FINAL

IMA

ADDENDUM #6
TO THE
SAMPLING AND ANALYSIS PLAN

FOR

3d Inf Div (Mech)

PHASE II RCRA FACILITY INVESTIGATIONS
OF
16 SOLID WASTE MANAGEMENT UNITS
AT
FORT STEWART, GEORGIA

Prepared for

U.S. ARMY CORPS OF ENGINEERS
SAVANNAH DISTRICT

Contract No. DACA21-02-D-0004
Delivery Order 0056

August 2005

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Prepared by

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August 2005

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION

contributed to the preparation of this document and should not be considered an eligible contractor for its review.

APPROVALS

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OF
16 SOLID WASTE MANAGEMENT UNITS
AT
FORT STEWART, GEORGIA

Jeffery J. Longaker for — August 12, 2005
Greg Grim, Program Manager — Date

Jeffery J Longaker — August 12, 2005
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FIGURE

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ACRONYMS

BGS	below ground surface
BTEX	benzene, toluene, ethylbenzene, and total xylenes
CAP	Corrective Action Plan
RCRA	Resource Conservation and Recovery Act
SVOC	semivolatile organic compound
SWMU	solid waste management unit

1.0 INTRODUCTION

This addendum supplements the *Sampling and Analysis Plan for Phase II RCRA Facility Investigations of 16 Solid Waste Management Units at Fort Stewart, Georgia* (SAIC 1997). It presents changes to the sampling and analysis plan and presents the specific sampling requirements for the performance of additional investigations to support the Corrective Action Plans (CAP) required by the Georgia Environmental Protection Division at Solid Waste Management Units (SWMUs) 12A, the Explosive Ordinance Disposal area, and SWMU 27F, Northwest of Building 1340.

2.0 PROJECT ORGANIZATION

The organizational chart for the SWMU 12A and SWMU 27F investigations is presented in Figure 1.

3.0 FIELD ACTIVITIES

Field activities at the SWMU 12A site will consist of groundwater and surface water sampling and a site inspection. Six monitoring wells will be sampled for semivolatile organic compounds (SVOCs), explosives, and Resource Conservation and Recovery Act (RCRA) metals. Four surface water samples will be collected and sampled for SVOCs, explosives, and RCRA metals. A site inspection will be conducted in accordance with the approved CAP for SWMU 12A. The site-specific investigation activities are presented in Table 1. The proposed sampling locations for the site are presented in Appendix A, Figure A-1.

At the SWMU 27F site, absorbent socks will be placed in the two wells (MW-4 and MW-12) containing free product on a quarterly basis for 1 year, and 14 soil borings will be installed to delineate soil contamination at the site. One soil sample will be collected from a depth of 10 ft below ground surface (BGS) from each soil boring and analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX) and SVOCs. The site-specific investigation activities are presented in Table 1. The proposed sampling locations for the site are presented in Appendix A, Figure A-2.

Table 2 presents the sample numbering system that will be used for these investigations. Table 3 presents a summary of the field and quality control soil and groundwater samples to be collected during the investigations.

4.0 GROUNDWATER SAMPLING

Low-flow techniques will be used to collect groundwater samples from six monitoring wells: MW-1 (site-specific background), MW-2, MW-3, MW-7 (site-specific background), MW-8, and MW-9. Field measurements performed during the investigations will include turbidity, temperature, specific conductance, and pH. Procedures and equipment for measurement of turbidity, temperature, specific conductance, and pH were presented in the Sampling and Analysis Plan (SAIC 1997).

The groundwater analytical samples will be sent to an off-site analytical laboratory for SVOC, explosives, and RCRA metals analysis in accordance with Appendix D-8 of Part B of the Hazardous Waste Permit No. HW-045(S&T).

5.0 SURFACE WATER SAMPLING

Surface water samples will be collected from the locations previously designated as SWS-3, SWS-4, SWS-5, and SWS-6. The downgradient surface water samples will be collected prior to the upstream samples. Field measurements performed during the investigations will include temperature, specific conductance, and pH. Procedures and equipment for measurement of temperature, specific conductance, and pH were presented in the Sampling and Analysis Plan (SAIC 1997).

The surface water analytical samples will be sent to an off-site analytical laboratory for SVOC, explosives, and RCRA metals analysis in accordance with Appendix D-8 of Part B of the Hazardous Waste Permit No. HW-045(S&T).

6.0 SITE INSPECTION

A site inspection in accordance with the approved CAP will be conducted at SWMU 12A. The site inspection will be conducted by a Professional Engineer and will include inspection and photographs of the existing fence and gate, signs, and soil/vegetative cover. Photographs of the back of each warning sign, which contains the sign's unique identifying number, will be taken. Any needed repairs identified during the inspection will be relayed to the Fort Stewart Military Reservation and U. S. Army Corps of Engineers.

7.0 SOIL BORING INSTALLATION

A total of 14 soil borings will be installed at the SWMU 27F site. Eight borings will be installed around the south and east sides of the maintenance pad on 25-ft centers. Two soil borings will be installed along the north side of the pad, and four borings will be installed downgradient of any soil boring indicating visible contamination. These borings will be installed using a Geoprobe rig as described in the Sampling and Analysis Plan (SAIC 1997). One soil sample will be collected from each boring from approximately 10 ft BGS.

The 14 direct-push technology locations will be documented by Science Applications International Corporation personnel using a handheld Global Positioning System unit and/or measurements from existing monitoring wells.

The soil analytical samples will be sent to an off-site analytical laboratory for BTEX and SVOC analysis. Soil samples collected for BTEX analysis will be collected using Encore™® sampling devices.

8.0 ABSORBENT SOCK INSTALLATION

Absorbent socks will be placed in the two wells (MW-4 and MW-12) currently containing free product, quarterly for 1 year. At the time of absorbent sock placement, the depth to free product and thickness of free product in each well will be recorded. The waste absorbent socks from the quarterly sock placement will be placed in a drum and disposed of at the end of the project.

9.0 WATER-LEVEL MEASUREMENT

Before the sampling team leaves the SWMU 12A site, a complete set of water-level measurements will be collected from all wells at the site. Procedures and equipment for water-level measurements were presented in the Sampling and Analysis Plan (SAIC 1997).

10.0 REFERENCES

SAIC (Science Applications International Corporation) 1997. *Sampling and Analysis for Phase II RCRA Facility Investigations of 16 Solid Waste Management Units at Fort Stewart, Georgia,* revised final, Oak Ridge, Tennessee, October.

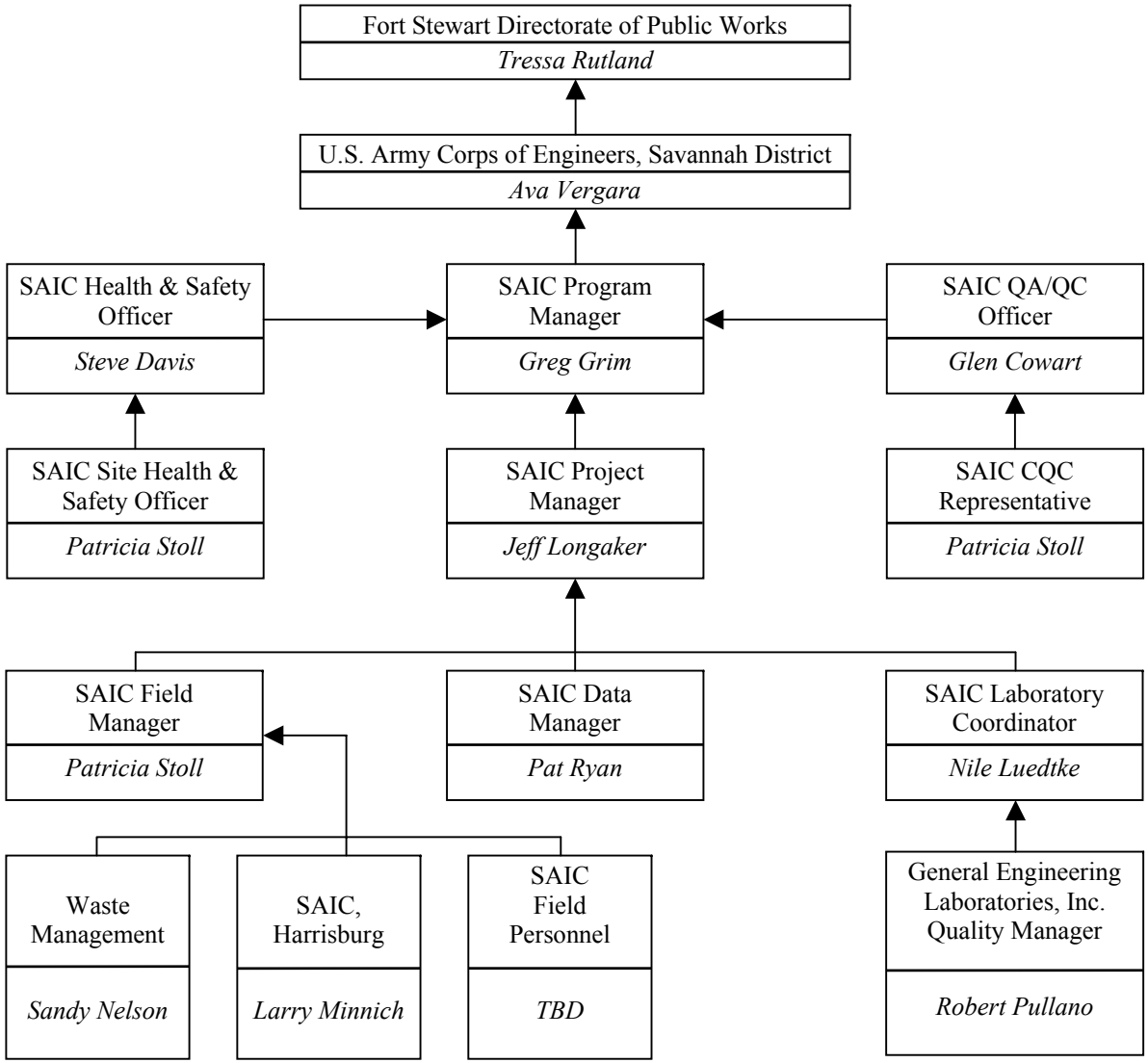


Figure 1. Revised Organizational Chart for the SWMU 12A and SWMU 27F Investigations

Table 1. SWMU 12A and SWMU 27F Investigations

Site Name	Bldg.	Unit	Soil Boring/ Absorbent Sock Installations	Laboratory Analyses	Surface Water to Be Sampled	Laboratory Analyses	Wells to Be Sampled	Laboratory Analyses	Sampling Times
SWMU 12A		EOD Area			SWS-3, SWS-4, SWS-5, SWS-6 (4)	SVOC, explosives, and RCRA metals[a]	MW-1, MW-2, MW-3, MW-7, MW-8, MW-9 (6)	SVOC, explosives, and RCRA metals[a]	GW/SW Sampling: July 2005
SWMU 27F	1340	10th Engineers Brigade	7J-SB-01 through 7J-SB-14 (14)	BTEX and SVOC (14)					Soil Sampling: September 2005 Absorbent Sock: Quarterly beginning September 2005

[a]Analysis performed in accordance with Appendix D-8 of Part B of the Hazardous Waste Permit No. HW-045(S&T).
BTEX = Benzene, toluene, ethylbenzene, and total xylenes.
EOD = Explosive ordnance disposal.
GW = Groundwater.
RCRA = Resource Conservation and Recovery Act.
SVOC = Semivolatile organic compound.
SW = Surface water.
SWMU = Solid waste management unit.

Table 2. Sample Numbering System for SWMU Activities

Sample Identification: XXMLT#	
XX = Area designator	Area designators used for the project will be the SWMU number Examples: 12 = SWMU 12A (EOD Area) 7J = SWMU 27F (10th Engineers Brigade)
M = Sample location	Examples 1 = Soil 2 = Sediment 3 = Surface Water 4 = Groundwater 5 = Leachate 6 = Waste Water 7 = Surface Soil
L = Sample depth	Examples 1 = First sample location (MW-1, SB-1) 2 = Second sample location (MW-2, SB-2) 0 = Tenth sample location (MW-10, SB-10) A = Eleventh sample location (MW-11, SB-11) B = Twelfth sample location (MW-12, SB-12)
T = Sample type	Examples 1 = Environmental sample 2 = Duplicate sample 3 = QA split sample 4 = Rinsate blank 5 = Geoprobe screening sample 6 = Geoprobe screening duplicate 7 = Monitoring well sample 8 = Soil boring sample 9 = Surface water sample

All trip blank samples used during the project will be consecutively identified.
QA = Quality assurance.
SWMU = Solid waste management unit.

Table 3. Summary of Analytical Samples to Be Collected during SWMU 12A and SWMU 27F Investigations

Matrix	Analysis	Analytical Procedures	No. Field Samples	QC Dups.[a]	Field Rnsts.[b]	QC Trip Blanks	Total Samples	Holding Time	Preservation Requirements	Sample Containers
Water	SVOC[c]	EPA 8270C	10	1	1	0	12	14 days	Cool 4°C	Two 1-L AG
	RCRA Metals[c]	EPA 6010A, 6020, or 700	10	1	1	0	12	14 days	Cool 4°C HNO_3 pH <2	One, 1-L HDPE
	Explosives[c]	EPA SW-846 8330	10	1	1	0	12	14 days	Cool 4°C	Two 1-L AG
Soil	BTEX	EPA 5035/8260B	14	1	1	0	10	48 hours	Cool 0°C	Encore™®
	SVOC	EPA 8270B	14	1	1	0	10	14/40 days	Cool 4°C	One 8 oz. CWM
IDW Water	VOC	EPA 8260B	2	0	0	0	2	14 days	Cool 4°C HCl pH <2	Two 40-mL GSV[d]
	Oil and grease	EPA 413.2	2	0	0	0	2	28 days	Cool 4°C H_2SO_4 pH <2	Two 1-L AG
	Total phenols	EPA 420.1/420.2	2	0	0	0	2	28 days	Cool 4°C H_2S0_4 pH <2	Two 1-L AG
	pH	EPA 150.1	2	0	0	0	2	ASAP	Cool 4°C	One 250-mL HDPE

Note: This table is in conformance with EM-200-1-3

[a]The number of QC duplicate samples represents a 10% distribution between the different types of investigations to be conducted; however, the actual number of duplicates collected for each investigation type might vary slightly from the distribution presented.

[b]The number of QC rinsate blank samples represents a 5% distribution between the different types of investigations to be conducted; however, the actual number of blanks collected for each investigation type might vary slightly from the distribution presented.

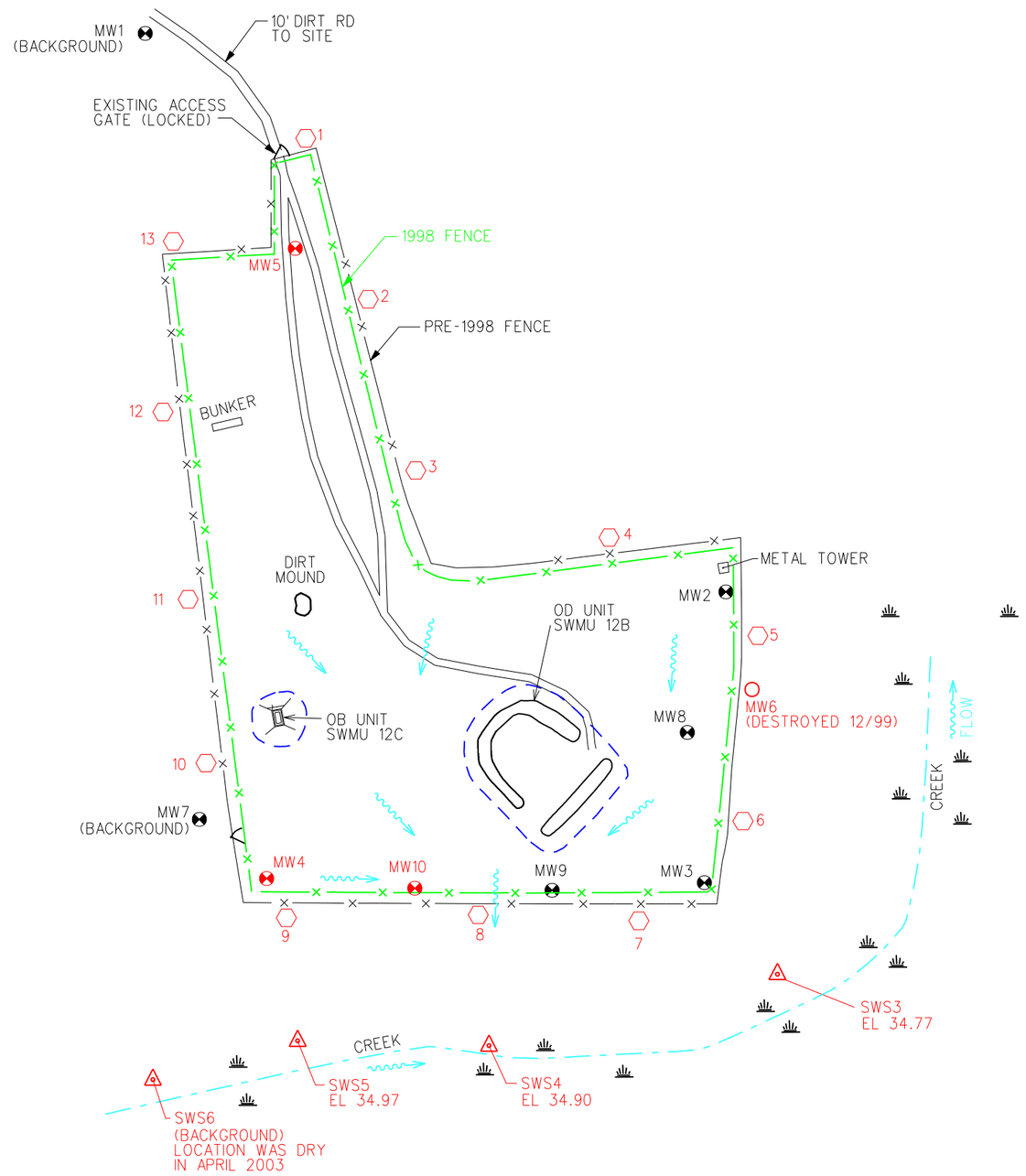
[c]Analysis performed in accordance with Appendix D-8 of Part B of the Hazardous Waste Permit No. HW-045(S&T).

[d]Sample containers will be filled so that no headspace is present.

AG = Amber glass.
ASAP = As soon as possible.
BTEX = Benzene, toluene, ethylbenzene, and total xylenes.
CWM = Clear, wide-mouth glass jar.
Dups. = Duplicates.
EPA = U.S. Environmental Protection Agency.
GSV = Glass septa vial.
HDPE = High-density polyethylene.
IDW = Investigation-derived waste.
QC = Quality control.
RCRA = Resource Conservation and Recovery Act.
Rnsts. = Rinsates.
SVOC = Semivolatile organic compound.
SWMU = Solid waste management unit.
VOC = Volatile organic compound.

APPENDIX A

PROPOSED SAMPLING LOCATIONS FOR SWMU 12A AND SWMU 27F INVESTIGATIONS



LEGEND:

MONITORING WELLS
- TO BE SAMPLED FOR 5 YEARS
- MONITORING WELLS ABANDONED

SURFACE WATER SAMPLE LOCATIONS

FENCE-MOUNTED SIGNS
- INSTALLED APPROX. EVERY 200 FEET

FENCE INSTALLED IN MID-1998
- THAT REPRESENTS SWMU 12A BOUNDARY

FENCE EXISTING PRIOR TO 1998

ESTIMATED SURFACE WATER FLOW DIRECTION

SWAMP/MARSH

NOTES:

1.) FENCE INSTALLED IN 1998 THAT REPRESENTS SWMU 12A BOUNDARY.

2.) SITE MAP REFLECTS RECONFIGURATION ACTIVITIES CONDUCTED DURING MID-1998 AND BASED ON THE MAY 1999 TOPOGRAPHIC SURVEY. CONTOUR LINES HAVE BEEN REMOVED FOR CLARITY. SEE FIGURE 2-5 FOR SITE TOPOGRAPHY.

0 50 100 150 300

SCALE: 1" = 150'

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SIGN LOCATION AND SAMPLING LOCATIONS FOR ANNUAL SITE MONITORING FOR CY 2004 FOR THE OD UNIT (SWMU 12B) AND OB UNIT (SWMU 12C)

DRAWN BY:	REV. NO./DATE:	CAD FILE:
R. BEELER	0/07-22-05	/05004/DGNS/B17_SWMU12-01

Figure A-1. Sign and Sampling Locations for Annual Site Monitoring for CY 2005 for the OD Unit (SWMU 12B) and OB Unit (SWMU 12C)

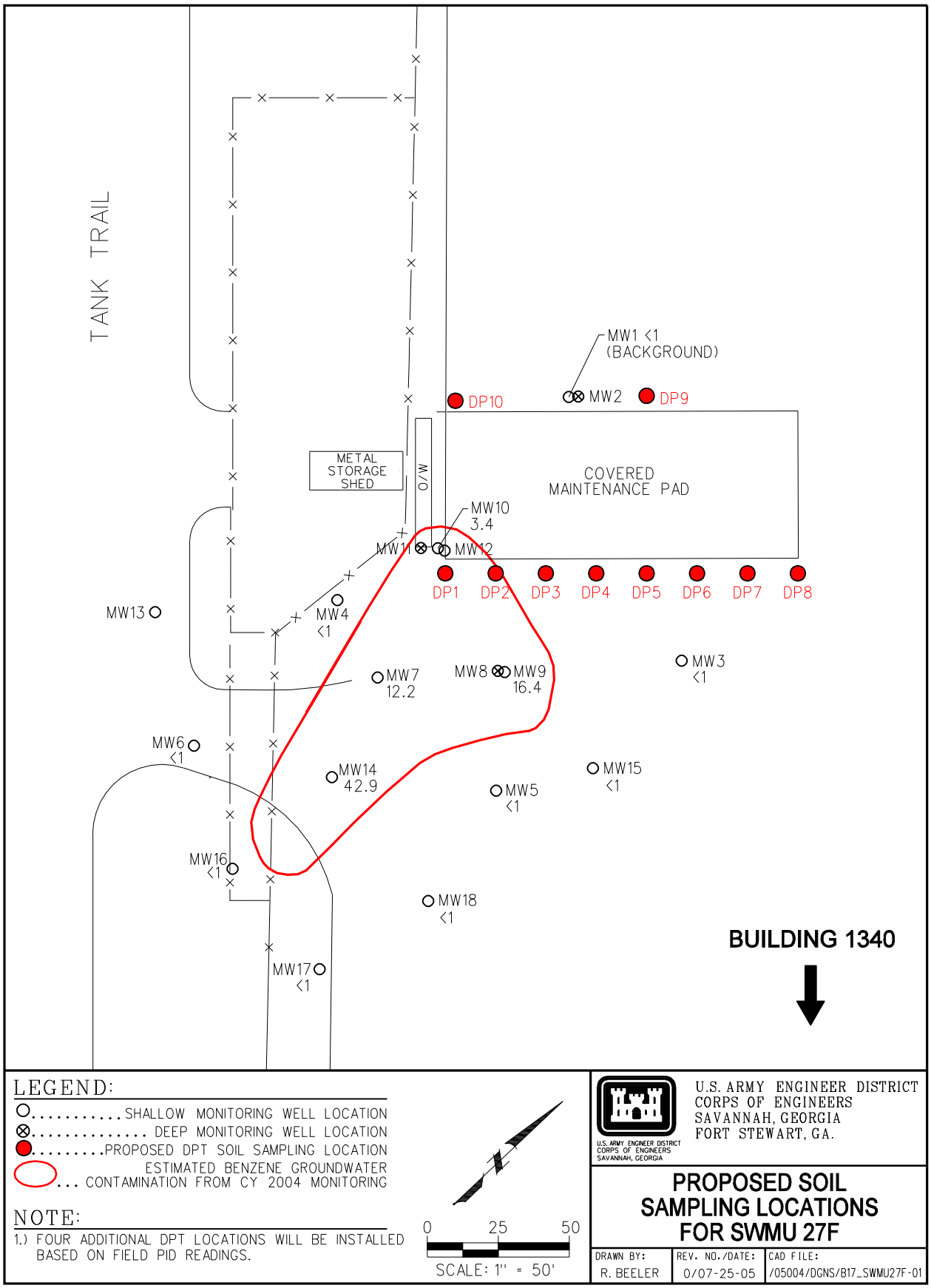

Figure A-2. Proposed Soil Sample Locations for SWMU 27F, Northwest of Building 1340