



ENSAFE INC

ENVIRONMENTAL AND MANAGEMENT CONSULTANTS

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September 12, 2000

Commanding Officer
Attn: James Reed/18812JR
SOUTHNAVFACENGCOM
2155 Eagle Drive
P.O. Box 190010
North Charleston, SC 29419-9010

Subject: CTO-146; NSA Mid-South, Millington, Tennessee

Document Transmittal - *Technical Memorandum — SWMUs 39 and 14/46 Investigation Work Plan, Revision 0*, September 8, 2000

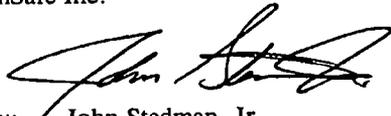
Reference: Contract N62467-89-D-0318 (CLEAN II)

Dear Sir:

This letter is provided to document submittal of the NSA Mid-South *Technical Memorandum — SWMUs 39 and 14/46 Investigation Work Plan, Revision 0*. If you have any questions or comments of a technical nature, please contact me at 901/372-7962. Comments or questions of a contractual nature should be directed to Debra Blagg at 901/386-9344.

Sincerely,

EnSafe Inc.



By: John Stedman, Jr.

Enclosures: As Stated

cc: Contracts File: CTO-146 (w/out enclosure)
Project File: 0146-14009 (w/out enclosure)
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TECHNICAL MEMORANDUM

To: James Reed, SOUTHDIV
Jim Morrison/Clayton Bullington, TDEC
Tonya Barker/Rob Williamson, NSA Mid-South
Jack Carmichael, USGS

From: John Stedman, EnSafe Inc.

Date: September 8, 2000

Re: SWMUs 39, 14 and 46 Investigation Work Plan (Revision 0)

INTRODUCTION

The Assembly F RFI report (EnSafe, Feb. 4, 2000) recommended further delineation of SWMU 39 soil and groundwater contamination. The NSA Mid-South BCT also determined that further evaluation of the presence and potential migration of contaminants is warranted for SWMU 39 before evaluating remedial alternatives in a Corrective Measures Study (CMS). Therefore, direct push technology (DPT) sampling is proposed to further delineate chlorinated solvents in soil beneath the Building S-74 foundation and around Building S-203. Loess groundwater will be sampled using 1-inch diameter temporary monitoring wells installed using DPT. Samples will be collected from existing fluvial deposits wells and analyzed for chlorinated solvents and petroleum hydrocarbons.

Groundwater sampling is also proposed for SWMU 14. The Assembly E RFI Report (EnSafe, Feb. 2, 1998) presents the SWMU 14 loess and fluvial deposits groundwater sampling results which reflect chlorinated solvents present above MCLs. In addition, total petroleum hydrocarbons (TPH) exceeded TDEC action levels in loess and fluvial deposits groundwater samples. The report, which groups SWMU 46 with SWMU 14, recommended a CMS to address chlorinated solvents in loess groundwater or at a minimum, continue

monitoring all SWMU 14 monitoring wells for VOCs. Again the BCT determined that additional groundwater sampling was warranted at SWMU 14 before evaluating remedial alternatives in a CMS.

Objectives and methods/procedures that will be used to complete proposed sampling at SWMU 39 and SWMUs 14 and 46 are described below.

OBJECTIVES

The following objectives have been identified for the SWMU 39 CMS sampling and DPT investigation and SWMUs 14 and 46 CMS sampling.

SWMU 39

- Further the delineation of TCE and PCE in soil beneath the Building S-74 foundation.
- Evaluate Building S-203's potential as a source of VOC contamination by sampling surface and subsurface soil around the building.
- Verify the presence of contamination in loess groundwater near the RFI DPT sample location 039G0014 and evaluate the potential for natural attenuation and applicability of other technologies. Achieve both by installing and sampling temporary monitoring wells.
- Resample fluvial deposits groundwater and evaluate the potential for natural attenuation and other applicable technologies.

SWMUs 14 and 46

- Evaluate the potential for natural attenuation and other applicable technologies for loess and fluvial deposits groundwater contamination by sampling existing monitoring wells.

Use the collected soil and groundwater data from each site to evaluate the extent of contamination, the potential for natural attenuation in groundwater, and the potential for other remedial alternatives.

SWMU 39 PROPOSED ACTIVITIES

Soil

To satisfy the objectives listed above, at least seven DPT sample locations through the concrete foundation will be completed to a maximum depth of 20 feet below land surface, or to the depth of shallow (loess) groundwater, whichever is encountered first. In addition, eight DPT pushes are proposed around Building S-203. The pushes will be sampled continuously and field-screened with a flame ionization detector (FID). Two samples from each push location will be selected for laboratory analysis: one from the interval with the highest FID response and the other from the deepest interval sampled. If there is no FID response during sampling, only the deepest interval will be sampled. A map with proposed SWMU 39 DPT locations is in Figure 1 of Attachment A.

Based on field screening as described above, additional DPT pushes and sampling may be conducted to determine the extent of soil contamination. Field procedures used in this investigation will be consistent with those outlined in the *Comprehensive RFI Work Plan* (EnSafe/Allen & Hoshall, 1994). The results will be presented in the CMS Work Plan.

Loess Groundwater

To satisfy the objectives listed above, four temporary monitoring wells are proposed to determine the presence of VOCs in SWMU 39 loess groundwater. The samples will be collected from the locations shown on Figure 2 (Attachment A) and analyzed for VOCs, Tennessee-Extractable Petroleum Hydrocarbons (TN-EPH), and the following natural attenuation parameters:

Field:

DO
ORP (Redox)
Temperature
pH
Ferrous Iron
Sulfide
Sulfate
Alaklinity
Chloride

Laboratory:

Total Organic Carbon
Total Iron
Nitrate
Methane, Ethane, Ethylene
Hydrogen
Carbon Dioxide

Field procedures used in this investigation will be consistent with those outlined in the previously cited *Comprehensive RFI Work Plan*. In addition, 1-inch slotted PVC pipe will be installed in each location for future monitoring. The results will be presented in the SWMU 39 CMS Work Plan.

Fluvial Deposits Groundwater Downgradient of Building S-74

To satisfy the objectives listed above, samples will be collected from existing fluvial deposits monitoring wells shown on Figure 2 of Attachment A. Samples will be analyzed for VOCs,

TN-EPH, and the natural attenuation parameters listed above. The results will be presented in the SWMU 39 CMS Work Plan.

SWMUs 14 and 46 PROPOSED ACTIVITIES

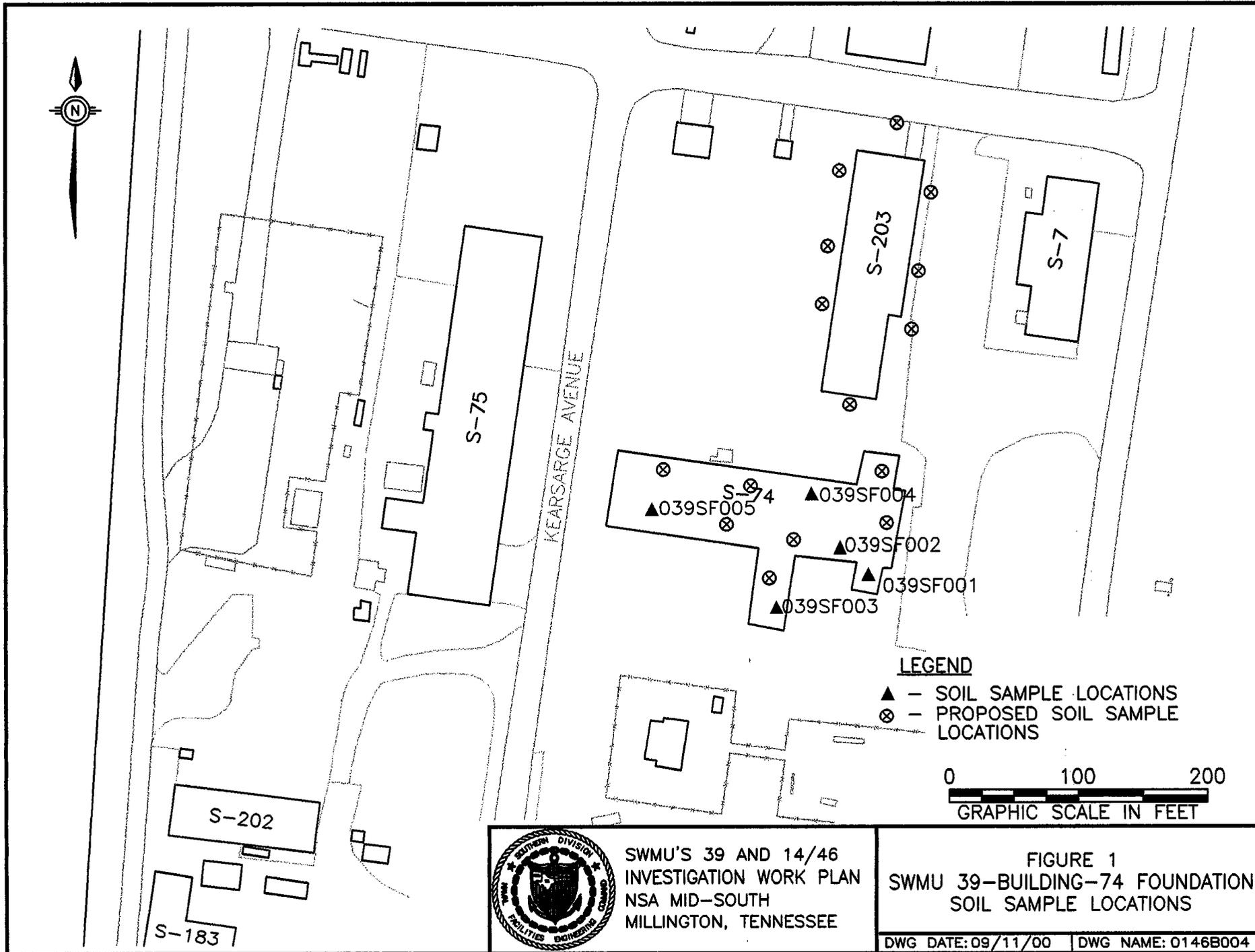
To satisfy the objectives listed above, groundwater samples will be collected from SWMU 14 monitoring wells. The five loess and four fluvial deposits monitoring wells shown on Figure 1 of Attachment B will be sampled. Each sample will be analyzed for VOCs, TN-EPH, and the natural attenuation parameters listed above for SWMU 39 loess groundwater. Field procedures used in this investigation will be consistent with those outlined in the *Comprehensive RFI Work Plan*. The results will be presented in the SWMUs 14 and 46 CMS Work Plan.

REFERENCES

- EnSafe/Allen and Hoshall. (1994). *Comprehensive RFI Work Plan — Naval Air Station Memphis*. E/A&H: Memphis, Tennessee. October 6, 1994.
- EnSafe. (February 1998). *Assembly E — SWMUs 2, 9, 14, 38, 59, and 65 RFI Report, Naval Support Activity Mid-South, Millington, Tennessee*. EnSafe: Memphis, Tennessee. February 2, 1998.
- EnSafe. (February 2000). *Assembly F — SWMUs 17, 19, 20, 22, 39, and 63 RFI Report, Naval Support Activity Mid-South, Millington, Tennessee*. EnSafe: Memphis, Tennessee. February 4, 2000.

ATTACHMENT A

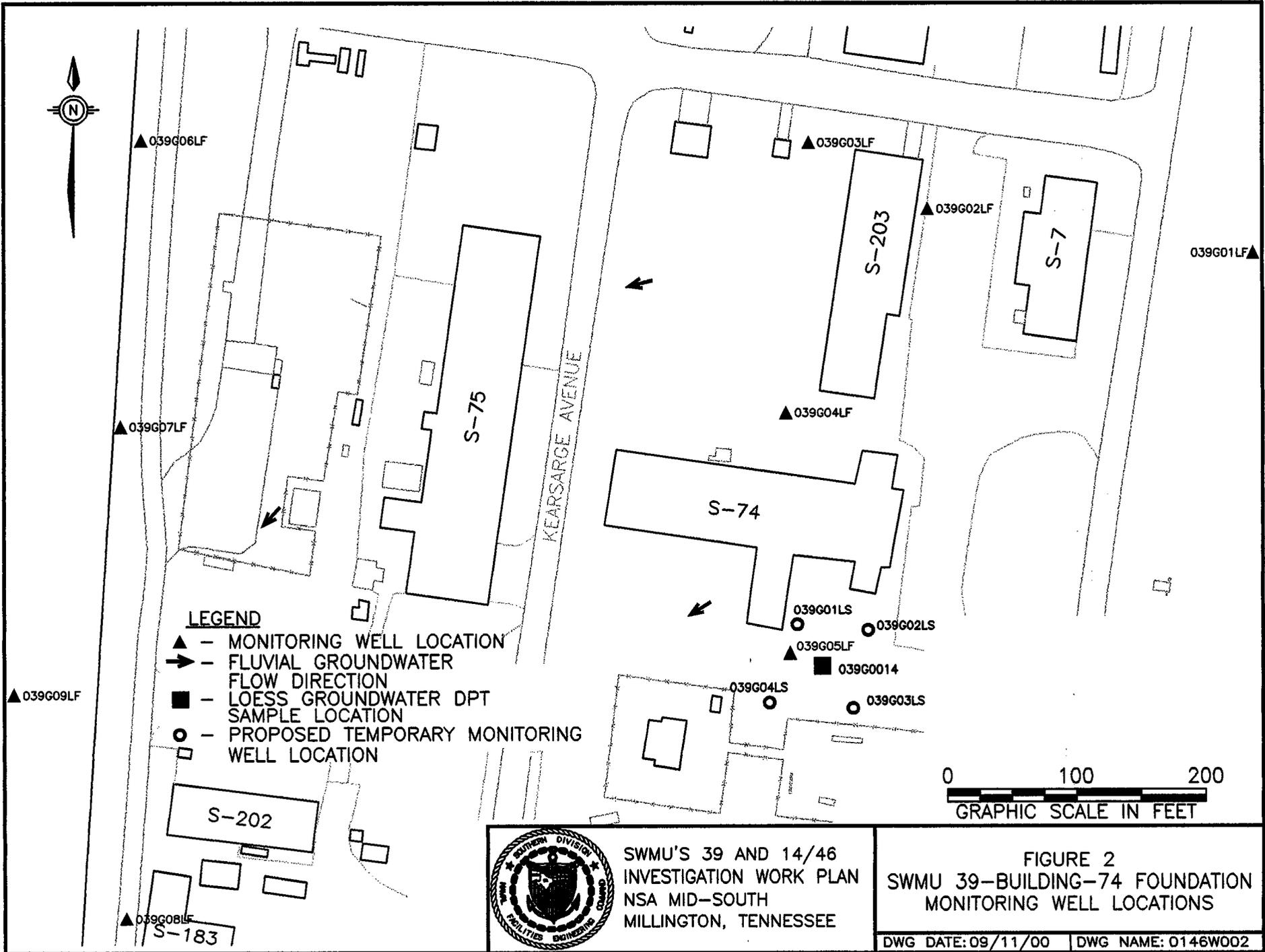
**PROPOSED SWMU 39 DPT BORING AND
EXISTING MONITORING WELL LOCATIONS**



SWMU'S 39 AND 14/46
 INVESTIGATION WORK PLAN
 NSA MID-SOUTH
 MILLINGTON, TENNESSEE

FIGURE 1
 SWMU 39-BUILDING-74 FOUNDATION
 SOIL SAMPLE LOCATIONS

DWG DATE: 09/11/00 | DWG NAME: 0146B004



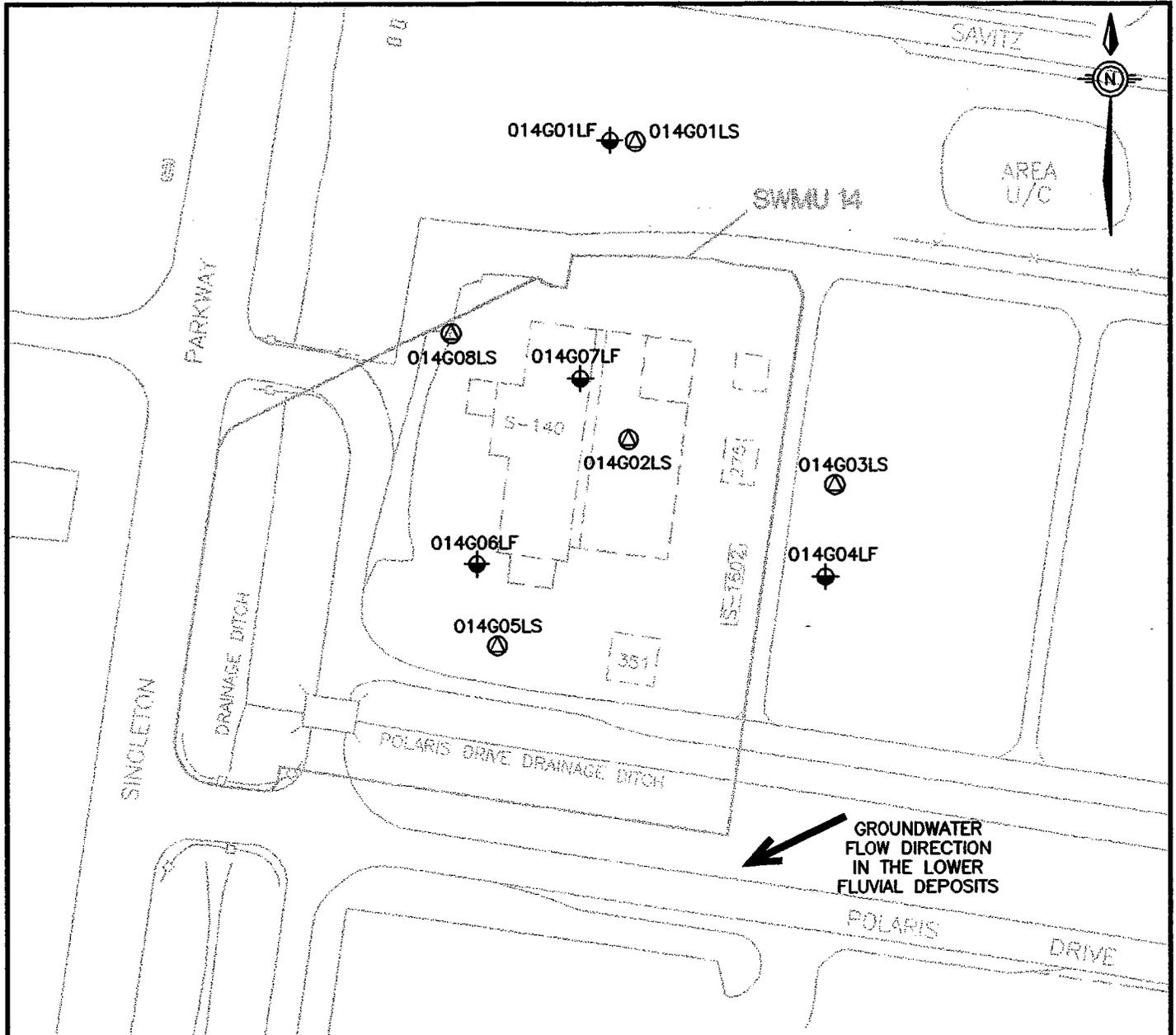
SWMU'S 39 AND 14/46
 INVESTIGATION WORK PLAN
 NSA MID-SOUTH
 MILLINGTON, TENNESSEE

FIGURE 2
 SWMU 39-BUILDING-74 FOUNDATION
 MONITORING WELL LOCATIONS

DWG DATE: 09/11/00 | DWG NAME: 0146W002

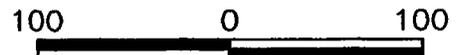
ATTACHMENT B

SWMUs 14 and 46 EXISTING MONITORING WELL LOCATIONS



LEGEND

- △ - LOESS MONITORING WELL
LOCATION AND DESIGNATION
- ⊕ - LOWER FLUVIAL DEPOSITS MONITORING WELL
LOCATION AND DESIGNATION



SCALE FEET



SWMU'S 39 AND 14/46
WORK PLAN INVESTIGATION
NAVAL SUPPORT ACTIVITY MID-SOUTH
MILLINGTON, TENNESSEE

FIGURE 1
MONITORING WELL LOCATIONS
SWMU 14 - BUILDING S-140 AND
SEVENTH AVENUE DRAINAGE DITCH

DWG DATE: 09/11/00

DWG NAME: 0146W001