

FINAL



FORS COM

CORRECTIVE ACTION PLAN

Part A



3d Inf Div (Mech)

**Underground Storage Tank 112
Building 8464
Facility Identification Number: 9-025108
Hunter Army Airfield, Georgia**

Prepared for



U.S. ARMY CORPS OF ENGINEERS
SAVANNAH DISTRICT

Contract No. DACA21-95-D-0022
Delivery Order 0019

February 1999

98-199P(PPT-8Fiery)/020999



DOCUMENT 10.1

FINAL

**CORRECTIVE ACTION PLAN - PART A REPORT
FOR
UNDERGROUND STORAGE TANK 112
BUILDING 8464
FACILITY IDENTIFICATION NUMBER: 9-025108
HUNTER ARMY AIRFIELD, GEORGIA**

Prepared for:

**U.S. Army Corps of Engineers - Savannah District
and
Fort Stewart Directorate of Public Works
Under Contract Number DACA21-95-D-0022
Delivery Order 0019**

Prepared by:

**Science Applications International Corporation
800 Oak Ridge Turnpike
Oak Ridge, Tennessee 37831**

February 1999

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List of Abbreviations and Acronyms

ACE	Anderson Columbia Environmental, Inc.
ASTM	American Society for Testing and Materials
ATL	alternate threshold level
BDL	below detection limit
BGS	below ground surface
BLS	below land surface
BTEX	benzene, toluene, ethylbenzene, and xylene
BTL	below threshold level
CAP	Corrective Action Plan
CL	clay
COE	(U.S. Army) Corps of Engineers
CX	Center of Excellence
DOT	U.S. Department of Transportation
DPW	Directorate of Public Works
DQA	data quality assessment
DQCR	Daily Quality Control Report
DQO	data quality objective
DRO	diesel-range organics

EPA	U.S. Environmental Protection Agency
EPD	Environmental Protection Division
FS	Fort Stewart
GA DNR	Georgia Department of Natural Resources
GEL	General Engineering Laboratories
gpm	gallons per minute
GRO	gasoline-range organics
GUST	Georgia Underground Storage Tank
HAAF	Hunter Army Airfield
ID	inside diameter
IDW	investigation-derived waste
IWTP	Industrial Waste Treatment Plant
LCS	laboratory control sample
MCL	maximum contaminant level
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
mg/kg	milligrams per kilogram
MPR	Monthly Progress Report
MS	matrix spike
N/A	not applicable
NCO	noncommissioned officer
NRC	no regulatory criteria
OVM	organic vapor meter
PAHs	polynuclear aromatic hydrocarbons
PID	photoionization detector
ppm	parts per million
PVC	polyvinyl chloride
QA	quality assurance
QA/QC	quality assessment/quality control
QAPjP	Quality Assurance Project Plan
QC	quality control
QCSR	Quality Control Summary Report
RCRA	Resource Conservation and Recovery Act
RPD	relative percent difference
SAIC	Science Applications International Corporation
SAS	South Atlantic Savannah (Division)
SC	clayey sand
SC-SM	clayey, silty sand
SM	silty sand
SP-SC	poorly graded, clayey sand
SW	sand
TBD	to be determined
TCLP	Toxicity Characteristic Leaching Procedure
TOC	total organic carbon
TPH	total petroleum hydrocarbon
UNK	unknown
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey
UST	underground storage tank

USTMP
VOC

Underground Storage Tank Management Program
volatile organic compound

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CORRECTIVE ACTION PLAN PART A

Facility Name: UST 112, Building 8464 Street Address: Building 8464, HAAF

Facility ID: 9-025108 City: Savannah County: Chatham Zip Code: 31406

Latitude: 32°00'03"N Longitude: 81°09'13"W

Submitted by UST Owner/Operator:

Name: Thomas C. Fry/Environmental Branch

Company: U.S. Army/HQ 3d, Inf. Div. (Mech)

Address: DPW ERD ENV. Br. (Fry)
1557 Frank Cochran Drive

City: Fort Stewart State: Georgia

Zip Code: 31314-4928

Telephone: (912) 767-1078

Prepared by Consultant/Contractor:

Name: C. Allison Bailey

Company: SAIC

Address: P.O. Box 2502

City: Oak Ridge State: TN

Zip Code: 37831

Telephone: (423) 481-8719

I. PLAN CERTIFICATION:

A. UST Owner/Operator Certification

I hereby certify that the information contained in this plan and in all the attachments is true, accurate, and the plan satisfies all criteria and requirements of rule 391-3-15-09 of the Georgia Rules for Underground Storage Tank Management.

Name: Thomas C. Fry

Signature: Thomas C. Fry Date: 03/01/99

B. Registered Professional Engineer or Professional Geologist Certification

I hereby certify that I have directed and supervised the field work and preparation of this plan, in accordance with State Rules and Regulations. As a registered professional geologist and/or professional engineer, I certify that I am a qualified groundwater professional, as defined by the Georgia State Board of Professional Geologists. All of the information and laboratory data in this plan and in all of the attachments are true, accurate, complete, and in accordance with applicable State Rules and Regulations.

Name: John B. Reeves, P.E.

Signature: John B. Reeves

Date: 1-22-99



General: READ THE GUIDANCE DOCUMENT FOR CAP PART-A BEFORE COMPLETING THIS FORM. FAILURE TO READ THE GUIDANCE DOCUMENT WILL MOST LIKELY RESULT IN PREPARATION OF AN UNACCEPTABLE REPORT. All text, figures, and tables requested in their respective sections should be prepared strictly in accordance with the Georgia EPD CAP-A guidance document. Please fill out this form as provided. Do not change the size of the fields or alter the placement of each section on each page.

(Appendix I: All Report Figures)

(Appendix II: All Report Tables)

II. INITIAL RESPONSE REPORT

A. Initial Abatement

Were initial abatement actions initiated?

YES _____ NO X

If Yes, please summarize. If No, please explain why not.

Actions were not required to abate imminent hazards and/or emergency conditions at the underground storage tank (UST) 112, Building 8464 site. Therefore, contaminant migration and release prevention, fire and vapor mitigation, or emergency free product removal were not performed prior to, or during, the removal of UST 112.

B. Free Product Removal

(Table 1: Summary of Free Product Removal – must include Free Product thickness in each well in which it was detected, and volume of product removed)

Free Product Detected?

YES _____ NO X

If Yes, please summarize free product recovery efforts.

Continuing free product recovery proposed?

YES _____ NO X

If yes, please indicate the method and frequency of removal.

C. Tank History

List current and former UST's operated at site based on owner/operator knowledge consistent with EPA 7530-1 Form). Systems must be illustrated on Figure 2 (Site Plan), as described in section D below.

CURRENT UST SYSTEMS (if applicable)

<u>Tank ID Number</u>	<u>Capacity (gal)</u>	<u>Substance Stored</u>	<u>Age (yrs)</u>	<u>Meets 1998 Upgrade Standards (Yes/No)</u>
N/A	N/A	N/A	N/A	N/A

FORMER UST SYSTEMS (if applicable)

<u>Tank ID Number</u>	<u>Capacity (gal)</u>	<u>Substance Stored</u>	<u>Date Removed</u>
112	550	diesel	September 24, 1996

D. Initial Site Characterization

(Figure 1: Vicinity/Location Map)

(Figure 2: Site Plan)

1. Regulated Substance Released (gasoline, diesel, used oil, etc.): diesel
Discuss how this determination was made and circumstances of discovery.

Characterization of petroleum-related contamination at the site was initiated during UST system closure activities on September 24, 1996, by Anderson Columbia Environmental, Inc. (ACE). Following the removal of UST 112, the ancillary piping was purged and closed in place by filling with grout. Two soil samples were collected from the excavation pit at reported depths of 6 and 12 feet below ground surface (BGS) (Figure 7). The soil samples did not contain contaminant concentrations that exceeded Georgia Environmental Protection Division (GA EPD) applicable soil threshold levels (i.e., Table A, column 1). However, elevated total petroleum hydrocarbon-diesel-range organics (TPH-DROs) were detected in both samples 8102-TK112-S1 and 8102-TK112-S2 (Table 5a). Groundwater was not sampled from the tank pit during UST closure activities.

2. Source(s) of Contamination: Unknown; piping leakage or tank overflow suspected
Discuss how this determination was made.

Although ACE (1996) presented a diagram showing approximate locations of the former UST and associated dispensers, a detailed schematic diagram is not available. During tank removal activities by ACE, holes in the UST were not reported. Therefore, the major source of contamination at the UST 112, Building 8464, Facility ID: 9-025108 site is believed to have been piping leakage or tank overflow.

3. Local Water Resources

(Figure 3: Quadrangle Map - Public and Private drinking water and surface water)

(Appendix III: Water resources survey documentation, including, but not limited to: USGS database search, interview forms, and documentation of field survey)

- a. Site located in high/average X OR low _____ groundwater pollution susceptibility area?
- b. Water Supplies within applicable radii? YES X NO _____
If yes,
i. Nearest public water supply located within: 250 feet
ii. Nearest down-gradient public water supply located within: 10,400 feet
iii. Nearest non-public water supply located within: 4,800 feet
iv. Nearest down-gradient non-public water supply located within: > 4,800 feet
- c. Surface Water Bodies and sewers:
i. Nearest surface water located within: 1,680 feet
ii. Nearest down-gradient surface water located within: 1,680 feet
iii. Nearest storm or sanitary sewer located within: 880 feet
iv. Depth to bottom of sewer at a point nearest the plume: 4.0 feet

4. Impacted Environmental Media

a. Soil Impacted

(Table 2: Soil Analysis Results)

(Figure 4: Soil Quality Map)

(Appendix IV: Soil Boring Logs)

(Appendix V: Soil Laboratory Reports)

(Appendix VI: ATL Calculations, if applicable)

Provide a brief discussion of soil sampling.

Continuous direct-push soil cores were collected at 2.0-foot intervals during the installation of 5 boreholes (G-1 through G-4, and G-7). Field headspace gas analyses were performed on each sample to determine organic vapor concentration. Two soil samples were selected from each borehole for laboratory chemical analysis of benzene, toluene, ethylbenzene, and xylene (BTEX); TPH gasoline-range organics/diesel-range organics (GROs/DROs); and polynuclear aromatic hydrocarbons (PAHs). In boreholes where organic vapors were detected, one sample was collected from the 2.0-foot interval where the highest vapor concentration was recorded, and the other from the 2.0-foot interval located immediately above the saturated zone. If organic vapors were not detected, one sample was collected from the 2.0-foot interval directly below ground surface, and the other from the 2.0-foot interval located immediately above the saturated zone. In addition, an undisturbed (Shelby-tube) soil sample (G-6) was collected and analyzed for geochemical parameters to determine vadose zone and aquifer characteristics at the site. The results are presented in Appendix VI, Table VI-A. Refer to Attachment A for complete documentation of the technical approach implemented during this investigation.

i. *Soil contamination above applicable threshold levels?*

YES _____ NO X

If yes, indicate highest concentrations in soil along with locations and depths detected.

ii. *ATLs calculated?*

YES _____ NO X

If yes, present ATLs.

iii. *If ATL's calculated, is soil contamination above ATL's?*

YES _____ NO _____ N/A X

b. *Groundwater Impacted*

(Table 3: Groundwater Analysis Results)

(Figure 5: Groundwater Quality Map)

(Appendix VII: Monitoring Well Details)

(Appendix VIII: Groundwater Laboratory Results)

Provide a brief discussion of groundwater sampling.

At each borehole location (G-1 through G-4, and G-7), one groundwater sample was collected from a depth interval of approximately 1.0 to 5.0 feet below the saturated zone using a direct-push sampling device. At the vertical profile location (G-5), discrete groundwater samples were collected every 10 feet below the saturated zone down to approximately 46 feet BGS. The vertical profile was terminated at this depth when it was determined that the Hawthorn unit (confining layer) had been encountered. Chemical parameters for groundwater samples submitted for laboratory analysis included BTEX and PAHs. Refer to Attachment A for complete documentation of the technical approach used to collect groundwater samples.

i. *Groundwater contamination above MCLs?* YES _____ NO X

ii. *Groundwater contamination above In-Stream Water Quality Standards?*

YES _____ NO X

If yes, indicate highest concentrations in groundwater along with the locations.

- c. *Surface Water Impacted?* YES _____ NO X
If Yes, indicate concentration(s) of surface water sample(s) taken from the surface water body/bodies impacted.

- d. *Point of Withdrawal Impacted?* YES _____ NO _____ N/A X
If Yes, indicate concentration(s) of water sample(s) taken from withdrawal point(s).

5. Other Geologic/Hydrogeologic Data

- a. *Depth to Groundwater:* 3.14 to 3.47 feet BGS (Table 4: Groundwater Elevations)
b. *Groundwater Flow Direction:* southwest (Figure 6: Potentiometric Surface Map)
c. *Hydraulic Gradient:* 0.013 feet/feet
d. *Geophysical Province:* Coastal Plain
e. *Unique geologic/hydrogeological conditions:* None

6. Corrective Action Completed or In-Progress (if applicable)

(Table 5: UST System Closure Sampling)
(Figure 7: UST System Closure Sampling)
(Appendix IX: Contaminated Soil Disposal Manifests)

- a. *Underground Storage Tank (UST) System Closure:* N/A _____
If applicable, summarize UST system closure activities conducted.

ACE removed UST 112 on September 24, 1996. The UST piping was drained into the tank, and all remaining contents were subsequently removed using a vacuum truck and/or compressor-driven barrel vacuum device. The piping was then closed in place by filling with grout. A backhoe was used to excavate down to the tank top. After the tank atmosphere was tested with a combustible gas indicator, all accessible tank openings were capped and the tank was lifted from the excavation pit.

b. Excavation and Treatment/Disposal of Backfill Materials and Native Soils

Check one: *No UST removal performed* _____

Returned to UST excavation _____

Excavated soils treated or disposed off site X

If soils were excavated, summarize excavation and treatment/disposal activities:

Approximately 37.49 tons of soil were removed from the Building 8464 site and stockpiled at the ACE temporary soil containment area located at Hunter Army Airfield (HAAF), where it was tested in accordance with the disposal facility requirements. The soil was transported to Kedesh, Inc., Highway 84, Ludowici, GA 31316. The Installation has records of all manifests and weight tickets for the total project. However, site-specific information is not available.

7. Site Ranking:

Environmental Site Sensitivity Score: 0
(Appendix X: Site Ranking Form)

8. Conclusions and Recommendations

Complete applicable section below, one section only

a. No Further Action Required (if applicable) N/A _____
(provide justification)

The groundwater and soil analytical data collected during the Corrective Action Plan (CAP) - Part A investigation are sufficient to define the nature and extent of petroleum contamination at the site. The results of the investigation indicate that site conditions do not exceed groundwater maximum contaminant levels (MCLs) or the applicable soil threshold levels (see Tables 2 and 3). Therefore, further investigation of the UST 112, Building 8464 site is not required.

b. Monitoring Only (if applicable) N/A X
(provide justification)

c. CAP-B (if applicable) N/A X
(provide justification)

III. MONITORING ONLY PLAN (if applicable):

N/A X

A. Monitoring points

B. Period/Frequency of monitoring and reporting

C. Monitoring Parameters

D. Milestone Schedule

E. Scenarios for site closure or CAP-Part B

IV. SITE INVESTIGATION PLAN (if applicable):

N/A X

(Figure 8: Proposed additional boring/monitoring well location)

A. Proposed Investigation of Horizontal and Vertical Extent of Contamination In:

1. Soil

N/A X

2. Groundwater

a. Free Product

N/A X

b. Dissolved phase

N/A X

3. Surface Water

N/A X

B. Proposed Investigation of Vadose Zone And Aquifer Characteristics:

V. PUBLIC NOTICE

(Figure 9. Tax Map)

(Appendix XI: Copies of public notification letters & certified return receipts or newspaper notice if approved)

UST 112, Building 8464, Facility ID: 9-025108, is located within the confines of the HAAF, which is part of the Fort Stewart Military Reservation, a federally owned facility. All of the property contiguous to the site is owned by the U.S. Government. The Fort Stewart Directorate of Public Works has complied with the public notice requirements defined by Georgia Department of Natural Resources (GA DNR) guidance by publishing an announcement in the local newspaper over a period of 2 weeks. Publication of this announcement has been completed simultaneously with the submittal of this CAP-Part A report for review by the GA DNR Environmental Protection Division Underground Storage Tank Management Program (USTMP). A copy of the newspaper announcement used for public notification is presented in Appendix XI.

VI. CLAIM FOR REIMBURSEMENT (for GUST Trust Fund sites only): N/A X
(Appendix XII: GUST Trust Fund Reimbursement Application and Claim for reimbursement)

The HAAF is a federally owned facility and has funded the investigation for the UST 112, Building 8464 site, Facility ID: 9-025108, using Environmental Restoration Account funds. Application for Georgia Underground Storage Tank Trust Fund reimbursement is not being pursued at this time.

APPENDIX I

REPORT FIGURES

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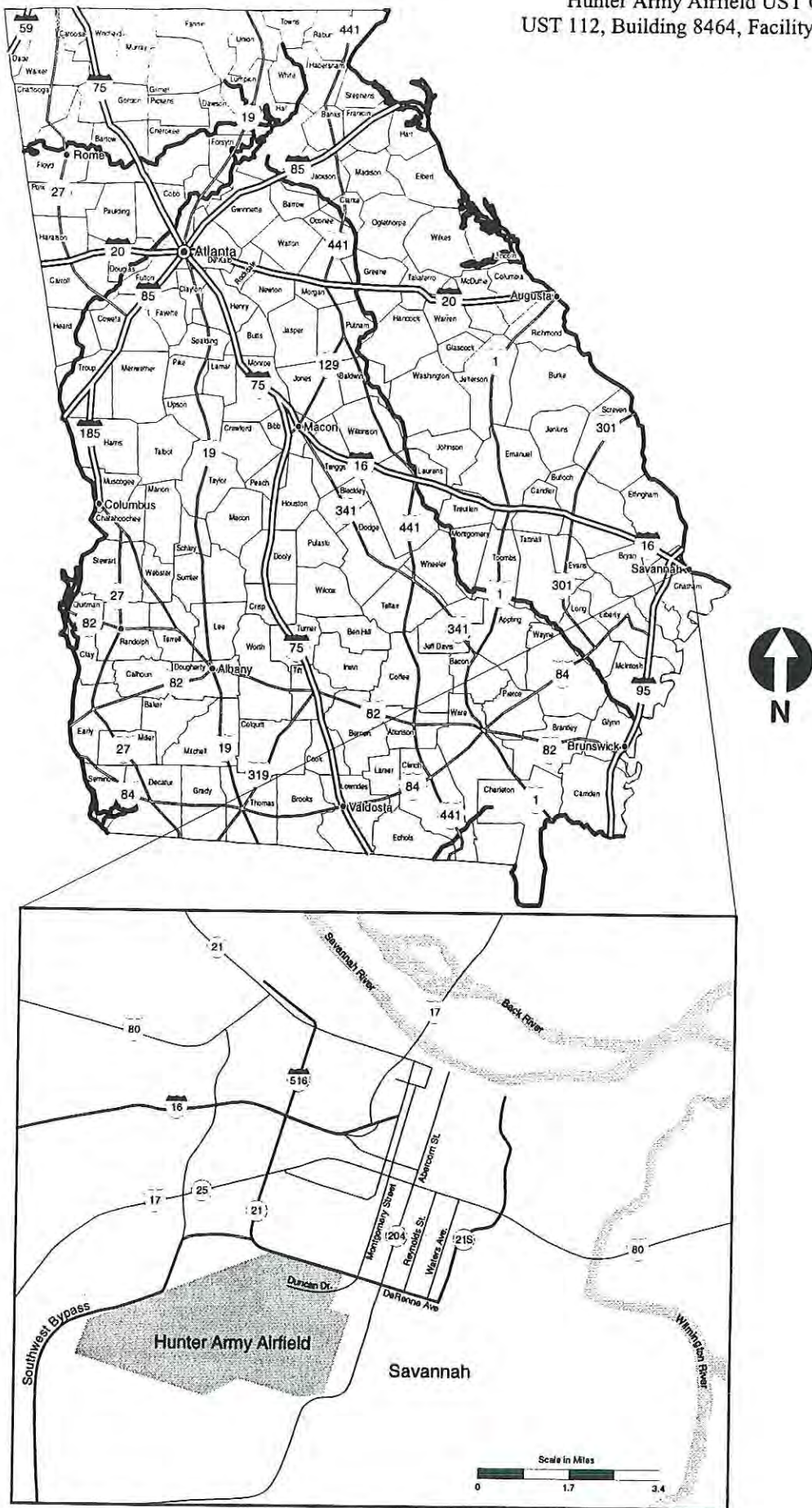


Figure 1. Location Map of Hunter Army Airfield, Chatham County, Georgia

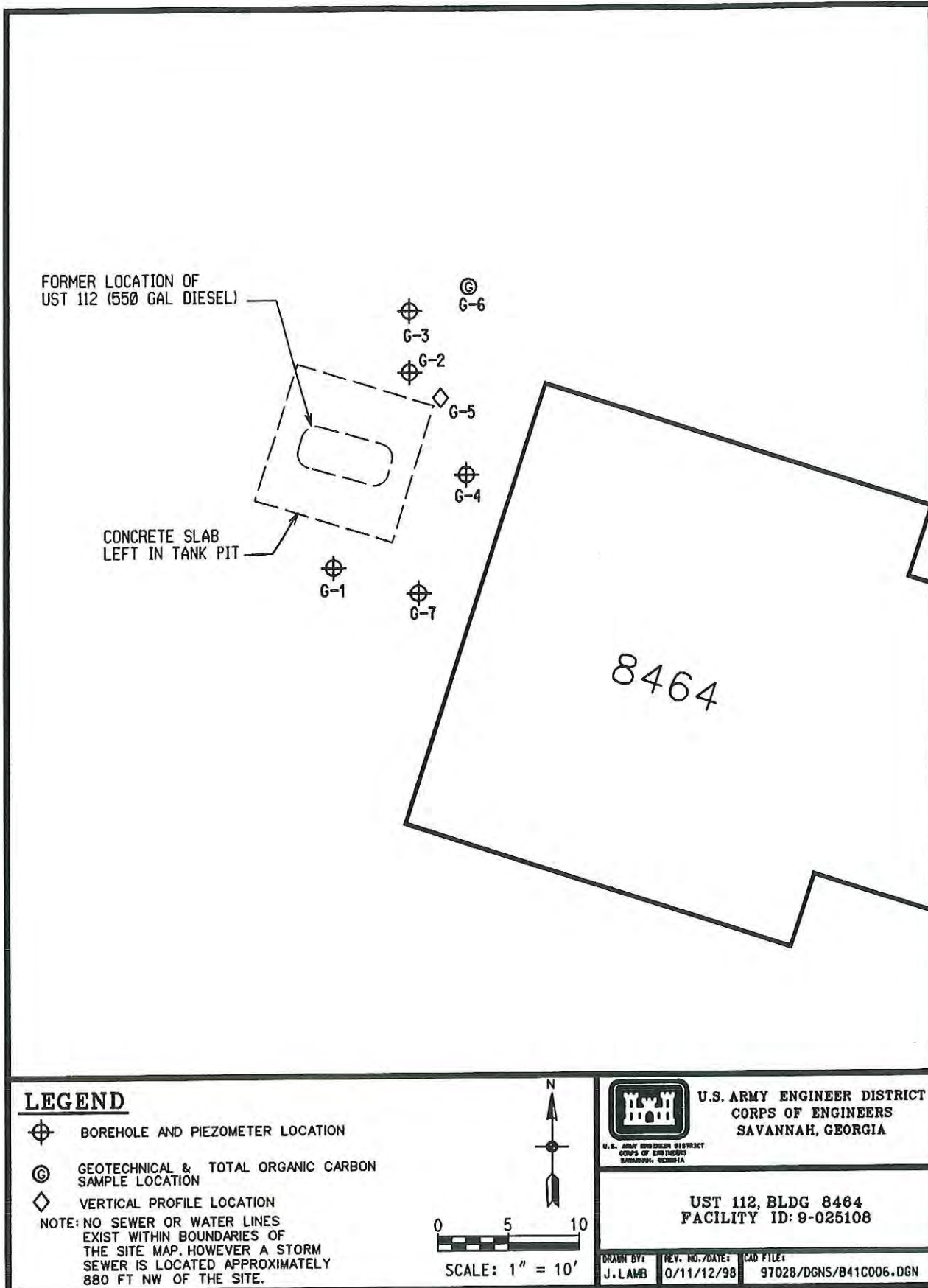
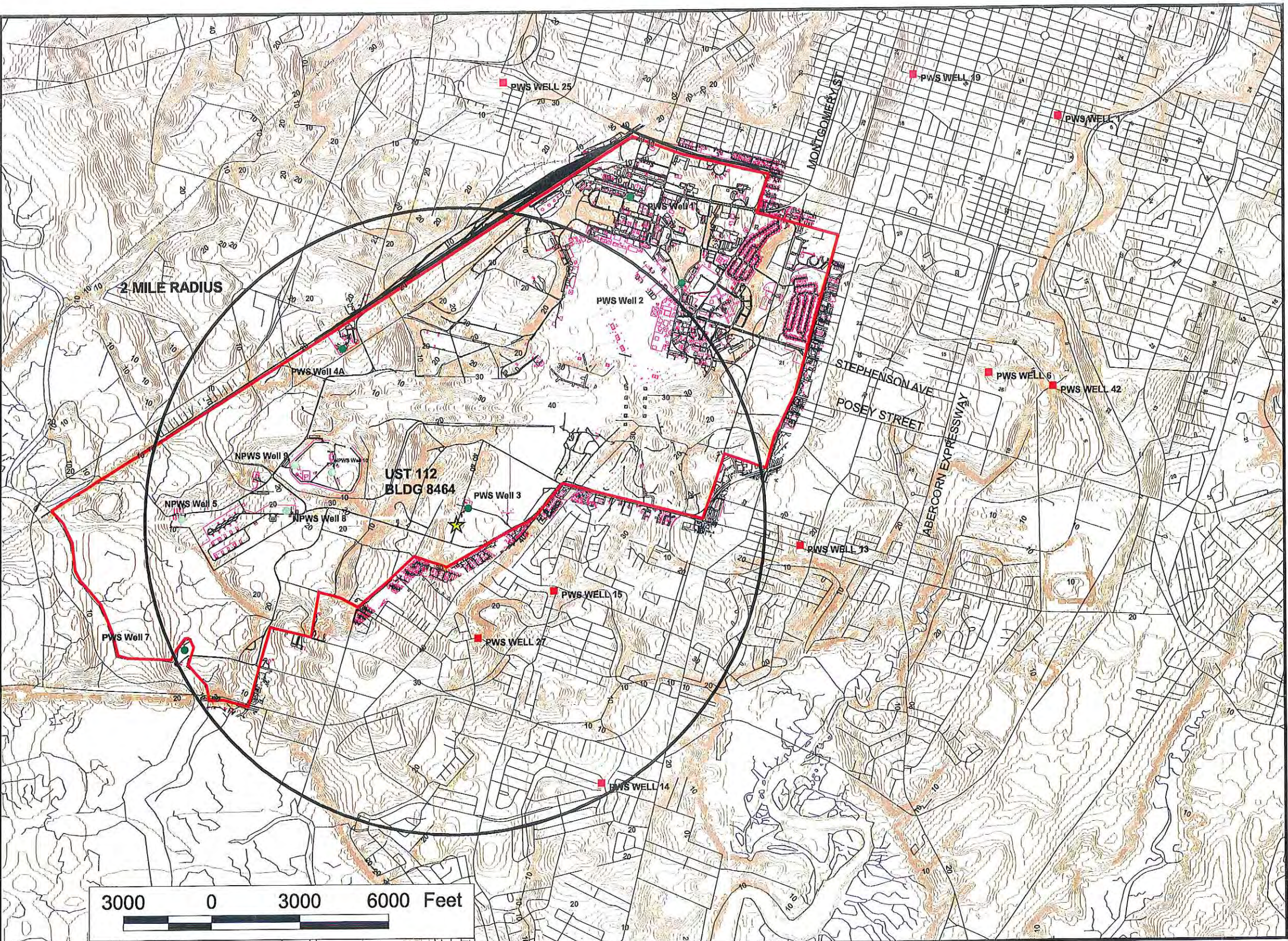


Figure 2. Site Plan for the UST 112, Building 8464 Site Investigation



Legend:

- Hunter Army Airfield Boundary
- ~ Surface Water (streams/rivers/drains)
- ~ Railroad
- ~ Roads (primary)
- ~ Buildings and Planimetric Features
- ~ Ground Contour (1 FT Intervals)
- HAAF Non-Public Water Supply Well
- HAAF Public Water Supply Well
- City of Savannah Public Water Supply Well

NOTE:

Contours were created from Digital Elevation Models translated from <http://mapping.usgs.gov/>, which were obtained from the following U.S.G.S. 7.5 minute Topographic Quad sheets: Boroughs, Isle of Hope, Savannah, and Garden City. Roads, surface water, and railroad were translated from <http://www.gis.state.ga.us/>. Hunter Army Airfield BaseMap received as Microstation files from Fort Stewart.



GA State Plane NAD83 (feet)

SAIC
Science Applications
International Corporation

UST 112, BLDG 8464
FACILITY ID: 9-025108

REVISION	DRAWN BY:	CHKD BY:	DATE:
0	M.Norris	A. Bailey	11/16/98

FILE REFERENCES

051rds polyline
051hyd polyline
051tr
hunterarea

burroughstcrf
isleofhopectrf
savannahctrf
gardencityctrf
trveh.dgn
bggen.dgn

SHT 1 of 1
DRAWING #

G:\97028ust112.APR
ARCVIEW PROJECT NAME

Figure 3a. Topographic Quadrangle Map of Hunter Army Airfield and Surrounding Area

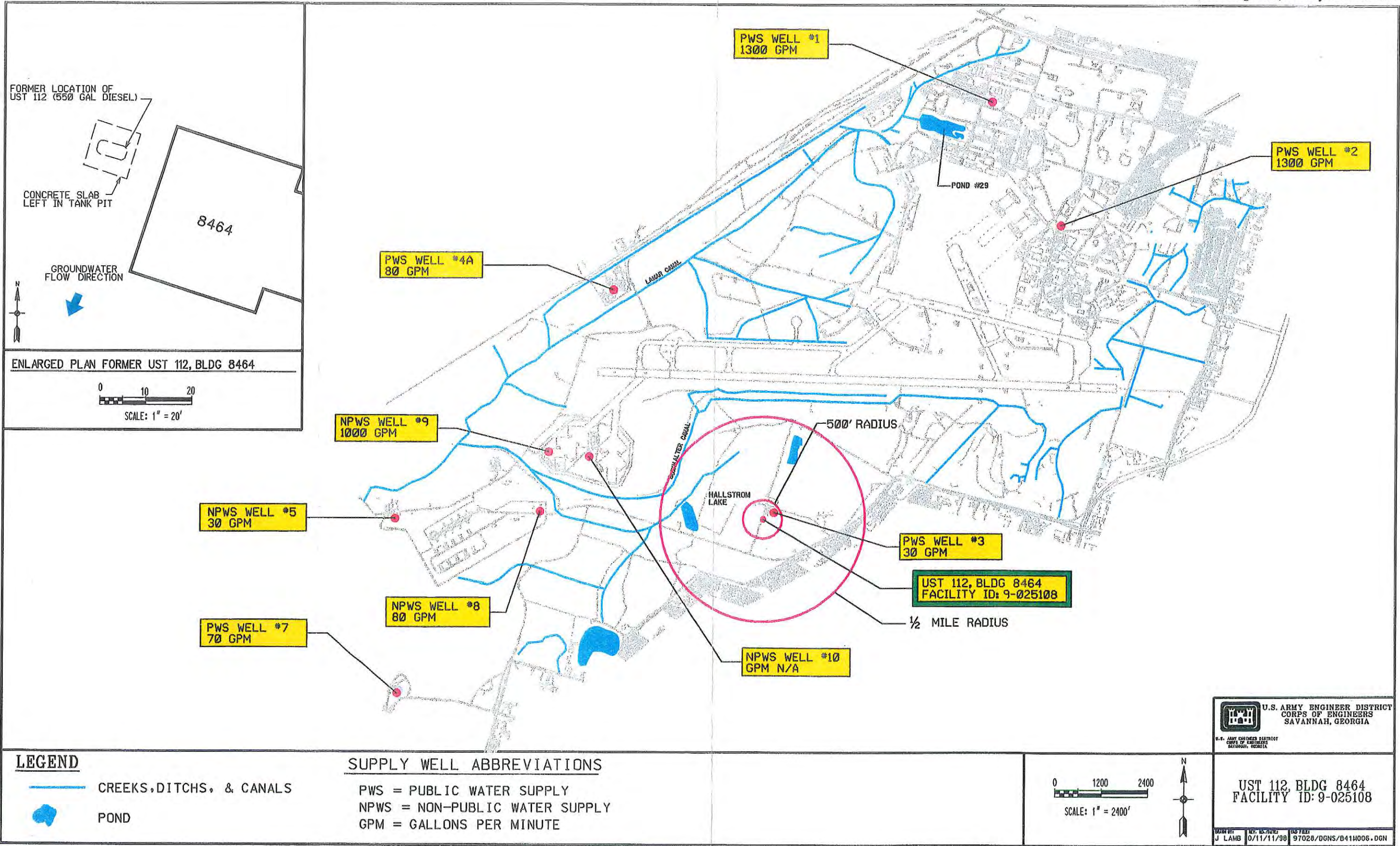


Figure 3b. Detailed Map Showing Public and Private Drinking Water Sources and Surface Water Bodies at Hunter Army Airfield

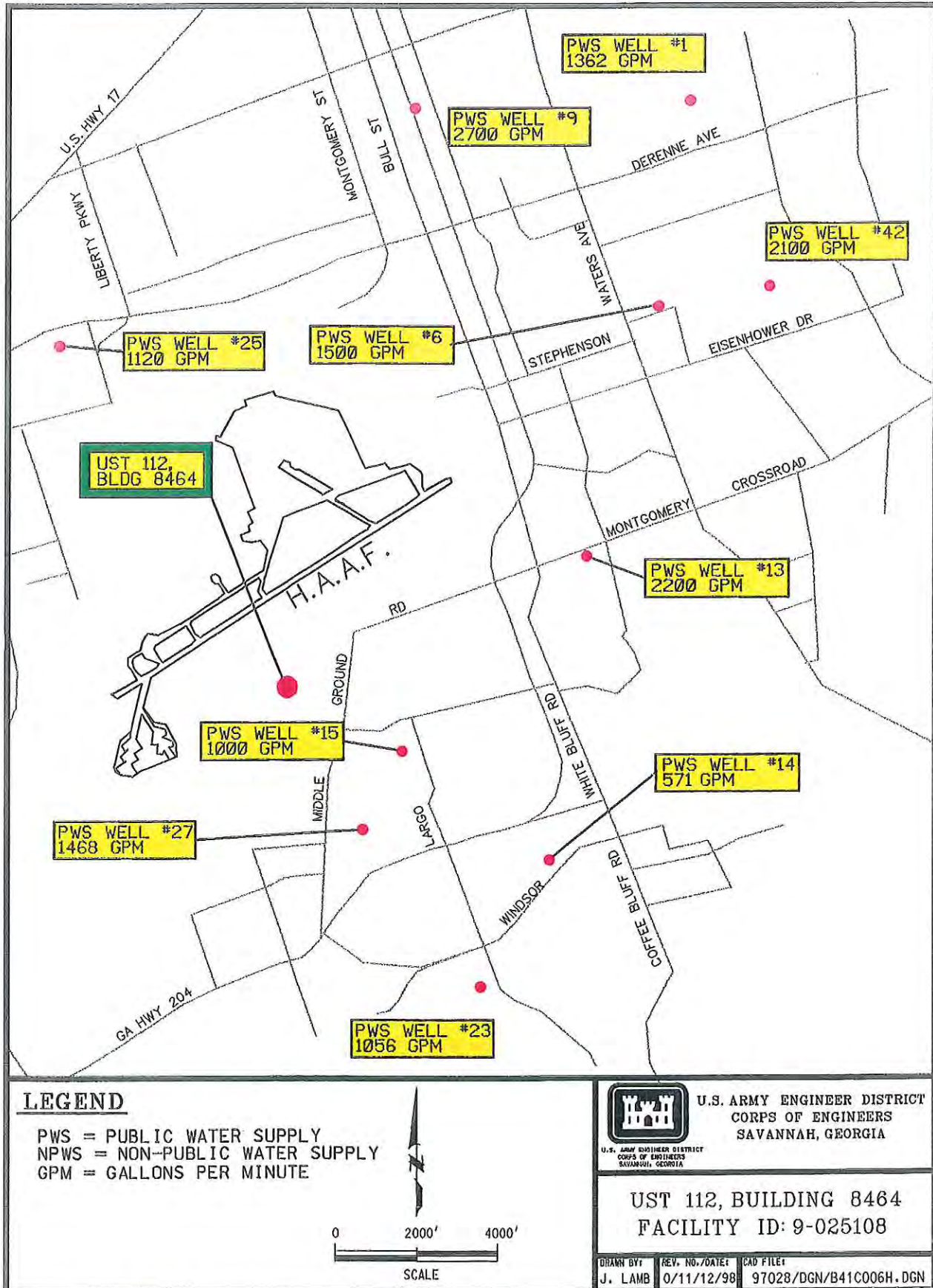


Figure 3c. Detailed Map Showing Public and Private Drinking Water Sources
in Areas Adjacent to Hunter Army Airfield

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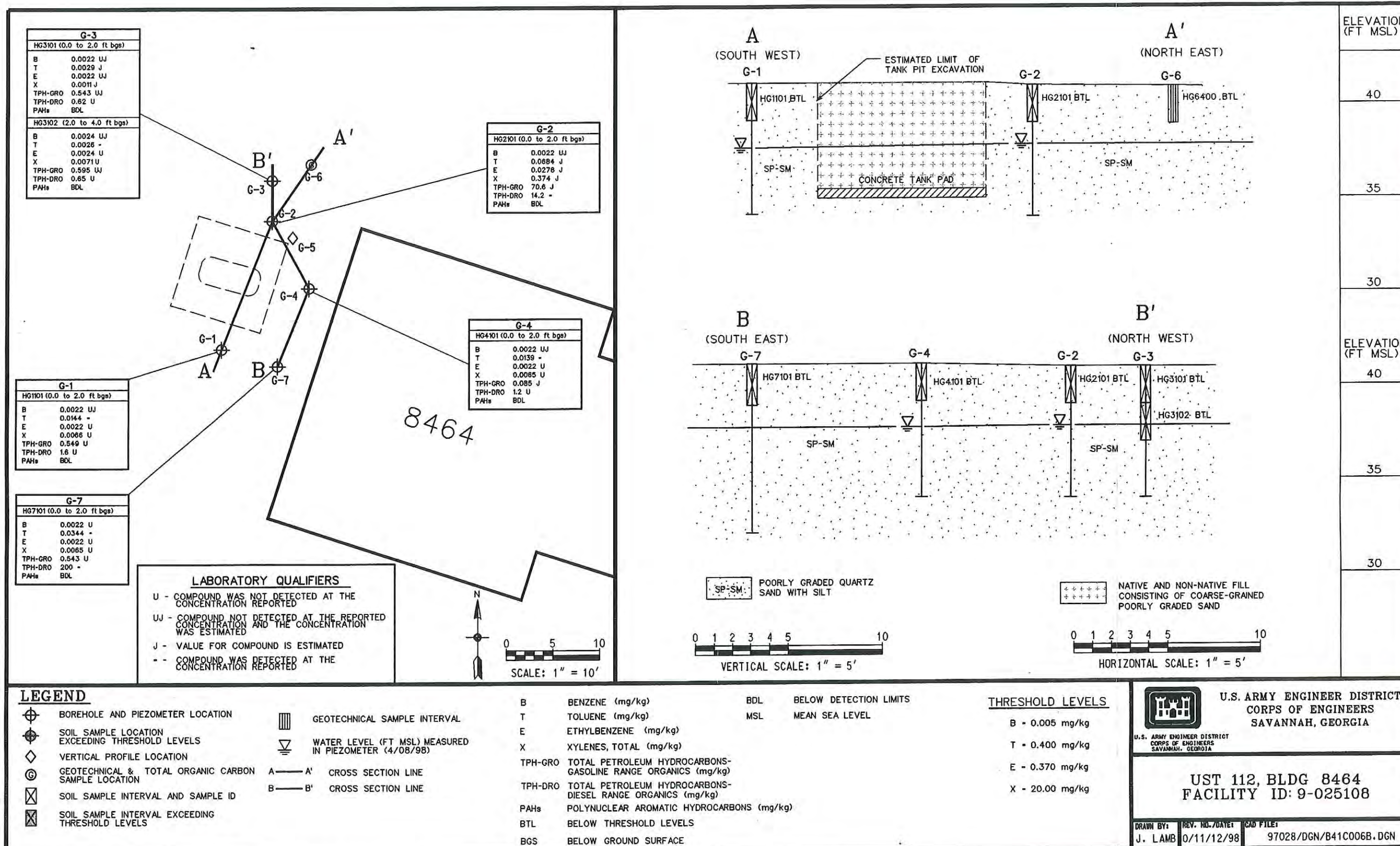


Figure 4. Soil Quality Map of the UST 112, Building 8464 Site

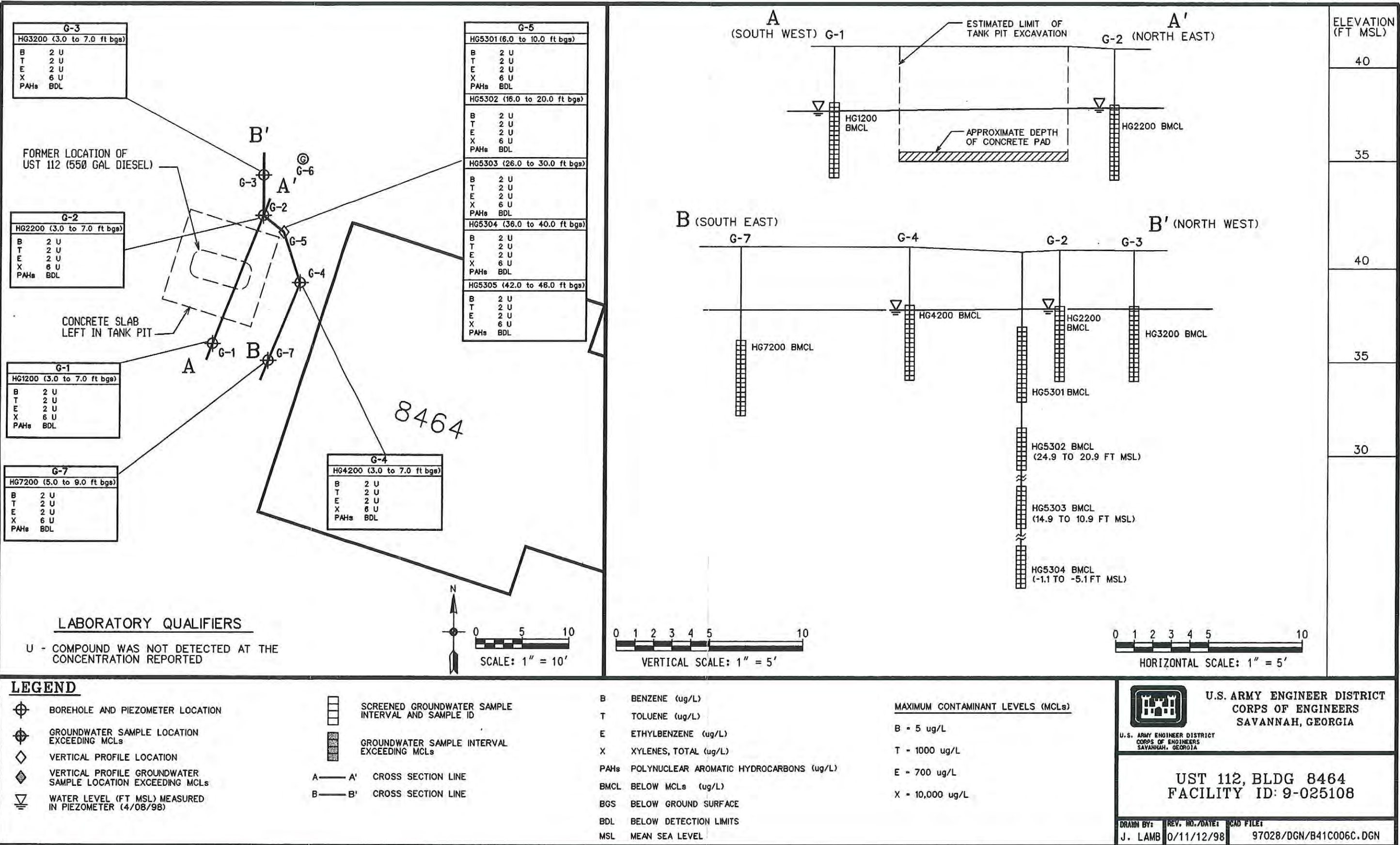


Figure 5. Groundwater Quality Map of the UST 112, Building 8464 Site

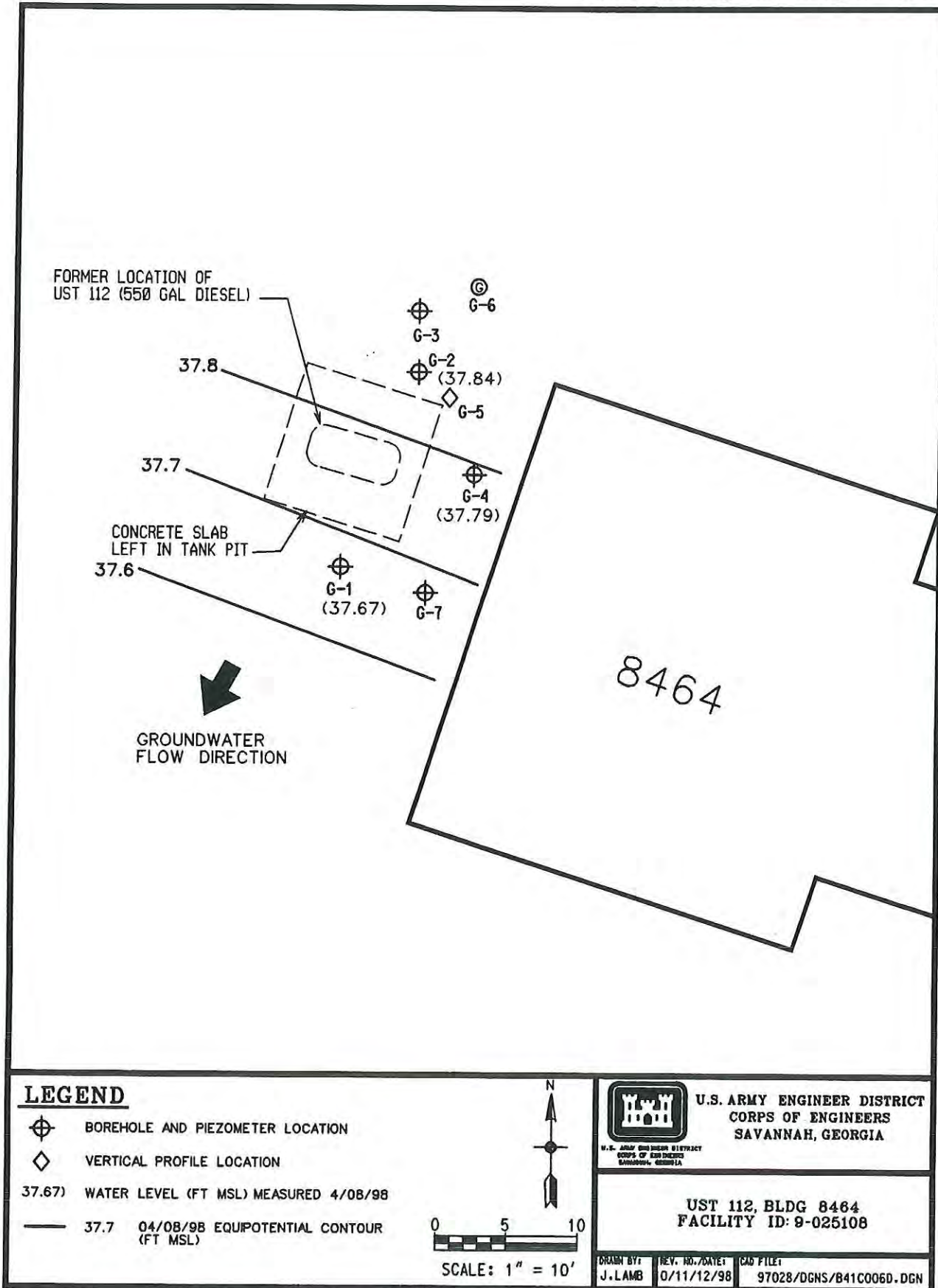


Figure 6. Potentiometric Surface Map of the UST 112, Building 8464 Site

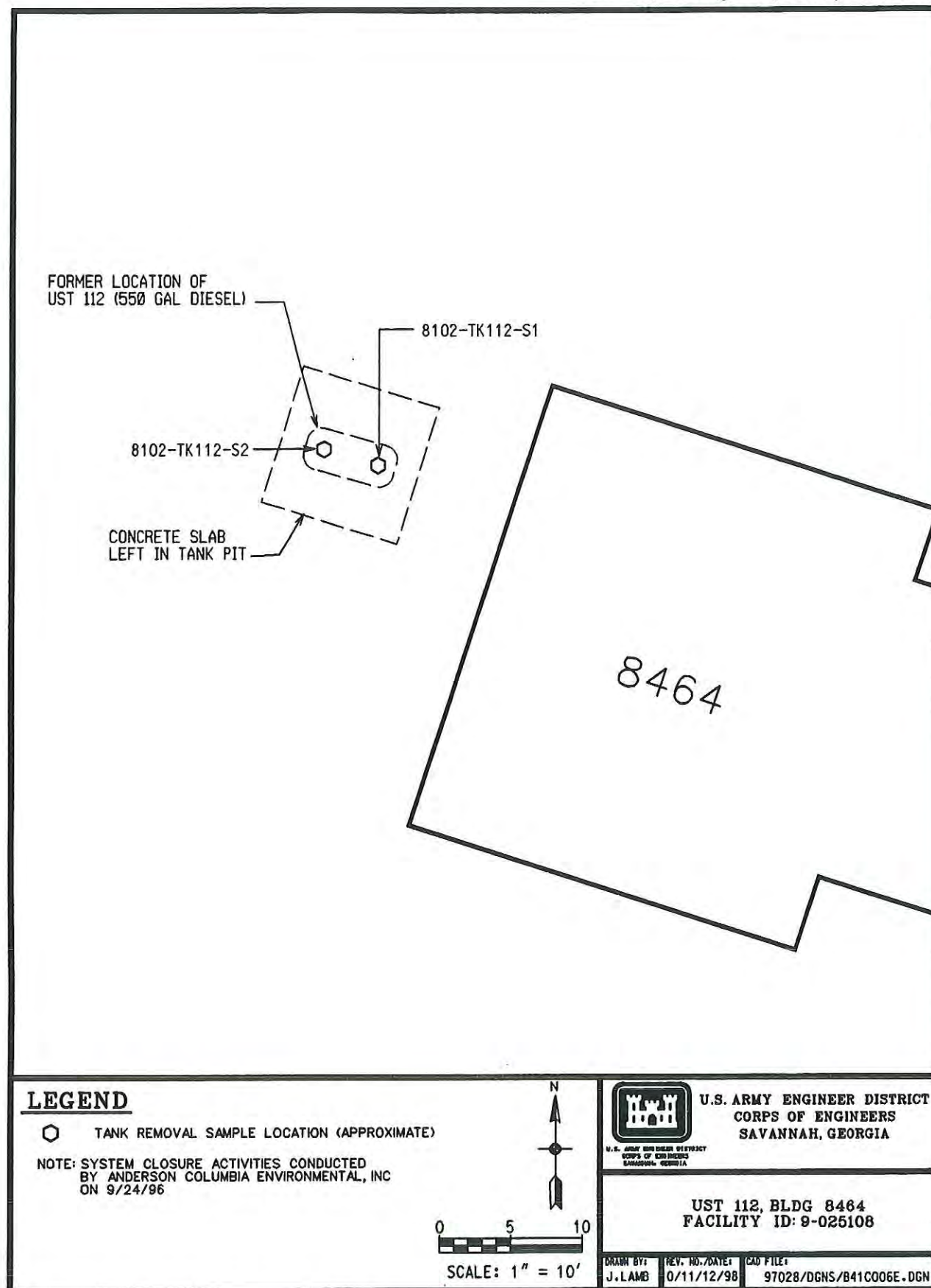


Figure 7. UST System Closure Sampling Locations at the UST 112, Building 8464 Site

**NOT APPLICABLE FOR THE UST 112, BUILDING 8464,
FACILITY ID: 9-025108 SITE INVESTIGATION**

Figure 8. Proposed Additional Boring/Monitoring Well Locations

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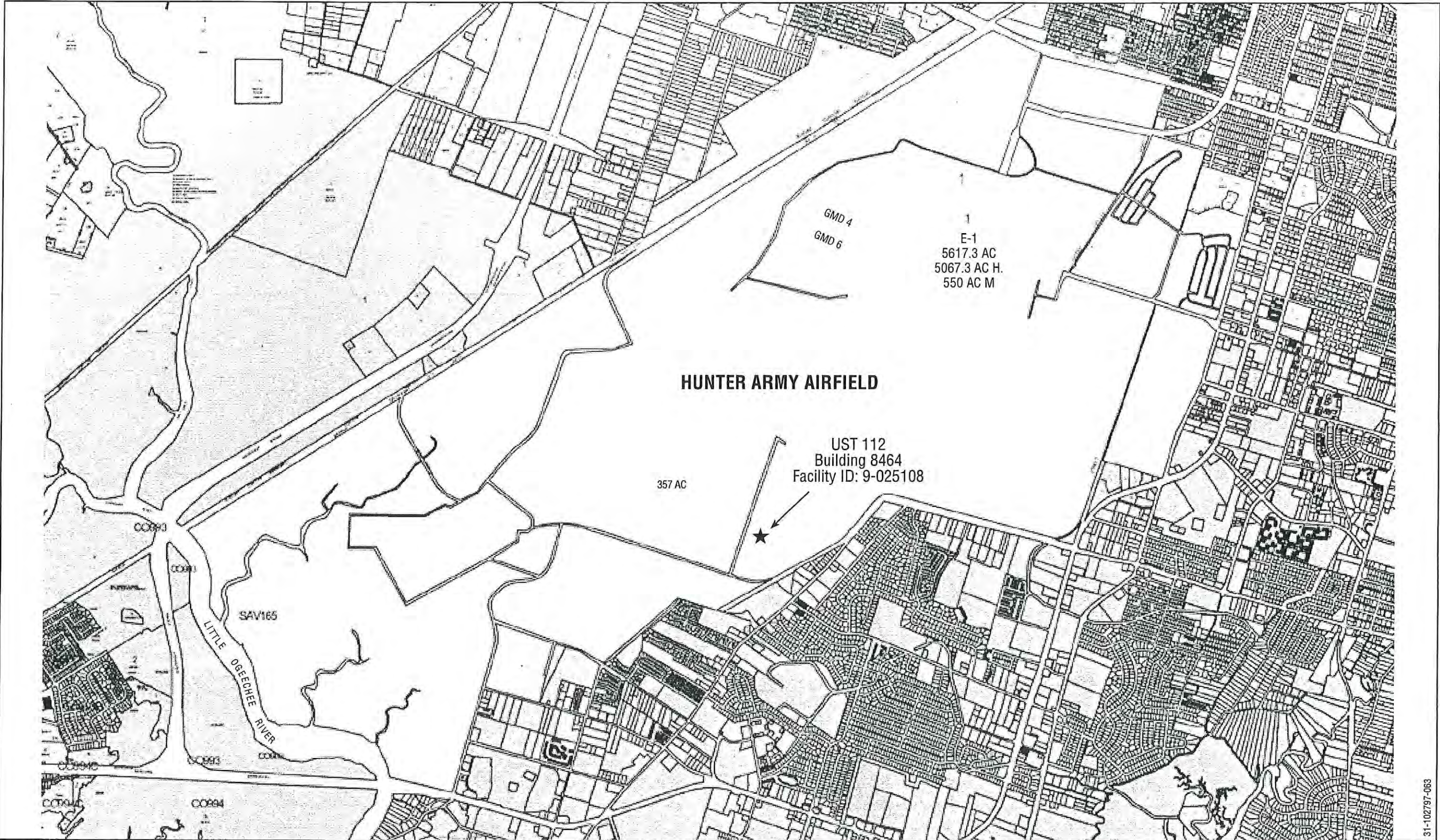


Figure 9. Tax Map of Hunter Army Airfield and Vicinity, Chatham County, Georgia



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APPENDIX II

REPORT TABLES

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UST 112, Building 8464
Hunter Army Airfield
Chatham County, Facility ID: 9-025108

TABLE 1: FREE PRODUCT REMOVAL

Monitoring Well Number: N/A				
Date of Measurement	Groundwater Elev. (ft MSL)	Product Thickness ¹ (ft)	Corrected Water Elev. (ft MSL)	Product Removed (gal)
TOTAL				NONE ¹

Monitoring Well Number: N/A				
Date of Measurement	Groundwater Elev. (ft MSL)	Product Thickness (ft)	Corrected Water Elev. (ft MSL)	Product Removed (gal)
TOTAL				NONE ¹

NOTE: MSL - mean sea level.

¹Free product was not found.

UST 112, Building 8464
Hunter Army Airfield
Chatham County, Facility ID: 9-025108

TABLE 2a: SOIL ANALYTICAL RESULTS³
(VOLATILE ORGANIC COMPOUNDS)

Sample Location	Sample ID	Depth (ft BGS)	Date Sampled	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)	Total BTEX ² (mg/kg)	TPH-DRO (mg/kg)	TPH-GRO (mg/kg)
G-1	HG1101	0.0 to 2.0	04/06/98	0.0022 UJ	0.0144 =	0.0022 U	0.0066 U	0.0144	1.6 U	0.549 U
G-2	HG2101	0.0 to 2.0	04/06/98	0.0022 UJ	0.0684 J	0.0278 J	0.374 J	0.4702	14.2 =	70.6 J
G-2	HG2110	0.0 to 2.0	04/06/98	0.0024 J	0.056 J	0.0597 J	0.605 J	0.7231	1760 =	77.5 J
G-3	HG3101	0.0 to 2.0	04/06/98	0.0022 UJ	0.0029 J	0.0022 UJ	0.0011 J	0.004	0.62 U	0.543 UJ
G-3	HG3102	2.0 to 4.0	04/06/98	0.0024 UJ	0.0026 =	0.0024 U	0.0071 U	0.0052	0.65 U	0.595 UJ
G-4	HG4101	0.0 to 2.0	04/06/98	0.0022 UJ	0.0139 =	0.0022 U	0.0065 U	0.0139	1.2 U	0.085 J
G-7	HG7101	0.0 to 2.3	04/06/98	0.0022 U	0.0344 =	0.0022 U	0.0065 U	0.0344	200 =	0.543 U
G-7	HG7111	0.0 to 2.3	04/22/98	0.0022 U	0.015 =	0.0022 U	0.0065 U	0.015	71.7 =	1.09 U
Applicable Standards ¹				0.005	0.400	0.370	20.00	NRC	NRC	NRC

NOTE:

¹ Georgia Department of Natural Resources (GA DNR) Applicable Soil Threshold Levels (i.e., Table A, column 1).

² The total value reported represents the sum of all detected compounds. A total is not reported if all the compounds are below the laboratory detection limits.

³ All field work and analytical sampling were performed prior to the release of the new GA DNR Corrective Action Plan (CAP)-Part A Guidance (i.e., May 1998); therefore, the new analytical methods specified were not used.

BDL - Below detection limit

BGS - Below ground surface.

BTEX - Benzene, toluene, ethylbenzene, and xylene.

NRC - No regulatory criteria.

TPH-DRO - Total petroleum hydrocarbon-diesel-range organics.

TPH-GRO - Total petroleum hydrocarbon-gasoline-range organics.

Laboratory Qualifiers

U - Indicates the compound was not detected at the concentration reported.

J - Indicates the value for the compound is an estimated value.

UJ - Indicates the compound was not detected at the reported concentration and the concentration was estimated.

= - Indicates the compound was detected at the concentration reported.

UST 112, Building 8464
Hunter Army Airfield
Chatham County, Facility ID: 9-025108

TABLE 2b: SOIL ANALYTICAL RESULTS³
(POLYNUCLEAR AROMATIC HYDROCARBONS)

Sample Location	Sample ID	Depth (ft BGS)	Date Sampled	Detected PAH Compounds (mg/kg)				Total PAHs (mg/kg)
				BDL ²	BDL ²	BDL ²	BDL ²	
G-1	HG1101	0.0 to 2.0	04/06/98					BDL ²
G-2	HG2101	0.0 to 2.0	04/06/98					
G-2	HG2110	0.0 to 2.0	04/06/98					
G-3	HG3101	0.0 to 2.0	04/06/98					
G-3	HG3102	2.0 to 4.0	04/06/98					
G-4	HG4101	0.0 to 2.0	04/06/98					
G-7	HG7101	0.0 to 2.3	04/06/98					
G-7	HG7111	0.0 to 2.3	04/22/98					
Applicable Standards ¹								NRC

NOTE: ¹Georgia Department of Natural Resources (GA DNR) Applicable Soil Threshold Levels (i.e., Table A, column 1).
²BDL - Below detection limit; PAH compounds were not detected above the laboratory detection limit. Refer to Appendix V, Table V-A, for a complete list of PAH results.
³All field work and analytical sampling were performed prior to the release of the new GA DNR Corrective Action Plan (CAP)-Part A Guidance (i.e., May 1998); therefore, the new analytical methods specified were not used.
 BGS - Below ground surface.
 NRC - No regulatory criteria.
 PAHs - Polynuclear aromatic hydrocarbons.

UST 112, Building 8464
Hunter Army Airfield
Chatham County, Facility ID: 9-025108

TABLE 3a: GROUNDWATER ANALYTICAL RESULTS⁴
(VOLATILE ORGANIC COMPOUNDS)

Sample Location	Sample ID	Depth (ft BGS)	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)	Total BTEX ³ (µg/L)
G-1	HG1200	3.0 to 7.0	04/06/98	2 U	2 U	2 U	6 U	BDL ²
G-2	HG2200	3.0 to 7.0	04/06/98	2 U	2 U	2 U	6 U	BDL
G-3	HG3200	3.0 to 7.0	04/06/98	2 U	2 U	2 U	6 U	BDL
G-4	HG4200	3.0 to 7.0	04/06/98	2 U	2 U	2 U	6 U	BDL
G-5	HG5301	6.0 to 10.0	04/07/98	2 U	2 U	2 U	6 U	BDL
G-5	HG5302	16.0 to 20.0	04/07/98	2 U	2 U	2 U	6 U	BDL
G-5	HG5303	26.0 to 30.0	04/07/98	2 U	2 U	2 U	6 U	BDL
G-5	HG5304	36.0 to 40.0	04/07/98	2 U	2 U	2 U	6 U	BDL
G-5	HG5305	42.0 to 46.0	04/07/98	2 U	2 U	2 U	6 U	BDL
G-7	HG7200	5.0 to 9.0	04/22/98	2 U	2 U	2 U	6 U	BDL
Applicable Standards ¹				5	1,000	700	10,000	NRC

NOTE: ¹ U.S. Environmental Protection Agency maximum contaminant level.

² BDL - Below detection limit.

³ The total value reported represents the sum of all detected compounds. A total is not reported if all the compounds are below the laboratory detection limits.

⁴ All field work and analytical sampling were performed prior to the release of the new Georgia Department of Natural Resources (GA DNR) Corrective Action Plan (CAP)-Part A Guidance (i.e., May 1998); therefore, the new analytical methods specified were not used.

BGS - Below ground surface.

BTEX - Benzene, toluene, ethylbenzene, and xylene.

NRC - No regulatory criteria.

PAHs - Polynuclear aromatic hydrocarbons.

Laboratory Qualifiers

U - Indicates the compound was not detected at the concentration reported.

UST 112, Building 8464
Hunter Army Airfield
Chatham County, Facility ID: 9-025108

TABLE 3b: GROUNDWATER ANALYTICAL RESULTS⁴
(POLYNUCLEAR AROMATIC HYDROCARBONS)

Sample Location	Sample ID	Depth (ft BGS)	Date Sampled	Detected PAH Compounds (mg/kg)				Total PAHs (mg/kg)
				BDL ²	BDL ²	BDL ²	BDL ²	
G-1	HG1200	3.0 to 7.0	04/06/98					
G-2	HG2200	3.0 to 7.0	04/06/98					
G-3	HG3200	3.0 to 7.0	04/06/98					
G-4	HG4200	3.0 to 7.0	04/06/98					
G-5	HG5301	6.0 to 10.0	04/07/98					
G-5	HG5302	16.0 to 20.0	04/07/98					
G-5	HG5303	26.0 to 30.0	04/07/98					
G-5	HG5304	36.0 to 40.0	04/07/98					
G-5	HG5305	42.0 to 46.0	04/07/98					
G-7	HG7200	5.0 to 9.0	04/22/98					
Applicable Standards ¹								NRC

- NOTE: ¹ U.S. Environmental Protection Agency maximum contaminant level.
² BDL - Below detection limit; PAH compounds were not detected above the laboratory detection limit. Refer to Appendix VIII, Table VIII-A, for complete list of PAH results.
³ The total value reported represents the sum of all detected compounds. A total is not reported if all the compounds are below the laboratory detection limits.
⁴ All field work and analytical sampling were performed prior to the release of the new Georgia Department of Natural Resources (GA DNR) Corrective Action Plan (CAP)-Part A Guidance (i.e., May 1998); therefore, the new analytical methods specified were not used.
 BGS - Below ground surface.
 NRC - No regulatory criteria.
 PAHs - Polynuclear aromatic hydrocarbons.

UST 112, Building 8464
Hunter Army Airfield
Chatham County, Facility ID: 9-025108

TABLE 4: GROUNDWATER ELEVATIONS

Well Number	Date Measured	Ground Surface Elev. (ft MSL)	Top of Casing Elev. (ft MSL)	Depth of Screened Interval (ft BGS)	Depth of Free Product (ft BTOC)	Water Depth (ft BTOC)	Product Thickness (ft)	Specific Gravity Adjustment	Corrected Groundwater Elev. (ft MSL)
G-1	04/08/98	41.14	42.77	2.0 to 7.0	N/A	5.10	N/A	N/A	37.67
G-2	04/08/98	41.00	42.12	2.0 to 7.0	N/A	4.28	N/A	N/A	37.84
G-3	04/08/98	40.99	42.23	2.0 to 7.0	N/A	4.54	N/A	N/A	37.69
G-4	04/08/98	41.06	41.99	2.0 to 7.0	N/A	4.20	N/A	N/A	37.79
G-7	04/23/98	41.17	42.33	4.0 to 9.0	N/A	4.30	N/A	N/A	38.03

NOTE: MSL - Mean sea level.
BGS - Below ground surface.
BTOC - Below top of casing.
N/A - Not applicable.

UST 112, Building 8464
Hunter Army Airfield
Chatham County, Facility ID: 9-025108

TABLE 5a: UST SYSTEM CLOSURE¹ - SOIL ANALYTICAL RESULTS
(VOLATILE ORGANIC COMPOUNDS)

Sample Location	Depth (ft BGS)	Date Sampled	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)	Total BTEX (mg/kg)	TPH-DRO (mg/kg)	TPH-GRO (mg/kg)
8102-TK112-S1	12.0	9/24/96	BDL	BDL	BDL	BDL	BDL	2,486	N/A
8102-TK112-S2	6.0	9/24/96	BDL	BDL	BDL	BDL	BDL	6,842	N/A
Applicable Standards ²			0.005	0.400	0.370	20.00	NRC	NRC	NRC

NOTE: ¹Underground storage tank system closure performed by Anderson Columbia Environmental, Inc. (1996).

²Georgia Department of Natural Resources Applicable Soil Threshold Levels (i.e., Table A, column 1).

BDL - Below detection limit.

BGS - Below ground surface.

BTEX - Benzene, toluene, ethylbenzene, and xylene.

N/A - Not applicable; TPH-GRO analysis not performed.

NRC - No regulatory criteria.

TPH-DRO - Total petroleum hydrocarbon-diesel-range organics.

TPH-GRO - Total petroleum hydrocarbon-gasoline-range organics.

UST 112, Building 8464
Hunter Army Airfield
Chatham County, Facility ID: 9-025108

TABLE 5b: UST SYSTEM CLOSURE¹ - SOIL ANALYTICAL RESULTS
(POLYNUCLEAR AROMATIC HYDROCARBONS)

Sample Location	Depth (ft BGS)	Date Sampled	Detected PAH Compounds (mg/kg)						Total PAHs (mg/kg)
			BDL	BDL	BDL	BDL	BDL	BDL	
8102-TK112-S1	12.0	9/24/96							BDL
8102-TK112-S2	6.0	9/24/96							BDL
Applicable Standards ²									NRC

NOTE: ¹Underground storage tank system closure performed by Anderson Columbia Environmental, Inc. (1996).

²Georgia Department of Natural Resources Applicable Soil Threshold Levels (i.e., Table A, column 1).

BDL - Below detection limit. Analytical result/detection limit not provided.

BGS - Below ground surface.

NRC - No regulatory criteria.

PAHs - Polynuclear aromatic hydrocarbons.

UST 112, Building 8464
Hunter Army Airfield
Chatham County, Facility ID: 9-025108

**TABLE 6a: UST SYSTEM CLOSURE¹ - GROUNDWATER
ANALYTICAL RESULTS
(VOLATILE ORGANIC COMPOUNDS)**

Sample Location	Depth (ft BGS)	Date Sampled	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (mg/L)	Total BTEX (mg/L)
N/A ²							
Applicable Standards ³			5	1,000	700	10,000	NRC

**TABLE 6b: UST SYSTEM CLOSURE¹ - GROUNDWATER
ANALYTICAL RESULTS
(POLYNUCLEAR AROMATIC HYDROCARBONS)**

Sample Location	Depth (ft BGS)	Date Sampled	Detected PAH Compounds (µg/L)			Total PAHs (µg/L)
N/A ²						
Applicable Standards ³						NRC

NOTE: ¹UST system closure performed by Anderson Columbia Environmental, Inc. (1996).

²Not applicable; groundwater samples were not collected by Anderson Columbia Environmental, Inc. (1996).

³U.S. Environmental Protection Agency maximum contaminant levels.

BDL - Below detection limit.

BGS - Below ground surface.

BTEX - Benzene, toluene, ethylbenzene, and xylene.

NRC - No regulatory criteria.

PAHs - Polynuclear aromatic hydrocarbons.

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APPENDIX III

WATER RESOURCES SURVEY DOCUMENTATION

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WATER RESOURCES SURVEY DOCUMENTATION

1.0 LOCAL WATER RESOURCES

As required by the Georgia Department of Natural Resources (GA DNR) Underground Storage Tank (UST) Corrective Action Plan (CAP)-Part A Guidance (GA DNR 1998b), a water resource survey documenting information for public and non-public water supply wells, surface water bodies, underground utilities, and potential receptors was conducted for all the Hunter Army Airfield (HAAF) UST investigation sites in April, May, and June 1998. The information presented in this section provides the supporting documentation for Section II.D.3 of the CAP-Part A form.

1.1 WATER SUPPLY WELL SURVEY

The water supply well survey was conducted using the following GA DNR guidelines/requirements:

- HAAF is located in an area of average or higher groundwater pollution susceptibility (GA DNR 1976).
- Locate all public supply wells, as defined by the GA DNR, that exist within 2 miles of the investigation sites.
- Locate all non-public supply wells that exist within 0.5 miles of the investigation sites.
- Locate all supply wells nearest the investigation sites.
- Locate all wells downgradient of the investigation sites.

The required survey was accomplished by obtaining information from the Fort Stewart Directorate of Public Works (FS DPW) and the City of Savannah Bureau of Water Operations, performing a field survey, and conducting a U.S. Geological Survey (USGS) database search. A summary of the information obtained during the survey is provided in the following sections.

1.1.1 Fort Stewart Directorate of Public Works Survey Summary

According to the FS DPW, nine water supply wells are located within the confines of the HAAF area (Figures 3a and 3b, Appendix I). These wells have the potential to provide up to 3890 gallons per minute (gpm) of water to occupants of the HAAF installation. The FS DPW was unable to provide documentation listing the companies responsible for well installation, and drillers' logs showing as-built information and subsurface geologic data. Information concerning such documentation was requested from several water well drilling companies in the Chatham County area; however, data were procured with very limited success. The FS DPW provided well locations, pump rates, treatment methods, casing depths, and total depths for eight of the nine wells located at HAAF (Table III-A). However, documentation of subsurface geology based on HAAF drill logs remains extremely limited. Therefore, other references providing deep-well

information were used to document the subsurface geology and aquifer characteristics beneath the HAAF area. Refer to Appendix X, Section 1.0, for further geologic discussion.

Wells 1 and 2, both public water supply wells located in the cantonment area of HAAF, constitute the main water supply system at the HAAF installation. Well 1, located at Building 711 on the corner of Moore Road and Douglas Street, is a 12-inch-diameter well with a 100-hp turbine pump serving a 100,000-gallon elevated storage tank (Tank 1) through 10-inch lines. Water from Well 1 is injected with hydrofluosilic acid and chlorine gas solution at the well house. Well 2, located at Building 1205 on the corner of Neal Street and Strachan Road, is a 12-inch-diameter well with a 100-hp turbine pump serving a 200,000-gallon elevated tank (Tank 2) through 10-inch lines. Water from Well 2 is also injected with hydrofluosilic acid and chlorine gas solution at the well house. Wells 1 and 2 provide water to a 500,000-gallon elevated storage tank (Tank 3) located on Middleground Road behind noncommissioned officer (NCO) family housing. This tank provides potable water to 694 service connections, which are used by an average of at least 5000 individuals year-round.

Wells 3, 4A, and 7 are public supply wells located outside the cantonment area of HAAF. Well 3, located at Building 8455, is a 4.0-inch-diameter well with a 1.0-hp electric submersible pump serving a 1000-gallon hydropneumatic storage tank through 1.5-inch galvanized steel lines. Water from Well 3 is treated with calcium hypochlorite solution and is consumed by approximately 25 people during daytime hours, year-round. Well 4A, located at Building 8581 at the 117th Air National Guard Facility, is a 4.0-inch-diameter well. Pumpage is accomplished with a 0.75-hp turbine pump with 80 gpm capacity. Well 4A provides water for approximately 50 people per day year-round. Well 7 is located at Building 8703 on the Forest River, west of Rio Road. Well 7 is a 4.0-inch well with a 3.0-hp submersible pump serving a 5000-gallon hydropneumatic tank through 2.0-inch galvanized steel lines. Well 7 serves approximately 500 people on a part-time basis. Sanitary protection for Wells 3, 4A, and 7 is provided by a pump motor block, concrete slab, sealed well head, and screened casing vent.

Based on the GA DNR criteria of serving potable water to less than 25 occupants per day and having less than 15 service connections, wells 5, 8, and 9 are classified as non-public supply wells (Figure 3a, Appendix I). Pump rates, casing depths, bore depths, treatment methods, and storage tank information are provided in Table III-A.

Well 10 is a non-potable water source (Figure 3b, Appendix I). Water from Well 10 is used for the cleaning of military equipment at a wash-rack facility. Additional information including capacity, borehole depth, and casing depth is not available.

1.1.2 City of Savannah Bureau of Water Operations Survey Summary

The locations of supply wells found outside the boundary of HAAF that are within 2 miles of one or more of the CAP-Part A investigation sites are shown on Figure 3b, Appendix I. These wells include 25, 15, 27, 14, 23, 6, and 9. Data concerning casing depths, borehole depths, casing sizes, and capacities are listed in Table III-B. The City of Savannah Bureau of Water Operations was unable to provide drill logs or as-built well information.

1.1.3 U.S. Geological Survey Summary

Chatham County encompasses three watersheds: Lower Savannah, Lower Ogeechee, and Ogeechee Coastal (EPA 1998). The HAAF installation is located within the Ogeechee Coastal watershed which covers 1477 square miles; includes 18 rivers and streams, including the Little Ogeechee River which borders the south western portion of HAAF; and contains land usage areas

classified as 2 percent urban, 67 percent forest, and 24 percent agricultural. Water use survey data for the watershed estimate that the area has a total population of 200,000 with domestic, industrial, and commercial water supplies mainly derived from groundwater sources (USGS 1990). Domestic water supply data show that a population of 144,000 receives public-supplied water from groundwater sources, 48,00 receive water from self-supplied groundwater sources, and 8,000 from public-supplied surface water sources. The water use survey also reports that two industrial facilities within the watershed are self-supplied with water obtained from groundwater sources. The survey also notes that a total of five wastewater facilities are located in the area with three reported as public wastewater treatment facilities.

1.2 SURFACE WATER BODIES

Surface water(s) in the State of Georgia, as defined by *Rules and Regulations for Water Quality Control, Chapter 391-3-6* (GA DNR 1998a), shall mean any and all rivers, streams, creeks, branches, lakes, reservoirs, ponds, drainage systems, springs producing 100,000 gallons per day, and all other bodies of surface water, natural or artificial, lying within or forming a part of the boundaries of the State which are not entirely confined and retained completely upon the property of a single individual, partnership, or corporation. The surface water body survey was conducted using the following GA DNR guidelines/requirements:

- surface water bodies that exist within 1 mile of the investigation sites,
- all surface water bodies nearest the investigation sites if these bodies lie outside the 1-mile radius of concern,
- all surface water bodies downgradient of the investigation sites, and
- the storm and sanitary sewers adjacent to investigation sites.

The locations of surface water bodies at HAAF were obtained from USGS aerial photographs, USGS topographic maps, and from maps provided by the FS DPW. Storm and sanitary sewer location maps, storm sewer invert elevations, and storm sewer and culvert construction details were provided by the FS DPW and the City of Savannah Bureau of Water and Sewer Planning (1998).

Surface water bodies at HAAF include Hallstrom Lake, Lamar Canal, Buckhalter Canal, Springfield Canal, Pond 29 located northwest of Buildings 336 and 232, and an unnamed pond located along the southeast boundary of the HAAF installation (Figure 3b, Appendix I). Several unnamed drainage canals exist throughout HAAF. Most of these canals drain southwest into the Little Ogeechee River, which is part of the Lower Ogeechee watershed. The remaining drainage canals located on the east side of the HAAF installation flow east and eventually drain into the Vernon River, which is located southeast of the HAAF installation.

Surface water bodies at HAAF and adjacent areas are not used as public water supplies. The ponds and lakes are perennial, whereas most of the drainage canals and ditches are intermittent. Most of the drainage canals are at least partially enclosed in culverts.

1.3 POTENTIAL RECEPTOR SURVEY SUMMARY OF THE UST 112, BUILDING 8464 SITE

A field potential receptor survey was conducted for the UST 112, Building 8464 site on April 30, 1998. The site and adjacent areas were surveyed for locations of surface water bodies, utility lines, and basements. Basements do not exist in the buildings adjacent to the site. Additional information, provided by the FS DPW, was used to determine the location of the nearest public and non-public water supply wells and downgradient surface water bodies not located during the field survey.

1.3.1 Water Supply Wells Near the UST 112, Building 8464 Site

The UST 112, Building 8464 site is located approximately 250 feet southwest (downgradient) of HAAF Well 3, which is located at Building 8455 (Figure 3a, Appendix I). Therefore, the UST 112, Building 8464 site is classified as being less than 500 feet to a withdrawal point. Based on the estimated nature and extent of petroleum-related groundwater contamination at the site, there is no indication that Well 3 has been impacted (Figure 3a, Appendix I). Therefore, collection and analysis of groundwater samples from Well 3 is not recommended.

1.3.2 Surface Water Bodies Near the UST 112, Building 8464 Site

Hallstrom Lake is located approximately 1,680 feet southwest (downgradient) of the UST 112, Building 8464 site. There is no indication that Hallstrom Lake has been impacted by the site.

TABLES

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CAP-Part A UST Investigation Sites
Hunter Army Airfield, Chatham County

**TABLE III-A. WATER SUPPLY WELL INFORMATION PROVIDED
BY THE FORT STEWART DPW**

Building	Well ID	Year Drilled	Bore Depth	Casing Depth	Pump Rate (gpm)	Number of Service Connections	Population	Public or Non-Public Supply
711	1	1941	550	250	1300	525	7500	Public
1205	2	1941	600	250	1300	525	7500	Public
8455	3	1951	360	40	30	2	25	Public
8581	4A	Unk	300	92	80	10	50	Public
8641	5	1955	380	85	30	Unk	Unk	Non-public
8703	7	1980	450	330	70	8	500	Public
8632	8	1956	370	255	80	5	Unk	Non-public
8654	9	Unk	600	255	1000	Unk	Unk	Non-public
8464	10	Unk	Unk	Unk	Unk	N/A	N/A	Non-public

NOTE: DPW - Directorate of Public Works.
N/A - Not applicable.
gpm - Gallons per minute.
Unk - Unknown.

CAP-Part A UST Investigation Sites
Hunter Army Airfield, Chatham County

**TABLE III-B. WATER SUPPLY WELL INFORMATION PROVIDED BY THE CITY OF
SAVANNAH BUREAU OF WATER OPERATIONS**

Well ID	Year Drilled	Bore Depth (feet)	Casing Depth (feet)	Pump Rate (gpm)	Number of Service Connections	Population¹	Public or Non-Public Supply¹
1	Unk	1006	300	1362	Unk	Unk	Public
6	Unk	750	240	1500	Unk	Unk	Public
9	Unk	710	267	2700	Unk	Unk	Public
13	Unk	1000	270	2200	Unk	Unk	Public
14	Unk	800	338	571	Unk	Unk	Public
15	Unk	414	252	1000	Unk	Unk	Public
23	Unk	639	320	1056	Unk	Unk	Public
25	Unk	540	287	1120	Unk	Unk	Public
27	Unk	550	321	1468	Unk	Unk	Public
42	Unk	550	260	2100	Unk	Unk	Public

NOTE: gpm - Gallons per minute.
TBD - To be determined.
Unk - Unknown.

¹All wells are part of the same public water supply system serving the population of the City of Savannah.

APPENDIX IV

SOIL BORING LOGS

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HTRW DRILLING LOG				DISTRICT		HOLE NUMBER	
1. COMPANY NAME SAIC				2. DRILL SUBCONTRACTOR RE Wright		HOLE NUMBER G1	
3. PROJECT HAAF CAP				4. LOCATION Hunter AAF Bldg 8464 Tank 112			
5. NAME OF DRILLER John Hasselhoff				6. MANUFACTURERS DESIGNATION OF DRILL Geoprobe Selina, KA			
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT 2" dia. macrocore acetate liner = 4ft				8. HOLE LOCATION TBD Bldg 8464 Tank 112			
9. SURFACE ELEVATION TBD				10. DATE STARTED 4-6-98			
				11. DATE COMPLETED 4/6/98			
12. OVERBURDEN THICKNESS NA				15. DEPTH GROUNDWATER ENCOUNTERED 2.0'			
13. DEPTH DRILLED INTO ROCK NA				16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED See water level log			
14. TOTAL DEPTH OF HOLE 7.0'				17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) See water level log			
18. GEOTECHNICAL SAMPLES NA		DISTURBED NA		UNDISTURBED NA		19. TOTAL NUMBER OF CORE BOXES NA	
20. SAMPLES FOR CHEMICAL ANALYSIS Soil / water		BTEX VOC 1/1		BTEX METALS 1/1		OTHER (SPECIFY) GRV 1/0	
22. DISPOSITION OF HOLE piezometer		BACKFILLED ✓		MONITORING WELL NA		OTHER (SPECIFY) NA	
						21. TOTAL CORE RECOVERY % 100%	
						23. SIGNATURE OF INSPECTOR John B Reeves	
LOCATION SKETCH/COMMENTS Soil desc. G7 on p. 37							
SCALE: not to scale							
PROJECT Hunter AAF CAP Part A UST Sites						HOLE NO. G1	

DEPTH (ft)	DESCRIPTION OF MATERIALS (F)	FIELD SCREENING RESULTS (D)	GEOTECH SAMPLE OR CORE BOX NO (E)	AST
0	0 to 0.7 5YR4/3 redish brown fine grain sand 0.7' to 2.0' 5YR3/4 dark reddish brown <u>WT</u> SP-SM poorly graded sand with silt Note: Inadequate amount of soil above ground-water to collect Sample below 2.0'	Head Space 2.6	9BR 4-7-94 PPM	HG1101
4				began 1450 end 1455 Recovery 4.0'
				began end 9BR 4-6-98 Recovery
				HG1200
8				

- TD = 7.0'

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HTRW DRILLING LOG		DISTRICT		ROLL NUMBER	
1. COMPANY NAME SAIC		2. DRILL SUBCONTRACTOR RE Wright (SAIC)		SHEET 1 OF 1	
3. PROJECT Hunter AAF CAP Part A UST sites		4. LOCATION Building 8464 Tex 112			
5. NAME OF DRILLER John Hasselhoff		6. MANUFACTURERS DESIGNATION OF DRILL Geoprobe, Salina, KA			
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT 2" dia microcore acetate liner = 4'		8. HOLE LOCATION G2			
9. SURFACE ELEVATION TBD		10. DATE STARTED 4-6-98			
11. DATE COMPLETED 4-6-98		12. OVERBURDEN THICKNESS NA			
13. DEPTH DRILLED INTO ROCK NA		15. DEPTH GROUNDWATER ENCOUNTERED 1.8'			
14. TOTAL DEPTH OF HOLE 4.0' 7.0'		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED See water level log			
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) See water level log		18. GEOTECHNICAL SAMPLES NA			
19. TOTAL NUMBER OF CORE BOXES NA		20. SAMPLES FOR CHEMICAL ANALYSIS SOIL / water			
21. TOTAL CORE RECOVERY % 80		22. DISPOSITION OF HOLE piezometer			
23. SIGNATURE OF INSPECTOR John B. Reeves		24. LOCATION SKETCH/COMMENTS See page 35			
25. SCALE not to scale					
PROJECT HAAF UST CAP Part A UST Sites		HOLE NO. G2			

43

DEPTH (ft)	DESCRIPTION OF MATERIALS (ft)	FIELD SCREENING RESULTS (ft)	GEOTECH SAMPLE OR CORE BOX NO (ft)
0	0 to 0.8 5 YRG/1 gray Sand poorly graded SP with quartz 0.8 to 3.2 5 YR 3/1 very dark grey silty sand WT 9BR 46-98 Note: Inadequate amount of soil above ground-water to collect sample below 2.0' 9BR 46-98 water sample = 4 to 7 TD = 7.0	Head Space 141	HG214 HG214 9BR 4-8-98 HG224

began 15' 5"
end 15' 1"
drilled 4' recovery
0 to 3.2'

PROJECT

Hunter AAF CAP Part A, UST Sites

HOJ: 80

G2

HTRW DRILLING LOG				DISTRICT		HOLE NUMBER	
1. COMPANY NAME SAIC				2. DRILL SUBCONTRACTOR RE Wright (SAIC)		3. SHEET SHEETS 1 OF 2	
3. PROJECT HAAF CAP Part A UST Sites				4. LOCATION Hunter AAF Bldg 8464 Tank 112			
5. NAME OF DRILLER John Hasselhoff				6. MANUFACTURERS DESIGNATION OF DRILL Geoprobe, Salina, KA			
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT 2" dia macrocore cutting lines = 4.0" shel to drive cap = 4.6" sampling screen = 3.5"				8. HOLE LOCATION G3			
				9. SURFACE ELEVATION TBD			
				10. DATE STARTED 4-6-98		11. DATE COMPLETED 4-6-98	
12. OVERBURDEN THICKNESS NA				15. DEPTH GROUNDWATER ENCOUNTERED 2.4'			
13. DEPTH DRILLED INTO ROCK NA				16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED See water level log			
14. TOTAL DEPTH OF HOLE 4.0' + 7.6'				17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) See water level log			
18. GEOTECHNICAL SAMPLES NA		DISTURBED NA		UNDISTURBED NA		19. TOTAL NUMBER OF CORE BOXES NA	
20. SAMPLES FOR CHEMICAL ANALYSIS soil / water		BTEX VOC 1 / 1		PbH METALS 1 / 1		OTHER (SPECIFY) GRO 1 / 6	
22. DISPOSITION OF HOLE piezometer		BACKFILLED ✓		MONITORING WELL NA		OTHER (SPECIFY) NA	
21. TOTAL CORE RECOVERY % 90				23. SIGNATURE OF INSPECTOR John B Reeves			
LOCATION SKETCH/COMMENTS							
SCALE: NOT to scale							
See page 35							
PROJECT HAAF CAP Part A. UST Sites						HOLE NO. G3	

50

DEPTH (ft)	DESCRIPTION OF MATERIALS (D)	FIELD SCREENING RESULTS (U)	GEOTECH SAMPLE OR CORE BOX NO (E)	
0'	5YR 4/3 reddish brown Sand poorly graded 0.7 to 3.2 5YR 5/1 gray silty sand well graded WT	Head Space 0 to 2' 343	0 to 2' HG3101	Collected GBR 4-6-98 Drilled 4' Recovered 0' to 3.2'
4'		Head Space 2' to 2.4' 8.8	2' to 4' HG3102	
	water sample taken at 3.0 to 7.0'			
	- TD = 7.0'		HG3200	

PROJECT

HAAF CAP Part A, UST sites

FILE NO

G3

HTRW DRILLING LOG		DISTRICT		HOLE NUMBER	
1. COMPANY NAME SAIC		USACE Savannah		G4	
2. DRILL SUBCONTRACTOR RE Wright (SAIC)		3. PROJECT Hunter AAF CAP Part A UST sites		4. LOCATION Hunter AAF Bldg 8464, Tank 112	
5. NAME OF DRILLER John Hasselhoff		6. MANUFACTURERS DESIGNATION OF DRILL Geoprobe, Salina, KA		7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT 2" dia Macrocore acetate liner = 4.0' shoe to drive cap = 4.6' screen = 3.5'	
8. HOLE LOCATION G4		9. SURFACE ELEVATION T130		10. DATE STARTED 4-6-98	
11. DATE COMPLETED 4-6-98		12. OVERBURDEN THICKNESS NA		13. DEPTH DRILLED INTO ROCK NA	
14. TOTAL DEPTH OF HOLE 4.0' 7.0'		15. DEPTH GROUNDWATER ENCOUNTERED 2.1'		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED See water level log	
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) See water level log		18. GEOTECHNICAL SAMPLES NA		19. TOTAL NUMBER OF CORE BOXES NA	
20. SAMPLES FOR CHEMICAL ANALYSIS Soil / water		DISTURBED NA		UNDISTURBED NA	
21. TOTAL CORE RECOVERY % 80		22. DISPOSITION OF HOLE piezometer		23. SIGNATURE OF INSPECTOR John B. Reiter	
LOCATION SKETCH/COMMENTS		SCALE: Not to scale			
See page 35 logbook # 7					
PROJECT Hunter AAF CAP Part A UST Sites		HOLE NO. G4			

$$-TD = 7.0$$

HTRW DRILLING LOG		DISTRICT		HOLE NUMBER	
1. COMPANY NAME SAIC		2. DRILL SUBCONTRACTOR RE Wright (SAIC)		HOLE NUMBER G5	
3. PROJECT HAAF CAP Part A, UST Sites		4. LOCATION Hunter AAF Bldg 8464 Tank 112		5. NAME OF DRILLER John Hasselhoff	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT acitate liner = 4' long macrocore = 2" diam. Shoe to drive cap = 4.6' push rods = 3' and 4' long; large bore rods = 3' long, 1.5" diam. screen = 3.55' long; = 1" diam.		8. HOLE LOCATION G5		9. SURFACE ELEVATION TBD	
12. OVERBURDEN THICKNESS NA		10. DATE STARTED 4-7-98		11. DATE COMPLETED 4/7/98	
13. DEPTH DRILLED INTO ROCK NA		15. DEPTH GROUNDWATER ENCOUNTERED 2.1'		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED See water level log	
14. TOTAL DEPTH OF HOLE 46'		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) see water level log		18. GEOTECHNICAL SAMPLES NA	
20. SAMPLES FOR CHEMICAL ANALYSIS water		19. TOTAL NUMBER OF CORE BOXES NA		21. TOTAL CORE RECOVERY %	
22. DISPOSITION OF HOLE vertical profile		23. SIGNATURE OF INSPECTOR John B. Reeves		24. SCALE: Not to scale	
LOCATION SKETCH/COMMENTS					
PROJECT HAAF CAP A UST Investigations				HOLE NO. G5	

DEPTH (ft)	DESCRIPTION OF MATERIALS (ft)	FIELD SCREENING RESULTS (ft)	GEOTECH SAMPLE OR CORE BOX NO (ft)
0			
5			
10			
15	46' to 48' 4/10 y dark greenish gray sand ^{gr 47} moderately sorted ^{gr 47} graded with silt cemented	at 10' groundwater sample HG 5301 collected	
20	Sub rounded to well rounded quartz grains	at 20' groundwater sample HG 5302 collected	
25	Note: Hawthorne Layer		
30	hit at 46' groundwater sample taken at this level	at 30' groundwater sample HG 5303 collected	
35			
40	Note: soil sample taken from 40' to 42'	at 40' groundwater sample HG 5304 collected	
45	5/5 GY greenish gray sand well graded		
50	per photovac was rezeroed with 0 air Head space read 72000 but probably due to saturated condition		

37

DEPTH (ft)	DESCRIPTION OF MATERIALS (D)	FIELD SCREENING RESULTS (U)	GEOTECH SAMPLE OR CORE BOX NO (E)	
1.0	(SW-SM) well graded Sand with silt (5%) and 2% black organics, color: 10YR 6/8 brownish yellow sorting: well grain rounding: sub-ang. sedim. Envir. - fill mat. Moisture content: moist Structure: homogeneous	ϕ - 2.3 HS = 720	NA	HG7101 HG7111 (DUP)
2.0			NA	
3.0	NO RECOVERY	PID READING FOR QUICK SCAN OF ENTIRE SAMPLING TUBE HS = 720 ppm		
4.0	4.0 WT			
5.0	5.0-9.0' Screened interval for GW collection			
6.0				
7.0	WATER: 10YR 7/2 (light gray) color of silt in water sample		HG7200	
8.0				
9.0	TD = 9.0 ft BGS			

START: 0725
STOP: 0930
4/22/98
DRILLED: 4.0 ft
REC'D: 2.3 ft

NOTE: BOTTOM OF CUTTING SHOE WAS WET!

Hammer; NOT USED

START STOP 0935
STOP: 0940
PUSHED SCREEN DOWN TO 9' BGS

Hammer: Not used was used for 4-9' push of water sampler

4/22/98

4/22/98

PROJECT

HAAF - CAP A UST INVESTIGATIONS
USACE SAVANNAH CORE

ROLL NO.

G-7

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APPENDIX V

SOIL LABORATORY REPORTS

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UST 112, Building 8464
Hunter Army Airfield
Chatham County, Facility ID: 9-025108

TABLE V-A. SUMMARY OF SOIL ANALYTICAL RESULTS³

Location Sample ID Date Collected Depth (ft BGS)	Applicable Standards ¹	G-1 HG1101 04/06/98 0.0 to 2.0	G-2 HG2101 04/06/98 0.0 to 2.0	G-2 HG2110 04/06/98 0.0 to 2.0	G-3 HG3101 04/06/98 0.0 to 2.0	G-3 HG3102 04/06/98 2.0 to 4.0
VOCs	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Benzene	0.005	0.0022 UJ	0.0022 UJ	0.0024 J	0.0022 UJ	0.0024 UJ
Toluene	0.400	0.0144 =	0.0684 J	0.056 J	0.0029 J	0.0026 =
Ethylbenzene	0.370	0.0022 U	0.0278 J	0.0597 U	0.0022 UJ	0.0024 U
Xylenes	20.00	0.0066 U	0.374 J	0.605 J	0.0011 J	0.0071 U
TPH-DRO	NRC	1.6 U	14.2 =	1760 =	0.62 U	0.65 U
TPH-GRO	NRC	0.549 U	70.6 J	77.5 J	0.543 UJ	0.595 UJ
PAHs	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
2-Chloronaphthalene	N/A ²	0.365 U	14.4 U	14.2 U	0.361 U	0.396 U
Acenaphthene	N/A ²	0.365 U	14.4 U	14.2 U	0.361 U	0.396 U
Acenaphthylene	N/A ²	0.365 U	14.4 U	14.2 U	0.361 U	0.396 U
Anthracene	N/A ²	0.365 U	14.4 U	14.2 U	0.361 U	0.396 U
Benzo(a)anthracene	N/A ²	0.365 U	14.4 U	14.2 U	0.361 U	0.396 U
Benzo(a)pyrene	0.660	0.365 U	14.4 U	14.2 U	0.361 U	0.396 U
Benzo(b)fluoranthene	0.820	0.365 U	14.4 U	14.2 U	0.361 U	0.396 U
Benzo(g,h,i)perylene	N/A ²	0.365 U	14.4 U	14.2 U	0.361 U	0.396 U
Benzo(k)fluoranthene	1.60	0.365 U	14.4 U	14.2 U	0.361 U	0.396 U
Chrysene	0.660	0.365 U	14.4 U	14.2 U	0.361 U	0.396 U
Dibenzo(a,h)anthracene	1.50	0.365 U	14.4 U	14.2 U	0.361 U	0.396 U
Fluoranthene	N/A ²	0.365 U	14.4 U	14.2 U	0.361 U	0.396 U
Fluorene	N/A ²	0.365 U	14.4 U	14.2 U	0.361 U	0.396 U
Indeno(1,2,3-cd)pyrene	0.660	0.365 U	14.4 U	14.2 U	0.361 U	0.396 U
Naphthalene	N/A ²	0.365 U	14.4 U	14.2 U	0.361 U	0.396 U
Phenanthrene	N/A ²	0.365 U	14.4 U	14.2 U	0.361 U	0.396 U
Pyrene	N/A ²	0.365 U	14.4 U	14.2 U	0.361 U	0.396 U

NOTE: ¹ Georgia Department of Natural Resources (GA DNR) Applicable Soil Threshold Levels (i.e., Table A, column 1).
² Not applicable; the health-based threshold level exceeds the expected soil concentration under free product conditions.
³ All field work and analytical sampling were performed prior to the release of the new GA DNR Corrective Action Plan (CAP)-Part A Guidance (i.e., May 1998); therefore, the new analytical methods specified were not used.
 BGS - Below ground surface.
 NRC - No regulatory criteria.
 PAHs - Polynuclear aromatic hydrocarbons.
 TPH-DRO - Total petroleum hydrocarbon-diesel-range organics.
 TPH-GRO - Total petroleum hydrocarbon-gasoline-range organics.
 VOCs - Volatile organic compounds.

Laboratory Qualifier

U - Indicates the compound was not detected at the concentration reported.
 J - Indicates the value for the compound is an estimated value.
 UJ - Indicates the compound was not detected at the reported concentration and the concentration was estimated.
 = - Indicates the compound was detected at the concentration reported.

UST 112, Building 8464
Hunter Army Airfield
Chatham County, Facility ID: 9-025108

TABLE V-A. SUMMARY OF SOIL ANALYTICAL RESULTS³ (continued)

Location Sample ID Date Collected Depth (ft BGS)	Applicable Standards ¹	G-4 HG4101 04/06/98 0.0 to 2.0	G-7 HG7101 04/06/98 0.0 to 2.3	G-7 HG7111 04/22/98 0.0 to 2.3
VOCs	µg/L	µg/L	µg/L	µg/L
Benzene	0.005	0.0022 UJ	0.0022 U	0.0022 U
Toluene	0.400	0.0139 =	0.0344 =	0.015 =
Ethylbenzene	0.370	0.0022 U	0.0022 U	0.0022 U
Xylenes	20.00	0.0065 U	0.0065 U	0.0065 U
TPH-DRO	NRC	1.2 U	200 =	71.7 =
TPH-GRO	NRC	0.085 J	0.543 U	1.09 U
PAHs	mg/kg	mg/kg	mg/kg	mg/kg
2-Chloronaphthalene	N/A ²	0.360	1.43 U	1.42 U
Acenaphthene	N/A ²	0.360	1.43 U	1.42 U
Acenaphthylene	N/A ²	0.360	1.43 U	1.42 U
Anthracene	N/A ²	0.360	1.43 U	1.42 U
Benzo(a)anthracene	N/A ²	0.360	1.43 U	1.42 U
Benzo(a)pyrene	0.660	0.360	1.43 U	1.42 U
Benzo(b)fluoranthene	0.820	0.360	1.43 U	1.42 U
Benzo(g,h,i)perylene	N/A ²	0.360	1.43 U	1.42 U
Benzo(k)fluoranthene	1.60	0.360	1.43 U	1.42 U
Chrysene	0.660	0.360	1.43 U	1.42 U
Dibenzo(a,h)anthracene	1.50	0.360	1.43 U	1.42 U
Fluoranthene	N/A ²	0.360	1.43 U	1.42 U
Fluorene	N/A ²	0.360	1.43 U	1.42 U
Indeno(1,2,3-cd)pyrene	0.660	0.360	1.43 U	1.42 U
Naphthalene	N/A ²	0.360	1.43 U	1.42 U
Phenanthrene	N/A ²	0.360	1.43 U	1.42 U
Pyrene	N/A ²	0.360	1.43 U	1.42 U

NOTE: ¹Georgia Department of Natural Resources (GA DNR) Applicable Soil Threshold Levels (i.e., Table A, column 1).

²Not applicable; the health-based threshold level exceeds the expected soil concentration under free product conditions.

³All field work and analytical sampling were performed prior to the release of the new GA DNR Corrective Action Plan (CAP)-Part A Guidance (i.e., May 1998); therefore, the new analytical methods specified were not used.

BGS - Below ground surface.

NRC - No regulatory criteria.

PAHs - Polynuclear aromatic hydrocarbons.

TPH-DRO - Total petroleum hydrocarbon-diesel-range organics.

TPH-GRO - Total petroleum hydrocarbon-gasoline-range organics.

VOCs - Volatile organic compounds.

Laboratory Qualifier

U - Indicates the compound was not detected at the concentration reported.

J - Indicates the value for the compound is an estimated value.

UJ - Indicates the compound was not detected at the reported concentration and the concentration was estimated.

= - Indicates the compound was detected at the concentration reported.

800 Oak Ridge Turnpike, Oak Ridge, TN 37831 (423) 481-4600

CHAIN OF CUSTODY RECORD

COC NO.: 40898B

PROJECT NAME: CAP - Hunter AFB - Part A

PROJECT NUMBER: 0019

PROJECT MANAGER: Allison Bailey

Sampler (Signature) *Allison Bailey* (Printed Name) Mitchell Hall

Sample ID	Date Collected	Time Collected	Matrix
HN1101	4/6/98	1240	soil
HN1105	4/6/98	1305	soil
HN2101	4/6/98	1330	soil
HN2105	4/6/98	1350	soil
HG1101	4/6/98	1455	soil
HG3101	4/6/98	1540	soil
HG3102	4/6/98	1545	soil
HG4101	4/6/98	1605	soil
HG2110	4/6/98	1515	soil
HG6400	4/7/98	1115	soil
HG2101	4/6/98	1515	soil

REQUESTED PARAMETERS

BTX	PAH	DTP	GMO	TOC	No. of Bottles/Vials
X	X	X	X	X	2
X	X	X	X	X	2
X	X	X	X	X	2
X	X	X	X	X	2
X	X	X	X	X	2
X	X	X	X	X	2
X	X	X	X	X	2
X	X	X	X	X	2
X	X	X	X	X	2
X	X	X	X	X	1
X	X	X	X	X	2

LABORATORY NAME:
General Engineering Laboratory

LABORATORY ADDRESS:
2040 Savage Road
Charleston, SC 29417

PHONE NO: (803) 556-8171

OVA
SCREENING

OBSERVATIONS, COMMENTS
SPECIAL INSTRUCTIONS

> 2000 ppm 9804218-0
256 ppm 05
0 ppm 07
0.6 ppm 04
2.6 ppm 05
343 ppm 06
8.7 ppm 07
4.3 ppm 08
141 ppm 09
141 ppm 9804218-18
141 ppm 9804218-10

RELINQUISHED BY: *Allison Bailey*

COMPANY NAME: SAIC

RECEIVED BY: *John Doe*

COMPANY NAME: GEC

RELINQUISHED BY: *John Doe*

COMPANY NAME: GEC

RECEIVED BY: *John Doe*

COMPANY NAME: G-EL

RELINQUISHED BY:

COMPANY NAME:

RECEIVED BY:

COMPANY NAME:

Date/Time

4/8/98 14:00

Date/Time

14:00

Date/Time

16:30

TOTAL NUMBER OF CONTAINERS: 19

Cooler ID: 63

Cooler Temperature: 4°C

FEDEX NUMBER:

NA

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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HG1101

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA008S

Matrix: (soil/water) SOIL Lab Sample ID: 9804218-05

Sample wt/vol: 10.0 (g/mL) G Lab File ID: 2F1010

Level: (low/med) LOW Date Received: 04/08/98

% Moisture: not dec. 9 Date Analyzed: 04/20/98

GC Column: J&W DB-624 (PID) ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (ml) Soil Aliquot Volume: _____ (uL)

CAS NO.

COMPOUND

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Q

71-43-2-----Benzene	2.2	U	uJ 48 = u u
108-88-3-----Toluene	14.4		
100-41-4-----Ethylbenzene	2.2	U	
1330-20-7-----Xylenes (total)	6.6	U	

DATA VALIDATION
COPY

FORM I VOA

FORM 1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Science Applications 08-APR-1998

EG1101

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: EA008S

Matrix: (soil/water) SOIL Lab Sample ID: 9804213-05

Sample wt/vol: 30.6 (g/mL) G Lab File ID: 4D10045

Level: (low/med) LOW Date Received: 04/08/98

% Moisture: 9 decanted: (Y/N) N Date Extracted: 04/10/98

Concentrated Extract Volume: 1.00 (mL) Date Analyzed: 04/22/98

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG		Q
	-----Diesel Range Organics	1.6	B	U F01, F07

FORM I SV

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EG1101

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA008S

Matrix: (soil/water) SOIL Lab Sample ID: 9804218-05

Sample wt/vol: 10.0 (g/mL) G Lab File ID: 1F1012

Level: (low/med) LOW Date Received: 04/08/98

% Moisture: not dec. 9 Date Analyzed: 04/20/98

GC Column: J&W DB-624 (FID) ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
---------	----------	---	---

-----Gasoline Range Organics	549	U	✓
------------------------------	-----	---	---

FORM I VOA

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HG1101

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA

Case No.: NA

SAS No.: NA

SDG No.: HA008S

Matrix: (soil/water) SOIL

Lab Sample ID: 9804218-05

Sample wt/vol: 30.1 (g/mL) G

Lab File ID: 1Q111

Level: (low/med) LOW

Date Received: 04/08/98

% Moisture: 9 decanted: (Y/N) N

Date Extracted: 04/09/98

Concentrated Extract Volume: 1.00 (mL)

Date Analyzed: 04/20/98

Injection Volume: 1.0 (uL)

Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG		Q
91-20-3	naphthalene	365	U	U ↓
91-58-7	2-chloronaphthalene	365	U	
208-96-8	acenaphthylene	365	U	
83-32-9	acenaphthene	365	U	
86-73-7	fluorene	365	U	
85-01-8	phenanthrene	365	U	
120-12-7	anthracene	365	U	
206-44-0	fluoranthene	365	U	
129-00-0	pyrene	365	U	
56-55-3	benzo (a) anthracene	365	U	
218-01-9	chrysene	365	U	
205-99-2	benzo (b) fluoranthene	365	U	
207-08-9	benzo (k) fluoranthene	365	U	
50-32-8	benzo (a) pyrene	365	U	
193-39-5	indeno (1,2,3-cd) pyrene	365	U	
53-70-3	dibenz (a,h) anthracene	365	U	
191-24-2	benzo (g,h,i) perylene	365	U	

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HG2101

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA008S

Matrix: (soil/water) SOIL Lab Sample ID: 9804218-10

Sample wt/vol: 10.0 (g/mL) G Lab File ID: 2F1016

Level: (low/med) LOW Date Received: 04/08/98

% Moisture: not dec. 8 Date Analyzed: 04/20/98

GC Column: J&W DB-624 (PID) ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (ml) Soil Aliquot Volume: _____ (uL)

CAS NO. COMPOUND

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG Q

71-43-2-----Benzene	2.2	U
108-88-3-----Toluene	68.4	
100-41-4-----Ethylbenzene	27.8	
1330-20-7-----Xylenes (total)	374	P

UJ 601,008
J 601,008
J 601,008
J m08, 601
008

DATA VALIDATION
COPY

FORM I VOA

FORM 1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Science Applications 08-APR-1998 SA

EG2101DI1

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA308S

Matrix: (soil/water) SOIL Lab Sample ID: 9804213-10

Sample wt/vol: 30.4 (g/mL) G Lab File ID: 4D4009

Level: (low/med) LOW Date Received: 04/08/98

% Moisture: 8 decanted: (Y/N) N Date Extracted: 04/10/98

Concentrated Extract Volume: 1.00 (mL) Date Analyzed: 04/23/98

Injection Volume: 1.0 (uL) Dilution Factor: 5.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG	Q
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-----Diesel Range Organics	14.2	B	
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= F01,
F08

FORM I SV

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HG2111DL1

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HAP08S

Matrix: (soil/water) SOIL Lab Sample ID: 9804218-10

Sample wt/vol: 10.0 (g/mL) G Lab File ID: 1F307

Level: (low/med) LOW Date Received: 04/08/98

% Moisture: not dec. 8 Date Analyzed: 04/22/98

GC Column: J&W DB-624 (FID) ID: 0.53 (mm) Dilution Factor: 50.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
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-----Gasoline Range Organics	70600		J A03
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USE

FORM I VOA

18
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HG2101

Lab Name: GENERAL ENGINEERING LABOR Contract: NA
Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA008S
Matrix: (soil/water) SOIL Lab Sample ID: 9804218-10
Sample wt/vol: 30.1 (g/mL) G Lab File ID: 12204
Level: (low/med) LOW Date Received: 04/08/98
% Moisture: 8 decanted: (Y/N) N Date Extracted: 04/09/98
Concentrated Extract Volume: 1.00 (mL) Date Analyzed: 04/21/98
Injection Volume: 1.0 (uL) Dilution Factor: 40.0
GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
91-20-3	-----naphthalene	14400	U
91-58-7	-----2-chloronaphthalene	14400	U
208-96-8	-----acenaphthylene	14400	U
83-32-9	-----acenaphthene	14400	U
86-73-7	-----fluorene	14400	U
85-01-8	-----phenanthrene	14400	U
120-12-7	-----anthracene	14400	U
206-44-0	-----fluoranthene	14400	U
129-00-0	-----pyrene	14400	U
56-55-3	-----benzo (a) anthracene	14400	U
218-01-9	-----chrysene	14400	U
205-99-2	-----benzo (b) fluoranthene	14400	U
207-08-9	-----benzo (k) fluoranthene	14400	U
50-32-8	-----benzo (a) pyrene	14400	U
193-39-5	-----indeno (1,2,3-cd) pyrene	14400	U
53-70-3	-----dibenz (a,h) anthracene	14400	U
191-24-2	-----benzo (g,h,i) perylene	14400	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HG2110

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA

SDG No.: HA008S

Matrix: (soil/water) SOIL

Lab Sample ID: 9804218-09

Sample wt/vol: 10.0 (g/mL) G

Lab File ID: 2F1015

Level: (low/med) LOW

Date Received: 04/08/98

% Moisture: not dec. 7

Date Analyzed: 04/20/98

GC Column: J&W DB-624 (PID) ID: 0.53 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (ml)

Soil Aliquot Volume: (uL)

CAS NO.

COMPOUND

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Q

71-43-2-----	Benzene	2.4	P	J mps 601
108-88-3-----	Toluene	56.0	P	J mps 601
100-41-4-----	Ethylbenzene	59.7		J 601
1330-20-7-----	Xylenes (total)	605		J ↓

DATA VALIDATION
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FORM I VOA

FORM 1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Science Applications 08-APR-1998 SA

HG2110DI1

Lab Name: GENERAL ENGINEERING LABOR Contract: NA
Lab Code: NA Case No.: NA SAS No.: NA SDG No.: RAJ08S
Matrix: (soil/water) SOIL Lab Sample ID: 9804218-09
Sample wt/vol: 30.8 (g/mL) G Lab File ID: 4D4003
Level: (low/med) LOW Date Received: 04/08/98
% Moisture: 7 decanted: (Y/N) N Date Extracted: 04/10/98
Concentrated Extract Volume: 1.00 (mL) Date Analyzed: 04/23/98
Injection Volume: 1.0 (uL) Dilution Factor: 600.0
GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG		Q
	-----Diesel Range Organics	1760	B	= F01 F08

FORM I SV

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HG2110DL1

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA

Case No.: NA

SAS No.: NA

SDG No.: HA008S

Matrix: (soil/water) SOIL

Lab Sample ID: 9804218-09

Sample wt/vol: 10.0 (g/mL) G

Lab File ID: 1F306

Level: (low/med) LOW

Date Received: 04/08/98

% Moisture: not dec. 7

Date Analyzed: 04/22/98

GC Column: J&W DB-624 (FID) ID: 0.53 (mm)

Dilution Factor: 50.0

Soil Extract Volume: _____ (uL)

Soil Aliquot Volume: _____ (uL)

CAS NO.

COMPOUND

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Q

-----Gasoline Range Organics	77500	
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J A03

USE

FORM I VOA

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HG2110

Lab Name: GENERAL ENGINEERING LABOR Contract: NA
Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA008S
Matrix: (soil/water) SOIL Lab Sample ID: 9804218-09
Sample wt/vol: 30.2 (g/mL) G Lab File ID: 1Q203
Level: (low/med) LOW Date Received: 04/08/98
% Moisture: 7 decanted: (Y/N) N Date Extracted: 04/09/98
Concentrated Extract Volume: 1.00 (mL) Date Analyzed: 04/21/98
Injection Volume: 1.0 (uL) Dilution Factor: 40.0
GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
91-20-3	-----naphthalene	14200	U
91-58-7	-----2-chloronaphthalene	14200	U
208-96-8	-----acenaphthylene	14200	U
83-32-9	-----acenaphthene	14200	U
86-73-7	-----fluorene	14200	U
85-01-8	-----phenanthrene	14200	U
120-12-7	-----anthracene	14200	U
206-44-0	-----fluoranthene	14200	U
129-00-0	-----pyrene	14200	U
56-55-3	-----benzo (a) anthracene	14200	U
218-01-9	-----chrysene	14200	U
205-99-2	-----benzo (b) fluoranthene	14200	U
207-08-9	-----benzo (k) fluoranthene	14200	U
50-32-8	-----benzo (a) pyrene	14200	U
193-39-5	-----indeno (1,2,3-cd) pyrene	14200	U
53-70-3	-----dibenz (a,h) anthracene	14200	U
191-24-2	-----benzo (g,h,i) perylene	14200	U

FORM I SV-1

OLM03.0

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HG3101

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA

SDG No.: HA0085

Matrix: (soil/water) SOIL

Lab Sample ID: 9804218-06

Sample wt/vol: 10.0 (g/mL) G

Lab File ID: 2F1018

Level: (low/med) LOW

Date Received: 04/08/98

% Moisture: not dec. 8

Date Analyzed: 04/20/98

GC Column: J&W DB-624 (PID) ID: 0.53 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (ml)

Soil Aliquot Volume: (uL)

CAS NO.

COMPOUND

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Q

71-43-2-----Benzene	2.2	U	uJ 48
108-88-3-----Toluene	2.9		J
100-41-4-----Ethylbenzene	2.2	U	uJ
1330-20-7-----Xylenes (total)	1.1	J	J ↓

DATA VALIDATION
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FORM I VOA

FORM 1 Science Applications 08-APR-1998 SA
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

HG3101

Lab Name: GENERAL ENGINEERING LABOR Contract: NA
Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HAO08S
Matrix: (soil/water) SOIL Lab Sample ID: 9804218-06
Sample wt/vol: 30.5 (g/mL) G Lab File ID: 4D10046
Level: (low/med) LOW Date Received: 04/08/98
% Moisture: 8 decanted: (Y/N) N Date Extracted: 04/10/98
Concentrated Extract Volume: 1.00 (mL) Date Analyzed: 04/22/98
Injection Volume: 1.0 (uL) Dilution Factor: 1.0
GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG		Q
	-----Diesel Range Organics	0.62	JB	V F01, F06

FORM I SV

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HG3101

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA008S

Matrix: (soil/water) SOIL Lab Sample ID: 9804218-06

Sample wt/vol: 10.0 (g/mL) G Lab File ID: 1F1014

Level: (low/med) LOW Date Received: 04/08/98

% Moisture: not dec. 8 Date Analyzed: 04/20/98

GC Column: J&W DB-624 (FID) ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO. COMPOUND CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG Q

-----Gasoline Range Organics	543	U	uJ 602
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FORM I VOA

18
SEMI-VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HG3101

Lab Name: GENERAL ENGINEERING LABOR Contract: NA
Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA008S
Matrix: (soil/water) SOIL Lab Sample ID: 9804218-06
Sample wt/vol: 30.1 (g/mL) G Lab File ID: 1Q112
Level: (low/med) LOW Date Received: 04/08/98
% Moisture: 8 decanted: (Y/N) N Date Extracted: 04/09/98
Concentrated Extract Volume: 1.00 (mL) Date Analyzed: 04/20/98
Injection Volume: 1.0 (uL) Dilution Factor: 1.0
GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
91-20-3	-----naphthalene	361	U
91-58-7	-----2-chloronaphthalene	361	U
208-96-8	-----acenaphthylene	361	U
83-32-9	-----acenaphthene	361	U
86-73-7	-----fluorene	361	U
85-01-8	-----phenanthrene	361	U
120-12-7	-----anthracene	361	U
206-44-0	-----fluoranthene	361	U
129-00-0	-----pyrene	361	U
56-55-3	-----benzo (a) anthracene	361	U
218-01-9	-----chrysene	361	U
205-99-2	-----benzo (b) fluoranthene	361	U
207-08-9	-----benzo (k) fluoranthene	361	U
50-32-8	-----benzo (a) pyrene	361	U
193-39-5	-----indeno (1,2,3-cd) pyrene	361	U
53-70-3	-----dibenz (a,h) anthracene	361	U
191-24-2	-----benzo (g,h,i) perylene	361	U

FORM I SV-1

OLM03.0

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HG3102

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA008S

Matrix: (soil/water) SOIL Lab Sample ID: 9804218-07

Sample wt/vol: 10.0 (g/mL) G Lab File ID: 2F1012

Level: (low/med) LOW Date Received: 04/08/98

% Moisture: not dec. 16 Date Analyzed: 04/20/98

GC Column: J&W DB-624 (PID) ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (ml) Soil Aliquot Volume: _____ (uL)

CAS NO. COMPOUND

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG Q

71-43-2-----Benzene	2.4	U	uT uφ8
108-88-3-----Toluene	2.6		=
100-41-4-----Ethylbenzene	2.4	U	u
1330-20-7-----Xylenes (total)	7.1	U	u

DATA VALIDATION
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FORM I VOA

FORM 1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

HG3102

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA008S

Matrix (soil/water): SOIL Lab Sample ID: 9604213-07

Sample wt/vol: 30.8 (g/mL) G Lab File ID: 4D10047

Level: (low/med) LOW Date Received: 04/08/98

% Moisture: 16 decanted: (Y/N) N Date Extracted: 04/10/98

Concentrated Extract Volume: 1.00 (mL) Date Analyzed: 04/22/98

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO. COMPOUND CONCENTRATION UNITS:
(ug/L or ug/Kg) MG/KG Q

-----Diesel Range Organics	0.65	JB
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V F01,
F06

FORM I SV

1A
 VOLATILE ORGANICS ANALYSIS DATA SHEET

HG3102

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HAC08S

Matrix: (soil/water) SCIL Lab Sample ID: 9804218-07

Sample wt/vol: 10.0 (g/mL) G Lab File ID: 1F1033

Level: (low/med) LOW Date Received: 04/08/98

% Moisture: not dec. 16 Date Analyzed: 04/21/98

GC Column: J&W DB-624(FID) ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS:		Q
		(ug/L or ug/Kg)	UG/KG	
-----	Gasoline Range Organics	595	U	UJ A03, G02, C08

FORM I VOA

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HG3102

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA 08S

Matrix: (soil/water) SOIL Lab Sample ID: 9804218 07

Sample wt/vol: 30.1 (g/mL) G Lab File ID: 1Q113

Level: (low/med) LOW Date Received: 04/08/98

% Moisture: 16 decanted: (Y/N) N Date Extracted: 04/09/98

Concentrated Extract Volume: 1.00 (mL) Date Analyzed: 04/20/98

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO. COMPOUND CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG Q

91-20-3-----	naphthalene	396	U
91-58-7-----	2-chloronaphthalene	396	U
208-96-8-----	acenaphthylene	396	U
83-32-9-----	acenaphthene	396	U
86-73-7-----	fluorene	396	U
85-01-8-----	phenanthrene	396	U
120-12-7-----	anthracene	396	U
206-44-0-----	fluoranthene	396	U
129-00-0-----	pyrene	396	U
56-55-3-----	benzo(a)anthracene	396	U
218-01-9-----	chrysene	396	U
205-99-2-----	benzo(b)fluoranthene	396	U
207-08-9-----	benzo(k)fluoranthene	396	U
50-32-8-----	benzo(a)pyrene	396	U
193-39-5-----	indeno(1,2,3-cd)pyrene	396	U
53-70-3-----	dibenz(a,h)anthracene	396	U
191-24-2-----	benzo(g,h,i)perylene	396	U

FORM I SV-1

OLM03.0

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HG4101

Lab Name: GENERAL ENGINEERING LABOR

Contract: NA

Lab Code: NA

Case No.: NA

SAS No.: NA

SDG No.: HA008S

Matrix: (soil/water) SOIL

Lab Sample ID: 9804218-08

Sample wt/vol: 10.0 (g/mL) G

Lab File ID: 2F1014

Level: (low/med) LOW

Date Received: 04/08/98

% Moisture: not dec. 8

Date Analyzed: 04/20/98

GC Column: J&W DB-624 (PID) ID: 0.53 (mm)

Dilution Factor: 1.0

Soil Extract Volume: _____ (ml)

Soil Aliquot Volume: _____ (uL)

CAS NO.

COMPOUND

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Q

71-43-2-----Benzene		2.2	U
108-88-3-----Toluene		13.9	
100-41-4-----Ethylbenzene		2.2	U
1330-20-7-----Xylenes (total)		6.5	U

4.7 6.8
=
4
u

DATA VALIDATION
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FORM I VOA