

APPENDIX D

September 10, 2007

[REDACTED]
EarthTech, Inc.
University Corporate Centre
100 Corporate Parkway
Suite 341
Amherst, NY 14226

[REDACTED]:
Re: Geophysical Survey Results –Borehole Locations
Former Guterl Specialty Steel Site
Lockport, NY

This report presents the results of the geophysical investigation performed at the Former Guterl Specialty Steel Site in Lockport, NY (the Site).

INTRODUCTION

Geomatrix initiated a geophysical survey at the Site on August 13, 2007 at the request of EarthTech. EarthTech are performing an environmental investigation at the site. Numerous boreholes are planned however little is known concerning the locations of site utilities. A total of 59 locations were identified for geophysical investigation to characterize subsurface interferences. The surveys were conducted in 4 Investigative Areas as follows:

A04A	6 locations
A04B	41 locations
A04C	1 location
A04D	11 locations

The purpose of the geophysical investigation was to:

- reduce the risk of boreholes encountering buried utilities during the subsequent intrusive investigation.

Ground penetrating radar (GPR) and time domain electromagnetic (EM) methods were utilized at the Site.

The field methods and results of the investigation are presented below.

METHODOLOGY

Small subgrids were established around the area of the anticipated borings. For those borings in relatively close proximity to each other larger grids were installed to encompass more than one boring location. The EM data were collected along lines spaced 3 feet apart with a measurement made every 0.6 ft along those lines. The EM data were then gridded and plotted as a color plan map. This map shows the distribution of buried metals beneath the survey areas. Utilities are identified as linear trending buried metal anomalies.

With the EM data processed and in hand, the next phase of the investigation involved integrating GPR data and EM data. The purpose of using the GPR was twofold: it provided real time information concerning the presence of subsurface structures; and it provided an increased level of confidence in the survey as EM will not identify all buried utilities (i.e., non metallic, or minimally metallic as in direct buried cable). Subsequent to the EM and GPR work, standard pipe and cable tracing equipment (SeekTech SR-20) was employed to search for additional potential subsurface utilities.

ELECTROMAGNETIC SURVEY METHODOLOGY

The site was geophysically surveyed using the Geonics EM61. The EM61 unit is a high sensitivity, high resolution time domain electromagnetic (TDEM) metal detector that can detect both ferrous and nonferrous metallic objects. It has an approximate investigation depth of 10 feet. The processing console is contained in a backpack worn by the operator which is interfaced to a digital data logger. The transmitter and two receiver coils are located on a two-wheeled cart that is pulled by the operator.



EM equipment in use (photo not from this site)

The device's transmitter coil generates a pulsed primary EM field at a rate of 150 pulses per second, inducing eddy currents into the subsurface. The decay rates of these eddy currents are measured by two, 3.28 foot by 1.64 foot (1 meter by ½ meter) rectangular receiver coils. By taking the measurements at a relatively long time frame after termination of the primary pulse, the response is practically independent of the survey area's terrain conductivity. Specifically, the decay rates of the eddy currents are much longer for metals than for normal soils allowing the discrimination of the two.

Data are collected from the EM61's two receiver coils. One of the receiver coils is located coincident to the transmitter coil. The other receiver coil is located 1.31 feet (0.4 meters) above the transmitter coil. Data from the top receiver coil are stored on Channel 1 of a digital data logger. Data from the bottom receiver coil are stored on Channel 2 of the data logger. Channel 1 and Channel 2 data are simultaneously recorded at each station location. The instrument responses are recorded in units of millivolts (mV). Data were recorded digitally by a data logger at a rate of approximately 2 measurements per foot along the survey lines which were spaced 3 feet apart.

GROUND PENETRATING RADAR SURVEY METHODOLOGY

Ground penetrating radar works on the principle of inducing high frequency radio waves into the earth and recording the energy that is reflected back from depth. Depth of penetration is dependent on the transmitting frequency, the dielectric constant of the subsurface material and the electrical conductivity of the subsurface material and its pore fluid (i.e., depth of penetration is reduced in fine grained soils).

GPR reflections occur at interfaces between different materials. The magnitude and character of the reflections are dependent on the geometry of the reflecting interface and the change in the dielectric constant of the materials across that interface. A common misconception concerning GPR data that should be noted is that a GPR profile does not represent a 1-dimensional slice of the subsurface. Rather, as radar energy comes from a



GPR equipment (photo not from this site)

3-dimensional cone of material beneath the GPR transducer, features outside of the vertical line beneath the transducer may occur in a spatially incorrect position. For example, a point source (brick, cobble, etc) in the subsurface will exhibit a response similar in appearance to a hyperbola or inverted "U" on the radar profile. These hyperbolas are diffraction events from point sources in the subsurface. As the radar unit passes over the object, the radar wave travel time decreases until the radar unit is directly above the object. As the radar unit continues past the object, the travel time increases thereby forming a hyperbolic shaped reflection.

RESULTS

The geophysical data for this investigation are presented in a series of 46 Figures. To facilitate easy reference, the boring names were utilized for figure numbers. For those figures which encompass more than one boring location, the numerically lower boring designation is used for the figure number (refer to Table 1).

The color bar to the right of the figures indicates the colors associated with the instrument response. Areas suspected to be free of buried metals are shown as color shades of light blue. All areas exhibiting a response greater than background (0 to 20 mVolts) likely contain buried metals. These areas are depicted in shades of dark blue through yellow on the figures.

There are additional subsurface anomalies observed in the geophysical data other than the linear utility-type anomalies. These areas are shown in color shades of dark blue through yellow on the figures. These anomalies may represent buried obstructions such as reinforced concrete, buried fence posts, or misc. buried metals remaining from site activities.

Boring locations are shown overlain on the figures. Some borings were moved to avoid interpreted buried utilities or subsurface interferences. The new locations are shown on the Figures at the end of arrows originating at the original proposed location. Table 1 summarizes the figure numbers and provides information concerning the borings that were moved due to interpreted subsurface interferences.

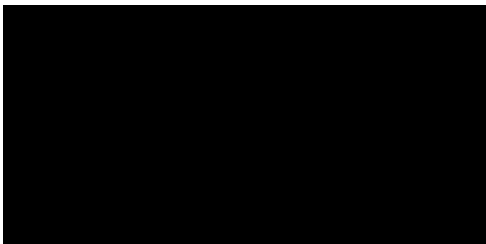
LIMITATIONS

The geophysical methods used during this survey are established, indirect techniques for non-invasive subsurface reconnaissance exploration. As these instruments utilize indirect methods, they are subject to inherent limitations and ambiguities. All geophysical methods utilize interpretative techniques that can be significantly impacted by varying site conditions. Geophysical anomalies can only be identified if they show recognizable patterns against data representative of background or natural conditions. Therefore, where possible, confirmation of any geophysical anomalies identified or interpreted should be sought through other investigative methods (i.e., the use of historical aerial photography, historical records, test pit, borehole information, etc.).

We trust the information contained in this report is sufficient for your present needs. Please do not hesitate to contact me if you have any questions or require additional information.

Yours very truly,

GEOMATRIX CONSULTANTS, INC.



Senior Geophysicist

Table 1

Boring Number	Figure Number (if different from Boring #)	Comments
A04A- 45		moved 3 ft west and 10 ft south to avoid buried metals
A04A- 46		
A04A- 47	A04A- 46	
A04A- 48	A04A- 46	
A04A- 49		
A04A- 51	A04A- 49	moved 2 ft west to get away from fence
A04B- 1		moved 6 ft west to avoid OH wires and buried metals
A04B- 2		moved 3 ft north to avoid buried metals
A04B- 3		moved 3 ft west to get away from fence
A04B- 4		
A04B- 5		
A04B- 6		original location south of fence line - moved north
A04B- 7		moved 3 ft south to avoid buried metals
A04B- 8	A04B- 7	
A04B- 9		moved 3 ft south to avoid buried metals
A04B- 10		moved 6 ft east and 15 ft south to avoid buried metals
A04B- 11		
A04B- 12		moved 12 ft north to avoid buried metals
A04B- 13		moved 3 ft east and 7 ft north to avoid buried metals
A04B- 14		
A04B- 15		original location south of fence line - moved north
A04B- 16		moved 6 ft west and 5 ft south to avoid buried metals
A04B- 17		moved 3 ft west and 37 ft north to avoid buried metals
A04B- 18	A04B- 15	
A04B- 19		moved 4 ft east and 1 ft north to avoid buried metals
A04B- 20		original location south of fence line - moved north
A04B- 21		moved 8 ft south to avoid buried metals
A04B- 22		
A04B- 23		moved 12 ft east and 9 ft north to avoid buried metals
A04B- 24		
A04B- 25		moved 8 ft east to avoid buried metals
A04B- 26	A04B- 20	moved 12 ft west and 9 ft south to avoid buried metals
A04B- 27		
A04B- 28		
A04B- 29		original location inaccessible - moved west
A04B- 30		moved 9 ft west and 13 ft south to avoid buried metals
A04B- 31	A04B- 24	
A04B- 32		
A04B- 33	A04B- 32	
A04B- 34	A04B- 24	
A04B- 35		
A04B- 36		
A04B- 37		
A04B- 38		moved 18 ft west and 4 ft north to avoid buried metals
A04B- 39		original location south of fence line - moved north
A04B- 40		moved 5 ft east and 6 ft south to avoid buried metals
A04B- 41		moved 10 ft north to avoid buried metals
A04C- 15	A04D- 1	moved 1 ft east to avoid buried metals
A04D- 1		moved 1 ft west to avoid buried metals
A04D- 5		
A04D- 6		
A04D- 7		moved 3 ft west to avoid utilities
A04D- 10		
A04D- 14	A04D- 6	
A04D- 20		moved 3 ft east to buried metals
A04D- 23	A04D- 20	moved 7 ft west and 25 ft north to avoid utilities
A04D- 25	A04D- 20	moved 8 ft west and 25 ft north to avoid utilities
A04D- 26		
A04D- 28		

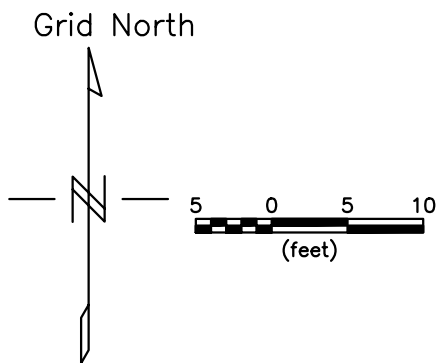
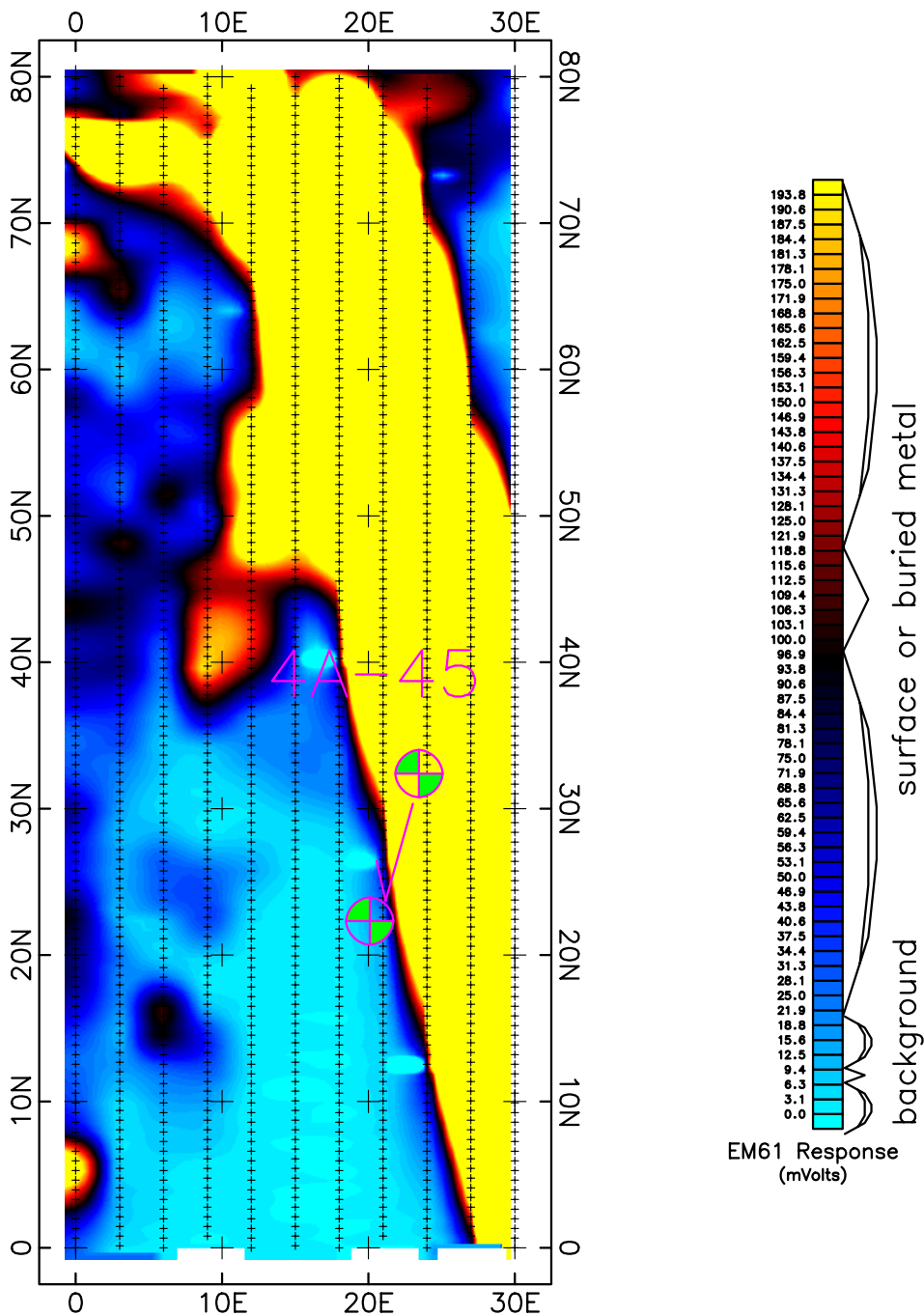
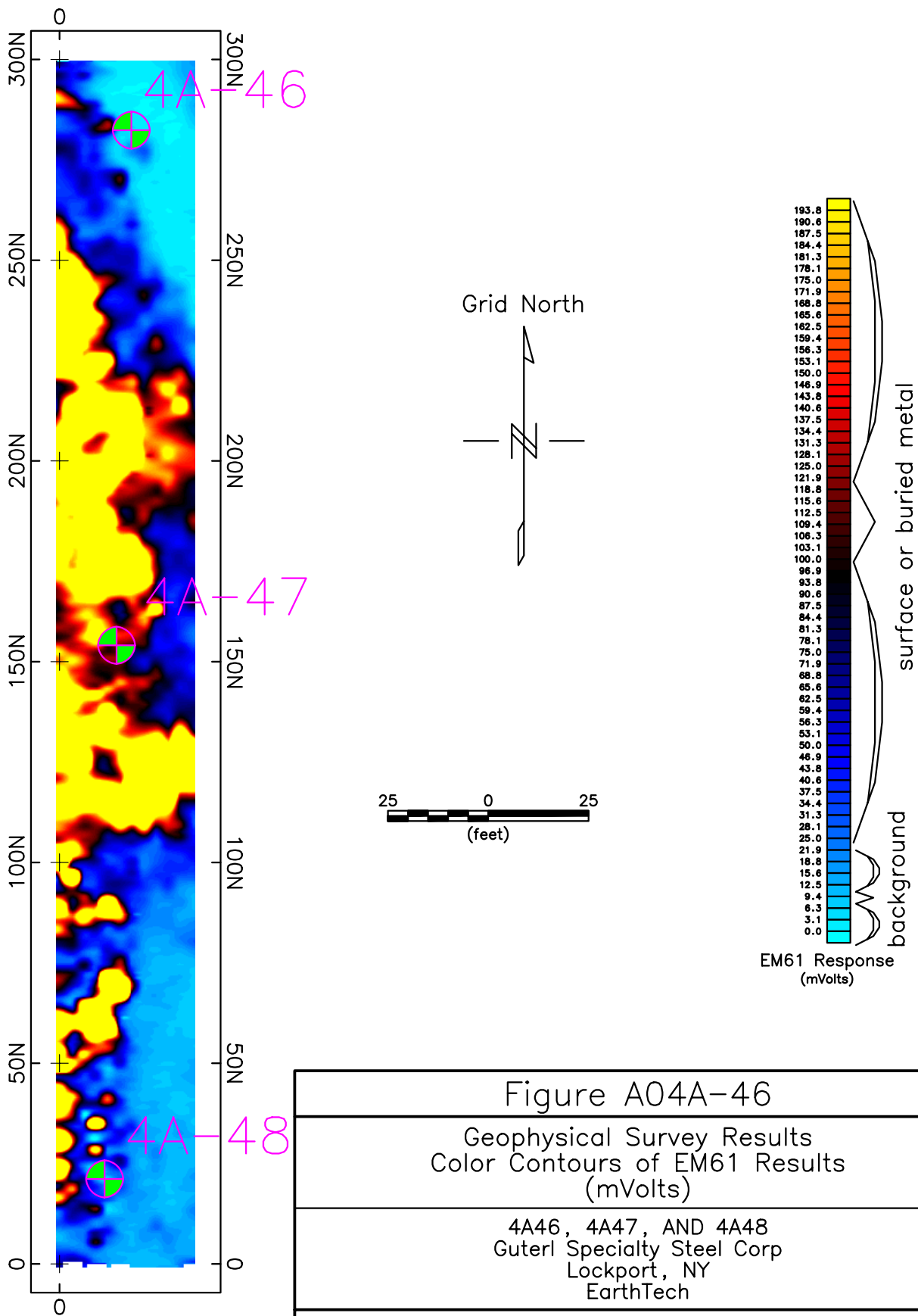


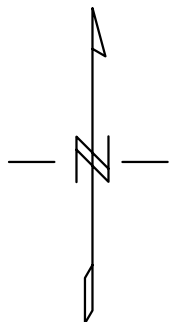
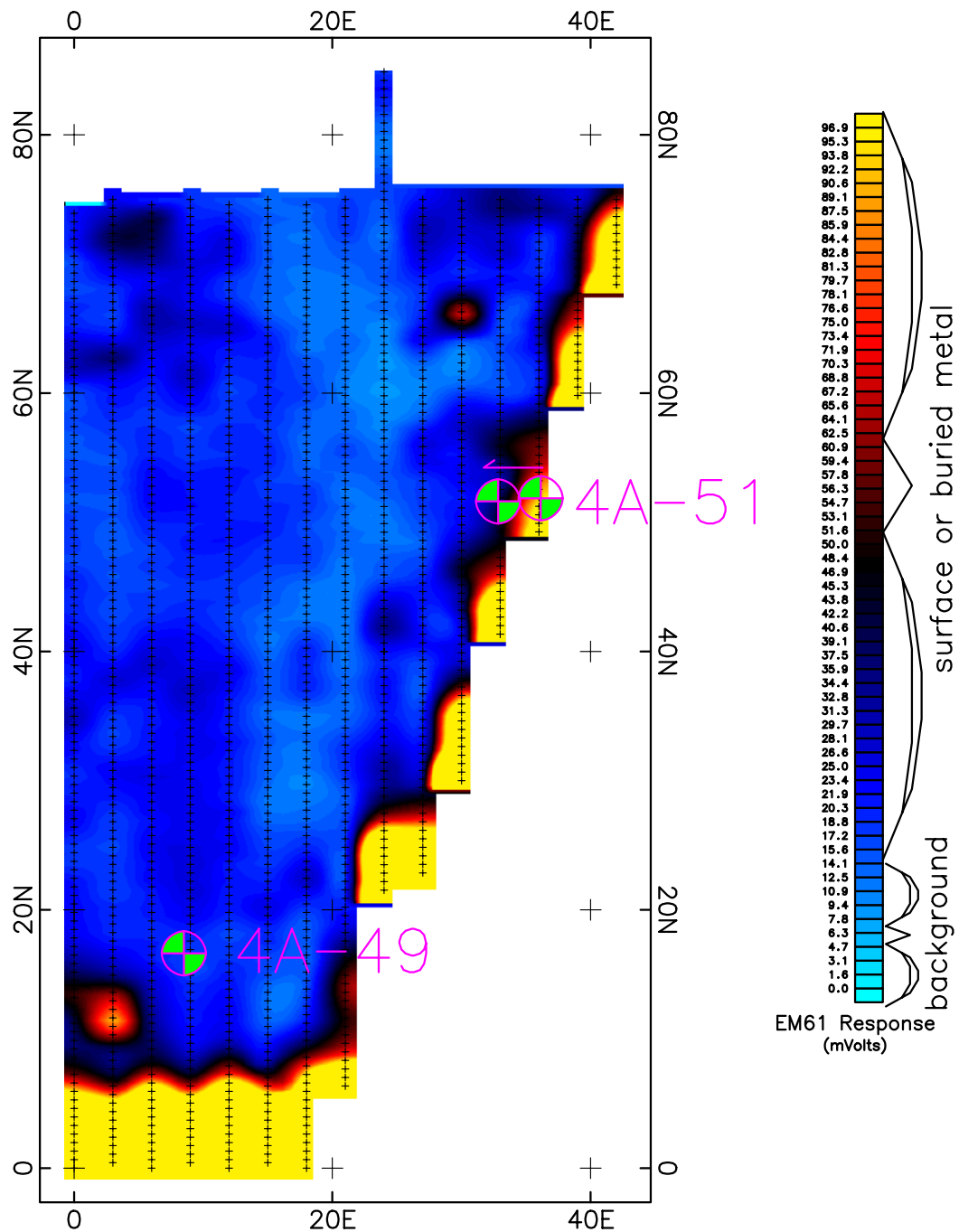
Figure A04A-45

Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

4A45
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624





10 0
(feet)

Figure A04A-49

Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

4A49 AND 4A51
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624

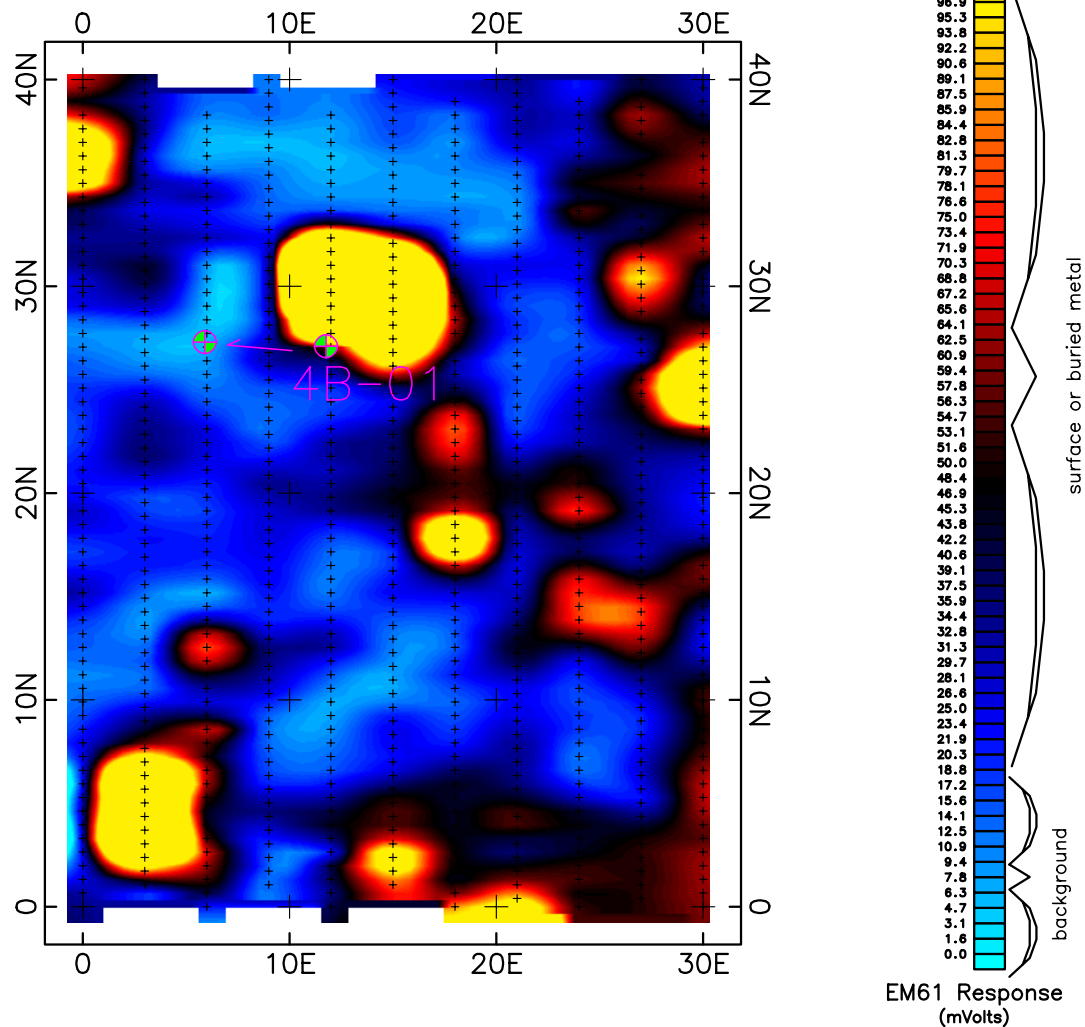
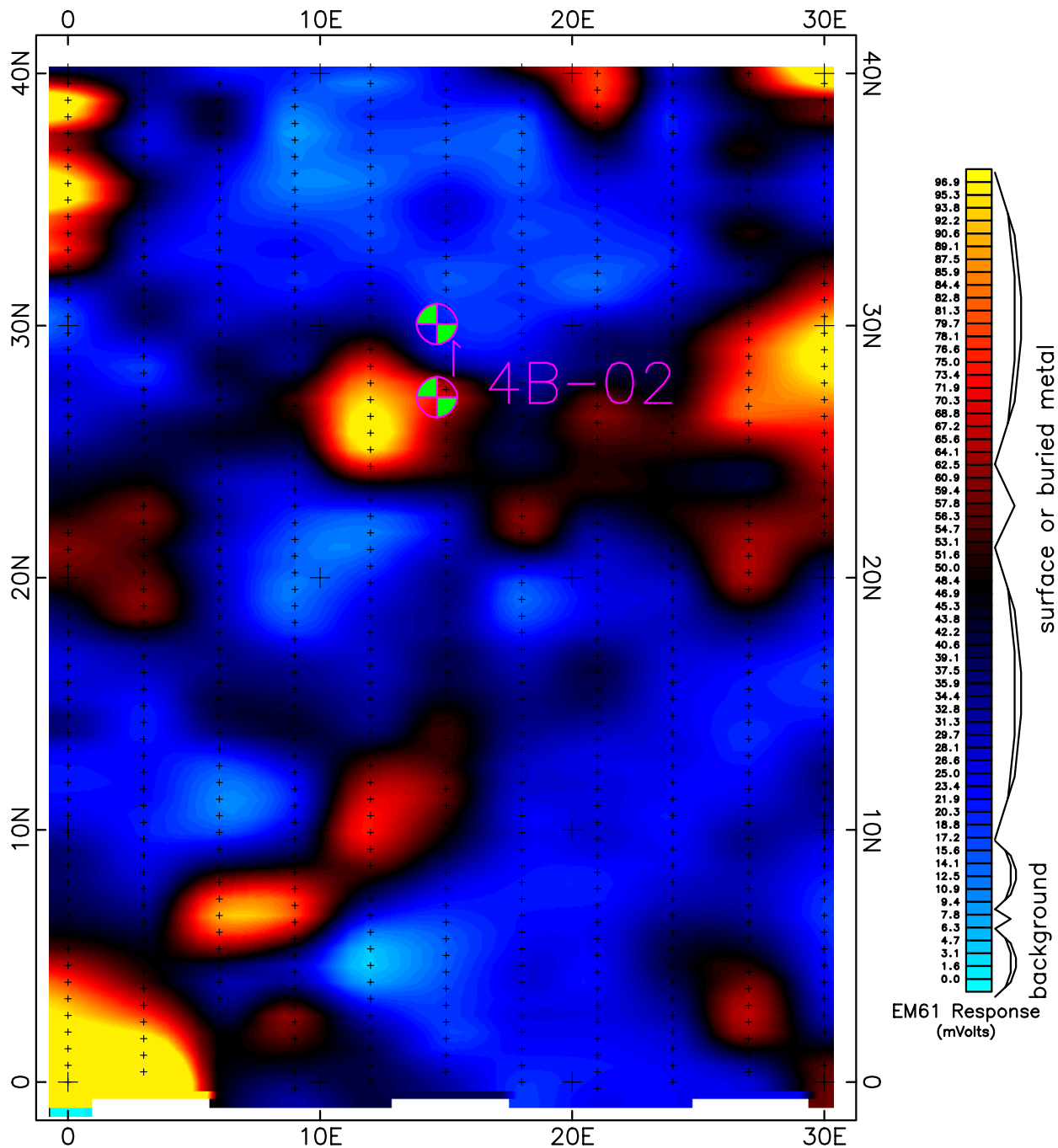


Figure A04B-01

Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

4B01
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624



Grid North

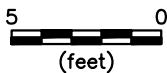
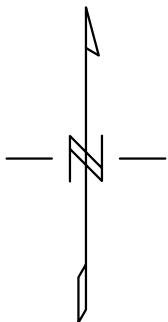


Figure A04B-02

Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

4B02
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624

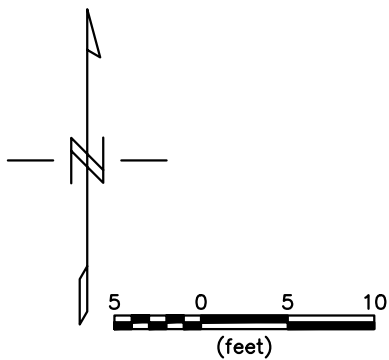
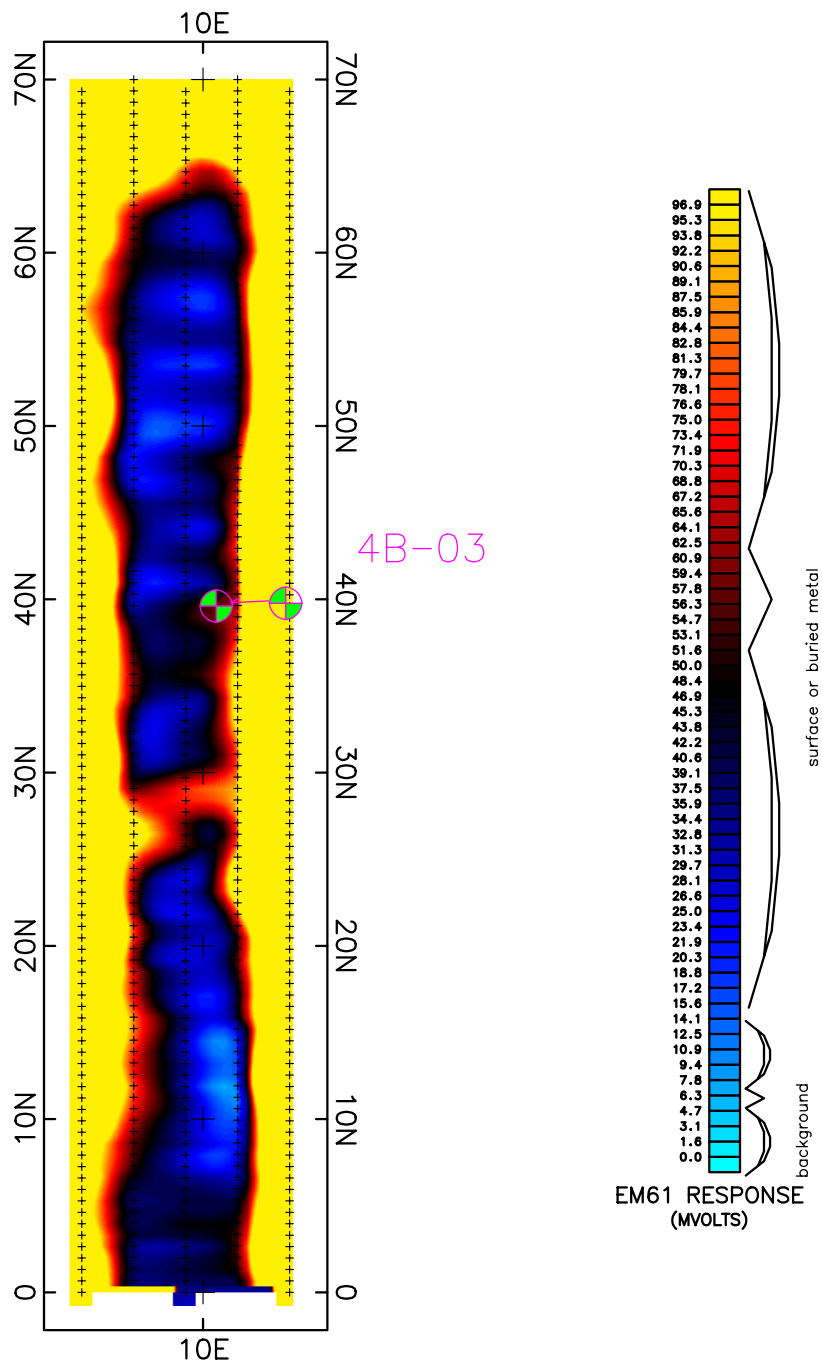
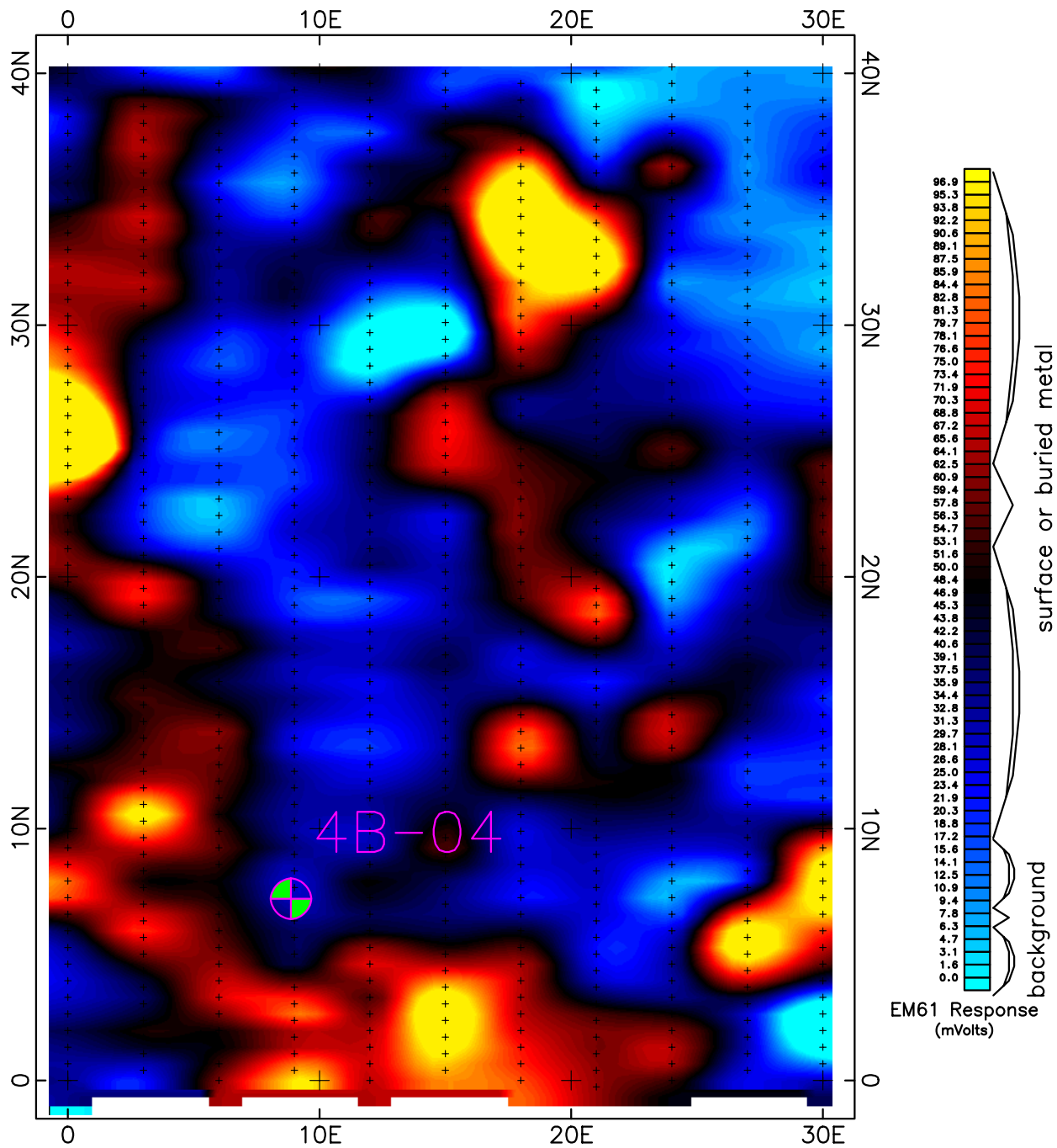


Figure A04B-03

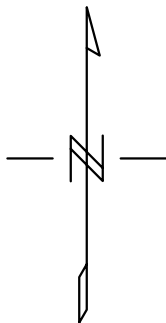
Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

4B03
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624



Grid North



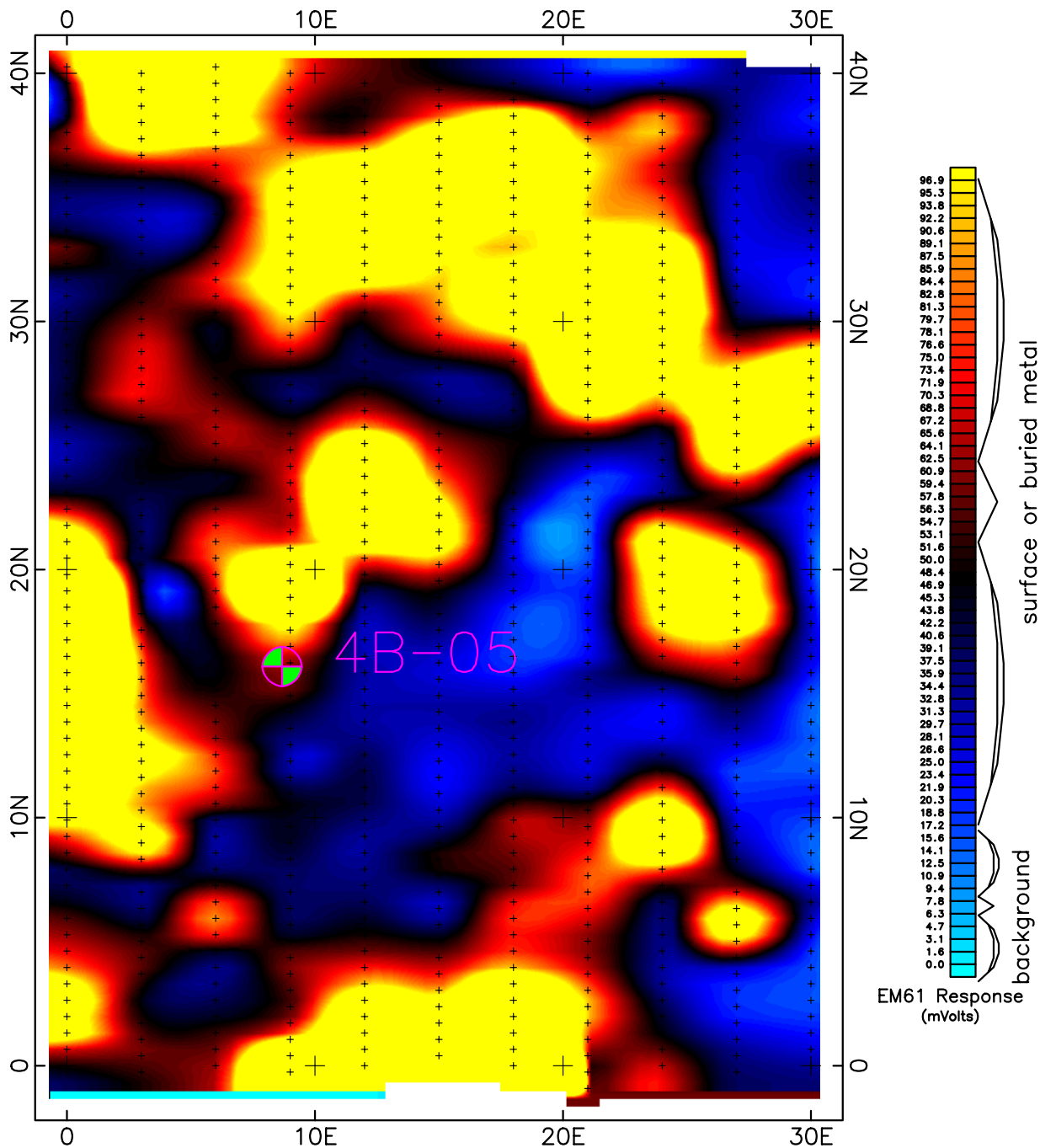
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(feet)

Figure A04B-04

Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

4B04
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624



Grid North

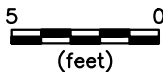
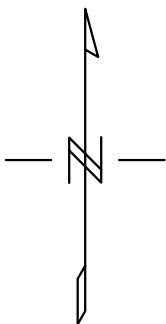
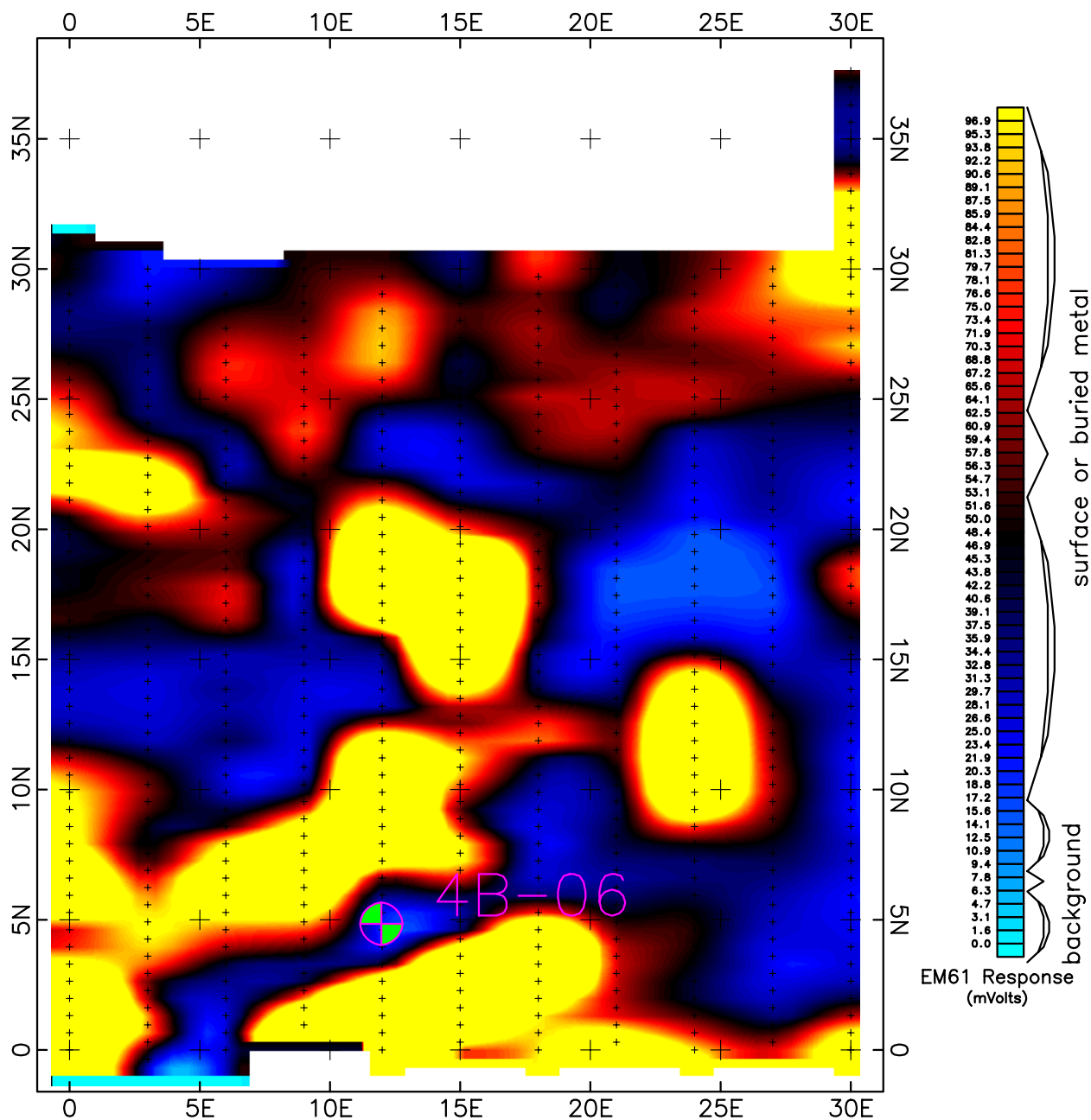


Figure A04B-05

Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

4B05
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624



Grid North

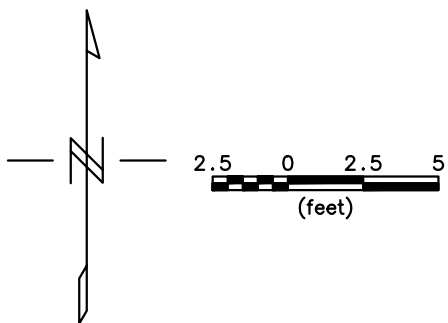


Figure A04B-06

Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

4B06
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624

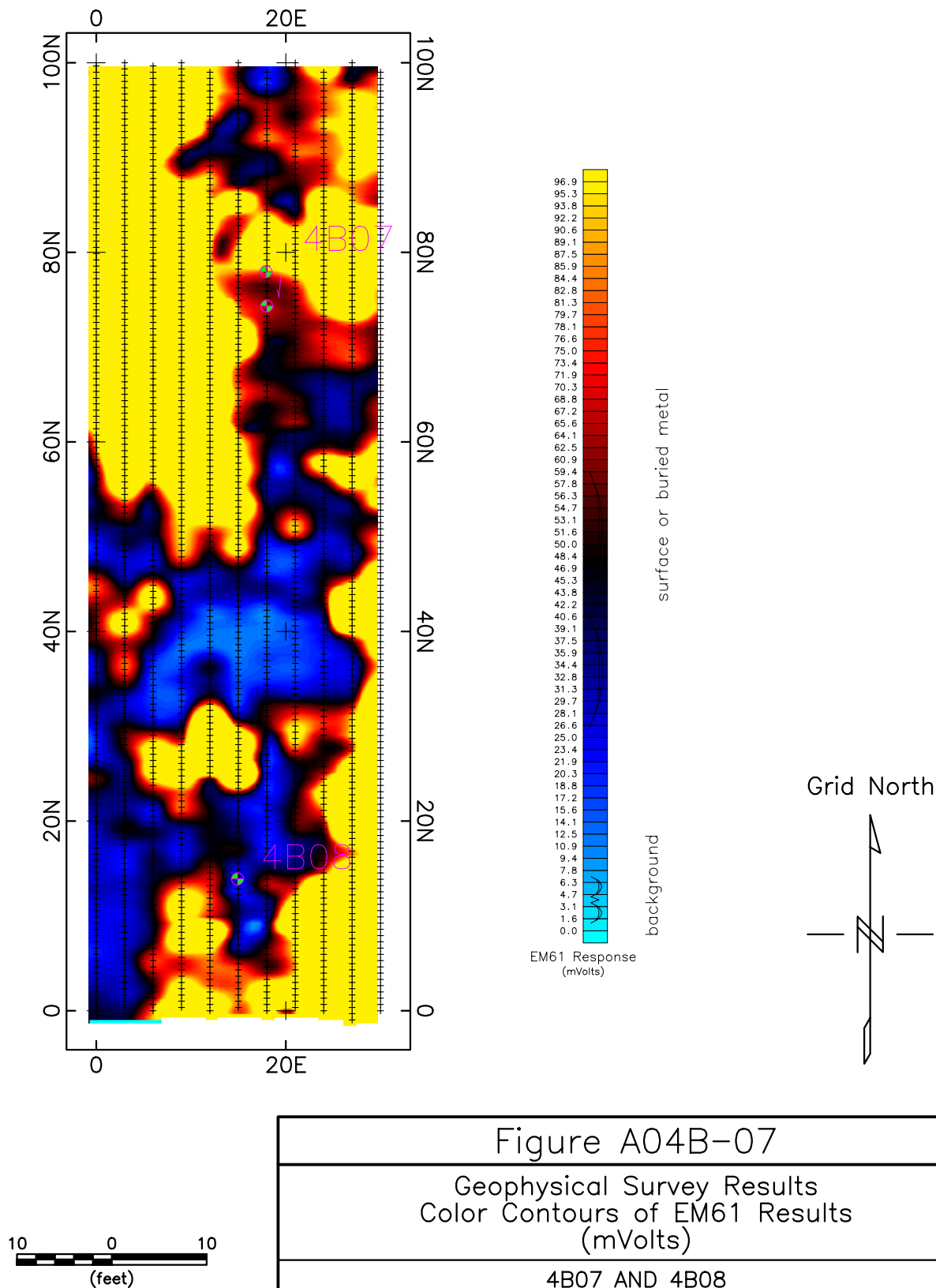
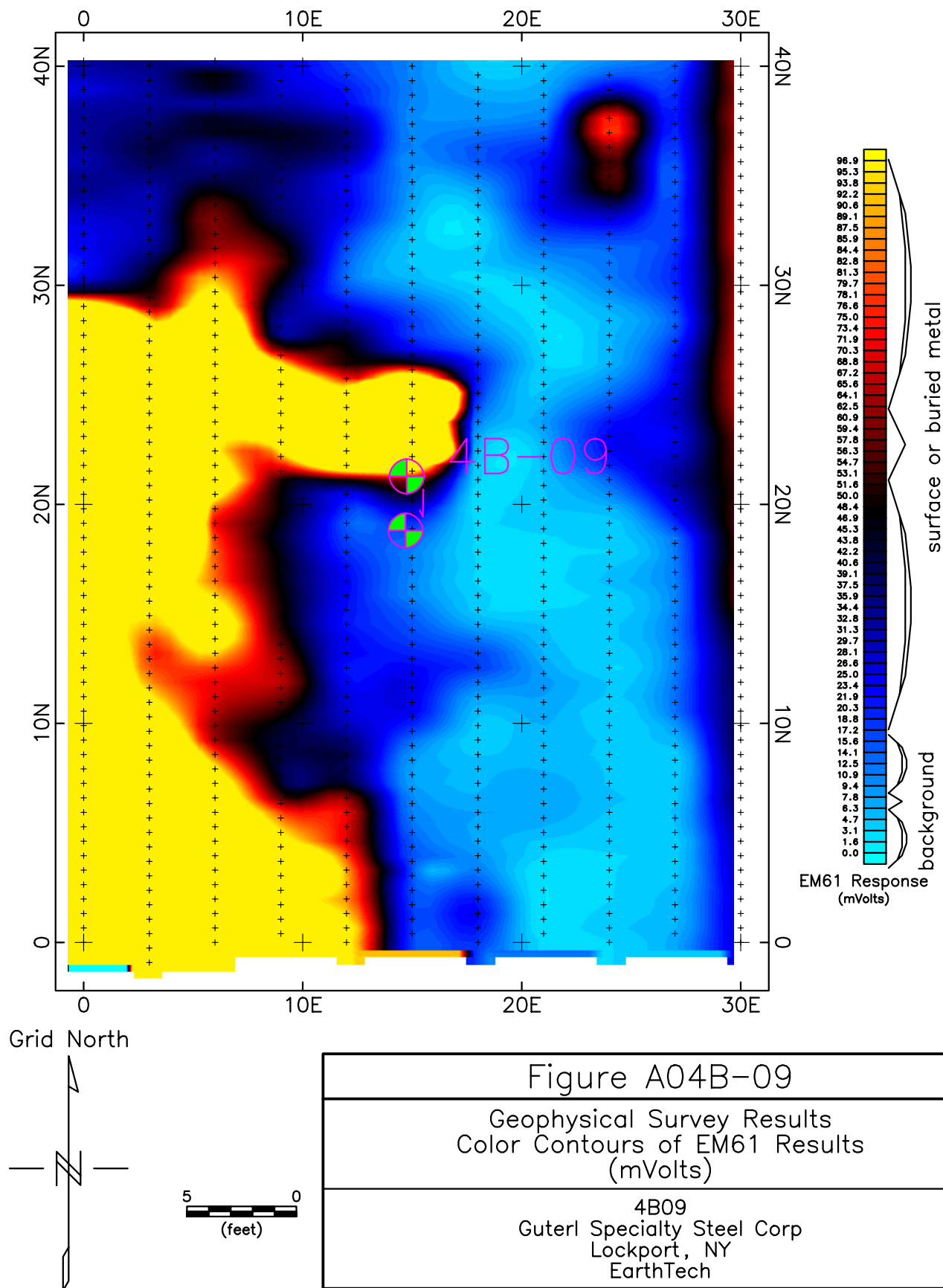


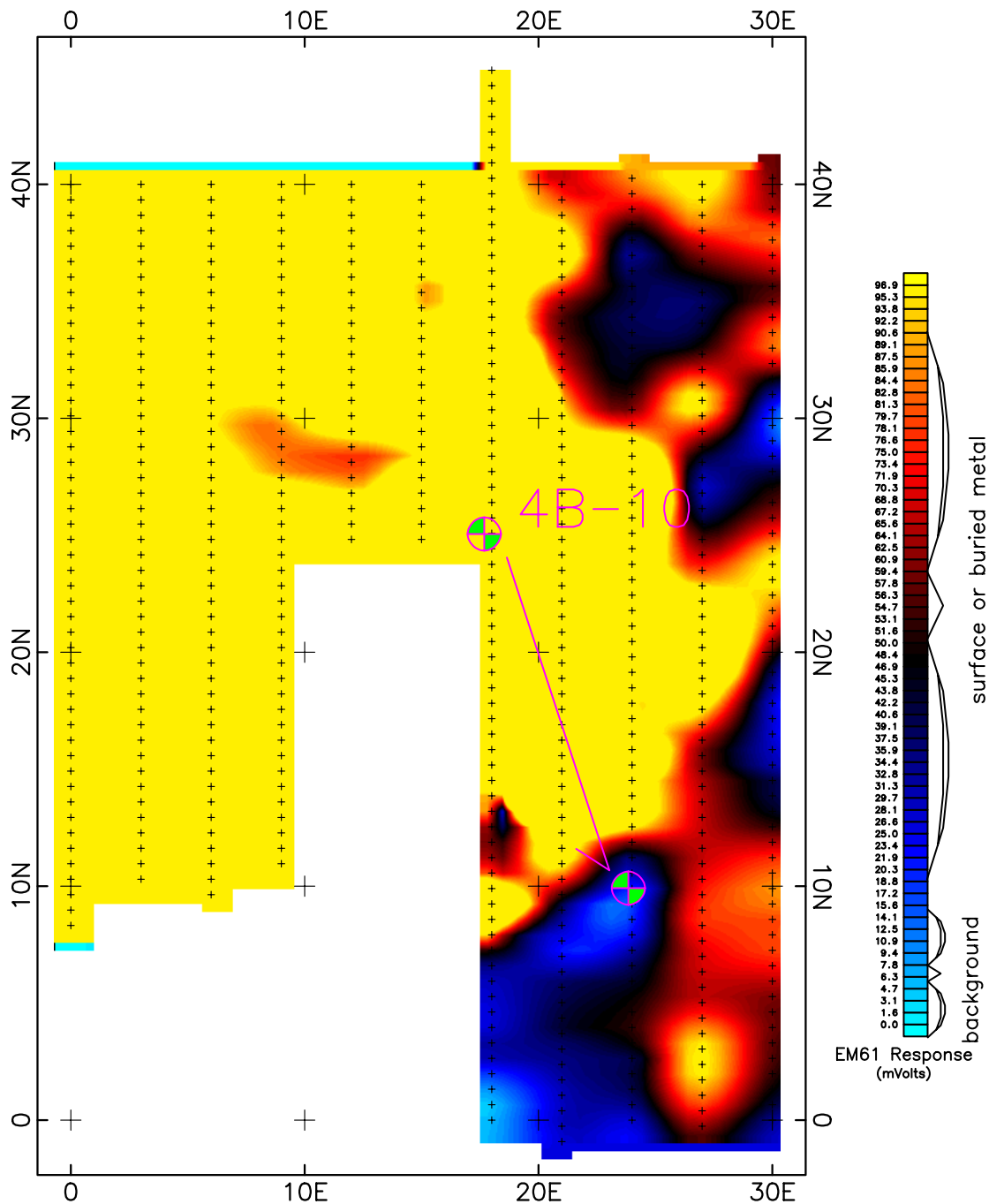
Figure A04B-07

Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

4B07 AND 4B08
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624





Grid North

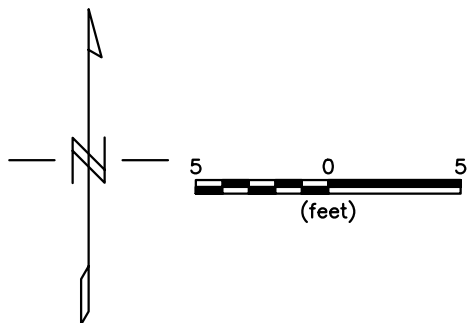
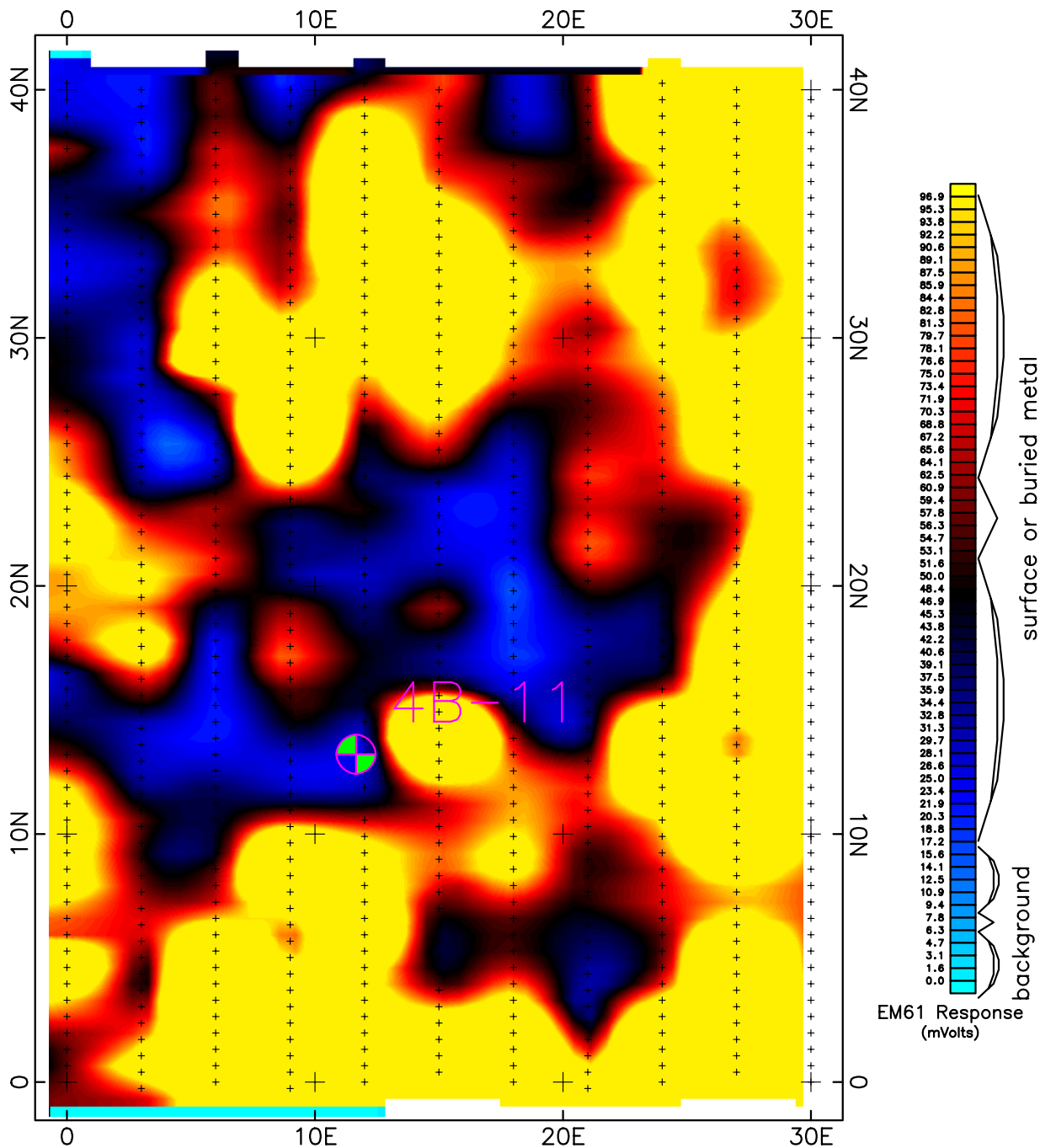


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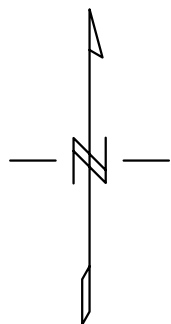
Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

4B10
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624



Grid North



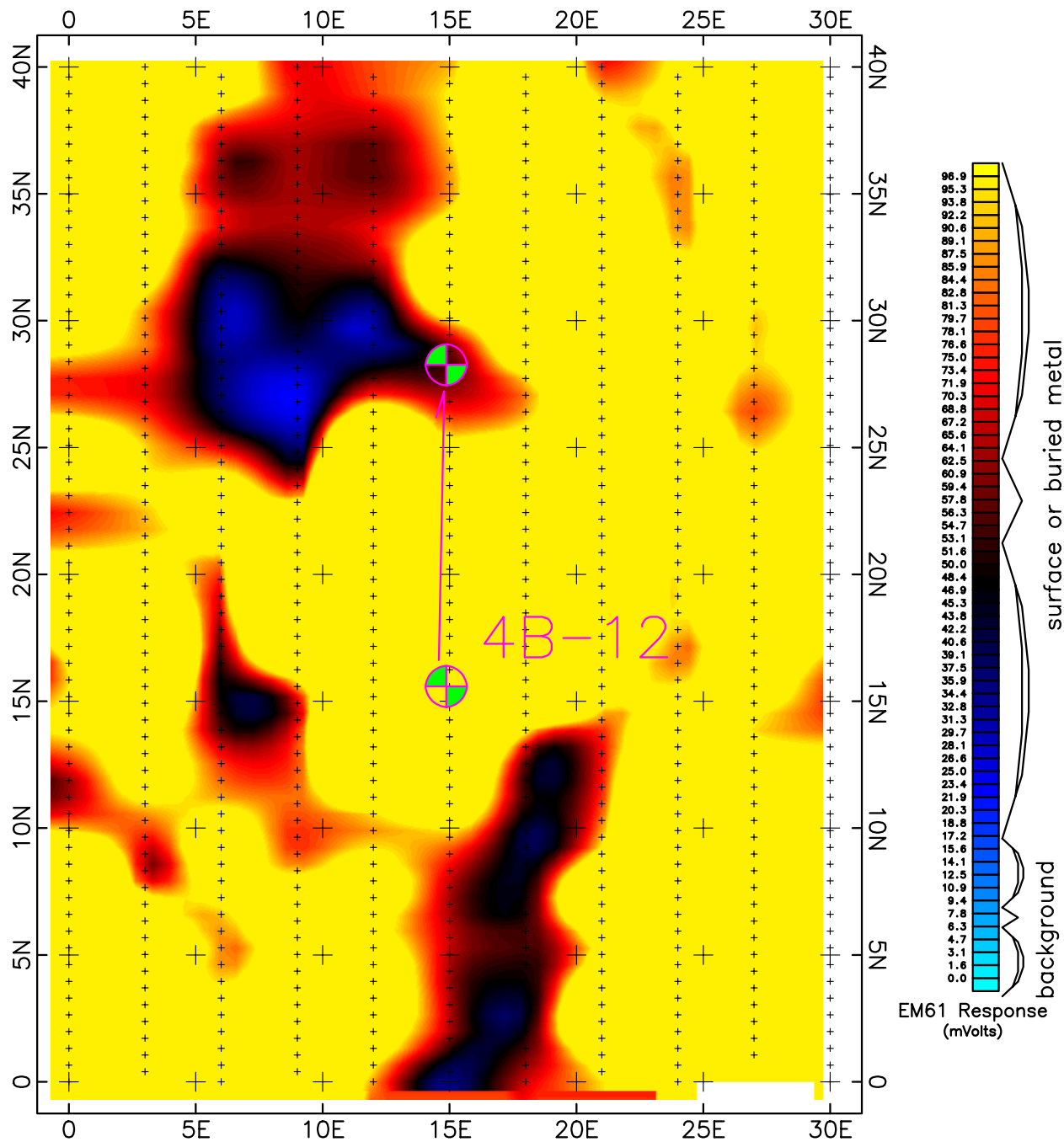
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(feet)

Figure A04B-11

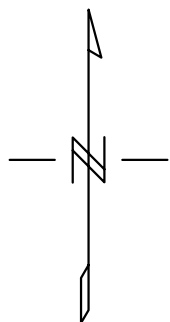
Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

4B11
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624



Grid North



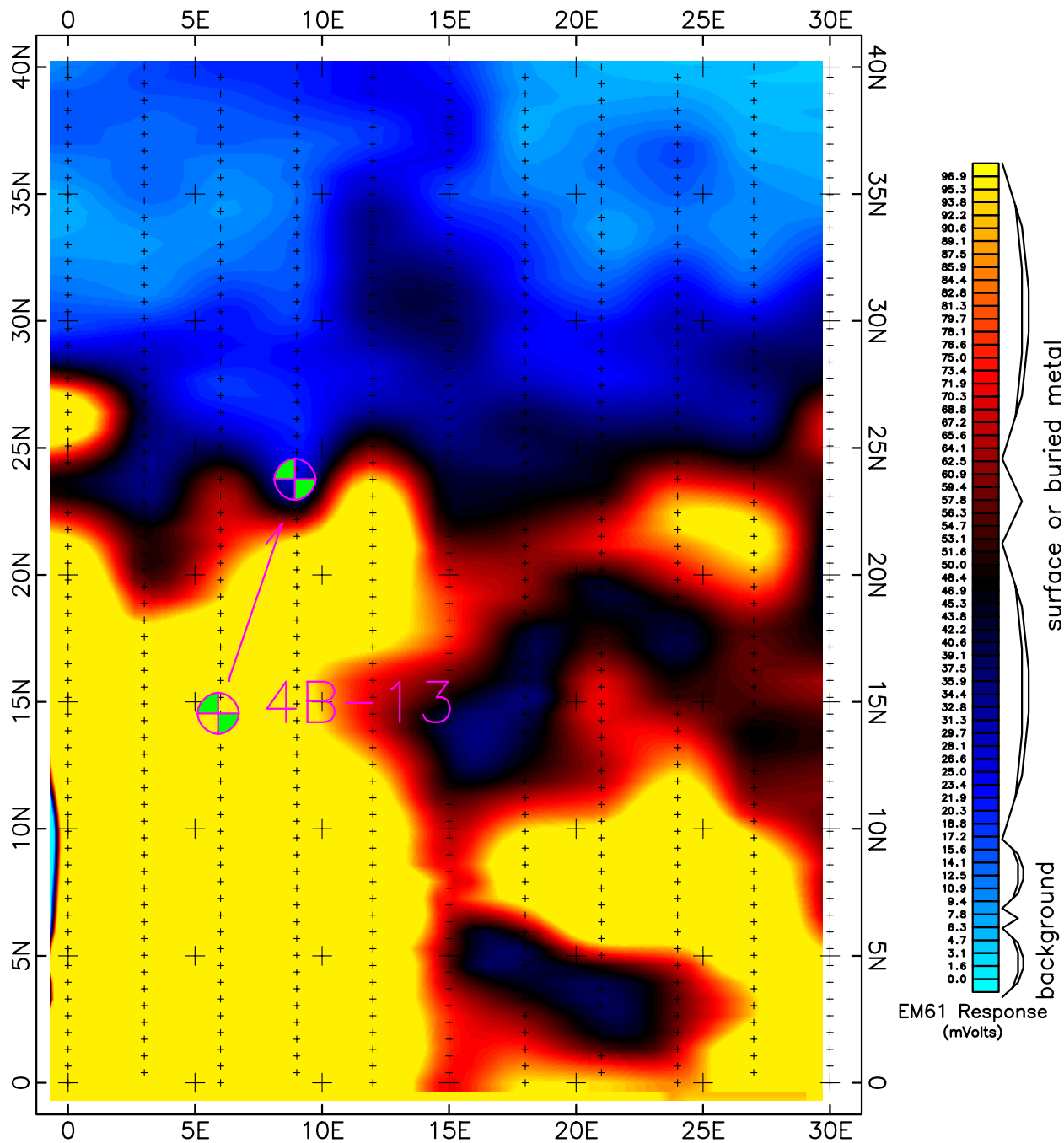
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(feet)

Figure A04B-12

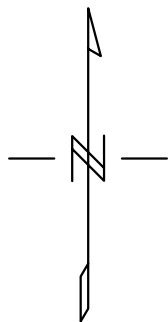
Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

4B12
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624



Grid North



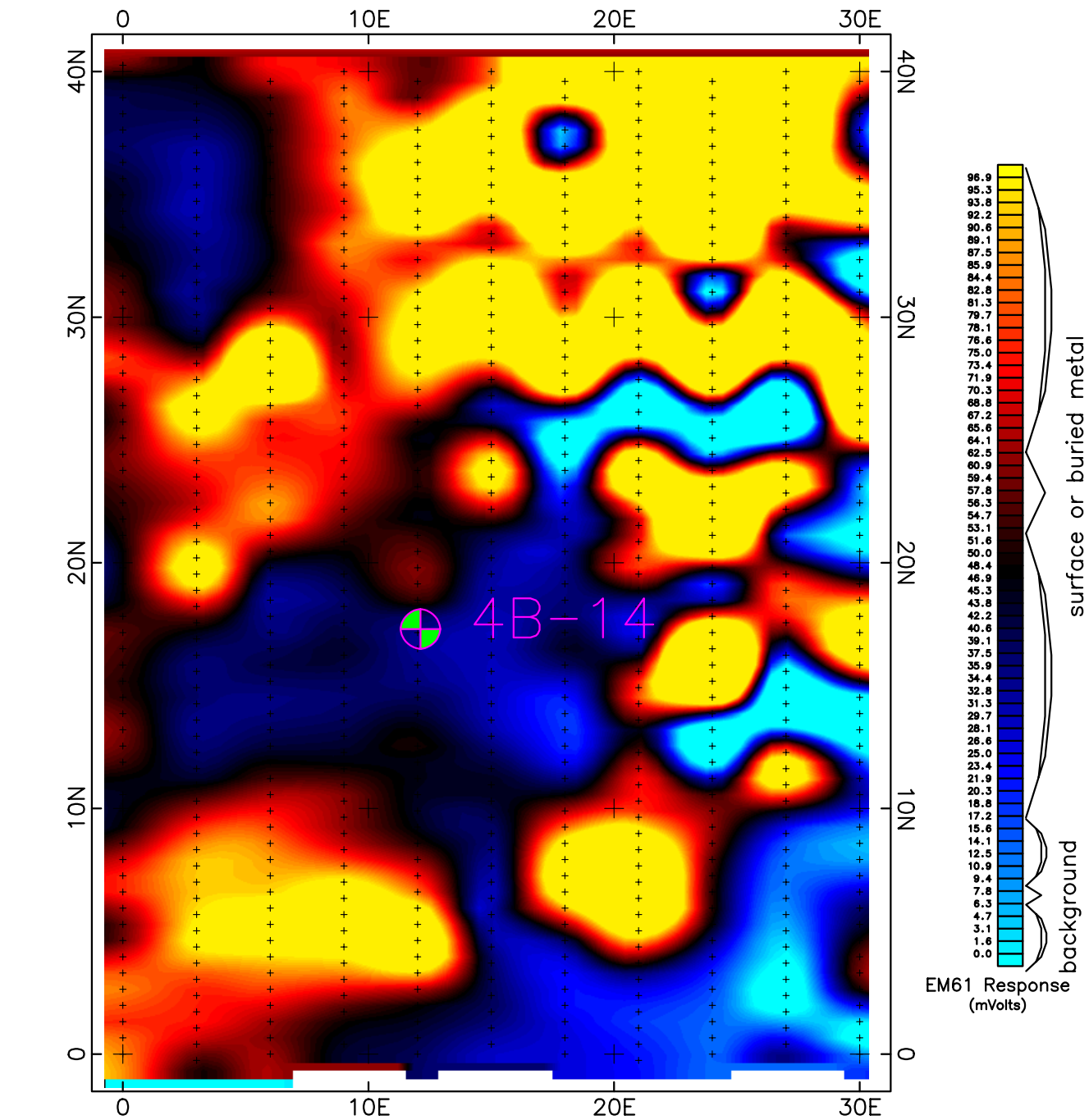
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Figure A04B-13

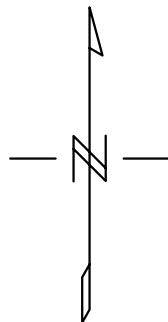
Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

4B13
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624



Grid North



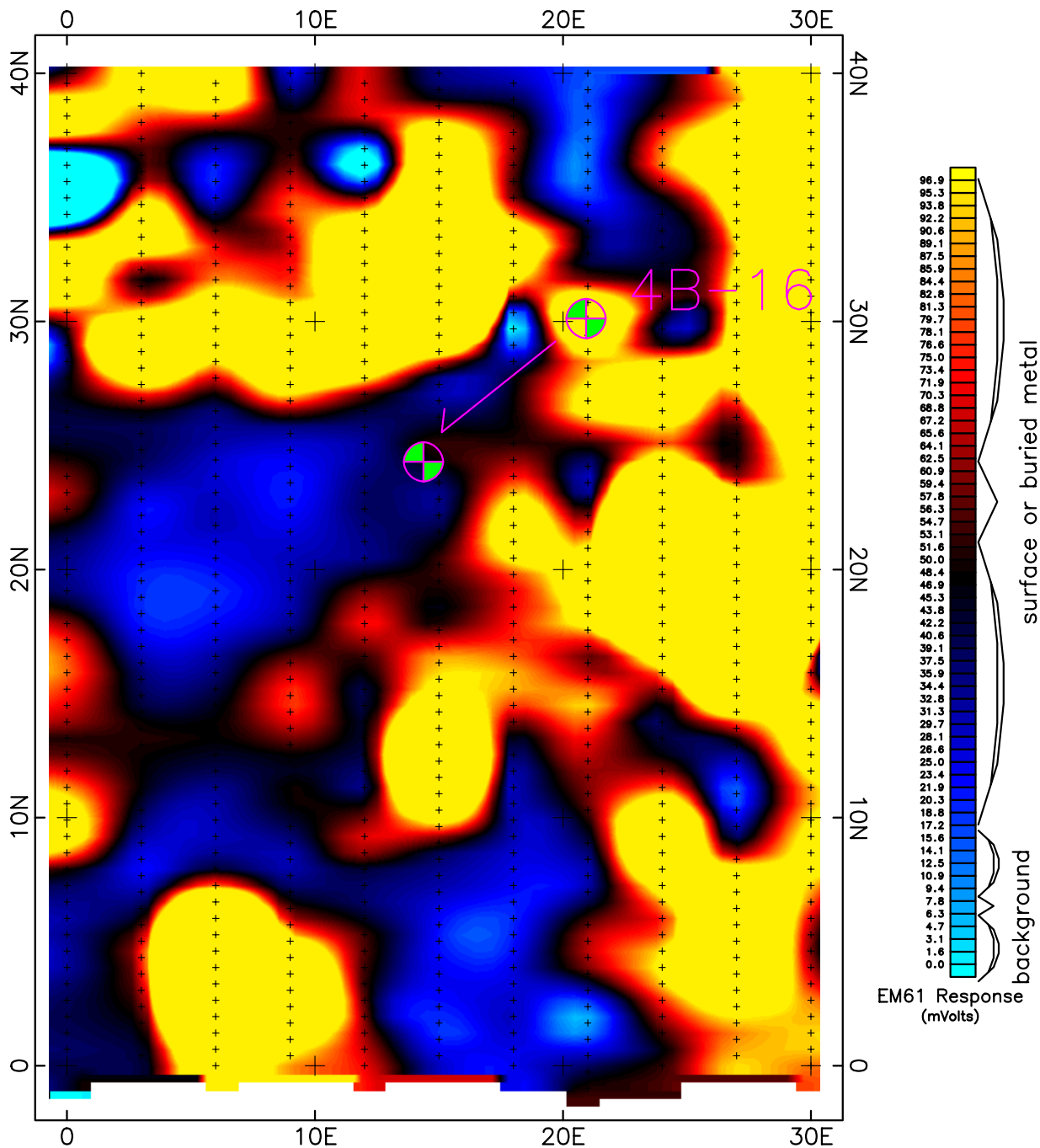
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(feet)

Figure A04B-14

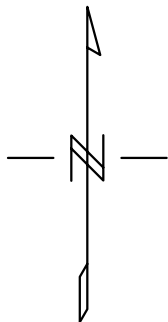
Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

4B14
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624



Grid North



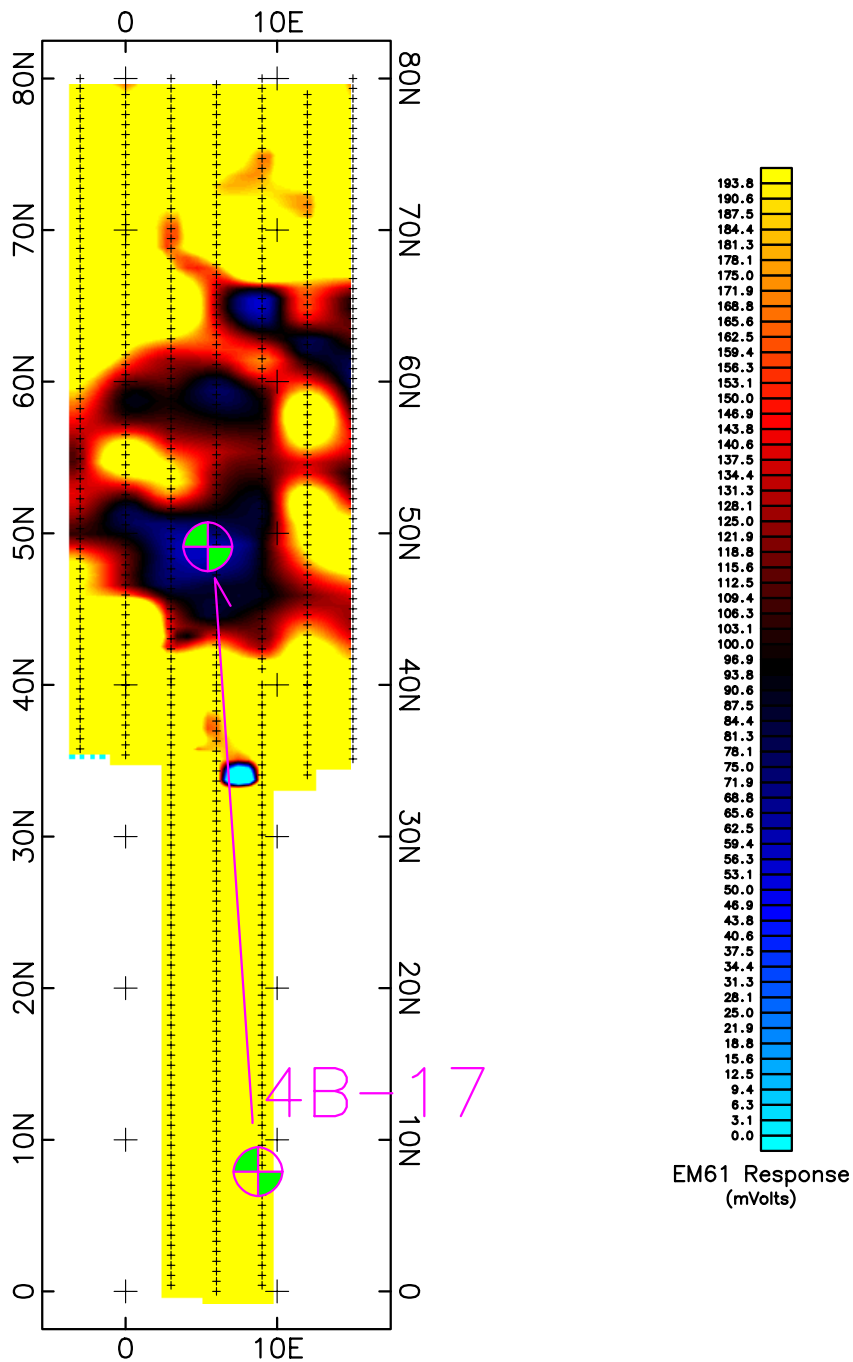
5 0
(feet)

Figure A04B-16

Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

4B16
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624



Grid North

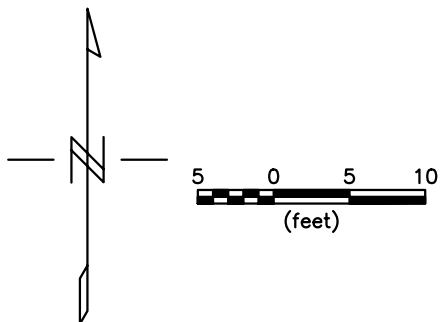


Figure A04B-17

Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

4B17
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624

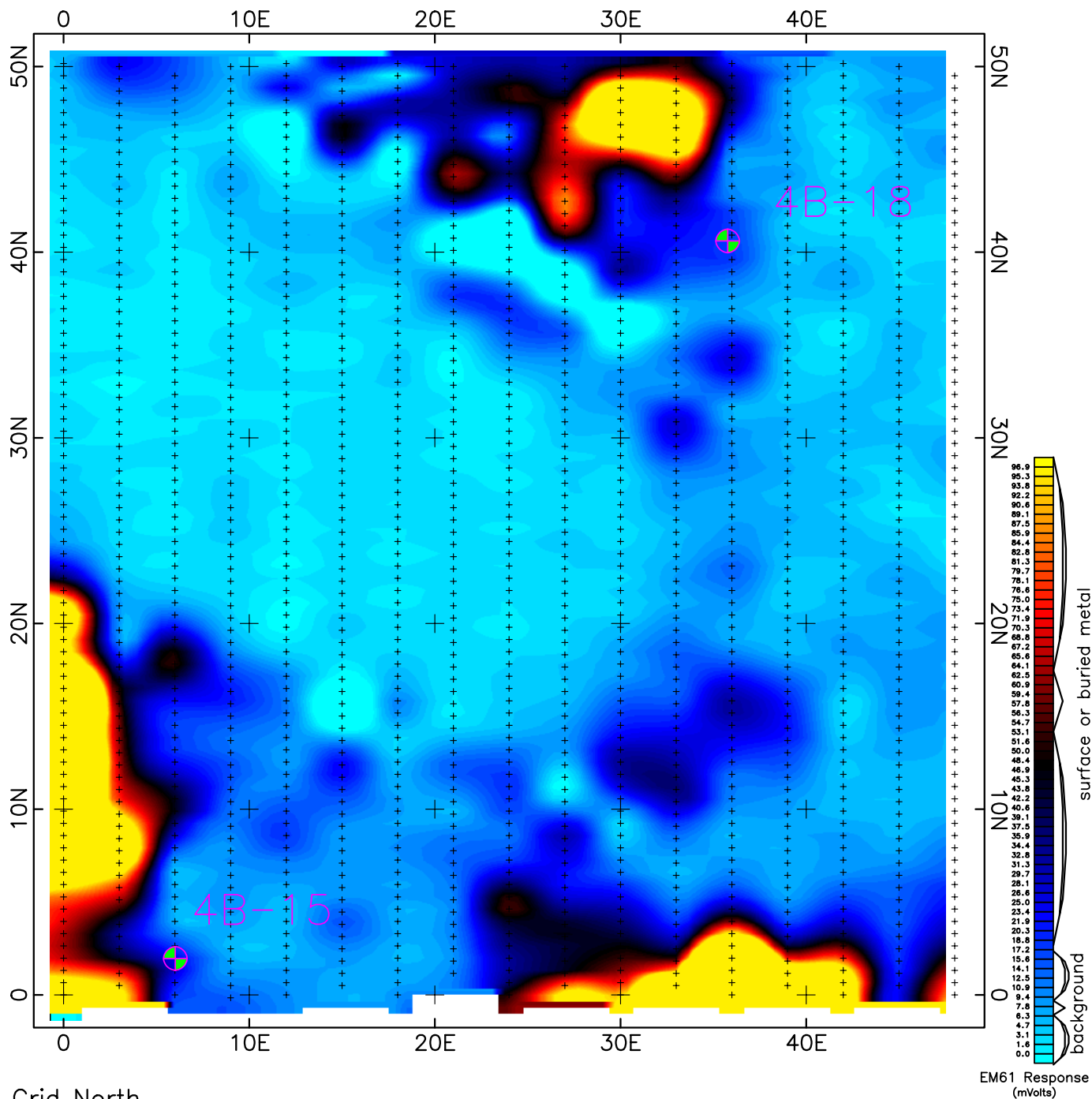
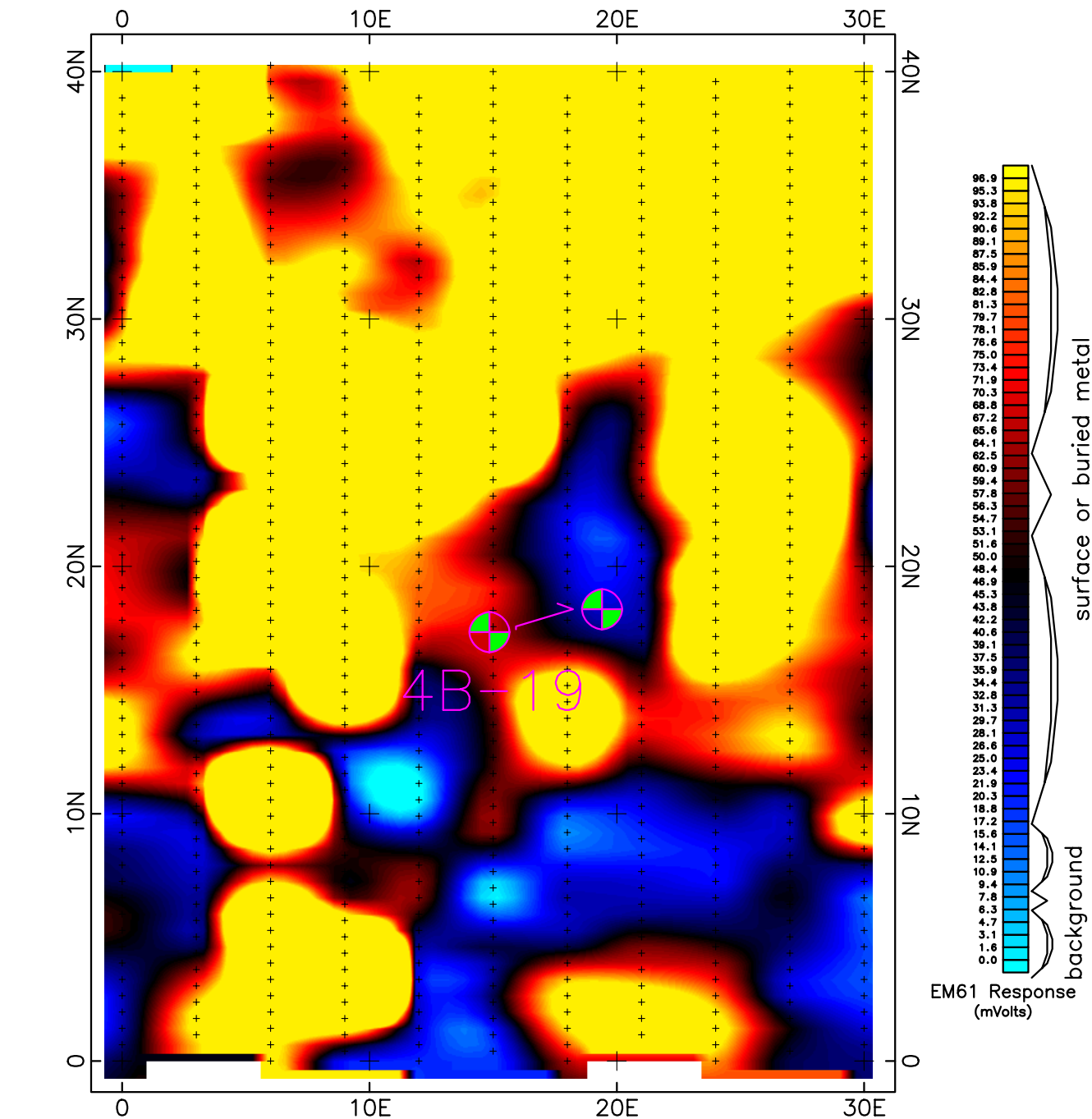


Figure A04B-18

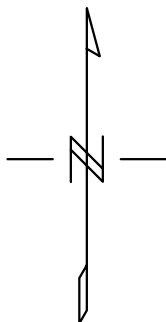
Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

4B18 and 4B15
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624



Grid North



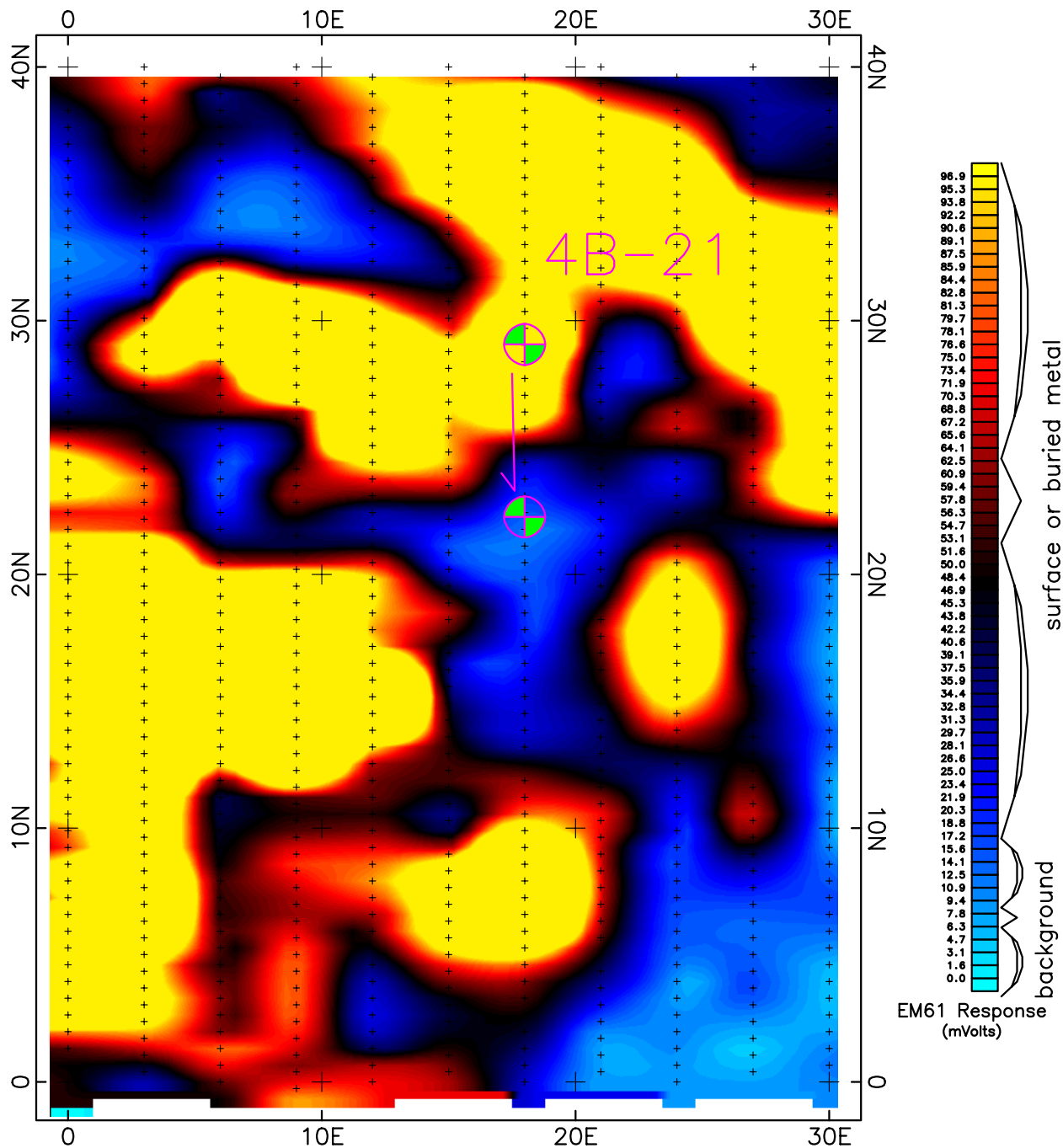
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(feet)

Figure A04B-19

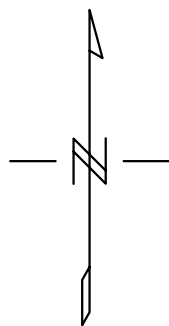
Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

4B19
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624



Grid North



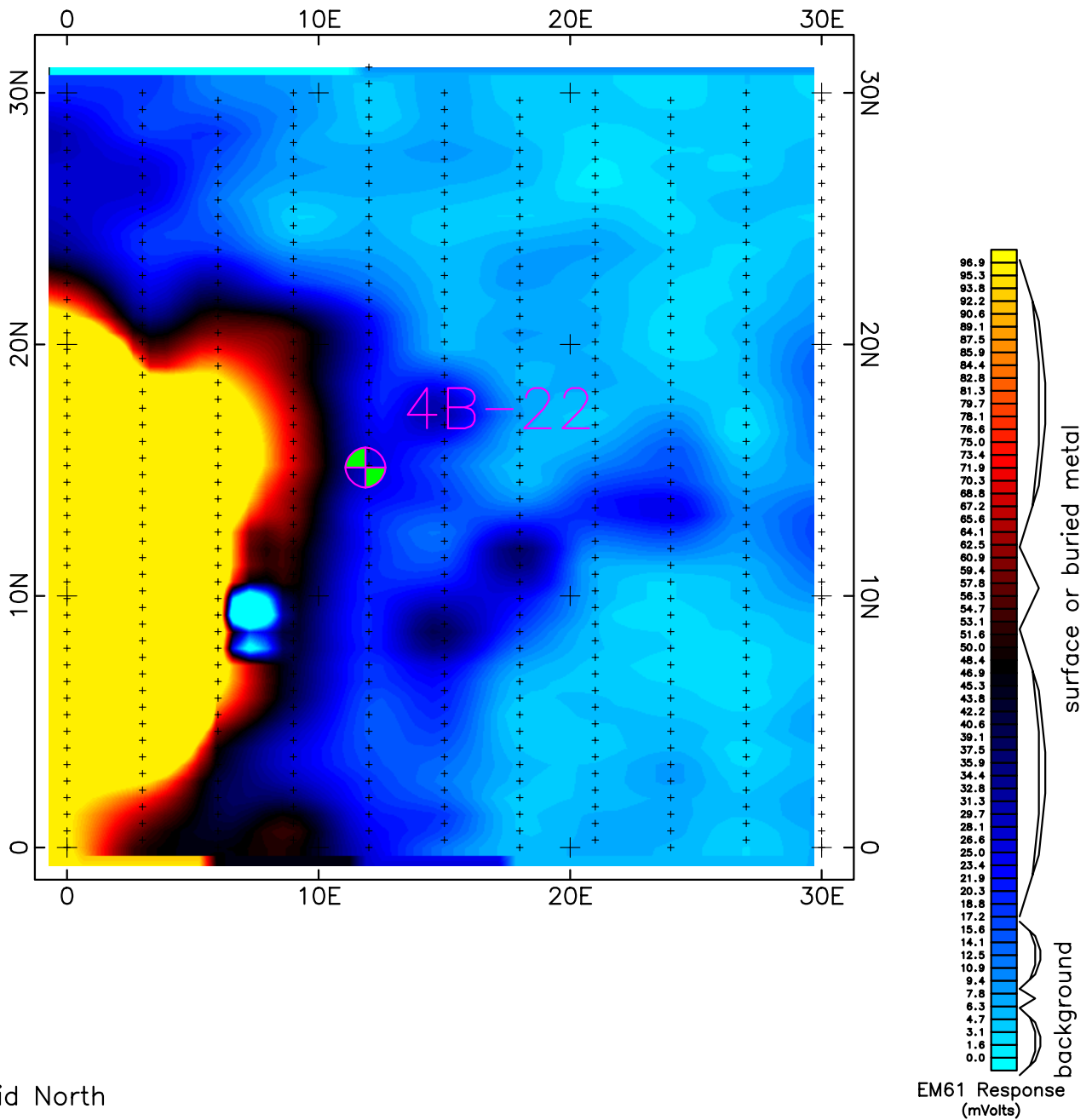
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(feet)

Figure A04B-21

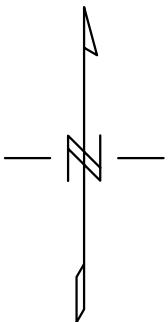
Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

4B21
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624



Grid North



5 0
(feet)

Figure A04B-22

Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

4B22
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624

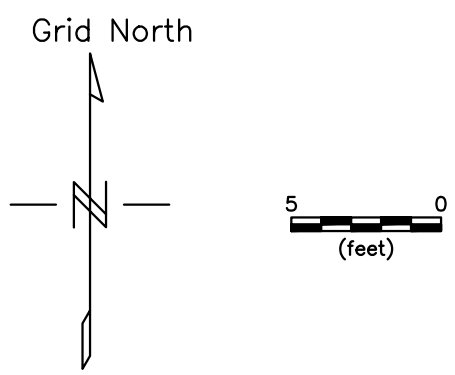
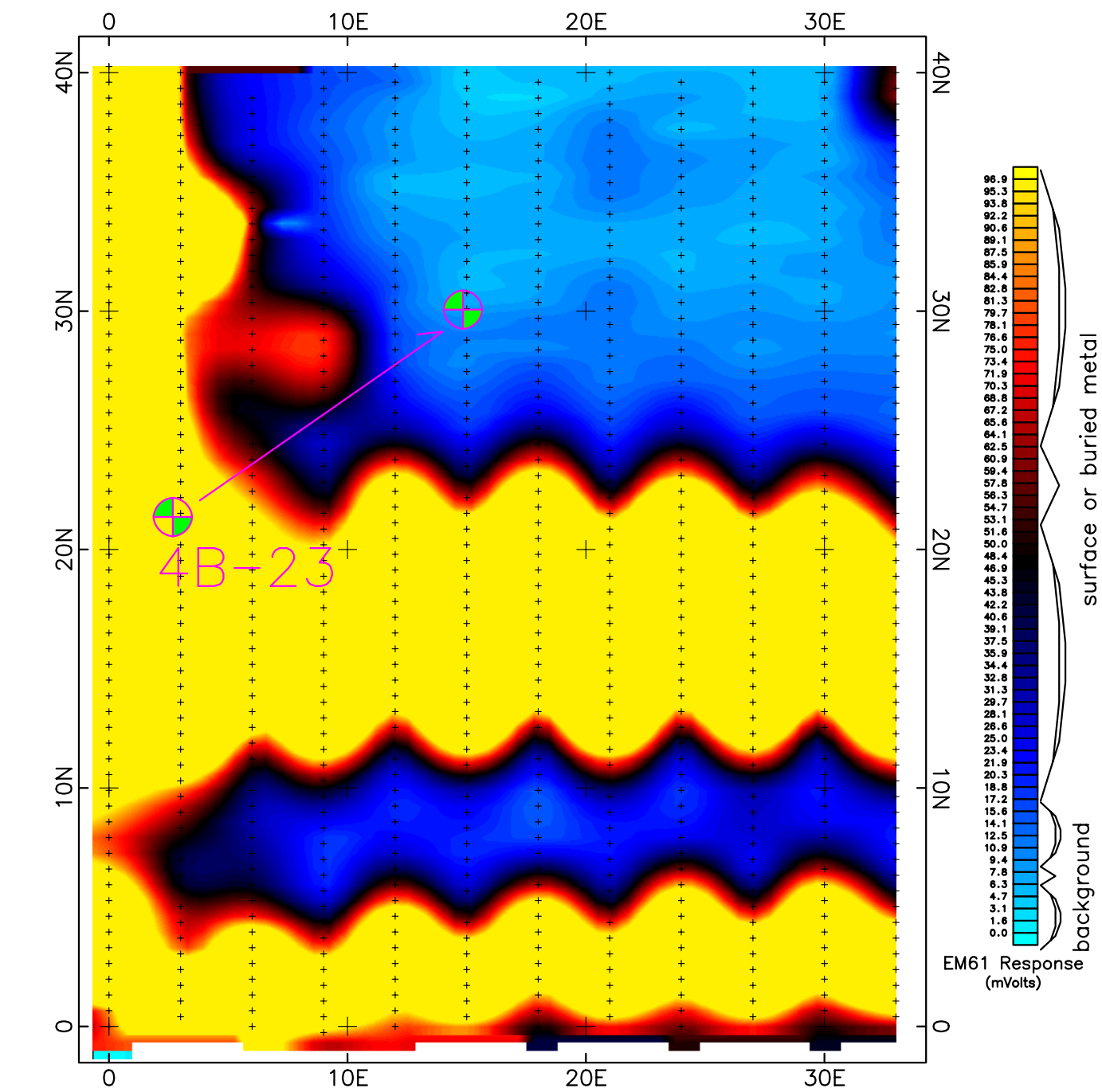
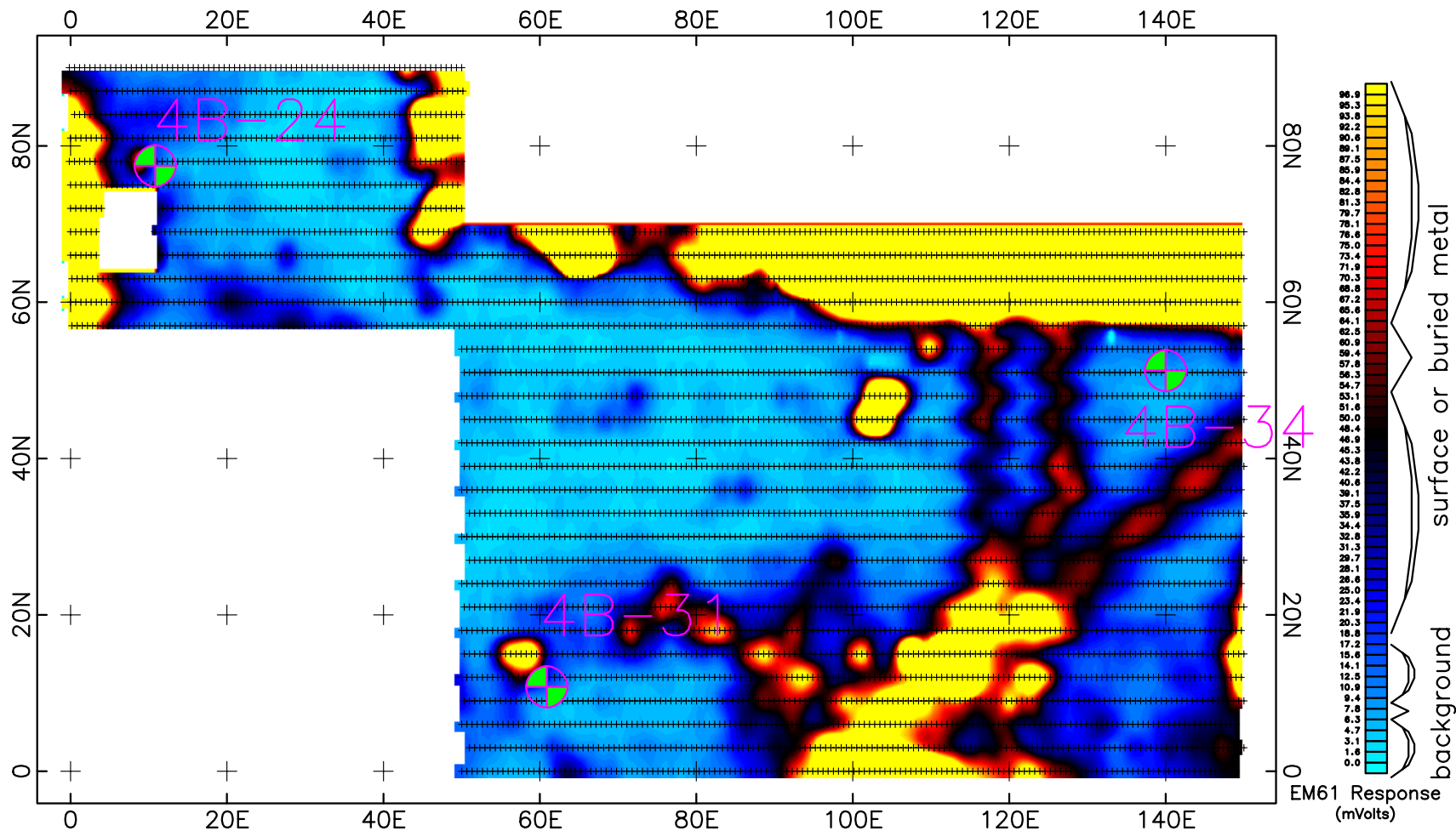


Figure A04B-23

Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

4B23
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624



Grid North

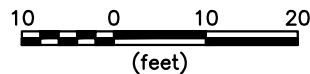
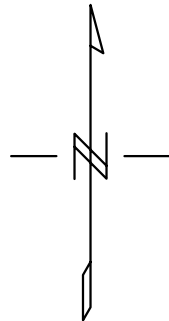


Figure A04B-24

Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

4B24, 4B31 AND 4B34
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624

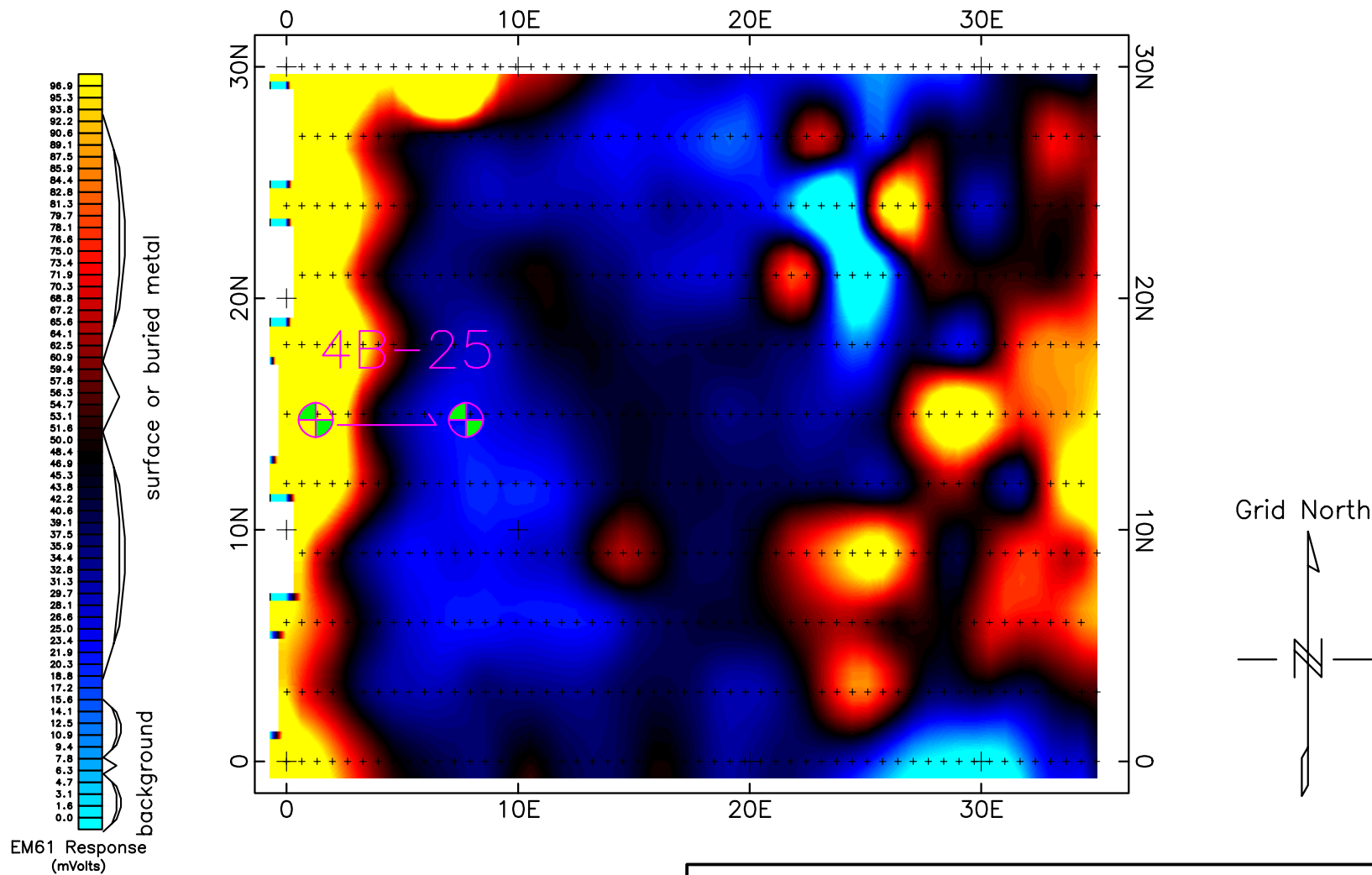
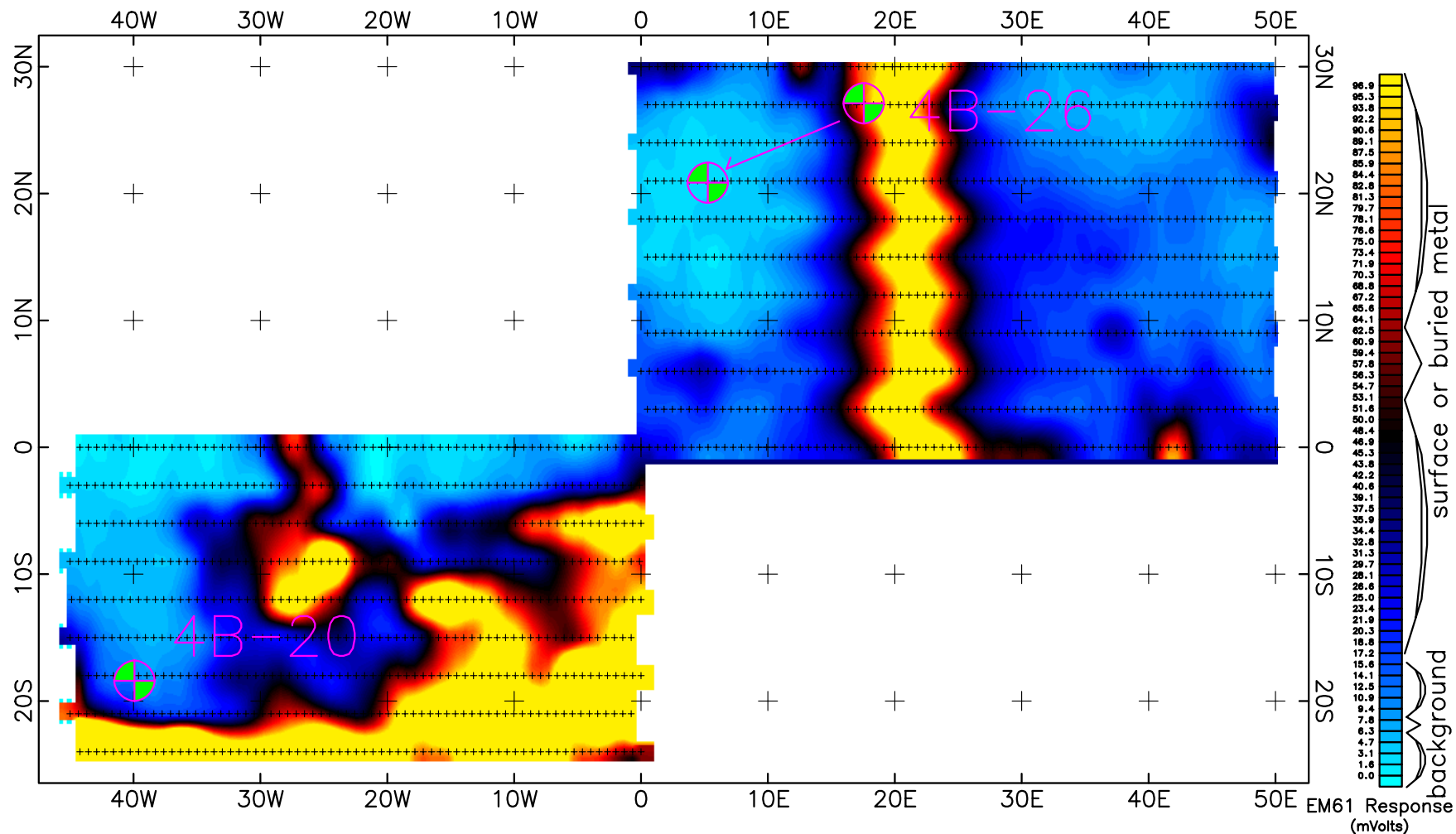


Figure A04B-25

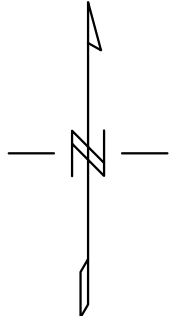
Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

4B25
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624



Grid North



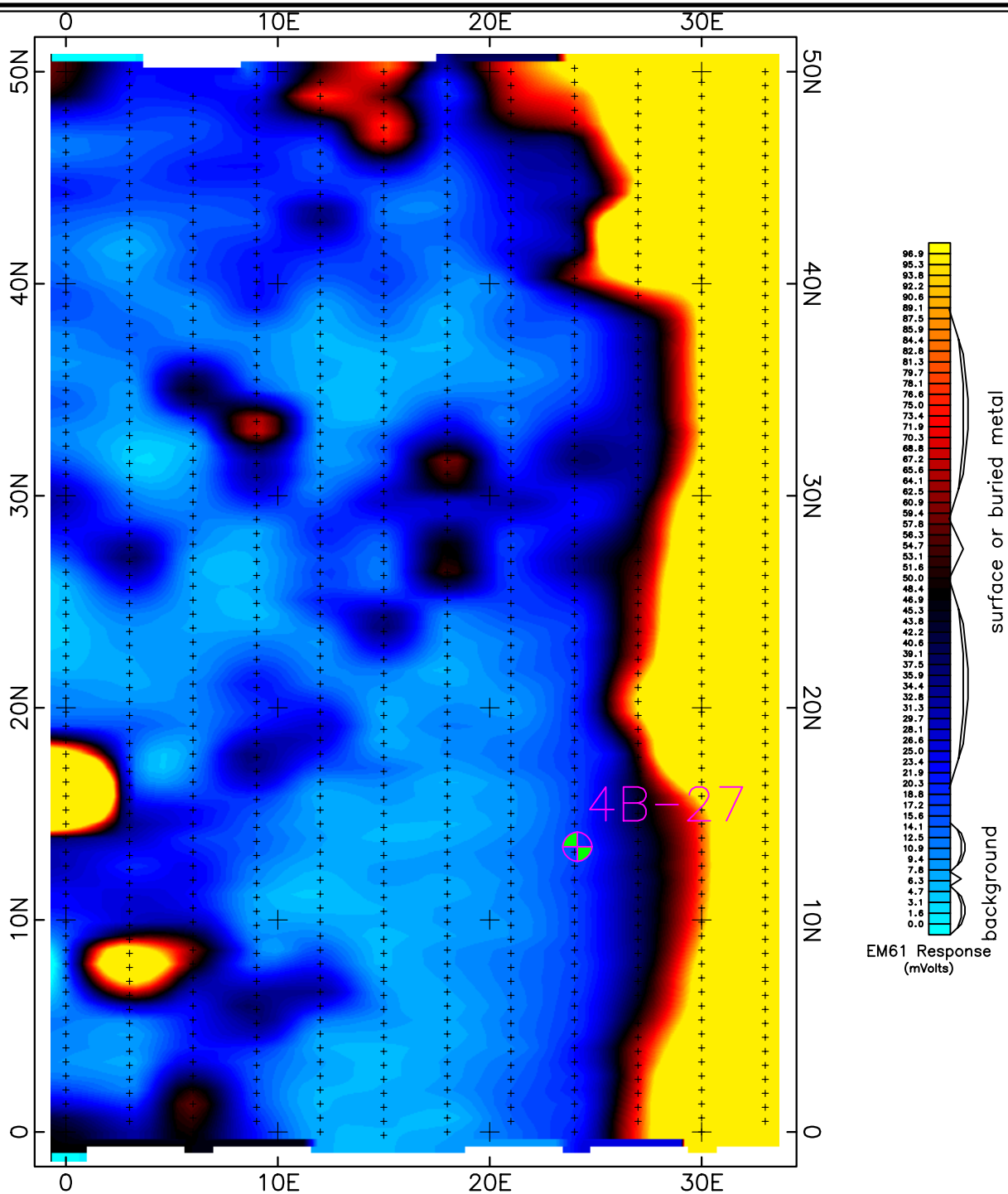
5 0 5 10 15
(feet)

Figure A04B-26

Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

4B26 and 4B20
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624



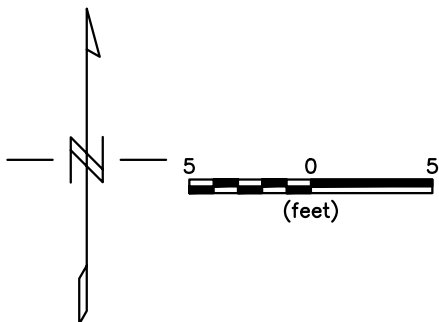
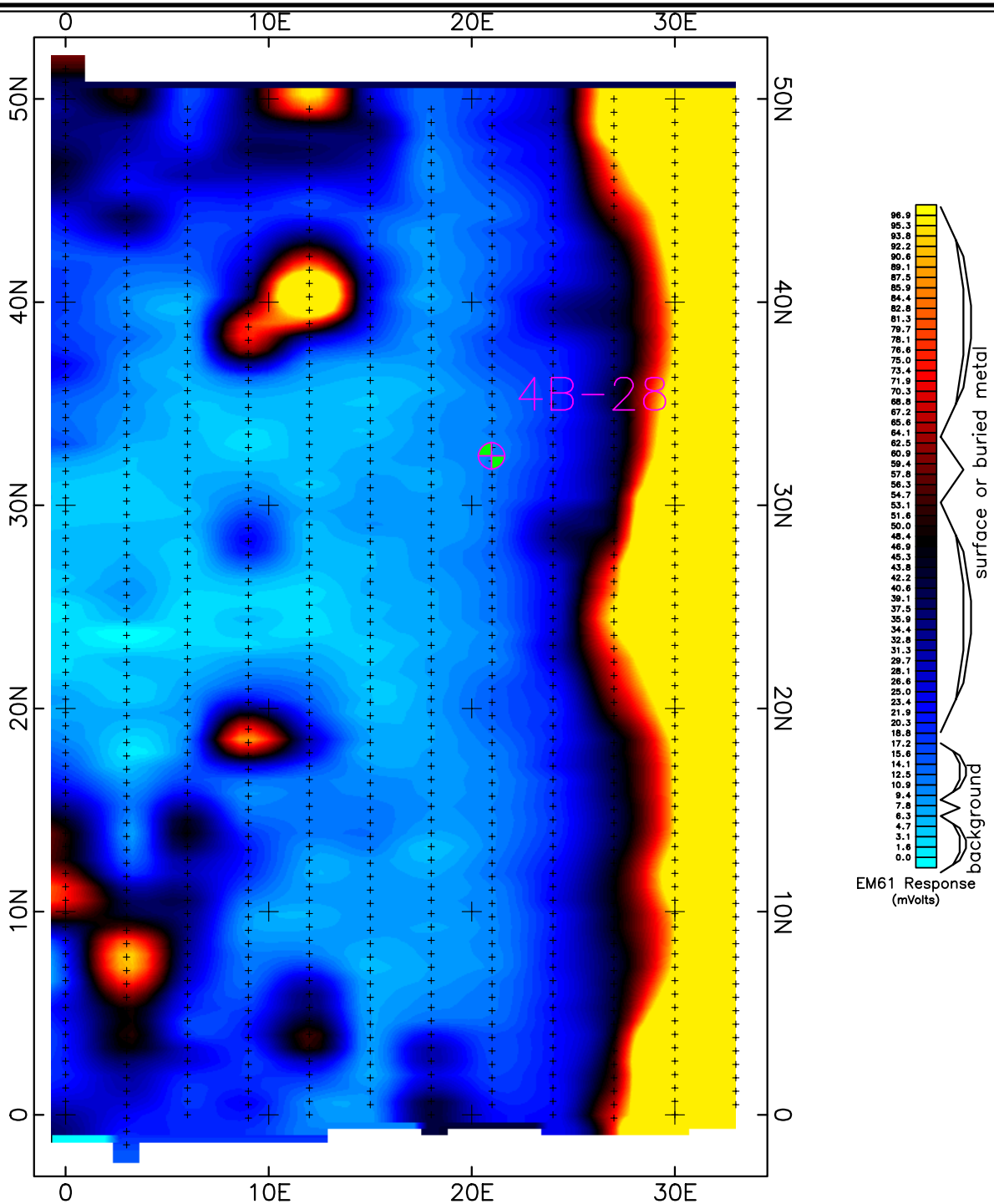
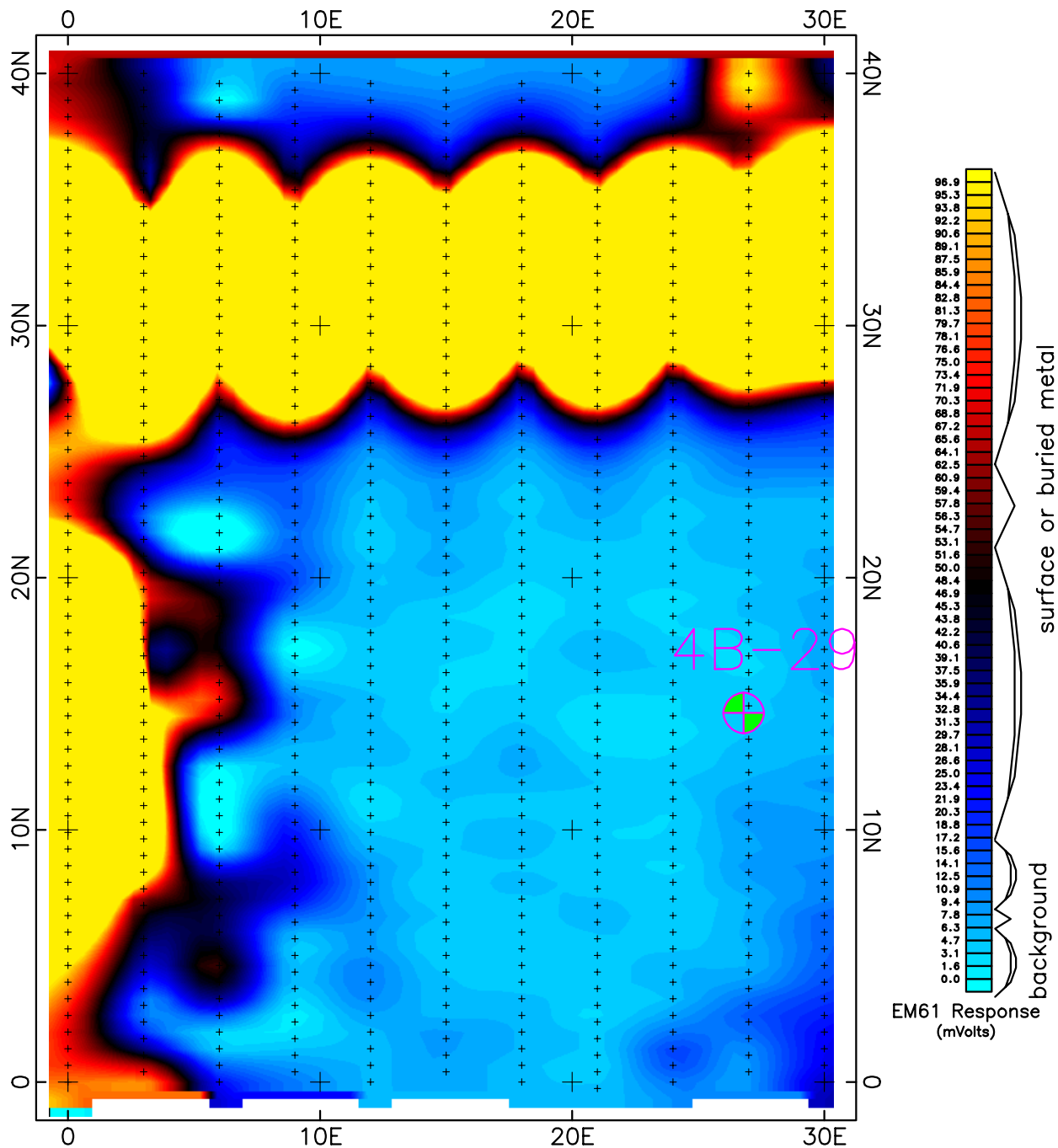


Figure A04B-28

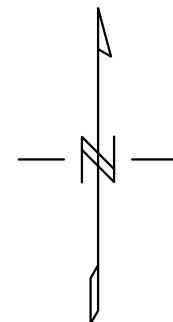
Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

4B28
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624



Grid North



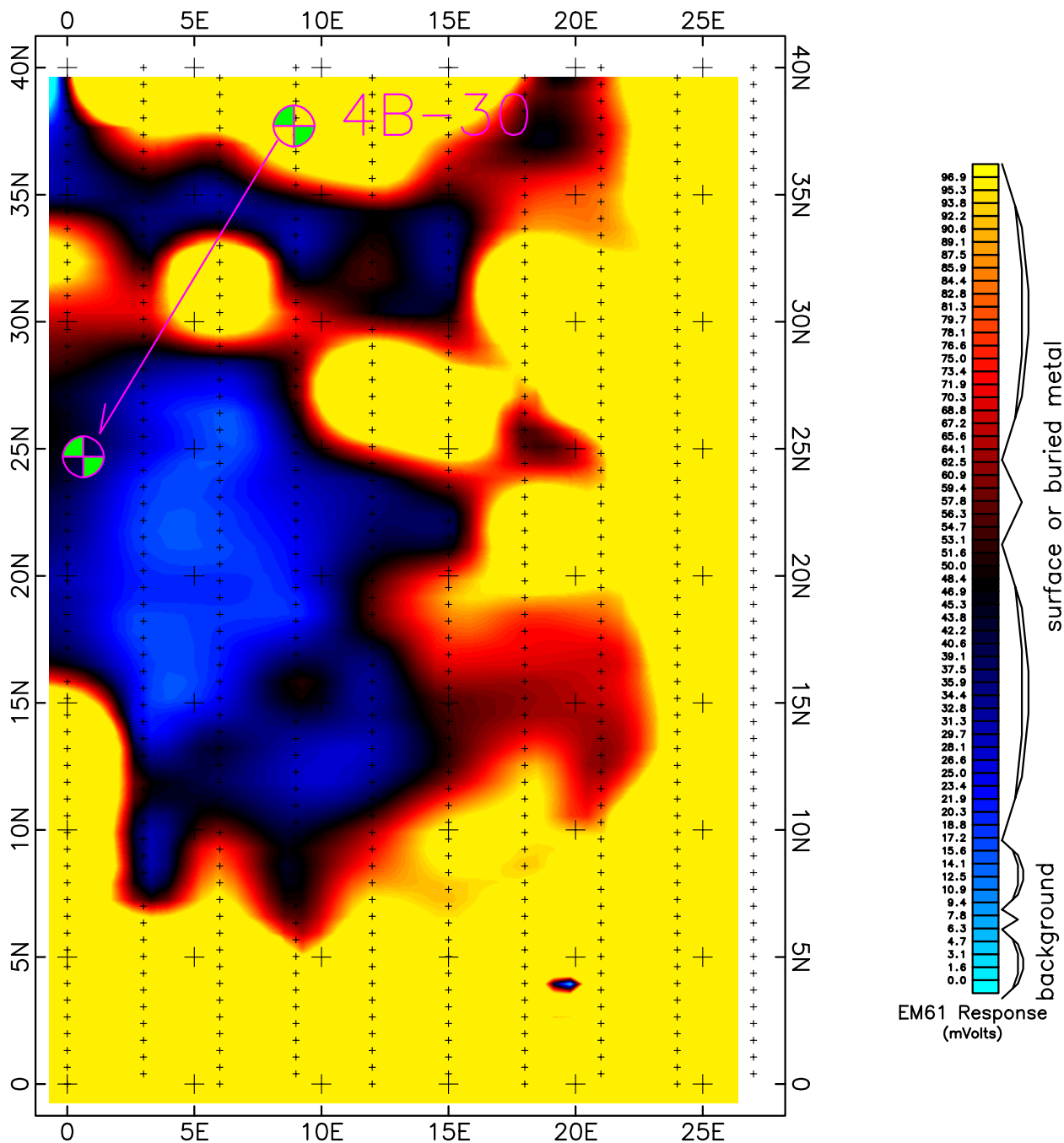
5 0
(feet)

Figure A04B-29

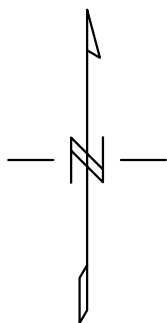
Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

4B29
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624



Grid North



2.5 0 2.5 5
(feet)

Figure A04B-30

Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

4B30
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624

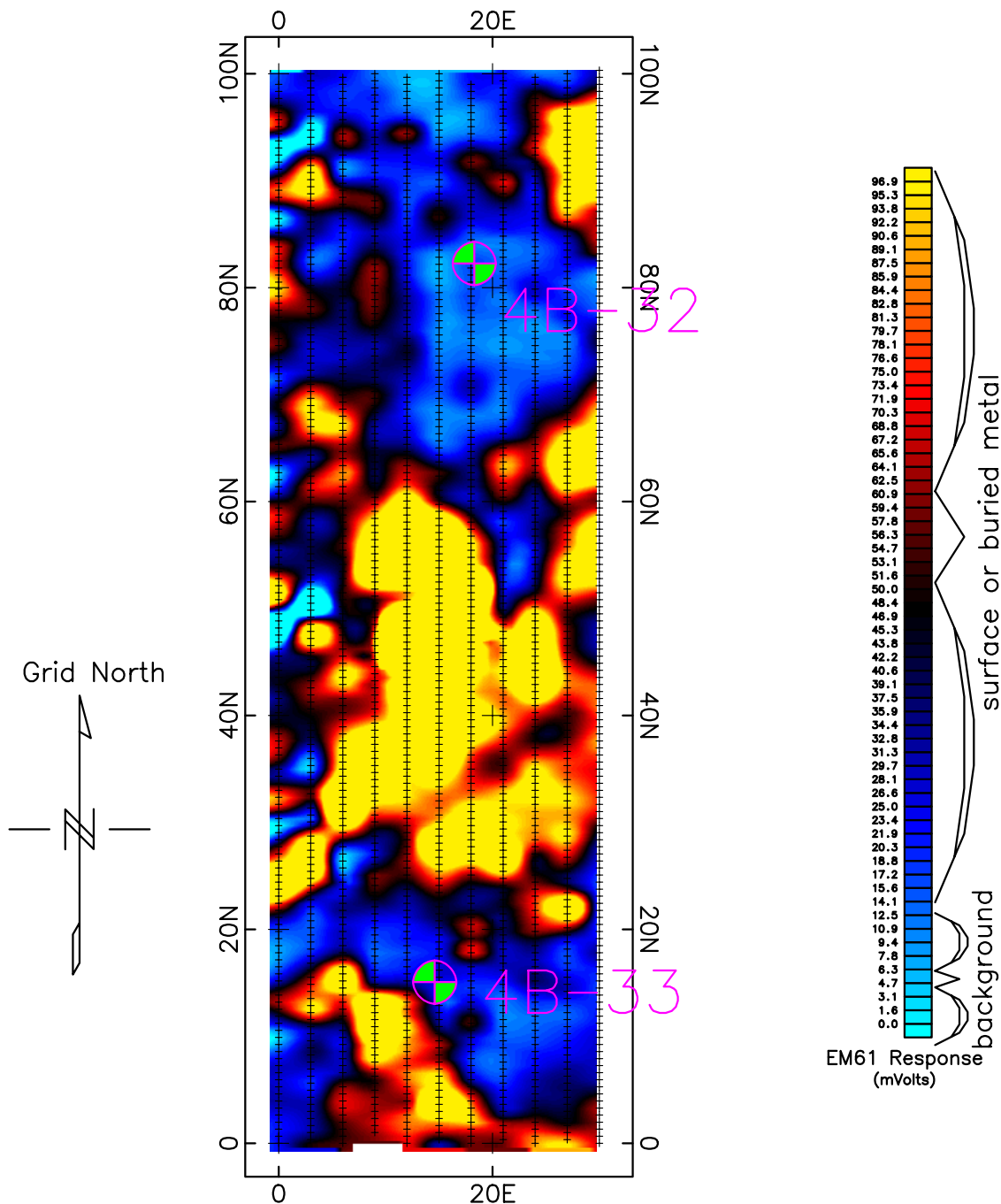
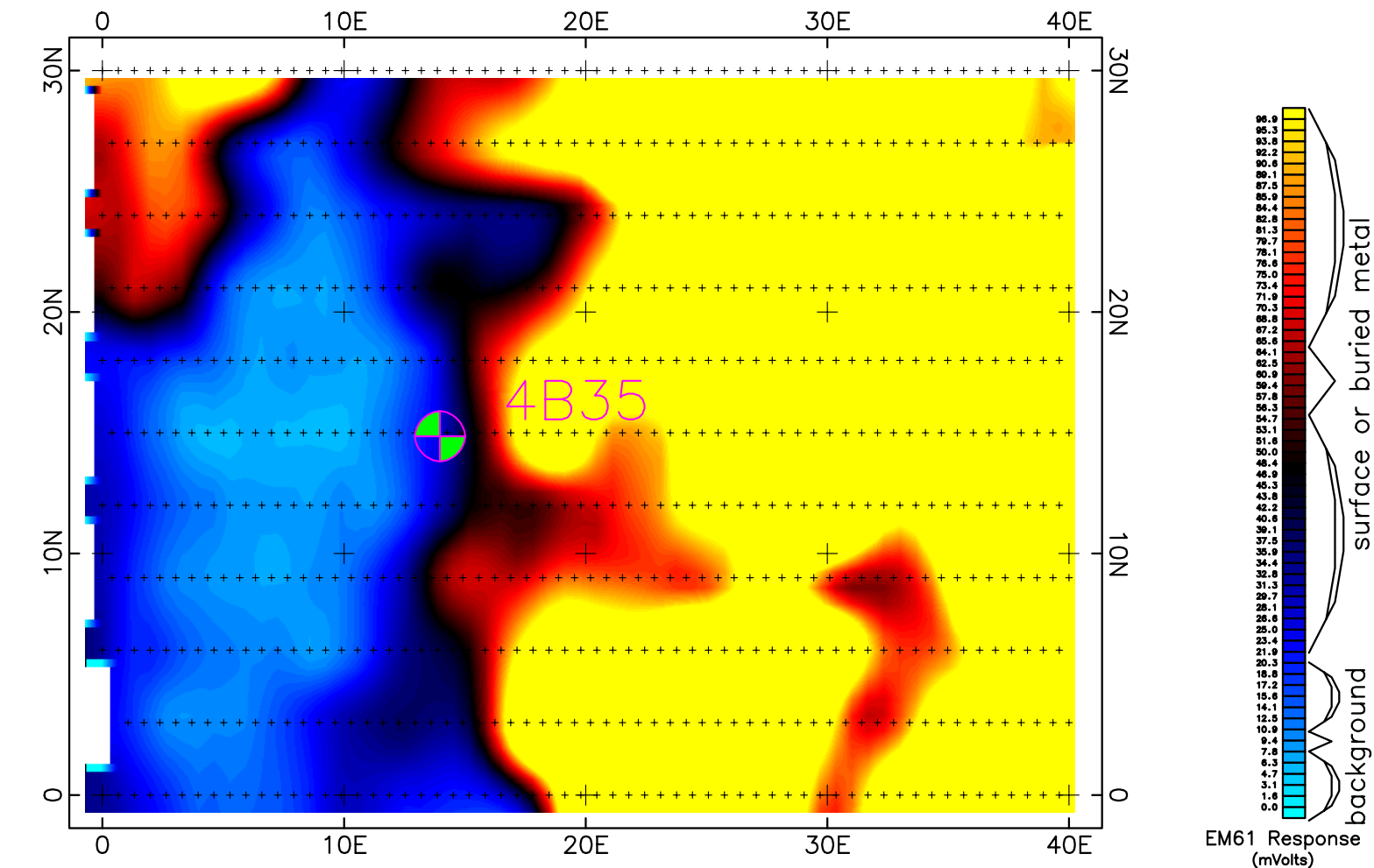


Figure A04B-32

Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

4B32 and 4B33
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624



Grid North

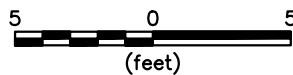
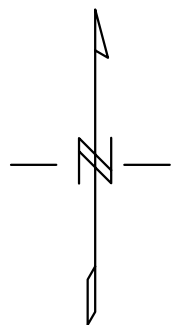
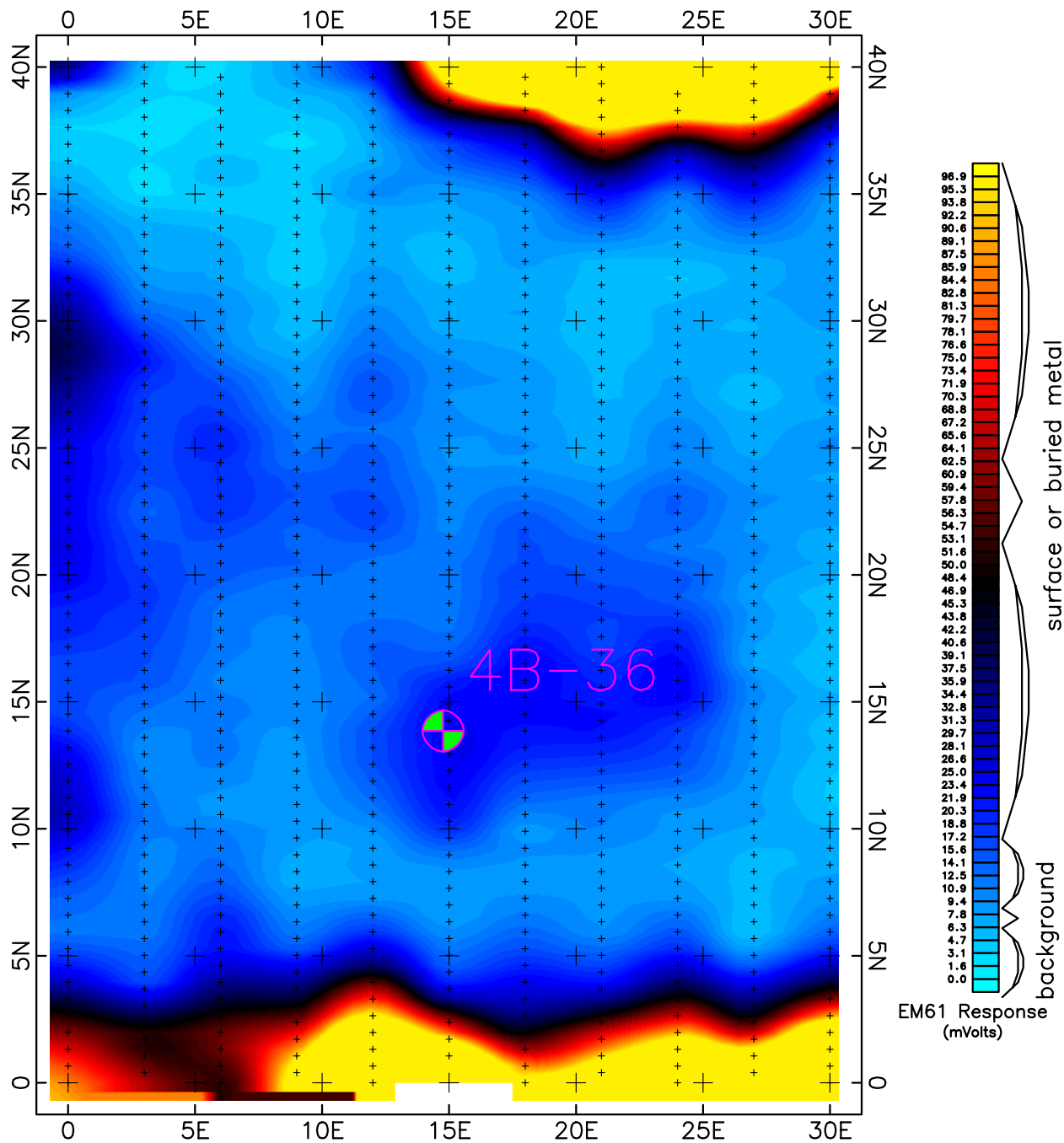


Figure A04B-35

Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

4B35
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624



Grid North

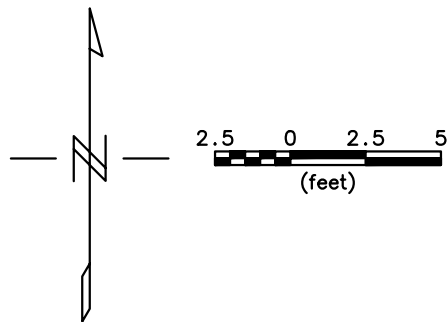
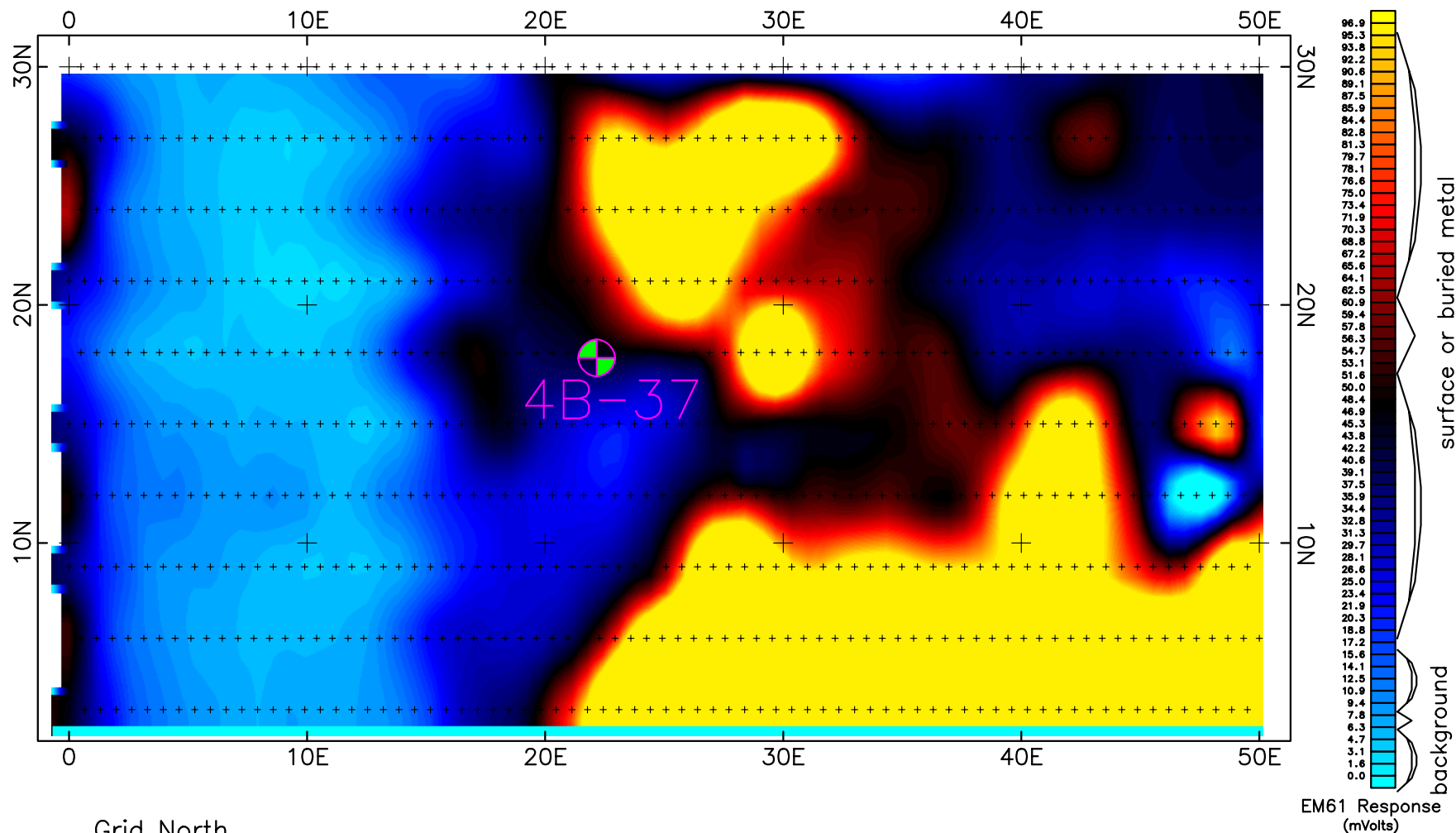


Figure A04B-36

Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

4B36
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624



Grid North

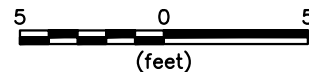
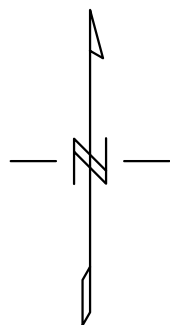


Figure A04B-37

Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

4B37
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624

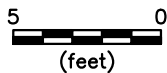
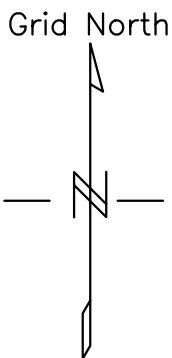
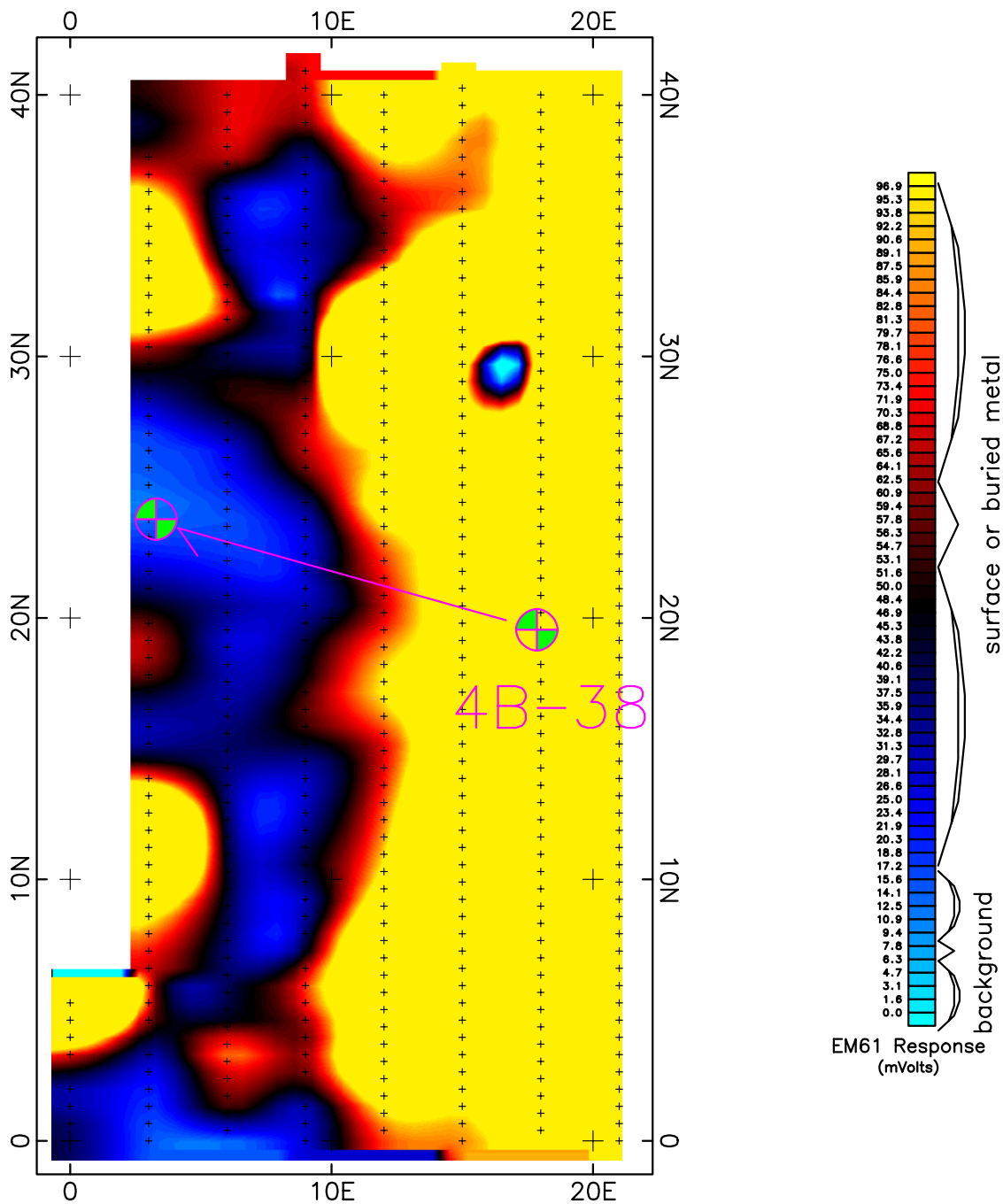
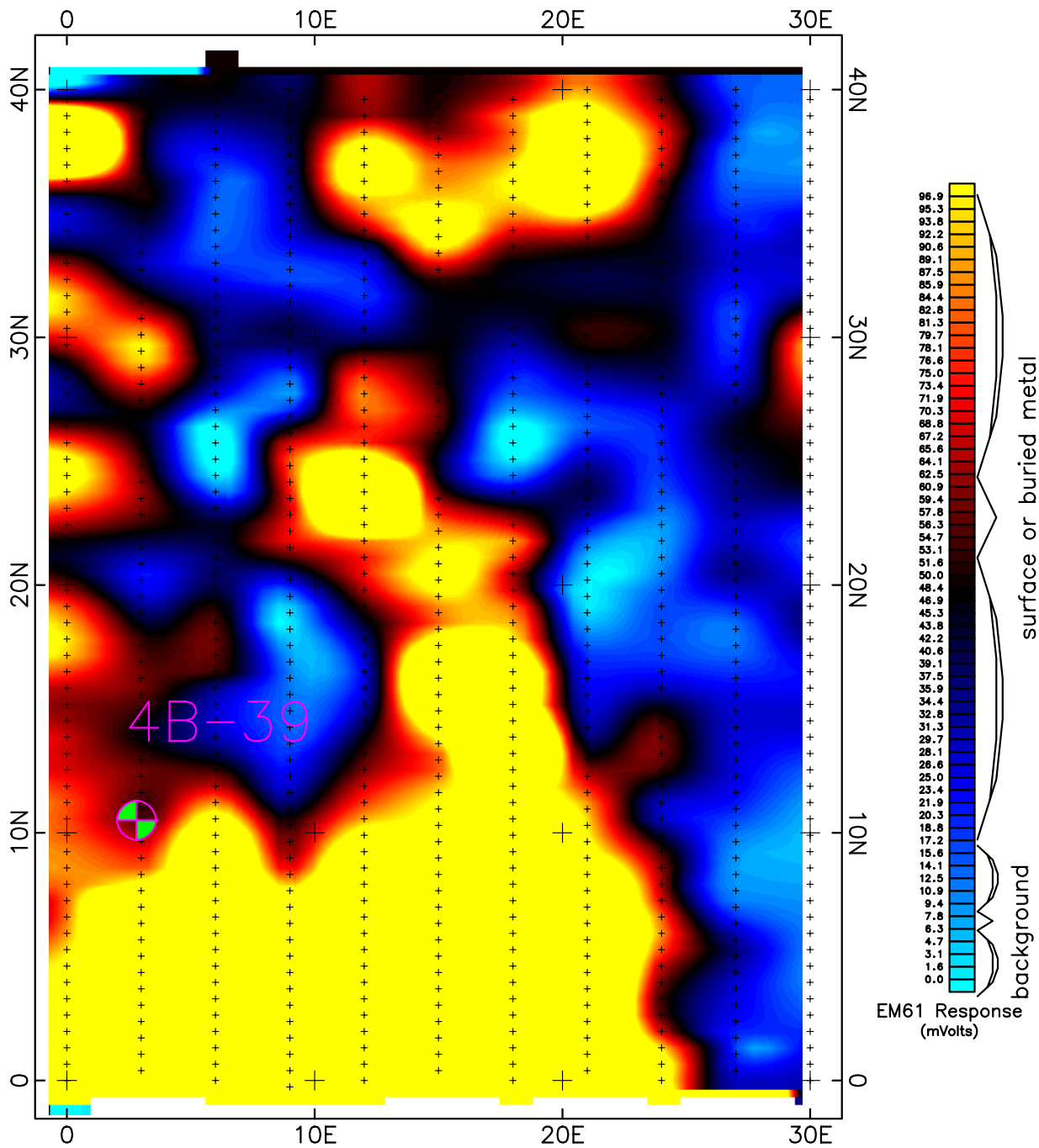


Figure A04B-38

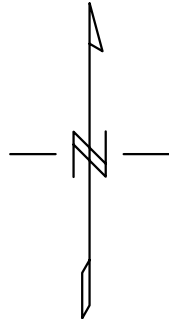
Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

4B38
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624



Grid North



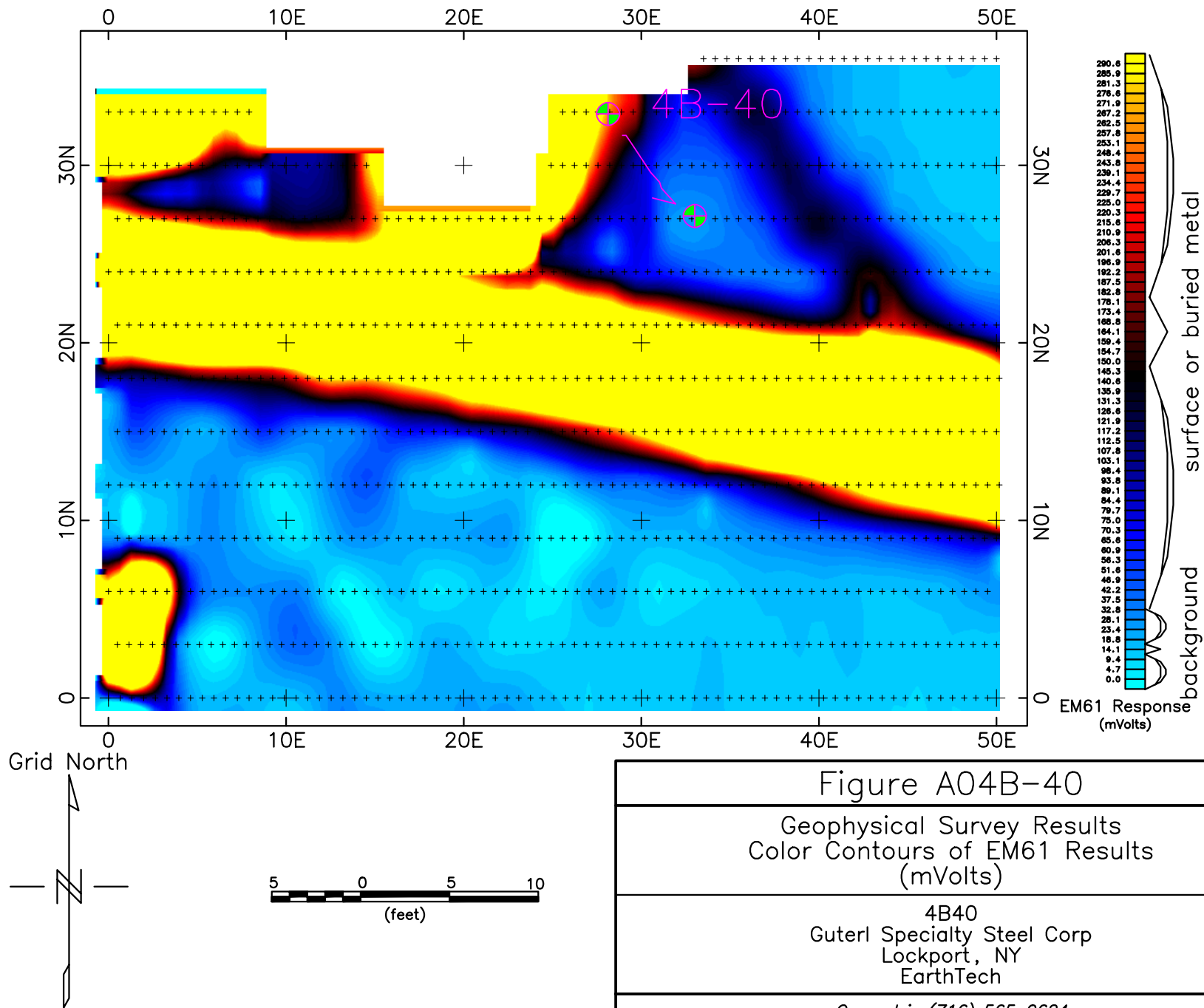
5 0
(feet)

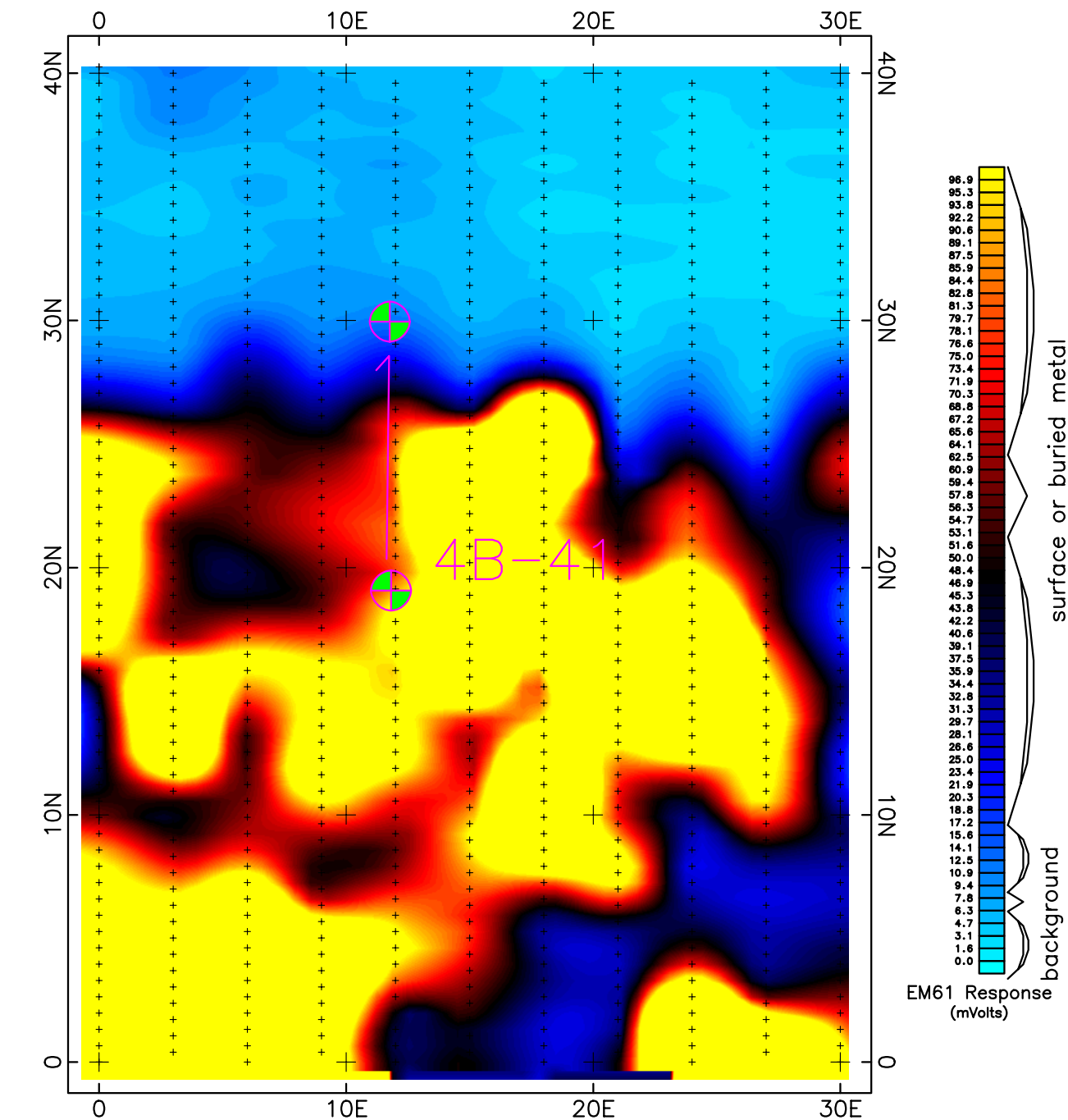
Figure A04B-39

Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

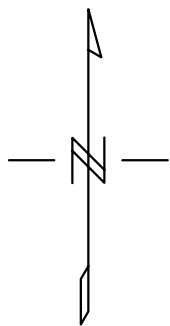
4B39
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624





Grid North



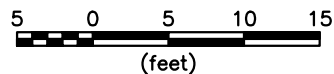
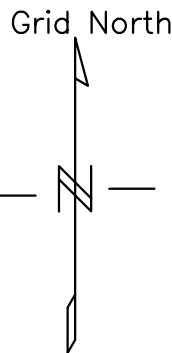
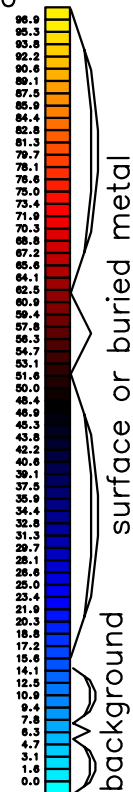
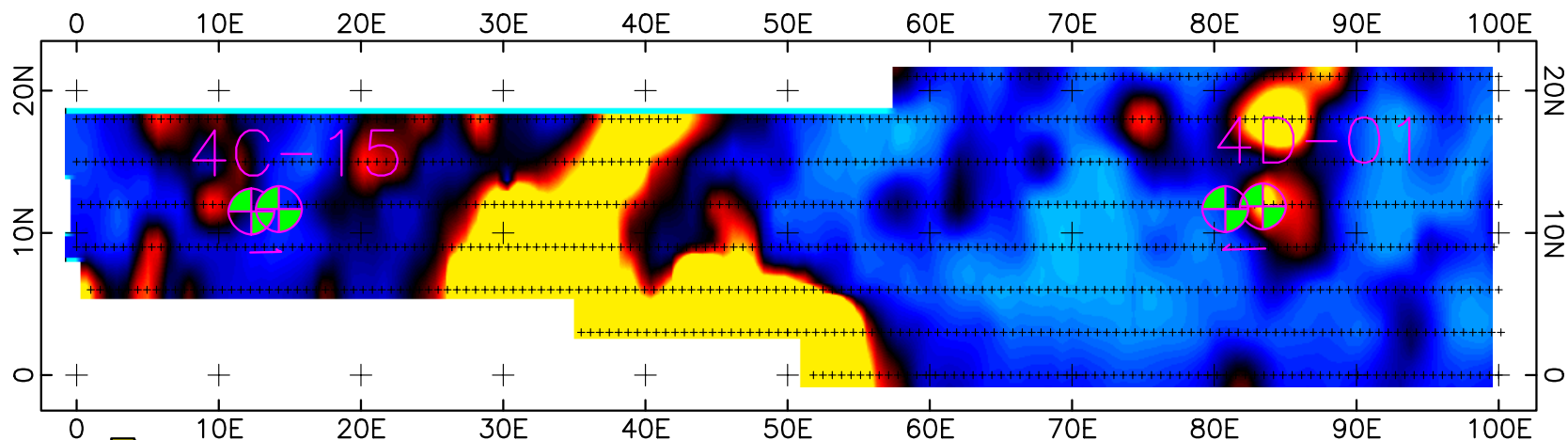
5 0
(feet)

Figure A04B-41

Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

4B41
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624

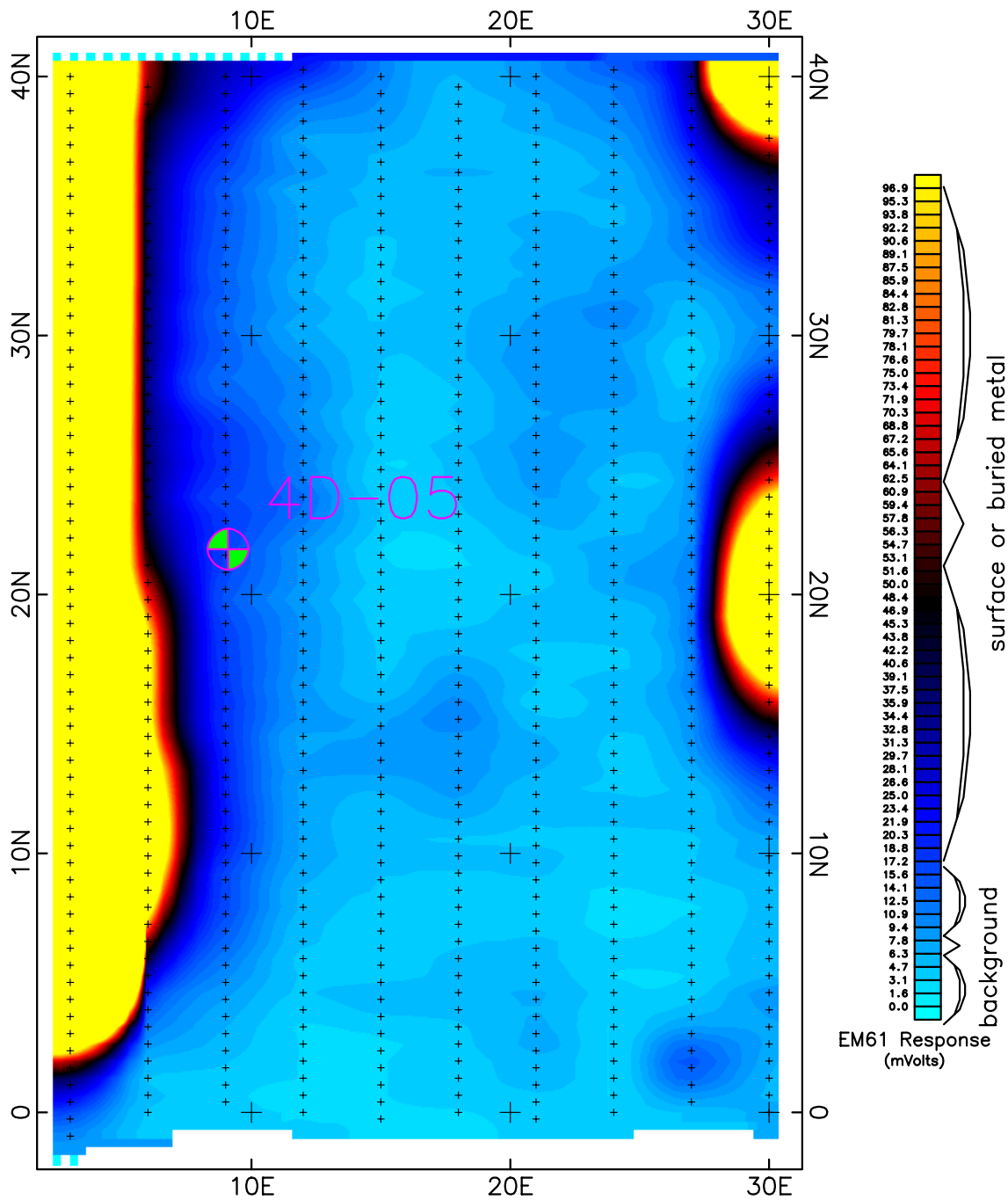


EM61 Response
(mVolts)

Figure A04D-01
Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

4D01 AND 4C15
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624



5 0
(feet)

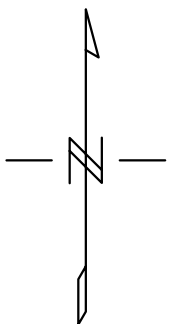


Figure A04D-05
Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

4D05
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624

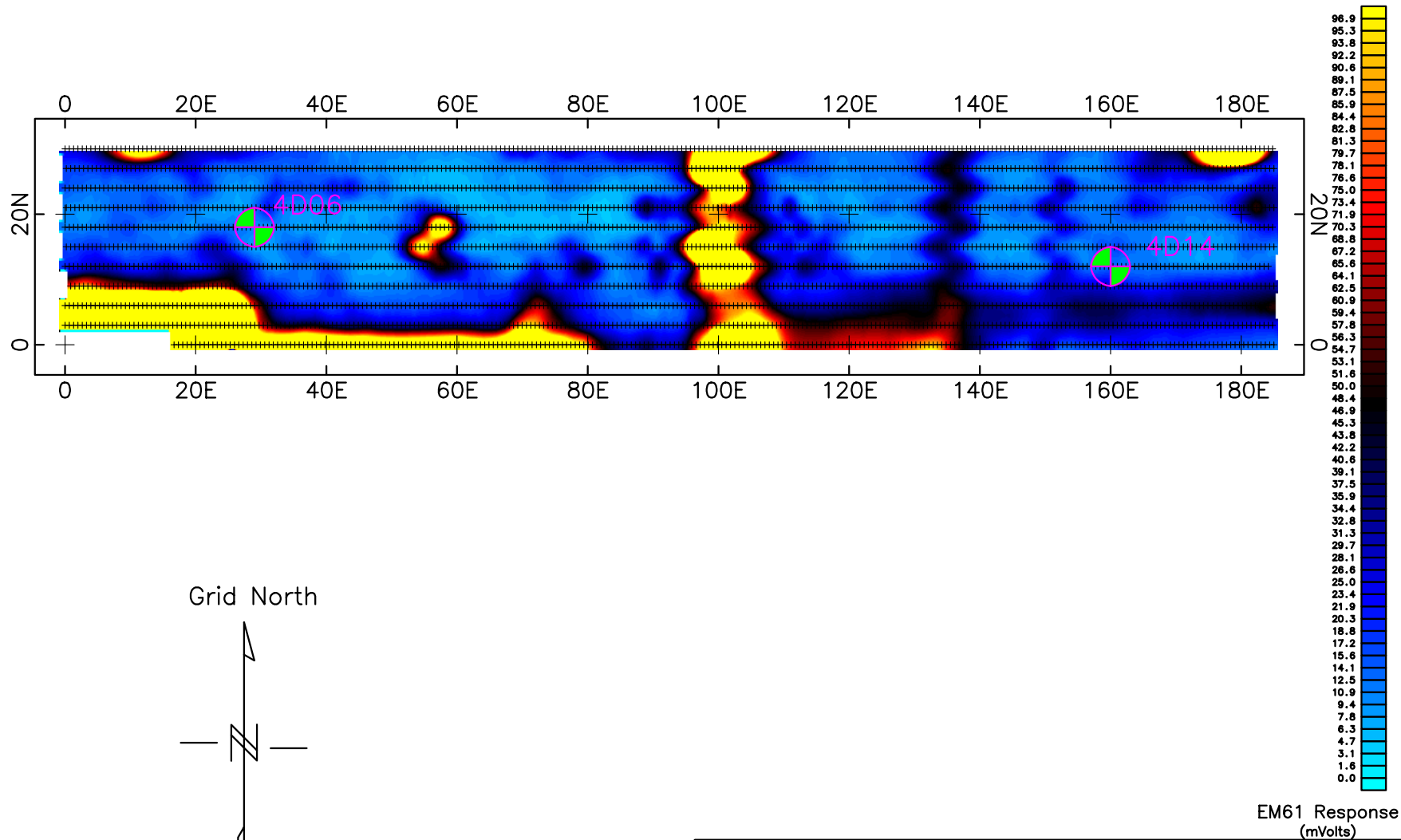
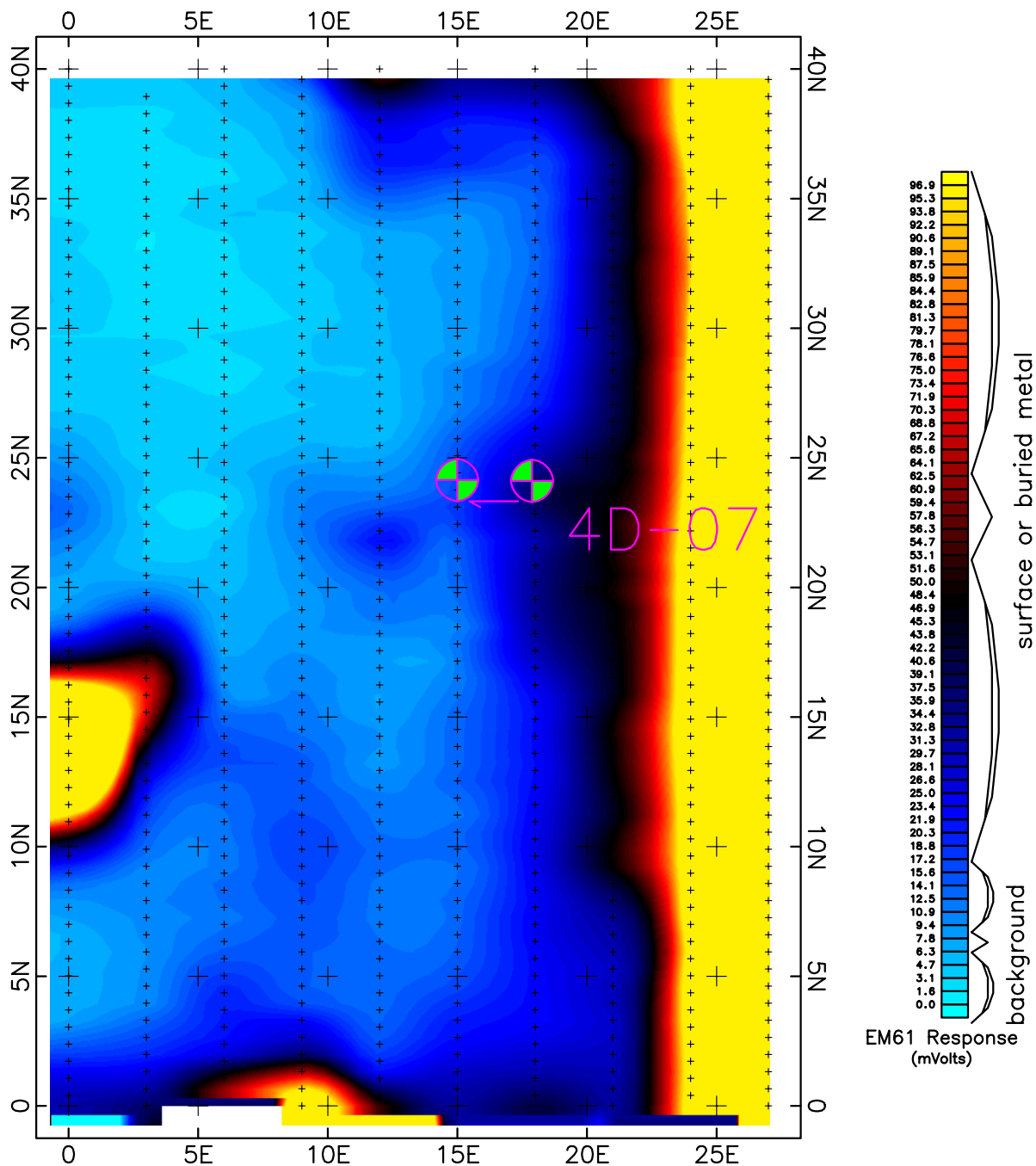


Figure A04D-06

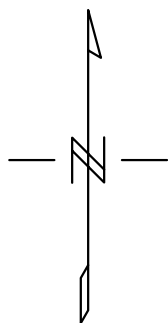
Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

4D06, 4D14
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624



Grid North



2.5 0 2.5 5
(feet)

Figure A04D-07

Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

4D07
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624

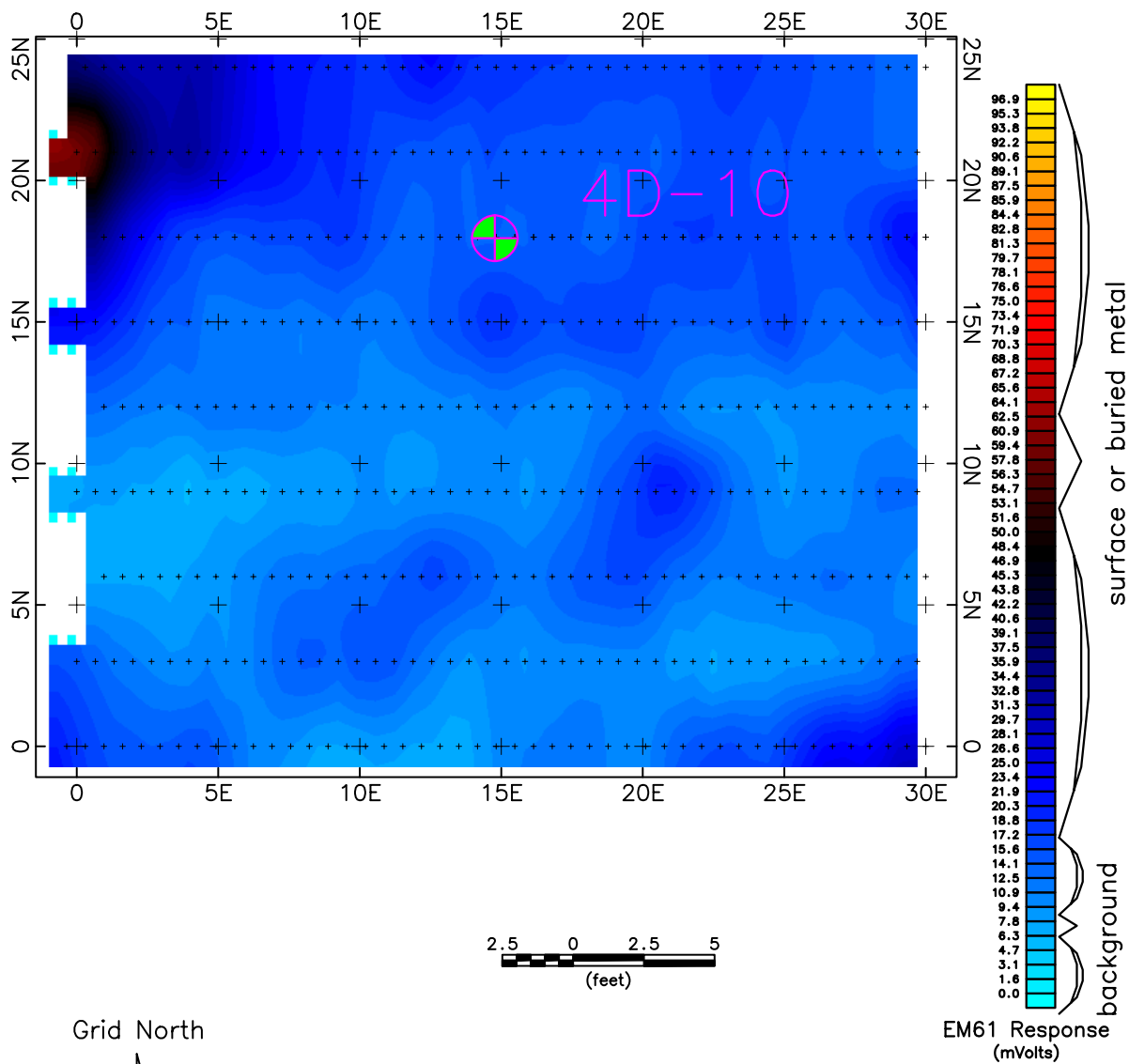
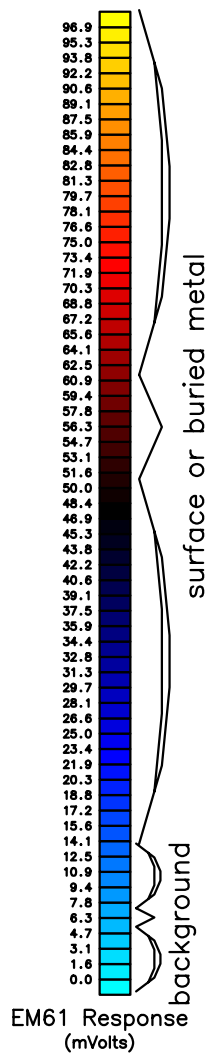
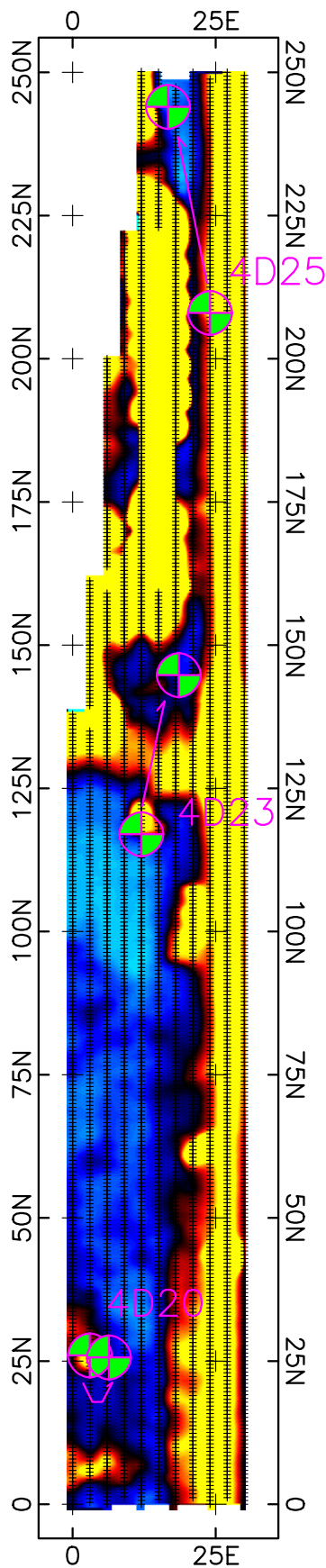


Figure A04D-10

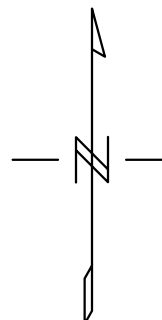
Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

4D10
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624



Grid North



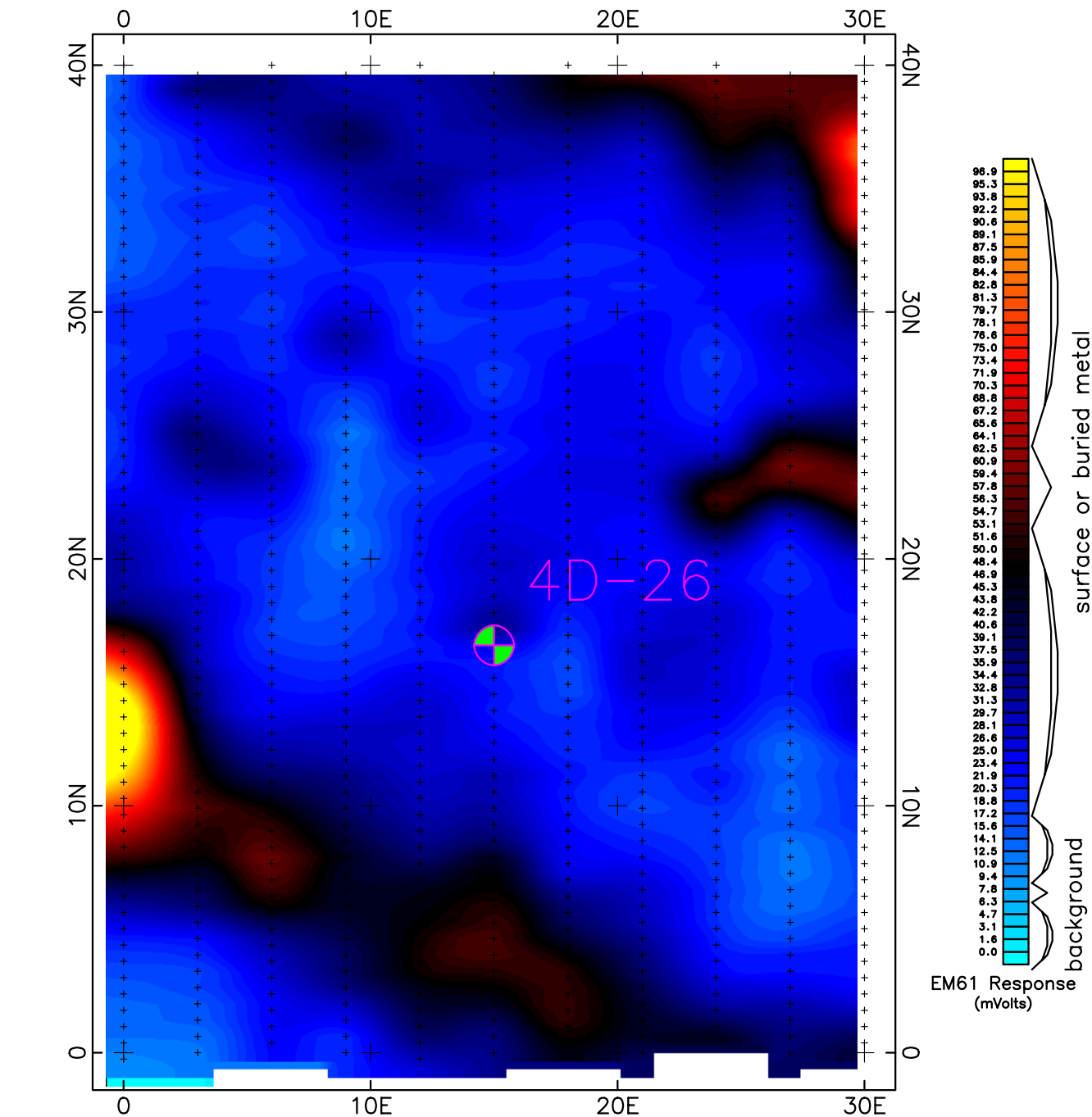
25 0
(feet)

Figure A04D-20

Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

4D20, 4D23, 4D25
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624



Grid North

5 0
(feet)

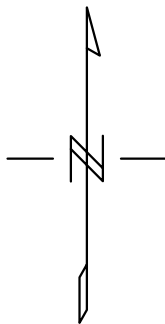
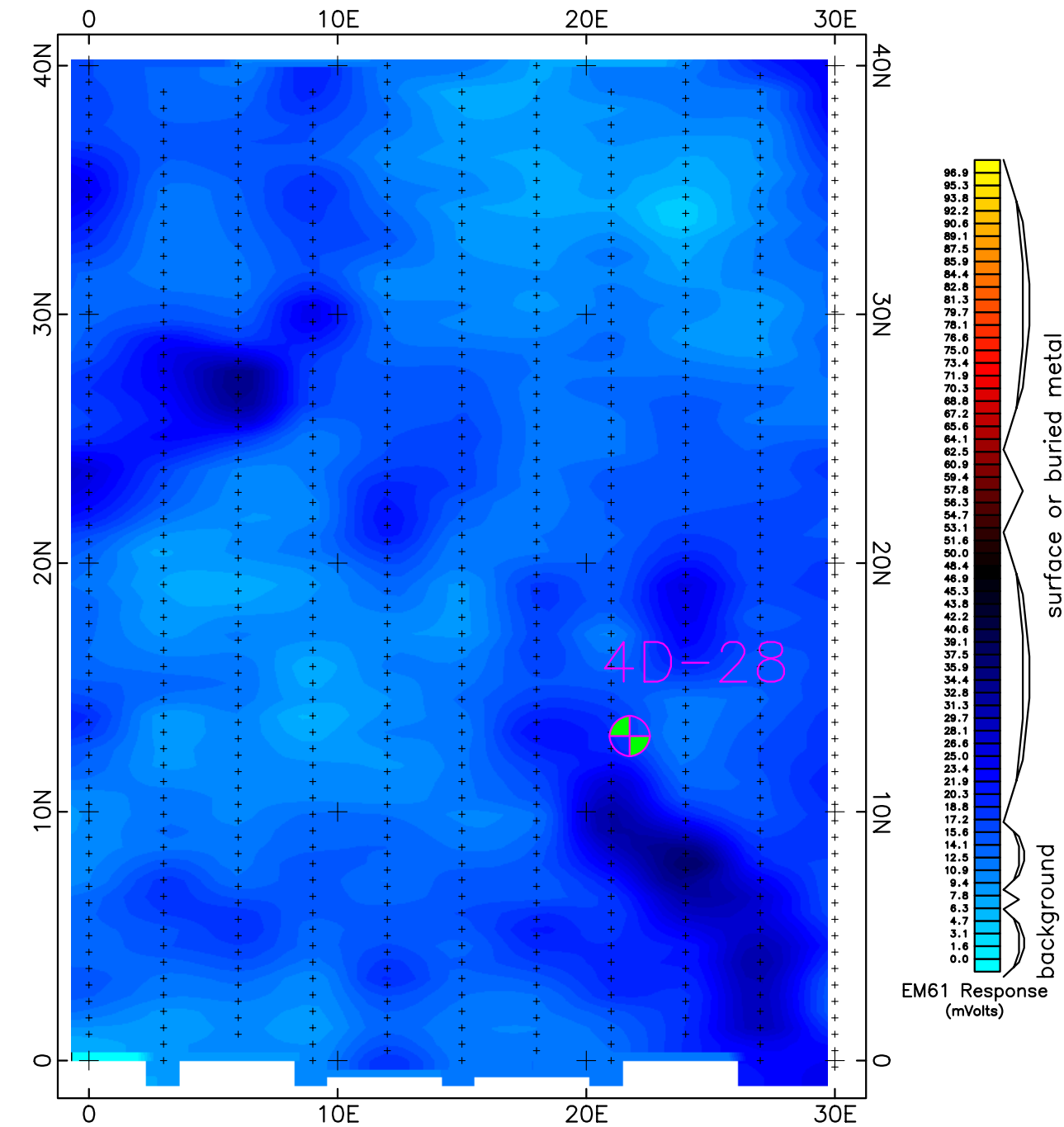


Figure AO4D-26

Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

4D26
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624



Grid North

5 0
(feet)

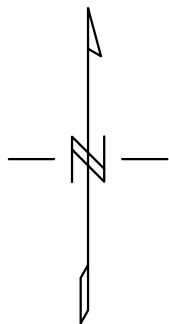


Figure A04D-28

Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

4D28
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624

November 26, 2007

██████████ ██████████
EarthTech, Inc.
University Corporate Centre
100 Corporate Parkway
Suite 341
Amherst, NY 14226

████████████████████
Re: Geophysical Survey Results –Additional Borehole Locations
Former Guterl Specialty Steel Site
Lockport, NY

This report presents the results of the geophysical investigation performed at the Former Guterl Specialty Steel Site in Lockport, NY (the Site).

INTRODUCTION

EarthTech are performing an environmental investigation at the site. Geomatrix previously performed a geophysical survey at the Site on August 13, 2007 and presented the results in a report dated September 10, 2007. Additional borings were required to further characterize site conditions. A total of 31 additional locations were identified for geophysical investigation to characterize subsurface interferences. The surveys were conducted in 3 Investigative Areas as follows:

A04A	11 locations
A04B	11 locations
A04D	9 location

The purpose of the geophysical investigation was to:

- reduce the risk of boreholes encountering buried utilities during the subsequent intrusive investigation.

Ground penetrating radar (GPR) and time domain electromagnetic (EM) methods were utilized at the Site.

The field methods and results of the investigation are presented below.

METHODOLOGY

Small subgrids were established around the area of the anticipated borings. For those borings in relatively close proximity to each other larger grids were installed to encompass more than one boring location. The EM data were collected along lines spaced 3 feet apart with a measurement made every 0.6 ft along those lines. The EM data were then gridded and plotted as a color plan map. This map shows the distribution of buried metals beneath the survey areas. Utilities are identified as linear trending buried metal anomalies.

With the EM data processed and in hand, the next phase of the investigation involved integrating GPR data and EM data. The purpose of using the GPR was twofold: it provided real time information concerning the presence of subsurface structures; and it provided an increased level of confidence in the survey as EM will not identify all buried utilities (i.e., non metallic, or minimally metallic as in direct buried cable). Subsequent to the EM and GPR work, standard pipe and cable tracing equipment (SeekTech SR-20) was employed to search for additional potential subsurface utilities.

ELECTROMAGNETIC SURVEY METHODOLOGY

The site was geophysically surveyed using the Geonics EM61. The EM61 unit is a high sensitivity, high resolution time domain electromagnetic (TDEM) metal detector that can detect both ferrous and nonferrous metallic objects. It has an approximate investigation depth of 10 feet. The processing console is contained in a backpack worn by the operator which is interfaced to a digital data logger. The transmitter and two receiver coils are located on a two-wheeled cart that is pulled by the operator.



EM equipment in use (photo not from this site)

The device's transmitter coil generates a pulsed primary EM field at a rate of 150 pulses per second, inducing eddy currents into the subsurface. The decay rates of these eddy currents are measured by two, 3.28 foot by 1.64 foot (1 meter by ½ meter) rectangular receiver coils. By taking the measurements at a relatively long time frame after termination of the primary pulse, the response is practically independent of the survey area's terrain conductivity. Specifically, the decay rates of the eddy currents are much longer for metals than for normal soils allowing the discrimination of the two.

Data are collected from the EM61's two receiver coils. One of the receiver coils is located coincident to the transmitter coil. The other receiver coil is located 1.31 feet (0.4 meters) above the transmitter coil. Data from the top receiver coil are stored on Channel 1 of a digital data logger. Data from the bottom receiver coil are stored on Channel 2 of the data logger. Channel 1 and Channel 2 data are simultaneously recorded at each station location. The instrument responses are recorded in units of millivolts (mV). Data were recorded digitally by a data logger at a rate of approximately 2 measurements per foot along the survey lines which were spaced 3 feet apart.

GROUND PENETRATING RADAR SURVEY METHODOLOGY

Ground penetrating radar works on the principle of inducing high frequency radio waves into the earth and recording the energy that is reflected back from depth. Depth of penetration is dependent on the transmitting frequency, the dielectric constant of the subsurface material and the electrical conductivity of the subsurface material and its pore fluid (i.e., depth of penetration is reduced in fine grained soils).

GPR reflections occur at interfaces between different materials. The magnitude and character of the reflections are dependent on the geometry of the reflecting interface and the change in the dielectric constant of the materials across that interface. A common misconception concerning GPR data that should be noted is that a GPR profile does not represent a 1-dimensional slice of the subsurface. Rather, as radar energy comes from a



GPR equipment (photo not from this site)

3-dimensional cone of material beneath the GPR transducer, features outside of the vertical line beneath the transducer may occur in a spatially incorrect position. For example, a point source (brick, cobble, etc) in the subsurface will exhibit a response similar in appearance to a hyperbola or inverted "U" on the radar profile. These hyperbolas are diffraction events from point sources in the subsurface. As the radar unit passes over the object, the radar wave travel time decreases until the radar unit is directly above the object. As the radar unit continues past the object, the travel time increases thereby forming a hyperbolic shaped reflection.

RESULTS

The geophysical data for this investigation are presented in a series of 8 Figures. Table 1 correlates the boring and Figure numbers. The color bar to the right of the figures indicates the colors associated with the instrument response. Areas suspected to be free of buried metals are shown as color shades of light blue. All areas exhibiting a response

greater than background (0 to 20 mVolts) likely contain buried metals. These areas are depicted in shades of dark blue through yellow on the figures.

There are additional subsurface anomalies observed in the geophysical data other than the linear utility-type anomalies. These areas are shown in color shades of dark blue through yellow on the figures. These anomalies may represent buried obstructions such as reinforced concrete, buried fence posts, or misc. buried metals remaining from site activities.

Boring locations are shown overlain on the figures. Some borings were moved to avoid interpreted buried utilities or subsurface interferences. The new locations are shown on the Figures at the end of arrows originating at the original proposed location.

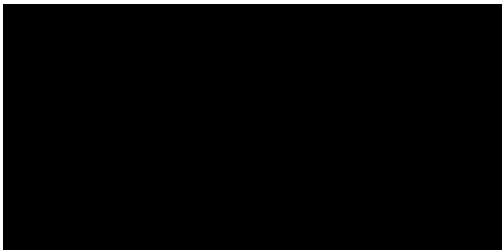
LIMITATIONS

The geophysical methods used during this survey are established, indirect techniques for non-invasive subsurface reconnaissance exploration. As these instruments utilize indirect methods, they are subject to inherent limitations and ambiguities. All geophysical methods utilize interpretative techniques that can be significantly impacted by varying site conditions. Geophysical anomalies can only be identified if they show recognizable patterns against data representative of background or natural conditions. Therefore, where possible, confirmation of any geophysical anomalies identified or interpreted should be sought through other investigative methods (i.e., the use of historical aerial photography, historical records, test pit, borehole information, etc.).

We trust the information contained in this report is sufficient for your present needs. Please do not hesitate to contact me if you have any questions or require additional information.

Yours very truly,

GEOMATRIX CONSULTANTS, INC.



Senior Geophysicist

Table 1

Boring Number	Associated first Round Boring Number	Figure Number
A04A- 314	A04A- 47	Figure 1
A04A- 315	A04A- 47	Figure 1
A04A- 316	A04A- 47	Figure 1
A04A- 317	A04A- 47	Figure 1
A04A- 310	A04A- 48	Figure 1
A04A- 311	A04A- 48	Figure 1
A04A- 312	A04A- 48	Figure 1
A04A- 313	A04A- 48	Figure 1
A04A- 306	A04A- 49	Figure 2
A04A- 307	A04A- 49	Figure 2
A04A- 308	A04A- 49	Figure 2
A04B- 13	A04B- 309	Figure 3
A04B- 13	A04B- 310	Figure 3
A04B- 13	A04B- 311	Figure 3
A04B- 13	A04B- 312	Figure 3
A04B- 42	NA	Figure 4
A04B- 43	NA	Figure 4
A04B- 18	A04B- 301	Figure 5
A04B- 18	A04B- 302	Figure 5
A04B- 18	A04B- 303	Figure 5
A04B- 18	A04B- 304	Figure 5
A04B- 41	A04B- 308	Figure 6
A04D- 23	A04D- 319	Figure 7
A04D- 23	A04D- 320	Figure 7
A04D- 23	A04D- 321	Figure 7
A04D- 26	A04D- 315	Figure 8
A04D- 26	A04D- 316	Figure 8
A04D- 26	A04D- 317	Figure 8
A04D- 26	A04D- 318	Figure 8
A04D- 28	A04D- 313	Figure 8
A04D- 28	A04D- 314	Figure 8

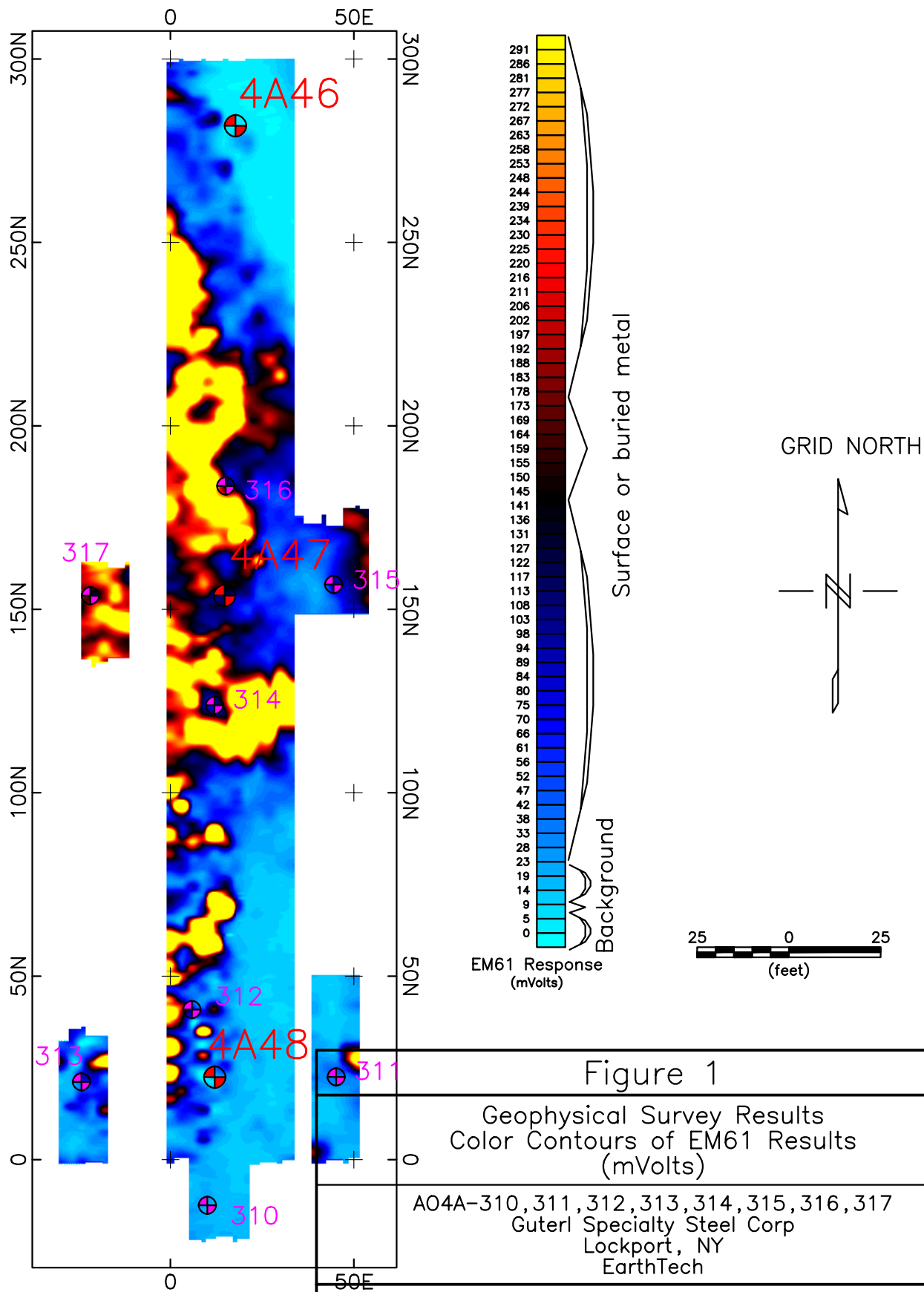
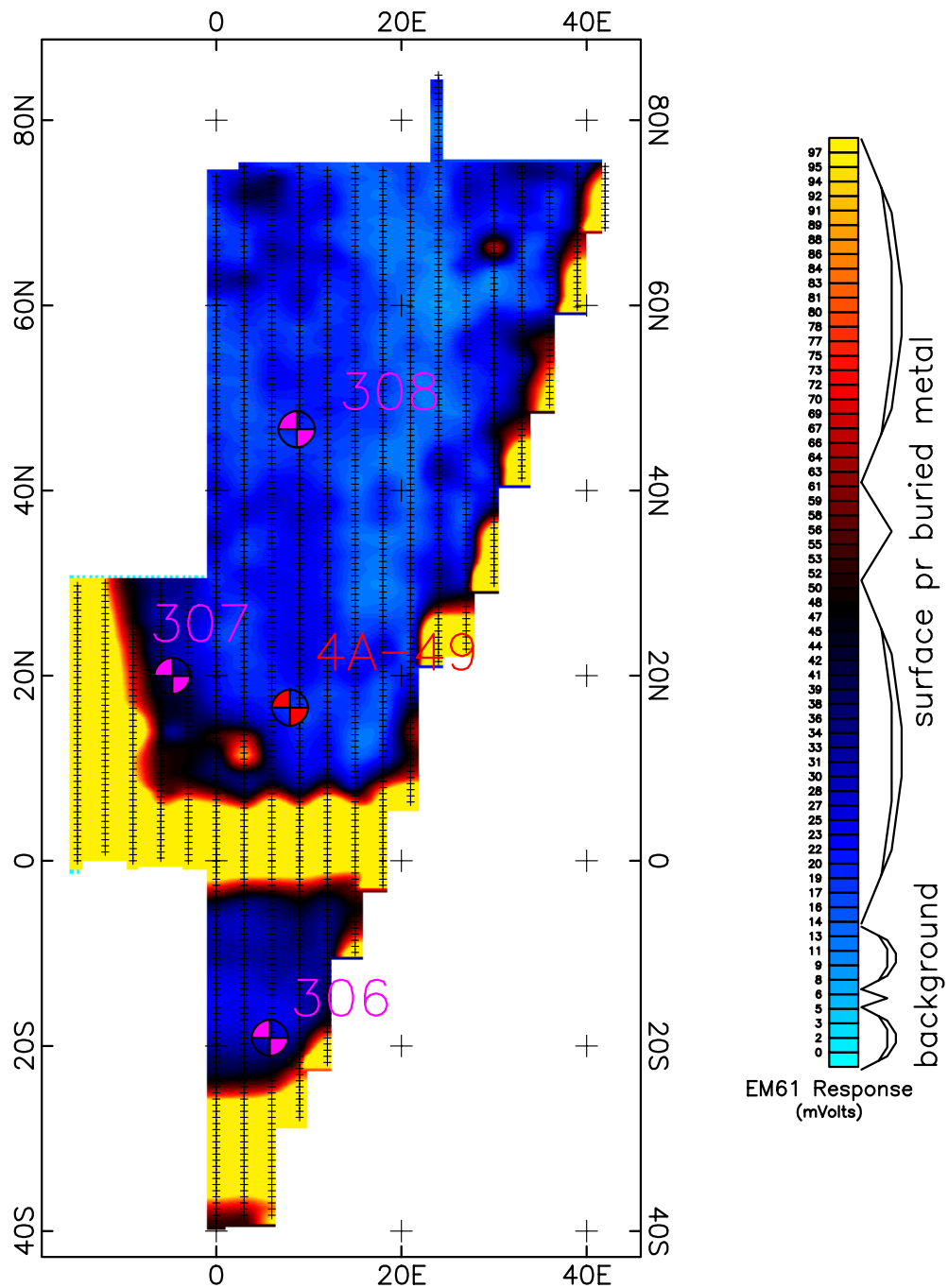


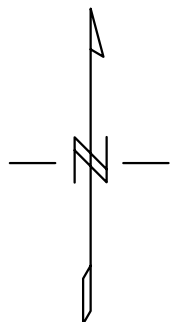
Figure 1

Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

A04A-310, 311, 312, 313, 314, 315, 316, 317
Guterl Specialty Steel Corp
Lockport, NY
EarthTech



Grid North



10 0 10
(feet)

Figure 2

Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

A04A-49 306, 307, 308
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624

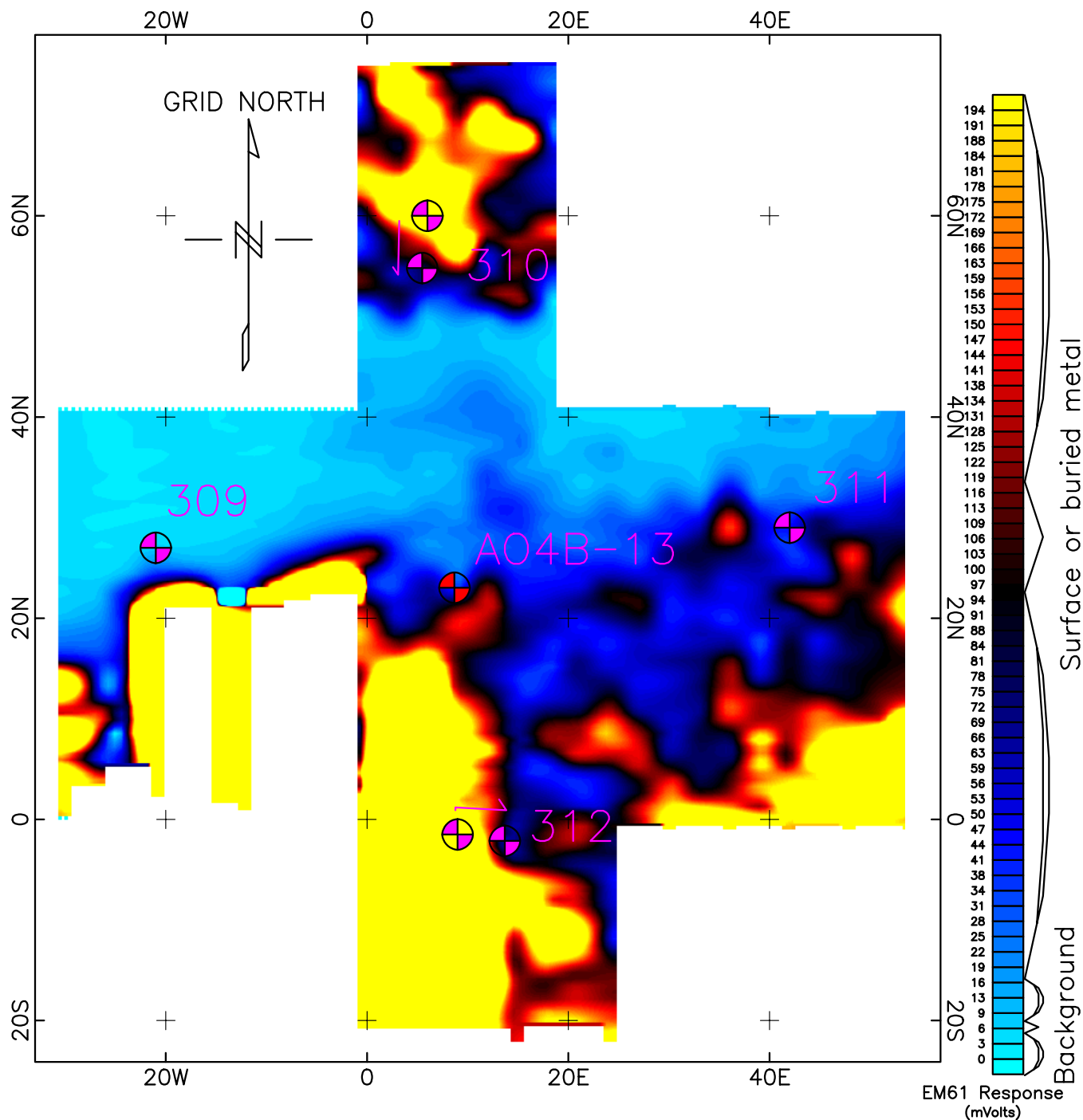
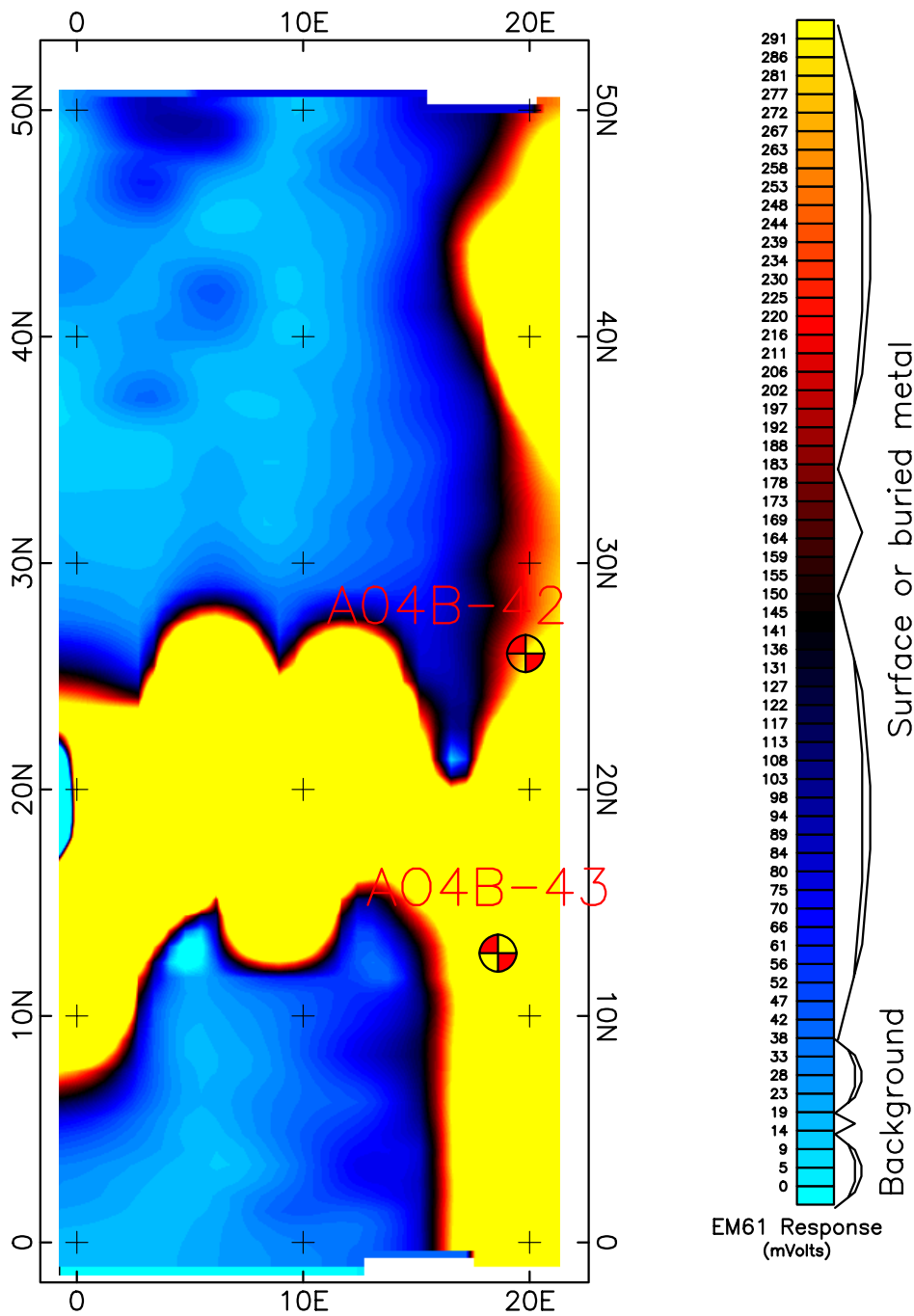


Figure 3

Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

A04B-13 309, 310, 311, 312
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624



Grid North

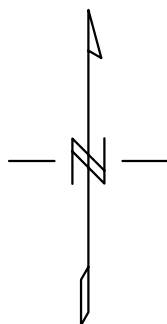


Figure 4

Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

A04B-42, A04B-43
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624

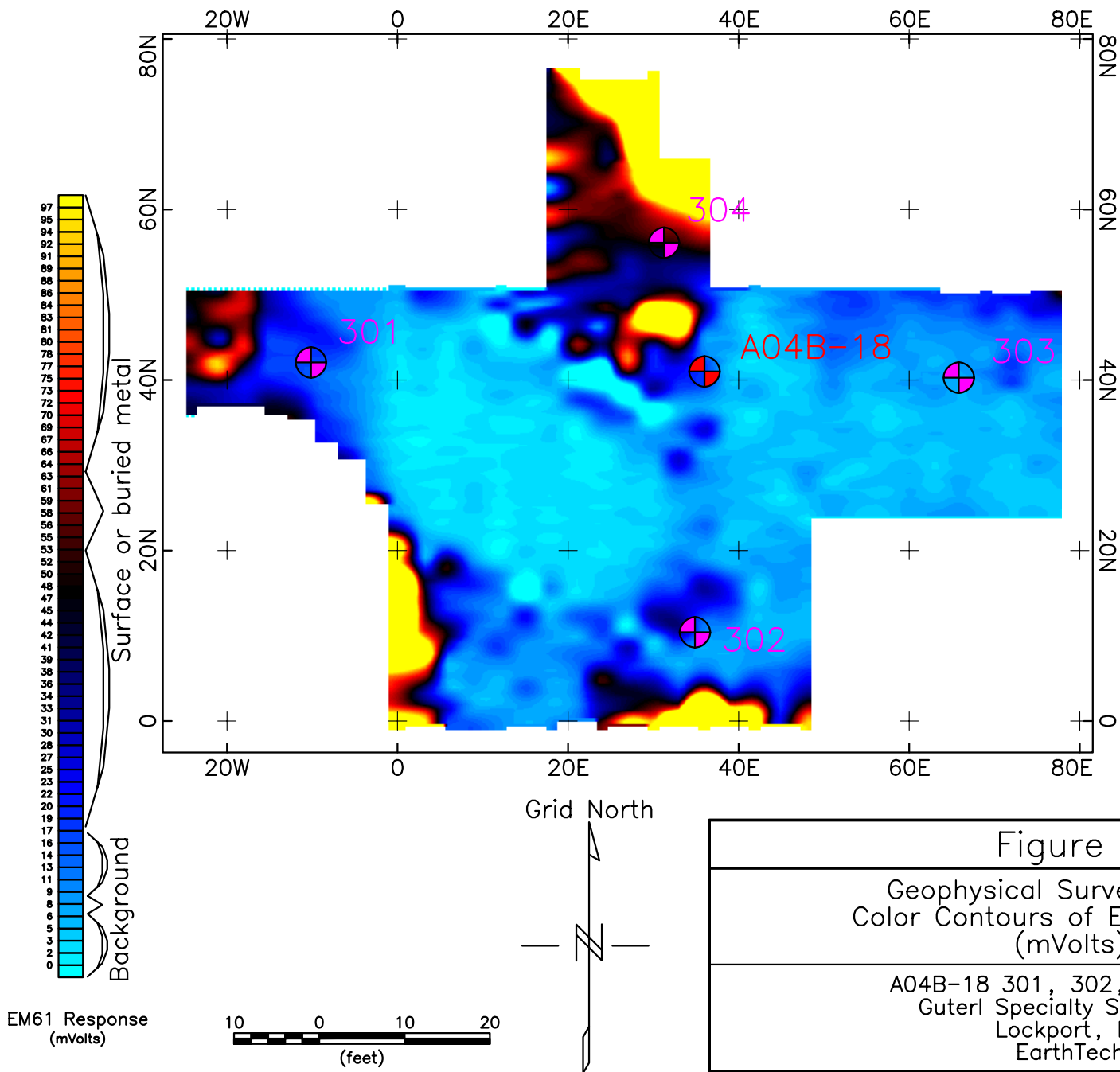
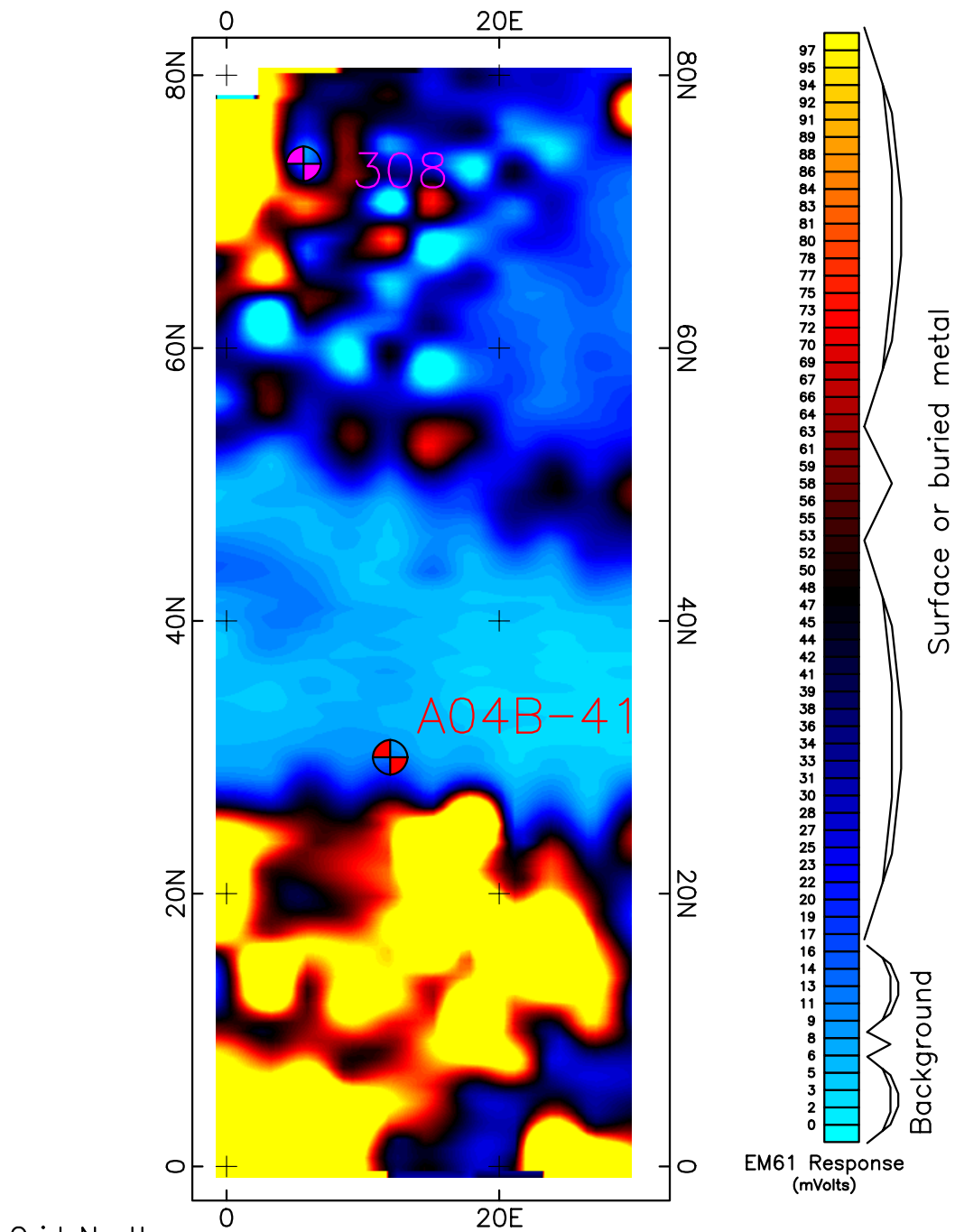


Figure 5

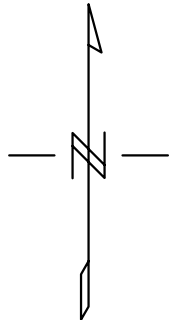
Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

A04B-18 301, 302, 303, 304
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624



Grid North



10 0
(feet)

Figure 6

Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

A04B-41 308
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624

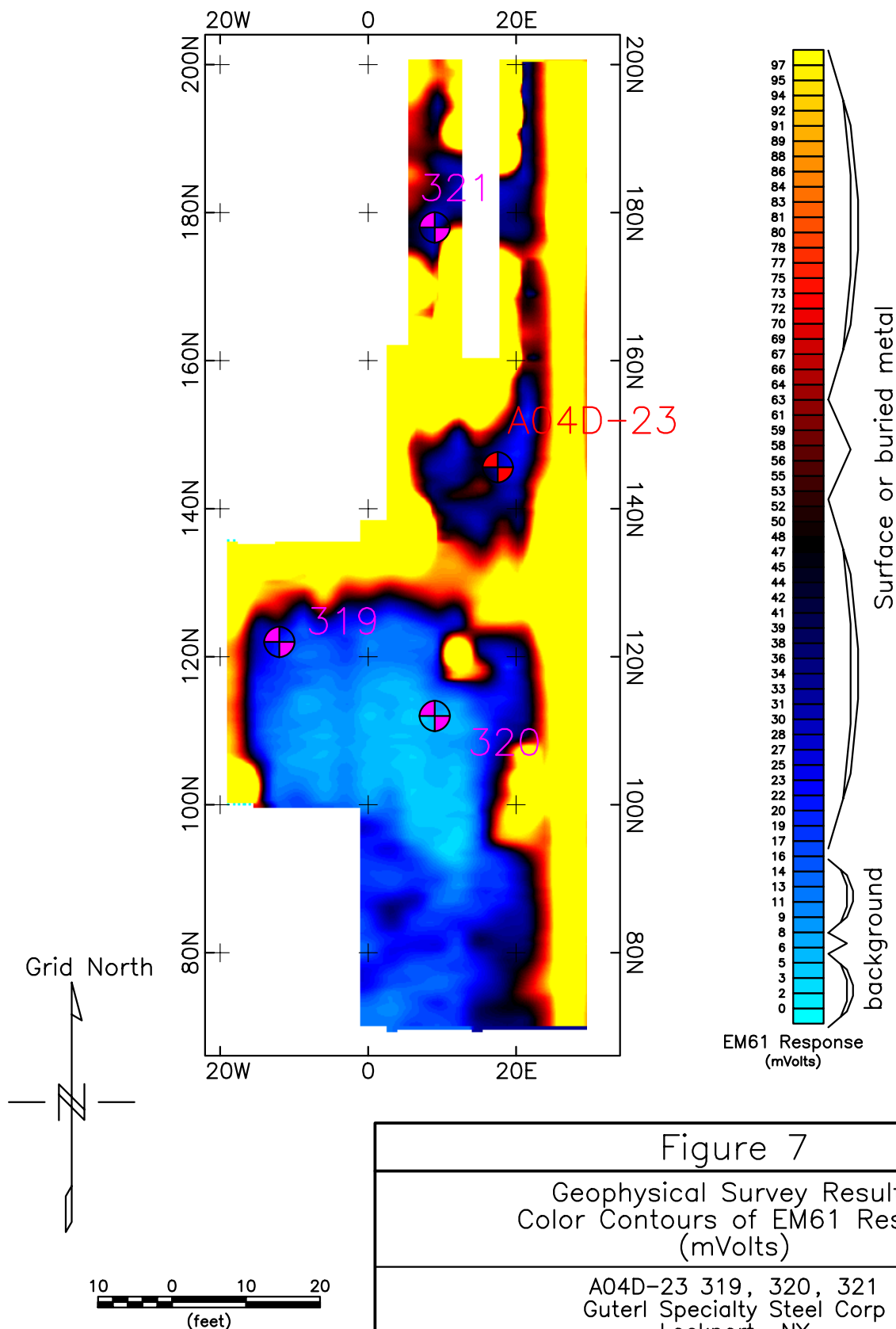


Figure 7

Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

A04D-23 319, 320, 321
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

Geomatrix (716) 565-0624

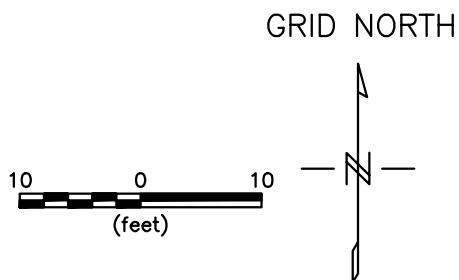
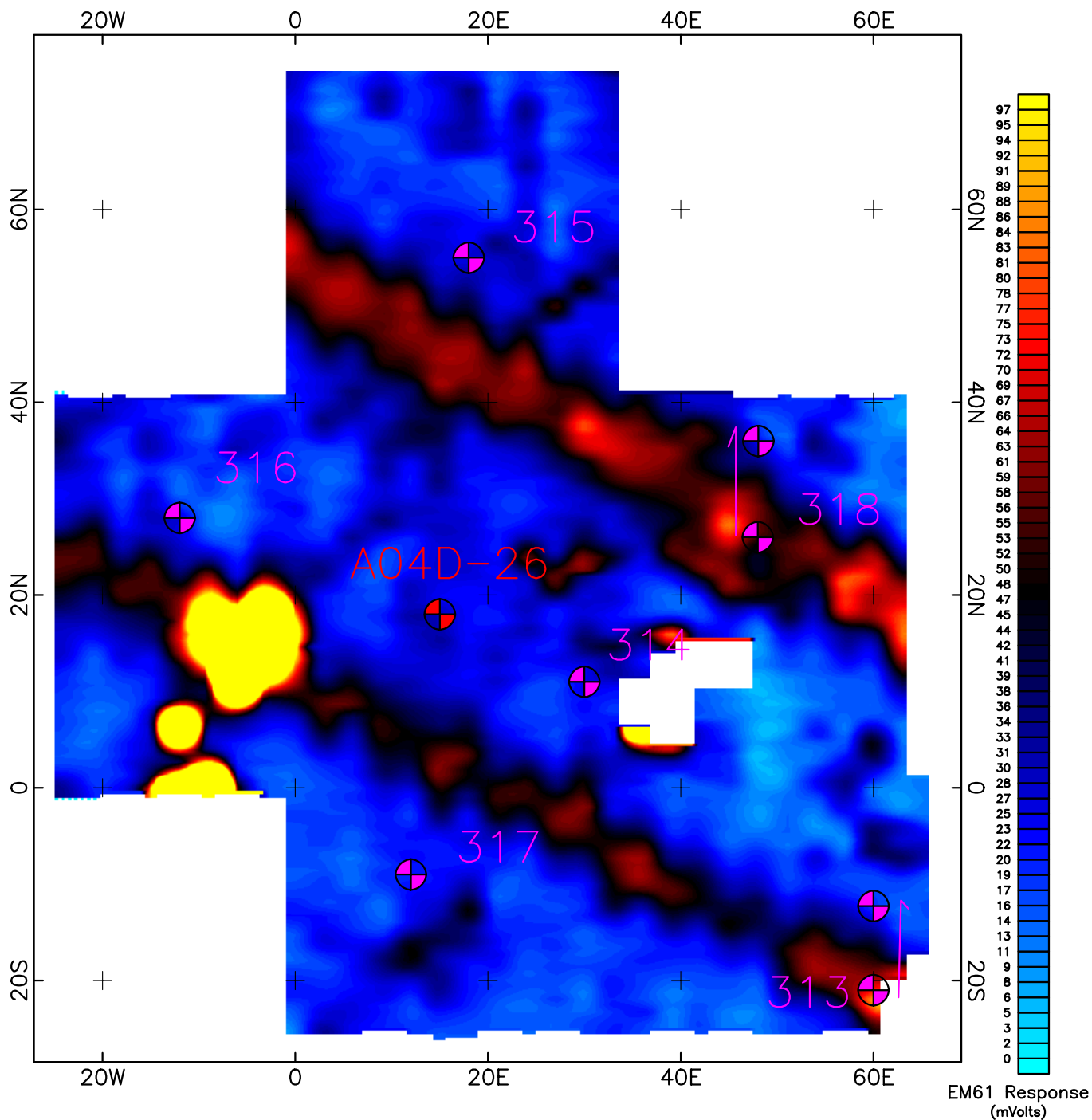


Figure 8

Geophysical Survey Results
Color Contours of EM61 Results
(mVolts)

A04D-26, A04D-28 313, 314, 315, 316, 317, 318
Guterl Specialty Steel Corp
Lockport, NY
EarthTech

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