

Final

Remedial Investigation

**Site-Specific Field Sampling Plan Addendum
Small Weapons Repair Shop, Parcel 66(7)**

**Fort McClellan
Calhoun County, Alabama**

Prepared for:

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Contract No. DACA21-96-D-0018
IT Project No. 796887**

November 2000

Revision 1

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List of Acronyms

See Attachment 1, List of Abbreviations and Acronyms.

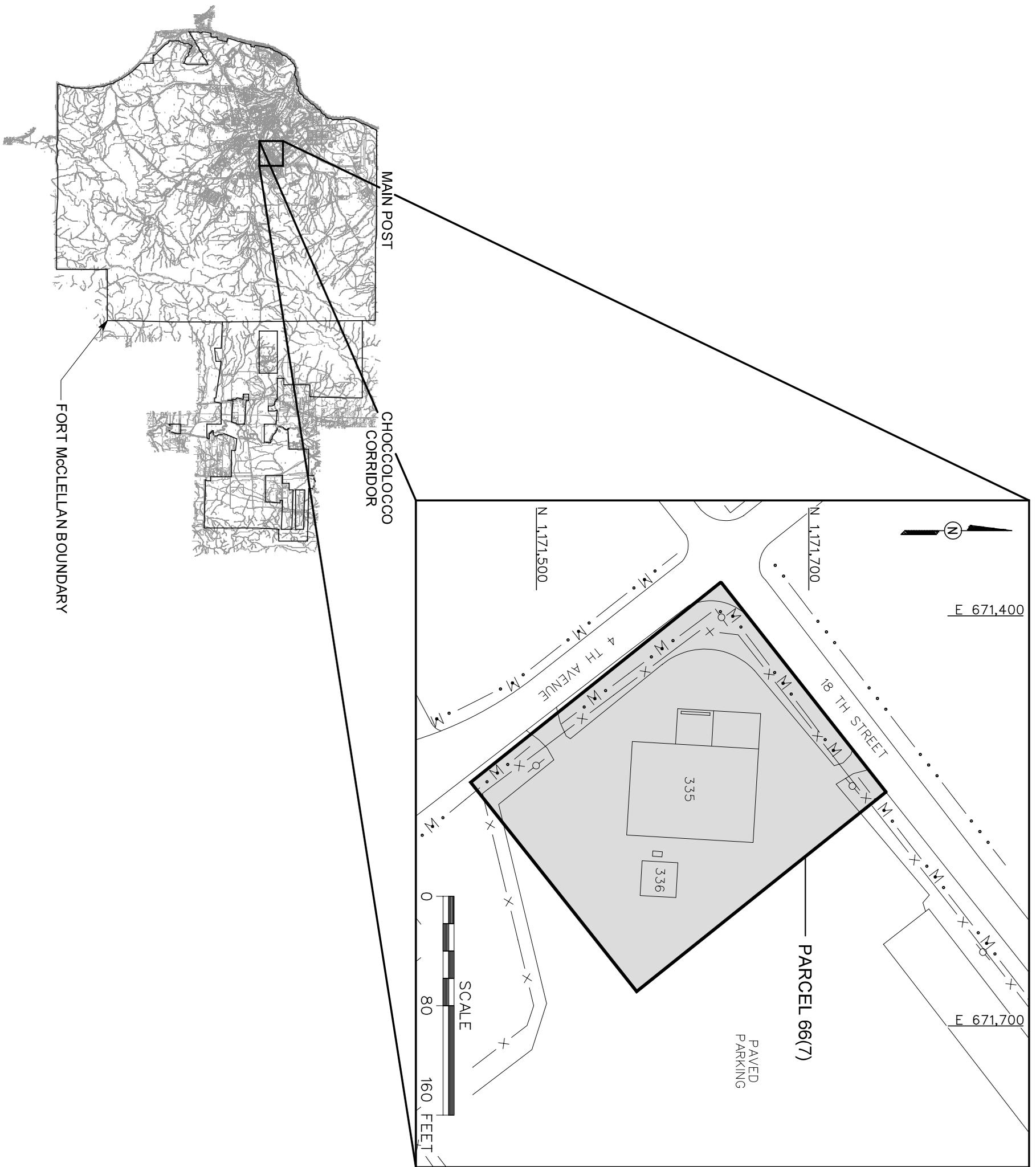
1.0 Introduction

The Small Weapons Repair Shop, Parcel 66(7), was investigated as part of the site investigation (SI) conducted for the Former Ordnance Motor Repair Area, Parcel 75(7), Fort McClellan (FTMC), Calhoun County, Alabama.

The Small Weapons Repair Shop, Parcel 66(7) (Figure 1-1), was identified as an area to be investigated prior to property transfer. The area was identified as a Category 7 site in the environmental baseline survey (Environmental Science and Engineering, 1998). Category 7 sites are areas that are not evaluated and/or require further evaluation. A site-specific field sampling plan (SFSP) attachment and a site-specific safety and health plan (SSHP) attachment were finalized in December 1998 (IT Corporation [IT], 1998a) to address field activities associated with the SI. The SI for the Former Ordnance Motor Repair Area included field work to collect three surface soil samples, three subsurface soil samples, and three groundwater samples in the vicinity of the Small Weapons Repair Shop. The SI was performed to determine whether potential site-specific chemicals were present at concentrations that would present an unacceptable risk to human health or the environment. The SI analytical results were compared to human health site-specific screening levels (SSSL), ecological screening values (ESV), and background screening values for FTMC. The SSSLs and ESVs were compiled by IT as part of the human health and ecological risk evaluations associated with SIs being conducted under the Base Realignment and Closure Environmental Restoration Program at FTMC. Vinyl chloride (0.037 milligrams per liter [mg/L]), 1,1-dichloroethane (0.0018 mg/L), and cis-1,2-dichloroethene (0.021 mg/L) were detected in the groundwater sample collected from temporary well PPMP-75-GP01 at concentrations exceeding residential human health SSSLs. Based on the comparisons of the analytical data to the SSSLs, a remedial investigation (RI) is required to determine the horizontal and vertical extent of groundwater contamination.

Specifically, IT will collect 13 groundwater samples from 13 monitoring wells. Groundwater samples collected during the RI field program will be analyzed for volatile organic compounds (VOC). Analytical data from these samples will be compared to the SSSLs to determine if chemical constituents are present at concentrations requiring further cleanup action by the Army prior to transfer.

This addendum to the SFSP attachment will be used in conjunction with the SSHP, the installation-wide work plan (IT, 1998b), and installation-wide sampling and analysis plan (SAP)



LEGEND	
	UNIMPROVED ROADS AND PARKING
	PAVED ROADS AND PARKING
	BUILDING
	PARCEL BOUNDARY
	SURFACE DRAINAGE / CREEK
	MANMADE SURFACE DRAINAGE FEATURE
	FENCE
	UTILITY POLE

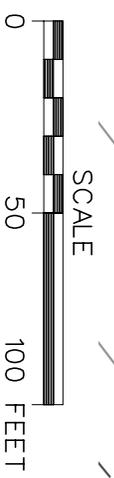
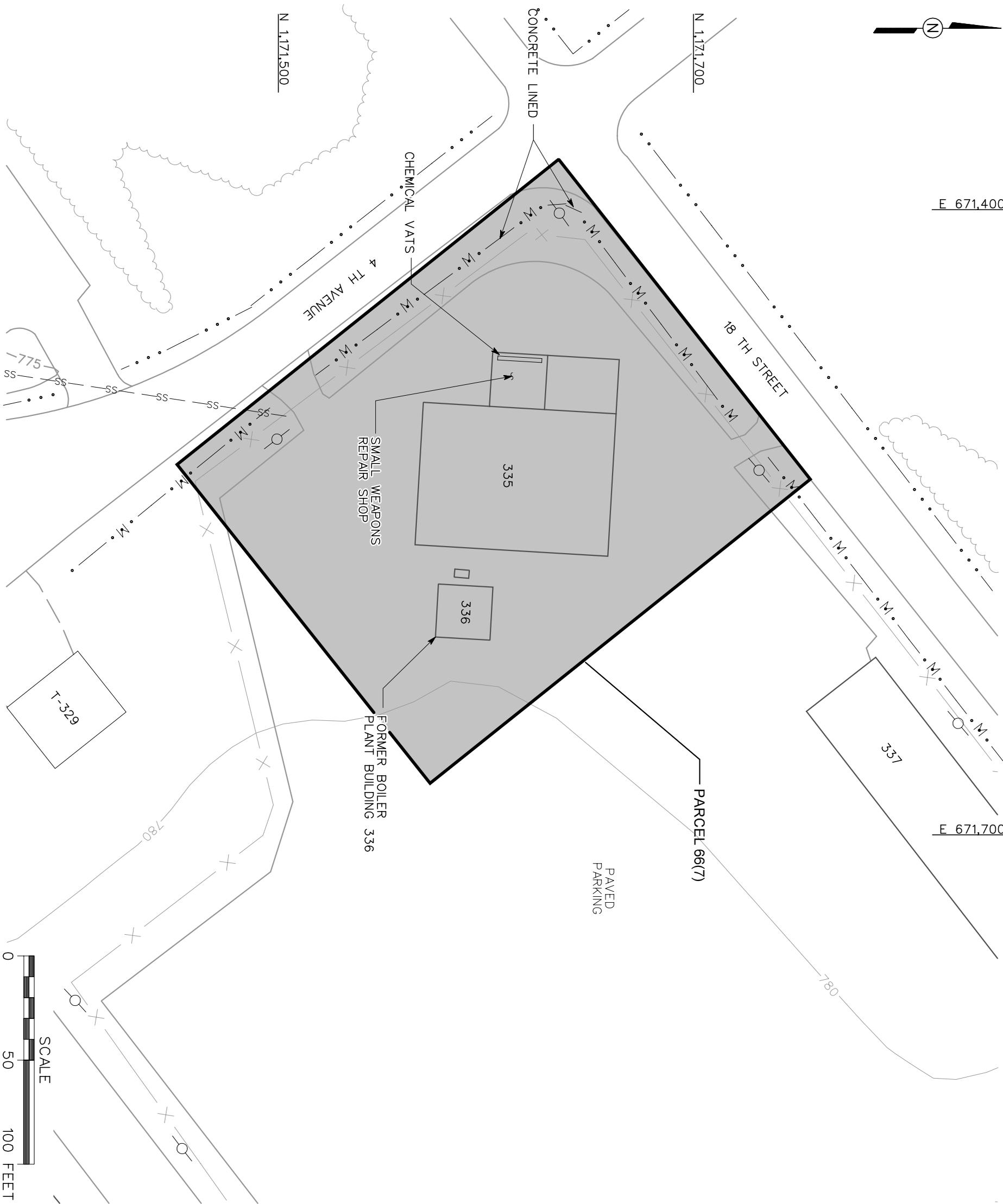
FIGURE 1-1
SITE LOCATION MAP
SMALL WEAPONS REPAIR SHOP
PARCEL 66(7)

U. S. ARMY CORPS OF ENGINEERS
 MOBILE DISTRICT
 FORT MCCLELLAN
 CALHOUN COUNTY, ALABAMA
 Contract No. DACA21-96-D-0018



(IT, 2000). The SAP includes the installation-wide safety and health plan, waste management plan, and quality assurance plan. Site-specific hazard analyses are included in the SSHP.

This addendum to the SFSP attachment for FTMC has been prepared to provide technical guidance and rationale for sample collection and analysis at the Small Weapons Repair Shop, Parcel 66(7) (Figure 1-2). IT will collect samples at this site as part of a RI effort. The purpose of the RI is to define the horizontal and vertical extent of chlorinated compounds in groundwater, specifically, vinyl chloride. The groundwater elevation data is provided in Figure 1-3 and Table 1-1.



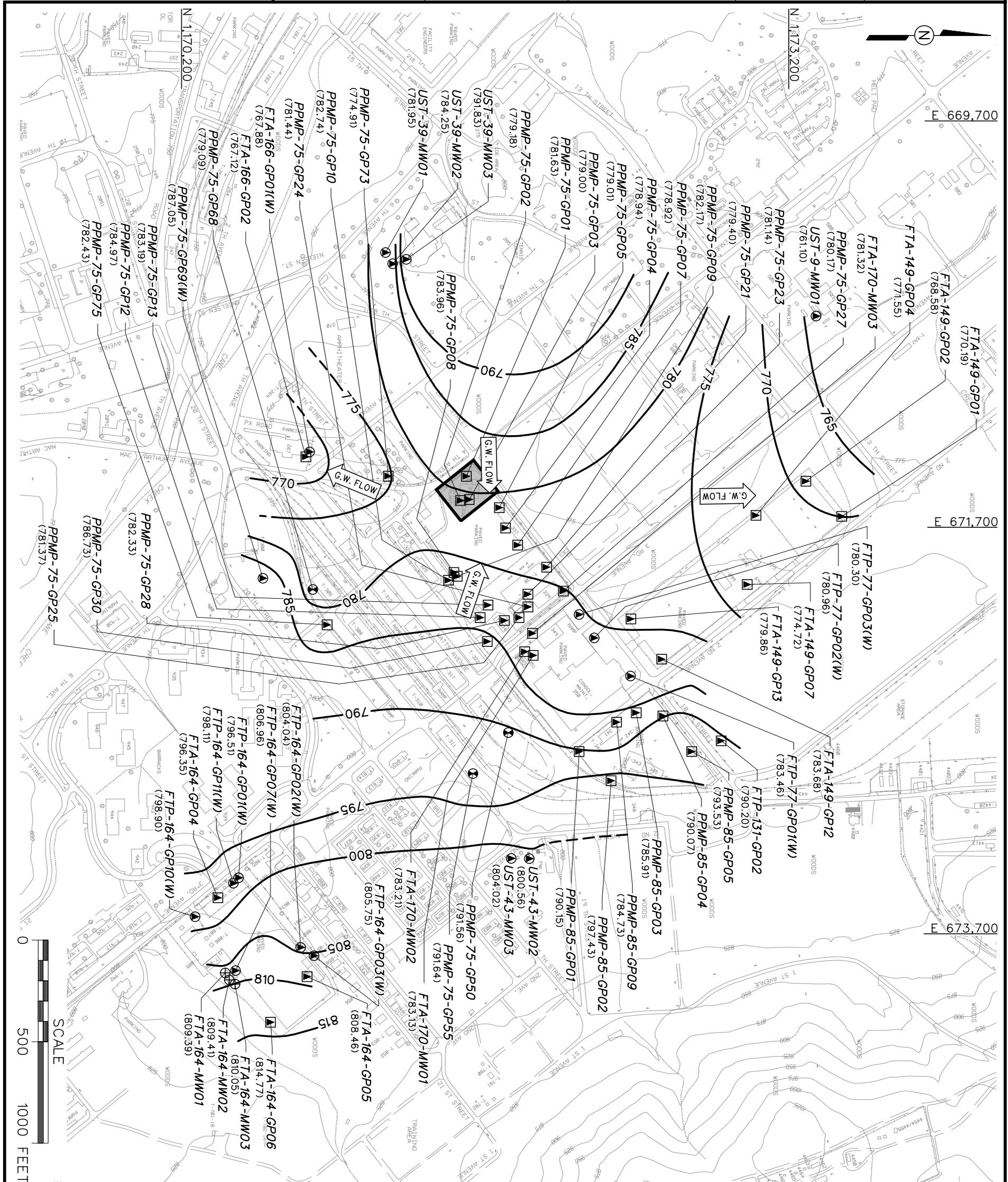
LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- BUILDING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
- TREES / TREELINE
- PARCEL BOUNDARY
- CULVERT WITH HEADWALL
- SURFACE DRAINAGE / CREEK
- MANMADE SURFACE DRAINAGE FEATURE
- FENCE
- UTILITY POLE
- SANITARY SEWER LINE

FIGURE 1-2
SITE MAP
SMALL WEAPONS REPAIR SHOP
PARCEL 66(7)

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT MCCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018





LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- BUILDING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
- GROUNDWATER ELEVATION CONTOURS (DASHED WHERE INFERRED)
- (774.72) GROUNDWATER ELEVATION (FT MSL)
- G.W. FLOW GROUNDWATER FLOW DIRECTION
- TREES / TREELINE
- PARCEL BOUNDARY
- CULVERT WITH HEADWALL
- SURFACE DRAINAGE / CREEK
- MANMADE SURFACE DRAINAGE FEATURE
- FENCE
- UTILITY POLE
- RESIDUUM MONITORING WELL LOCATION
- GROUNDWATER SAMPLE LOCATION
- GROUNDWATER, SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- GROUNDWATER AND SUBSURFACE SOIL SAMPLE LOCATION

FIGURE 1-3
GROUNDWATER ELEVATION MAP
MARCH 13 AND 14, 2000
SMALL WEAPONS REPAIR SHOP
PARCEL 66(7)

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT MCCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018



Table 1-1

**Groundwater Elevation Data
 March 13 and 14, 2000
 Site Investigation, 1999
 Small Weapons Repair Shop, Parcel 66(7)
 Fort McClellan, Calhoun County, Alabama**

(Page 1 of 2)

Temporary Well	Ground Elevation (ft-msl)	TOC Elevation (ft-msl)	Groundwater Elevation (ft msl)
PPMP-75-GP01	783.59	782.78	781.63
PPMP-75-GP02	782.11	781.98	779.18
PPMP-75-GP03	781.49	781.34	779
FTA-131-GP02	791.36	793.21	790.2
FTA-149-GP01	772.87	773.58	770.19
FTA-149-GP02	770.66	773.28	768.58
FTA-149-GP04	773.83	775.68	771.55
FTA-149-GP07	781.95	784.41	774.72
FTA-149-GP12	788.04	789.93	783.68
FTA-149-GP13	782.32	784.57	779.86
FTA-164-GP01	799.55	801.39	796.51
FTA-164-GP02	807.51	810.05	804.04
FTA-164-GP03	807.16	807.26	805.75
FTA-164-GP04	800.54	802.1	796.35
FTA-164-GP05	812.26	813.63	808.46
FTA-164-GP06	817.22	819.14	814.77
FTA-164-GP07	812.67	813.57	806.96
FTA-164-GP10	803.08	805.79	798.9
FTA-164-GP11	799.96	801.59	798.11
FTA-164-MW01	813.74	813.535	809.385
FTA-164-MW02	814.03	813.73	809.41
FTA-164-MW03	814.62	814.305	810.045
FTA-166-GP01	767.92	768.38	767.88
FTA-166-GP02	768.06	767.92	767.12
FTA-170-MW01	790.095	789.874	783.134
FTA-170-MW02	790.677	790.485	783.205
FTA-170-MW03	786.03	785.854	781.324
FTP-77-GP01	789.56	789.66	783.46
FTP-77-GP02	787.78	789.79	780.96
FTP-77-GP03	787.78	788.77	780.3
PPMP-75-GP01	783.59	782.78	781.63
PPMP-75-GP02	782.11	781.98	779.18
PPMP-75-GP03	781.49	781.34	778.99
PPMP-75-GP04	782.71	782.25	778.94
PPMP-75-GP05	781.92	782.36	779.01
PPMP-75-GP07	782.62	782.87	778.92
PPMP-75-GP08	788.75	791.15	783.96
PPMP-75-GP09	788.38	790.61	782.17
PPMP-75-GP10	787.29	787.24	782.74
PPMP-75-GP12	788.47	788.12	784.97
PPMP-75-GP13	786.49	785.7	783.19
PPMP-75-GP21	782.6	782.2	779.4
PPMP-75-GP23	783.53	784.51	781.14
PPMP-75-GP24	784.13	783.96	781.44
PPMP-75-GP25	785.41	784.91	781.37
PPMP-75-GP27	784.61	784.45	780.17
PPMP-75-GP28	785.61	785.3	782.33
PPMP-75-GP30	789.16	789.59	786.73
PPMP-75-GP50	793.73	795.33	791.56

Table 1-1

**Groundwater Elevation Data
March 13 and 14, 2000
Site Investigation, 1999
Small Weapons Repair Shop, Parcel 66(7)
Fort McClellan, Calhoun County, Alabama**

(Page 2 of 2)

Temporary Well	Ground Elevation (ft-msl)	TOC Elevation (ft-msl)	Groundwater Elevation (ft msl)
PPMP-75-GP55	801.653	803.493	791.643
PPMP-75-GP68	779.61	779.5	779.09
PPMP-75-GP69	788.77	791.32	787.05
PPMP-75-GP73	777.74	779.42	774.91
PPMP-75-GP75	784.75	784.86	782.43
PPMP-85-GP01	800.06	801.59	790.15
PPMP-85-GP02	800.82	801.53	797.43
PPMP-85-GP03	797.76	798.71	785.91
PPMP-85-GP04	796.07	798.25	790.07
PPMP-85-GP05	798.1	800.56	793.53
PPMP-85-GP09	801.75	804.54	784.73
UST-39-MW01	788.321	790.523	781.953
UST-39-MW02	795.109	797.183	784.253
UST-39-MW03	803.174	802.462	791.832
UST-43-MW02	808.069	810.243	800.563
UST-43-MW03	805.932	808.314	804.024
UST-9-MW01	763.702	763.441	761.101

Elevations referenced to the North American Vertical Datum of 1988 (NAVD88).
ft- feet.
msl- Mean sea level.
TOC-Top of casing.

2.0 Summary of Site Investigation

This section summarizes the SI activities conducted by IT at the Small Weapons Repair Shop, Parcel 66(7), including the environmental sampling and analysis and monitoring well installation activities.

2.1 Environmental Sampling

The environmental sampling performed during the SI at the Small Weapons Repair Shop, Parcel 66(7), included the collection of three surface soil samples, three subsurface soil samples, and three groundwater samples for chemical analysis. The sample locations were determined by the on-site geologist based on the sampling rationale, presence of surface structures, site topography, buried and overhead utilities, observing site physical characteristics noted during a site visit, and by reviewing historical documents pertaining to activities conducted at the site. Analytical results were compared to residential human health SSSLs, ESVs, and background screening values (metal, and semivolatile organic compounds [SVOC]), as presented in Tables 2-1 through 2-3. Sample locations are presented on Figure 2-1.

2.1.1 Surface Soil Sampling

Three surface soil samples were collected from three locations at the Small Weapons Repair Shop, Parcel 66(7). Surface soil samples were collected from the upper 1 foot of soil at the locations shown on Figure 2-1. As shown on Table 2-1, three VOCs and four SVOCs exceeded residential human health SSSLs. However, the metals and SVOCs were within background concentrations.

Metals. The concentrations of aluminum (two locations), arsenic (three locations), and iron (three locations) exceeded residential human health SSSLs. However, these samples were within background concentrations.

Semivolatile Organic Compounds. Four SVOCs, including benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h,)anthracene, and indeno(1,2,3-cd)pyrene, were detected at concentrations exceeding residential human health SSSLs. However, all four SVOCs were within background concentrations. Sample location PPMP-75-GP01 contained all four of the detected SVOCs.

Table 2-1

**Summary of Surface Soil Analytical Results
Site Investigation, 1999
Small Weapons Repair Shop, Parcel 66(7)
Fort McClellan, Calhoun County, Alabama**

Parcel Number		PPMP-75 PPMP-75-GP01 KJ0001 18-Jan-99 0-1								PPMP-75 PPMP-75-GP02 KJ0005 18-Jan-99 0-1					PPMP-75 PPMP-75-GP03 KJ0007 18-Jan-99 0-1			
Sample Location																		
Sample Number																		
Sample Date																		
Sample Depth (ft)																		
Parameter	Units	Bkg ^a	SSSL ^b	ESV ^b	Result	Qual	>Bkg	>SSSL	>ESV	Result	Qual	>Bkg	>SSSL	>ESV	Result	Qual	>Bkg	
Metals																		
Aluminum	mg/kg	16306	7.80E+03	5.00E+01	6.34E+03				YES	1.17E+04			YES	YES	1.18E+04			
Arsenic	mg/kg	13.73	4.26E-01	1.00E+01	1.30E+00	B		YES		6.30E+00			YES		5.00E+00			
Barium	mg/kg	123.94	5.47E+02	1.65E+02	4.65E+01					1.01E+02					6.53E+01			
Beryllium	mg/kg	0.8	9.60E+00	1.10E+00	8.10E-01		YES			1.20E+00	YES			YES	4.60E-01	J		
Calcium	mg/kg	1723	NA	NA	2.46E+04	J	YES			3.19E+03	J	YES			3.71E+02	J		
Chromium	mg/kg	37.04	2.32E+01	4.00E-01	7.60E+00	J			YES	1.71E+01	J			YES	1.67E+01	J		
Cobalt	mg/kg	15.15	4.68E+02	2.00E+01	1.30E+00	J				2.39E+01		YES		YES	3.80E+00	J		
Copper	mg/kg	12.71	3.13E+02	4.00E+01	6.50E+00					4.51E+01		YES		YES	2.08E+01		YES	
Iron	mg/kg	34154	2.34E+03	2.00E+02	4.37E+03			YES	YES	3.05E+04			YES	YES	2.75E+04			
Lead	mg/kg	40.05	4.00E+02	5.00E+01	1.08E+01					2.60E+01				YES	1.15E+01			
Magnesium	mg/kg	1033	NA	440000	7.90E+03	J	YES			6.03E+03	J	YES			1.13E+03	J	YES	
Manganese	mg/kg	1579	3.63E+02	1.00E+02	2.09E+02				YES	3.63E+02				YES	1.54E+01			
Mercury	mg/kg	0.08	2.33E+00	1.00E-01	2.60E-02	J				4.10E-02	J				1.70E-02	J		
Nickel	mg/kg	10.33	1.54E+02	3.00E+01	3.30E+00	J				4.58E+01		YES		YES	8.00E+00			
Potassium	mg/kg	799.76	NA	NA	5.31E+02	J				4.57E+02	J				4.04E+02	J		
Selenium	mg/kg	0.48	3.91E+01	8.10E-01	ND					1.60E+00		YES		YES	1.40E+00		YES	
Sodium	mg/kg	634.28	NA	NA	1.40E+02	B				8.37E+01	B				1.23E+02	B		
Vanadium	mg/kg	58.84	5.31E+01	2.00E+00	9.40E+00				YES	2.45E+01				YES	2.87E+01			
Zinc	mg/kg	40.64	2.34E+03	5.00E+01	1.61E+01					1.00E+02		YES		YES	2.16E+01			
Volatile Organic Compounds																		
2-Butanone	mg/kg	NA	4.66E+03	8.96E+01	5.80E-03	J				ND					ND			
Acetone	mg/kg	NA	7.76E+02	2.50E+00	4.60E-02	B				1.50E-01	J				2.50E-02	B		
Bromomethane	mg/kg	NA	1.09E+01	NA	3.00E-03	B				3.10E-03	B				3.20E-03	B		
Carbon disulfide	mg/kg	NA	7.77E+02	9.00E-02	1.70E-03	J				ND					ND			
Methylene chloride	mg/kg	NA	4.66E+02	2.00E+00	3.30E-03	B				2.80E-03	B				3.40E-03	B		
Toluene	mg/kg	NA	1.55E+03	5.00E-02	2.00E-03	J				ND					ND			
Semivolatile Organic Compound																		
Anthracene	mg/kg	2.10E+00	2.33E+03	1.00E-01	7.90E-02	J				ND					ND			
Benzo(a)anthracene	mg/kg	3.13E+00	8.51E-01	5.21E+00	7.30E-01					4.10E-02	J				ND			
Benzo(a)pyrene	mg/kg	3.16E+00	8.51E-02	1.00E-01	1.60E+00			YES	YES	ND					ND			
Benzo(b)fluoranthene	mg/kg	3.90E+00	8.51E-01	5.98E+01	2.10E+00			YES		6.70E-02	J				ND			
Benzo(ghi)perylene	mg/kg	1.64E+00	2.32E+02	1.19E+02	1.10E+00					ND					ND			
Benzo(k)fluoranthene	mg/kg	2.72E+00	8.51E+00	1.48E+02	6.10E-01					ND					ND			
Chrysene	mg/kg	3.33E+00	8.61E+01	4.73E+00	9.40E-01					4.00E-02	J				ND			
Dibenz(a,h)anthracene	mg/kg	9.90E-01	8.61E-02	1.84E+01	2.70E-01	J		YES		ND					ND			
Fluoranthene	mg/kg	7.16E+00	3.09E+02	1.00E-01	1.10E+00				YES	8.10E-02	J				ND			
Indeno(1,2,3-cd)pyrene	mg/kg	1.72E+00	8.51E-01	1.09E+02	1.20E+00	J		YES		ND					ND			
Phenanthrene	mg/kg	5.46E+00	2.32E+03	1.00E-01	1.80E-01	J			YES	ND					ND			
Pyrene	mg/kg	5.58E+00	2.33E+02	1.00E-01	1.10E+00				YES	6.50E-02	J				ND			
Chlorinated Pesticides																		
Aldrin	mg/kg	NA	3.65E-02	2.50E-03	ND					ND					1.00E-03	J		
Endrin	mg/kg	NA	2.32E+00	1.00E-03	5.20E-03	J			YES	ND					ND			
Methoxychlor	mg/kg	NA	3.89E+01	1.99E-02	1.20E-02	J				ND					ND			

Analyses performed by Quanterra Environmental Services using U.S.EPA SW-846 analytical methods, including Update III methods where applicable.

^a Bkg - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in Science Applications International Corporation (1998), *Final Background Metals Survey Report, Fort McClellan*

^b Residential human health site-specific screening level (SSSL) and ecological screening value (ESV) as given in IT Corporation (2000), *Draft Human Health and Ecological Screening Values*

and *PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama, March*.

B = Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero).

J = Result is greater than stated method detection limit but less than or equal to specified reporting limit.

mg/kg = Milligrams per kilogram.

NA - Not Available.

ND - Not Detected.

Qual - Data Validation Qualifier.

Table 2-2

**Summary of Subsurface Soil Analytical Results
Site Investigation, 1999
Small Weapons Repair Shop, Parcel 66(7)
Fort McClellan, Calhoun County, Alabama**

Parcel Number Sample Location Sample Number Sample Date Sample Depth (ft)				PPMP-75 PPMP-75-GP01 KJ0004 18-Jan-99 5-7				PPMP-75 PPMP-75-GP02 KJ0006 18-Jan-99 3-5				PPMP-75 PPMP-75-GP03 KJ0008 18-Jan-99 3-5			
Parameter	Units	Bkg ^a	SSSL ^b	Result	Qual	>Bkg	>SSSL	Result	Qual	>Bkg	>SSSL	Result	Qual	>Bkg	>ESV
Metals															
Aluminum	mg/kg	1.36E+04	7.80E+03	1.31E+04			YES	1.30E+04			YES	1.49E+04		YES	
Arsenic	mg/kg	1.83E+01	4.26E-01	2.60E+00			YES	4.40E+00			YES	4.90E+00			
Barium	mg/kg	2.34E+02	5.47E+02	1.73E+02				8.57E+01				8.54E+01			
Beryllium	mg/kg	8.60E-01	9.60E+00	1.30E+00		YES		1.80E+00		YES		2.00E+00		YES	
Calcium	mg/kg	6.37E+02	NA	1.45E+03	J	YES		1.02E+03	J	YES		8.94E+02	J	YES	
Chromium	mg/kg	3.83E+01	2.32E+01	1.67E+01	J			1.81E+01	J			1.94E+01	J		
Cobalt	mg/kg	1.75E+01	4.68E+02	1.11E+01				3.18E+01		YES		3.74E+01		YES	
Copper	mg/kg	1.94E+01	3.13E+02	1.76E+01				3.77E+01		YES		3.90E+01		YES	
Iron	mg/kg	4.48E+04	2.34E+03	2.36E+04			YES	3.06E+04			YES	3.46E+04			
Lead	mg/kg	3.85E+01	4.00E+02	1.18E+01				1.61E+01				1.89E+01			
Magnesium	mg/kg	7.66E+02	NA	3.33E+03	J	YES		6.72E+03	J	YES		7.50E+03	J	YES	
Manganese	mg/kg	1.36E+03	3.63E+02	1.32E+02				3.12E+02				1.79E+02			
Mercury	mg/kg	7.00E-02	2.33E+00	1.90E-02	J			5.40E-02	J			3.20E-02	J		
Nickel	mg/kg	1.29E+01	1.54E+02	2.18E+01		YES		7.18E+01		YES		6.99E+01		YES	
Potassium	mg/kg	7.11E+02	NA	4.93E+02	J			4.20E+02	J			3.80E+02	J		
Selenium	mg/kg	4.70E-01	3.91E+01	1.00E+00		YES		1.50E+00		YES		1.60E+00		YES	
Sodium	mg/kg	7.02E+02	NA	1.95E+02	B			9.23E+01	B			1.25E+02	B		
Thallium	mg/kg	1.40E+00	5.08E-01	4.30E-01	J			6.10E-01	J		YES	ND			
Vanadium	mg/kg	6.49E+01	5.31E+01	2.10E+01				1.83E+01				1.84E+01			
Zinc	mg/kg	3.49E+01	2.34E+03	4.11E+01		YES		1.04E+02		YES		1.11E+02		YES	
Volatiles															
2-Butanone	mg/kg	NA	4.66E+03	3.80E-03	J			ND				ND			
Acetone	mg/kg	NA	7.76E+02	2.70E-01	J			4.90E-02	B			1.90E-02	B		
Bromomethane	mg/kg	NA	1.09E+01	3.00E-03	B			3.10E-03	B			2.90E-03	B		
Methylene chloride	mg/kg	NA	8.41E+01	2.90E-03	B			2.50E-03	B			3.00E-03	B		
cis-1,2-Dichloroethene	mg/kg	NA	7.77E+01	1.80E-02				ND				ND			
trans-1,2-Dichloroethene	mg/kg	NA	1.55E+02	3.20E-03	J			ND				ND			
Semivolatile Organic Compounds															
bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	ND				ND				5.10E-02	B		

Analyses performed by Quanterra Environmental Services using U.S.EPA SW-846 analytical methods, including Update III methods where applicable.

^a Bkg - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in Science Applications International Corporation (1998), *Final Background Metals Survey Report, Fort McClellan, Alabama, July*.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero).

^bResidential human health site-specific screening level (SSSL) and ecological screening value (ESV) as given in IT Corporation (2000), *Draft Human Health and Ecological Screening and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama, March*.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero)

ft - Foot.

J - Result is greater than stated method detection limit but less than or equal to specified reporting limit.

mg/kg - Milligrams per kilogram.

NA - Not Available.

ND - Not detected.

Qual - Data validation qualifier.

Table 2-3

**Summary of Groundwater Analytical Results
Site Investigation, 1999
Small Weapons Repair Shop, Parcel 66(7)
Fort McClellan, Calhoun County, Alabama**

Parcel Number Sample Location Sample Number Sample Date				PPMP-75 PPMP-75-GP01 KJ3001 24-Feb-99				PPMP-75 PPMP-75-GP02 KJ3002 24-Feb-99				
Parameter	Units	Bkg ^a	SSSL ^b	Result	Qual	>Bkg	>SSSL	Result	Qual	>Bkg	>SSSL	Result
Metals												
Aluminum	mg/L	2.34E+00	1.56E+00	1.02E-01	J			7.57E-02	J			1.39E+00
Barium	mg/L	1.27E-01	1.10E-01	8.02E-02	J			2.10E-02	J			3.15E-02
Calcium	mg/L	5.65E+01	NA	1.21E+02		YES		3.24E+01				2.71E+01
Iron	mg/L	7.04E+00	4.69E-01	1.22E+00			YES	ND				1.83E+00
Magnesium	mg/L	2.13E+01	NA	6.81E+01		YES		2.19E+01		YES		1.54E+01
Manganese	mg/L	5.81E-01	7.35E-02	1.15E+00		YES	YES	5.46E-02				3.95E-01
Nickel	mg/L	NA	3.13E-02	ND				ND				1.25E-02
Potassium	mg/L	7.20E+00	NA	3.81E+00	J			2.42E+00	J			1.23E+00
Sodium	mg/L	1.48E+01	NA	1.09E+02		YES		2.65E+01		YES		1.67E+01
Volatiles												
1,1,1-Trichloroethane	mg/L	NA	3.05E-01	5.00E-04	J			ND				ND
1,1-Dichloroethane	mg/L	NA	1.54E-01	6.90E-03				ND				ND
1,1-Dichloroethene	mg/L	NA	9.00E-05	1.80E-03			YES	ND				ND
Trichloroethene	mg/L	NA	4.50E-03	4.40E-03				ND				ND
Vinyl chloride	mg/L	NA	3.00E-05	3.70E-02			YES	ND				ND
cis-1,2-Dichloroethene	mg/L	NA	1.55E-02	2.10E-02			YES	ND				ND
trans-1,2-Dichloroethene	mg/L	NA	3.07E-02	1.50E-02				ND				ND

Analyses performed by Quanterra Environmental Services using U.S. Environmental Protection Agency SW-846 analytical methods, including Update III methc
^a Bkg - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in Science Applications International
Final Background Metals Survey Report, Fort McClellan, Alabama, July.

^b Residential human health site-specific screening level (SSSL) as given in IT Corporation (2000), *Draft Human Health and Ecological Screening Values
and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama, March.*

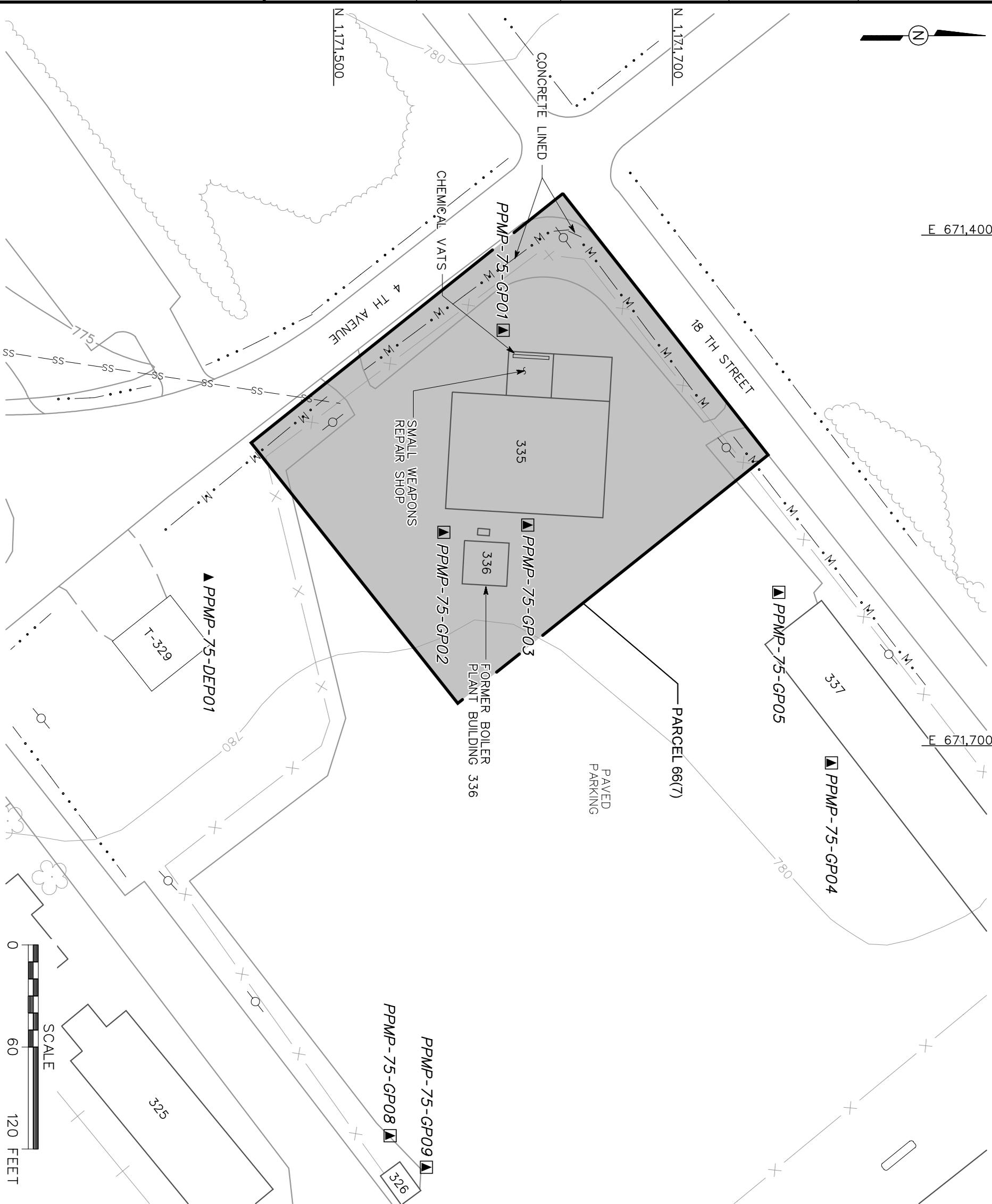
J - Result is greater than stated method detection limit but less than or equal to specified reporting limit.

mg/L - Milligrams per liter.

NA - Not Available.

ND - Not Detected.

Qual - Data Validation Qualifier.

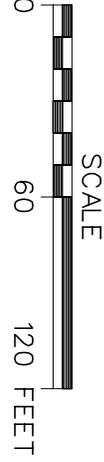


LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- BUILDING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
- TREES / TREELINE
- PARCEL BOUNDARY
- CULVERT WITH HEADWALL
- SURFACE DRAINAGE / CREEK
- MANMADE SURFACE DRAINAGE FEATURE
- FENCE
- UTILITY POLE
- SANITARY SEWER LINE
- GROUNDWATER, SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- DEPOSITIONAL SOIL SAMPLE LOCATION

FIGURE 2-1
SAMPLE LOCATION MAP
 SITE INVESTIGATION, 1999
 SMALL WEAPONS REPAIR SHOP
 PARCEL 66(7)

U. S. ARMY CORPS OF ENGINEERS
 MOBILE DISTRICT
 FORT MCCLELLAN
 CALHOUN COUNTY, ALABAMA
 Contract No. DACA21-96-D-0018



2.1.2 Subsurface Soil Sampling

Subsurface soil samples were collected from three soil borings at the Small Weapons Repair Shop (Parcel 66 [7]), as shown on Figure 2-1. As shown on Table 2-2, three metals, including aluminum, arsenic, and iron, were detected at concentrations exceeding the residential human health SSSLs. With the exception of aluminum at sample location PPMP-75-GP03, the concentrations of these metals were within background concentrations. Sample locations with analytical results exceeding SSSLs and background concentrations are shown on Figure 2-2.

2.1.3 Groundwater Sampling

Three temporary wells PPMP-75-GP01, PPMP-75-GP02, and PPMP-75-GP03 were installed in the residuum groundwater zone at the Small Weapons Repair Shop. Analytical results were compared to the residential human health SSSLs and background screening values. As shown on Table 2-3, two metals and three VOCs exceeded the human health SSSLs. Groundwater samples exceeding the SSSLs are presented on Figure 2-2.

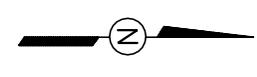
Metals. The concentrations of two metals (iron and manganese) exceeded residential human health SSSLs at temporary wells PPMP-75-GP01 and PPMP-75-GP03. The concentration of manganese exceeded the background concentration at temporary well PPMP-75-GP01.

Volatile Organic Compounds. Three VOCs, 1,1-dichloroethene (0.0018 mg/L), cis-1,2-dichloroethene (0.021 mg/L), and vinyl chloride (0.037 mg/L) were detected at concentrations exceeding residential human health SSSLs. All three VOCs were detected at temporary well location PPMP-75-GP01.

2.1.4 Water Level Measurements

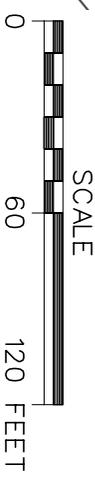
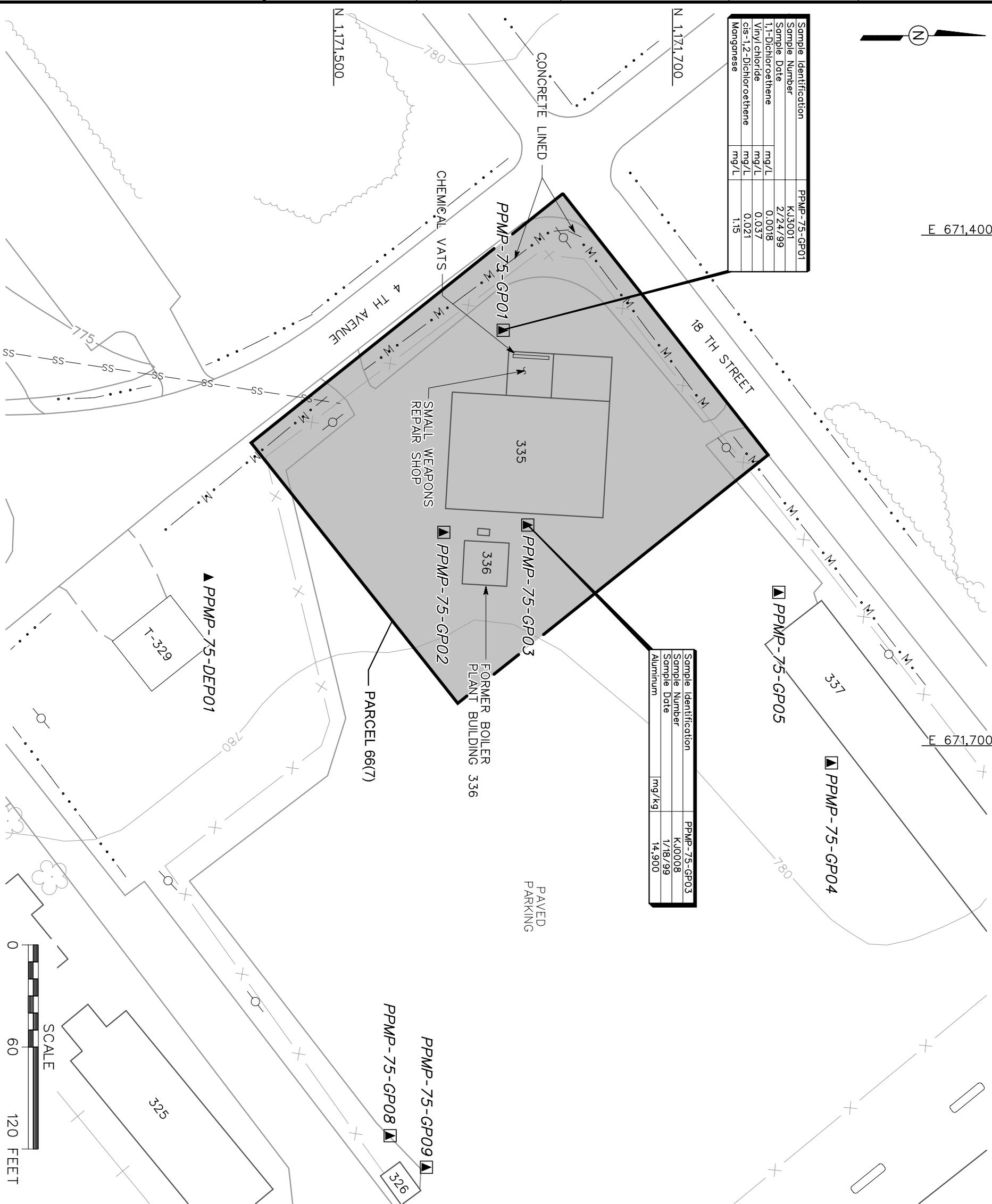
The depth to groundwater was measured in the three temporary wells installed at the Small Weapons Repair Shop, Parcel 66(7), following procedures outlined in Section 4.18 of the SAP (IT, 2000). Water levels from temporary wells at adjacent parcels were also measured to establish groundwater elevations across the entire area. Depth to groundwater was measured with an electronic water level meter. The meter probe and cable were cleaned between use at each temporary and permanent well location following decontamination methodology presented in Section 4.10 of the SAP (IT, 2000). Measurements were referenced to the top of the polyvinyl chloride (PVC) stickup. A summary of groundwater level measurements is presented in Table 1-1. A groundwater elevation map constructed from March 13 and 14, 2000 data is presented as Figure 1-3.

Based on topography and groundwater elevations shown on Figure 1-3, regional groundwater



Sample Identification	PPMP-75-GP01
Sample Number	KJ3001
Sample Date	2/24/99
1,1-Dichloroethene	mg/L 0.0018
Vinyl chloride	mg/L 0.037
cis-1,2-Dichloroethene	mg/L 0.021
Manganese	mg/L 1.15

Sample Identification	PPMP-75-GP03
Sample Number	KJ0008
Sample Date	1/18/99
Aluminum	mg/kg 14,900



LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- BUILDING
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- TREES / TREELINE
- PARCEL BOUNDARY
- CULVERT WITH HEADWALL
- SURFACE DRAINAGE / CREEK
- MANMADE SURFACE DRAINAGE
- FEATURE
- FENCE
- UTILITY POLE
- SANITARY SEWER LINE
- GROUNDWATER, SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- DEPOSITIONAL SOIL SAMPLE LOCATION
- ANALYTE DETECTED IN METHOD BLANK AT CONCENTRATION GREATER THAN THE REPORTING LIMIT (AND GREATER THAN ZERO)
- RESULT IS GREATER THAN STATED METHOD DETECTION LIMIT BUT LESS THAN OR EQUAL TO SPECIFIED REPORTING LIMIT
- SITE SPECIFIC SCREENING LEVELS
- MILLIGRAMS PER LITER
- MILLIGRAMS PER KILOGRAMS

FIGURE 2-2
SOIL AND GROUNDWATER SAMPLE LOCATIONS EXCEEDING RESIDENTIAL HUMAN HEALTH SSSLs
SMALL WEAPONS REPAIR SHOP
PARCEL 66(7)

U. S. ARMY CORPS OF ENGINEERS
 MOBILE DISTRICT
 FORT MCCLLELLAN
 CALHOUN COUNTY, ALABAMA
 Contract No. DACA21-96-D-0018



flows towards the Small Weapons Repair Shop Parcel 66(7) from the east and from the west. The groundwater flow is controlled by a topographic high west of the site. The opposing groundwater flow directions have created a groundwater divide in the general vicinity of Building 335, diverting the local groundwater to the southwest towards Cane Creek.

3.0 Proposed Field Activities

3.1 Utility Clearances

A utility clearance will be performed at all locations where groundwater samples will be collected, using the procedure outlined in Section 4.2.6 of the SAP (IT, 2000). The site manager will mark the proposed locations with stakes, coordinate with local utility companies to clear the proposed locations for utilities, and obtain digging permits. Once the locations are approved for intrusive sampling, the stakes will be labeled as cleared.

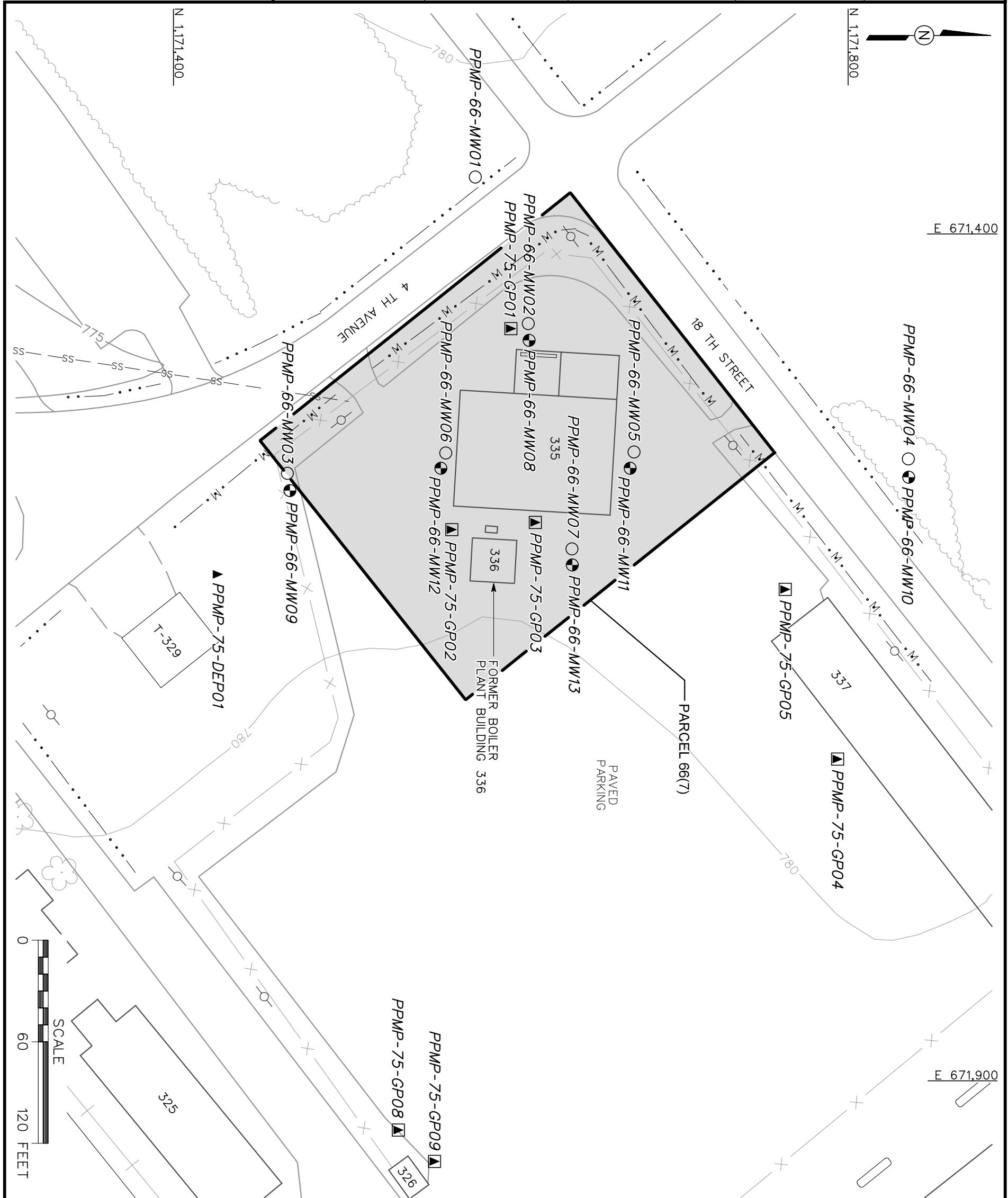
3.2 Environmental Sampling

The environmental sampling program during the RI at the Small Weapons Repair Shop, Parcel 66(7), includes the installation and sampling of 13 monitoring wells. Groundwater samples will be collected from the proposed wells to provide data in order to determine the horizontal and vertical extent of groundwater contamination.

3.3 Residuum Monitoring Wells

Residuum monitoring well boreholes will be drilled and installed using 4.25-inch inside diameter (ID) hollow-stem augers. Residuum monitoring wells will be drilled a minimum of 10 feet below the first groundwater bearing zone or to the top of bedrock, whichever is encountered first. The monitoring well casing will consist of new 2-inch ID, Schedule 40, threaded, flush-joint, PVC pipe. Attached to the bottom of the well casing will be a section of new threaded, flush-joint, 0.010-inch continuous wrap PVC well screen, approximately 10 to 20 feet long. The proposed residuum monitoring well locations are shown on Figure 3-1. The exact monitoring well locations will be determined in the field by the on-site geologist based on actual field conditions.

Soil samples will be collected at 5-foot intervals to the total depth of the hole during hollow-stem auger drilling. Samples will be collected using a 24-inch long, 2-inch diameter or-larger-diameter split-spoon samplers. Lithologic samples will be collected for all monitoring wells during drilling to provide a detailed lithologic log. Soil borings will be logged in accordance with American Society for Testing and Materials Method D 2488 using the Unified Soil Classification System. The residuum monitoring wells will be drilled, installed and developed as specified in Section 4.8 and Appendix C of the SAP (IT, 2000). Groundwater samples will not



LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- BUILDING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
- TREES / TREELINE
- PARCEL BOUNDARY
- CULVERT WITH HEADWALL
- SURFACE DRAINAGE / CREEK
- MANMADE SURFACE DRAINAGE FEATURE
- FENCE
- UTILITY POLE
- SANITARY SEWER LINE
- EXISTING GROUNDWATER, SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION (WELL TO BE ABANDONED)
- EXISTING DEPOSITIONAL SOIL SAMPLE LOCATION
- PROPOSED RESIDUUM MONITORING WELL LOCATION
- PROPOSED BEDROCK MONITORING WELL LOCATION

FIGURE 3-1
PROPOSED MONITORING WELL
LOCATIONS
SMALL WEAPONS REPAIR SHOP
PARCEL 66(7)

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 CALHOUN COUNTY, ALABAMA
 Contract No. DACA21-96-D-0018



be collected from residuum wells for a period of at least 14 days after well development. The proposed residuum monitoring well rationale is presented in Table 3-1.

3.4 Bedrock Monitoring Wells

Six bedrock monitoring wells will be installed using a combination of hollow stem auger and air rotary drilling techniques at the small weapon repair shop, Parcel 66(7). The proposed bedrock monitoring well locations are shown on Figure 3-1.

An air rotary rig with a 12-inch percussion bit or rotary bit will be used to drill the borehole from land surface to 10 feet into bedrock. The borehole diameter will be approximately 12 inches, such that a 10-inch ID carbon steel International Pipe Standard outer casing will be installed into the borehole from land surface to 5 feet into bedrock. A minimum of a 2-inch annular space between the outer casing and borehole wall will be required. The 10-inch carbon steel outer casing will be grouted in-place using a tremie pipe suspended in the annulus outside of the casing. Bentonite-cement grout will be mixed using approximately 6.5 to 7 gallons of water, and 5 pounds of bentonite per 94 pound bag of Type I Portland cement. After the grout has cured a minimum of 48 hours, an HQ wireline core barrel will be used to collect core samples continuously from the bottom of the outer casing to a minimum of 20 feet into bedrock. The hole depth into bedrock will be increased if groundwater is not encountered. After completion of core sample collection, an 8-inch air percussion bit will be used to ream the hole a minimum of 15 feet below the bottom of the outer casing and into bedrock. The compressor on the drill rig will be equipped with an air filter between the compressor and the drill bit. Water will be the only lubricant allowed during drilling operations.

Four-inch monitoring wells will be installed inside the outer casing at each proposed well location. The well casing will consist of new, 4-inch ID, Schedule 40, threaded, flush-joint, PVC pipe. Attached to the bottom of the well casing will be a section of new threaded, flush joint 0.010-inch continuous wrap PVC well screen, approximately 10 to 20 feet long. Attached to the bottom of the screen will be a sump, approximately 3 to 5 feet long, composed of new, 4-inch ID, Schedule 40, threaded, flush-joint PVC pipe. After the casing and screen materials are lowered into the boring, a gravel pack will be installed around the well screen and the inside casing will be grouted from the top of the gravel pack to land surface. The gravel pack will consist of 20/40 silica sand and will be tremied into place from the bottom of the sump to approximately 5 feet above the top of the screen. A bentonite seal approximately 5 feet thick

Table 3-1

**Site Sampling Rationale, Remedial Investigation
Small Weapons Repair Shop, Parcel 66(7)
Fort McClellan, Calhoun County, Alabama**

Sampling Location Rationale
Residuum groundwater monitoring well PPMP-66-MW01 will be installed approximately 100 feet upgradient of temporary monitoring well PPMP-75-GP01 to provide groundwater quality data and to determine whether the organic compounds detected in temporary monitoring well PPMP-75-GP01 during SI activities are from sources other than the Small Weapons Repair Shop.
Residuum groundwater monitoring well PPMP-66-MW02 will replace temporary well PPMP-75-GP01 located on the southwest corner of the Small Weapons Repair Shop. It is estimated that the monitoring well will be installed to a depth of approximately 14 feet below ground surface. Groundwater samples will be collected from the well to determine the presence or absence of volatile organic compounds. Current and previous data will be compared and groundwater quality assessed.
Residuum groundwater monitoring well PPMP-66-MW03 will be installed approximately 150 feet south and potentially downgradient of the Small Weapons Repair Shop to provide groundwater quality data, groundwater elevations to establish groundwater flow direction, vertical gradient, and to determine the lateral extent of groundwater contamination. Groundwater samples collected from the monitoring well will be analyzed for volatile organic compounds.
Residuum groundwater monitoring well PPMP-66-MW04 will be installed approximately 180 feet north of the Small Weapons Repair Shop to provide groundwater quality data, groundwater elevations to establish groundwater flow direction, vertical gradient, and to determine the lateral extent of groundwater contamination. Groundwater samples collected from the monitoring well will be analyzed for volatile organic compounds.
Residuum groundwater monitoring well PPMP-66-MW05 will be installed approximately 90 feet northeast of temporary monitoring well PPMP-75-GP01 to provide groundwater quality data, groundwater elevations to establish groundwater flow direction, vertical gradient, and to determine the lateral extent of groundwater contamination. Groundwater samples collected from the monitoring well will be analyzed for volatile organic compounds.
Residuum monitoring well PPMP-66-MW06 will be installed approximately 90 feet southeast of temporary monitoring well PPMP-75-GP01 to provide groundwater quality data, groundwater elevations to establish groundwater flow direction, vertical gradient, and to determine the lateral extent of groundwater contamination. Groundwater samples collected from the monitoring well will be analyzed for volatile organic compounds.
Residuum monitoring well PPMP-66-MW07 will be installed approximately 120 feet northeast and potentially downgradient of temporary monitoring well PPMP-75-GP01 to provide groundwater quality data, groundwater elevations to establish groundwater flow direction, vertical gradient, and to determine the lateral extent of groundwater contamination. Groundwater samples collected from the monitoring well will be analyzed for volatile organic compounds.
Bedrock groundwater monitoring well PPMP-66-MW08 will be installed adjacent to residuum with monitoring well PPMP-66-MW02 to provide groundwater quality data, groundwater elevations to establish groundwater flow direction, vertical gradient, and to determine the vertical extent of groundwater contamination. It is estimated that the monitoring well will be installed to a maximum depth of approximately 75 feet below ground surface. Groundwater samples collected from the monitoring well will be analyzed for volatile organic compounds.
Bedrock groundwater monitoring well PPMP-66-MW09 will be installed adjacent to residuum monitoring well PPMP-66-MW03 to provide groundwater quality data, groundwater elevations to establish groundwater flow direction, vertical gradient, and to determine the vertical extent of groundwater contamination. It is estimated that the monitoring well will be installed to a maximum depth of approximately 75 feet below ground surface. Groundwater samples collected from the monitoring well will be analyzed for volatile organic compounds.
Bedrock groundwater monitoring well PPMP-66-MW10 will be installed adjacent to residuum monitoring well PPMP-66-MW04 to provide groundwater quality data, groundwater elevations to establish groundwater flow direction, vertical gradient, and to determine the vertical extent of groundwater contamination. It is estimated that the monitoring well will be installed to a maximum depth of approximately 75 feet below ground surface. Groundwater samples collected from the monitoring well will be analyzed for volatile organic compounds.
Bedrock groundwater monitoring well PPMP-66-MW11 will be installed adjacent to residuum monitoring well PPMP-66-MW05 to provide groundwater quality data, groundwater elevations to establish groundwater flow direction, vertical gradient, and to determine the vertical extent of groundwater contamination. It is estimated that the monitoring well will be installed to a maximum depth of approximately 75 feet below ground surface. Groundwater samples collected from the monitoring well will be analyzed for volatile organic compounds, semivolatle compounds, and explosives.
Bedrock groundwater monitoring well PPMP-66-MW12 will be installed adjacent to residuum monitoring well PPMP-66-MW06 to provide groundwater quality data, groundwater elevations to establish groundwater flow direction, vertical gradient, and to determine the vertical extent of groundwater contamination. It is estimated that the monitoring well will be installed to a maximum depth of approximately 75 feet below ground surface. Groundwater samples collected from the monitoring well will be analyzed for volatile organic compounds, semivolatle compounds, and explosives.
Bedrock groundwater monitoring well PPMP-66-MW13 will be installed adjacent to residuum monitoring well PPMP-66-MW07 to provide groundwater quality data, groundwater elevations to establish groundwater flow direction, vertical gradient, and to determine the vertical extent of groundwater contamination. It is estimated that the monitoring well will be installed to a maximum depth of approximately 75 feet below ground surface. Groundwater samples collected from the monitoring well will be analyzed for volatile organic compounds.

will be placed above the gravel pack. The remaining annular space will be grouted with a bentonite-cement mixture (described above) and tremied in place with a side discharge tremie from the top of the bentonite seal to ground surface. The bedrock monitoring wells will be drilled, installed, and developed as specified in Section 4.8 and Appendix C of the SAP (IT, 2000). Groundwater samples will not be collected from bedrock wells for a period of at least 14 days after well development. The proposed bedrock monitoring well rationale is presented in Table 3-1.

3.5 Groundwater Sampling

Thirteen groundwater samples will be collected from the proposed permanent monitoring wells at the Small Weapons Repair Shop, Parcel 66(7), to determine the nature and extent of VOCs in the groundwater.

Groundwater samples will be collected from the residuum and bedrock wells installed at the site. Groundwater sampling rationale is presented in Table 3-1. The groundwater sample designations and required quality assurance/quality control sample quantities are listed in Table 3-2. Groundwater samples will be collected in accordance with the procedures outlined in the SAP (IT, 2000).

3.6 Temporary Well Abandonment

Temporary monitoring wells PPMP-75-GP01, PPMP-75-GP02 and PPMP-75-GP03 constructed of 2-inch diameter PVC will be abandoned per Alabama Department of Environmental Management guidelines. The wells will be abandoned by removing the PVC pipe casing and screen. After the casing and screen are removed, the borehole will then be grouted from the bottom of the borehole to approximately 6 inches below ground surface. If the screen and casing cannot be removed, the PVC pipe and screen will be abandoned by pressure grouting the inside of the casing. Upon completion of abandonment operations, the area surrounding the wells will be patched using concrete.

3.7 Slug Tests

The hydraulic conductivity of the geologic material underlying the Small Weapons Repair Shop, Parcel 66(7), site will be estimated by performing slug tests in three permanent monitoring wells. Rising head (slug out) and/or falling head (slug in) tests will be conducted and drawdown measurements taken with a pressure transducer and data logger from selected monitoring wells.

Table 3-2

**Groundwater Sample Designations and QA/QC Sample Quantities
Small Weapons Repair Shop, Parcel 66(7)
Fort McClellan, Calhoun County, Alabama**

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
PPMP-66-MW01	PPMP-66-MW01-GW-HN3001-REG	a				TCL VOCs
PPMP-66-MW02	PPMP-66-MW02-GW-HN3002-REG	a	PPMP-66-MW02-GW-HN3003-FD	PPMP-66-MW02-GW-HN3004-FS		TCL VOCs
PPMP-66-MW03	PPMP-66-MW03-GW-HN3005-REG	a				TCL VOCs
PPMP-66-MW04	PPMP-66-MW04-GW-HN3006-REG	a			PPMP-66-MW04-GW-HN3006-MS/MSD	TCL VOCs
PPMP-66-MW05	PPMP-66-MW05-GW-HN3007-REG	a				TCL VOCs
PPMP-66-MW06	PPMP-66-MW06-GW-HN3008-REG	a				TCL VOCs
PPMP-66-MW07	PPMP-66-MW07-GW-HN3009-REG	a				TCL VOCs
PPMP-66-MW08	PPMP-66-MW08-GW-HN3010-REG	a				TCL VOCs
PPMP-66-MW09	PPMP-66-MW09-GW-HN3011-REG	a				TCL VOCs
PPMP-66-MW10	PPMP-66-MW10-GW-HN3012-REG	a				TCL VOCs
PPMP-66-MW11	PPMP-66-MW10-GW-HN3013-REG	a				TCL VOCs
PPMP-66-MW12	PPMP-66-MW10-GW-HN3014-REG	a				TCL VOCs
PPMP-66-MW13	PPMP-66-MW11-GW-HN3015-REG	a				TCL VOCs

^a Actual sample depth selected for analysis will be at the discretion of the on-site geologist and will be based on field observation.

FD- Field duplicate.

FS-Field split.

QA/QC - Quality assurance/quality control.

MS/MSD - Matrix spike/matrix spike duplicate.

TCL - Target compound list.

VOC - Volatile organic compound.

Slug tests will be conducted in accordance with the procedures outlined in Section 4.16.1 of the SAP (IT, 2000).

3.8 Surveying of Sample Locations

Sampling locations will be marked with pin flags, stakes, and/or flagging and will be surveyed using either global positioning system (GPS) or conventional civil survey techniques, as necessary, to obtain the required level of accuracy. Horizontal coordinates will be referenced to the U.S. State Plane Coordinate System, Alabama East Zone, North American Datum 1983. Elevations will be referenced to the National Geodetic Vertical Datum of 1929 or the North American Vertical Datum of 1988 (soon to be established on site).

Horizontal coordinates will be recorded using a GPS to provide accuracy within 1 meter. Because of the need to use monitoring wells to determine water levels, a higher level of accuracy is required. Monitoring wells will be surveyed to an accuracy of 0.1 foot for horizontal coordinates and 0.01 foot for elevations, using survey-grade GPS techniques and/or conventional civil survey techniques, as required. Procedures to be used for GPS surveying are described in Section 4.3 of the SAP. Conventional land survey requirements are presented in Section 4.19 of the SAP (IT, 2000).

3.9 Investigation-Derived Waste Management

Management and disposal of the investigation-derived wastes (IDW) will follow procedures and requirements as described in Appendix D of the SAP (IT, 2000). The IDW expected to be generated at the Small Weapons Repair Shop site will include purge water from permanent monitoring well development and sampling activities, spent well materials, decontamination fluids, and disposable personal protective equipment. The IDW will be staged within the fenced area surrounding Buildings 335 and 336 while awaiting final disposal.

3.10 Site-Specific Safety and Health

Safety and health requirements for the RI are provided in the SSHP attachment for the Former Ordnance Motor Repair Area, Parcel 75(7). The SSHP attachment will be used in conjunction with the installation-wide safety and health plan.

4.0 Project Schedule

The project schedule for the supplemental RI activities will be provided by the IT project manager to the Base Realignment and Closure Cleanup Team on a monthly basis.

5.0 References

Environmental Science and Engineering Inc., 1998, *Final Environmental Baseline Survey, Fort McClellan, Alabama*, prepared for U.S. Army Environmental Center, Aberdeen Proving Ground, Maryland, January.

IT Corporation (IT), 2000, *Final Installation-Wide Sampling and Analysis Plan, Fort McClellan, Calhoun County, Alabama*, March.

IT Corporation (IT), 1998a, *Final Site-Specific Field Sampling and Analysis Plan, Former Ordnance Motor Repair Area, Fort McClellan, Calhoun County, Alabama*, December.

IT Corporation (IT), 1998b, *Final Installation-Wide Work Plan, Fort McClellan, Calhoun County, Alabama*, August.

ATTACHMENT 1

LIST OF ABBREVIATIONS AND ACRONYMS

List of Abbreviations and Acronyms (Continued)

ID	inside diameter	MSD	matrix spike duplicate	ppt	parts per thousand
IDL	instrument detection limit	msl	mean sea level	PSSC	potential site-specific chemical
IDLH	immediately dangerous to life or health	MtD3	Montevally shaly, silty clay loam, 10 to 40 percent slopes, severely eroded	pt	peat or other highly organic silts
IDW	investigation-derived waste	mV	millivolts	PVC	polyvinyl chloride
IMPA	isopropylmethyl phosphonic acid	MW	monitoring well	QA	quality assurance
in.	inch	N/A	not applicable; not available	QA/QC	quality assurance/quality control
Ing	ingestion	NAD	North American Datum	QAP	installation-wide quality assurance plan
Inh	inhalation	NAD83	North American Datum of 1983	QC	quality control
IP	ionization potential	NAVD88	North American Vertical Datum of 1988	QST	QST Environmental Inc.
IPS	International Pipe Standard	ND	not detected	qty	quantity
IRDMIS	Installation Restoration Data Management Information System	NE	no evidence	Qual	qualifier
IT	IT Corporation	NFA	No Further Action	R	rejected
ITEMS	IT Environmental Management System™	ng/L	nanograms per liter	RCRA	Resource Conservation and Recovery Act
J	estimated concentration	NGVD	National Geodetic Vertical Datum	RDX	cyclonite
JeB2	Jefferson gravelly fine sandy loam, 2 to 6 percent slopes, eroded	NIC	notice of intended change	ReB3	Rarden silty clay loams
JeC2	Jefferson gravelly fine sandy loam, 6 to 10 percent slopes, eroded	NIOSH	National Institute for Occupational Safety and Health	REG	field sample
JfB	Jefferson stony fine sandy loam, 0 to 10 percent slopes have strong slopes	No.	number	REL	recommended exposure limit
K	conductivity	NOAA	National Oceanic and Atmospheric Administration	RFA	request for analysis
L	lewisite; liter	NR	not requested	RI	remedial investigation
LC ₅₀	lethal concentration for 50 percent of population tested	ns	nanosecond	RL	reporting limit
LD ₅₀	lethal dose for 50 percent of population tested	N-S	north to south	RPD	relative percent difference
l	liter	nT	nanotesla	RRF	relative response factor
LCS	laboratory control sample	NTU	nephelometric turbidity unit	RSD	relative standard deviation
LEL	lower explosive limit	O&G	oil and grease	RTK	real-time kinematic
LT	less than the certified reporting limit	OD	outside diameter	SAD	South Atlantic Division
max	maximum	OE	ordnance and explosives	SAE	Society of Automotive Engineers
MDL	method detection limit	oh	organic clays of medium to high plasticity	SAIC	Science Applications International Corporation
mg/kg	milligrams per kilogram	ol	organic silts and organic silty clays of low plasticity	SAP	installation-wide sampling and analysis plan
mg/L	milligrams per liter	OP	organophosphorus	sc	clayey sands; sand-clay mixtures
mg/m ³	milligrams per cubic meter	OSHA	Occupational Safety and Health Administration	Sch.	schedule
mh	inorganic silts, micaceous or diatomaceous fine, sandy or silt soils	OWS	oil/water separator	SD	sediment
MHz	megahertz	oz	ounce	SDG	sample delivery group
µg/g	micrograms per gram	PAH	polynuclear aromatic hydrocarbon	SDZ	safe distance zone; surface danger zone
µg/kg	micrograms per kilogram	Pb	lead	SEMS	Southern Environmental Management & Specialties
µg/L	micrograms per liter	PCB	polychlorinated biphenyl	SFSP	site-specific field sampling plan
µmhos/cm	micromhos per centimeter	PCE	perchloroethene	SGF	standard grade fuels
min	minimum	PDS	Personnel Decontamination Station	SHP	installation-wide safety and health plan
MINICAMS	miniature continuous air sampling system	PEL	permissible exposure limit	SI	site investigation
ml	inorganic silts and very fine sands	Pest.	pesticide	SL	standing liquid
mL	milliliter	PG	professional geologist	sm	silty sands; sand-silt mixtures
mm	millimeter	PID	photoionization detector	SOP	standard operating procedure
MM	mounded material	PkA	Philo and Stendal soils local alluvium, 0 to 2 percent slopes	sp	poorly graded sands; gravelly sands
MOGAS	motor vehicle gasoline	POL	petroleum, oils, and lubricants	SP	sump pump
MPA	methyl phosphonic acid	PP	peristaltic pump	Ss	stony rough land, sandstone series
MR	molasses residue	ppb	parts per billion	SS	surface soil
MS	matrix spike	PPE	personal protective equipment	SSC	site-specific chemical
mS/cm	millisiemens per centimeter	ppm	parts per million	SSHO	site safety and health officer
		PPMP	Print Plant Motor Pool	SSHP	site-specific safety and health plan

List of Abbreviations and Acronyms

3D	3D International Environmental Group	CNS	chloroacetophenone, chloropicrin, and chloroform	FedEx	Federal Express, Inc.
Abs	skin absorption	COC	chain of custody	FFE	field flame expedient
AC	hydrogen cyanide	COE	Corps of Engineers	Fil	filtered
AcB2	Anniston and Allen gravelly loams, 2 to 6 percent slopes, eroded	Con	skin or eye contact	Flt	filtered
AcC2	Anniston and Allen gravelly loams, 6 to 10 percent slopes, eroded	CRL	certified reporting limit	FMP 1300	Former Motor Pool 1300
AcD2	Anniston and Allen gravelly loams, 10 to 15 percent slopes, eroded	CRZ	contamination reduction zone	Frtn	fraction
AcE2	Anniston and Allen gravelly loams, 15 to 25 percent slopes, eroded	CS	ortho-chlorobenzylidene-malononitrile	FS	field split
ACGIH	American Conference of Governmental Industrial Hygienists	CSEM	conceptual site exposure model	ft	feet
ADEM	Alabama Department of Environmental Management	ctr.	container	ft/ft	feet per foot
AEL	airborne exposure limit	CWA	chemical warfare agent	FTA	Fire Training Area
AL	Alabama	CWM	chemical warfare material; clear, wide mouth	FTMC	Fort McClellan
amb.	amber	CX	dichloroformoxime	g	gram
ANAD	Anniston Army Depot	D	duplicate	G-856	Geometrics, Inc. G-856 magnetometer
APT	armor-piercing tracer	DANC	decontamination agent, non-corrosive	G-858G	Geometrics, Inc. G-858G magnetic gradiometer
ASP	Ammunition Supply Point	°C	degrees Celsius	gal	gallon
ASR	Archives Search Report	°F	degrees Fahrenheit	gal/min	gallons per minute
AST	aboveground storage tank	DDT	dichlorodiphenyltrichloroethane	GB	sarin
ASTM	American Society for Testing and Materials	DEP	depositional soil	gc	clay gravels; gravel-sand-clay mixtures
B	Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero)	DI	deionized	GC	gas chromatograph
BCT	BRAC Cleanup Team	DIMP	di-isopropylmethylphosphonate	GC/MS	gas chromatograph/mass spectrometer
BFB	bromofluorobenzene	DMMP	dimethylmethylphosphonate	GFAA	graphite furnace atomic absorption
bgs	below ground surface	DOD	U.S. Department of Defense	gm	silty gravels; gravel-sand-silt mixtures
bkg	background	DP	direct-push	gp	poorly graded gravels; gravel-sand mixtures
bls	below land surface	DPDO	Defense Property Disposal Office	gpm	gallons per minute
BOD	biological oxygen demand	DQO	data quality objective	GPR	ground-penetrating radar
BRAC	Base Realignment and Closure	DRMO	Defense Reutilization and Marketing Office	GPS	global positioning system
Braun	Braun Intertec Corporation	DRO	diesel range organics	GS	ground scar
BTEX	benzene, toluene, ethylbenzene, and xylenes	DS	deep (subsurface) soil	GSA	General Services Administration
BTOC	below top of casing	DS2	Decontamination Solution Number 2	GSBP	Ground Scar Boiler Plant
BZ	breathing zone; 3-quinuclidinyl benzilate	E&E	Ecology and Environment, Inc.	GSSI	Geophysical Survey Systems, Inc.
C	ceiling limit value	EBS	environmental baseline survey	GST	ground stain
Ca	carcinogen	Elev.	elevation	GW	groundwater
CCAL	continuing calibration	EM	electromagnetic	gw	well-graded gravels; gravel-sand mixtures
CCB	continuing calibration blank	EM31	Geonics Limited EM31 Terrain Conductivity Meter	HA	hand auger
CD	compact disc	EM61	Geonics Limited EM61 High-Resolution Metal Detector	HCl	hydrochloric acid
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	EOD	explosive and ordnance disposal	HD	distilled mustard
CERFA	Community Environmental Response Facilitation Act	EODT	explosive and ordnance disposal team	HDPE	high-density polyethylene
CESAS	Corps of Engineers South Atlantic Savannah	EPA	U.S. Environmental Protection Agency	Herb.	herbicides
CFC	chlorofluorocarbon	EPC	exposure point concentration	HNO ₃	nitric acid
CG	cyanogen chloride	EPIC	Environmental Photographic Interpretation Center	hr	hour
ch	inorganic clays of high plasticity	ER	equipment rinsate	H&S	health and safety
CK	carbonyl chloride	ESE	Environmental Science and Engineering, Inc.	HSA	hollow-stem auger
cl	inorganic clays of low to medium plasticity	ESV	ecological screening value	HTRW	hazardous, toxic, and radioactive waste
Cl.	chlorinated	Exp.	explosives	I	out of control, data rejected due to low recovery
CLP	Contract Laboratory Program	E-W	east to west	ICAL	initial calibration
CN	chloroacetophenone	EZ	exclusion zone	ICB	initial calibration blank
CNB	chloroacetophenone, benzene, and carbon tetrachloride	FB	field blank	ICP	inductively-coupled plasma
		FD	field duplicate	ICS	interference check sample

List of Abbreviations and Acronyms (Continued)

SSSL	site-specific screening level	WP	installation-wide work plan
STB	supertropical bleach	WS	watershed
STEL	short-term exposure limit	WSA	Watershed Screening Assessment
STOLS	Surface Towed Ordnance Locator System®	WWI	World War I
Std. units	standard units	WWII	World War II
SU	standard unit	XRF	x-ray fluorescence
SVOC	semivolatile organic compound	yd ³	cubic yards
SW	surface water		
SW-846	U.S. EPA <i>Test Methods for Evaluating Solid Waste: Physical/Chemical Methods</i>		
SZ	support zone		
TAL	target analyte list		
TAT	turn around time		
TB	trip blank		
TCE	trichloroethene		
TCL	target compound list		
TCLP	toxicity characteristic leaching procedure		
TDGCL	thiodiglycol		
TDGCLA	thiodiglycol chloroacetic acid		
TERC	Total Environmental Restoration Contract		
TIC	tentatively identified compounds		
TLV	threshold limit value		
TN	Tennessee		
TOC	top of casing, total organic carbon		
TPH	total petroleum hydrocarbons		
TRADOC	U.S. Army Training and Doctrine Command		
TRPH	total recoverable petroleum hydrocarbons		
TWA	time weighted average		
UCL	upper confidence limit		
UCR	upper certified range		
UJ	not detected above reporting limit; result should be estimated		
USACE	U.S. Army Corps of Engineers		
USAEC	U.S. Army Environmental Center		
USAEHA	U.S. Army Environmental Hygiene Agency		
USAMCLS	U.S. Army Chemical School		
USATEU	U.S. Army Technical Escort Unit		
USATHAMA	U.S. Army Toxic and Hazardous Material Agency		
USCS	Unified Soil Classification System		
USDA	U.S. Department of Agriculture		
USEPA	U.S. Environmental Protection Agency		
UST	underground storage tank		
UXO	unexploded ordnance		
VOA	volatile organic analyte		
VOC	volatile organic compound		
VOH	volatile organic hydrocarbon		
VQlfr	validation qualifier		
VQual	validation qualifier		
VX	nerve agent (O-ethyl-S- [diisopropylaminoethyl]-methylphosphonothiolate)		
Weston	Roy F. Weston, Inc.		