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SUPPLEMENTAL SITE SCREENING WORK PLAN FOR STUDY AREA 39 NTC ORLANDO FL

3/1/1997

ABB ENVIRONMENTAL

SUPPLEMENTAL SITE SCREENING WORKPLAN
STUDY AREA 39

MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

UNIT IDENTIFICATION CODE: N65928
CONTRACT NO.: N62467-89-D-0317/107

MARCH 1997

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

March 14, 1997 8545.492

Commanding Officer
SOUTHNAVFACENGCOM
2155 Eagle Drive
N. Charleston, S.C. 29419-9010

Attn: **Ms. Barbara Nwokike, Code 187300**

Subject: NTC, Orlando Supplemental Site Screening Work Plan
Study Area 39
CTO 107, Contract No. N62467-89-D-0317

Dear Barbara:

Enclosed for your use is the Final Site Screening Work Plan for Study Area 39. This document contains changes that were discussed during last months OPT meeting. We will be proceeding with the field work on Monday, March 17, 1997.

Should you have any questions or need additional information, please call me at (407) 895-8845.

Very Truly Yours,
ABB ENVIRONMENTAL SERVICES, INC.

John P. Kaiser
Installation Manager

JPK/lh
Enclosure

cc: W. Hansel (SDIV)
J. Mitchell (FDEP)
N. Rodriguez(EPA)
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Rick Allen (ABB-ES)
O. McNeil (Bechtel)
S. McCoy (Brown & Root)

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SUPPLEMENTAL SITE SCREENING WORKPLAN

STUDY AREA 39
MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Unit Identification Code: N65928

Contract No.: N62467-89-D-0317/107

Prepared by:

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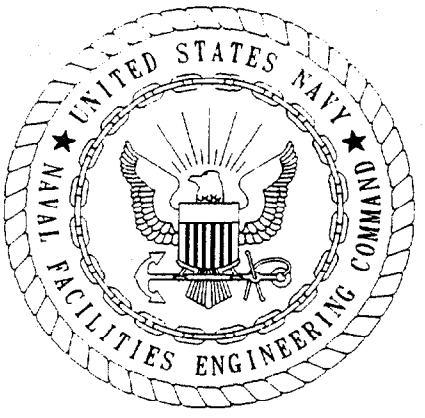
March 1997



CERTIFICATION OF TECHNICAL
DATA CONFORMITY (MAY 1987)

The Contractor, ABB Environmental Services, Inc., hereby certifies that, to the best of its knowledge and belief, the technical data delivered herewith under Contract No. N62467-89-D-0317/107 are complete and accurate and comply with all requirements of this contract.

DATE: March 11, 1997

NAME AND TITLE OF CERTIFYING OFFICIAL: John Kaiser
Task Order Manager

NAME AND TITLE OF CERTIFYING OFFICIAL: Richard Allen
Project Technical Lead

(DFAR 252.227-7036)

TABLE OF CONTENTS

Supplemental Site Screening Workplan
Study Area 39, Main Base
Naval Training Center
Orlando, Florida

LIST OF FIGURES

Supplemental Site Screening Workplan
Study Area 39, Main Base
Naval Training Center
Orlando, Florida

GLOSSARY

ABB-ES	ABB Environmental Services, Inc.
bls	below land surface
CLEAN	Comprehensive Long-Term Environmental Action, Navy
CPT	cone penetrometer testing
DPT	direct push technology
FID	flame ionization detector
$\mu g/\ell$	micrograms per liter
NTC	Naval Training Center
PCE	tetrachloroethene
POP	Project Operations Plan
QA/QC	quality assurance/quality control
SA	Study Area
SM	Service Mark
USEPA	U.S. Environmental Protection Agency
UXO	unexploded ordnance

1.0 INTRODUCTION

This workplan establishes the rationale and field program to further evaluate the occurrence of chlorinated volatile organic compound(s) at Study Area (SA) 39 at the Naval Training Center (NTC) in Orlando, Florida. The objectives of the supplemental screening program are to further assess the extent of impact to the shallow (surficial) aquifer.

1.1 SITE DESCRIPTION AND USE. SA 39 is located adjacent to SA 40 in the southwest corner of the Main Base of the NTC, Orlando (Figure 1-1). These two study areas were combined for study during the initial phase of the site screening. The two areas are bounded on the south and west by the base's property line, on the east by Grace Hopper Avenue, and the Maguire Road gate on the north. Most of SA 39 is an undeveloped grassy field. The Hazardous Material Storage facility (Building 137) is located in the southeast corner along with an office/storage/maintenance building utilized by the base's lawn maintenance contractor. Both of these buildings are located in the southeast corner of the area (Figure 1-2). There are several large solid waste receptacles (dumpsters) and loading ramps, located in the southeast corner of SA 39, that receive solid waste from various activities onbase. The ground surface in the area immediate to the dumpsters is used to temporarily store larger items awaiting disposal, including generators, air conditioners, trees, and brush. A parking lot covers most of the northeast corner of the study area. The boundary between SAs 39 and 40 is marked by Nautilus Drive, a paved roadway that extends from Grace Hopper Avenue to the base's western property line. SA 40 is undeveloped, with the exception of two ballfields located along the northern boundary and two tennis courts located in the eastern boundary.

SA 39 was defined during the environmental baseline survey to include the area used for storage of coal when the base's utilities were powered by coal (ABB Environmental Services, Inc. [ABB-ES], 1994b). The former coal storage area was designated Unnumbered Facility 10. A secondary area of concern was the presence of the hazardous waste handling and storage area and the lawn maintenance areas.

1.2 RESULTS OF PREVIOUS SITE SCREENING ACTIVITIES. The initial phase of site screening at SA 39 was performed during the first quarter of 1996. The field program included the following:

- an unexploded ordnance (UXO) survey,
- a geophysical survey,
- a passive soil gas survey,
- a potentiometric (water table) surface elevation survey, and
- soil and groundwater sampling and analysis.

In addition to the areas immediately downgradient of the landfill and former coal storage areas, the soil gas survey results were used to target areas for soil and groundwater sampling. The soil and groundwater samples were submitted to a laboratory for a full suite Contract Laboratory program target compound list and target analyte list analysis.

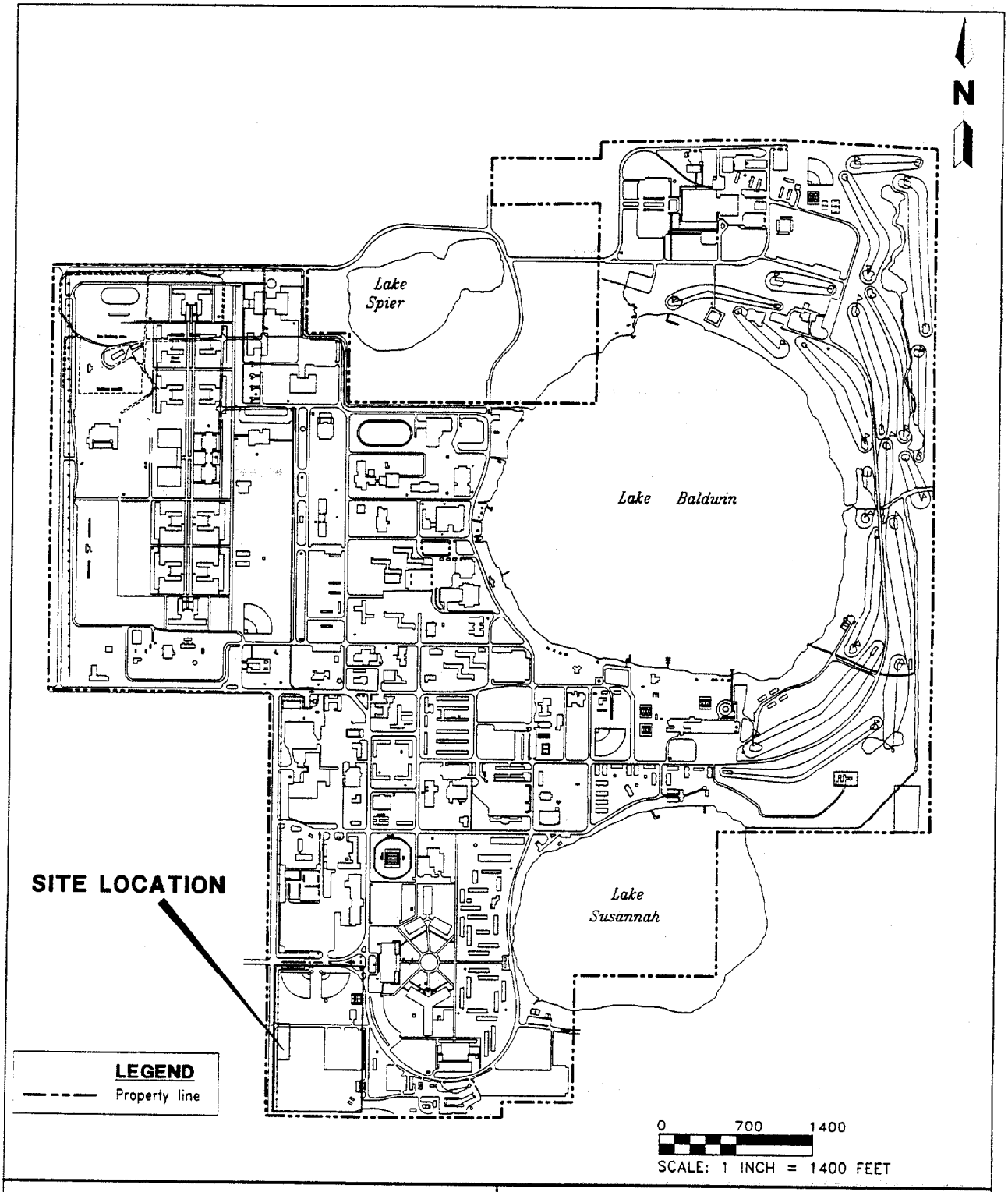


FIGURE 1-1
SITE VICINITY MAP

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TECHNICAL MEMORANDUM
SITE SCREENING INVESTIGATION
STUDY AREA 39

NAVAL TRAINING CENTER
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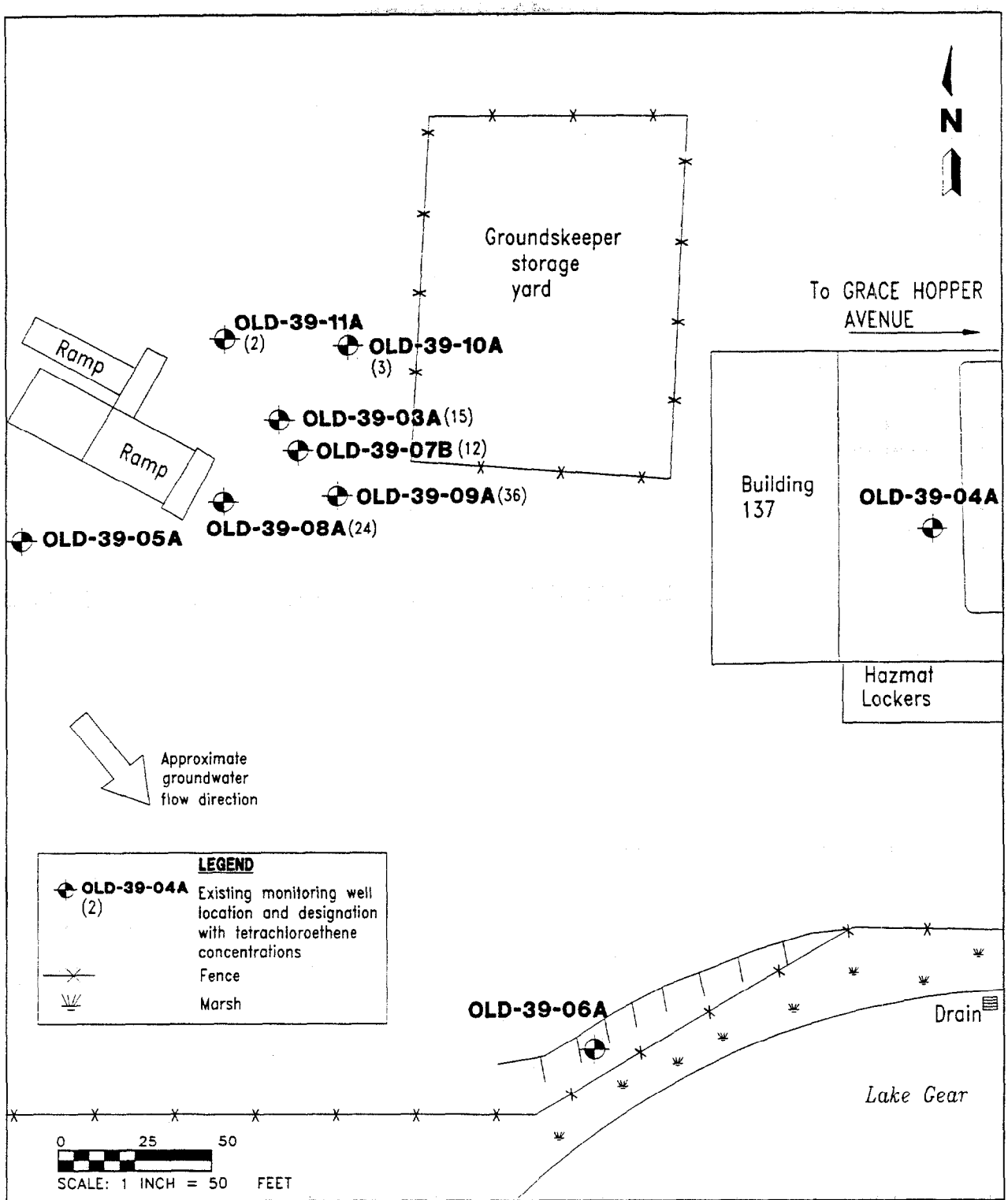

FIGURE 1-2
RESULTS OF PREVIOUS GROUNDWATER SCREENING

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TECHNICAL MEMORANDUM
SITE SCREENING INVESTIGATION
STUDY AREA 39

NAVAL TRAINING CENTER
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The geophysical survey results indicated the presence areas of anomalous, magnetic and time domain metal detector contours in relation to the recorded location of the Bottle Landfill. The survey also revealed several isolated anomalies, which were investigated by the U.S. Navy's UXO team stationed in Mayport, Florida. Their survey showed no evidence of UXO in the subsurface in either SA 39 or 40.

Soil was collected from the surface and subsurface at eight locations in SA 39 and two locations at SA 40. Surface soil samples collected at several locations in both study areas showed polynuclear aromatic hydrocarbons and arsenic at concentrations in excess of screening criteria.

Water-level data collected from piezometers indicated that the potentiometric (water table) surface was approximately 10 feet below land surface (bls) across the site, and that groundwater flows south-southeast toward Lake Gear. The soil gas results indicated that BTEX (benzene, toluene, ethylbenzene, and xylene) was present in most of the southern and eastern portions of SA 39, and that tetrachloroethene (PCE) was present in a smaller area on the east side. Based on this information, five shallow permanent, and one temporary, monitoring wells were installed at SA 39. Two shallow permanent monitoring wells were installed at SA 40. The presence of PCE was confirmed in the soil and groundwater analytical results collected at one of monitoring wells (OLD-39-03A) installed in the southeast corner of SA 39.

Following review of the screening results in November 1996, the Orlando Partnering Team requested that additional groundwater samples be collected from the area around well OLD-39-03A in order to confirm the presence of PCE in the groundwater. In December 1996, five monitoring wells were installed. Four shallow monitoring wells were installed approximately 30 feet from OLD-39-03A. The shallow wells (OLD-39-07A through OLD-39-11A) were constructed with the screens bracketing the water table. An intermediate-depth well (OLD-39-07B) was installed approximately 10 feet downgradient of OLD-39-03A. The intermediate well was constructed with the screen set at the surface of a shallow aquitard located 32 to 34 feet bls. Groundwater samples were collected from the five new wells and existing well OLD-39-03A.

All of the groundwater samples collected from the newly installed monitoring wells contained PCE. The PCE concentration ranged from 2 micrograms per liter ($\mu g/\ell$) at the upgradient shallow well location (OLD-39-11A) to 36 $\mu g/\ell$ at the shallow downgradient well location (OLD-39-09A). The concentration of PCE detected at each well is shown on Figure 1-2. The results indicate that the impacted groundwater extends at least 30 feet in all directions from OLD-39-03A, with the higher concentrations situated in the downgradient direction. The PCE extends vertically to a depth of at least 30 feet bls. Complete details on the groundwater screening investigation can be found in the Draft Technical Memorandum, Screening Results for Study Areas 39, 40, and 45 (ABB-ES, 1996).

Based on these results, in December 1996, the OPT requested that ABB-ES further characterize both the lateral and vertical limits of impact to the groundwater resulting from PCE. The following workplan was developed in response to that request.

2.0 PROPOSED SUPPLEMENTAL SCREENING FIELD PROGRAM

The objectives of the supplemental screening investigation are to

- assess PCE distribution in surficial aquifer and
- evaluate the presence of PCE in soil above the water table.

The technical approach and rationale for the individual field investigation tasks are discussed in the sections that follow.

2.1 GROUNDWATER ASSESSMENT. The groundwater assessment for SA 39 will include tasks to provide data regarding the horizontal and vertical distribution of PCE and related compounds at the site. Data will also be collected to evaluate the hydrogeologic conditions in the surficial aquifer, which may influence the distribution of compounds released at the site. To provide the necessary data, the following tasks will be performed:

- shallow groundwater screening with direct-push technology (DPT)
- cone penetrometer test (CPT) soundings
- deep groundwater screening with DPT
- monitoring well installation and sampling
- aquifer evaluation

2.1.1 Shallow Groundwater Screening Existing data indicate that PCE is present in the shallow surficial aquifer at SA 39 above regulatory criteria. The first phase of the supplemental field investigation will focus on assessing the extent of groundwater impact in the shallow surficial aquifer. For this investigation, the shallow surficial aquifer is defined as the saturated zone between the water table and any intermediate low permeability zones above the Hawthorn Group. Previous drilling at the site encountered a clay zone at approximately 32 to 34 feet bls; therefore, this phase of the investigation will focus on the zone between the water table and the clay zone.

Groundwater screening samples will be collected from discrete depth intervals at selected locations to determine the vertical and horizontal distribution of contaminants in the shallow surficial aquifer. The groundwater screening samples will be collected using a TerraProbe℠ groundwater sampler. The groundwater sampler operates by pushing it to the selected sampling depth and opening by pulling back on the drive rods, exposing the screen. The water sample is then collected by inserting tubing down the rods and purging the sampler with a peristaltic pump. The full tubing is brought to the surface following purging and the groundwater sample is decanted into the sample containers.

Shallow groundwater samples will be collected for onsite screening from a grid with 50-foot spacing between centers in the area shown on Figure 2-1. Fifteen explorations are anticipated. The first exploration will be placed adjacent to the monitoring well that showed the highest PCE concentration (OLD-39-09A). Groundwater samples will be collected at a 5-foot interval from the water table to approximately 32 feet bls. If a clay horizon is encountered above 32 feet at any sampling location, then sample collection will be halted at that depth. The analytical results from the shallow groundwater samples will be used to determine the vertical limits of impact and to identify any area(s) of PCE concentration.

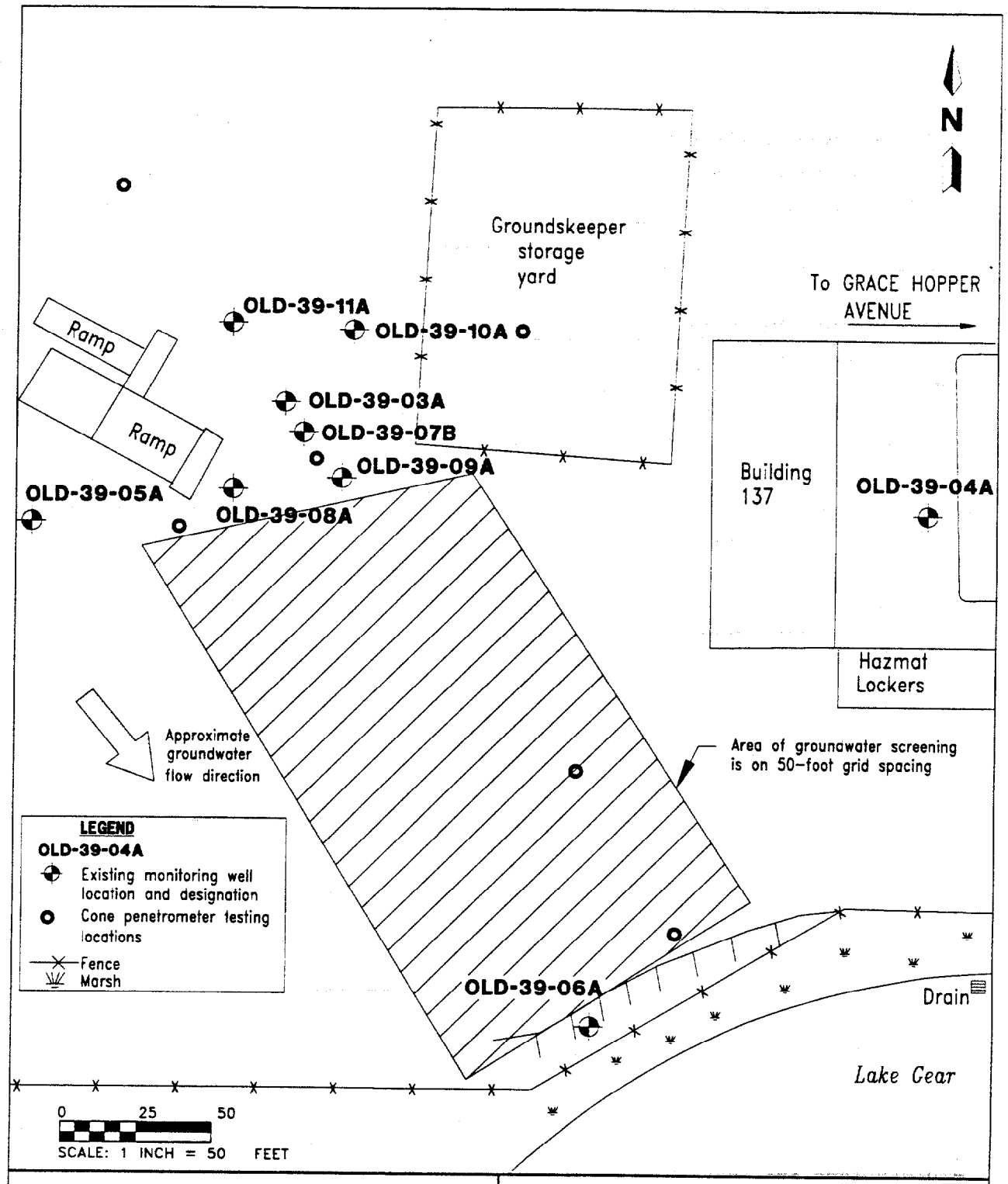

FIGURE 2-1
PROPOSED GROUNDWATER SCREENING AND CPT SOUNDING LOCATIONS

TECHNICAL MEMORANDUM
SITE SCREENING INVESTIGATION
STUDY AREA 39

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

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The remaining explorations will be used to delineate the lateral limits of impact. At a minimum, sample collection at those push points made after the first exploration will occur at 10-foot intervals from the water table to the shallowest clay lens in the Hawthorn Group. The distribution of the contaminants in the subsurface may require additional samples. Given the anticipated depth to the shallowest clay in the Hawthorn Group (estimated to be 80 to 90 feet bls), at least 20 samples will be collected from the first push exploration, and at least 10 from the other 14 push locations, for a total of 160 samples.

The groundwater samples will be analyzed onsite with a field gas chromatograph. Duplicates of approximately 10 percent of the samples will be submitted to a certified laboratory for confirmatory analysis using U.S. Environmental Protection Agency (USEPA) Test Method 524.2. The analytical data obtained during these activities are considered Level II and will be used for selecting monitoring well locations and characterizing hydrogeologic conditions at SA 39. Quality control analyses will consist of a three-point calibration of each analyte, method blank, matrix spike, and matrix spike duplicate and a continuing calibration standard check at a rate of one per day.

2.1.2 CPT Soundings Following the shallow groundwater screening investigation, a CPT survey will be conducted. The CPT soundings will provide data on the lithology of the surficial aquifer in the study area. The tip pressure and sleeve friction values recorded during the CPT soundings will be used to create vertical profiles of soil properties at each sounding location. These data, along with soil pore pressure measurements, allow detailed interpretation of site stratigraphy and hydrogeology. Because of the tendency of the contaminants of concern to pool along aquitard surfaces, the CPT logs will be used to map the configuration of these units where present at the site. These data will be used to target areas for sample collection during the groundwater screening investigation, as well as to design the monitoring well network. The six locations selected as CPT soundings are shown on Figure 2-1. Depending on site conditions, lithology and contaminant distribution, additional CPT soundings may be required. The CPT soundings will be pushed from the surface to the shallowest significant clay lens encountered within the Hawthorn Group.

2.1.3 Deep Groundwater Screening The data collected during the shallow groundwater screening and the CPT soundings will direct the deep groundwater screening investigation. The CPT rig will be used to collect groundwater samples at discrete depth intervals to evaluate the vertical distribution of contaminants at selected locations. The selection of sampling locations will be based on the results of the shallow groundwater screening. The sampling intervals at each location will be determined from the CPT sounding data. The initial deep sampling locations will coincide with the highest concentrations in the shallow groundwater. The initial samples will be collected below the 32-foot maximum depth of the shallow groundwater screening and continue to the top of the shallowest clay unit in the Hawthorn Group clay. Sample spacing will depend on location-specific lithology, with a maximum vertical separation of 10 feet. Based on previous data, the shallowest Hawthorn clay should be encountered between 80 and 90 feet bls at this site. Approximately 7 samples will be collected at each deep groundwater screening location. Depending on plume geometry, 10 to 15 sampling locations may be required to adequately determine conditions at the site.

The groundwater samples will be analyzed onsite with a field gas chromatograph. Duplicates of approximately 10 percent of the samples will be submitted to a certified laboratory for confirmatory analysis using USEPA Test Method 524.2. The analytical data obtained during these activities are considered Level II and will be used for selecting monitoring well locations and characterizing hydrogeologic conditions at SA 39. Quality control analyses will consist of a three-point calibration of each analyte, method blank, matrix spike, and matrix spike duplicate and a continuing check calibration standard at a minimum of one per day.

2.1.4 Monitoring Well Installation and Sampling Following the groundwater screening and CPT sounding investigations, adequate data should be available to select monitoring well locations. The objective of the monitoring well installation is to confirm the geochemical, lithologic, and hydrogeologic data collected by DPT methods. The locations and screened intervals for monitoring well installations at SA 39 will be based on an evaluation of the data provided by the direct push screening program. For purposes of this workplan, the following scenario is considered likely. Five well clusters within the surficial aquifer system (shallow, intermediate, and deep) will be required to fully characterize groundwater quality. The clusters will be located upgradient (1), on either side of the plume (2), downgradient (1), and within the plume (1) to characterize the highest concentrations. The shallow (OLD-39-03A) and intermediate (OLD-39-07B) wells already installed may serve as characterization wells within the plume, and only a deep well will be required to complete the characterization cluster. The preliminary well locations are shown on Figure 2-2.

For this program, hollow-stem augers (6 ¼-inch inside diameter) will be used to advance the hole to the desired depth. Soil samples will be collected continuously from the water table surface to the base of the surficial aquifer at each deep well location using a split-spoon sampler. The samples will be classified using the Unified Soil Classification System and screened for any organic vapors using a flame ionization detector (FID). All wells will be installed with 2-inch polyvinyl chloride screen and riser, and well installation details will be in accordance with the Project Operations Plan (POP), Subsection 4.4.6, Exploratory Drilling (ABB-ES, 1994a).

The shallow wells will be constructed with 10 feet of 0.01-inch slotted screen set to bracket the water table surface. The intermediate and deep wells will be constructed with 5 feet of 0.01-inch slotted screen. The base of the screen of the intermediate well will be set above the upper surface of any potential aquitard encountered within the surficial aquifer. A silty to sandy clay unit was encountered at a depth of 32 to 34 feet bls in the vicinity of OLD-39-03A during the earlier phase of screening. If this unit is continuous across the area, then the intermediate wells will be set along its surface. If the unit is not continuous, then the intermediate wells will be set at the midpoint of the aquifer. The screens of the deep wells will be set above the shallowest significant clay encountered in the Hawthorn Group.

Each well will be developed upon installation to ensure performance of the filter pack. Following development, the wells will be purged and sampled using the low-flow method. Monitoring well development, purging, and sampling activities will be accomplished in accordance with the guidelines prescribed in Section 4.5 of the POP (ABB-ES, 1994a). The groundwater samples will be sent to a certified

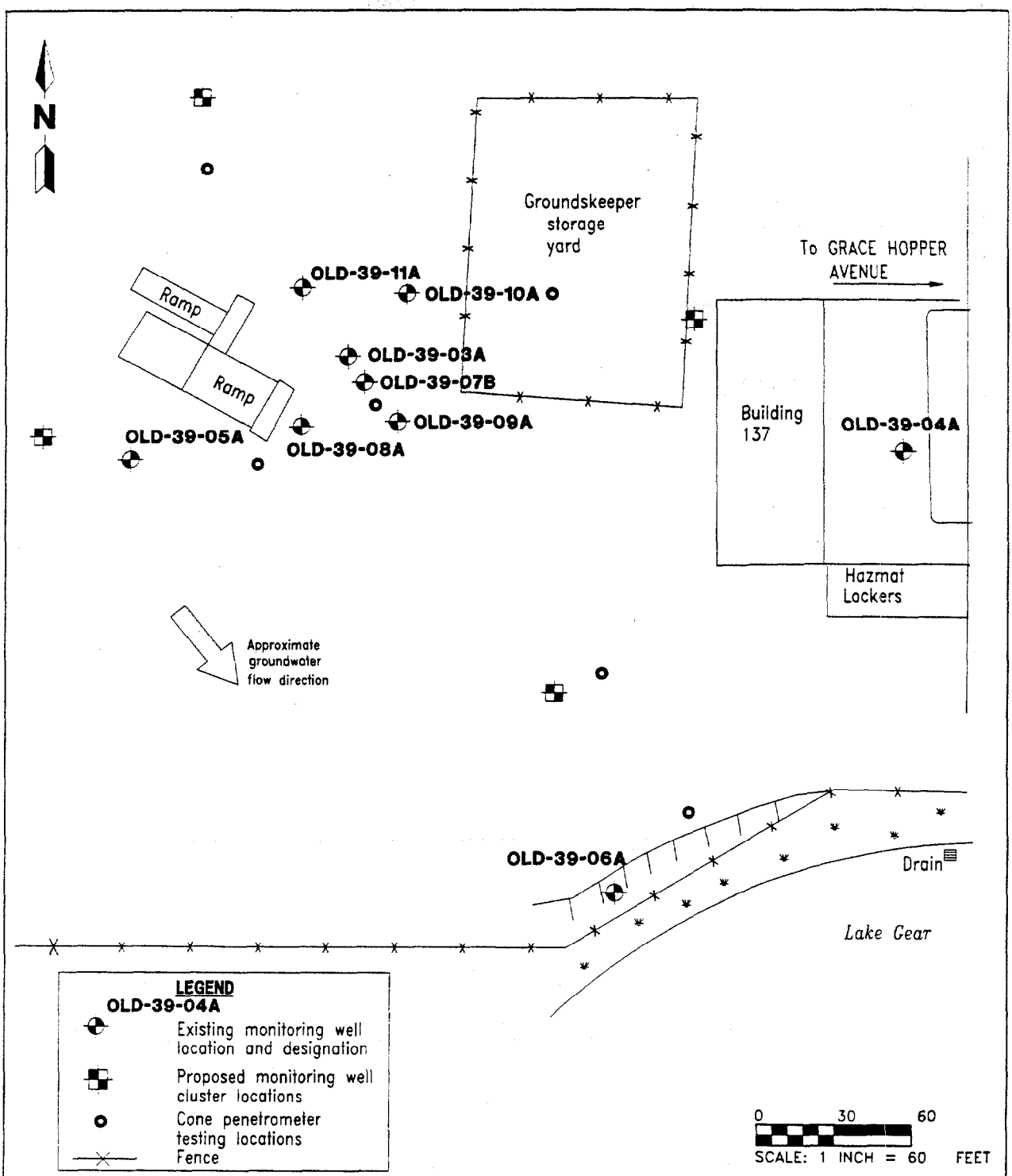

FIGURE 2-2
PROPOSED MONITORING WELL CLUSTER LOCATIONS

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SITE SCREENING INVESTIGATION
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laboratory for analysis. Each sample will be analyzed for volatile organic compounds included in USEPA Method 524.2.

2.1.5 **Aquifer Evaluation** In order to determine the hydrogeologic properties of the surficial aquifer at the site and to determine the nature of potential interaction with the surface water of Lake Gear, the following data will be collected and assessed. Groundwater elevation data will be measured from each of the monitoring wells at SA 39 to allow analysis of groundwater flow direction and hydraulic gradient. An *in situ* hydraulic conductivity test will be performed on each monitoring well to provide data regarding aquifer permeability and flow velocities when used in conjunction with the gradient data.

2.2 **SOIL ASSESSMENT**. Current data suggest that PCE detected in the shallow groundwater at SA 39 may have originated from a surface release. During the initial phase of screening, PCE was detected in the surface soil and groundwater samples collected at well OLD-39-03. The objective of the soil assessment is to determine if PCE is present in the soil at SA 39 at concentrations above screening criteria. In order to evaluate potential soil contamination at the site, soil samples will be collected in and upgradient from the areas of highest PCE detections determined from the shallow groundwater screening. The soil samples will be collected using a TerraProbe℠ soil coring sampler. The soil sampler has a 4-foot-long sample barrel that is driven into the soil. Upon retrieval, the soil sampler is opened and the sample screened with an FID. The soil collected at the interval with the highest FID reading will be submitted to a certified laboratory of analysis for volatile organic compounds using USEPA Method 8010.

Historically, depth to groundwater at the site has measured approximately 10 to 12 feet bls. Therefore, at each location, the sampler will be driven from 0-4, 4-8, and 8-12 feet bls. Saturated soil collected from below the water table will not be analyzed during this investigation. Depending on the results of the shallow groundwater screening, approximately 10 sample locations should be adequate to evaluate site soil.

3.0 DATA MANAGEMENT

The approach to providing reliable data that meet the Data Quality Objectives will include Quality Assurance (QA)/Quality Control (QC) requirements for each of the analytical data types generated during the field investigation. The QA/QC efforts for laboratory analyses will include collection and submittal of QC samples and the assessment and validation of data from the subcontract laboratories. Analytical data will be subjected to independent data validation by a subcontractor as described in the POP, Section 8.2, Validation (ABB-ES, 1994a).

For QA/QC efforts for onsite analysis, the field chemist will review each chromatogram before analyzing the next sample or batch of samples. The review will include calculation of surrogate standard recoveries, comparison of sample retention times to calibration standards for compound identification, and evaluation of potential sample carryover. All field chemistry data will be reviewed by an independent ABB-ES project chemist to demonstrate compliance with the analytical criteria specified.

Samples collected for offsite laboratory analysis will be used to confirm the analytical data collected in the onsite field laboratory. The data will be used to evaluate immediate risks to human health and to prepare the site screening report. The data will be collected and entered into a computer database for appropriate statistical analysis.

Samples will be tracked from the field collection activities to the analytical laboratories through return of sample residuals from the laboratories (if not disposed of by the laboratory) following standard ABB-ES chain-of-custody procedures. These procedures are described in the POP, Chapter 5.0, Sample Handling and Custody Procedures (ABB-ES, 1994a). Samples will be labeled and identified following the ABB-ES Standard Operating Procedures, Identification of Environmental Samples for the CLEAN program. Sample information recorded from chain-of-custody forms will be transferred (electronically or manually) into the sample tracking portion of the database management system (Fast Retrieval of Environmental Data), thus, enabling the samples to be tracked through final disposition. The sample tracking system will produce reports to inform the project team of potential delays or problems related to sample analysis and validation.

REFERENCES

ABB Environmental Services, Inc. (ABB-ES), 1994a, Project Operations Plan for Site Investigations and Remedial Investigations, Naval Training Center (NTC), Orlando: prepared for Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM), Charleston, South Carolina, March.

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