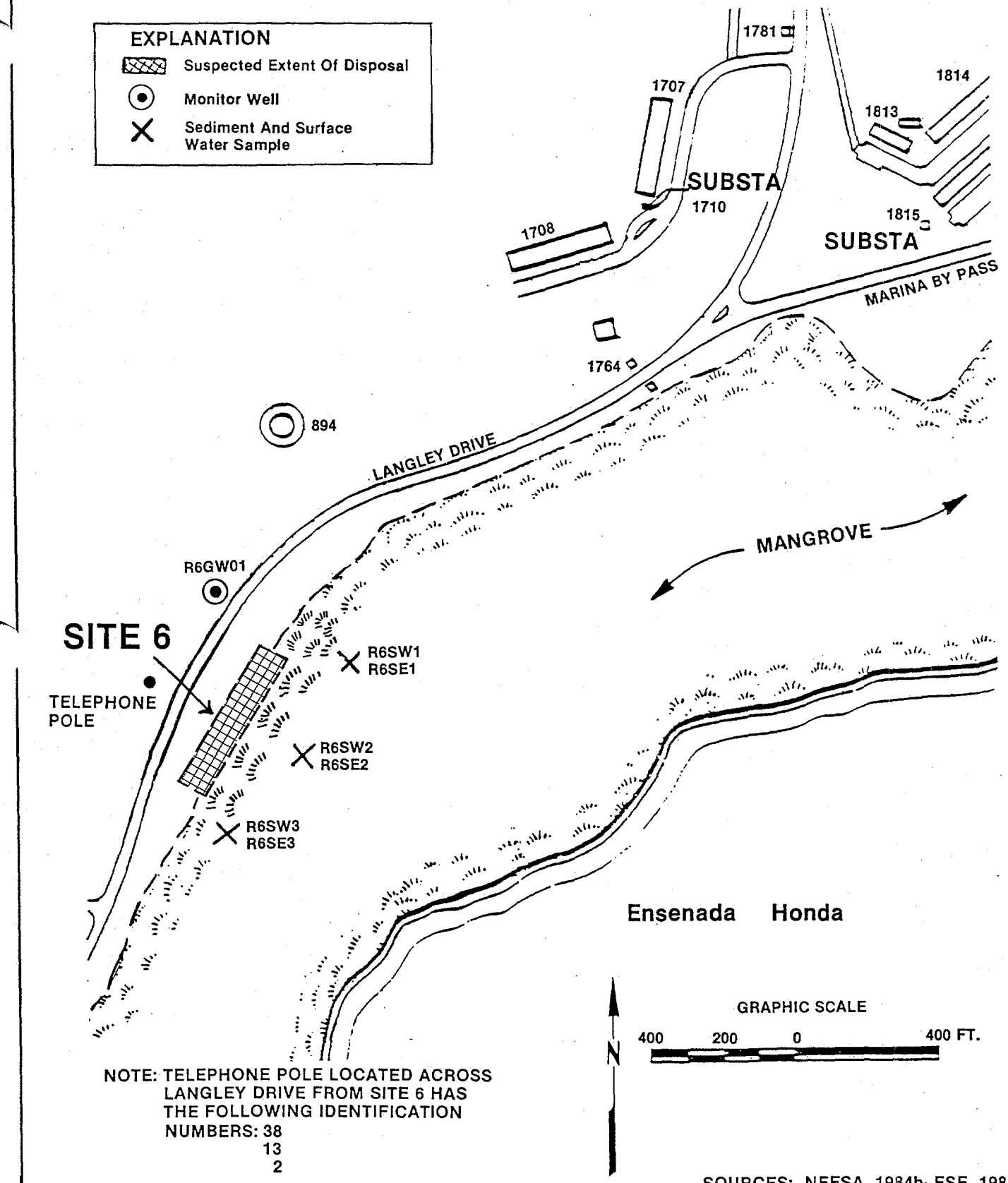

Figure 2-7
PROPOSED GROUND WATER,SURFACE WATER, AND SEDIMENT SAMPLING LOCATIONS AT SITE NO.6, LANGLEY DRIVE DISPOSAL SITE

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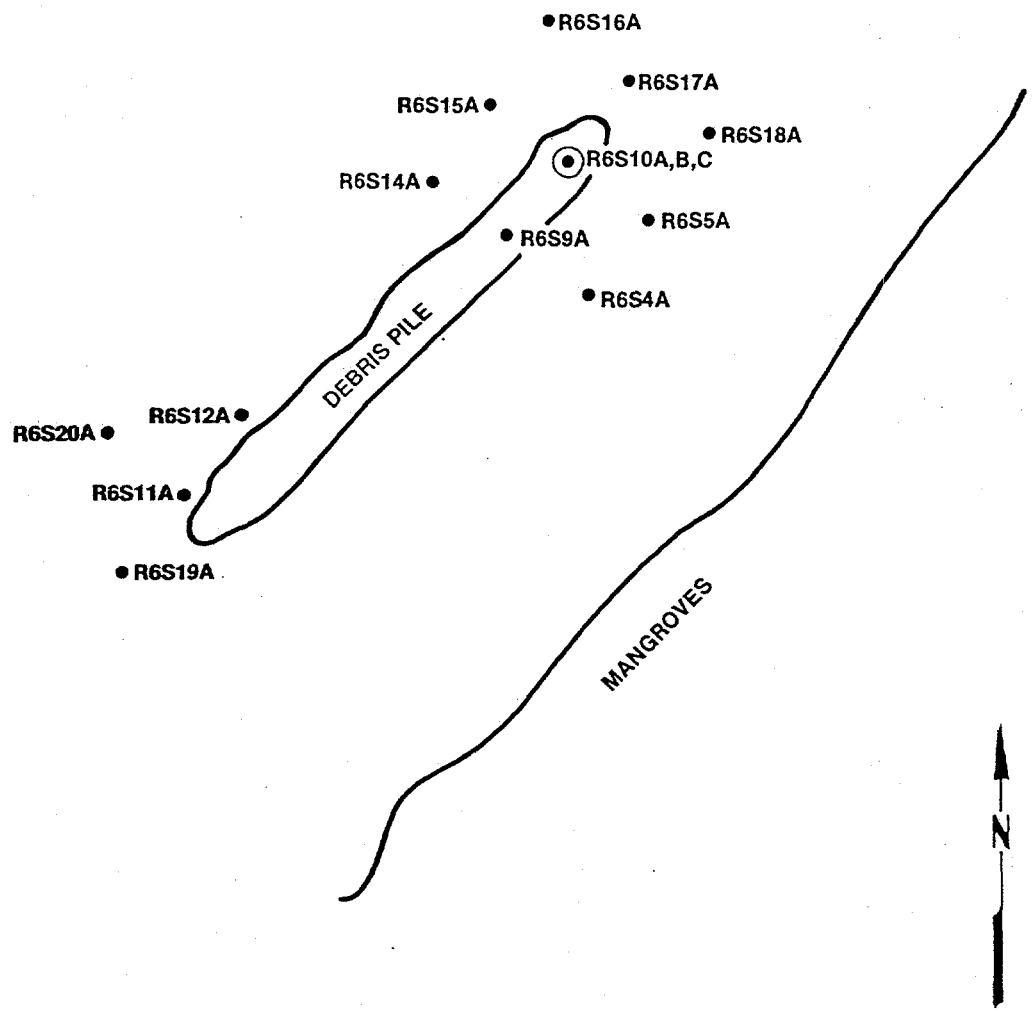

EXPLANATION

- ● Composite Soil Sample From 0 To 1 Ft. Depth
- ⊙ Composite Soil Samples From 0- To 1- Ft. Depth, 1- To 2- Ft. Depth, And 2- To 3- Ft. Depth (Total Of 3 Samples)

NOTE: Grid Spacing For Soil Sampling Locations Is 25 Feet

Figure 2-8
PROPOSED SOIL SAMPLING LOCATIONS AT SITE NO. 6, LANGLEY DRIVE DISPOSAL SITE

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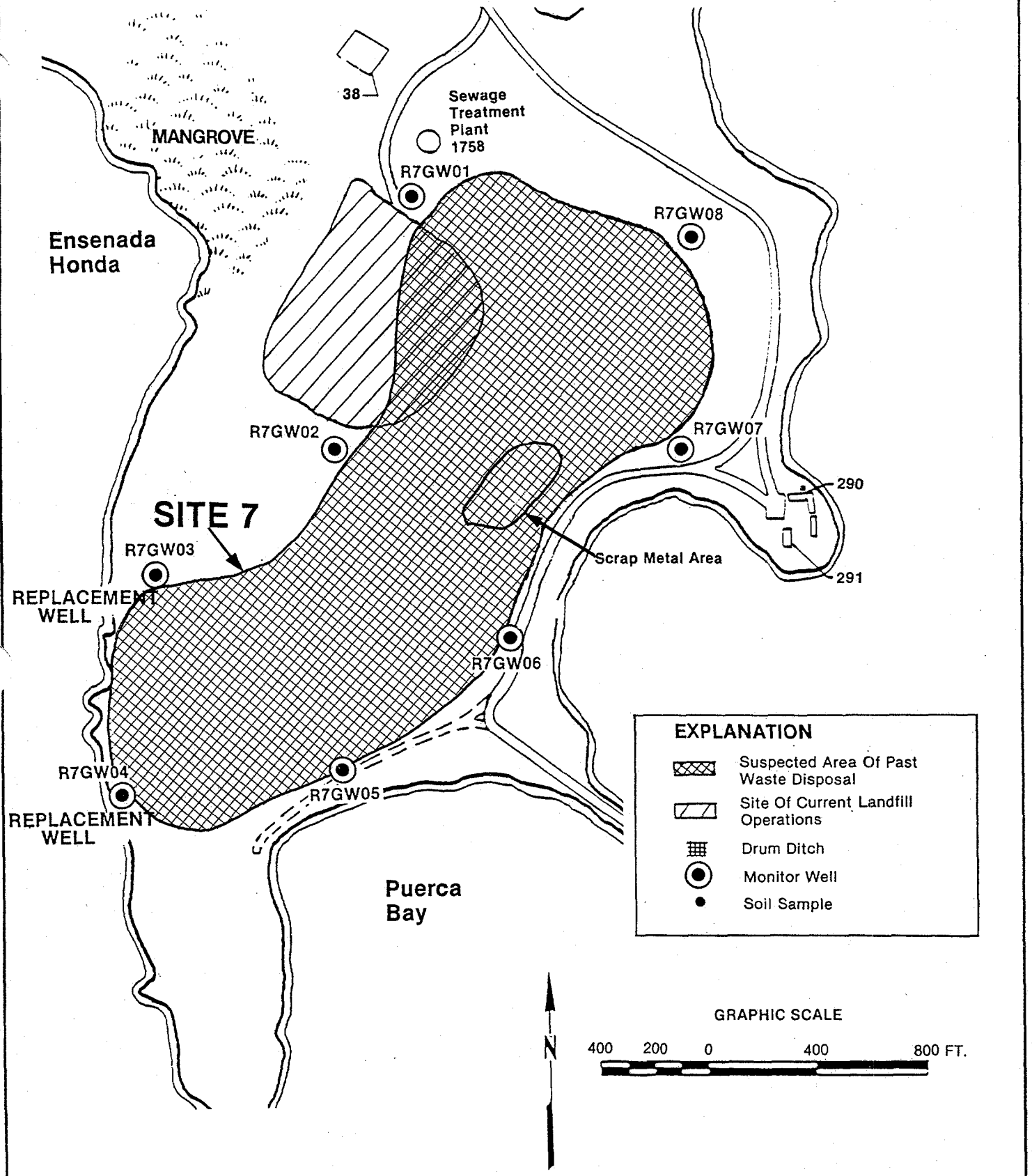

SOURCES: NEESA, 1984b; ESE, 1985.

Figure 2-9
PROPOSED SAMPLING LOCATIONS AT SITE NO. 7, STATION LANDFILL

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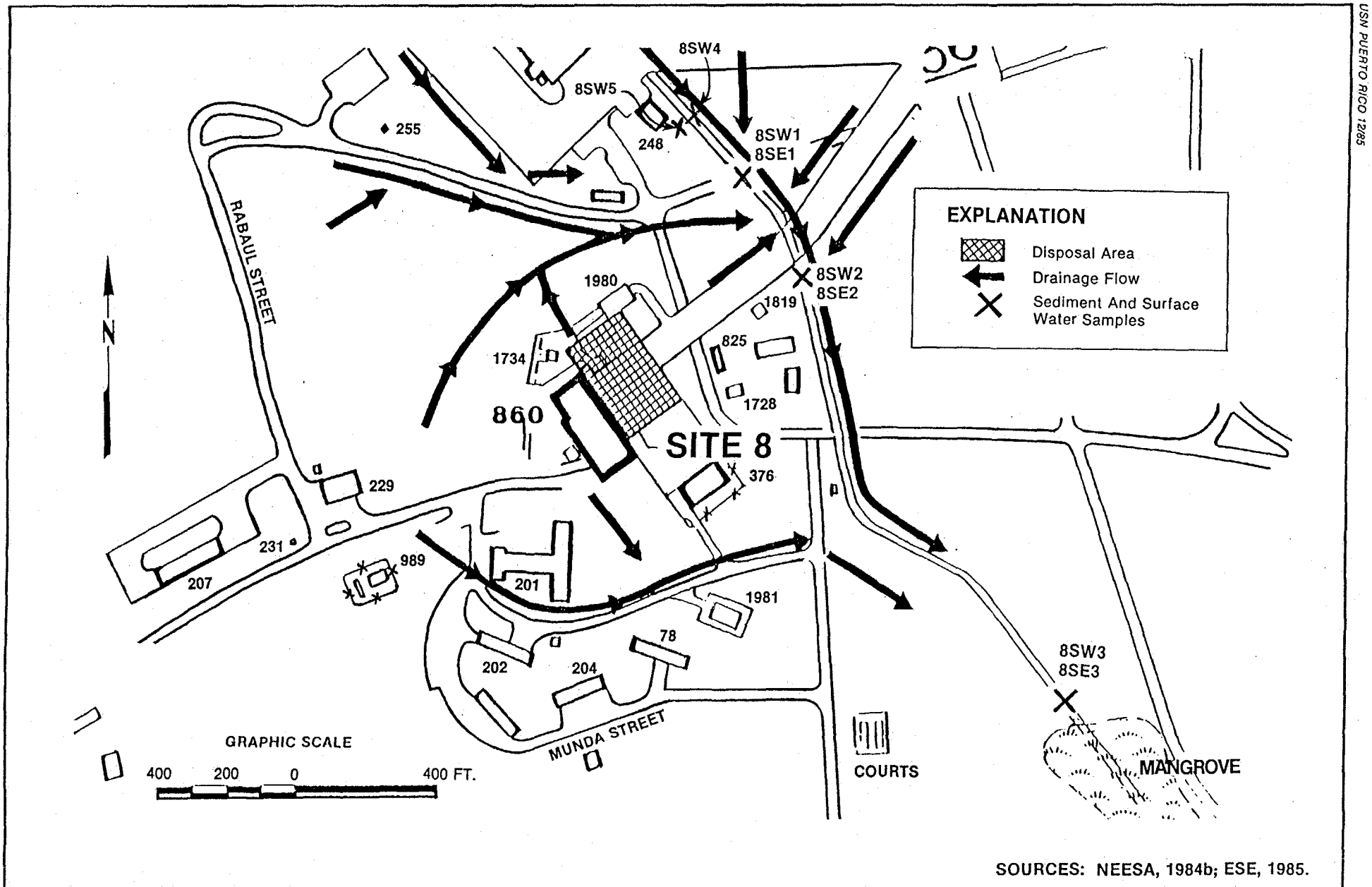

SOURCES: NEESA, 1984b; ESE, 1985.

Figure 2-10
PROPOSED SAMPLING LOCATIONS AT SITE NO. 8, DRONE WASHDOWN

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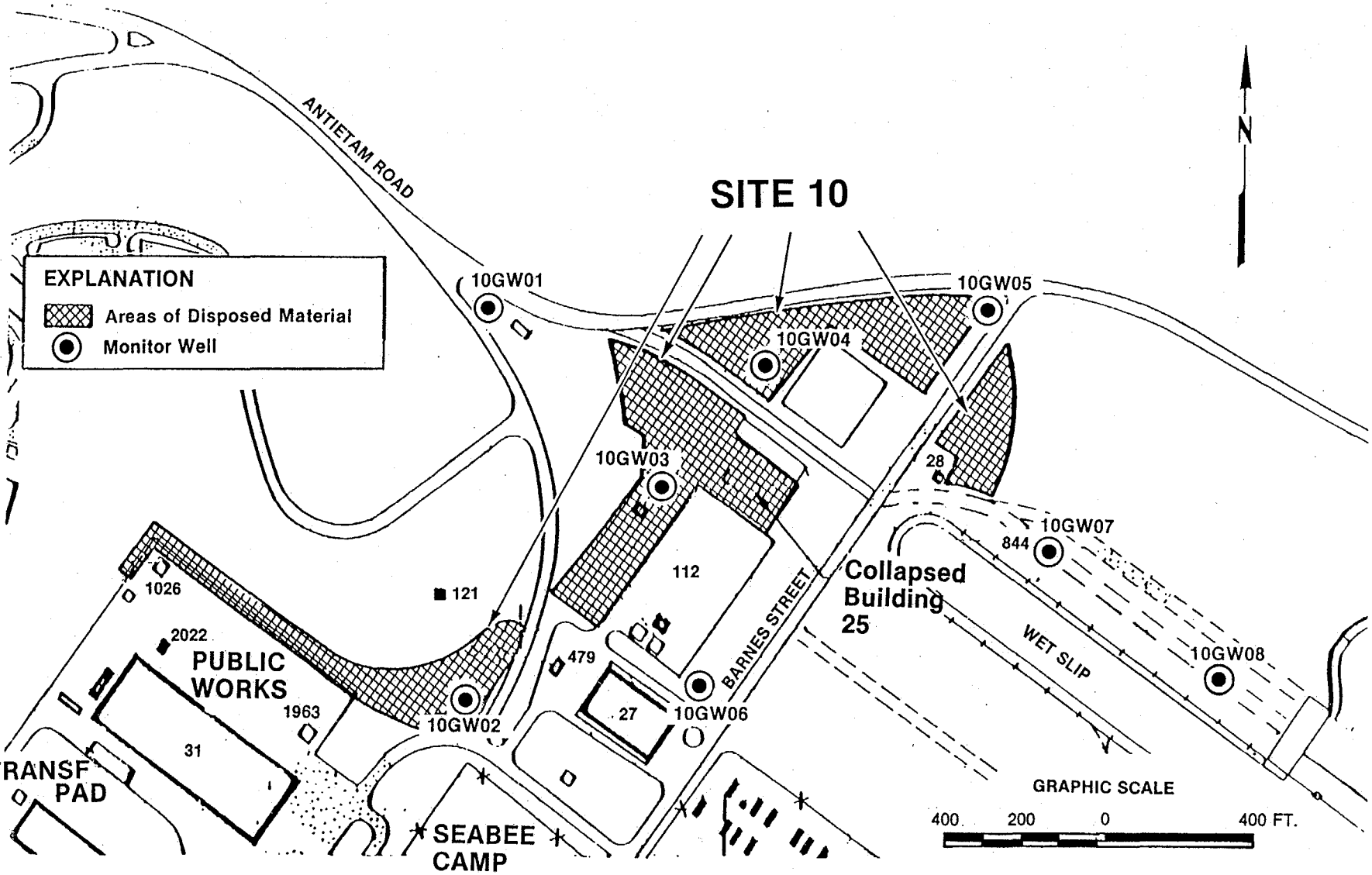

SOURCES: NEESA, 1984b; ESE, 1985.

Figure 2-11
PROPOSED SAMPLING LOCATIONS AT SITE NO. 10, BUILDING 25 STORAGE AREA

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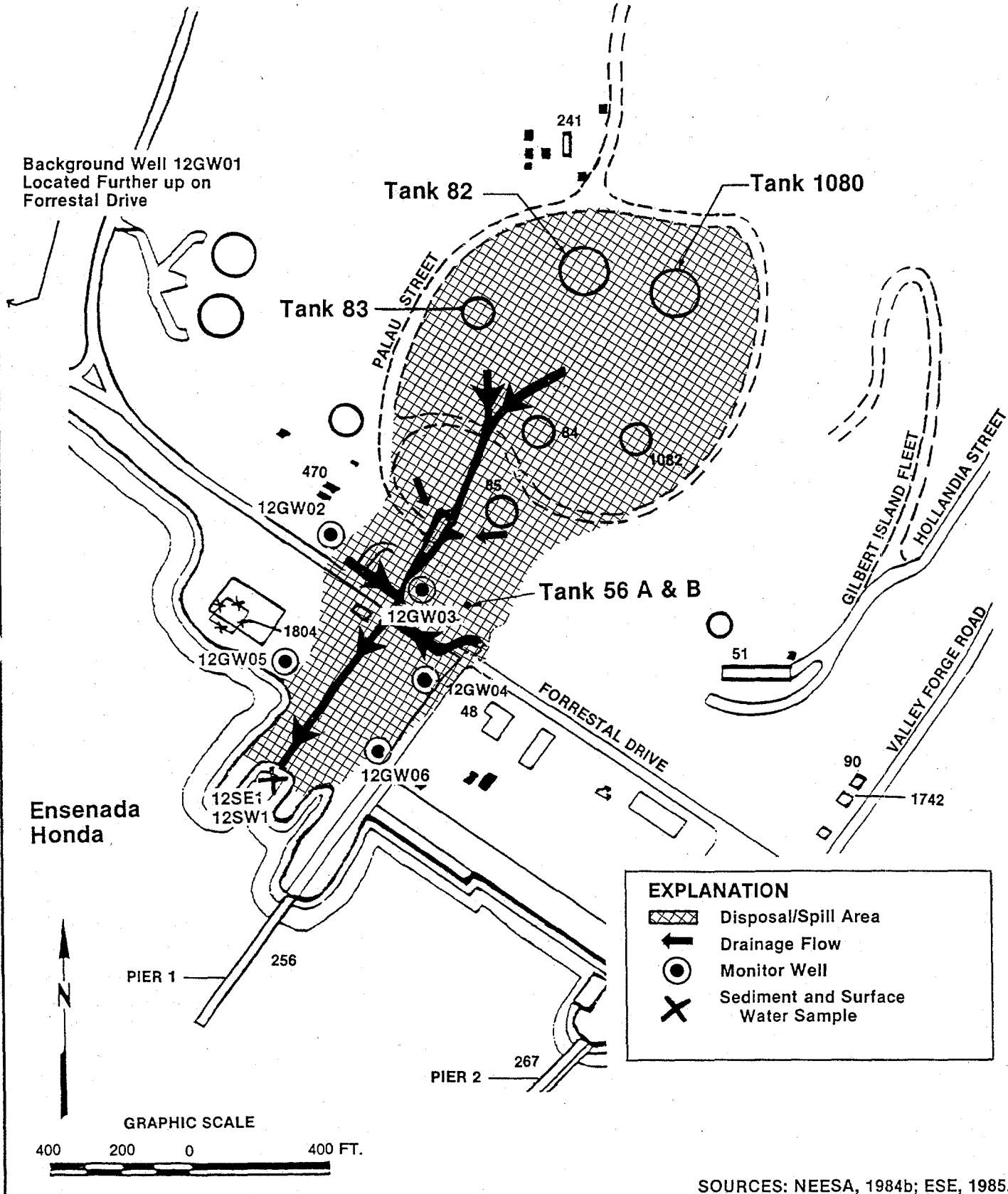

SOURCES: NEESA, 1984b; ESE, 1985.

Figure 2-12
PROPOSED GROUND WATER, SURFACE WATER, AND SEDIMENT SAMPLING LOCATIONS AT SITE NO. 12 TOW WAY ROAD FUELS FARM

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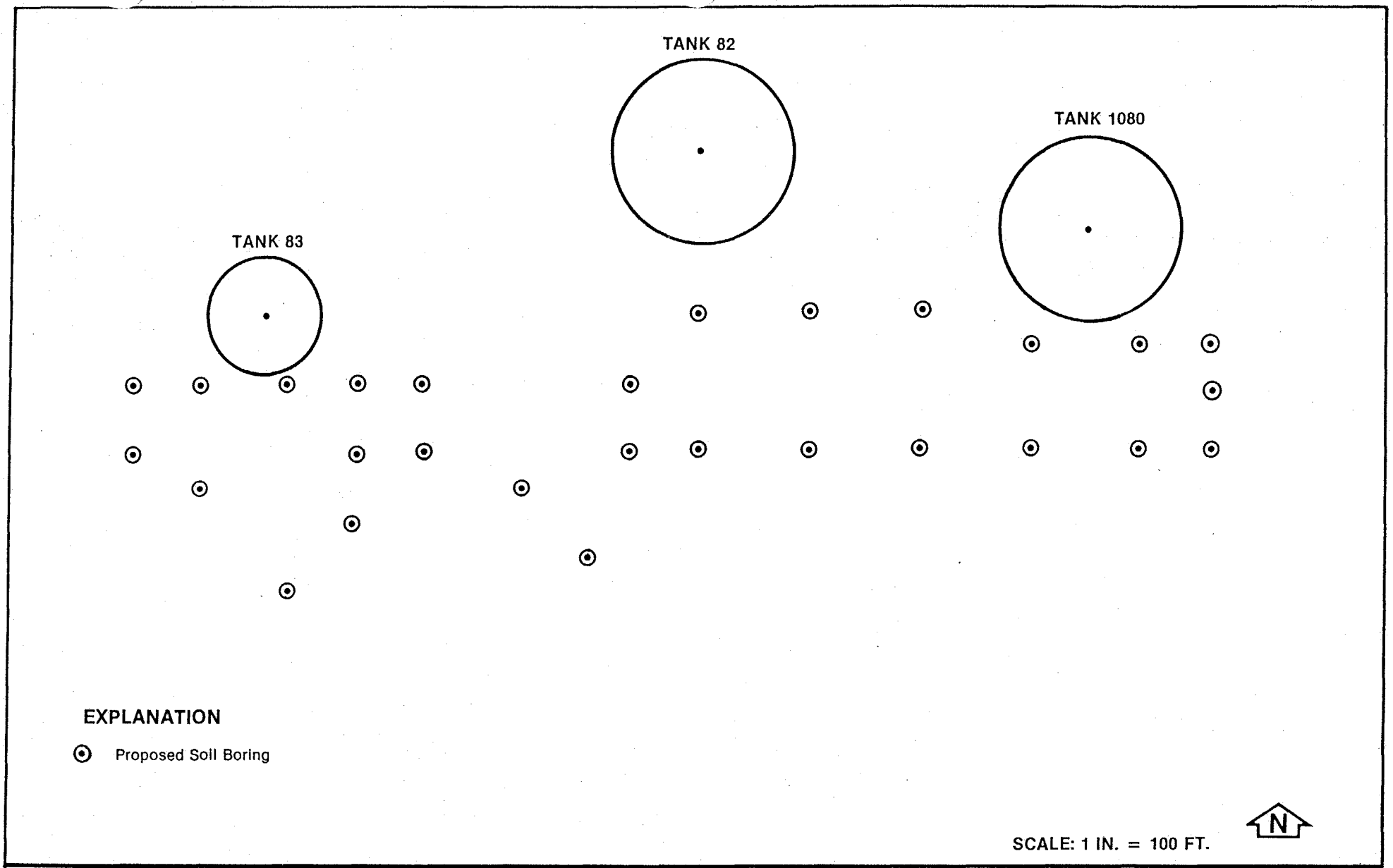

Figure 2-13
PROPOSED SOIL BORING LOCATIONS AT SITE 12, TOW WAY ROAD FUELS FARM

SOURCE: ESE, 1986.

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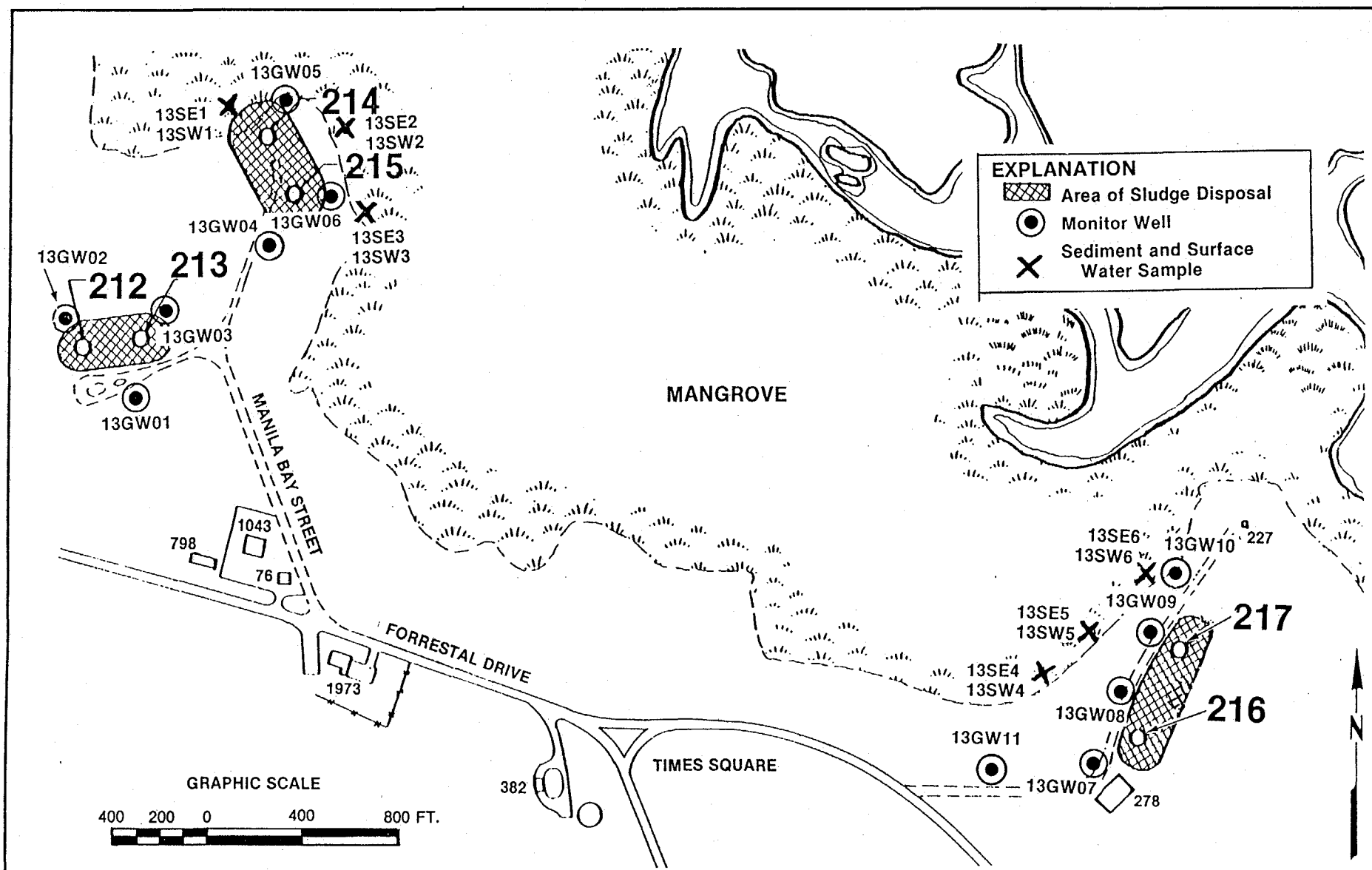

SOURCES: NEESA, 1984b; ESE, 1985.

Figure 2-14
PROPOSED SAMPLING LOCATIONS AT SITE NO. 13, TANKS 212 TO 217

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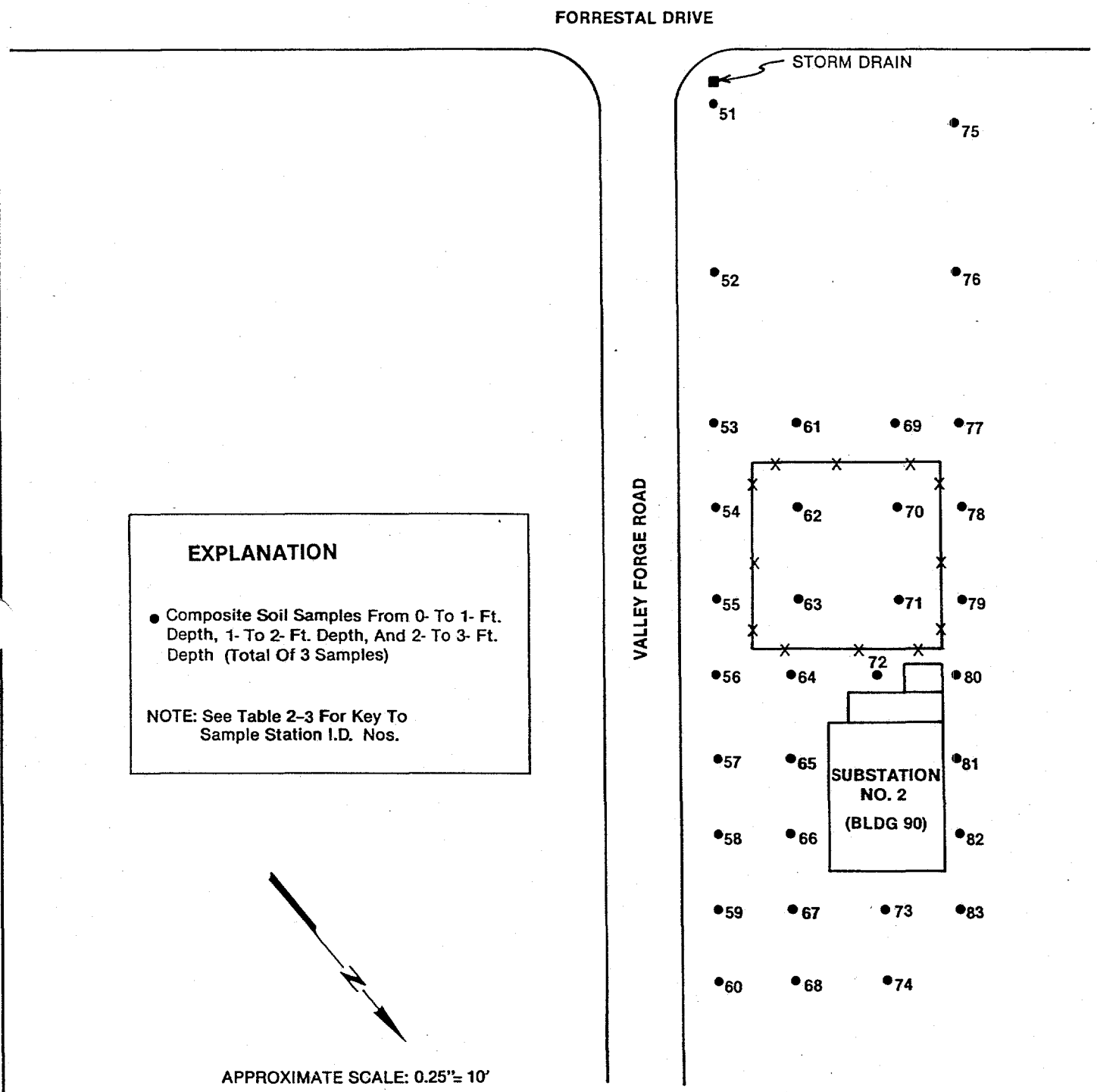

Figure 2-15
PROPOSED SAMPLING LOCATIONS AT SITE NO. 15, SUBSTATION 2

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Table 2-3. Key to Soil Sample Station Identification Numbers at Site No. 15, Substation 2

Sample Point No.	Sample Station I.D. No.
51	15S17
52	15S18
53	15S19
54	15S20
55	15S21
56	15S22
57	15S23
58	15S24
59	15S25
60	15S26
61	15S27
62	15S28
63	15S29
64	15S30
65	15S3
66	15S4
67	15S31
68	15S32
69	15S33
70	15S34
71	15S35
72	15S2
73	15S8
74	15S36
75	15S37
76	15S38
77	15S39
78	15S40
79	15S41
80	15S6
81	15S42
82	15S43
83	15S44

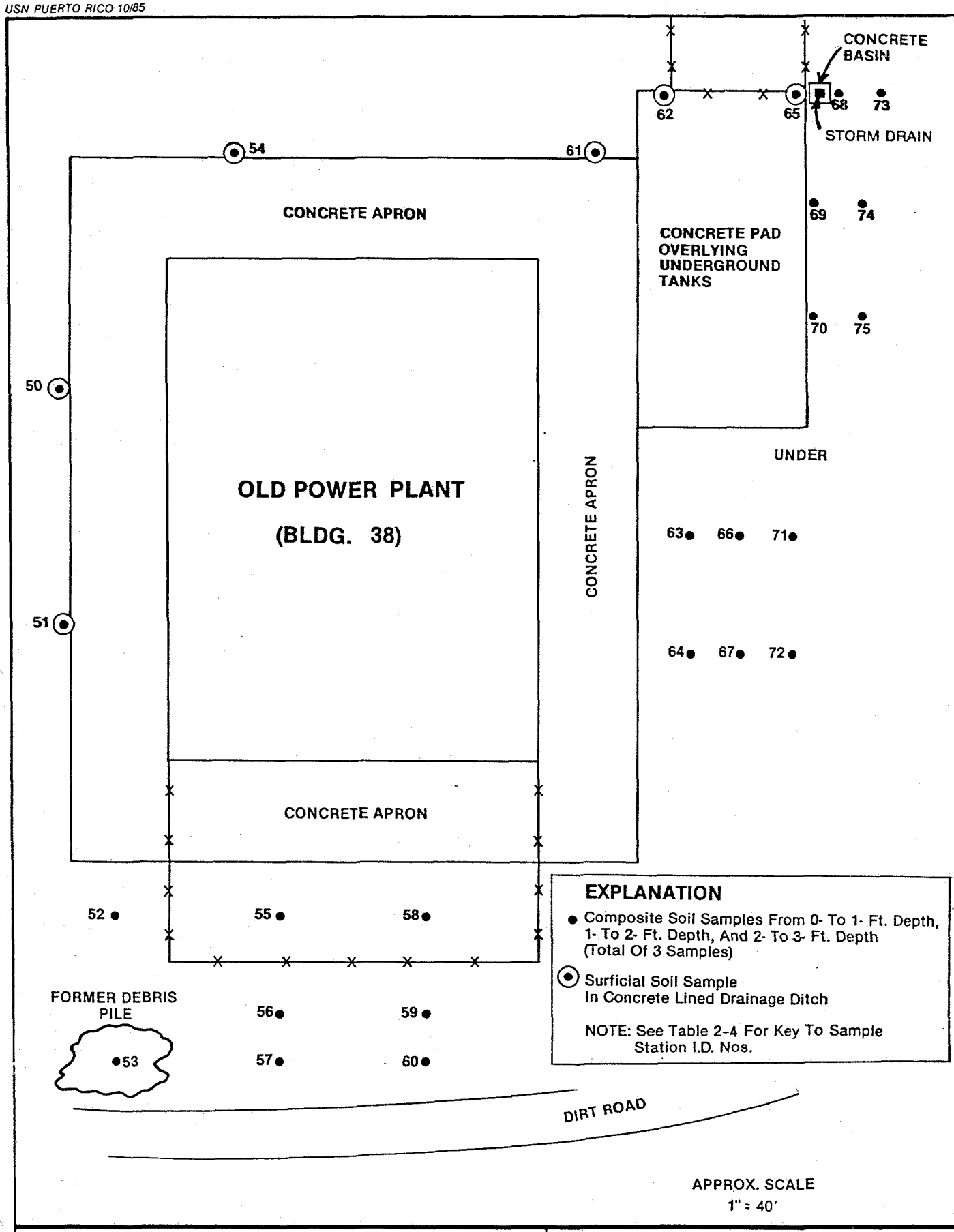

Figure 2-16
PROPOSED SAMPLING LOCATIONS AT SITE NO. 16, OLD POWER PLANT, BUILDING 38

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PUERTO RICO

Table 2-4. Key to Soil Sample Station Identification Numbers at Site No. 16, Old Power Plant, Building 38

Sample Point No.	Sample Station I.D. No.
50	16S10
51	16S11
52	16S12
53	16S13
54	16S14
55	16S15
56	16S16
57	16S17
58	16S18
59	16S19
60	16S20
61	16S21
62	16S7
63	16S22
64	16S23
65	16S9
66	16S24
67	16S25
68	16S26
69	16S27
70	16S28
71	16S29
72	16S30
73	16S31
74	16S32
75	16S33

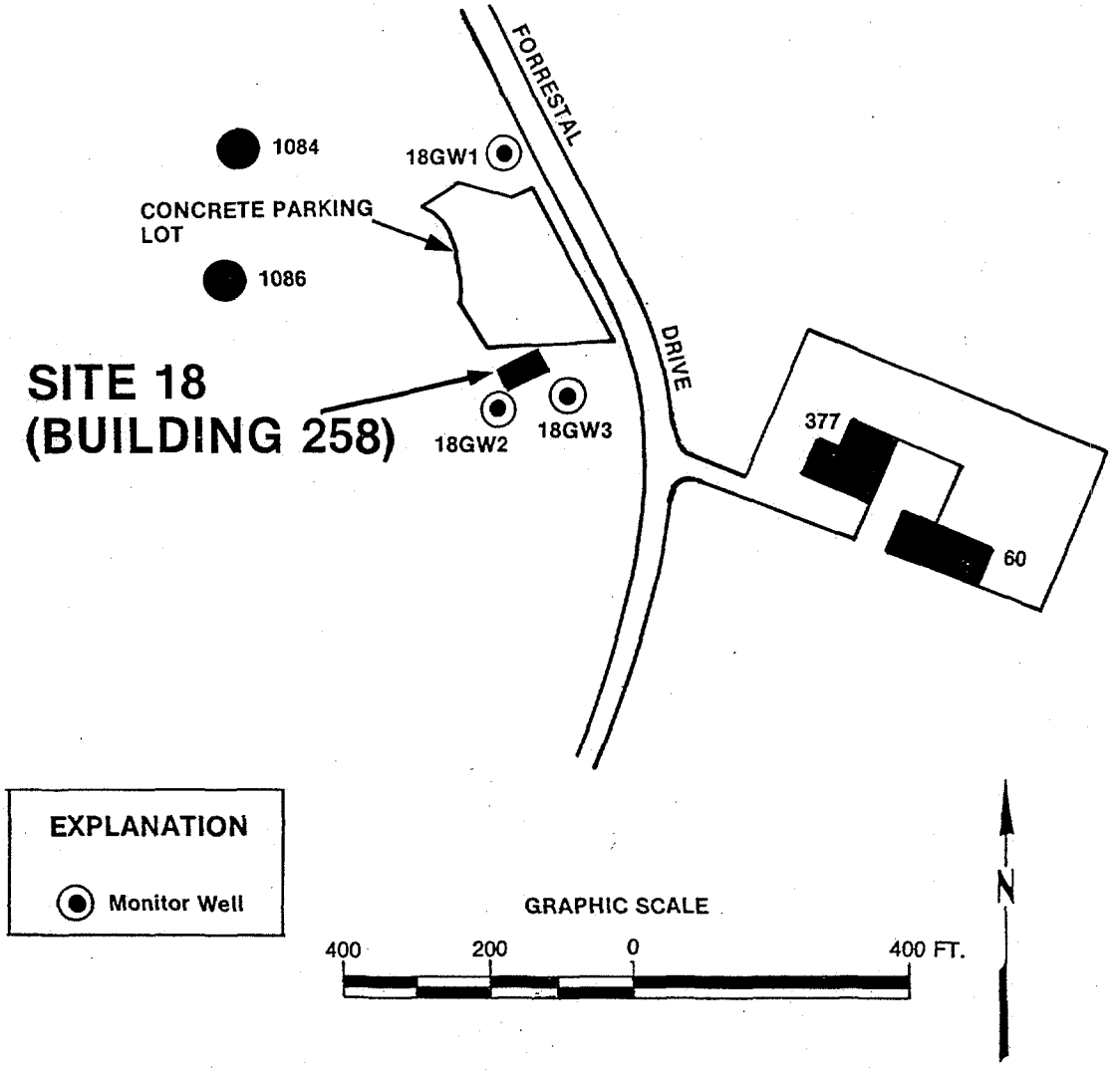

Figure 2-17
PROPOSED GROUND WATER SAMPLING LOCATIONS AT SITE NO.18, PEST CONTROL SHOP

CONFIRMATION STUDY
U.S. NAVAL COMPLEX
PUERTO RICO

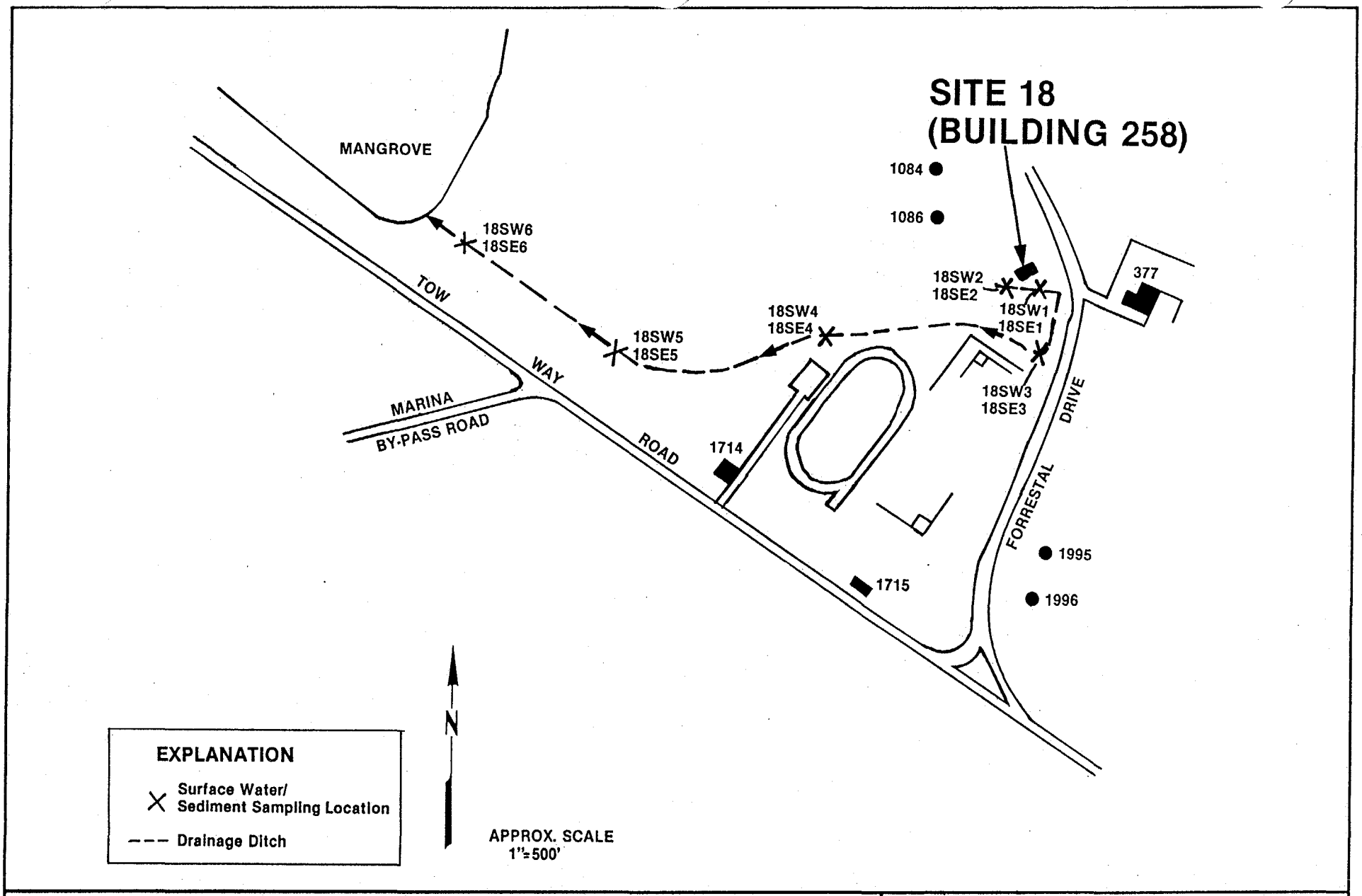

Figure 2-18
PROPOSED SURFACE WATER AND SEDIMENT SAMPLING LOCATIONS AT SITE NO.18, PEST CONTROL SHOP

CONFIRMATION STUDY
U.S. NAVAL COMPLEX
PUERTO RICO

USN PUERTO RICO 10/85

3. Well Development: Following the installation of ground water monitor wells, each well will be developed by vigorous pumping until the water is clear and free from sediment. All water removed from the well during development will be allowed to seep back into the ground at each drill site. Small hand-dug trenches/pits may be used to collect water to allow it to seep into the ground. Proper well development will assure the collection of representative ground water samples during the subsequent sampling activities.

4. Surveying: Surveying will be performed to provide approximate vertical and horizontal locations of all monitor wells and to determine ground water elevations in each well. Elevation data will be related to a common reference datum where possible, and existing benchmarks will be used wherever feasible. In the absence of a common reference datum, the site wells will be related to a relative datum established at the site. Elevations of wells will be reported at the top of the well casing, with the cap off. All well locations will be plotted on existing base maps and described relative to fixed landmarks.

5. Soil Boring/Sampling: As shown in Table 2-1, soil boring and sampling will be conducted at Sites 6, 12, 15, and 16 at NAVSTA Roosevelt Roads. Table 2-2 shows the number of soil borings to be augered at each of the sites and the number of samples to be collected from each. Figures 2-8, 2-13, 2-15, and 2-16 show the proposed soil sample locations. Hand augering and sampling of soils for analysis at Sites 6, 15, and 16 will be performed. The drill rig will be used to drill the borings at Site 12 to investigate potential

subsurface fuel contamination.

6. Water Quality/Sediment Sampling: Ground water, surface water, and sediment samples will be collected and analyzed. The number and the types of samples to be collected from each site, and the analytical constituents for each are presented in Table 2-1. The ground water, surface water, and/or sediment sampling locations are shown in Figures 2-3 through 2-7, 2-9 through 2-12, 2-14, 2-17, and 2-18.

7. Preliminary Characterization: Perform a remedial action alternatives analysis for the PCB-contaminated soil at Sites 15 and 16. This analysis will include an evaluation of a minimum of four remedial action alternatives. The alternatives analysis will be based on the Preliminary Characterization sampling and analysis results. Several cleanup levels for the PCB contaminated soil will be addressed in the analysis including 50 parts per million (ppm), PCB, 1 ppm, PCB, and background PCB concentration.

8. Update and Revise Remedial Action Performance Work Statement: A site reconnaissance of Sites 6, 7, 10, and 11 at NAVSTA Roosevelt Roads will be conducted to gather information needed to update the Remedial Response Plan Performance Work Statement (PWS) developed as part of Round 1 of the Verification Step. In addition, the PWS will be revised in accordance with new guidance from Naval Facilities Engineering Command Atlantic Division.

9. Site Specific Operations: The main point of contact for the onsite investigation of NAVSTA Roosevelt Roads and NAF Vieques is Felix Mestey, Public Works Department, Environmental Engineering Division

(Telephone No. 809/865-2000, ext. 2507). The ESE field team will maintain frequent communications with these points of contact to ensure that the daily location of the ESE field team is known throughout the onsite investigations. Prior to initiating any drilling activities at NAVSTA Roosevelt Roads and NAF Vieques, the ESE field team would contact Rafael Acevedo, Engineering Branch Manager of the Public Works Department (Telephone No. 809/865-2000, ext. 4156/3048) to obtain information regarding the presence of any underground utilities which may be in the vicinity of the drilling site.
In addition to the overall points of contact identified, site-specific information concerning sampling activities, ground water monitor well installation, site access, and other required points of contact for each site are presented in the subsequent paragraphs.

Site 1, NAF Vieques--As shown in Tables 2-1 and Figure 2-3, three ground water monitor wells (1GW01 - 1GW03) will be sampled.

Site 2, NAF Vieques--As shown in Tables 2-1 and 2-2 and Figure 2-4, surface water and sediment samples will be collected from Site 2.

Site 3, NAF Vieques--As shown in Table 2-1 and Figure 2-5, a sample of ground water will be collected from the existing well at Site 3 (3PW01).

Site 5, NAVSTA Roosevelt Roads--As shown in Tables 2-1 and 2-2, and Figure 2-6, five ground water monitor wells (5GW01 - 5GW05) will be sampled, and samples of surface water and sediment will also be collected at Site 5.

Site 6, NAVSTA Roosevelt Roads--As shown in Tables 2-1 and 2-2, and Figures 2-7 and 2-8, surface water, sediment, and soil samples will be collected at Site 6. In addition, one ground water monitor well will be installed and sampled.

Site 7, NAVSTA Roosevelt Roads--As shown in Tables 2-1 and Figure 2-9, two monitor wells (R7GW03 and R7GW04) will be installed, and eight monitor wells (7GW01 - 7GW08) will be sampled. Because four of the eight wells to be sampled at Site 7 are within the fenced landfill area, the ESE field team will coordinate with the landfill operating contractor personnel in the landfill dispatcher office located on the first floor of the east corner of the Public Works building (Building 31) to gain access to the landfill and to avoid interference with the landfill operation.

Site 8, NAVSTA Roosevelt Roads--As shown in Tables 2-1 and 2-2 and Figure 2-10, surface water and sediment samples will be collected at Site 8.

Site 10, NAVSTA Roosevelt Roads--As shown in Table 2-1 and Figure 2-11, eight ground water monitor wells (10GW01 - 10GW08) will be sampled at Site 10.

Site 11, NAVSTA Roosevelt Roads--No sampling will be conducted at Site 11, but a thorough site reconnaissance will be performed to gather information required to update the remedial response action PWS.

Site 12, NAVSTA Roosevelt Roads--As shown in Tables 2-1 and 2-2 and Figures 2-12 and 2-13, six ground water monitor wells (12GW01 - 12GW06) will be sampled, and surface water and sediment samples will also be collected for analysis. In addition, test borings will be performed at Site 12 to investigate possible fuel contamination. The test borings will be drilled in two separate areas at Site 12; up on the side of hill near the fuel storage tanks, and down near the shore in the vicinity of monitor well 12GW06. Figure 2-13 shows the proposed locations for the 28 test borings near the fuel storage tanks. In addition to these 28 borings, 24 borings will be drilled in the vicinity of well 12GW06. These 24 borings will be located on a 50-foot grid system with well 12GW06 being located in the center of the grid system. However, the locations of the borings may be modified in the field by the project geologist depending on the contamination encountered and the suspected path of contaminant migration. Modifications of the boring locations will be discussed with the ESE project manager and the NAVFAC Engineer In Charge, prior to drilling. The ESE field team will coordinate all field activities at

Site 12 with Senior Chief Burchette of the Fuels Division (Telephone No. 809/865-2000, ext. 5971/ 0073) to gain site access and to avoid damaging underground fuel pipeline and interfering with the tank farm operations. In addition, as a safety precaution, the Fire Department (Telephone No. 809/865-2000, ext. 4333) will be notified by the ESE field team prior to initiating field activities at Site 12.

Site 13, NAVSTA Roosevelt Roads--As shown in Table 2-1 and Figure 2-14, eleven ground water monitor wells (13GW01 - 13GW11 will be sampled, and surface water and sediment samples will be collected for analysis. As with Site 12, the ESE field teams will coordinate with the Fuels Division and the Fire Department prior to initiating field activities at Site 13.

Site 15, NAVSTA Roosevelt Roads--As shown in Tables 2-1 and 2-2 and Figure 2-15, soil samples will be collected at Site 15 for analysis.

Site 16, NAVSTA Roosevelt Roads--As shown in Tables 2-1 and 2-2 and Figure 2-16, soil samples will be collected for analysis.

Site 18, NAVSTA Roosevelt Roads--As shown in Tables 2-1 and 2-2 and Figures 2-17 and 2-18, surface water and sediment samples will be collected at Site 18. In addition, three gound water monitor wells will be installed and sampled.

2.1.3 EVALUATION AND REPORTS

1. Monthly Progress Reports: A brief progress report will be submitted to the EIC by the 15th day of each calendar month for the duration of the contract.

2. Evaluation and Presentation of Verification Step Round 2 Results: All laboratory analytical results and field investigation data will be evaluated and presented to the EIC in the Confirmation Study Round 2 report. The evaluation will consist of a comparison of the analytical data with existing water quality criteria [primarily U.S. Environmental Protection Agency (EPA) 1980 Water Quality Criteria, Federal Register, 45(231) and EPA health advisories] to determine if water quality criteria are being violated. Based on this evaluation, ESE will develop recommendations for the third round of sampling of the Verification Step of the Confirmation Study. If the analytical data indicates the presence of an imminent hazard to human health or the environment, ESE will immediately notify the EIC.

3. Preliminary Characterization Report: The results of the Preliminary Characterization sampling and analysis program for Sites 15 and 16 will be presented in the Preliminary Characterization report. A separate report will be prepared for each site. The reports will also present the results of the remedial action alternatives analysis including cost estimates for the various alternatives evaluated.

4. Remedial Response Action PWS: The PWS will be updated and revised for Sites 6, 7, 10, and 11 at NAVSTA Roosevelt Roads to include site access; waste container staging, segregation, and overpacking; sampling and analysis; decontamination procedures and equipment; offsite disposal of wastes; and a site safety/ contingency plan.

2.2 PROJECT SCHEDULE

The project schedule for each task is presented in Figure 2-19. Throughout the course of the project, ESE will routinely contact the EIC to report the project status and any adjustments to the schedule.

2.3 PROJECT ORGANIZATION

2.3.1 ESE

ESE will be responsible for providing all personnel, material, and equipment necessary to complete the study. Persons in responsible positions on the project staff have extensive experience and expertise in their area(s) of involvement, which include geohydrologic investigations, contamination assessments, remedial engineering, and site safety for hazardous waste disposal sites. ESE's responsibilities include the development of and adherence to an appropriate safety/ contingency plan to protect contractor and Government personnel. Key ESE project personnel are listed in Table 2-5, along with pertinent identification information.

2.3.2 CARIBBEAN SOIL TESTING COMPANY, INC. (CST)

As a subcontractor to ESE, CST will be responsible for performing all drilling operations associated with the installation of ground water monitor wells and test borings.

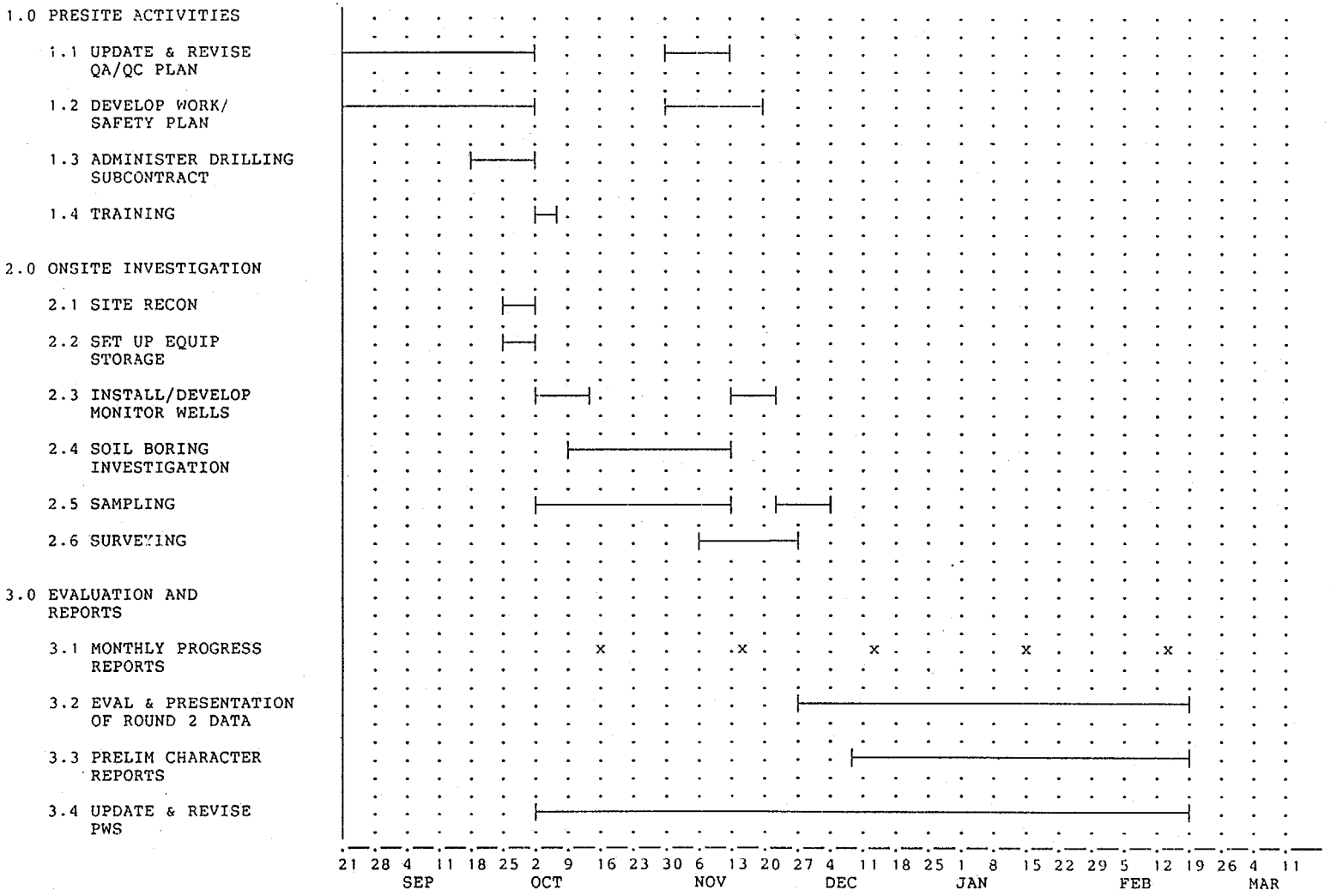

FIGURE 2-19
NAVSTA ROOSEVELT ROADS CONFIRMATION STUDY ROUND 2 SCHEDULE

Table 2-5. ESE Project Personnel

NAME	TITLE	FREQUENCY ON SITE	DATE OF BIRTH	SOCIAL SECURITY NO.	TELEPHONE NO.	MEDICAL EXAMINATION (WITHIN THE LAST YEAR)*
LOUIS J. BILELLO	PROJECT DIRECTOR	PERIODIC	8/15/47	064-40-9730	904/332-3318+ (809/865-2507)**	YES
RUSSELL V. BOWEN	PROJECT MANAGER	PERIODIC	10/24/51	265-13-9004	916/924-5997+ (809/865-2507)	YES
GABRIELLE E. BENIGNI	PROJECT GEOLOGIST	DAILY	11/14/60	266-45-1969	904/739-2007+ (809/865-2507)	YES
ROBERT R. BURKS, JR.	FIELD TEAM LEADER/ SITE SAFETY OFFICER	DAILY	2/21/58	245-96-1097	813/873-1745+ (809/865-2507)	YES
CYNTHIA S. EVANS	PROJECT GEOLOGIST	DAILY	6/8/59	247-33-0539	813/873-1745+ (809/865-2507)	YES
KAY L. WINSLOW	TEAM GEOLOGIST	DAILY	8/10/61	226-02-2689	813/873-1745+ (809/865-2507)	YES

*VERIFICATION OF MEDICAL RECORDS ON FILE WITH: PERSONNEL OFFICE
ENVIRONMENTAL SCIENCE AND ENGINEERING, INC.
GAINESVILLE, FL 32602
904/332-3318

ENVIRONMENTAL SCIENCE AND ENGINEERING, INC.
FELIX MESTEY
BLIC WORKS DEPARTMENT, NAVSTA ROOSEVELT ROADS

SOURCE: ESE, 1987.

CST personnel will be required to adhere to the Safety/Contingency Plan, as directed by the ESE Project Geologist, and will receive onsite specific training as needed by the ESE Project Geologist. CST personnel assigned to this project are listed in Table 2-6, along with pertinent identification information.

2.3.3 U.S. NAVY PERSONNEL

Primary contacts at Naval Facilities Engineering Command, Atlantic Division (LANTNAVFACENGCOM) and NAVSTA Roosevelt Roads involved in this project are listed in Table 2-7.

Table 2-6. CST Project Personnel

NAME	TITLE	FREQUENCY ON SITE	DATE OF BIRTH	SOCIAL SECURITY NO.	TELEPHONE NO. U.S. NAVAL COMPLEX, PUERTO RICO	MEDICAL EXAMINATION (WITHIN THE LAST YEAR)*
ENRIQUE AYALA	FOREMAN	DAILY	05/13/30	582-30-2775	809/753-0147+ (809/865-2000) EXT. 2507)**	YES
CARLOS CALDERON	LABORER	DAILY	01/08/58	582-98-4890	809/753-0147 (809/865-2000) EXT. 2507)	NO
JUAN A. CALDERON	LABORER	DAILY	12/20/59	583-72-4417	809/753-0147 (809/865-2000) EXT. 2507)	NO
PABLO ANDINO	FOREMAN	DAILY	03/02/51	583-26-9798	809/753-0147 (809/865-2000) EXT. 2507)	NO
GILBERTO BAEZ	LABORER	DAILY	07/11/60	581-27-9455	809/753-0147 (809/865-2000) EXT. 2507)	NO
HECTOR BAEZ	LABORER	DAILY	07/23/65	581-27-9242	809/753-0147 (809/865-2000) EXT. 2507)	NO
JOSE RAMON PADRO	MECHANIC	DAILY	01/28/43	581-82-0999	809/753-0147 (809/865-2000) EXT. 2507)	NO
ISRAEL R. VAZQUES	CIVIL ENGINEER	PERIODIC	03/09/58	581-13-3944	809/753-0147 (809/865-2000) EXT. 2507)	NO
CARLOS R. MOLINA	ENGINEER/ GEOLOGIST	PERIODIC	01/16/57	581-02-1908	809/753-0147 (809/865-2000) EXT. 2507)	YES
ALFONSO V. CASTILLO	CIVIL ENGINEER	PERIODIC	11/11/52	583-52-1118	809/753-0147 (809/865-2000) EXT. 2507)	YES
LEONCIO CALDERON	LABORER	DAILY	02/14/30	582-28-8805	809/753-0147 (809/865-2000) EXT. 2507)	NO
VICTOR CALDERON	LABORER	DAILY	03/18/57	783-51-6323	809/753-0147 (809/865-2000) EXT. 2507)	NO
ANGELE REYES	LABORER	DAILY	05/14/53	584-58-0909	809/753-0147 (809/865-2000) EXT. 2507)	NO

* VERIFICATION OF MEDICAL RECORDS ON FILE WITH: CARIBBEAN SOIL TESTING COMPANY, INC.
P. O. BOX 3967
SAN JUAN, PUERTO RICO 00936
809/753-0147

+ CARIBBEAN SOIL TESTING COMPANY, INC.
**FELIX MESTEY
PUBLIC WORKS DEPARTMENT
NAVSTA ROOSEVELT ROADS

SOURCE: ESE, 1987.

Table 2-7. U. S. Navy Personnel

Name	Title	Involvement	Telephone No.
Jerry Wallmeyer	Environmental Engineer	EIC	804/445-1814
Felix Mestey	Environmental Engineer, Public Works Department	NAVSTA Roosevelt Roads and NAF Vieques--Main Point of Contact	809/865-2000 ext. 2507
Rafael Acevedo	Engineering Branch Manager, Public Works Department	NAVSTA Roosevelt Roads and NAF Vieques-Well Locations and Underground utilities.	809/865-2000 ext. 4156/ 3048
Sr. Chief Burchette		NAVSTA Roosevelt Roads--Sites 12 and 13 Field Activities	809/865-2000 ext. 5971/ 0073

3.0 SAFETY PLAN

3.1 PROJECT DESCRIPTION

ESE will provide sampling and analytical services to determine the extent of contamination that may have resulted from past disposal operations, spills, or leaks at Naval Station (NAVSTA) Roosevelt Roads, Puerto Rico and Naval Ammunition Facility (NAF), Vieques.

Ground water monitor wells will be installed, and sampling will include soil, sediments, ground water, and surface water to confirm or refute the presence of contamination. If contamination is detected, additional sampling and analysis will be conducted to further define the extent of contamination. Once evaluations based on the site investigation are completed, recommendations on future remedial action will be made.

3.2 RESPONSIBILITY AND ORGANIZATION

The purpose of the Safety Plan is to protect all personnel and the surrounding environment during investigative activities at NAVSTA Roosevelt Roads and NAF Vieques and to satisfy Occupational Safety and Health Administration (OSHA) requirements. The plan includes procedures and preventive measures that will protect human health and the environment from the hazards of metal, acid, and toxic organic compound exposure and from fire, explosion, and mechanical hazards which may exist during field and laboratory activities.

The corporate safety policy of ESE requires that a safety plan be implemented to protect all individuals and the environment.

It is the responsibility of each member of the investigative team, including all subcontractor personnel, to conform to and comply with all aspects of this safety program. All personnel must regard and conduct themselves as members of the "safety team" and adhere to the prescribed site Safety Plan. The senior ESE person onsite is responsible for enforcing strict adherence to the plan.

The "buddy system" is a key element of this plan and requires that all activities at the site be conducted using a minimum of 2-person teams.

Overall responsibility for safety during the site investigation and laboratory activities rests with the Project Manager, Russell Bowen. His responsibilities include:

1. Preparing an effective site safety plan for the project, that satisfies OSHA requirements;
2. Categorizing and identifying the project staff as to the levels of potential exposure to dangerous levels of hazardous materials;
3. Assuring that adequate and appropriate safety training and equipment are available for project personnel;
4. Arranging for medical examinations for specified project personnel; and
5. Designating a Site Safety Officer.

The responsibilities of the Site Safety Officer, Robert Burks, Jr., include:

1. Implementing all safety procedures and operations onsite;

2. Updating equipment or procedures based upon new information gathered during site inspections and monitoring;
3. Upgrading or downgrading (with approval of the Project Manager) the levels of personnel protection based upon site observations;
4. Determining and posting locations and routes to medical facilities, including poison control centers, and arranging emergency transportation to medical facilities (as required);
5. Notifying (as required) local public emergency officers (i.e., police and fire departments) of the nature of the team's operations, and making emergency telephone numbers available to all team members;
6. Observing work party members for symptoms of exposure or stress; and
7. Arranging for the availability of emergency medical care and first aid onsite, as necessary.

The Site Safety Officer has the ultimate responsibility to stop any operation that threatens the health and safety of the team or surrounding populace or causes significant adverse impact to the environment.

In the absence of Robert Burks during the onsite investigation, the Field Geologist, Cynthia Evans, will serve as the Site Safety Officer.

It is the responsibility of all other onsite personnel:

1. To comply with all aspects of the Project Safety Plan, including strict adherence to the "buddy system;"

2. To obey the orders of the Site Safety Officer; and
3. To notify the Site Safety Officer of hazardous or potentially hazardous incidents or working situations.

3.3 GENERAL SAFETY RULES

3.3.1 ONSITE SAFETY

In addition to the specific requirements of the Project Safety Plan, common sense should prevail at all times. The following general safety rules will be in effect at the site.

1. Each sample must be treated as though it were toxic and hazardous;
2. Unauthorized personnel are not permitted at the work sites or within 50 feet of drilling equipment, and Base Security will be asked to remove violators upon failure to heed a verbal request to vacate the site;
3. To reduce contact between the hands and mouth, all smoking, eating, and drinking will be strictly prohibited in the work area;
4. Persons with beards or other facial hair that interferes with respirator fit are not permitted within the site boundaries when conditions require respiratory protection. A respirator program shall be in place in accordance with 29 CFR 1910.134 for all activities requiring respirators.
5. Persons with long hair and/or loose fitting clothing which could become entangled in drilling equipment are not permitted in the work area;
6. All personnel should avoid unnecessary contact with contaminated soil and water;
7. All personnel should avoid any contact between their hands and mouths until they are thoroughly

decontaminated;

8. Horseplay is prohibited;
9. Use of alcohol, narcotics, or controlled substances while working is prohibited;
10. Firearms, ammunition, fireworks, and explosives are prohibited; and
11. Approved and appropriate safety equipment, as specified in the Project Safety Plan, such as eye protection, hardhats, foot protection, gloves and respirators, must be worn in areas where required by the Safety Plan. In addition, eye protection must be worn when handling acidic, caustic, or other hazardous liquids, such as analytical preservatives.
12. Prior to encountering hazardous materials, all site personnel will be trained in accordance with 29 CFR 1919.1200 (Hazard Communication).

The Site Safety Officer will have the authority to modify the site safety rules when necessitated by onsite conditions.

3.3.2 LABORATORY SAFETY

Samples collected from NAVSTA Roosevelt Roads and NAF Vieques, and shipped to the ESE laboratory for analysis may present a potential for exposure of laboratory personnel to dangerous levels of metals, pesticides, or PCBs. Potentially hazardous samples will be identified as such by the Field Team Leader and appropriately labeled prior to shipment to the laboratory. It is important that the laboratory implement an effective safety plan for handling these materials.

Handling procedures must protect personnel from skin contact with the hazardous materials and offer respiratory protection from airborne concentrations of hazardous samples. At a minimum, all laboratory personnel having direct contact with the hazardous samples must be equipped with:

1. Safety glasses or a face shield to protect from splashes,
2. Impervious gloves, and
3. Rubberized aprons and other chemical protective garments.

Respiratory protection in the form of air-purifying cartridge respirators for acids and dust may be required by the Laboratory Coordinator, Lisa Bare, if airborne exposure to hazardous samples is likely. All operations conducted with unextracted hazardous materials must be performed where there is adequate ventilation. The extraction procedures place the contaminants in a controlled environment.

Due to possibly high concentrations of toxic materials in the contaminated water and soil samples, all laboratory personnel handling these samples:

1. Must not smoke, eat, chew gum, or drink, to avoid contact between their hands and mouths while carrying out laboratory activities;
2. Must thoroughly wash their hands and other potentially exposed skin upon completion of laboratory work; and
3. Must keep the work area and equipment as clean as possible to avoid contamination.

All appropriate safety precautions described in the ESE Laboratory Safety Manual must be followed during laboratory work.

3.4 SITE CHARACTERIZATION AND SITE SAFETY PLAN

A characterization of each site of potential contamination was performed, based on a thorough evaluation of the IAS of NAVSTA Roosevelt Roads (NEESA 13-051, September 1984) and the Verification Step Round 1 sampling results. This site characterization was performed to assess the potential hazards at each site. Based on the site characterization, a Site Safety Plan was prepared to describe various procedures and precautions that will be followed to assure preservation of health and safety during all site activities.

3.4.1 SITE CHARACTERIZATION

The IAS (NEESA 13-051, September 1984) and Verification Step Round 1 report identified 16 sites (13 sites at NAVSTA Roosevelt Roads and 3 sites at NAF Vieques) that may pose a potential threat to human health or the environment due to contamination resulting from past hazardous materials operations. A thorough review of the information presented in the IAS and Verification Step Round 1 report regarding type and estimated quantities of hazardous materials disposed of at each site was conducted to identify the potential hazards that exist in performing the confirmation study. Information contained in the IAS and Verification Step Round 1 reports indicates that many different compounds have been spilled, leaked, or disposed of at the various sites of potential contamination. Possible PCB contamination has been identified at several sites, which could pose a skin absorption problem

or an inhalation problem when present in dust particles. Possible pesticide and herbicide contamination has also been identified at several sites. These compounds affect the nervous system, and many are absorbed through intact skin. Both solutions and dusts containing these compounds are potentially hazardous. Solvents such as trichloroethylene, methyl ethyl ketone, and methyl isobutyl ketone have been reported as possible water contaminants and may be present in drums in a relatively pure state. Skin contact should be avoided, but inhalation is the greatest hazard. Explosives are an obvious hazard to drilling and sampling activities, but are not reasonably expected in any of the test areas.

Additionally, underground fuel leaks have occurred at some of the sites and could pose a fire and/or explosion hazard during drilling activities.

The following Site Safety Plan presents procedures and precautions that will be followed to ensure the protection of human health and the environment during confirmation study activities.

3.4.2 SITE SAFETY/CONTINGENCY PLAN

The Site Safety/Contingency Plan outlines procedures to be used during investigations at uncontrolled hazardous waste sites to minimize the risk of injury or illness resulting from onsite activities. The specific health and safety concerns in this plan deal with chemical and physical hazard exposure during the various phases of the site investigation. The intent is to carry out these duties to the degree that injuries, occupational illnesses, and unwarranted property

losses are prevented, while at the same time ensuring compliance with applicable laws and regulations. Emphasis will be placed on individual awareness, personal protective equipment, and emergency response. In this project, it is expected that the work currently identified will be conducting geophysical studies, installing ground water monitor wells, and collecting samples of ground water, surface water, sediment, and soil from locations of suspected hazardous conditions.

Site Safety Plan

The Site Safety Plan is comprised of the following major sections:

* Personal Protective Clothing and Equipment
* Medical Monitoring
* Site Entry Procedures
* Decontamination Procedures
* Investigation-Derived Material Disposal

Personal Protective Clothing and Equipment--Personnel must wear protective equipment when response activities involve known or suspected atmospheric contamination, when vapors, gases, or particulates may be generated, or when direct contact with skin-affecting substances may occur. Respirators can protect lungs, gastrointestinal tract, and eyes against air toxicants. Chemical-resistant clothing can protect the skin from contact with skin-destructive and absorbable chemicals. Good personal hygiene limits or prevents ingestion of material. Splashes of contaminated materials into the eyes of field team members will result in the use of portable eyewash stations.

Equipment to protect the body against contact with known or anticipated chemical hazards has been divided into four categories according to the degree of protection afforded:

- Level A: Should be worn when the highest level of respiratory, skin, and eye protection is needed.
- Level B: Should be selected when the highest level of respiratory protection, but a lesser level of skin protection, is needed. Level B protection is the minimum level recommended on initial site entries until the hazards have been further defined by onsite studies and appropriate personnel protection utilized.
- Level C: Should be selected when the types of airborne substances are known, the concentrations measured, and the criteria for using air-purifying respirators are met.
- Level D: Should not be worn on any site with respiratory or skin hazards. Is primarily a work uniform providing minimal protection.

The level of protection selected should be based primarily on:

- Types and measured concentrations of chemical substances in the ambient atmosphere and their toxicity.
- Potential or measured exposure to substances in air, splashes of liquids, or other direct contact with material due to work being performed.

In situations where the types of chemicals, their concentrations, and possibilities of contact are not known, the appropriate level of protection must be selected based on professional experience and judgment until the hazards can be

better characterized. Additional guidance for selecting level of protection utilizing air monitoring equipment is presented later in this section. Air monitoring is necessary in all levels of protection to allow immediate upgrade of protection or temporary retreat from the site.

The specifications of protective clothing and equipment associated with each level of protection identified above are listed below:

Level A Protection

Personal Protective Equipment:

- Pressure-demand, self-contained breathing apparatus, approved by the Mine Safety and Health Administration (MSHA) and National Institute of Occupational Safety and Health (NIOSH)
- Fully encapsulating chemical-resistant suit
- Coveralls*
- Long cotton underwear*
- Gloves (outer), chemical-resistant
- Gloves (inner), chemical-resistant
- Boots, chemical-resistant, steel toe and shank (depending on suit construction, worn over or under suit boot)
- Hardhat* (under suit)
- Disposable protective suit, gloves, and boots* (worn over fully encapsulating suit)
- 2-way radio communications

*Optional

Criteria for Selection: Meeting any of these criteria warrants useof Level A protection:

- The chemical substances have been identified and require the highest level of protection for skin, eyes, and the respiratory system based on:

- Measured (or potential for) high concentrations of atmospheric vapors, gases, or particulates, or

- Site operations and work functions involving high potential for splash, immersion, or exposure to unexpected vapors, gases, or particulates

- Extremely hazardous substances (for example: dioxin, cyanide compounds, concentrated pesticides, Department of Transportation Poison "A" materials, suspected carcinogens, and infectious substances) are known or suspected to be present, and skin contact is possible.

- The potential exists for contact with substances that destroy skin.

- Operations must be conducted in confined, poorly ventilated areas until the absence of hazards requiring Level A protection is demonstrated.

- Total atmospheric readings on the Century OVA System, HNU Photoionizer, or similar instruments indicate 500 to 1,000 parts per million (Ppm) of unidentified substances.

Level B Protection

Personal Protective Equipment:

- Pressure-demand, self-contained breathing apparatus (MSHA/NIOSH approved)

Chemical-resistant clothing (overalls and long-sleeved jacket; coveralls; hooded, one or two-piece chemical-splash suit; disposable chemical-resistant coveralls)

- Coveralls*

- Gloves (outer), chemical-resistant

- Gloves (inner), chemical-resistant
- Boots (outer), chemical-resistant, steel toe and shank
- Boots (outer), chemical-resistant (disposable*)
- Hardhat (face shield*)
- 2-way radio communications

*Optional

Criteria for Selection: Meeting any one of these criteria warrants use of Level B protection:

- The types and atmospheric concentrations of toxic substances have been identified and require the highest level of respiratory protection, but a lower level of skin and eye protection. These would be atmospheres:
- With concentrations Immediately Dangerous to Life and Health (IDLH), or
- Exceeding limits of protection afforded by a full-face, air-purifying mask, or
- Containing substances for which air-purifying canisters do not exist or have low removal efficiency, or
- Containing substances requiring air-supplied equipment, but substances and/or concentrations do not represent a serious skin hazard.
- The atmosphere contains less than 19.5 percent oxygen.
- Site operations make it highly unlikely that the small, unprotected area of the head or neck will be contacted by splashes of extremely hazardous substances.
- Total atmospheric concentrations of unidentified vapors or gases range from 5 ppm to 500 ppm on instruments such as the Century OVA or HNU Photoionizer, and vapors are not suspected of containing high levels of chemicals toxic to skin.

Level C Protection

Personal Protective Equipment:

- Full-face, air-purifying, canister-equipped respirator (MSHA/NIOSH approved)
- Chemical-resistant clothing (coveralls; hooded, two-piece chemical splash suit; chemical-resistant hood and apron; disposable chemical-resistant coveralls)
- Coveralls*
- Gloves (outer), chemical-resistant
- Gloves (inner), chemical-resistant*
- Boots (outer), chemical-resistant, steel toe and shank*
- Boots (outer), chemical-resistant (disposable*)
- Hardhat (face shield*)
- 2-way radio communications

*Optional

Criteria for Selection: Meeting all of these criteria permits use of Level C protection:

- Measured air concentrations of identified substances will be reached by the respirator at or below the substance's exposure limit, and the concentration is within the service limit stated on the canister.
- Atmospheric contaminant concentrations do not exceed IDLH levels.
- Atmospheric contaminants, liquid splashes, or other direct contact will not adversely affect the small area of skin left unprotected by chemical-resistant clothing.
- Job functions have been determined not to require self-contained breathing apparatus.

- Total vapor readings register between background and 5 ppm above background on instruments such as the HNU Photoionizer and Century OVA.

- Air will be monitored periodically.

Level D Protection

Personal Protection Equipment:

- Coveralls

- Gloves*

- Boots/shoes, leather or chemical-resistant, steel toe and shank

- Boots (outer), chemical-resistant (disposable*)

- Safety glasses or chemical splash goggles*

- Hardhat (face shield*)

- Escape mask*

*Optional, but should remain onsite for quick access in an emergency.

Criteria for Selection: Meeting any of these criteria allows use of Level D protection:

- No hazardous air pollutants have been measured.

- Work functions preclude splashes, immersion, or potential for unexpected inhalation of any chemicals.

Guidance on Selection Criteria: Level D protection is primarily a work uniform. It can be worn in areas where: (1) only boots can be contaminated, or (2) there are no inhalable toxic substances.

Based on information presented in the IAS and the Verification Step Round 1 report, personnel involved in the sampling and drilling operations during the investigation will wear Level D

protection at the 10 sites at NAVSTA Roosevelt Roads and the 3 sites at NAF Vieques, which will include:

- o Saranex or uncoated Tyvek coveralls (based on site history),
- o Work boots,
- o Disposable boot covers,
- o Disposable gloves,
- o Impervious inner gloves and outer drilling gloves (drillers), and
- o Respirators (full-face, with organic vapor/pesticide cartridges)*.

*Not regularly worn in Level D but must be available for use if air monitoring indicates the need.

Saranex -coated Tyvek coveralls will be substituted for uncoated coveralls during all drilling programs at sites known or suspected to contain explosives, solvents, PCBs, or pesticides. These areas include Sites 1, 2, 5, 7, 10, 12, and 13 at NAVSTA Roosevelt Roads and NAF Vieques.

As mentioned earlier, air monitoring will be conducted during all phases of drilling operations to assess the need for upgrading personnel protection. The criteria described above for each level for protection will be used in decision making regarding the appropriate level of personal protection. The ESE Site Safety Officer will be responsible for air monitoring and assessment of the need for upgrading the level of personal protection. Air monitoring will be performed at each drilling location using an HNU, with a 10.2-electron volt (eV) lamp or the Foxboro OVA. Full-face, air-purifying respirators with

organic vapor/pesticide cartridges will be available and will be used if air monitoring instruments show readings above background levels. Respirators will also be used if visible dusting occurs in the vicinity of the drilling operation at pesticide or PCB sites.

Prior to drilling operations at some of the sites, geophysical surveys will be performed to screen potential drilling locations to prevent drilling into buried objects such as ordnance, gas cylinders, and drums. Techniques to be utilized include: resistivity, magnetometer, and metal detector surveys. Personnel involved in these activities will wear Level D equipment:

- o Tyvek coveralls,
- o Work boots,
- o Disposable boot covers, and
- o Two pairs of disposable gloves.

The same equipment listed above for drilling operations will be used by personnel involved in the collection of surface and ground water, sediment, and soil samples.

In addition to the protective clothing and equipment specified above for conditions normally anticipated for this investigation, an emergency egress pack will be available for each field team member in the event of a major release of toxic gas, vapor, or dust emission. The emergency egress pack will allow field personnel to quickly vacate the area affected by the sudden release.

Medical Monitoring--Medical monitoring of all field personnel involved in this investigation is required to identify potential adverse effects that may result from exposure to toxic substances. The medical monitoring program consists of a baseline medical examination and periodically scheduled surveillance examination. The surveillance examinations are at the discretion of the Site Safety Officer.

The baseline physical examinations shall provide a history of previous exposure and general health status and will serve as a baseline for comparative purposes.

The baseline examinations include the following:

1. Self-administered health history questionnaire as an aid in diagnosis.
2. General physical examination to assess the individual's overall health and current heart and neurological conditions. Specific tests which will be given in this regard include:
   - Chest X-ray
   - Electrocardiogram
   - Stress test
3. Laboratory hematologic analysis to determine liver and blood functions. These clinical tests include a complete blood count with differential, VDRL, thyroid hormone, albumin, alkaline phosphatase, bilirubin-total and iron-serum, lactic acid dehydrogenase, phosphorus, potassium, protein-total, sodium, SGOT, SGPT, triglycerides, urea nitrogen (BUN) and uric acid, hemoglobin, methemoglobin, heavy metals, and pesticide residues.

4. Urinalysis for urine characterization.
5. Pulmonary functions to be measured for determining lung condition. These specific tests include: forced vital capacity, forced volume, max-mid exploratory flow, maximum voluntary ventilation, functional residual volume, residual volume, and total lung capacity.
6. Hearing abilities will be determined through audiometric testing.

Periodic examinations will be performed annually for all personnel participating in the medical monitoring program. Periodic monitoring provides a continuous record of health status and also assists in the early identification of advanced health effects. Periodic surveillance examinations shall include those items which are considered good indicators of acute toxicity. Specifically, these involve the clinical tests listed above for kidney, liver, and blood functions.

Copies of medical records will be kept in personnel files at the office of the person's employer.

Site Entry Procedures--Field personnel should enter sites where drilling operations are underway from an upwind direction, if possible. This practice will avoid obvious contamination and lessen the risk of exposure.

Decontamination Procedures--A portable steam cleaning unit will be used to decontaminate the drill rigs to be used in the investigation. Waste rinse water will be disposed of at the site of potential contamination. Likewise, wash and rinse

water generated by the cleaning of contaminated boots, gloves, other protective clothing, and sampling equipment will be disposed of onsite. Due to the number of sites to be investigated in a short time frame, decontamination stations must be easily mobile and simple (wash-and-rinse basins, heavy duty trash bags for disposable clothing).

Investigation-Derived Material Disposal--Contaminated disposable clothing must be labeled and stored onsite in heavy plastic bags or drums. Disposition of this contaminated material will be determined by the Site Safety Officer.

Contingency Plan

The Contingency Plan is comprised of two major sections: (1) Emergency Communications, and (2) Medical Support. These sections provide critical information required for emergency response related to the following:

- Fire or explosion requiring fire department response
- Serious injury requiring immediate attention
- Any other serious incident requiring rescue, police, fire, or security support from NAVSTA Roosevelt Roads and NAF Vieques.

Emergency Communications--In the event of emergency, the appropriate response resources must be contacted. Pertinent emergency response activities and telephone numbers are listed below:

NAVSTA Roosevelt Roads:

Ambulance	865-2000, ext. 4144 (4144 on base)
Hospital	865-2000, ext. 4133 (4133 on base)
Police	865-2000, ext. 4123 (4123 on base)
Fire Department	865-2000, ext. 4333 (4333 on base)
Explosives Unit	865-2000, ext. 4333 (4333 on base)

Safety Manager (M. Santiago) 809/865-2000 ext. 3010 or 5564.

Vieques:

Ambulance	741-2156
Hospital	741-2341
Police	741-2020
Fire Department	741-2111

In addition, the following emergency contacts are available to lend information and support:

1. Charles Haury, ESE (Industrial Hygiene Manager), 904/332-3318
2. Felix Mestey (Environmental Coordinator, NAVSTA Roosevelt Roads), 809/865-2000, ext. 2507
3. Lt. Saul Alvarez (Industrial Hygienist, NAVSTA Roosevelt Roads).

All field team members should acquaint themselves with the location of the nearest telephone to each site prior to initiation of work. This will help minimize response time in the event of an emergency. In addition, if working at remote areas, a hand-held radio will be used for emergency communications.

In the event of a medical emergency, the U.S. Naval Hospital (NAVSTA Roosevelt Roads), or the Vieques Municipal Hospital (Vieques), will provide medical attention required for stabilizing the injured person prior to transferring to an offpost medical facility. The U.S. Naval Hospital at NAVSTA Roosevelt Roads is located in Building 1790. The Vieques Municipal Hospital is located in the town of Isabel Segunda. For major medical services, the Veterans' Administration Hospital in Rio Piedras is located approximately 12 miles west of NAVSTA Roosevelt Roads.

APPENDIX A
SCOPE OF WORK

SCOPE OF WORK FOR VERFICATION STEP SAMPLING
ROUND TWO, AND PRELIMINARY CHARACTERIZATION EFFORTS
CONTRACT N62470-85B-7972

1. Perform second round verification step sampling at the sites described below. The sampling and analysis recommendations are summarized in Attachment A.

a. Site 6, NAVSECGRUACT Sabana Seca. Sample surface water and sediment from the small creek north of the site in three locations (one upgradient, two downgradient). Analyze samples for priority pollutant pesticides.

b. Site 7, NAVSECGRUACT Sabana Seca. Resample wells 7GW01-7GW04, 7PW01 and 7PW02 and the surface water/sediment sampling location. Analyze samples for priority pollutants.

c. Site 1. Resample wells 1GW01-1GW03; analyze samples for priority pollutants, xylene, MEK, MIBK, EDB, and hexavalent chromium.

d. Site 2. Resample the five surface water and sediment locations. Analyze samples for round one parameters.

e. Site 3. Sample well 3PW01 and analyze sample for priority pollutants.

f. Site 5. Resample wells 5GW01-5GW05 and the five surface water and sediment sampling locations. Analyze samples for round one parameters.

g. Site 6, NAVSTA Roosevelt Roads. Install one well northwest of site 6 to determine the groundwater quality upgradient of the site. Resample the three surface water and sediment sampling locations. Analyze these samples for round one parameters. Collect an additional fifteen soil samples for lead analysis; run the EP toxicity test for lead on the sample with the highest total lead content. Proposed sampling locations are shown in Attachment B.

h. Site 7, NAVSTA Roosevelt Roads. Resample the eight monitoring wells installed around the site and analyze for round one parameters.

i. Site 8. Resample the three surface water and sediment locations and run the round one analytes plus the EP toxicity test for lead (sediment samples only).

j. Site 10. Resample monitor wells 10GW01-10GW08 and analyze for round one parameters.

k. Site 12. Resample the six monitoring wells and the one surface water/sediment sampling location and analyze for round one parameters. Measure and sample the floating product in well 12GW06. Perform a GC "Fingerprint" analysis to identify the type of fuel present (tanks at site 12 store diesel, JP-5, and MOGAS). Drill 24 soil borings to a depth of 20' on a 50' grid system around well 12GW06 to determine the extent of subsurface oil contamination. Drill an additional 28 soil borings to a maximum depth of 20' in the area between tanks 82, 83 and 1082 to define the extent of oil contamination in that area. Measure the thickness of the oil layer in all borings at a minimum of 24 hours after the boring is completed or prior to the collapse of the boring.

l. Site 13. Resample the 11 wells and six surface water/sediment sampling locations. Analyze for round one parameters.

m. Site 18. Sample surface water and sediment from the drainage canal in six locations for priority pollutant pesticides analyses. One sample should be upstream of the pest control shop, two should be collected from the existing sample stations, and the remainder should be spaced at even intervals downstream from 18SW2/SE2. Install three groundwater monitoring wells around the site; sample and analyze for pesticides and VOAs.

2. Within 45 days of completion of the on-site sampling, submit round two data evaluation reports for Sabana Seca and Roosevelt Roads.

3. Initiate preliminary characterization efforts at those sites where we are fairly certain some contamination exists. Sampling and analysis recommendations are summarized in Attachment C; a site-by-site description of these efforts is given below:

a. Site 15. Collect additional soil samples to characterize the extent of the PCB contamination. An additional 24 samples from 20 locations, as shown in Attachment D, are proposed for PCB analysis.

b. Site 16. Conduct additional sampling to determine the extent of PCB contamination. We propose 33 samples be collected and analyzed for PCBs and lead (see Attachment E). Run the EP toxicity test for lead on the two composite samples from the the soil/debris pile and the sample with the highest total lead content from the area around Building 38.

4. Evaluate a minimum of four alternatives for remediating the PCB contamination at Sites 15 and 16. This evaluation should include the characterization results and should conform to the reporting requirements for Step 1B, Characterization, and Step II, Feasibility, given in the original scope of work. Include a comparison of the costs versus benefits of cleanup to several levels, including 50 ppm, 1ppm, and background.

5. All work under this change order should be completed within 180 days of contract award.

VERIFICATION STEP, ROUND TWO, SAMPLING AND ANALYSIS FOR WATER SAMPLES

	SITE #													
Parameters	S6	S7	1	2	3	5	R6	R7	8	10	12	13	18	Totals
Pesticides	3	—	–	–	–	–	–	–	–	–	–	–	9	12
Priority Pollutants	–	7	3	–	1	10	4	8	–	8	–	–	–	41
Xylene, MEK, MIBK	–	–	3	5	–	10	4	–	3	8	–	17	–	50
Hexavalent Chromium	–	–	3	–	–	10	4	8	–	8	–	–	–	33
Oil and Grease	–	–	–	–	–	–	–	–	3	–	7	17	–	27
Volatile Organics	–	–	–	5	–	–	–	–	3	–	7	17	3	35
Chromium (total and hexavalent)	–	–	–	5	–	–	–	–	–	–	–	–	–	5
Lead	–	–	–	5	–	–	–	–	3	–	7	17	–	32
EDB	–	–	3	–	–	10	4	–	3	8	7	17	–	52
GC Fingerprint	–	–	–	–	–	–	–	–	–	–	1	–	–	1
Xylene	–	–	–	–	–	–	–	–	–	–	7	–	–	7

Change Order P00003

VERIFICATION STEP, ROUND TWO, SAMPLING AND ANALYSIS FOR SOIL/SEDIMENT SAMPLES

	Site #									
Parameters	S6	S7	2	5	R6	8	12	13	18	Totals
Pesticides	3	–	–	–	–	–	–	–	6	9
Priority Pollutants	–	1	–	5	3	–	–	–	–	9
Chromium (total and hexavalent)	–	–	5	–	–	–	–	–	–	5
Lead	–	–	5	–	15	3	1	6	–	30
Volatile Organics	–	–	5	–	–	3	1	6	–	15
Xylene, MEK, MIBK	–	–	5	5	3	3	–	6	–	22
EDB	–	–	–	5	3	3	1	6	–	18
Hexavalent Chromium	–	–	–	5	3	–	–	–	–	8
EP toxicity (lead)	–	–	–	–	1	3	–	–	–	4
Oil and Grease	–	–	–	–	–	3	1	6	–	10
Xylene	–	–	–	–	–	–	1	–	–	1
% Moisture	3	1	5	5	18	3	1	6	6	48

Attachment A

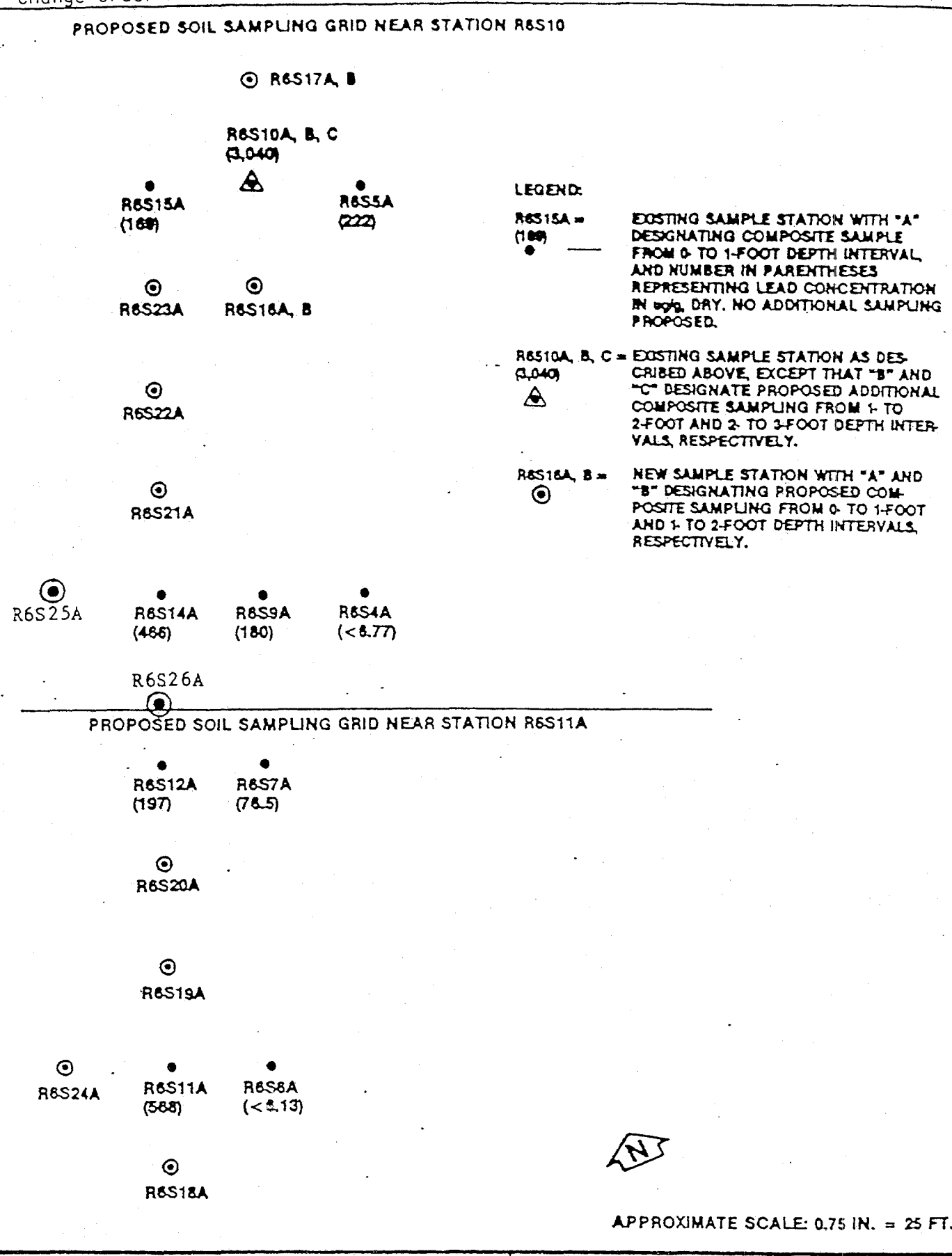

Figure 3-1
PROPOSED SOIL SAMPLING FOR ROUND TWO VERIFICATION—SITE 6, LANGLEY DRIVE DISPOSAL SITE
SOURCE: ESE, 1986.

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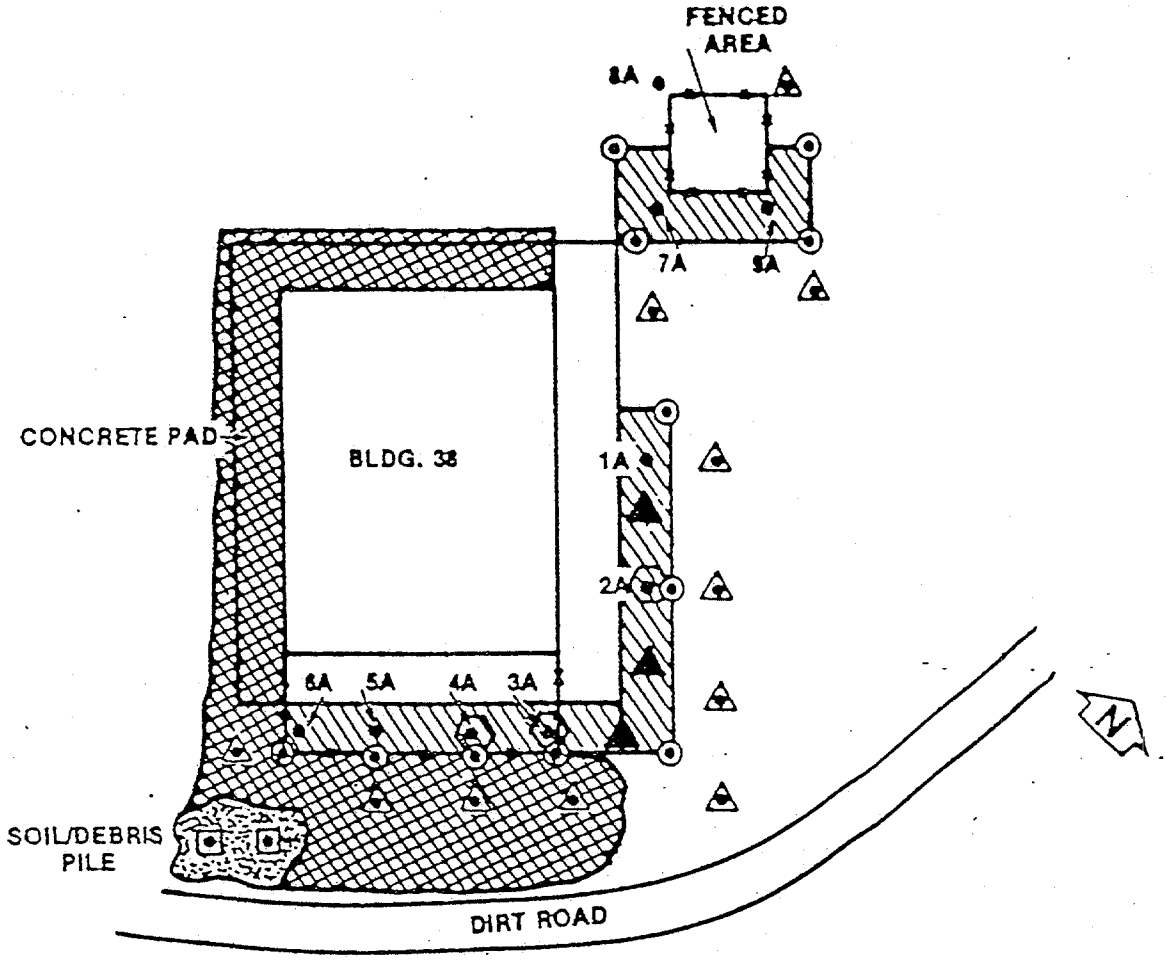
PRELIMINARY CHARACTERIZATION SAMPLING AND ANALYSIS

	Site # 15	16	Totals
PCBs	24	33	57
Lead	-	33	33
EP toxicity (lead)	-	3	3
% Moisture	24	33	57

NOTE: All samples collected under this effort are soil or sediment samples.



LEGEND:

- RECENTLY SCRAPED AREA
- PROPOSED AREA FOR EXCAVATION TO A DEPTH OF 1 FOOT
- 2A — SOIL SAMPLE STATION 16S2A
- PROPOSED CONFIRMATORY SOIL SAMPLE FROM 0- TO 1-FOOT DEPTH INTERVAL
- PROPOSED COMPOSITE SOIL SAMPLE FROM 0- TO 1-FOOT INTERVAL
- PROPOSED COMPOSITE SOIL SAMPLE FROM TOP OF PILE TO GROUND SURFACE WITH ALIQUOTS COLLECTED AT 2-FOOT INTERVALS
- ▲ Proposed composite sample from 0 to 1 foot, 1 to 2 foot intervals
- ⬢ Proposed composite sample from 1 to 2 foot interval

SOIL SAMPLE STATION	CONCENTRATION (ug/g, DRY) PCB	LEAD
16S1A	—	3,910
16S2A	404	420
16S3A	92.9	15,700
16S4A	55.9	834
16S5A	3.39	151
16S6A	8.85	12.7
16S7A	22.8	69.8
16S8A	—	215
16S9A	7.51	—

SCALE: 1 IN. = 80 FT.

Figure 3-4
PROPOSED SOIL SAMPLING AND EXCAVATION AT SITE 16, OLD POWER PLANT, BUILDING 38

SOURCE: ESE, 1986.

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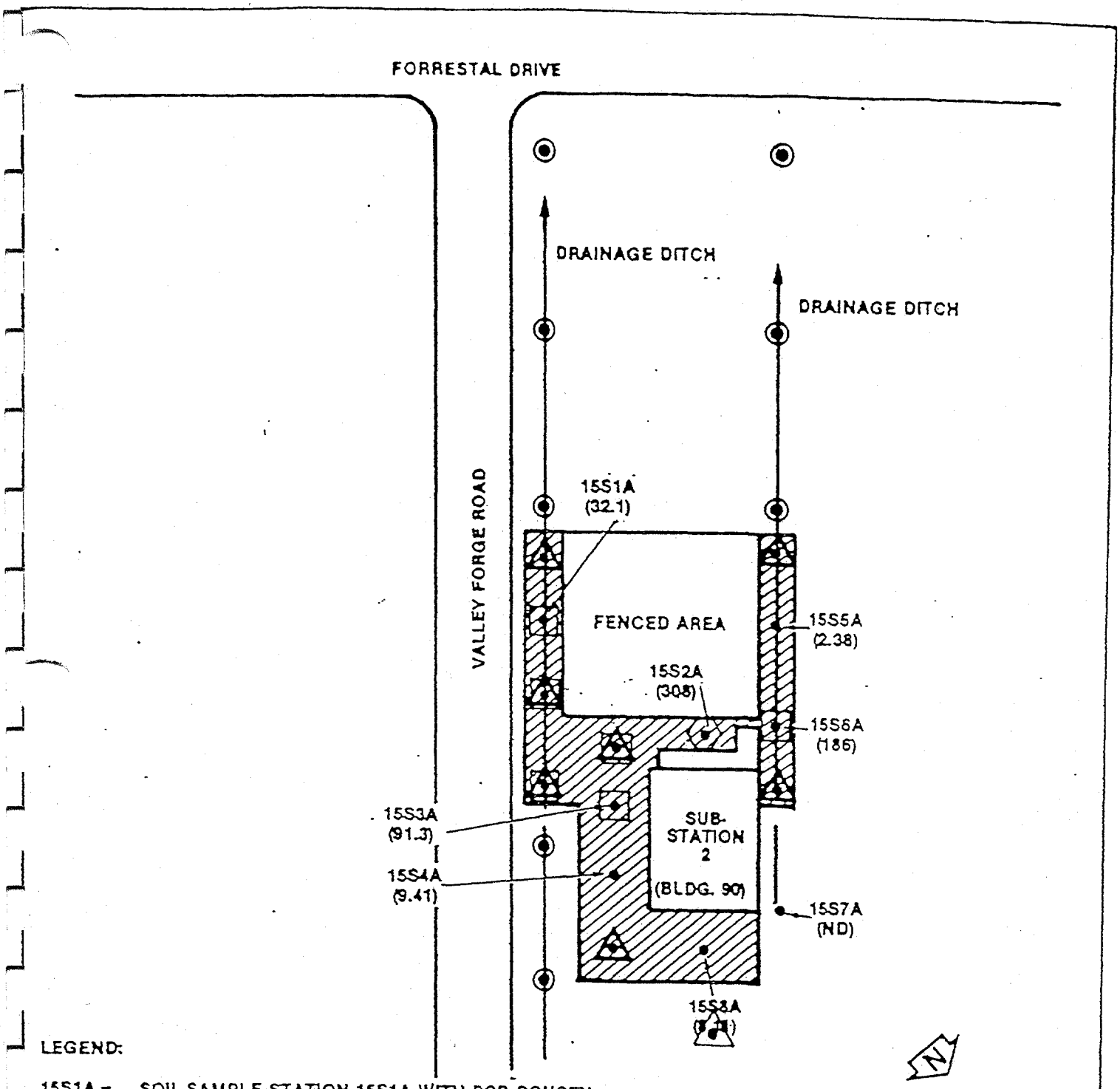

LEGEND:

15S1A = (32.1) SOIL SAMPLE STATION 15S1A WITH PCB CONCENTRATION OF 32.1 ug/g, Dry. (ND) = NOT DETECTED.

PROPOSED COMPOSITE SOIL SAMPLE FROM 0- TO 1-FOOT DEPTH INTERVAL

PROPOSED CONFIRMATORY SOIL SAMPLE FROM 0- TO 1-FOOT DEPTH INTERVAL

PROPOSED AREA FOR EXCAVATION TO A DEPTH OF 1 FOOT.

Proposed composite sample from 1 to 2, 2 to 3 foot intervals

Proposed composite sample from 1 to 2 foot interval

SCALE: 0.25 IN. = 10 FT.

Figure 3-3
PROPOSED SOIL SAMPLING AND EXCAVATION AT SITE 15, SUBSTATION 2

SOURCE: ESE, 1986

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