

Draft-Final

Site Investigation and Fill Area Definition Report

**Parcels 78(6), 79(6), 80(6), 81(5), 175(5), 230(7),
227(7), 126(7), 229(7), 231(7), 233(7), and 82(7)
Fort McClellan, Calhoun County, Alabama**

(Volume 2 of 4 - Appendices A through B)

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**Task Order CK09
Contract No. DACA21-96-D-0081
IT Project No. 796886**

March 2002

Revision 1

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APPENDIX A

Draft

**Geophysical Survey Report
Landfill No.1
Parcel 78(6)
Fort McClellan, Calhoun County, Alabama**

August 2001

The statements, opinions, and conclusions contained in this report are based solely upon the services performed by IT Corporation (IT) as described in this report and the Scope of Work as established for the report by the Client's budgetary and time constraints and the terms and conditions of the agreement with Client. In performing these services and preparing the report, IT relied upon work and information provided by others, including public agencies, whose information is not guaranteed by IT.

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List of Acronyms

EBS	Environmental Baseline Study
EM	electromagnetic
EM31	Geonics Limited EM31 Terrain Conductivity Meter
ESE	Environmental Science and Engineering
G-856AX	Geometrics, Inc. G-856AX magnetometer
G-858G	Geometrics, Inc. G-858G magnetic gradiometer
GPS	global positioning system
IT	IT Corporation
mS/m	milliSiemens per meter
NAD	North American Datum
nT	nanoTeslas
ppt	parts per thousand
RTK	real-time kinematic
TERC	Total Environmental Restoration Contract
USACE	U.S. Army Corps of Engineers

A.1.0 Introduction

IT Corporation (IT) conducted a surface geophysical survey at Landfill No.1 (Parcel 78[6]), at Fort McClellan in Calhoun County, Alabama, on January 11, 2000. This survey was conducted for the U.S. Army Corps of Engineers (USACE)-Mobile District, under Total Environmental Restoration Contract (TERC) No. DACA21-96-D-0018, Delivery Order CK005. The geophysical survey objectives were to determine the boundaries of the fill areas and to locate the proposed trench locations in the proper area of concern. The total linear distance surveyed was 4,200 feet. The Vicinity Map (Figure A78-1) shows the approximate location of the survey area.

To accomplish the objectives of the investigation magnetic and frequency-domain electromagnetic induction (EM) methods were used. All geophysical data were processed and color-enhanced to aid in interpreting subtle anomalies. Following geophysics fieldwork, a survey-grade global positioning system (GPS) and total station were used to document the location of the site.

The survey area has rolling topography and slopes down to the south. The southern portion of the site is tree covered while the northern portion of the site is grass covered and contains playground equipment and residential housing as shown on the site map with geophysical interpretation (Figure A78-2).

Field procedures used during the investigation are described in Chapter A.2.0. The data processing methods used during the investigation are presented in Chapter A.3.0. Data interpretation and criteria used to interpret geophysical anomalies are presented in Chapter A.4.0. Conclusions and recommendations derived from the geophysical surveys are presented in Chapter A.5.0. A description of the equipment and a theoretical discussion of the geophysical methods are presented in the Attachment.

A.2.0 Field Procedures

Field procedures are presented in this chapter, including discussions of the survey control and site map, field equipment, data acquisition parameters, and field verification of geophysical anomalies.

A.2.1 Survey Control

The geophysical survey area was identified in the site specific work plan based on historical site information compiled by IT and the Environmental Baseline Study (EBS), (Environmental Science and Engineering, Inc., 1998). The geophysics crew surveyed the lines (Line 1 through Line 14) using a compass and 300-foot fiber glass tape. To aid in the location of the lines, the geophysics crew used surface features for reference and marked the lines at 100-foot intervals. Using the 100-foot interval on the line as a reference, the crew marked control points at 10-foot intervals along the line with surveyor's paint to provide the spatial control required for the investigation. Due to the uncertainty of true field positions inherent when establishing a survey area using 300-foot fiberglass tapes in the presence of wind and surface obstructions (e.g., trees and heavy vegetation), the linear precision for the surveyed lines and anomalies is estimated to be within +/- 2 feet. Following geophysics field work, a GPS survey was conducted at the site referencing the U.S. State Plane Coordinate System (Alabama East Zone, North American Datum [NAD]1983). The GPS survey was performed in the real-time kinematic (RTK) mode, which provided nominal sub-centimeter resolution in XY coordinates for the site.

A detailed site map for each survey line was hand-drawn in the field. The map included any surface cultural features within the vicinity of each line that could potentially affect the geophysical data (e.g., overhead utilities, manhole covers, fire hydrants, etc.). The map also shows reference features, such as buildings, fences, asphalt patches, and survey monuments that could later aid in reconstructing the site boundaries. All pertinent reference information documented on the hand-drawn site map were placed on the site interpretation map (Figure A78-2). Also included on the site map are GPS coordinates to help relocate the survey area.

A.2.2 Geophysical Survey

Field Instruments. The magnetic instruments used during the investigation consisted of a Geometrics Inc. G-858G magnetic gradiometer (G-858G) for collecting survey data, and a Geometrics G-856AX magnetometer (G-856AX) used as a magnetic base station. Frequency-

1 domain EM induction equipment consisted of a Geonics EM31 Terrain Conductivity Meter
2 (EM31) coupled to an Omnidata DL720 digital data logger. A Trimble 4000SSI Total Station
3 GPS and a Sokkia SET5F were used to conduct the civil survey work.
4

5 All geophysical data were collected using the following IT standard operating procedures:
6

- 7 • ITGP-001 Surface Magnetic Surveys
- 8 • ITGP-002 Surface Frequency-Domain Electromagnetic Surveys
- 9 • ITGP-005 Global Positioning System Survey
- 10 • ITGP-012 Geophysical Data Management.
11

12 **Field Instrument Base Station.** A field instrument base station was established at Landfill
13 No. 1 site to provide quality control for the geophysical survey data collected. The base station
14 location was chosen to be free of surface and subsurface cultural features that could affect the
15 geophysical data. Standard field procedures were to occupy the base station and collect readings
16 with the survey instruments (magnetic and EM31) before and after each data collection session.
17 These base station files were then reviewed to assess instrument operation. Base station file
18 names and average data values were recorded on base station summary forms.
19

20 **A.2.2.1 Magnetic Survey**

21

22 **Magnetic Base Station.** A magnetic base station was established at Fort McClellan to record
23 diurnal variation in the Earth's magnetic field during the G858G magnetic gradiometer survey.
24 The magnetic base station was located in a field of small pine trees on the south side of Sixth
25 Avenue (near Parcel 151), a location which was determined to be free of surface and subsurface
26 cultural interference (e.g., fences, utilities, and surface/buried metal objects) that could affect the
27 data. A G-856AX base station magnetometer was time-synchronized with the G-858G survey
28 instrument and programmed to record the Earth's background magnetic field at 10-second
29 intervals during the magnetic survey. The background magnetic field data also showed that the
30 survey was conducted during a time of diurnal quiescence.
31

32 **G-858G Data Collection.** Magnetic field measurements were collected with the two sensors
33 of the G858-G spaced 2.5 feet (0.76 meters) apart; the lower sensor was 2.0 feet above the
34 ground surface and the upper sensor was 4.5 feet above the ground surface. At the start and end
35 of each data collection session, approximately 60 readings were recorded with the G-858G at the
36 field instrument base station to verify that the instrument was operating properly and to provide a
37 quantitative record of instrument variation during the survey period. A review of these base

1 station files indicates that the instrument was operating properly and that the instrument drift was
2 within acceptable limits. Magnetic survey data were collected at 0.5-second intervals (approx-
3 imately 2.0- to 2.5-foot intervals) along the survey lines for a total of approximately 4,200 linear
4 feet of survey coverage.

5
6 The magnetic data were stored in the internal memory of the G-858G, along with corresponding
7 line and station numbers and time of acquisition. Magnetic survey data were screened in the
8 field to assess data quality prior to completing the investigation. All magnetic survey and base
9 station data were downloaded to a personal computer, backed up on IOMEGA® compatible zip
10 disks, and are retained in project files.

11 12 **A.2.2.2 Frequency-Domain EM Survey**

13
14 **EM31 Data Collection.** Prior to conducting the EM31 survey, the instrument was calibrated,
15 and the in-phase component zeroed at the field instrument base station. The instrument was
16 operated in the vertical dipole mode, measuring the in-phase and out-of-phase components of the
17 secondary EM field. At the start and end of each data collection session approximately 20
18 readings were recorded at the field instrument base station to verify that the instrument was
19 operating properly and to provide a quantitative record of instrument variation, or drift, during
20 the survey period. A review of these base station files indicated that the instrument was
21 operating properly and that instrument drift was within acceptable limits. Survey data were
22 collected at 5-foot intervals along the survey lines for a total of approximately 4,200 linear feet
23 of survey coverage.

24
25 The EM31 data were stored in the digital data logger along with corresponding line and station
26 numbers. EM31 line profiles were reviewed in the field using the DAT31® program to verify
27 data quality prior to completing the survey. All EM31 survey and base station data were
28 downloaded to a personal computer, backed up on IOMEGA® compatible zip disks, and are
29 retained in project files.

30 31 **A.2.2.3 Anomaly Verification and Sampling Locations**

32
33 **Anomaly Verification.** Preliminary line profiles of the magnetic and EM31 data were
34 generated and field-checked to differentiate between anomalies caused by surface and subsurface
35 sources. Geophysical anomalies verified as being caused by surface features were labeled as

1 such on the field map. Anomalies caused by buried metallic objects were carefully located in the
2 field and marked on the site map.

3
4 **Trench Locations.** After the geophysical data interpretation was complete all anomalies
5 interpreted to represent fill were marked on data maps and provided to the site manager. The site
6 geophysicist and site manager then determined the trench locations that would meet the criteria
7 established in trenching rationale and ensure the safety of the trenching/sampling team.

1 **A.3.0 Data Processing**
2
3

4 **Line Profiles.** Plots of magnetic and EM31 data profiles along the survey line were generated
5 using Microsoft® Excel. These profiles were plotted to the same scale to aid with interpreting
6 subtle anomalies. Select line profiles of each survey line are presented as Figures A78-3 through
7 A78-24.

8
9 A series of data processing steps were required to generate the line profiles. Magnetic
10 gradiometer data were downloaded from the field instrument and converted to an ASCII file
11 using Geometrics, Inc. MAGMAP® program. EM31 data were downloaded from the data logger
12 and converted to ASCII files using DAT31® and software from Geonics, Inc. The ASCII data
13 files were then reviewed to assess line numbers, station ranges, and overall data quality. Field
14 data file names and corresponding base station data files were recorded on the data file tracking
15 form. Data screening results were then recorded on the base station summary form. Following
16 data quality assessment, geometry corrections to field data files were made, if necessary, using a
17 text editor and recorded on the geophysical data editing form.

18
19 Final, corrected magnetic and EM data files containing local geophysical station coordinates (X,
20 Y) and the geophysical measurement (Z) were imported into Microsoft® Excel. The data were
21 then plotted using XY scatter with the same scale and x-axis range for each respective data set.
22 All completed forms of magnetic and EM data collected during the investigation are retained in
23 project files.

A.4.0 Interpretation of Geophysical Data

The method by which the geophysical data were interpreted, and the results of that interpretation are presented in this chapter.

Figure A78-2 presents the site map with geophysical interpretation. The line profile of total magnetic field for the upper sensor, EM31 conductivity and in-phase component data for each survey line is presented as Figures A78-3 through Figures A78-24. A theoretical background is presented as an Attachment to this appendix. The attachment discusses the factors influencing the observed geophysical response for the various methods and equipment used to conduct the survey at Landfill No.1.

In addition to the geophysical interpretation, the site map (Figure A78-2) contains detailed information on reference features (e.g., asphalt and concrete pavement, monitor wells, and fences), so that the survey area and the geophysical anomaly locations can be relocated in the future. Anomalies shown on the site interpretation map correspond to those seen in the magnetic and EM data. Surface reference features shown on the site interpretation map were translated from the hand-drawn site map made in the field. The site interpretation map also references the Alabama East State Plane, NAD 1983 Coordinate System.

A.4.1 Data Interpretation Criteria

Geophysical Line Data. Anomalies shown on the magnetic and EM line data range from high to low values and from negative to positive, depending on the type of data displayed. The observed anomalies in the total magnetic field data for the upper sensor have values above and below the average magnetic field intensity of 51,300 nanoteslas (nT) for Anniston, Alabama. The typical magnetic data response to near-surface ferrous metallic debris is an asymmetric south high/north low signature. The upper sensor magnetic data are more useful than the lower sensor data for locating large buried objects because the lower sensor is more sensitive to small near-surface objects; hence the upper sensor magnetic data are presented. The characteristic EM31 anomaly over a near-surface metallic conductor consists of a narrow zone having strong negative amplitude centered over the target and a broader lobe of weaker, positive amplitude on either side of the target. As the depth of the target feature increases, the characteristic EM31 response changes to a positive amplitude centered over the target.

1 Anomalies present on the magnetic and EM31 data are first field-checked and correlated with
 2 known metallic surface objects and other cultural surface features so that anomalies caused by
 3 subsurface sources could be determined. Many of the high-amplitude anomalies seen in the
 4 magnetic and EM31 data (Figures A78-3 through A78-24) are caused by cultural features
 5 including roads, underground utilities, and metallic debris. Anomalies caused by surface metal
 6 are labeled as such on the line data, and the locations of these features are indicated on the
 7 geophysical interpretation map. Anomalies interpreted to be caused by buried metal objects,
 8 buried construction debris, underground utilities, etc. can be referenced in the site maps.

9

10 **A.4.2 Landfill No.1 Data Interpretation.**

11 The geophysical interpretation map (Figure A78-2) shows the location of the geophysical survey
 12 lines, trenches, and the landfill boundary interpreted from the geophysical data.

13

14 A total of fourteen (14) geophysical lines of data were collected in an effort to determine the
 15 boundary of the landfill. The geophysical lines were placed in a more-or-less radial pattern
 16 around the presumed landfill boundary. Geophysical survey line data was compared to site maps
 17 so that anomalies reflecting surface features would not be erroneously interpreted. Interpretation
 18 of the geophysical data were based on the deviation of the data from background. Background is
 19 considered a deviation in the line profile data from the average or “flatness” of the line.

20 Interpretation of the magnetic and EM data determined following landfill boundary for each
 21 geophysical line.

22

Geophysical Line Number	Trench Number	Interpreted Landfill Boundary (feet)
Line 1		150
Line 2	T78-8	160
Line 3		138
Line 4	T78-7	110
Line 5		120
Line 6	T78-6	180
Line 7		140
Line 8	T78-5	130
Line 9		105
Line 10	T78-4	135
Line 11	T78-3	170
Line 12	T78-2	150
Line 13		120
Line 14	T78-1	110 / 160

23

24 After the geophysical data interpretation was complete the boundary that represents fill/native
 25 soil were marked on the line data and provided to the site manager. The site geophysicist and

- 1 site manager then determined the sample and trench locations that would meet the criteria
- 2 established in sampling rationale and ensure the safety of the trenching/sampling team.

A.5.0 Conclusions and Recommendations

1
2
3
4 A surface geophysical survey using magnetic and EM methods was conducted on January 11,
5 2000 at Landfill No. 1 (Parcel 78[6]). The survey objectives was to define the boundaries of the
6 fill areas in order to locate the proposed trench locations in the proper area of concern.

7
8 Geophysical data analysis indicates the probable boundaries of fill material. The southwestern
9 portion of the survey appears to contain a higher concentration of metallic debris. The
10 interpretation map also shows the locations of individual surface metal objects and the areas of
11 low to moderate concentrations of surface metal.

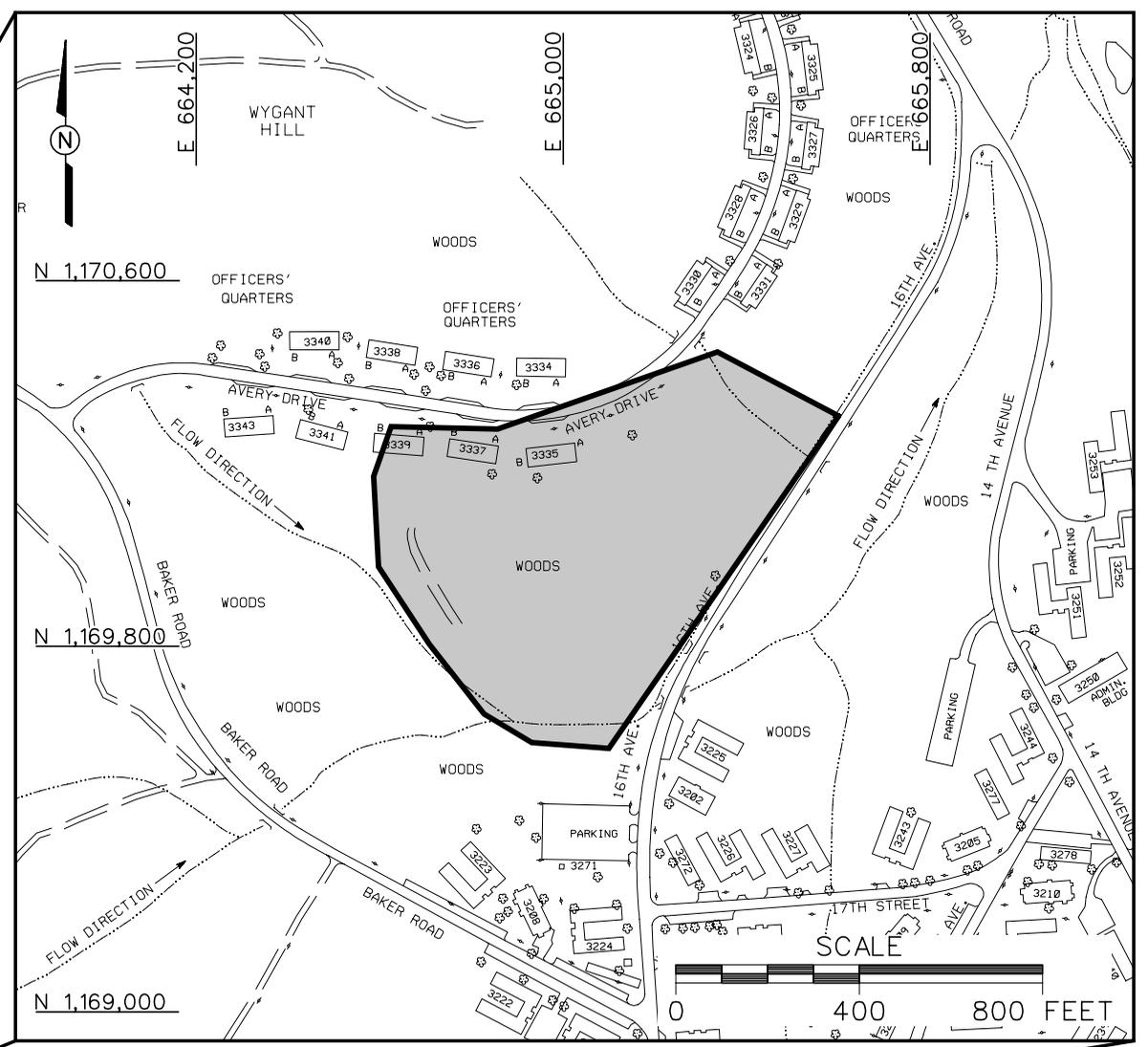
12
13 After the geophysical data interpretation was complete all anomalies interpreted to represent fill
14 were marked on data maps and provided to the site manager. The site geophysicist and site
15 manager then determined the sample locations that would meet the criteria established in
16 sampling rationale and ensure the safety of the trenching/sampling team.

17
18 A hand drawn field map along each geophysical data line and GPS survey of site features
19 provided a permanent record of the survey boundaries and anomaly locations. Positions on the
20 site map generated (Figure A78-2) are conservatively estimated to be accurate to within +/- 2
21 feet.

22
23 The site interpretation map should not be considered clearance for exploratory trenching or other
24 invasive investigations. Should such clearance be necessary, IT recommends proper geophysical
25 clearance using available utility maps, EM utility locator, and ground penetrating radar.

26
27 Beyond the recommendation above, and based on the objectives and results of the geophysical
28 survey presented in this report, no further geophysical effort is recommended.

DWG. NO.: ... \796886es.097
 PROJ. NO.: 796886
 INITIATOR: C. SCHMALZ
 PROJ. MGR.: J. YACOUB
 DRAFT. CHCK. BY:
 ENGR. CHCK. BY: J. HACKWORTH
 DATE LAST REV.:
 DRAWN BY:
 STARTING DATE: 04/03/01
 DRAWN BY: D. BOMAR
 04/03/01
 04:06:20 PM
 DBILLING
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LEGEND	
	UNIMPROVED ROADS AND PARKING
	PAVED ROADS AND PARKING
	BUILDING
	TREES / TREELINE
	PARCEL BOUNDARY
	CULVERT WITH HEADWALL
	SURFACE DRAINAGE / CREEK
	UTILITY POLE

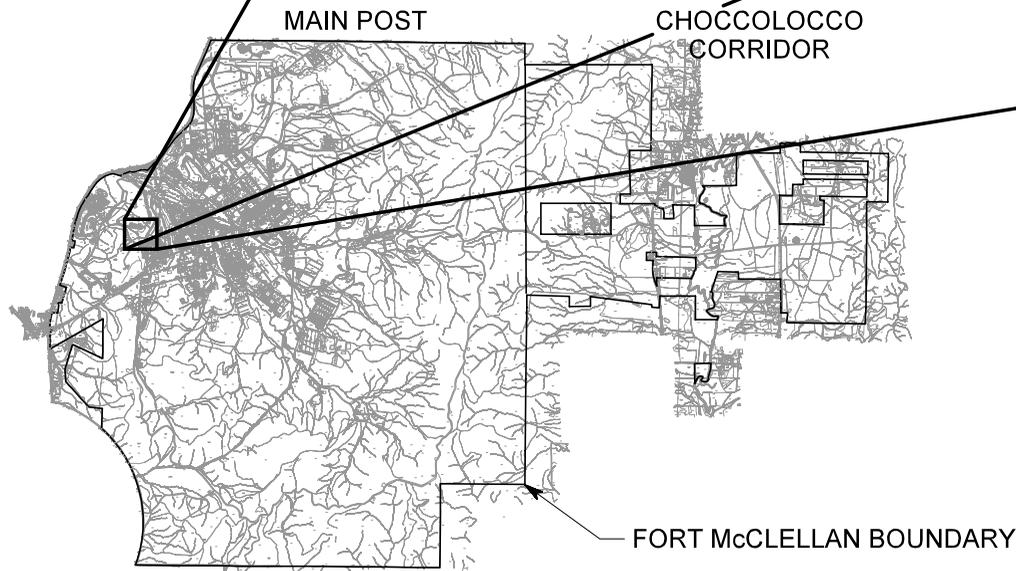


FIGURE A78-1
VICINITY MAP
LANDFILL NO. 1
PARCEL 78(6)

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



DWG. NO.: 796886ES.098
 PROJ. NO.: 793886
 INITIATOR: C. SCHMALZ
 PROJ. MGR.: J. YACOUB
 DRAFT. CHK. BY:
 ENGR. CHK. BY: J. HACKWORTH
 DATE LAST REV.:
 DRAWN BY:
 STARTING DATE: 04/03/01
 DRAWN BY: D. BOMAR
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LEGEND

- PARCEL BOUNDARY
- SAIC GEOPHYSICAL SURVEY LINE
- IT GEOPHYSICAL SURVEY LINE
- SAIC GEOPHYSICAL ANOMALY
- IT GEOPHYSICAL ANOMALY (LANDFILL BOUNDARY AS INTERPRETED FROM GEOPHYSICAL LINE DATA)
- TRENCH EXCAVATION
- FILL BOUNDARY OBSERVED WITHIN TRENCH EXCAVATION
- SURFACE DRAINAGE / CREEK
- TREES / TREELINE
- UTILITY POLE
- BEDROCK MONITORING WELL LOCATION
- SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION

NOTES:

- WELL LF1-GP04 LOCATION IS ESTIMATED BECAUSE COORDINATES ON BORING LOG DOES NOT MATCH FIGURE IN SAIC RI REPORT, 1995.

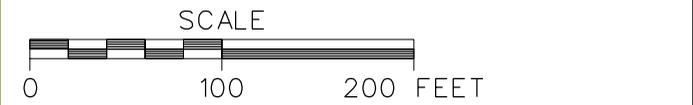


FIGURE A78-2
LANDFILL NO. 1
SITE MAP WITH GEOPHYSICAL INTERPRETATION
PARCEL 78(6)

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

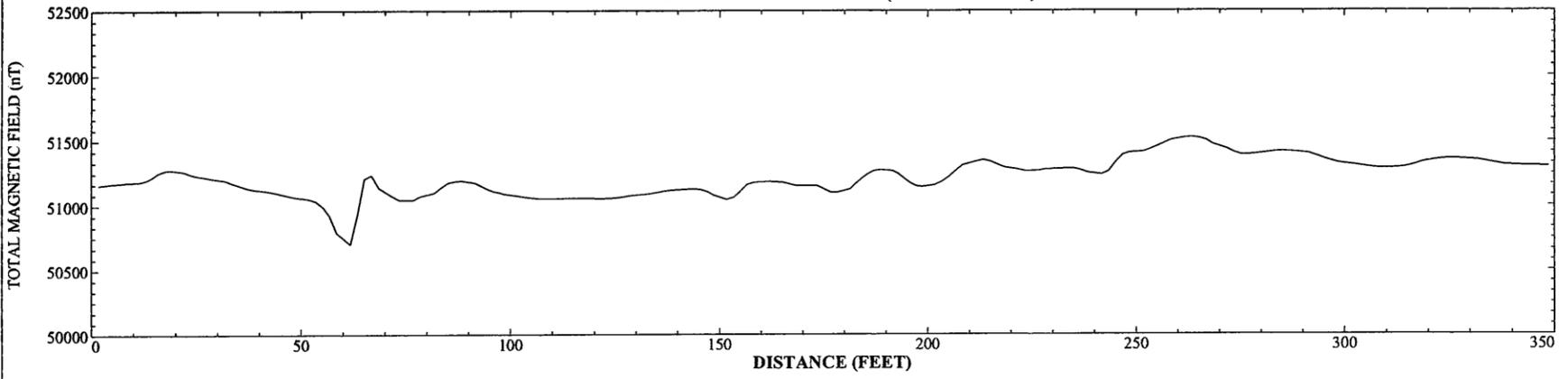


APPROXIMATE AREA OF OBSERVED MOUNDING. MOUNDS GENERALLY TREND NNW TO SSE AND ARE THREE TO FOUR FEET IN HEIGHT.

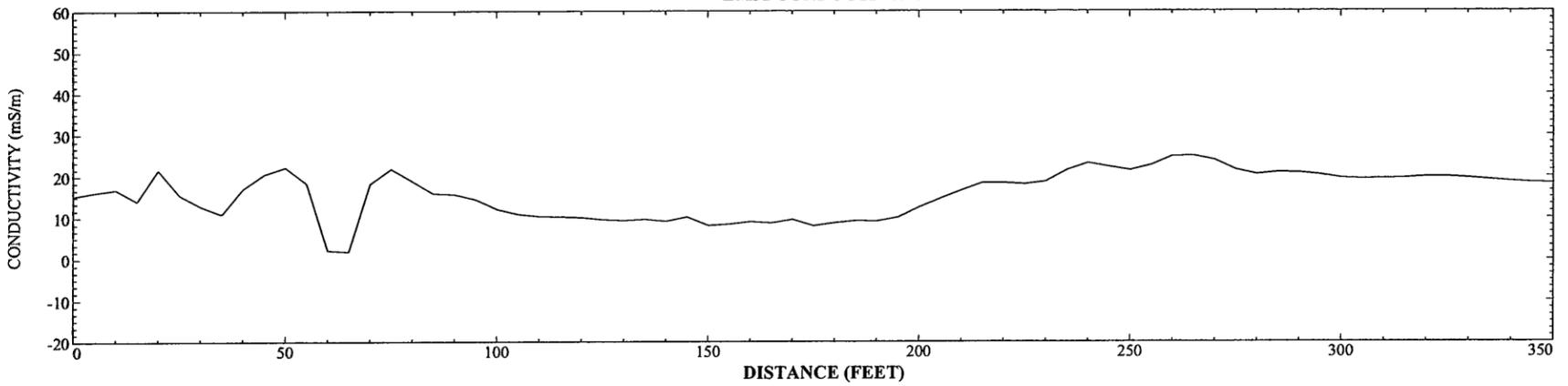
NW

SE

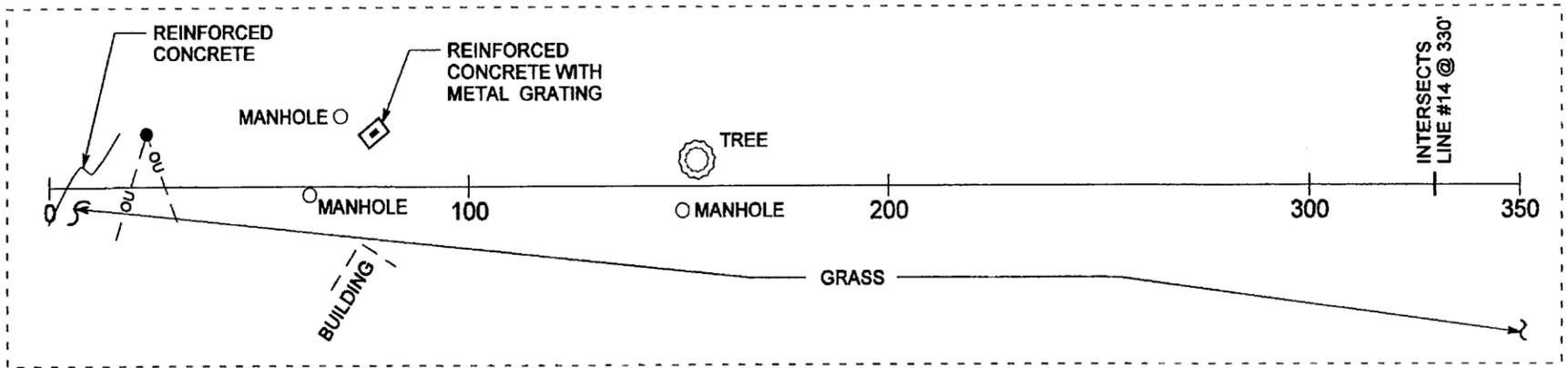
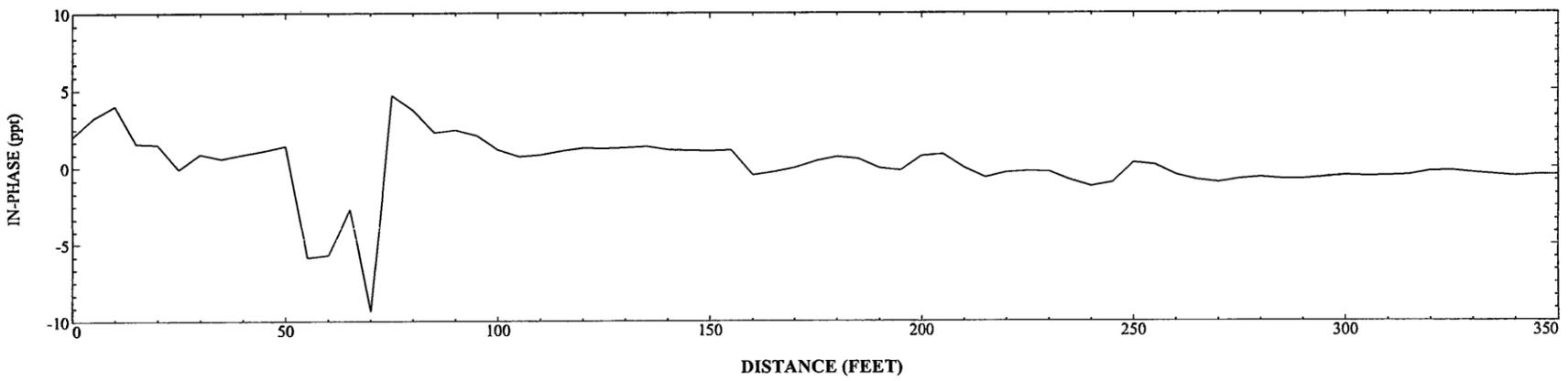
TOTAL MAGNETIC FIELD (UPPER SENSOR)



EM31 CONDUCTIVITY



EM31 IN-PHASE COMPONENT



LEGEND:

OU OVERHEAD UTILITY

FIGURE A78-3

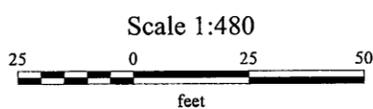
LANDFILL No. 1
 PARCEL 78(6)
 LINE 1
 FORT McCLELLAN

TOTAL MAGNETIC FIELD (UPPER SENSOR)
 EM31 CONDUCTIVITY (VERTICAL DIPOLE)
 EM31 IN-PHASE (VERTICAL DIPOLE)
 LINE 1 SITE MAP

U.S. ARMY CORPS OF ENGINEERS
 MOBILE DISTRICT
 FORT McCLELLAN
 CALHOUN COUNTY, ALABAMA
 CONTRACT NO. DACA21-96-D-0018

IT IT CORPORATION
 A Member of The IT Group

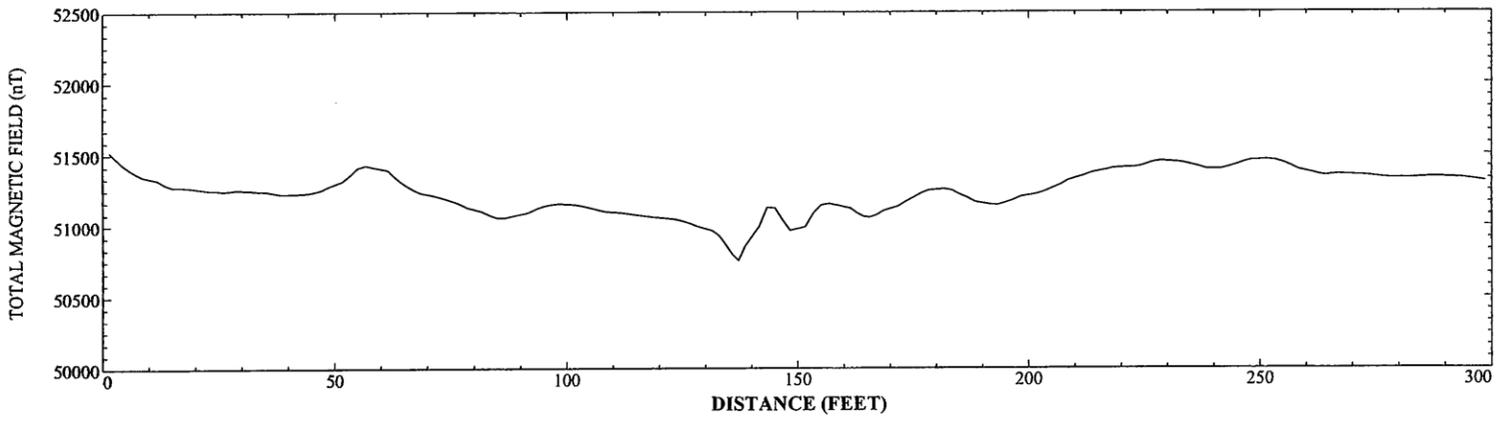
NAME: James Cox	DATE: February 27, 2001
PROJECT NUMBER: 774645	LOCATION: C:\IT\projects\FtMcClellan\Landfill1\Figure3.map



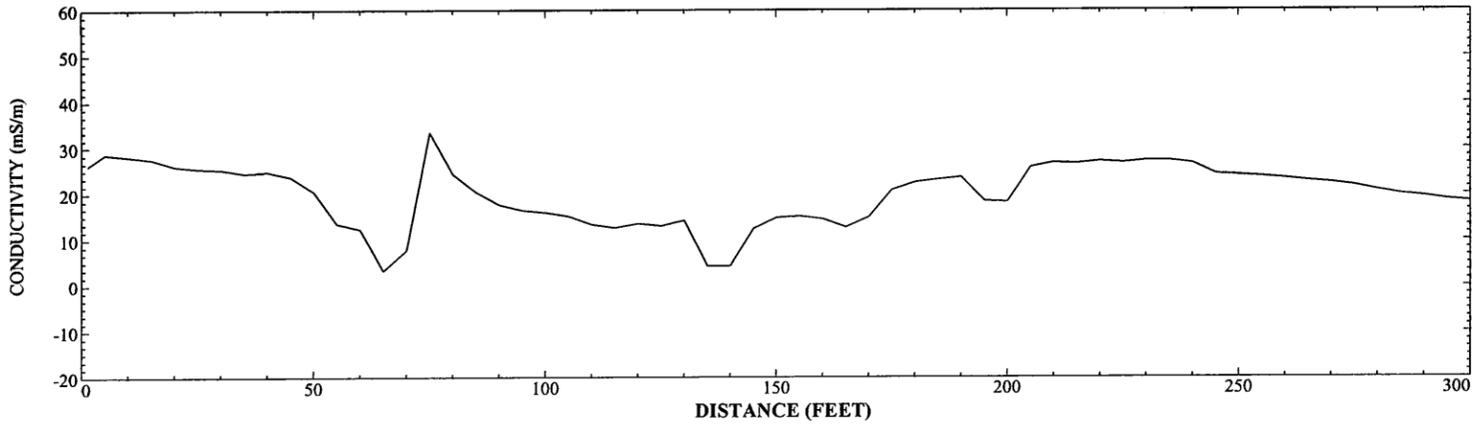
N

S

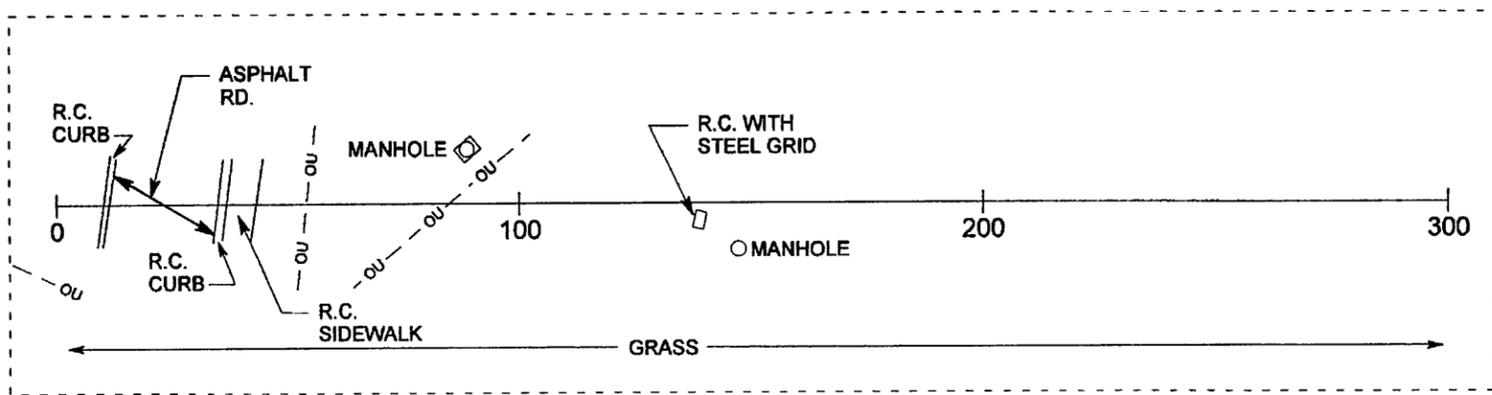
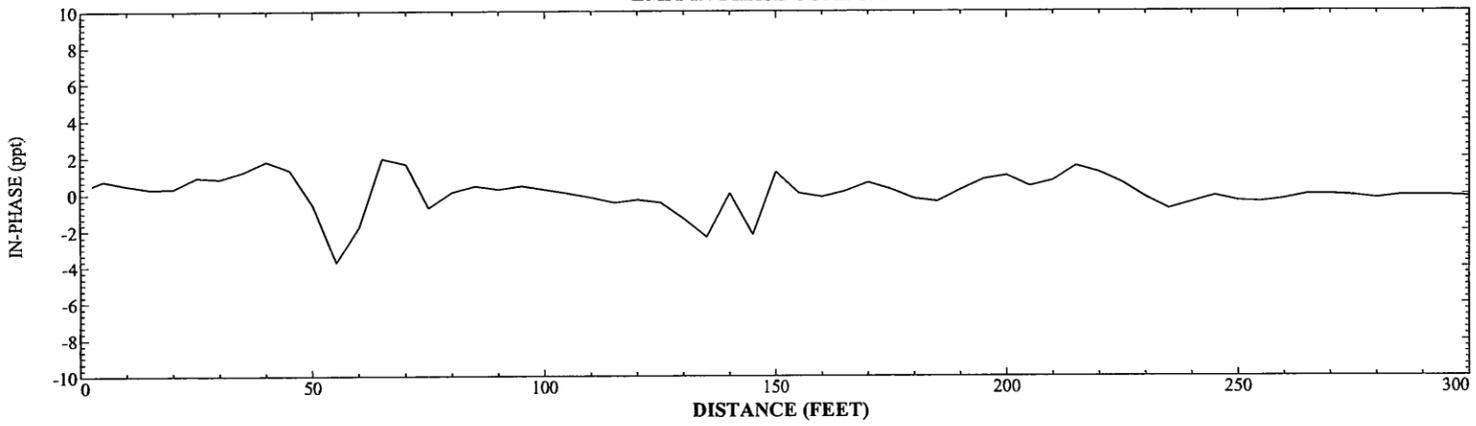
TOTAL MAGNETIC FIELD (UPPER SENSOR)



EM31 CONDUCTIVITY



EM31 IN-PHASE COMPONENT



LEGEND:

- RC REINFORCED CONCRETE
- OU OVERHEAD UTILITY

FIGURE A78-4

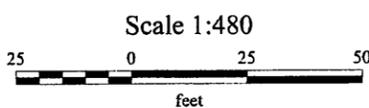
LANDFILL No. 1
 PARCEL 78(6)
 LINE 2
 FORT McCLELLAN

TOTAL MAGNETIC FIELD (UPPER SENSOR)
 EM31 CONDUCTIVITY (VERTICAL DIPOLE)
 EM31 IN-PHASE (VERTICAL DIPOLE)
 LINE 2 SITE MAP

U.S. ARMY CORPS OF ENGINEERS
 MOBILE DISTRICT
 FORT McCLELLAN
 CALHOUN COUNTY, ALABAMA
 CONTRACT NO. DACA21-96-D-0018



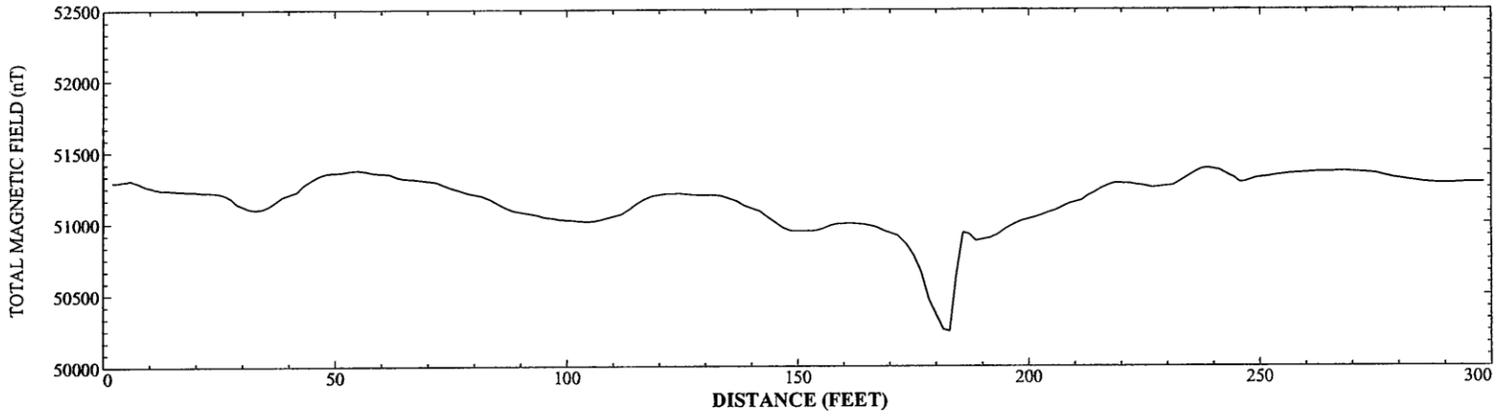
NAME: James Cox	DATE: February 27, 2001
PROJECT NUMBER: 774645	LOCATION: C:\ITP\projects\FtMcClellan\Landfill 1\Ffigure4.map



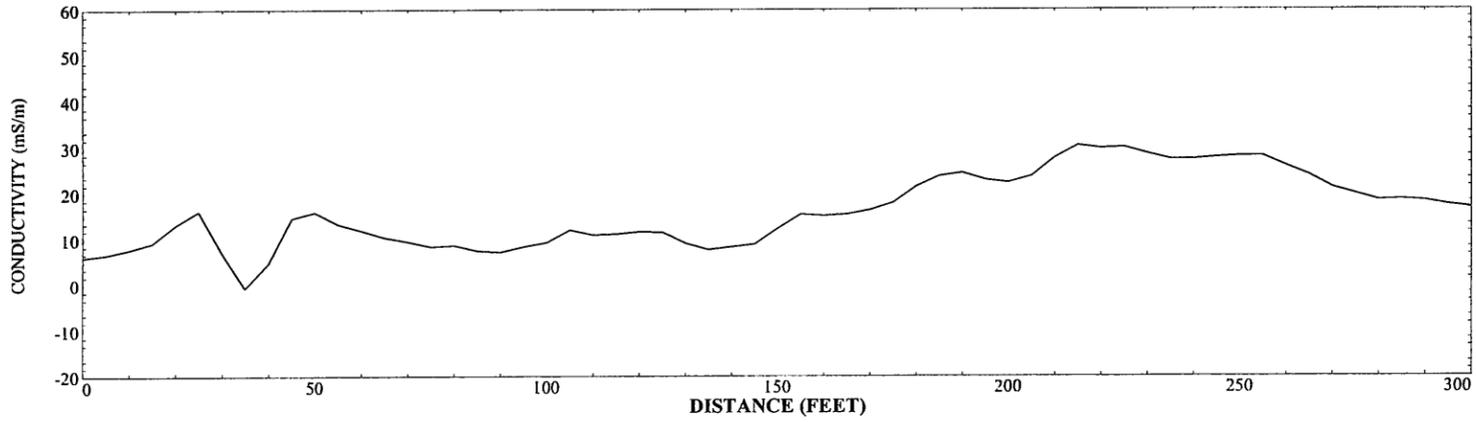
NW

SE

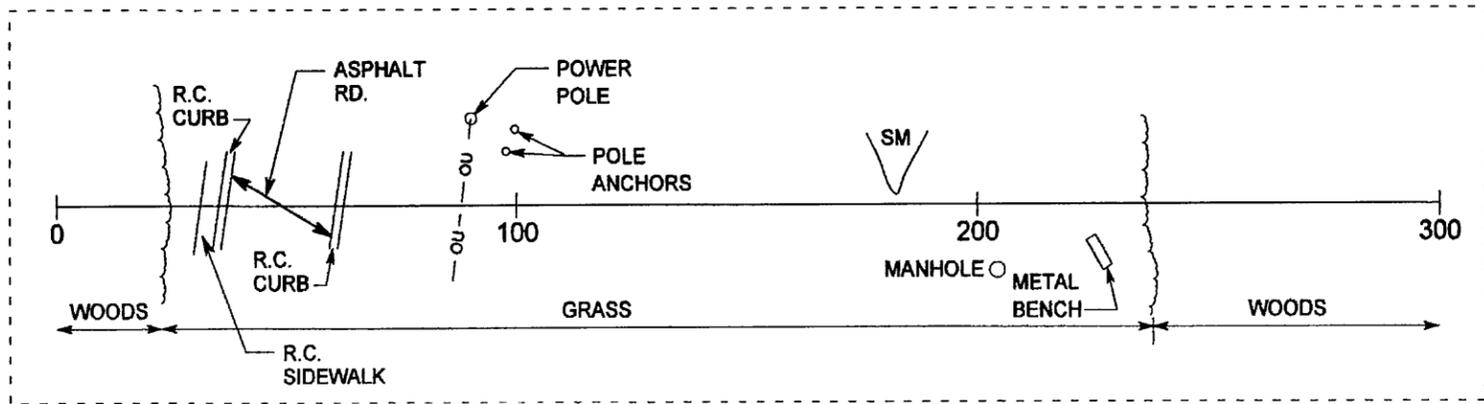
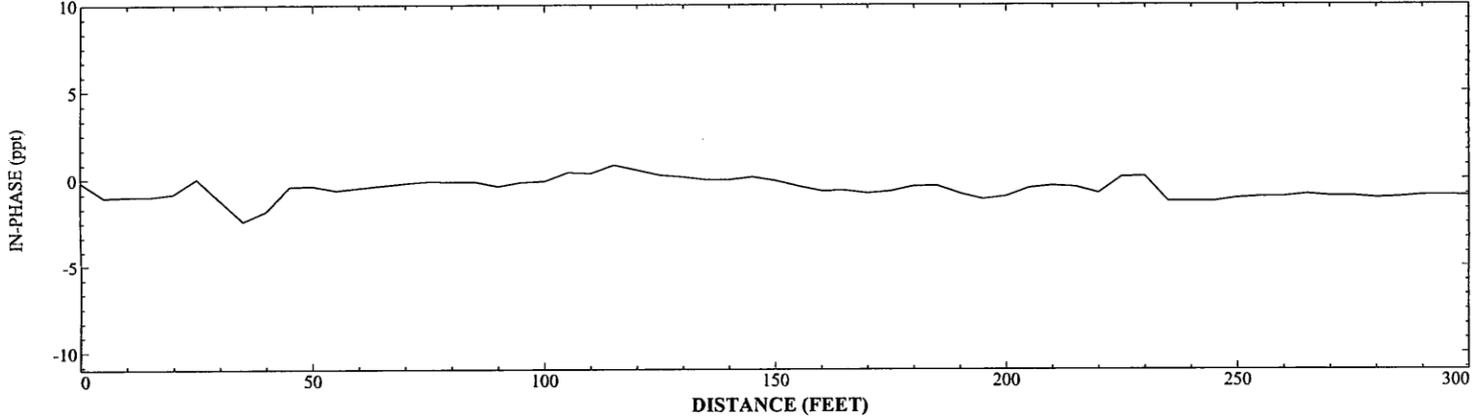
TOTAL MAGNETIC FIELD (UPPER SENSOR)



EM31 CONDUCTIVITY



EM31 IN-PHASE COMPONENT



LEGEND:

- RC REINFORCED CONCRETE
- SM SURFACE METAL
- OU OVERHEAD UTILITY

FIGURE A78-5

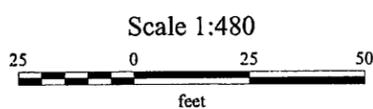
LANDFILL No. 1
 PARCEL 78(6)
 LINE 3
 FORT McCLELLAN

TOTAL MAGNETIC FIELD (UPPER SENSOR)
 EM31 CONDUCTIVITY (VERTICAL DIPOLE)
 EM31 IN-PHASE (VERTICAL DIPOLE)
 LINE 3 SITE MAP

U.S. ARMY CORPS OF ENGINEERS
 MOBILE DISTRICT
 FORT McCLELLAN
 CALHOUN COUNTY, ALABAMA
 CONTRACT NO. DACA21-96-D-0018

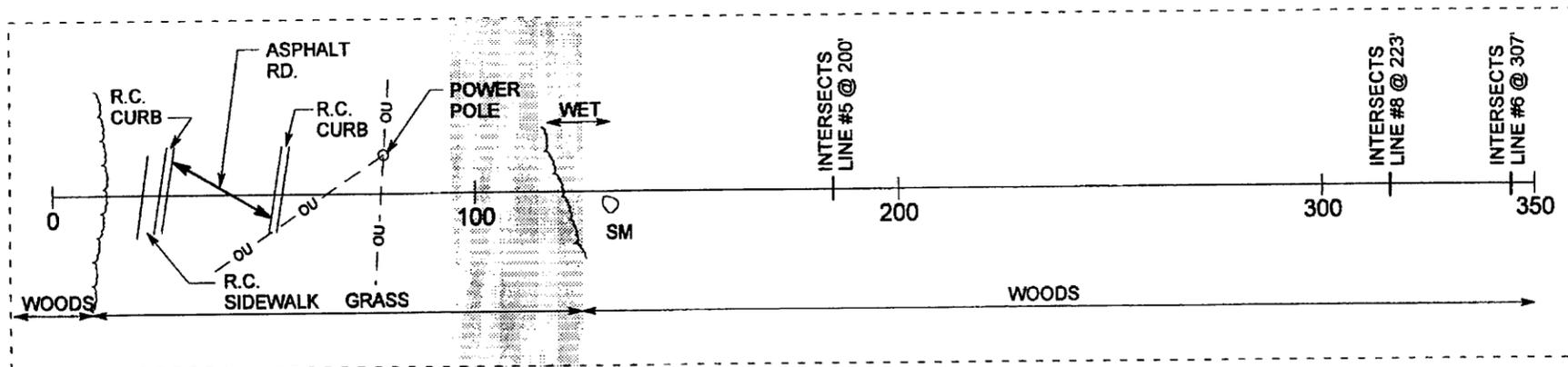
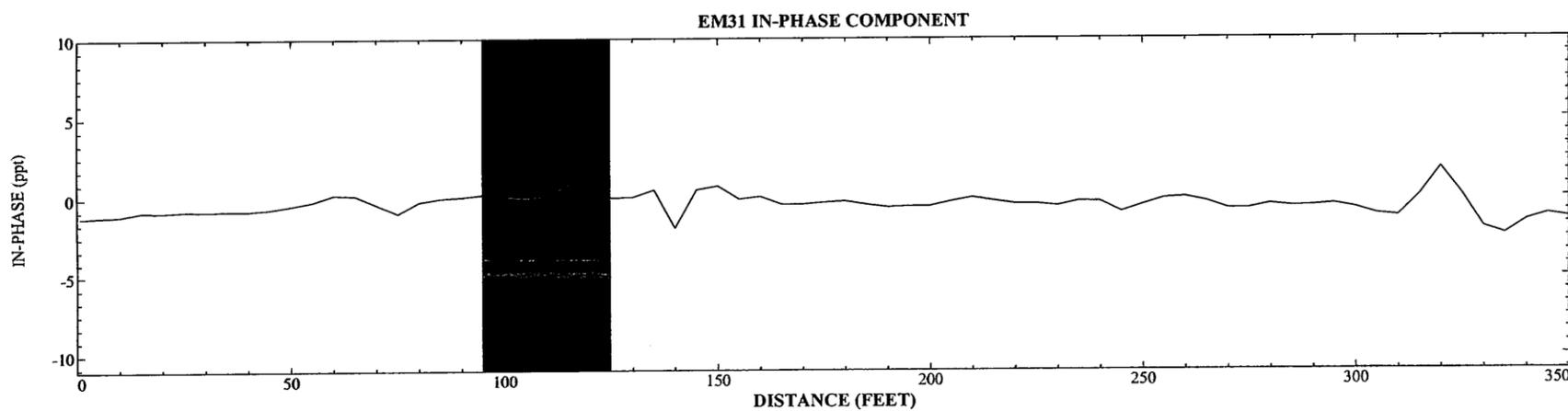
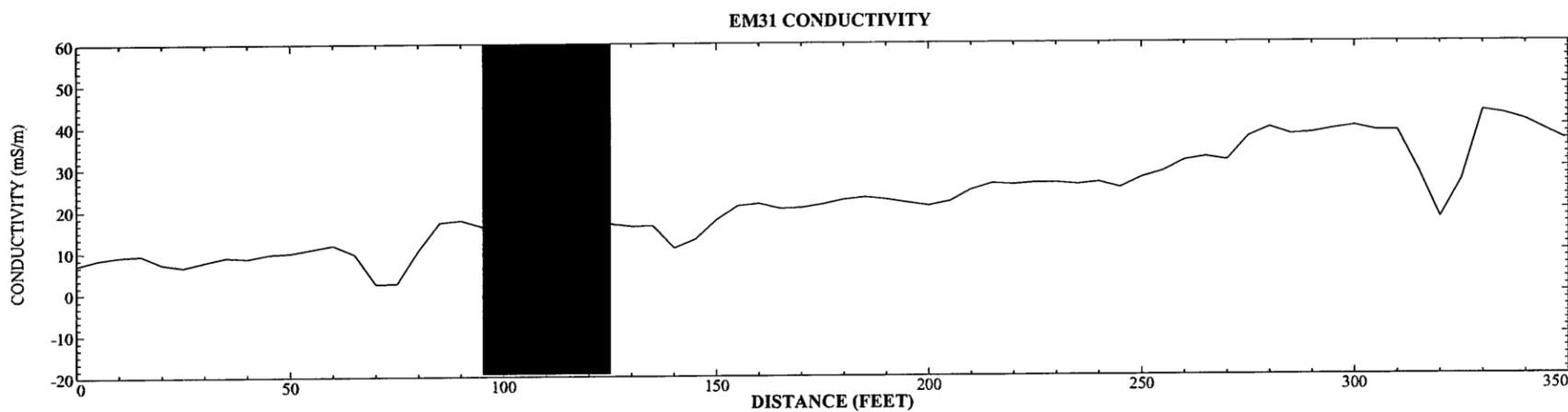
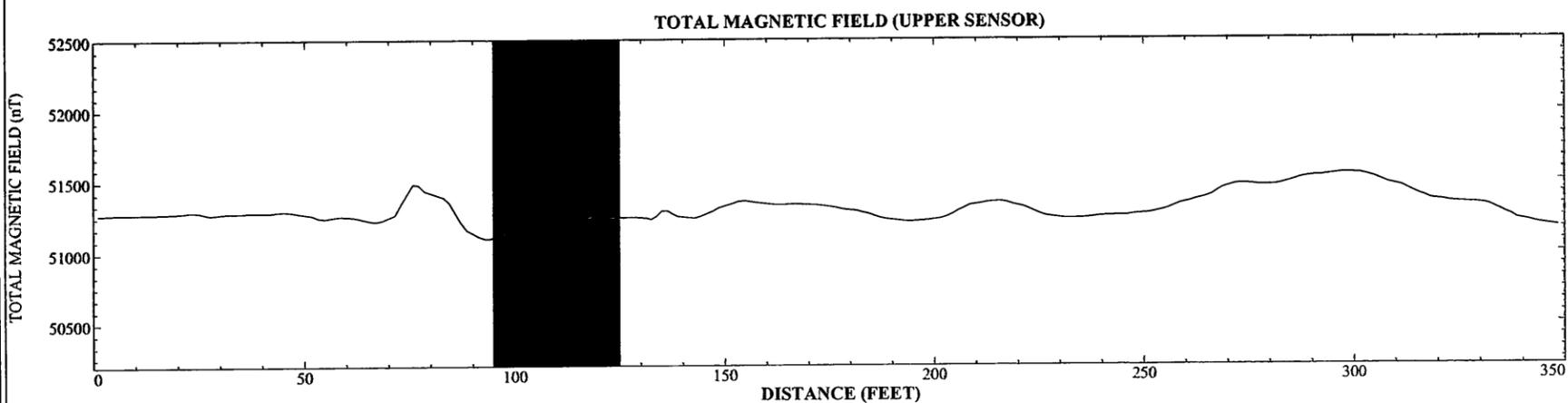


NAME: James Cox	DATE: February 27, 2001
PROJECT NUMBER: 774645	LOCATION: C:\IT\Projects\FtMcClellan\Landfill\1\Figure5.map



NW

SE



LEGEND:

- LOCATION OF TRENCH (T78-7)
- RC REINFORCED CONCRETE
- SM SURFACE METAL
- OU OVERHEAD UTILITY

FIGURE A78-6

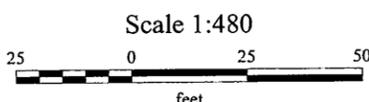
LANDFILL No. 1
 PARCEL 78(6)
 LINE 4
 FORT McCLELLAN

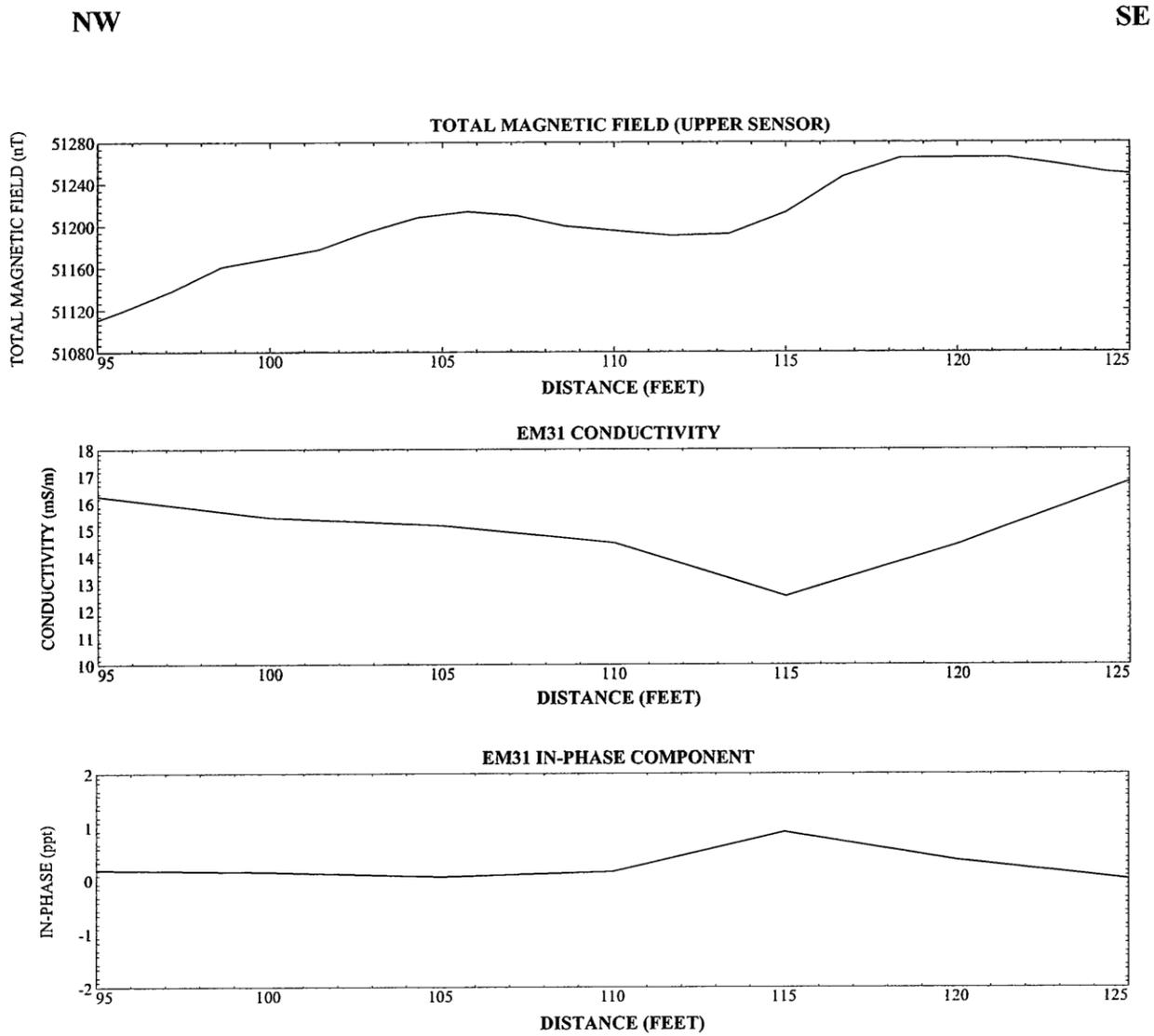
TOTAL MAGNETIC FIELD (UPPER SENSOR)
 EM31 CONDUCTIVITY (VERTICAL DIPOLE)
 EM31 IN-PHASE (VERTICAL DIPOLE)
 LINE 4 SITE MAP

U.S. ARMY CORPS OF ENGINEERS
 MOBILE DISTRICT
 FORT McCLELLAN
 CALHOUN COUNTY, ALABAMA
 CONTRACT NO. DACA21-96-D-0018



NAME: James Cox	DATE: February 27, 2001
PROJECT NUMBER: 774645	LOCATION: C:\IT\projects\F\McClellan\Landfill1\Figure6.map





PLAN VIEW



PROFILE VIEW

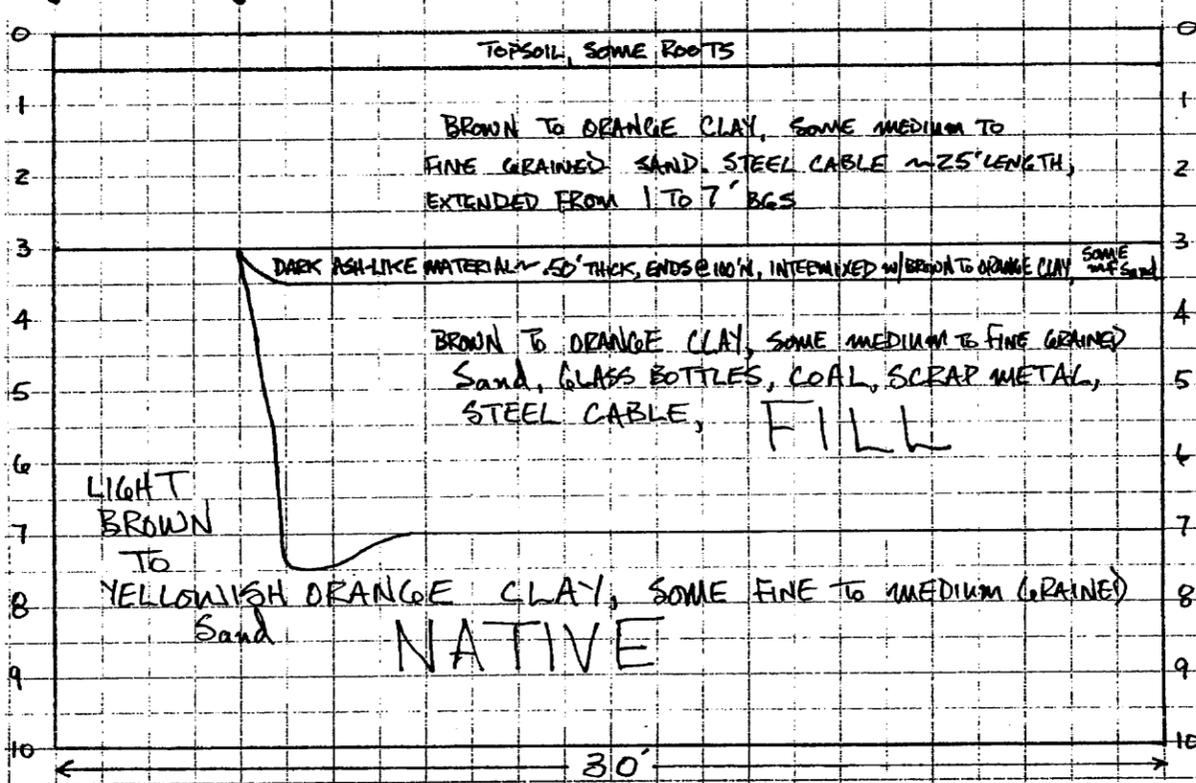


FIGURE A78-7

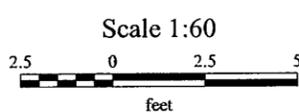
LANDFILL No. 1
 PARCEL 78(6)
 LINE 4 TRENCH LOG
 WITH CORRESPONDING GEOPHYSICAL DATA
 FORT McCLELLAN

TOTAL MAGNETIC FIELD (UPPER SENSOR)
 EM31 CONDUCTIVITY (VERTICAL DIPOLE)
 EM31 IN-PHASE (VERTICAL DIPOLE)
 LINE 4 TRENCH LOG (T78-7)

U.S. ARMY CORPS OF ENGINEERS
 MOBILE DISTRICT
 FORT McCLELLAN
 CALHOUN COUNTY, ALABAMA
 CONTRACT NO. DACA21-96-D-0018

IT CORPORATION
 A Member of The IT Group

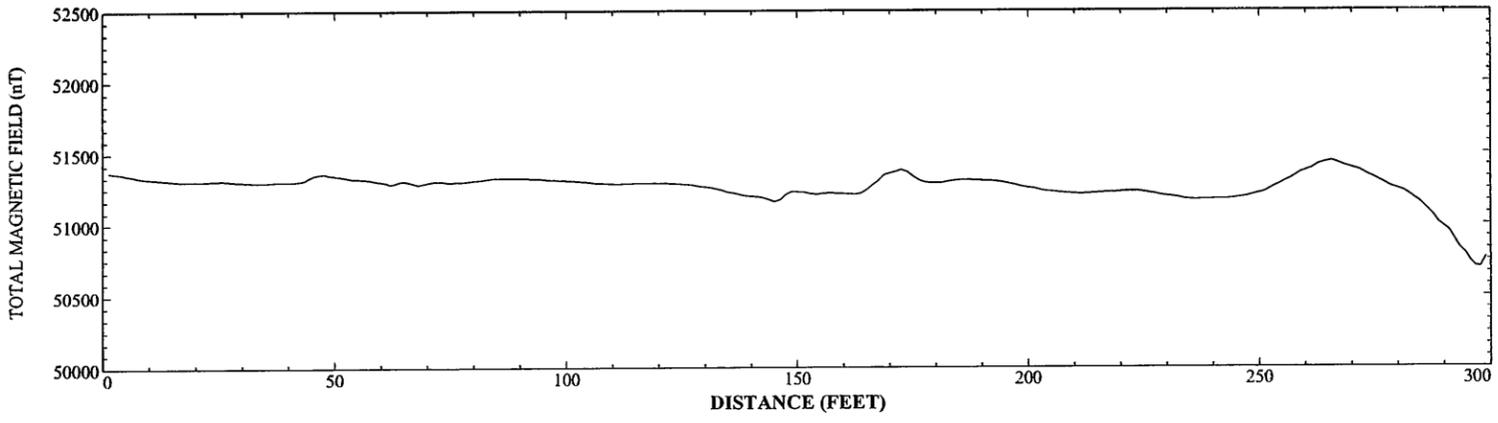
NAME: James Cox	DATE: February 27, 2001
PROJECT NUMBER: 774645	LOCATION: C:\MTP\projects\FtMcClellan\Landfill\Figure7.map



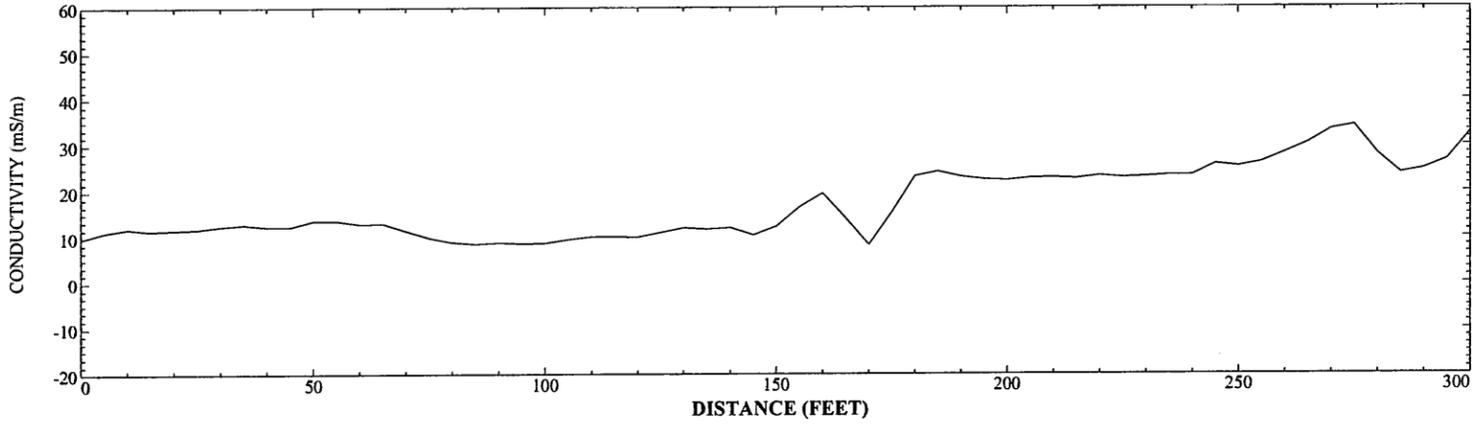
NE

SW

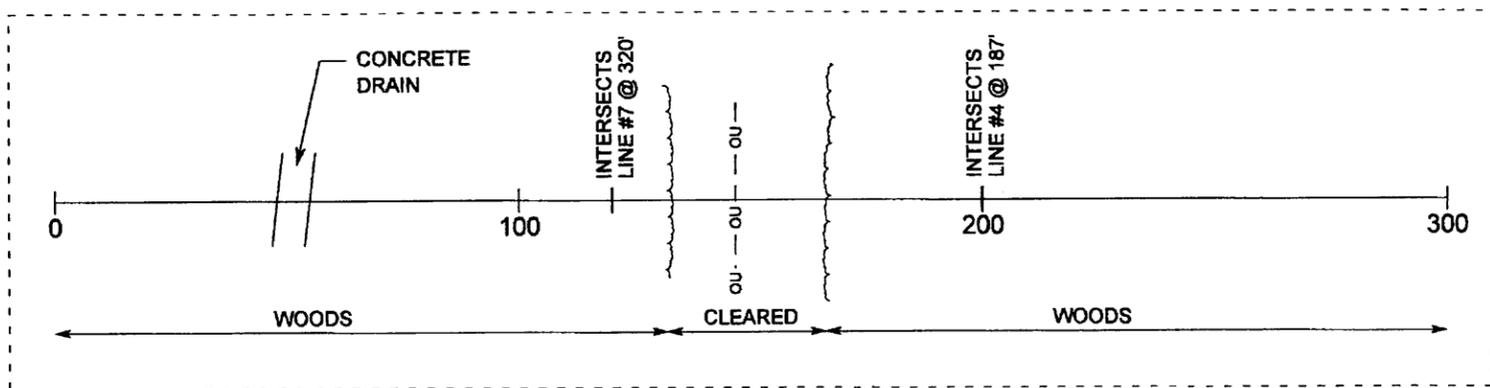
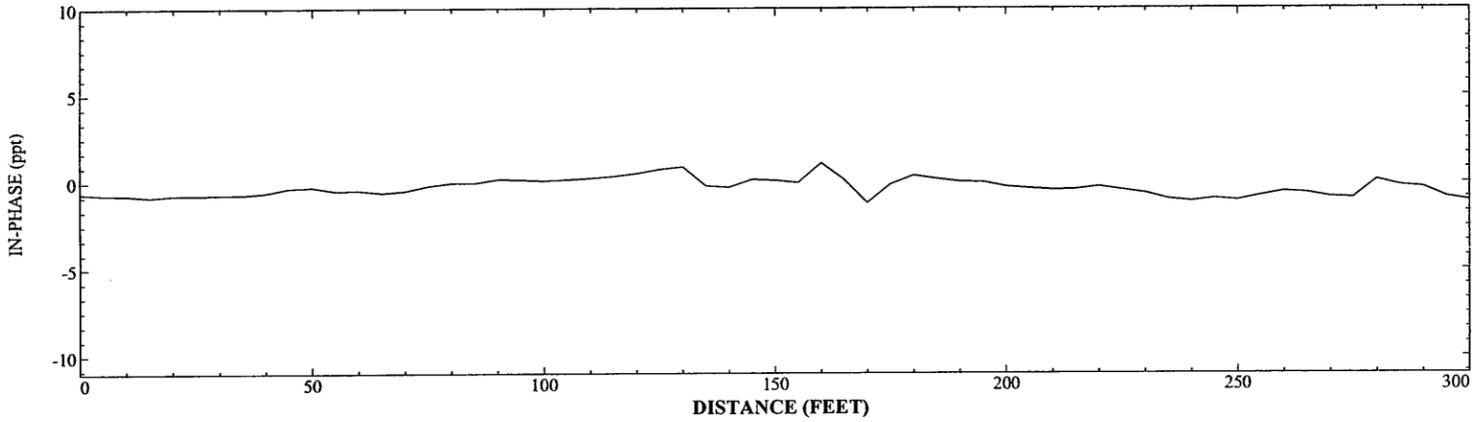
TOTAL MAGNETIC FIELD (UPPER SENSOR)



EM31 CONDUCTIVITY



EM31 IN-PHASE COMPONENT



LEGEND:

OU OVERHEAD UTILITY

FIGURE A78-8

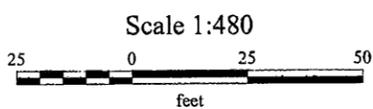
LANDFILL No. 1
PARCEL 78(6)
LINE 5
FORT McCLELLAN

TOTAL MAGNETIC FIELD (UPPER SENSOR)
EM31 CONDUCTIVITY (VERTICAL DIPOLE)
EM31 IN-PHASE (VERTICAL DIPOLE)
LINE 5 SITE MAP

U.S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
CONTRACT NO. DACA21-96-D-0018



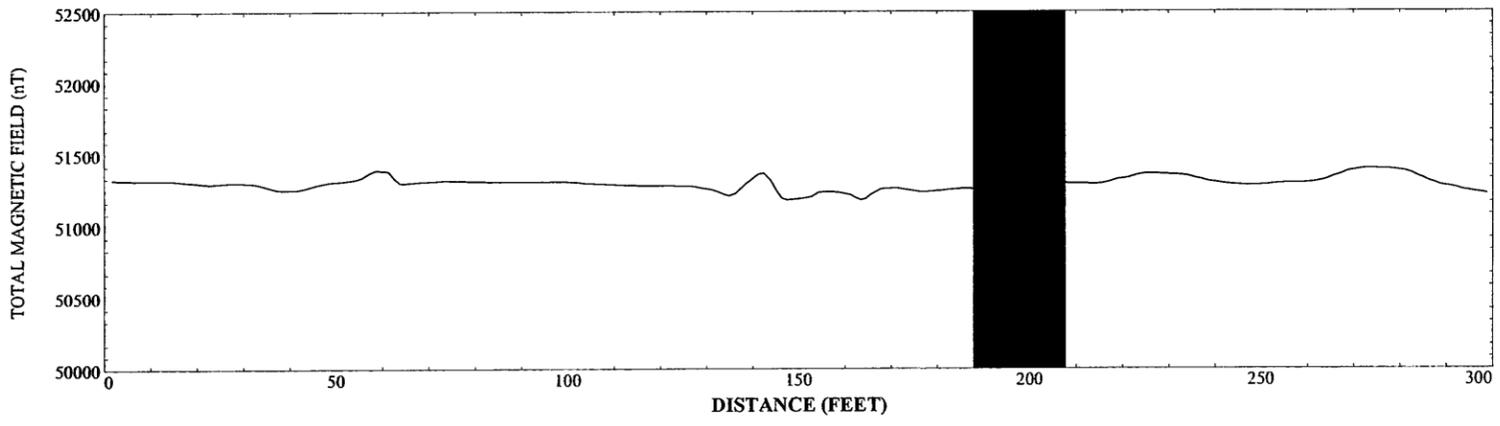
NAME: James Cox	DATE: February 27, 2001
PROJECT NUMBER: 774645	LOCATION: C:\IT\projects\FtMcClellan\Landfill\1\Figure8.map



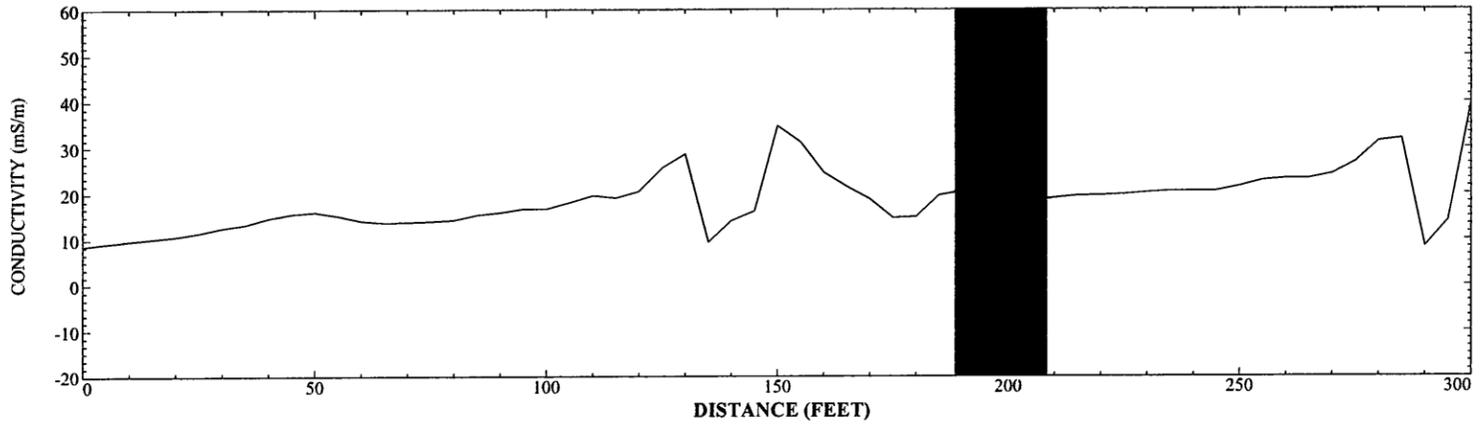
NE

SW

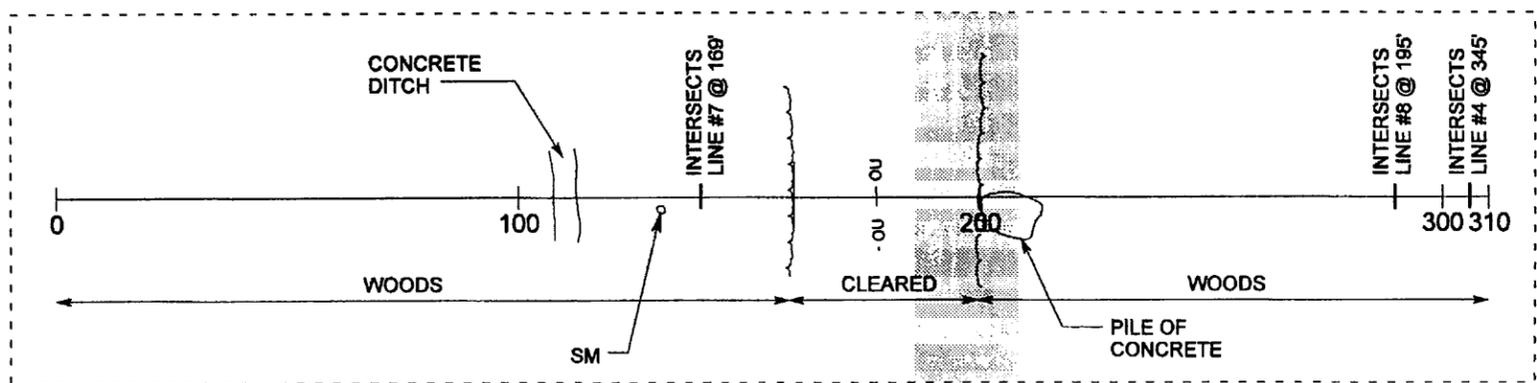
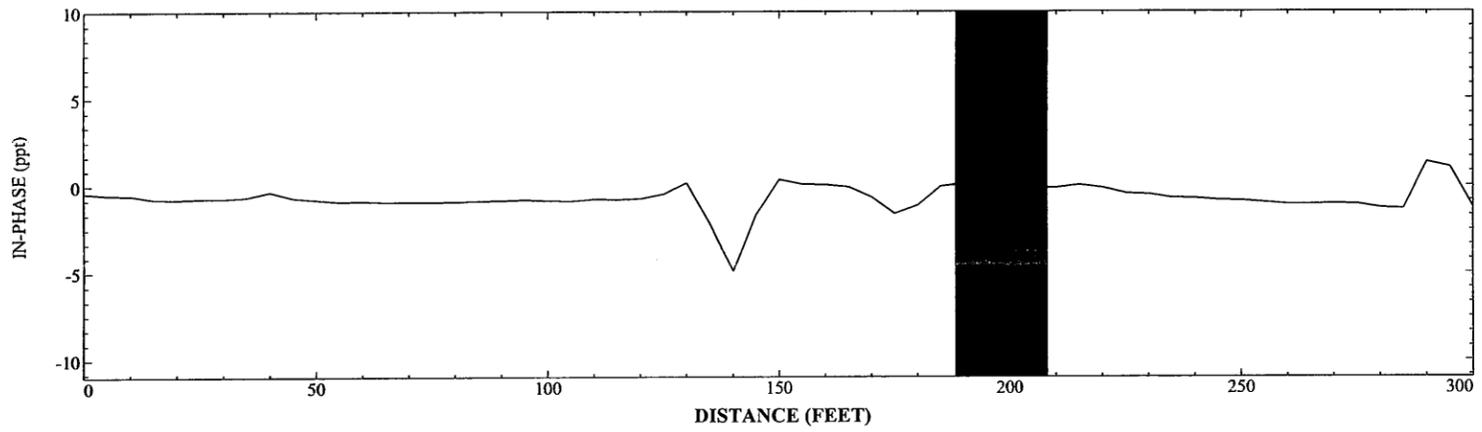
TOTAL MAGNETIC FIELD (UPPER SENSOR)



EM31 CONDUCTIVITY



EM31 IN-PHASE COMPONENT



LEGEND:

- LOCATION OF TRENCH (T78-6)
- SM SURFACE METAL
- OU OVERHEAD UTILITY

FIGURE A78-9

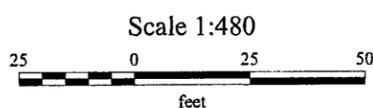
LANDFILL No. 1
 PARCEL 78(6)
 LINE 6
 FORT McCLELLAN

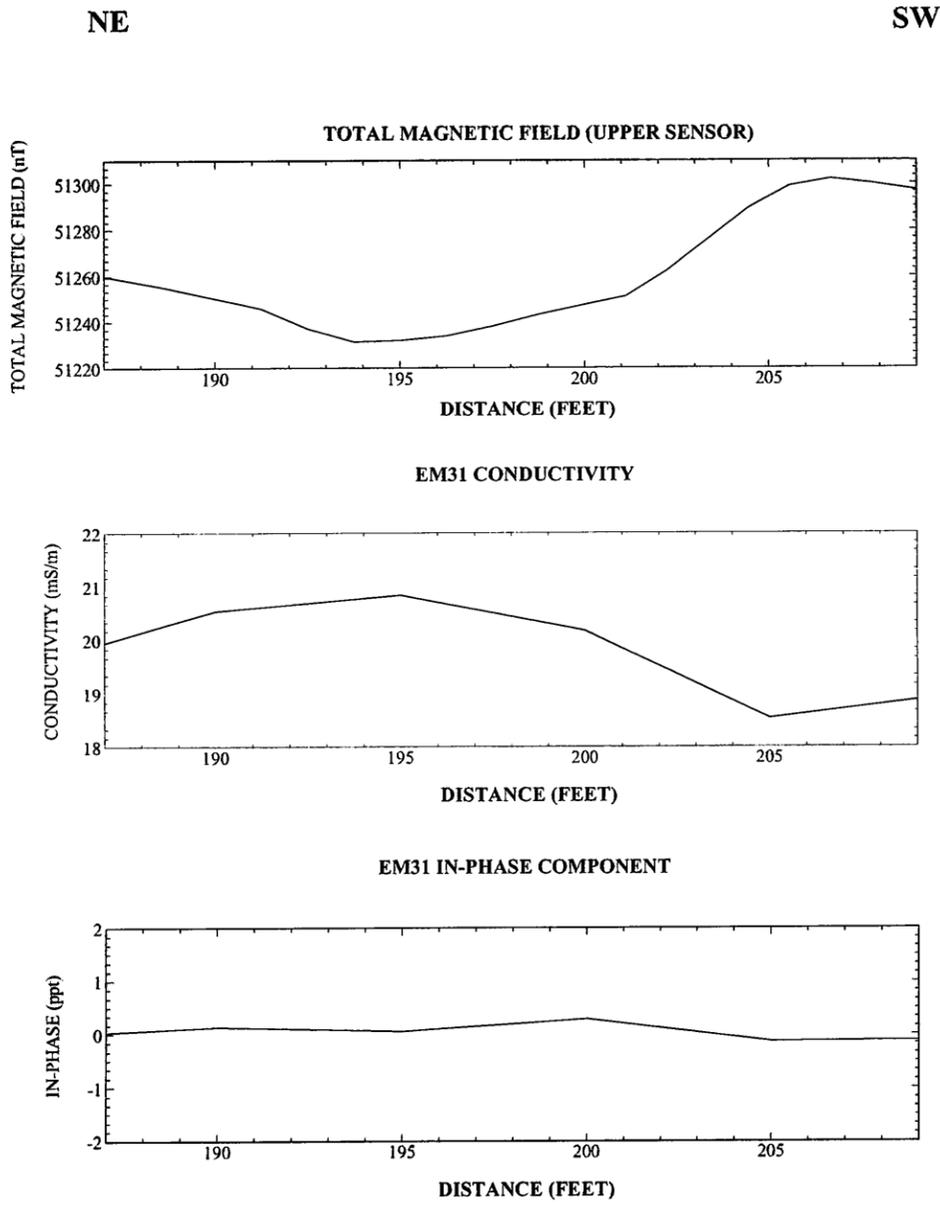
TOTAL MAGNETIC FIELD (UPPER SENSOR)
 EM31 CONDUCTIVITY (VERTICAL DIPOLE)
 EM31 IN-PHASE (VERTICAL DIPOLE)
 LINE 6 SITE MAP

U.S. ARMY CORPS OF ENGINEERS
 MOBILE DISTRICT
 FORT McCLELLAN
 CALHOUN COUNTY, ALABAMA
 CONTRACT NO. DACA21-96-D-0018

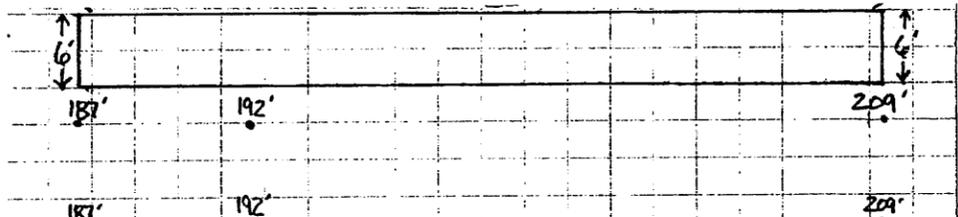
IT CORPORATION
 A Member of The IT Group

NAME: James Cox	DATE: February 27, 2001
PROJECT NUMBER: 774645	LOCATION: C:\IT\Projects\FtMcClellan\Landfill\Figure9.map





PLAN VIEW



PROFILE VIEW

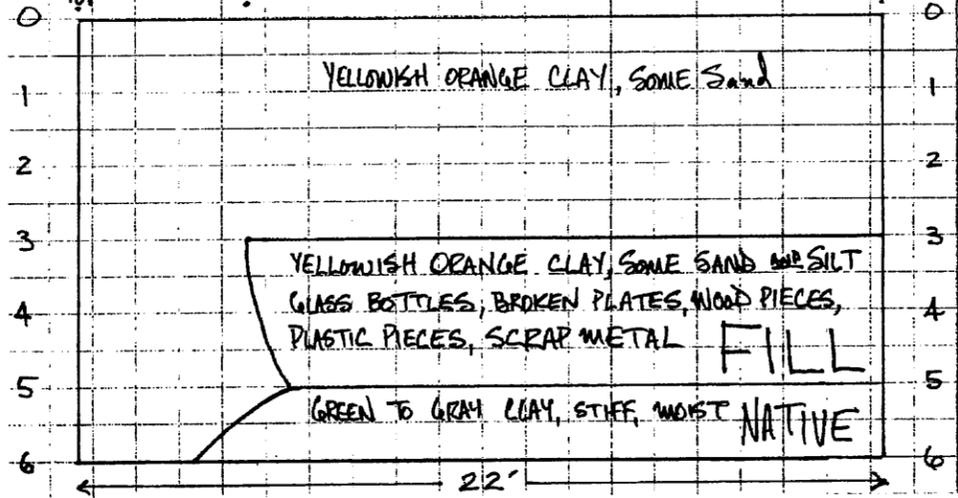


FIGURE A78-10

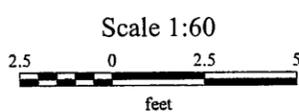
**LANDFILL No. 1
PARCEL 78(6)
LINE 6 TRENCH LOG
WITH CORRESPONDING GEOPHYSICAL DATA
FORT McCLELLAN**

TOTAL MAGNETIC FIELD (UPPER SENSOR)
EM31 CONDUCTIVITY (VERTICAL DIPOLE)
EM31 IN-PHASE (VERTICAL DIPOLE)
LINE 6 TRENCH LOG (T78-6)

U.S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
CONTRACT NO. DACA21-96-D-0018

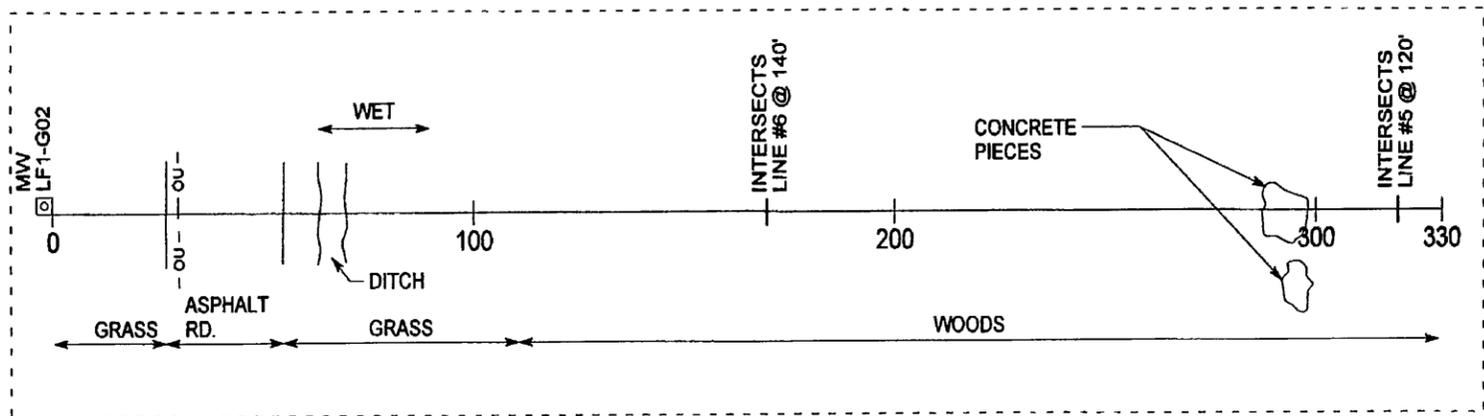
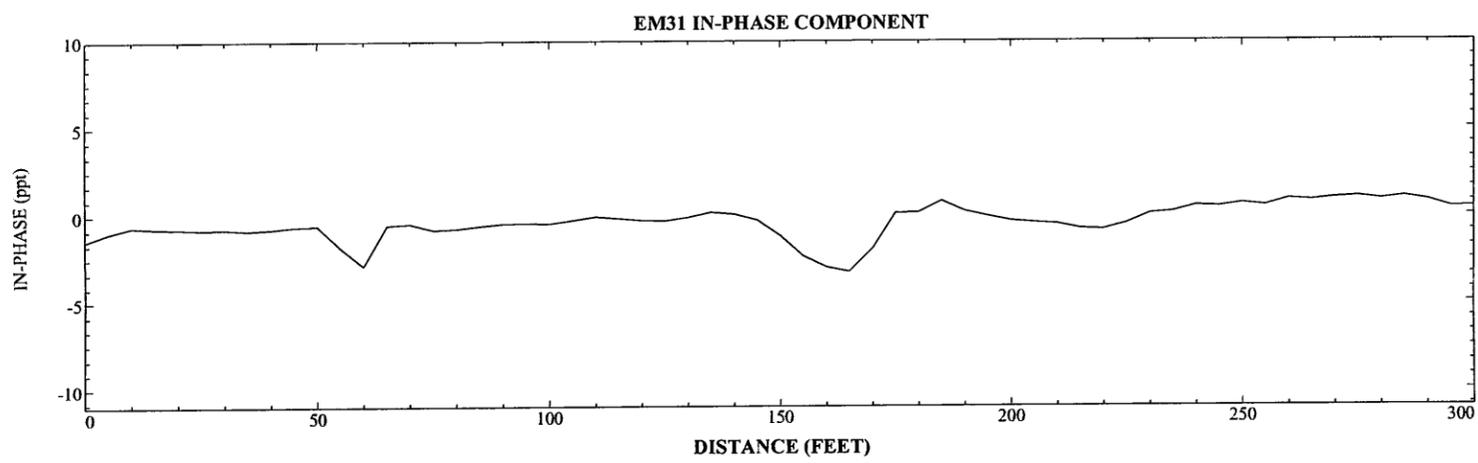
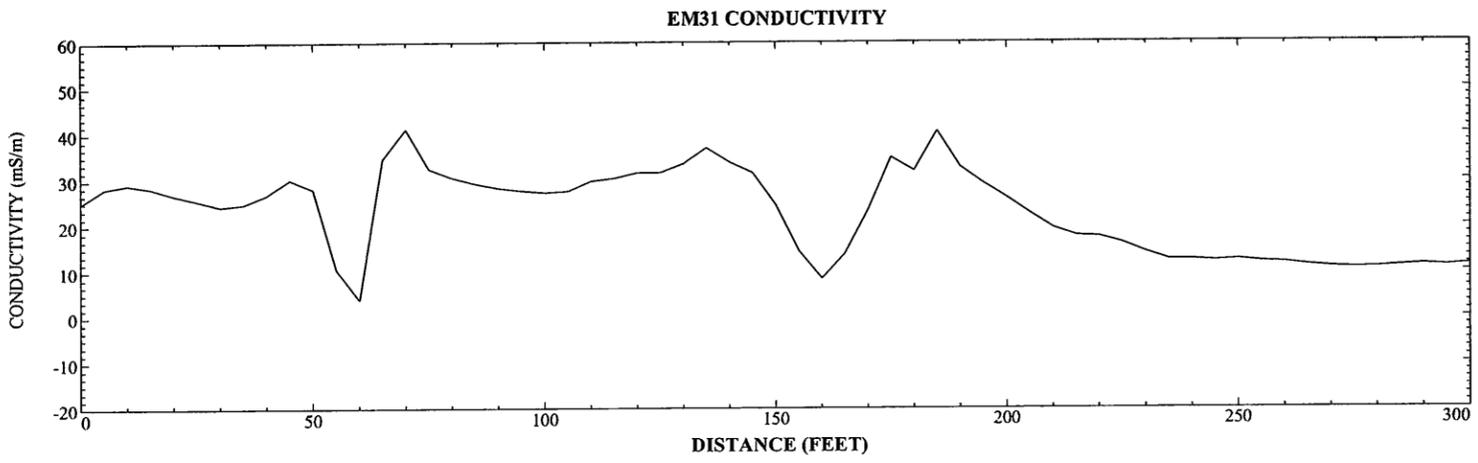
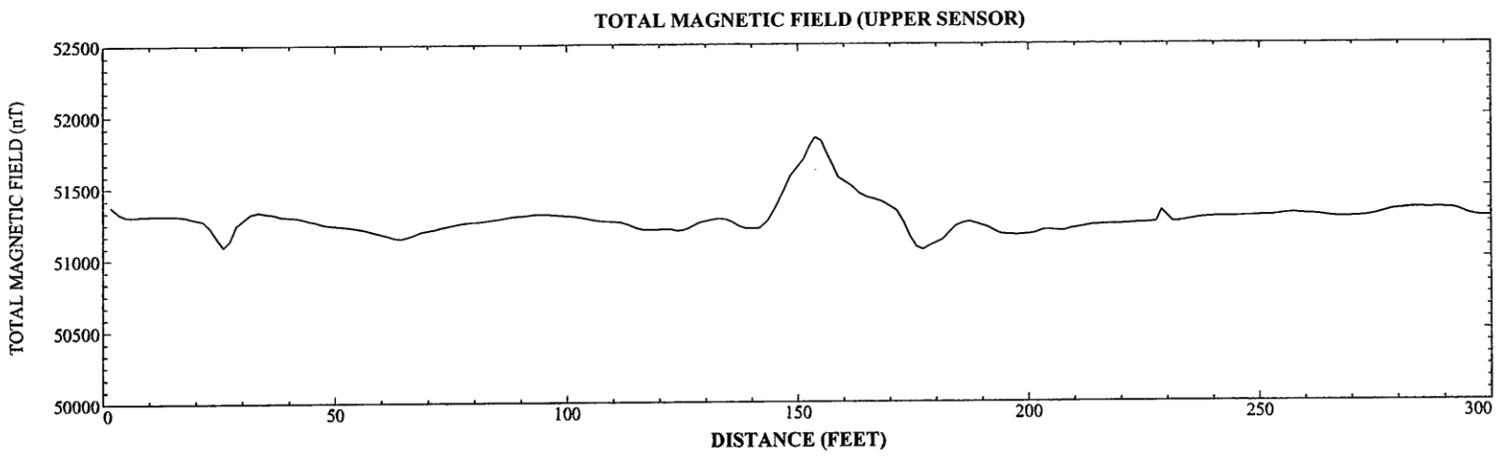
IT CORPORATION
A Member of The IT Group

NAME: James Cox	DATE: February 27, 2001
PROJECT NUMBER: 774645	LOCATION: C:\IT\projects\FtMcClellan\Landfill\Figure10.map



SE

NW



LEGEND:

- OU OVERHEAD UTILITY
- MW MONITORING WELL

FIGURE A78-11

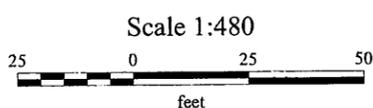
**LANDFILL No. 1
PARCEL 78(6)
LINE 7
FORT McCLELLAN**

TOTAL MAGNETIC FIELD (UPPER SENSOR)
EM31 CONDUCTIVITY (VERTICAL DIPOLE)
EM31 IN-PHASE (VERTICAL DIPOLE)
LINE 7 SITE MAP

U.S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
CONTRACT NO. DACA21-96-D-0018

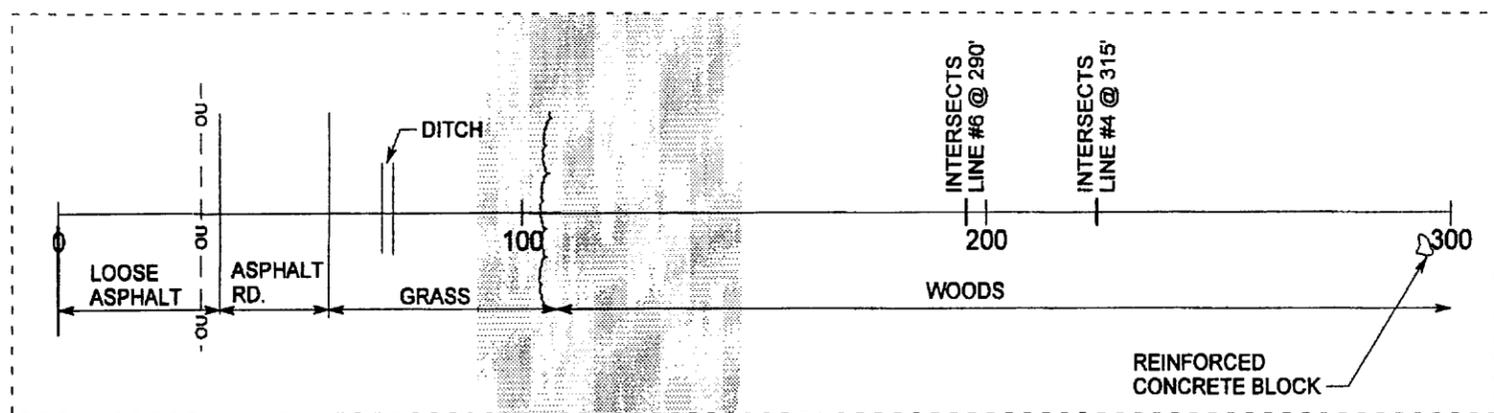
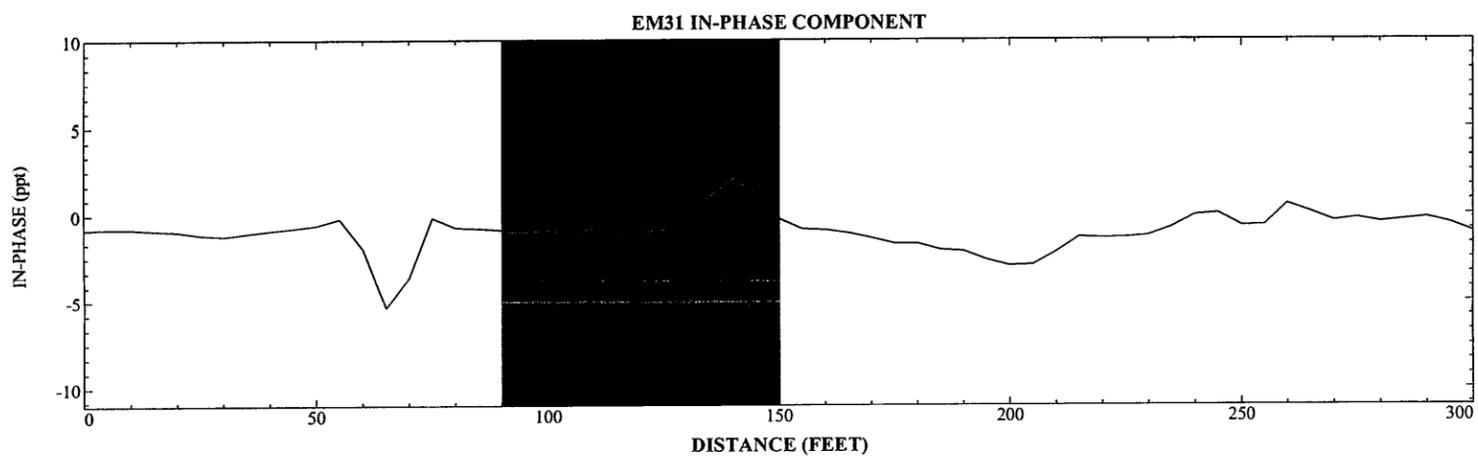
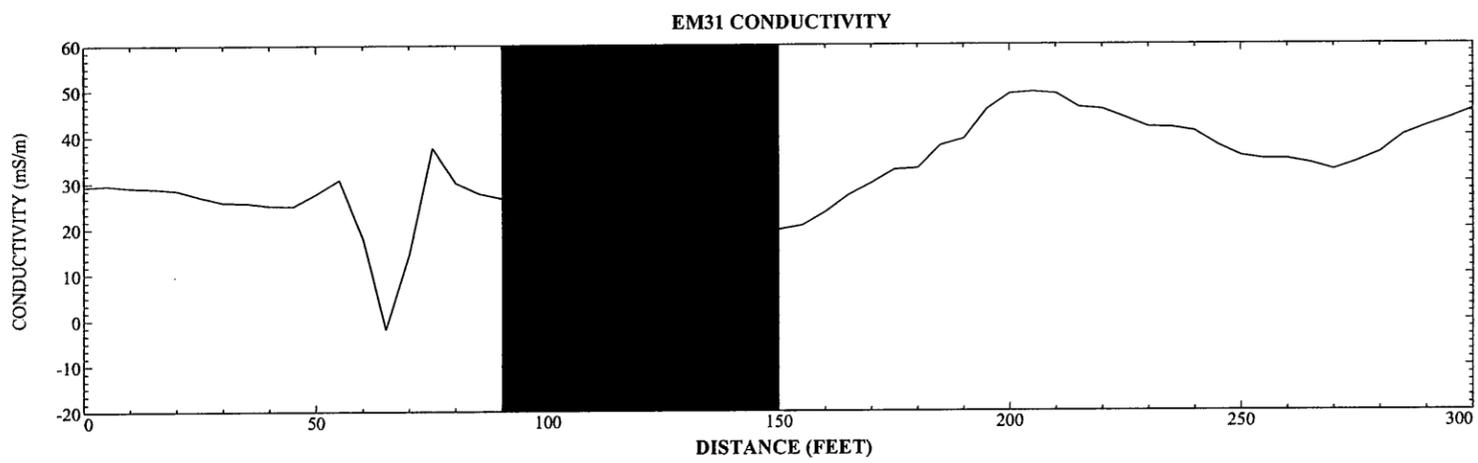
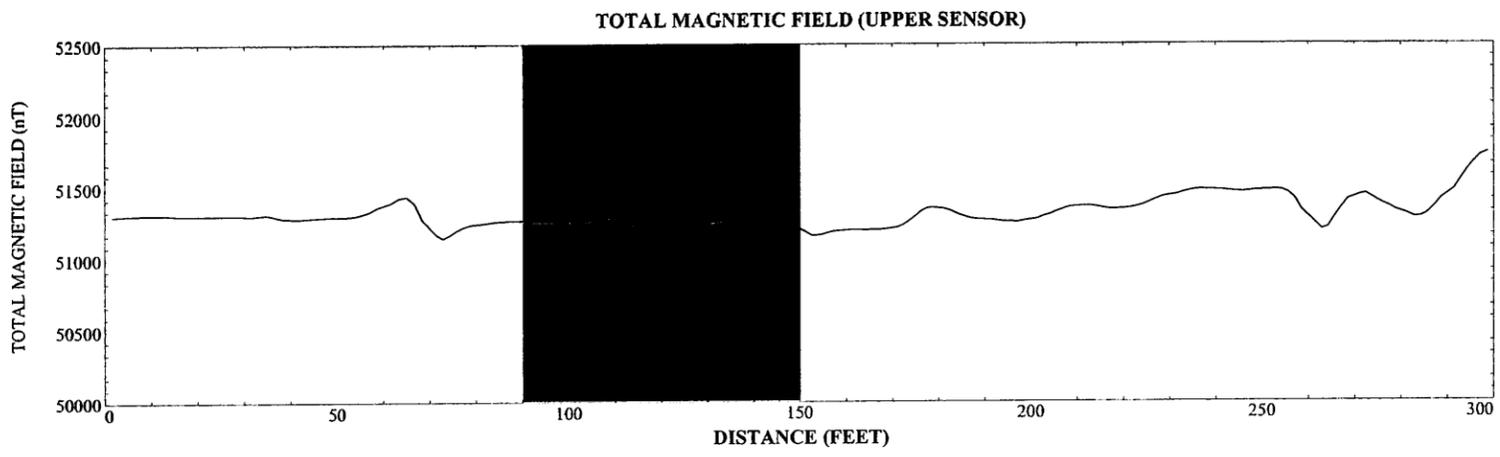


NAME: James Cox	DATE: February 27, 2001
PROJECT NUMBER: 774645	LOCATION: C:\IT\projects\FtMcClellan\Landfill\Figure11.map



SE

NW



LEGEND:

- LOCATION OF TRENCH (T78-5)
- OU OVERHEAD UTILITY

NOTE: TRENCH (T78-5) LOCATION IS
OFFSET APPROXIMATELY
25 FEET SW OF LINE 8

FIGURE A78-12

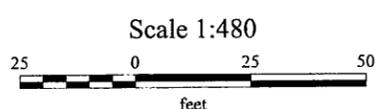
LANDFILL No. 1
PARCEL 78(6)
LINE 8
FORT McCLELLAN

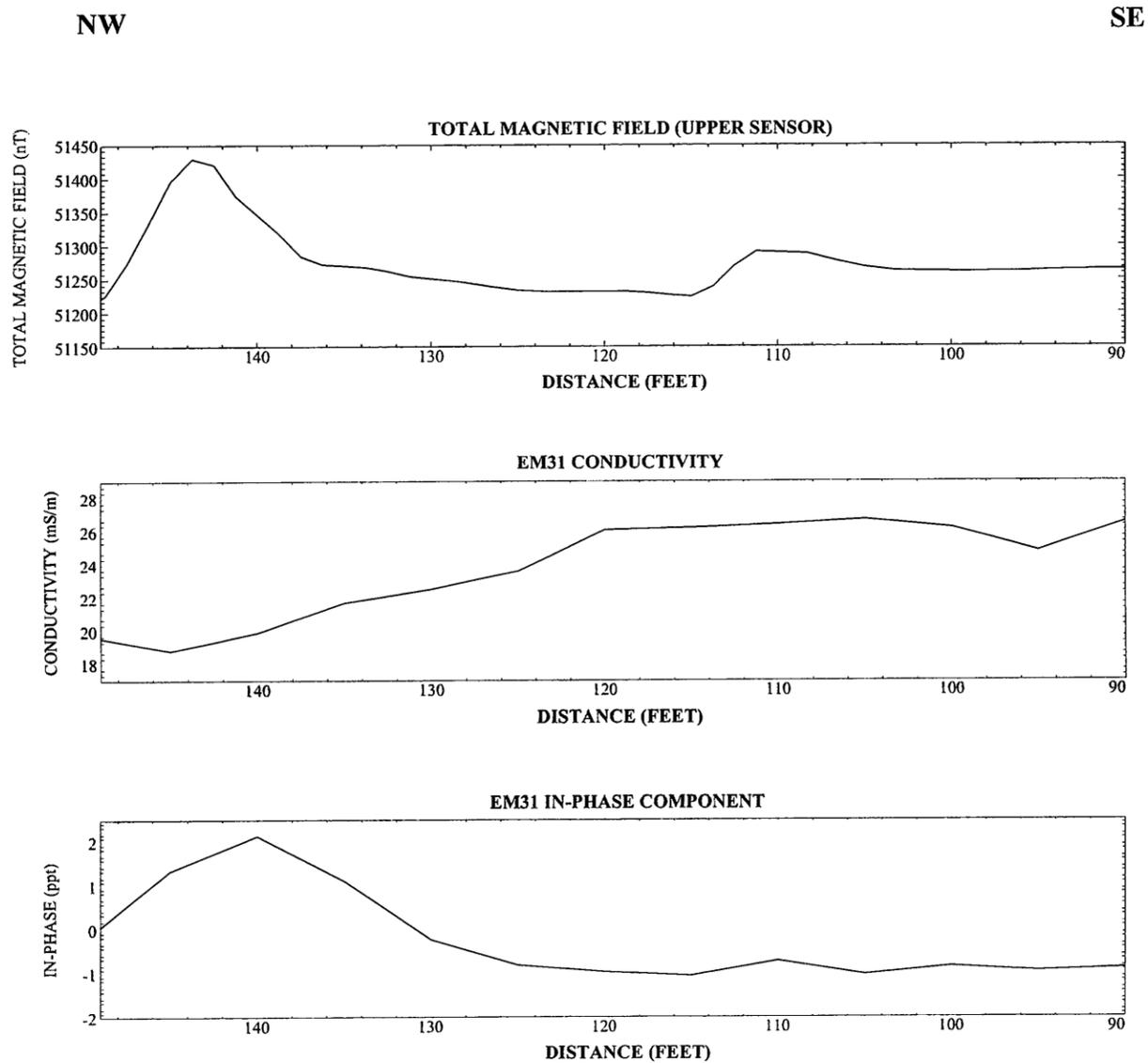
TOTAL MAGNETIC FIELD (UPPER SENSOR)
EM31 CONDUCTIVITY (VERTICAL DIPOLE)
EM31 IN-PHASE (VERTICAL DIPOLE)
LINE 8 SITE MAP

U.S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
CONTRACT NO. DACA21-96-D-0018

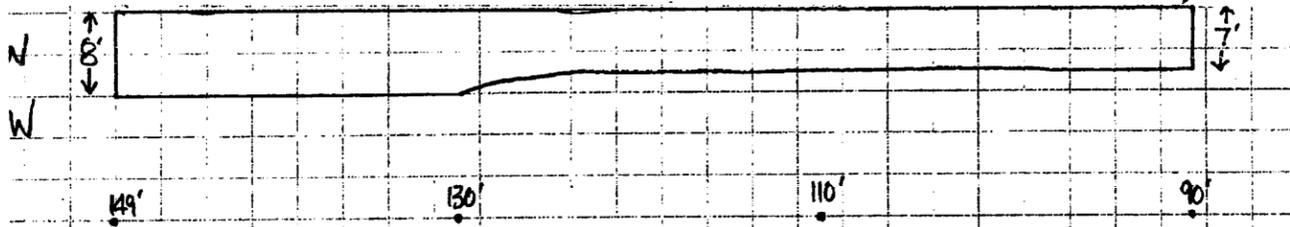


NAME: James Cox	DATE: February 27, 2001
PROJECT NUMBER: 774645	LOCATION: C:\ITP\projects\FtMcClellan\Landfill1\Figure12.map





PLAN VIEW



PROFILE VIEW

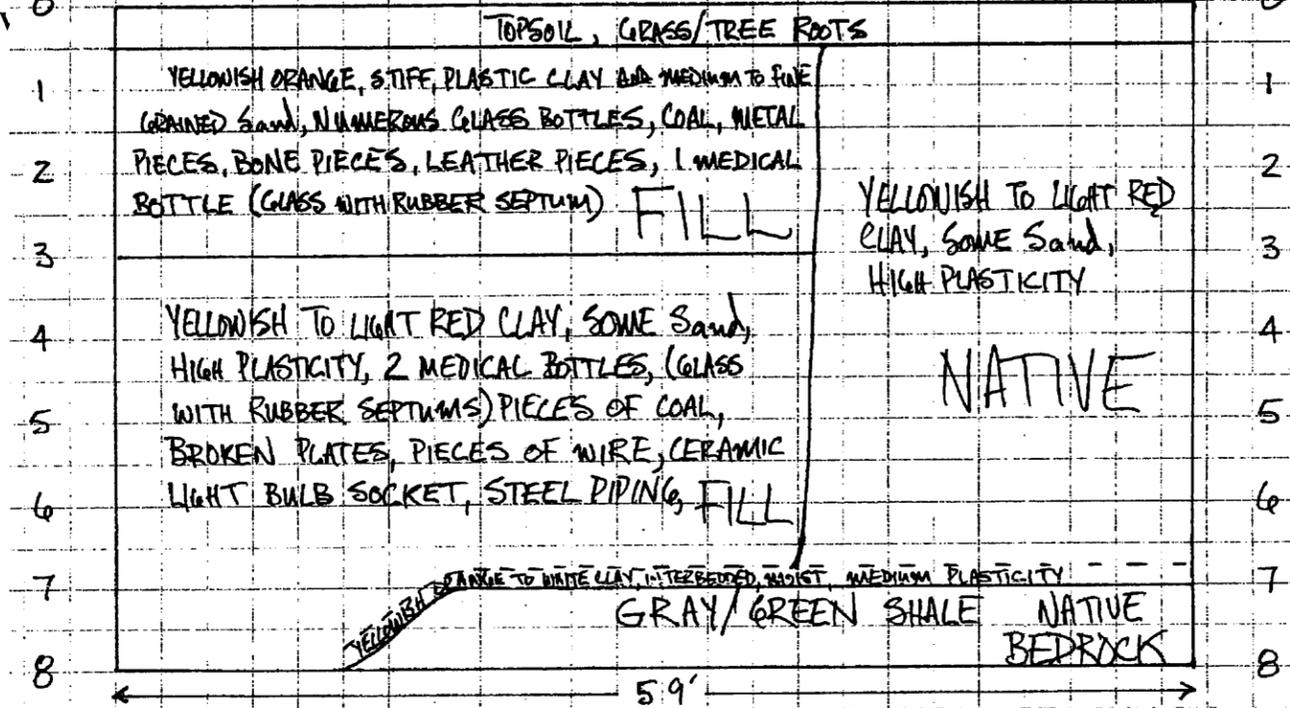


FIGURE A78-13

**LANDFILL No. 1
PARCEL 78(6)
LINE 8 TRENCH LOG
WITH CORRESPONDING GEOPHYSICAL DATA
FORT McCLELLAN**

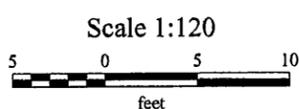
TOTAL MAGNETIC FIELD (UPPER SENSOR)
EM31 CONDUCTIVITY (VERTICAL DIPOLE)
EM31 IN-PHASE (VERTICAL DIPOLE)
LINE 8 TRENCH LOG (T78-5)

U.S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
CONTRACT NO. DACA21-96-D-0018

IT CORPORATION
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NOTE: TRENCH (T78-5) LOCATION IS
OFFSET APPROXIMATELY
25 FEET SW OF LINE 8

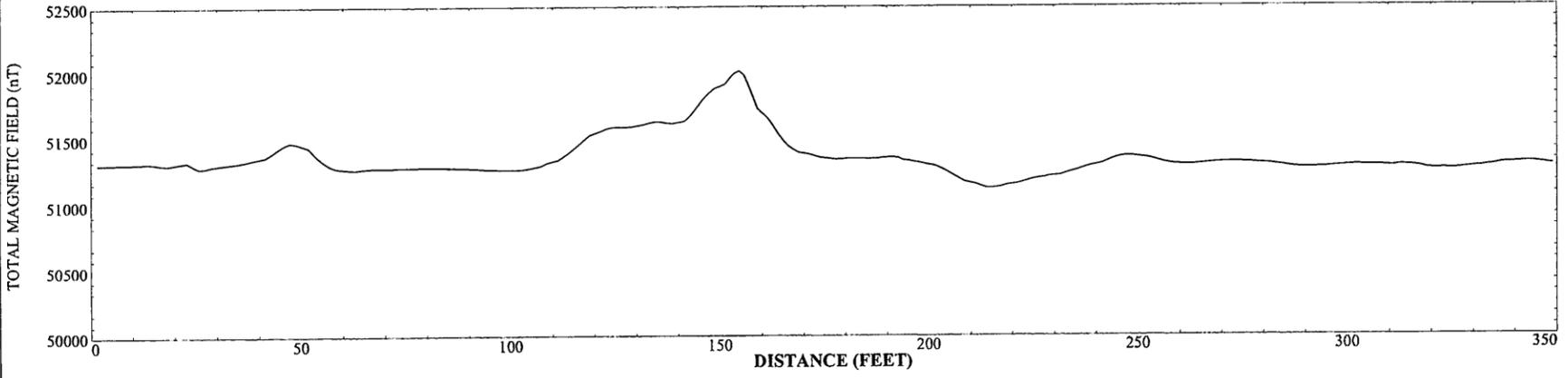
NAME: James Cox	DATE: February 27, 2001
PROJECT NUMBER: 774645	LOCATION: C:\IT\projects\FtMcClellan\Landfill\Figure13.map



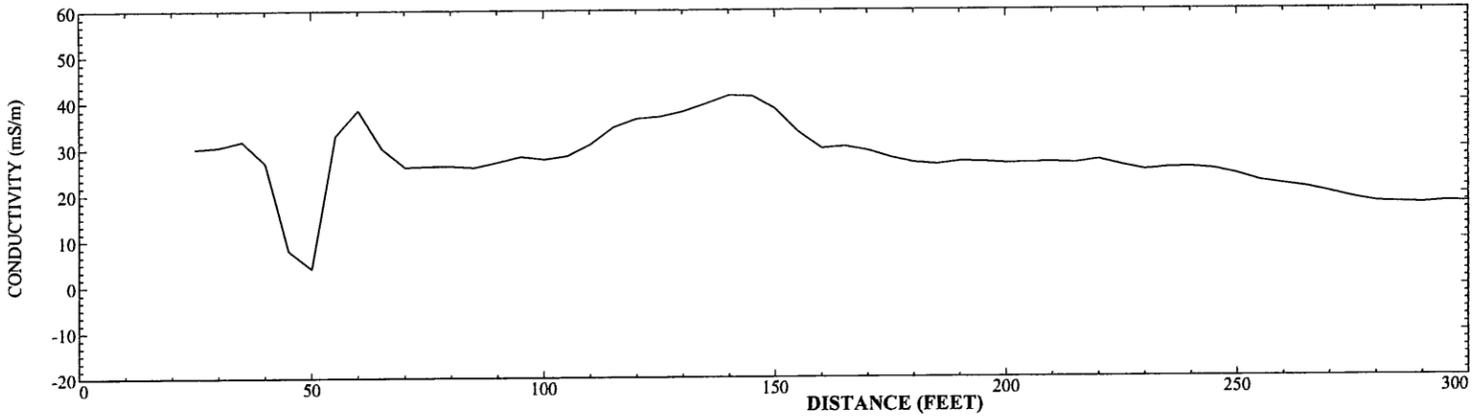
SE

NW

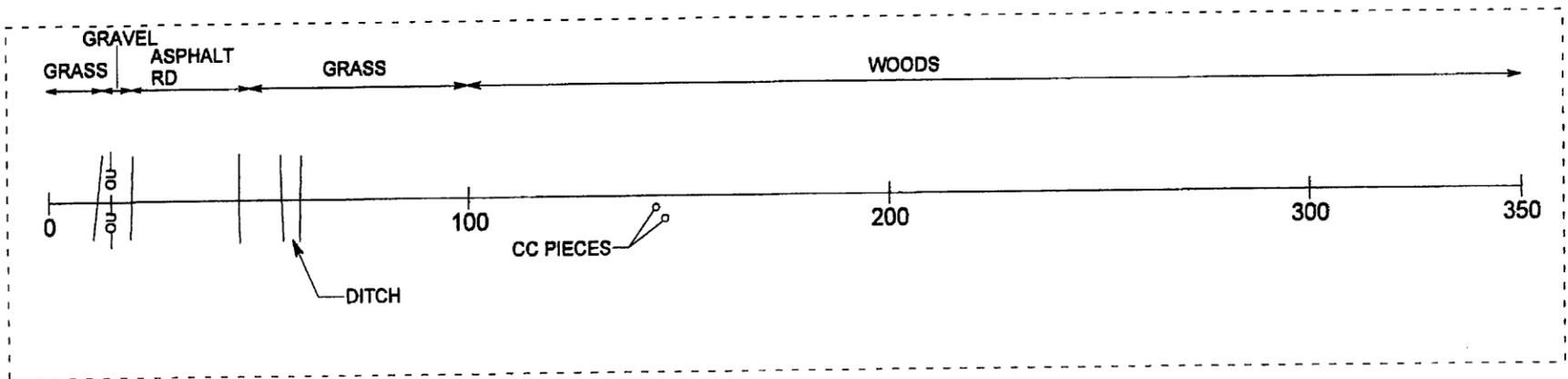
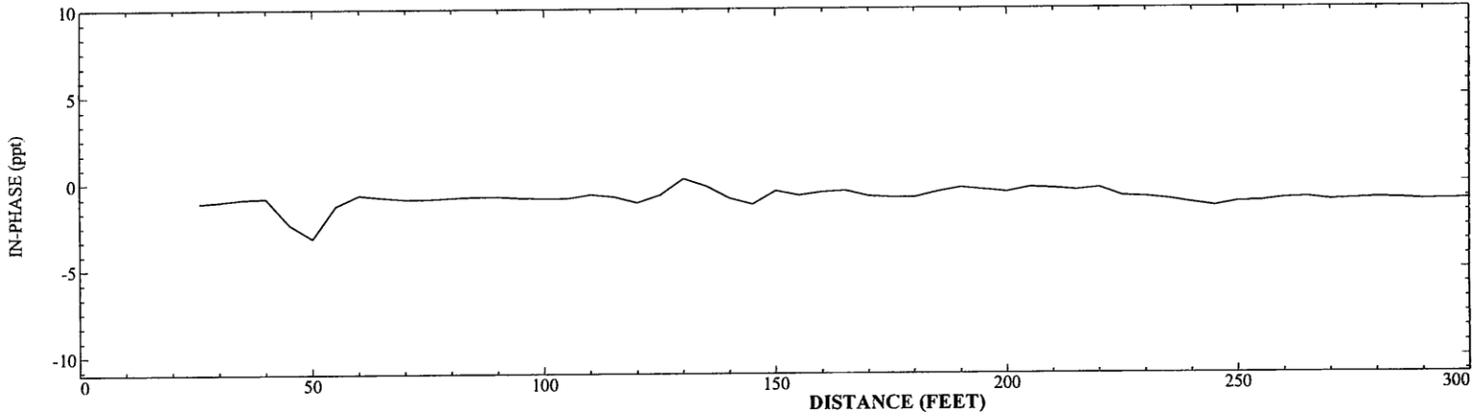
TOTAL MAGNETIC FIELD (UPPER SENSOR)



EM31 CONDUCTIVITY



EM31 IN-PHASE COMPONENT



LEGEND:

- CC CONCRETE
- OU OVERHEAD UTILITY

FIGURE A78-14

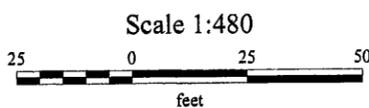
LANDFILL No. 1
 PARCEL 78(6)
 LINE 9
 FORT McCLELLAN

TOTAL MAGNETIC FIELD (UPPER SENSOR)
 EM31 CONDUCTIVITY (VERTICAL DIPOLE)
 EM31 IN-PHASE (VERTICAL DIPOLE)
 LINE 9 SITE MAP

U.S. ARMY CORPS OF ENGINEERS
 MOBILE DISTRICT
 FORT McCLELLAN
 CALHOUN COUNTY, ALABAMA
 CONTRACT NO. DACA21-96-D-0018



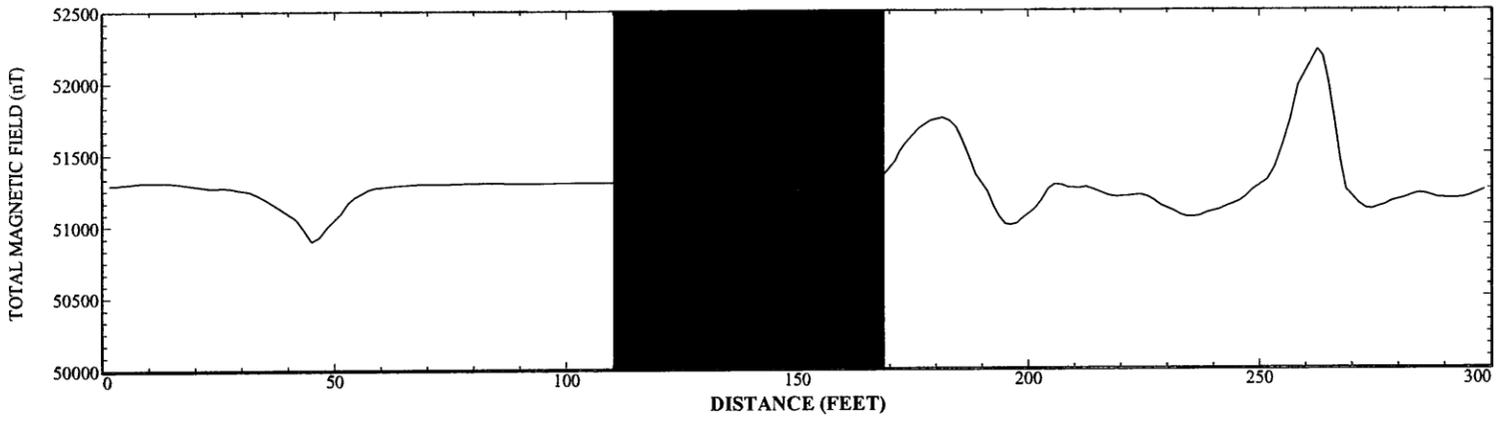
NAME: James Cox	DATE: February 27, 2001
PROJECT NUMBER: 774645	LOCATION: C:\IT\projects\FtMcClellan\Landfill\Figure14.map



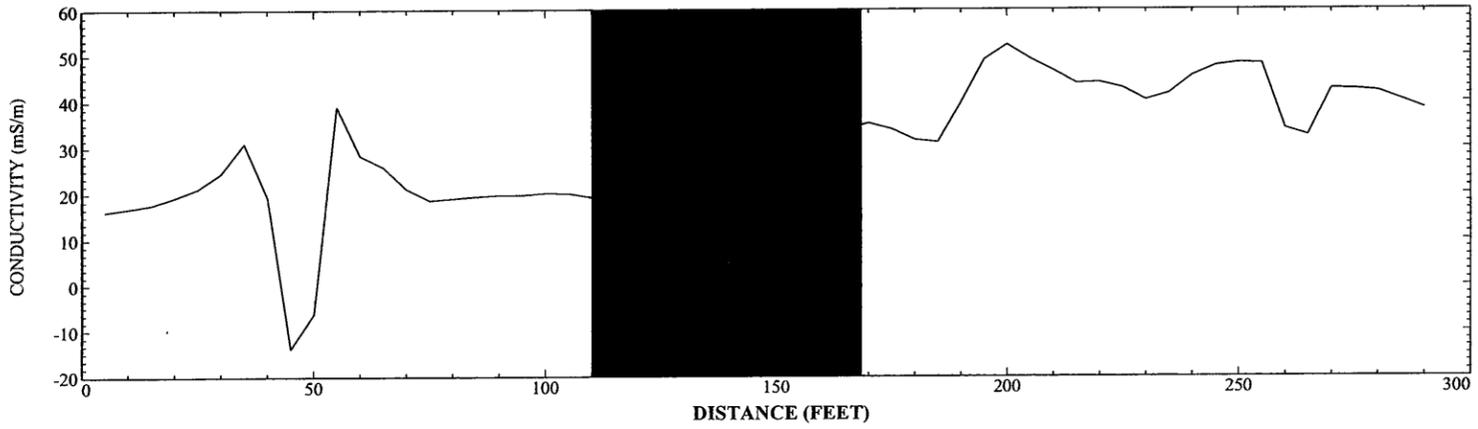
SE

NW

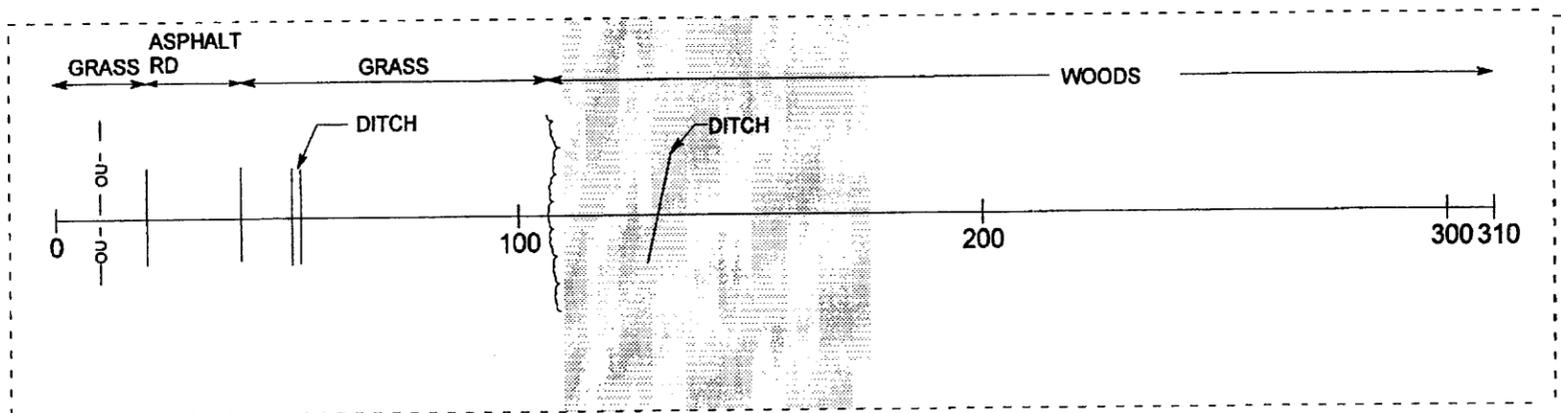
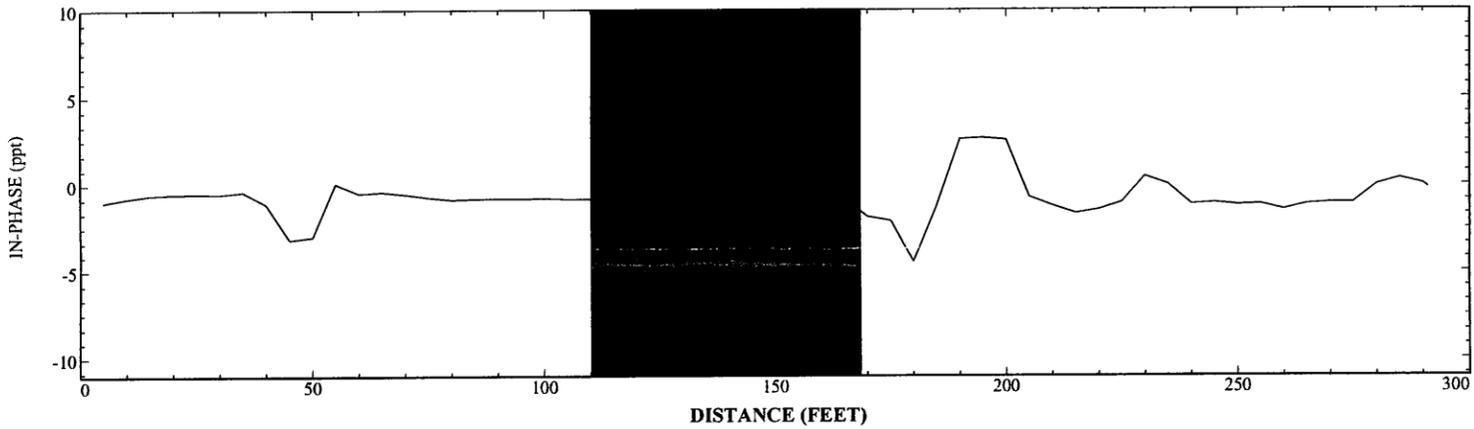
TOTAL MAGNETIC FIELD (UPPER SENSOR)



EM31 CONDUCTIVITY



EM31 IN-PHASE COMPONENT



LEGEND:

- █ LOCATION OF TRENCH (T78-4)
- OU OVERHEAD UTILITY

FIGURE A78-15

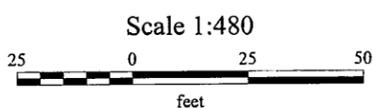
LANDFILL No. 1
 PARCEL 78(6)
 LINE 10
 FORT McCLELLAN

TOTAL MAGNETIC FIELD (UPPER SENSOR)
 EM31 CONDUCTIVITY (VERTICAL DIPOLE)
 EM31 IN-PHASE (VERTICAL DIPOLE)
 LINE 10 SITE MAP

U.S. ARMY CORPS OF ENGINEERS
 MOBILE DISTRICT
 FORT McCLELLAN
 CALHOUN COUNTY, ALABAMA
 CONTRACT NO. DACA21-96-D-0018



NAME: James Cox	DATE: February 27, 2001
PROJECT NUMBER: 774645	LOCATION: C:\ITP\projects\FtMcClellan\Landfill\Figure15.map



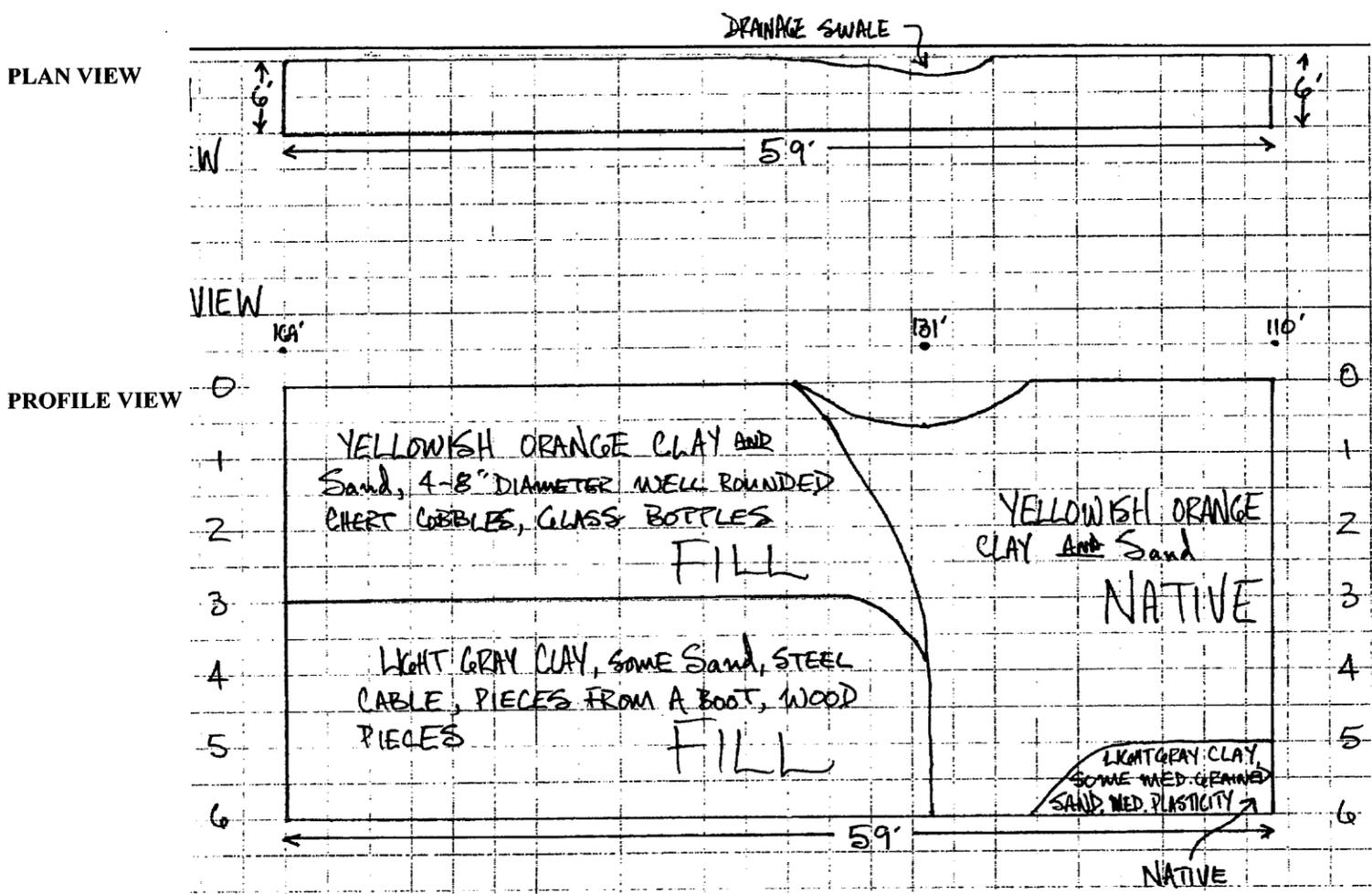
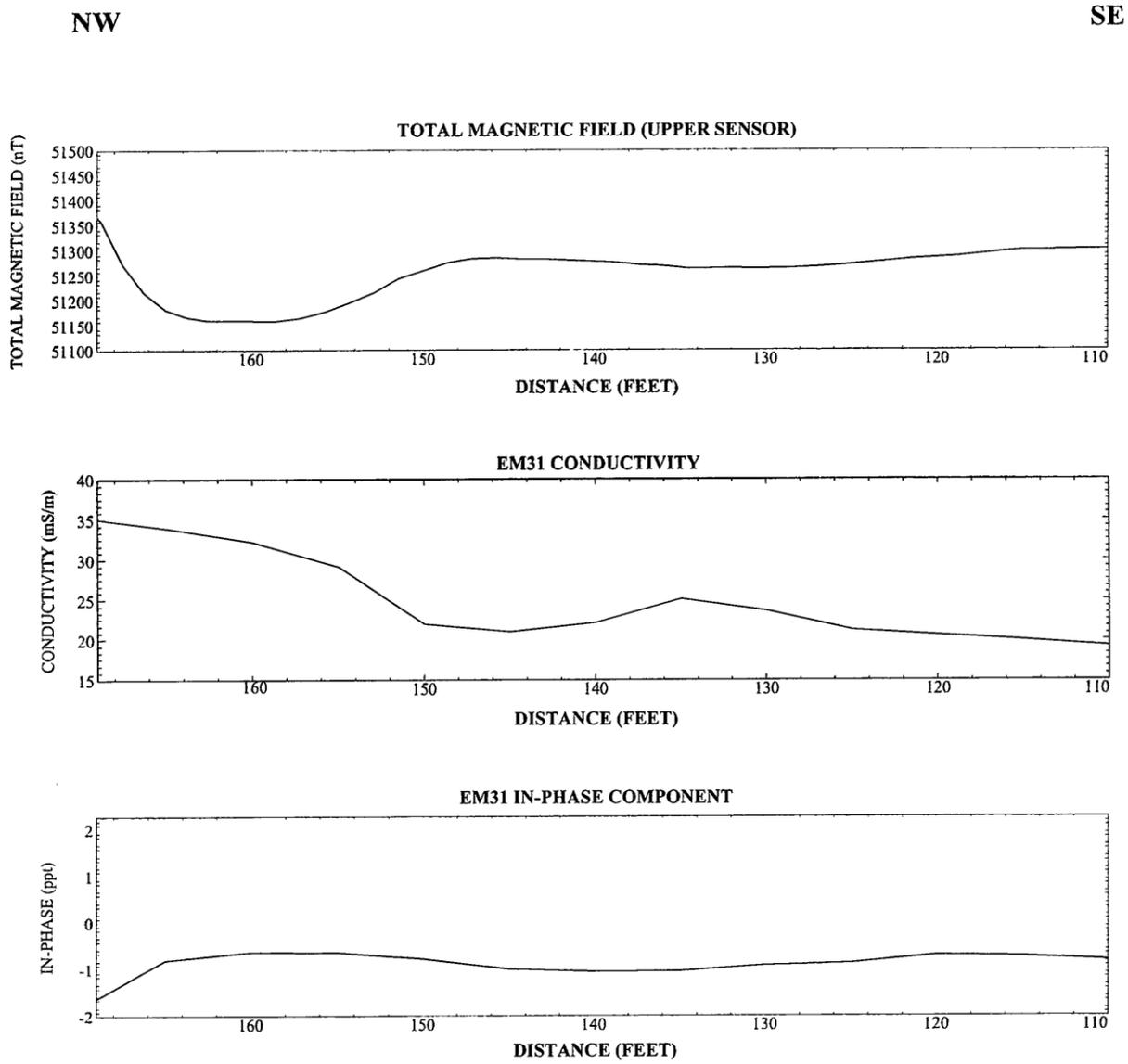


FIGURE A78-16

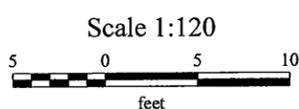
**LANDFILL No. 1
PARCEL 78(6)
LINE 10 TRENCH LOG
WITH CORRESPONDING GEOPHYSICAL DATA
FORT McCLELLAN**

TOTAL MAGNETIC FIELD (UPPER SENSOR)
EM31 CONDUCTIVITY (VERTICAL DIPOLE)
EM31 IN-PHASE (VERTICAL DIPOLE)
LINE 10 TRENCH LOG (T78-4)

U.S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
CONTRACT NO. DACA21-96-D-0018

IT CORPORATION
A Member of The IT Group

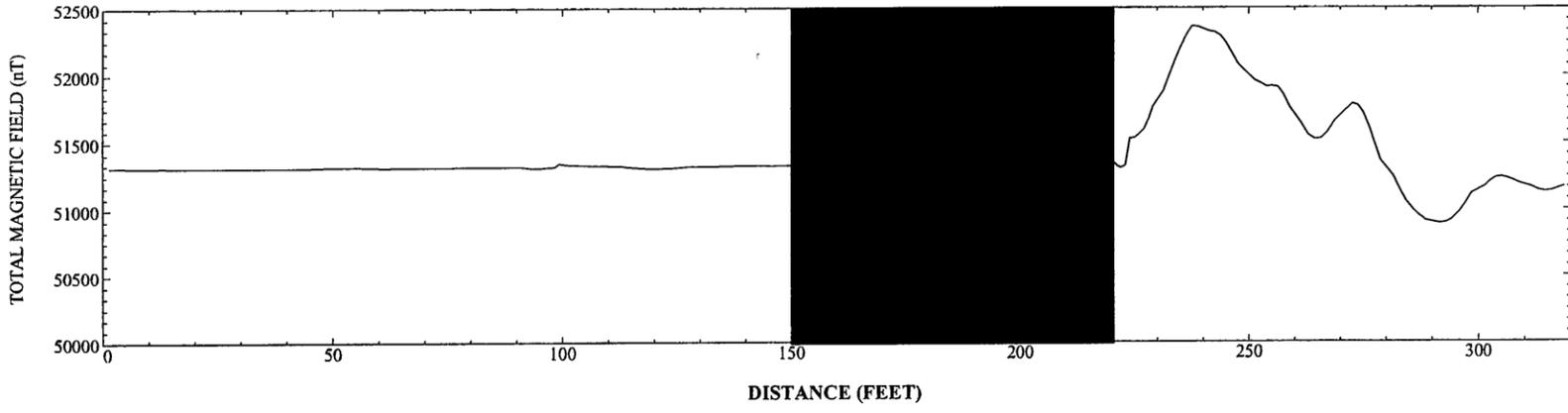
NAME: James Cox	DATE: February 27, 2001
PROJECT NUMBER: 774645	LOCATION: C:\IT\projects\FtMcClellan\Landfill\Figure16.map



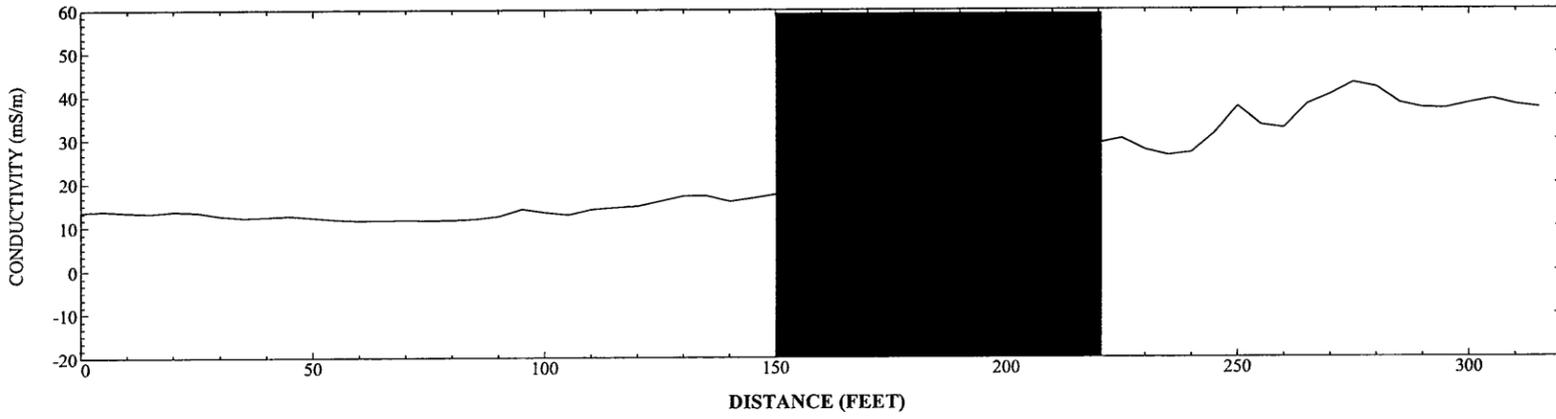
S

N

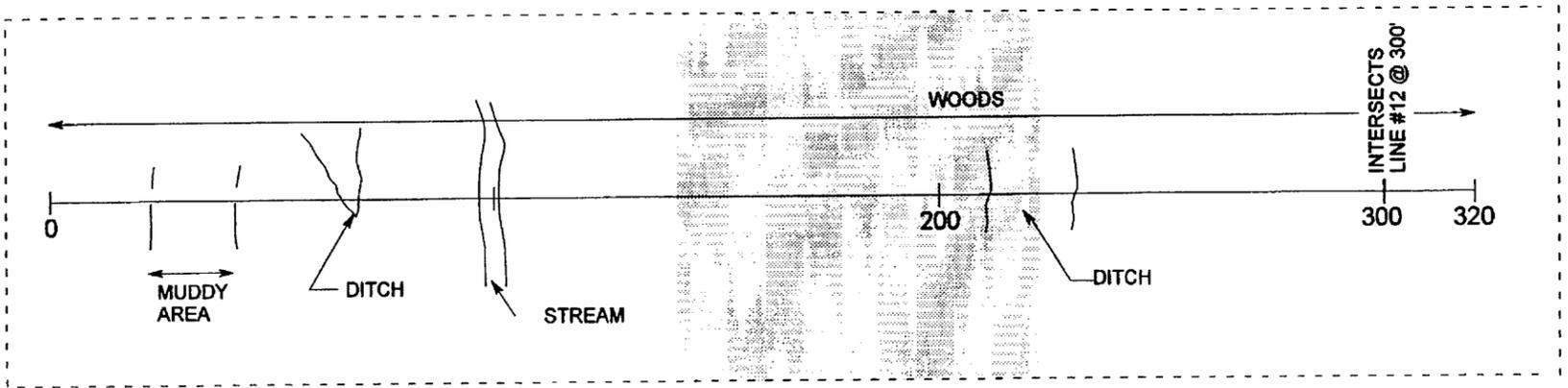
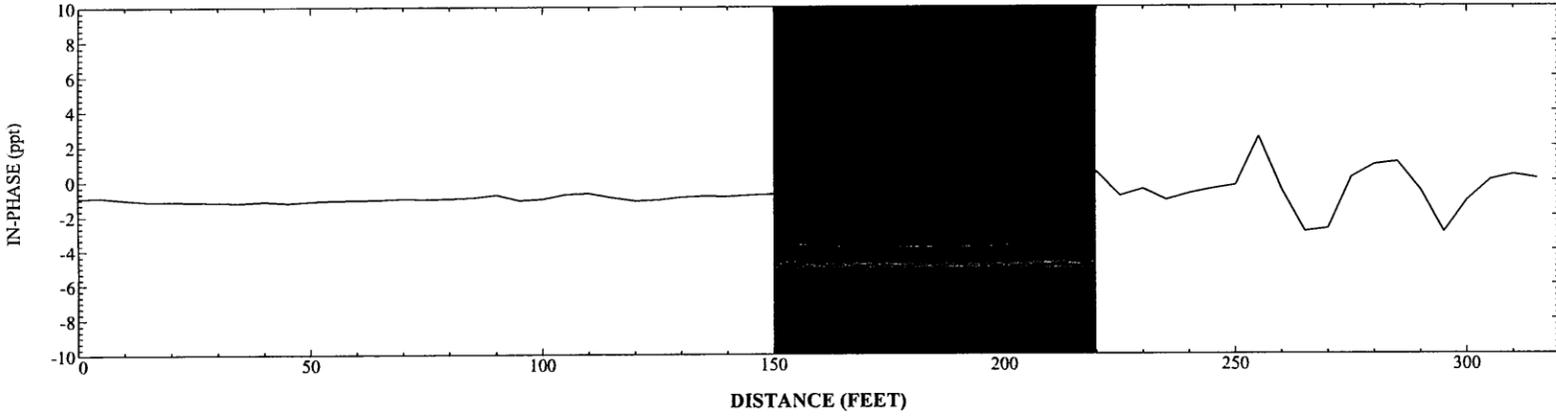
TOTAL MAGNETIC FIELD (UPPER SENSOR)



EM31 CONDUCTIVITY



EM31 IN-PHASE COMPONENT



LEGEND:

- LOCATION OF TRENCH (T78-3)
- OU OVERHEAD UTILITY

FIGURE A78-17

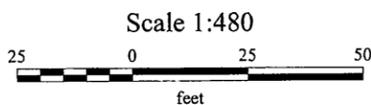
LANDFILL No. 1
 PARCEL 78(6)
 LINE 11
 FORT McCLELLAN

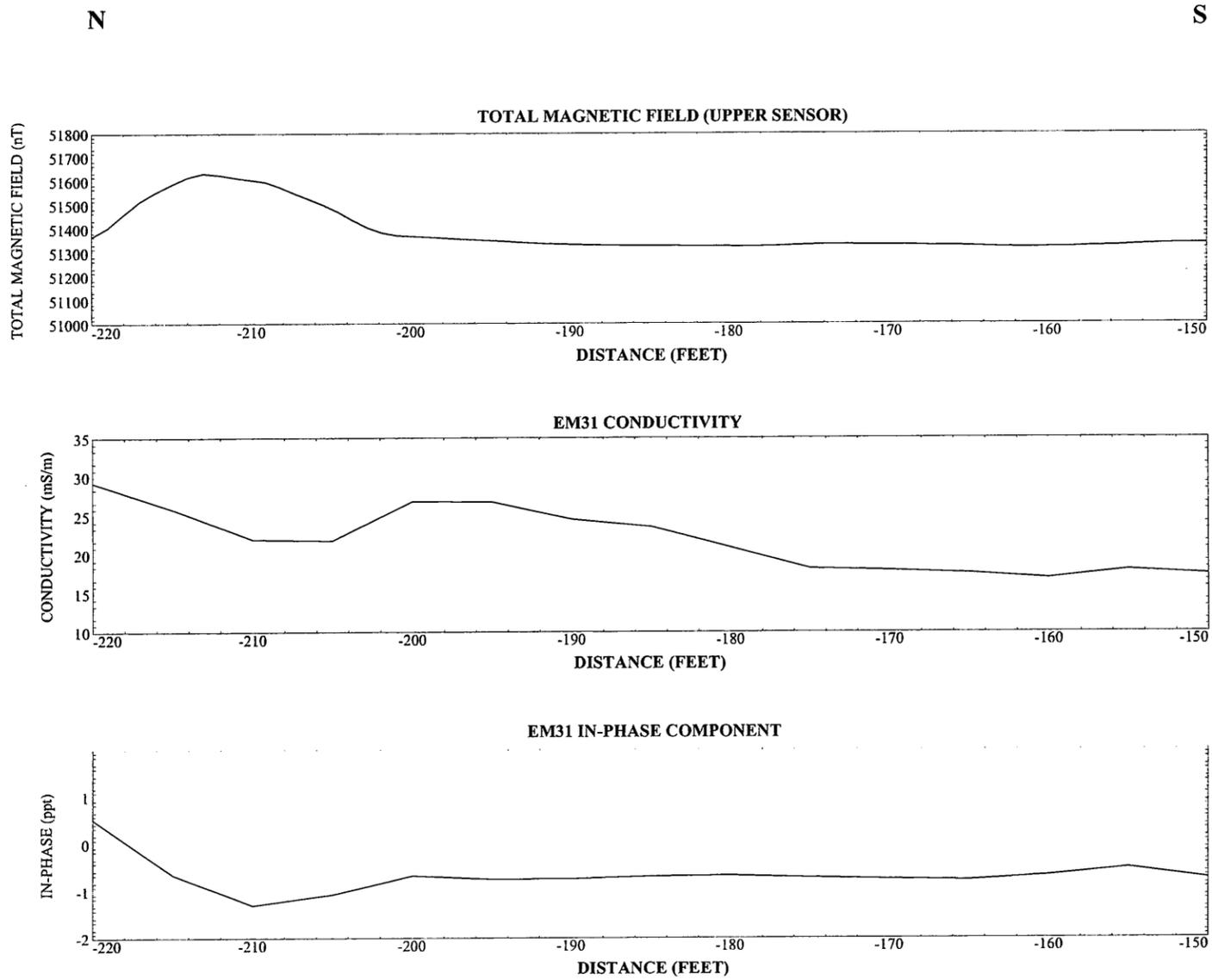
TOTAL MAGNETIC FIELD (UPPER SENSOR)
 EM31 CONDUCTIVITY (VERTICAL DIPOLE)
 EM31 IN-PHASE (VERTICAL DIPOLE)
 LINE 11 SITE MAP

U.S. ARMY CORPS OF ENGINEERS
 MOBILE DISTRICT
 FORT McCLELLAN
 CALHOUN COUNTY, ALABAMA
 CONTRACT NO. DACA21-96-D-0018

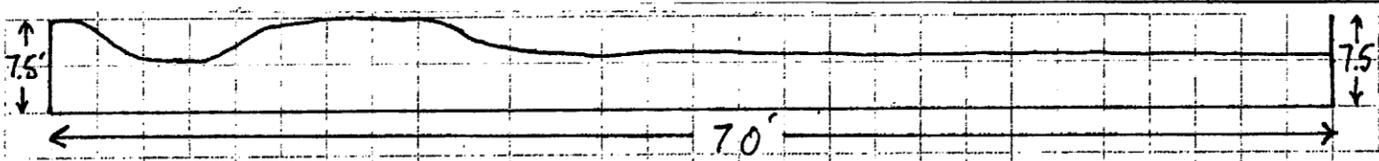


NAME: James Cox	DATE: February 27, 2001
PROJECT NUMBER: 774645	LOCATION: C:\IT\Projects\FtMcClellan\Landfill\Figure17.map





PLAN VIEW



PROFILE VIEW

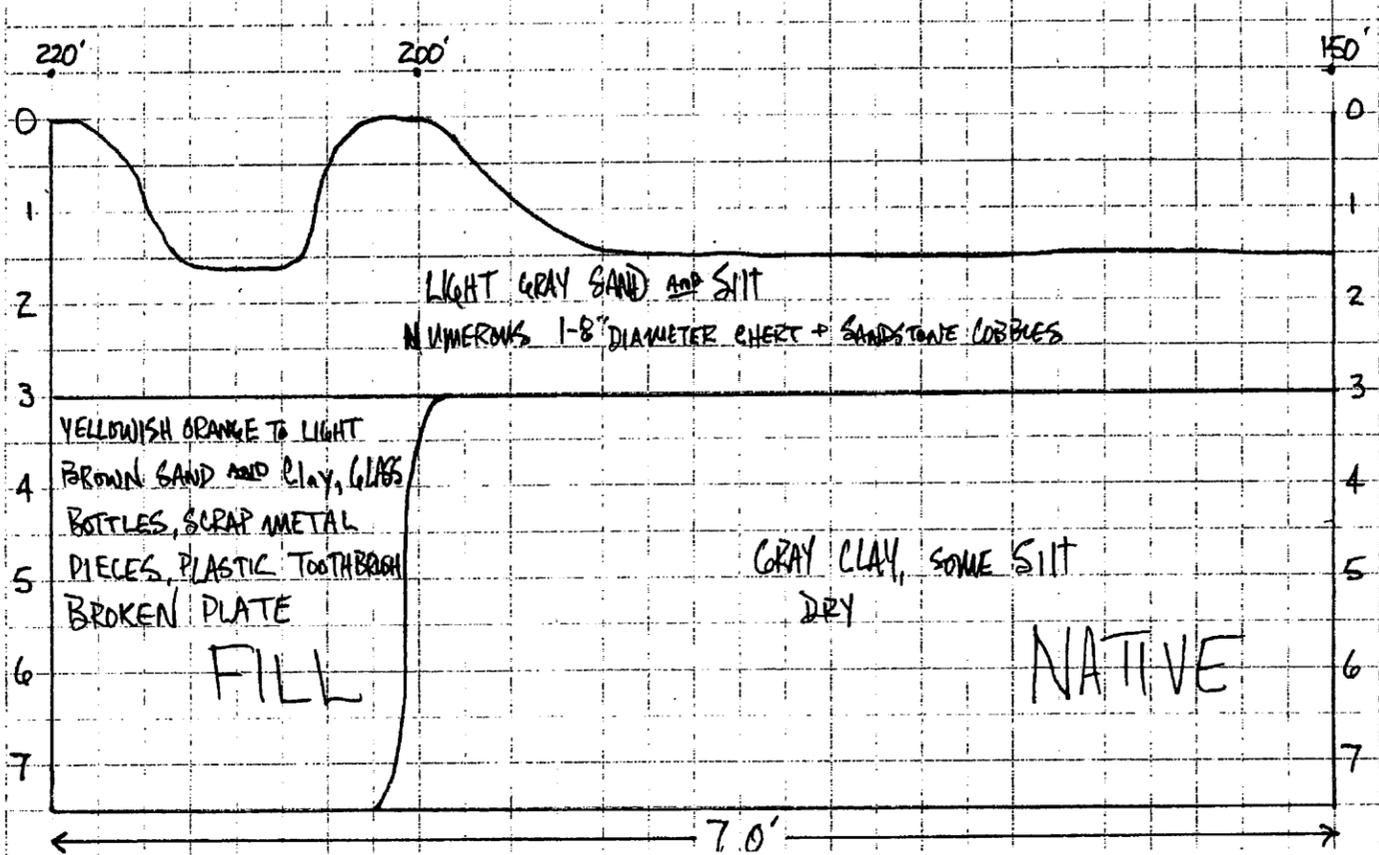


FIGURE A78-18

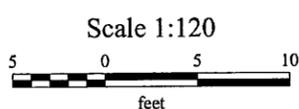
**LANDFILL No. 1
PARCEL 78(6)
LINE 11 TRENCH LOG
WITH CORRESPONDING GEOPHYSICAL DATA
FORT McCLELLAN**

TOTAL MAGNETIC FIELD (UPPER SENSOR)
EM31 CONDUCTIVITY (VERTICAL DIPOLE)
EM31 IN-PHASE (VERTICAL DIPOLE)
LINE 11 TRENCH LOG (T78-3)

U.S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
CONTRACT NO. DACA21-96-D-0018

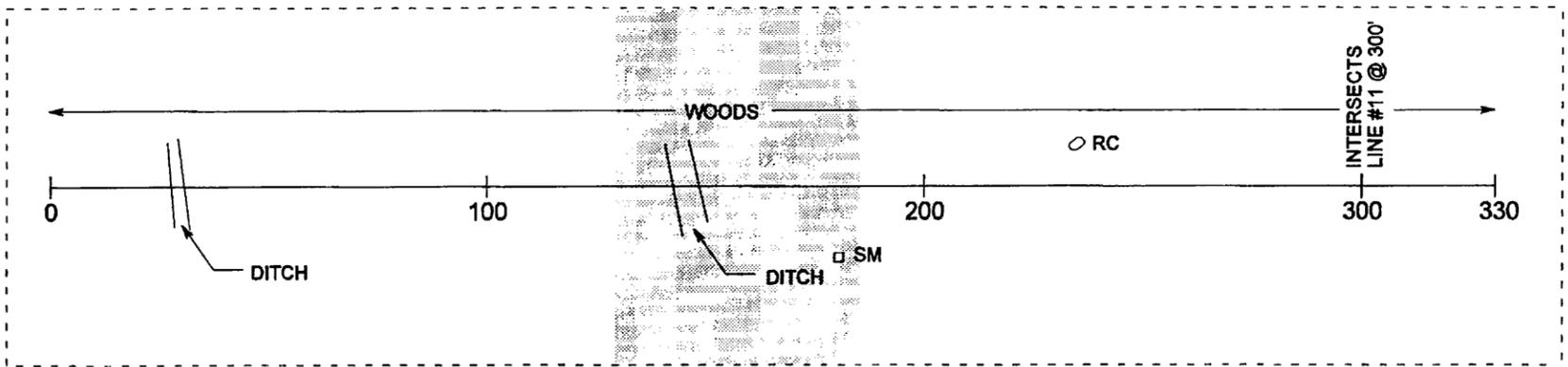
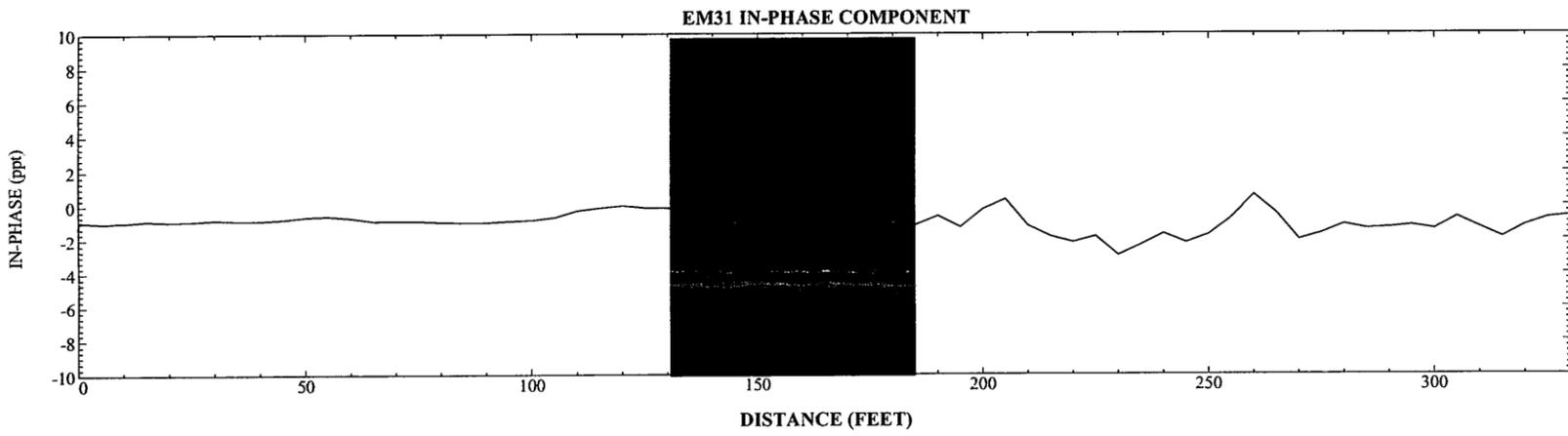
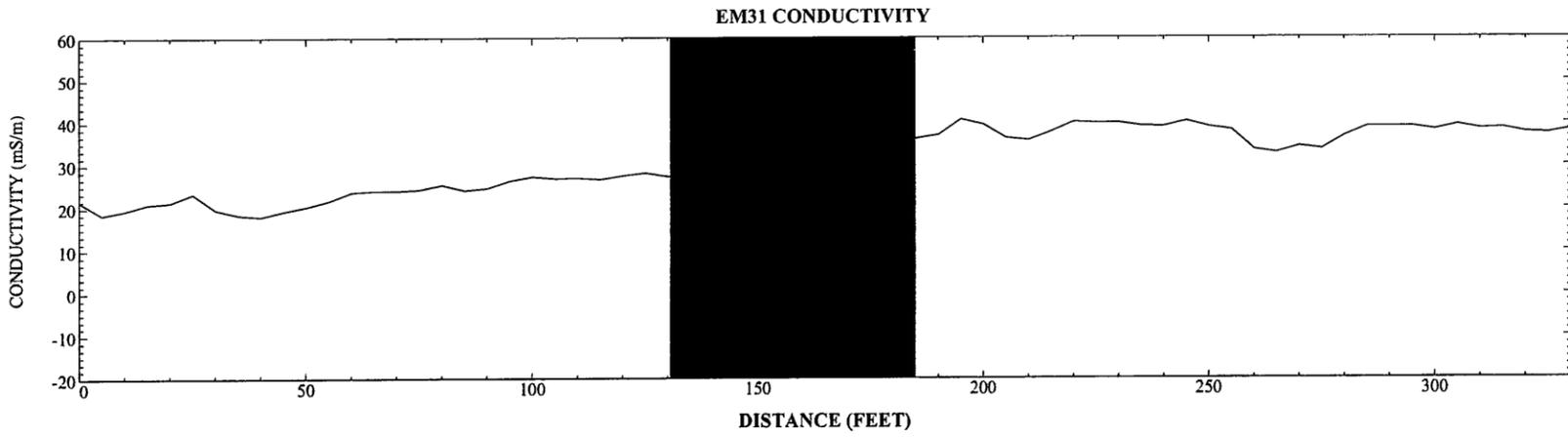
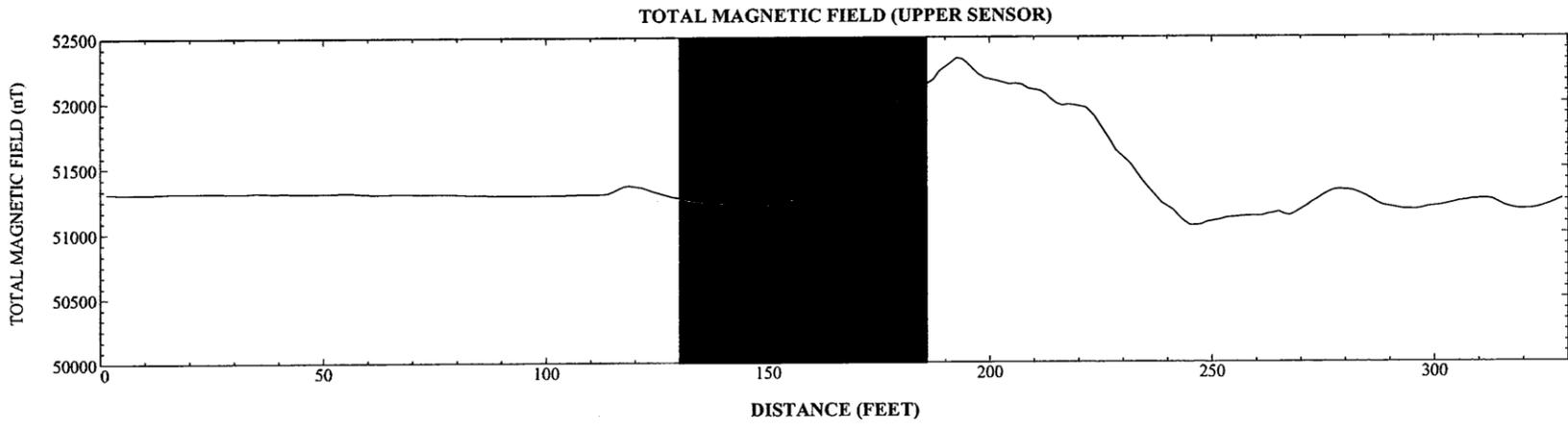
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NAME: James Cox	DATE: February 27, 2001
PROJECT NUMBER: 774645	LOCATION: C:\ATP\projects\FtMcClellan\Landfill1\Figure18.map



W

E



LEGEND:

- LOCATION OF TRENCH (T78-2)
- RC REINFORCED CONCRETE
- SM SURFACE METAL

FIGURE A78-19

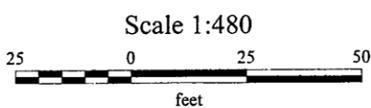
LANDFILL No. 1
 PARCEL 78(6)
 LINE 12
 FORT McCLELLAN

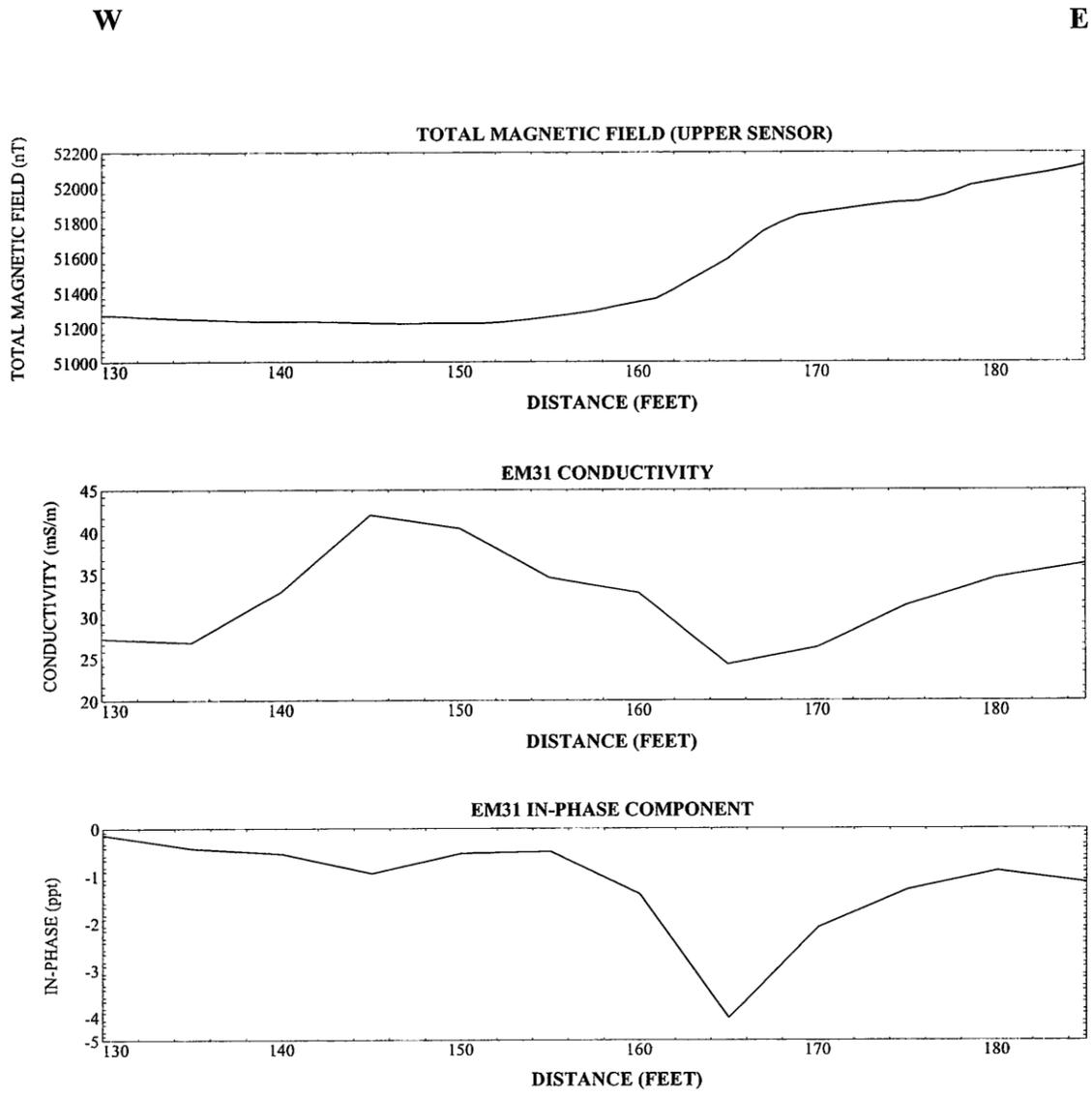
TOTAL MAGNETIC FIELD (UPPER SENSOR)
 EM31 CONDUCTIVITY (VERTICAL DIPOLE)
 EM31 IN-PHASE (VERTICAL DIPOLE)
 LINE 12 SITE MAP

U.S. ARMY CORPS OF ENGINEERS
 MOBILE DISTRICT
 FORT McCLELLAN
 CALHOUN COUNTY, ALABAMA
 CONTRACT NO. DACA21-96-D-0018

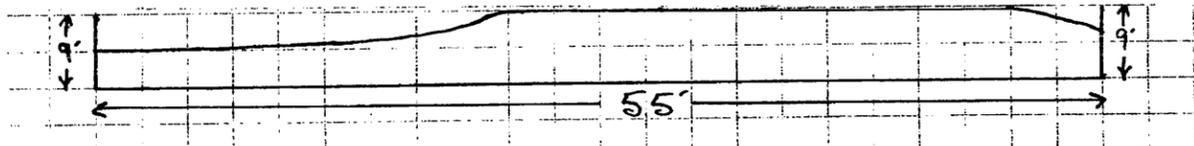


NAME: James Cox	DATE: February 27, 2001
PROJECT NUMBER: 774645	LOCATION: C:\IT\projects\FtMcClellan\Landfill\FIGURE19.map





PLAN VIEW



PROFILE VIEW

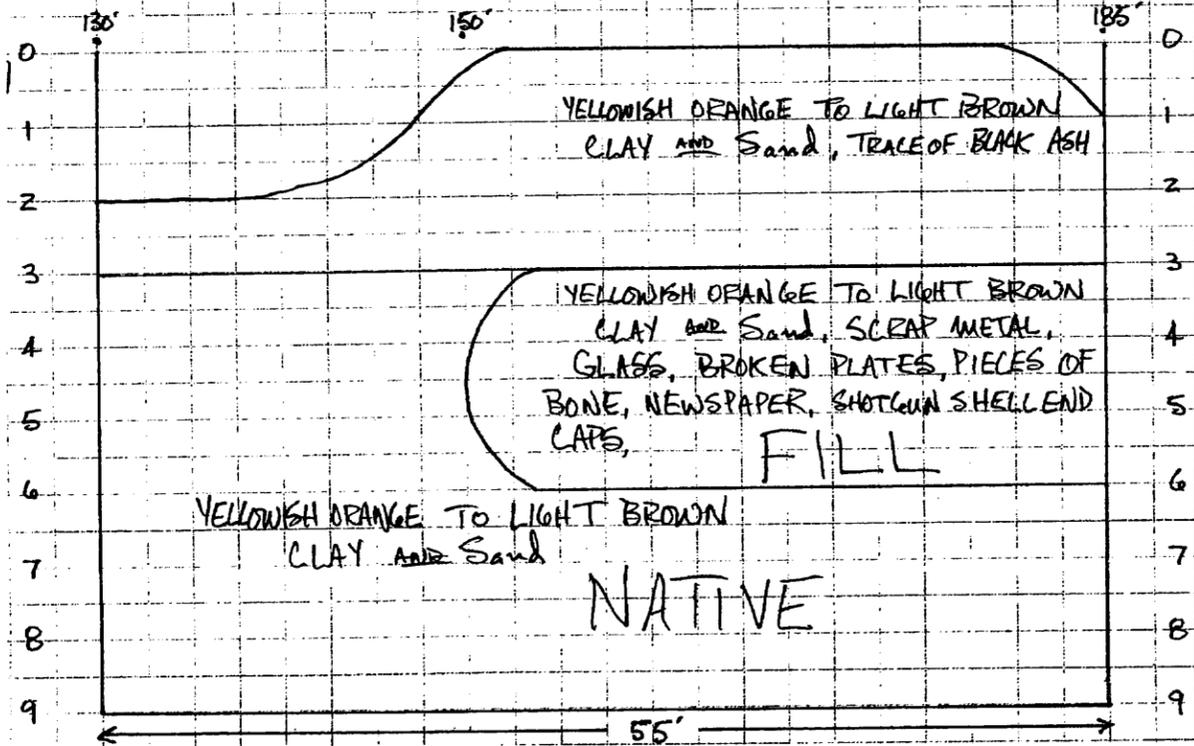


FIGURE A78-20

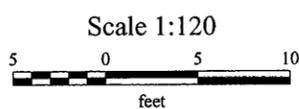
**LANDFILL No. 1
PARCEL 78(6)
LINE 12 TRENCH LOG
WITH CORRESPONDING GEOPHYSICAL DATA
FORT McCLELLAN**

TOTAL MAGNETIC FIELD (UPPER SENSOR)
EM31 CONDUCTIVITY (VERTICAL DIPOLE)
EM31 IN-PHASE (VERTICAL DIPOLE)
LINE 12 TRENCH LOG (T78-2)

U.S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
CONTRACT NO. DACA21-96-D-0018



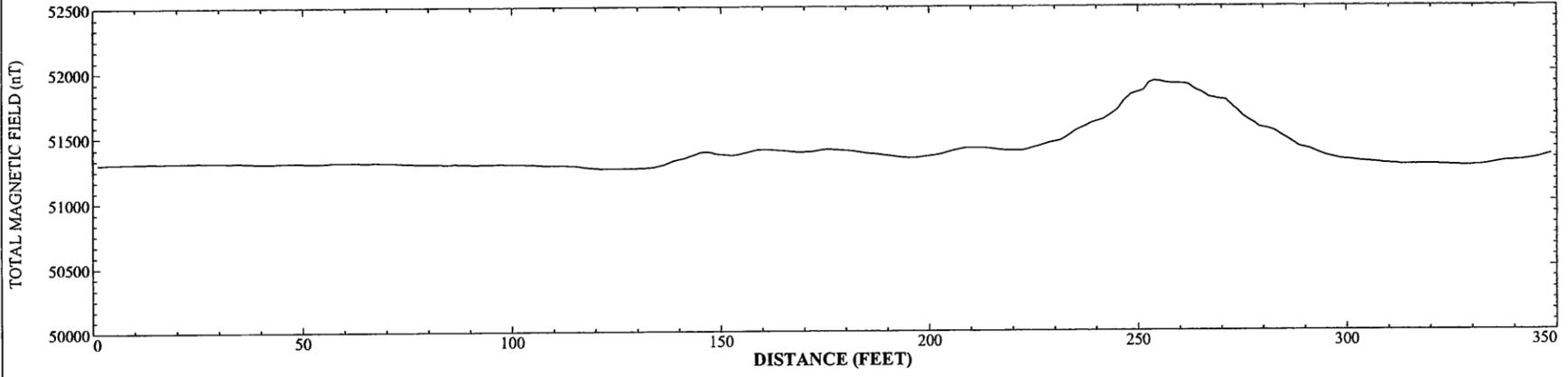
NAME: James Cox	DATE: February 27, 2001
PROJECT NUMBER: 774645	LOCATION: C:\ITP\projects\FtMcClellan\Landfill\Figure20.map



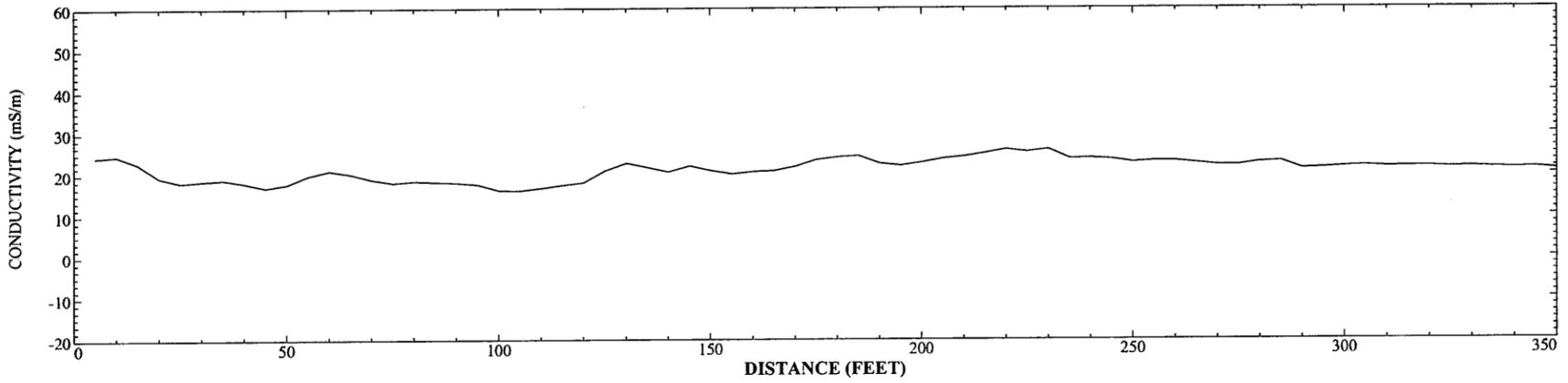
W

E

TOTAL MAGNETIC FIELD (UPPER SENSOR)



EM31 CONDUCTIVITY



EM31 IN-PHASE COMPONENT

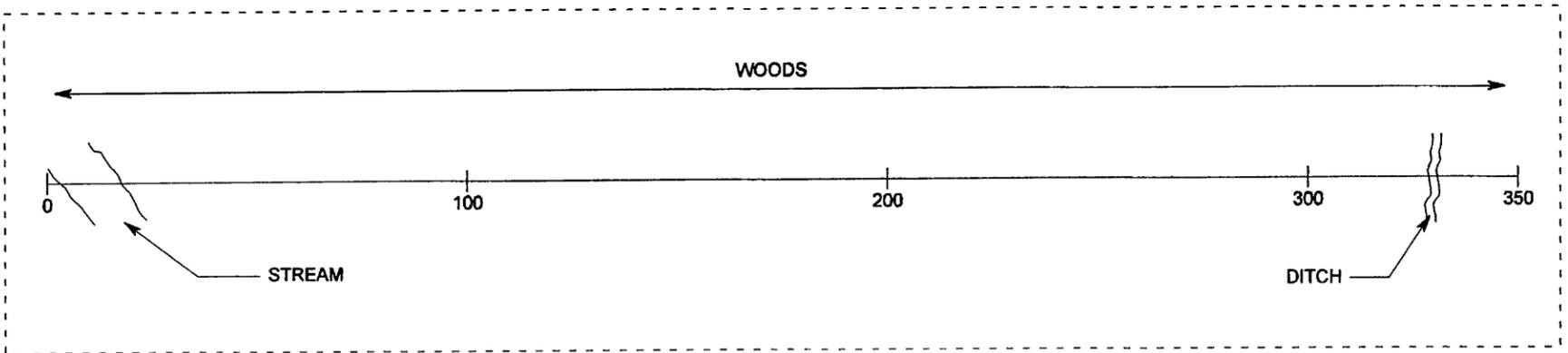
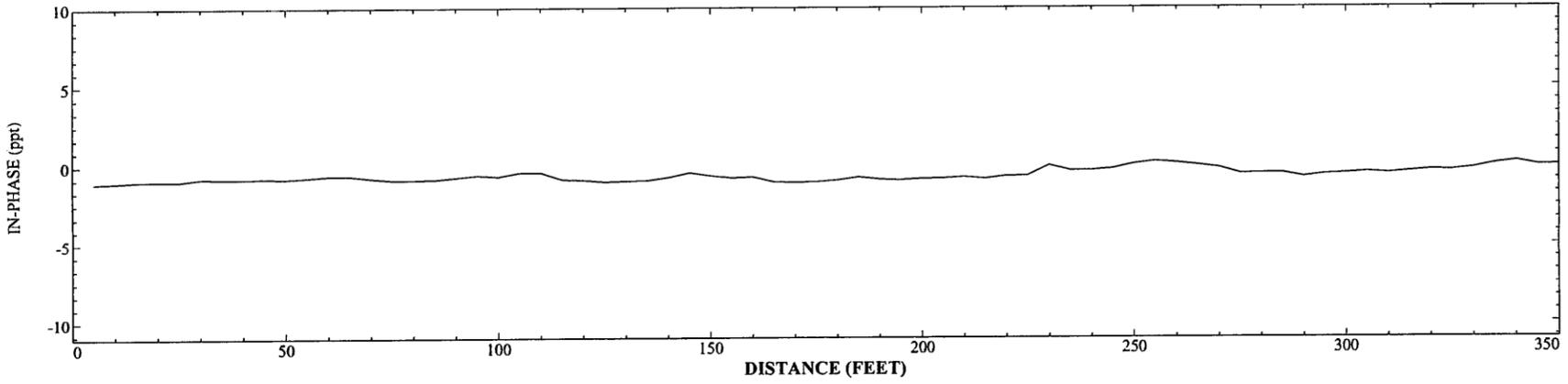


FIGURE A78-21

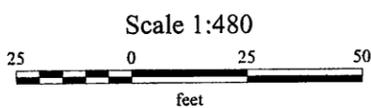
LANDFILL No. 1
 PARCEL 78(6)
 LINE 13
 FORT McCLELLAN

TOTAL MAGNETIC FIELD (UPPER SENSOR)
 EM31 CONDUCTIVITY (VERTICAL DIPOLE)
 EM31 IN-PHASE (VERTICAL DIPOLE)
 LINE 13 SITE MAP

U.S. ARMY CORPS OF ENGINEERS
 MOBILE DISTRICT
 FORT McCLELLAN
 CALHOUN COUNTY, ALABAMA
 CONTRACT NO. DACA21-96-D-0018

IT CORPORATION
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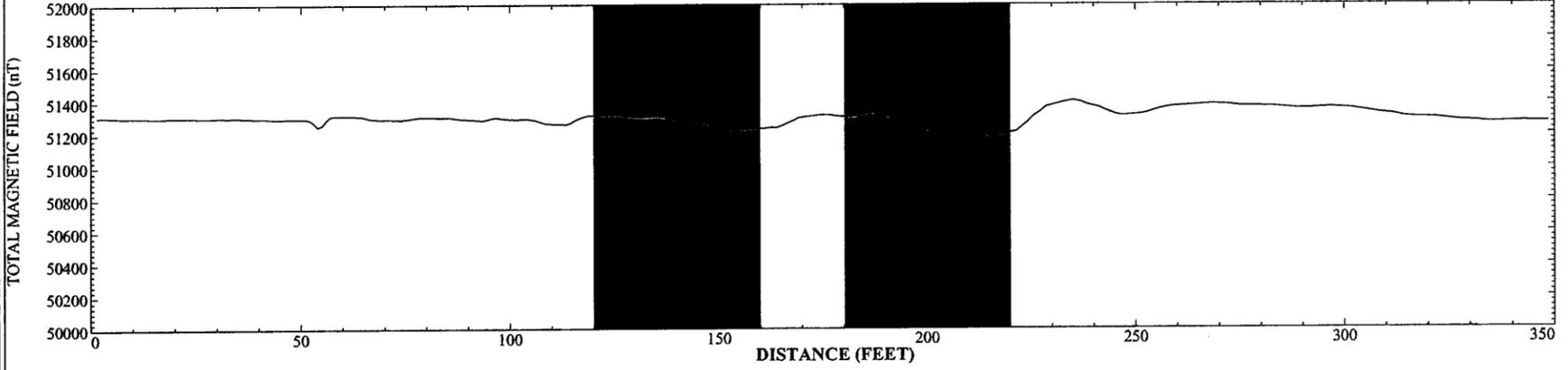
NAME: James Cox	DATE: February 27, 2001
PROJECT NUMBER: 774645	LOCATION: C:\IT\projects\FtMcClellan\Landfill\Figure21.map



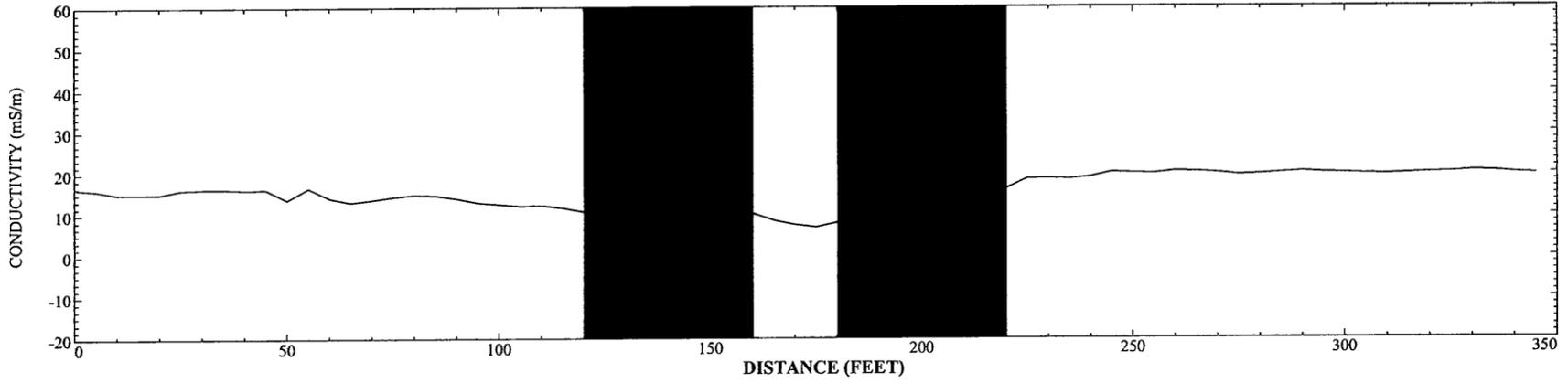
NW

SE

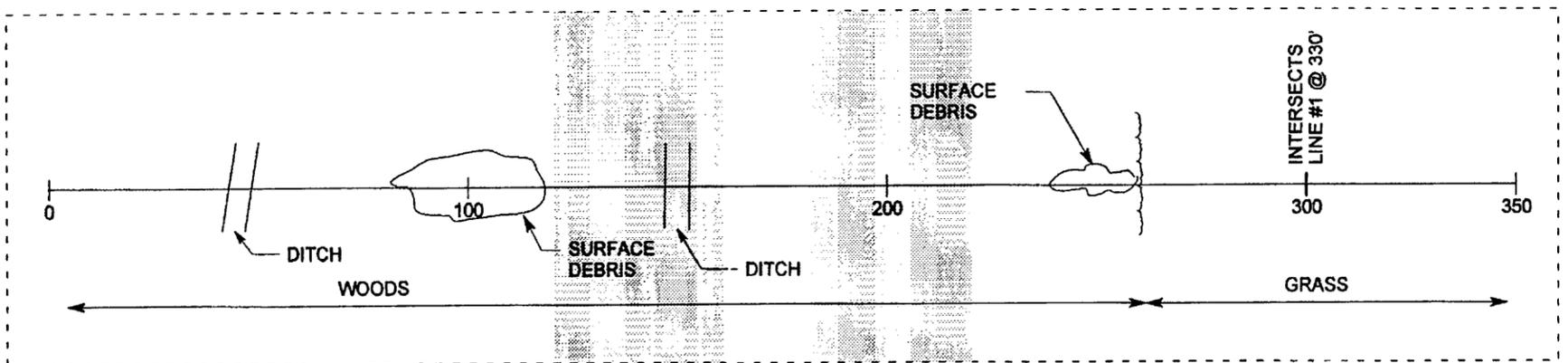
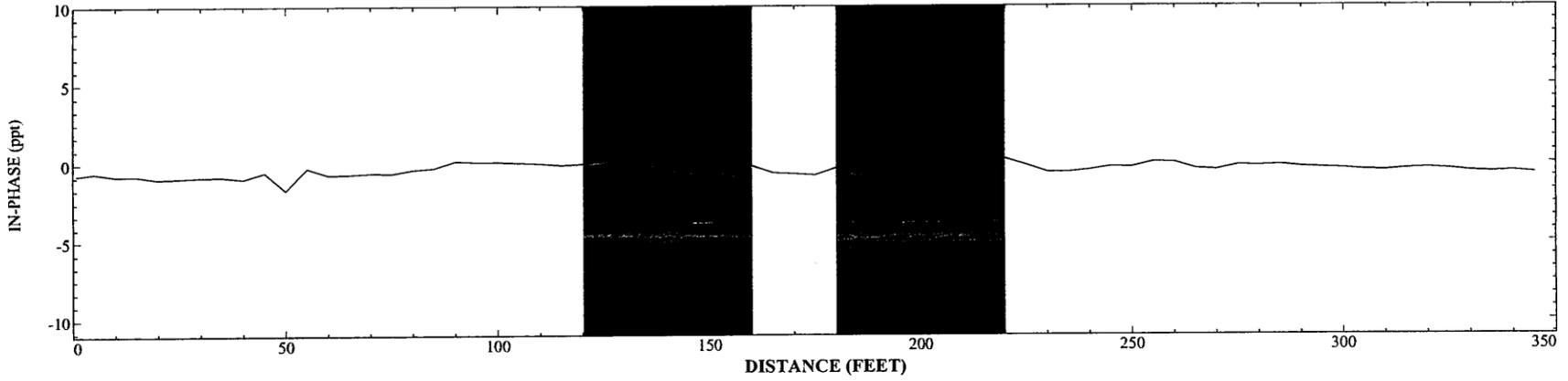
TOTAL MAGNETIC FIELD (UPPER SENSOR)



EM31 CONDUCTIVITY



EM31 IN-PHASE COMPONENT



LEGEND:

■ LOCATION OF TRENCH (T78-1)

FIGURE A78-22

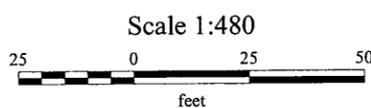
LANDFILL No. 1
PARCEL 78(6)
LINE 14
FORT McCLELLAN

TOTAL MAGNETIC FIELD (UPPER SENSOR)
EM31 CONDUCTIVITY (VERTICAL DIPOLE)
EM31 IN-PHASE (VERTICAL DIPOLE)
LINE 14 SITE MAP

U.S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
CONTRACT NO. DACA21-96-D-0018

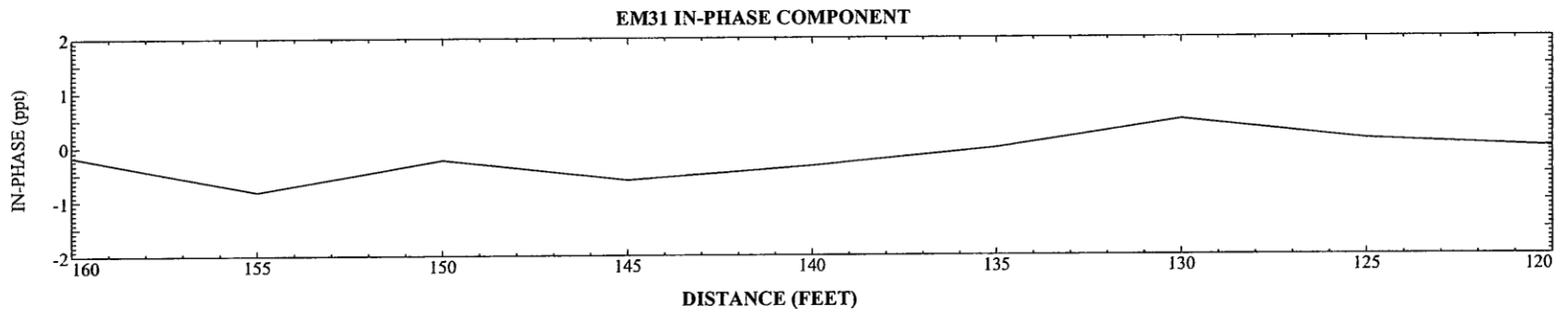
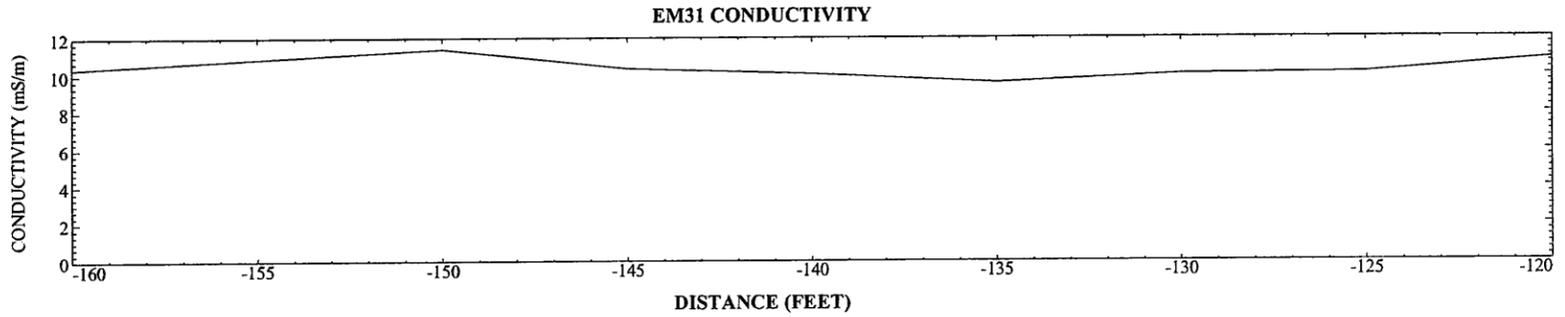
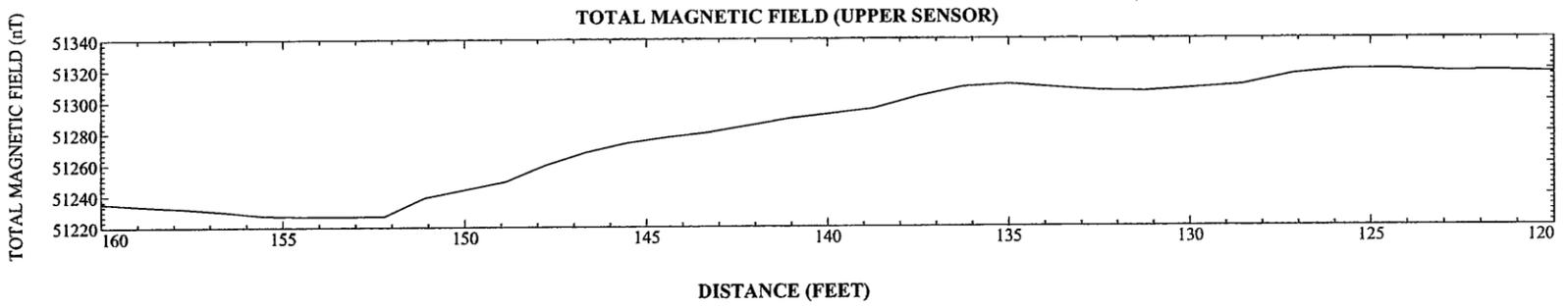
IT CORPORATION
A Member of The IT Group

NAME: James Cox	DATE: February 27, 2001
PROJECT NUMBER: 774645	LOCATION: C:\MTP\projects\FtMcClellan\Landfill1\Figure22.map

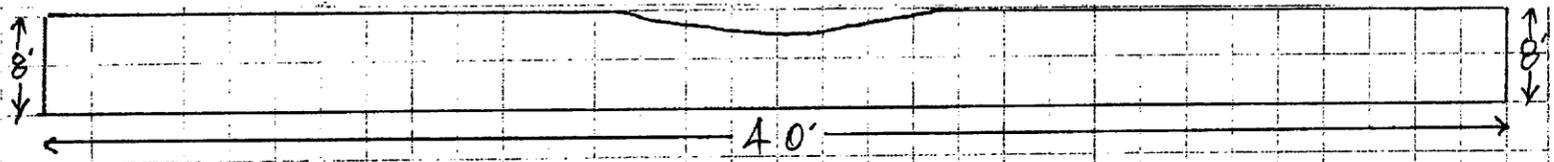


SE

NW



PLAN VIEW



PROFILE VIEW

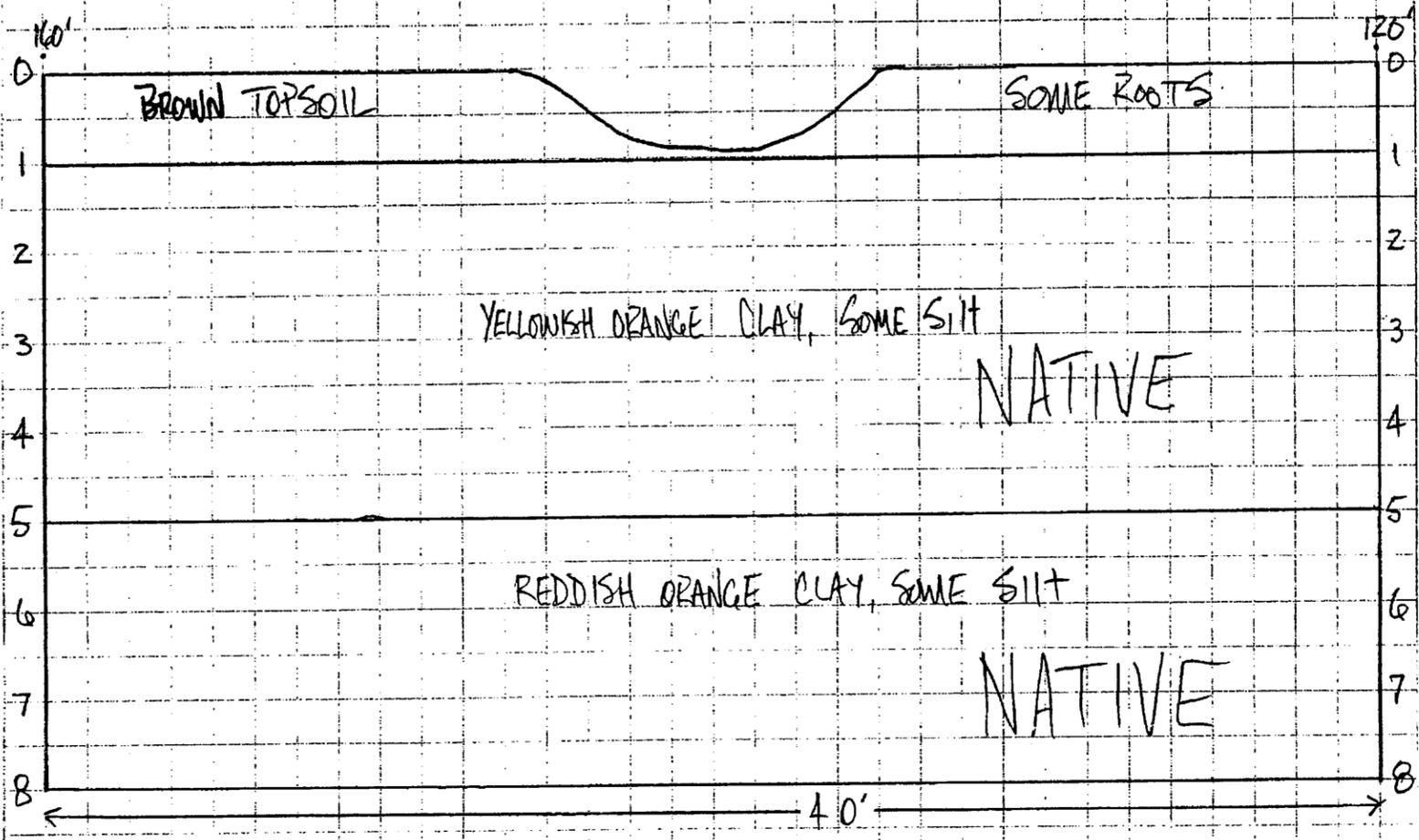


FIGURE A78-23

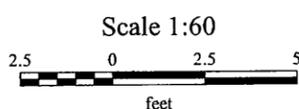
LANDFILL No. 1
 PARCEL 78(6)
 LINE 14 TRENCH LOG
 WITH CORRESPONDING GEOPHYSICAL DATA
 FORT McCLELLAN

TOTAL MAGNETIC FIELD (UPPER SENSOR)
 EM31 CONDUCTIVITY (VERTICAL DIPOLE)
 EM31 IN-PHASE (VERTICAL DIPOLE)
 LINE 14 TRENCH LOG (T78-1)

U.S. ARMY CORPS OF ENGINEERS
 MOBILE DISTRICT
 FORT McCLELLAN
 CALHOUN COUNTY, ALABAMA
 CONTRACT NO. DACA21-96-D-0018

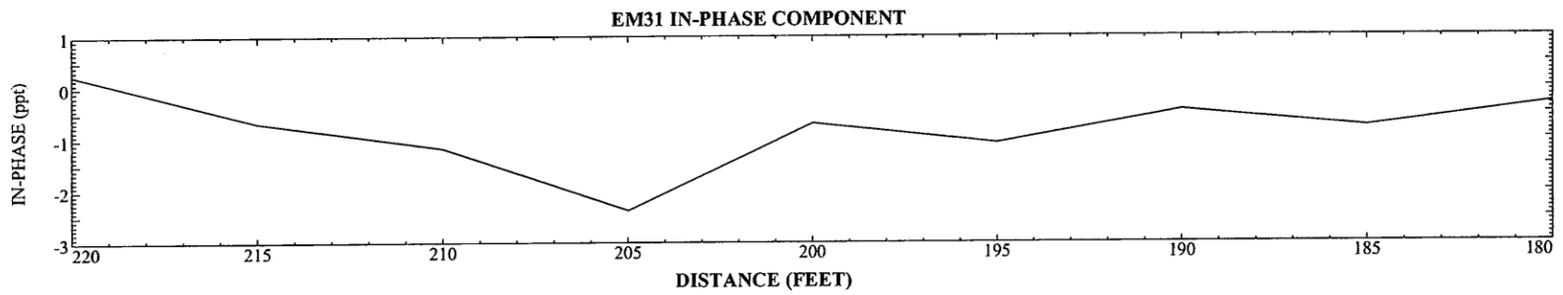
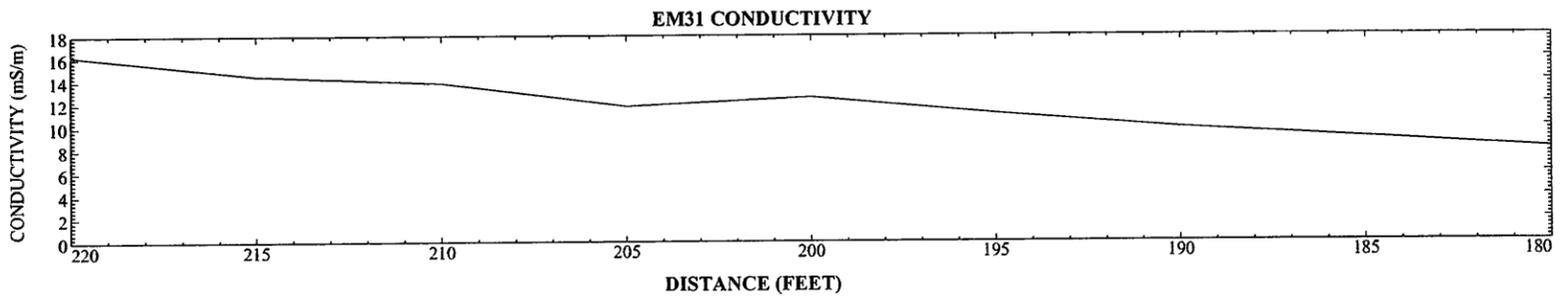
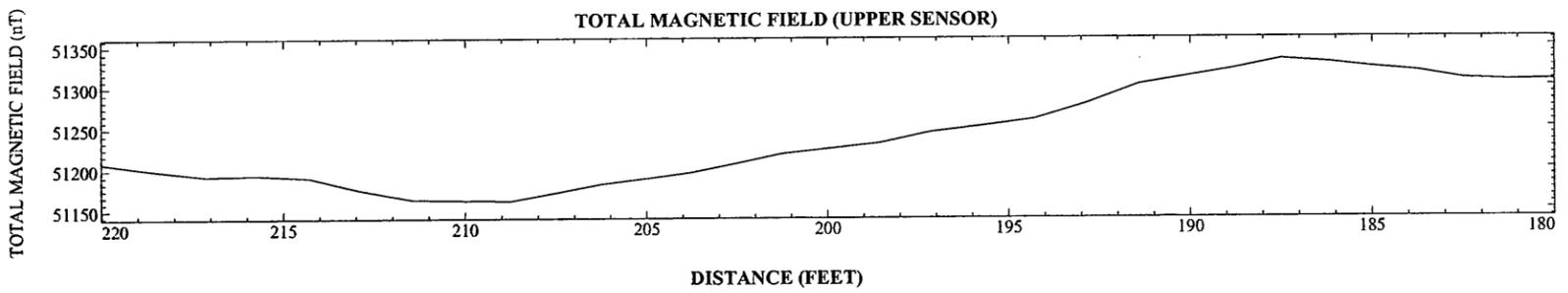
IT CORPORATION
 A Member of The IT Group

NAME: James Cox	DATE: February 27, 2001
PROJECT NUMBER: 774645	LOCATION: C:\MTP\projects\FtMcClellan\Landfill\Figure23.map

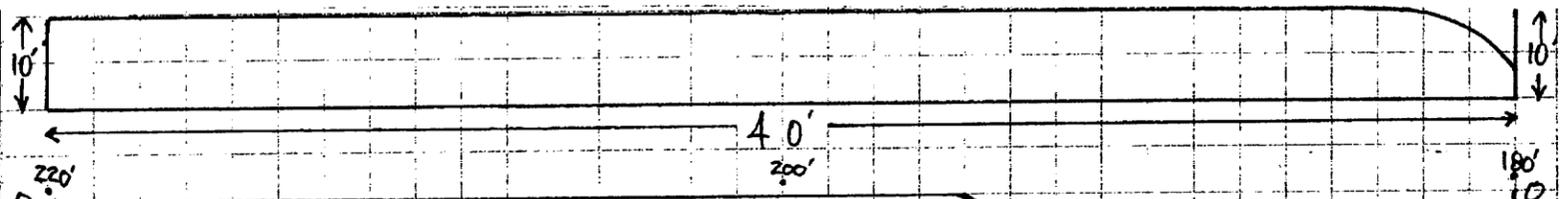


SE

NW



PLAN VIEW



PROFILE VIEW

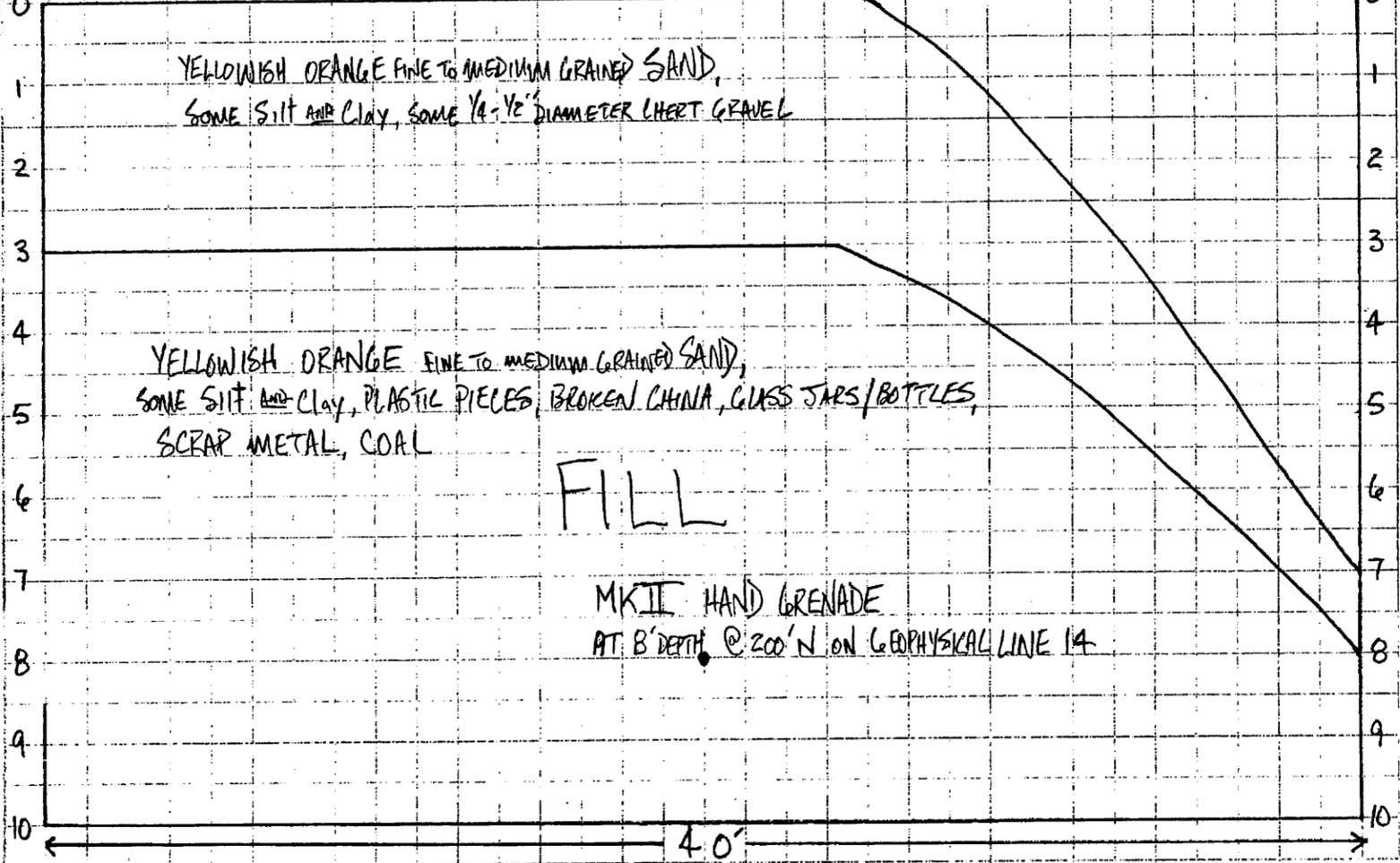


FIGURE A78-24

LANDFILL No. 1
 PARCEL 78(6)
 LINE 14 TRENCH LOG
 WITH CORRESPONDING GEOPHYSICAL DATA
 FORT McCLELLAN

TOTAL MAGNETIC FIELD (UPPER SENSOR)
 EM31 CONDUCTIVITY (VERTICAL DIPOLE)
 EM31 IN-PHASE (VERTICAL DIPOLE)
 LINE 14 TRENCH LOG (T78-1)

U.S. ARMY CORPS OF ENGINEERS
 MOBILE DISTRICT
 FORT McCLELLAN
 CALHOUN COUNTY, ALABAMA
 CONTRACT NO. DACA21-96-D-0018



NAME: James Cox	DATE: February 27, 2001
PROJECT NUMBER: 774645	LOCATION: C:\ATP\projects\FtMcClellan\Landfill\Figure24.map

