Forensic Environmental Services, Inc.
113 John Robert Thomas Drive
Exton, Pennsylvania 19341

Telephone: (610) 594-3940 Telecopier: (610) 594-3943

TO: Victor Valaitis, Environmental Engineer
NYS Dept. of Environmental Conservation
Division of Solid & Hazardous Materials
625 Broadway, Albany, NY 12233-7252

DATE: December 13, 2004

RE: Laboratory Data Packages/Geophysical Report
RFI Sampling & Supplemental Investigation
Former Norton/Nashua Tape Products Facility
2600 Seventh Avenue
Watervliet, New York

We are sending you __X__ herewith ______ under separate cover
______ drawings ______ letters ______ other

If material received is not as listed, please notify us at once.

Quantity	Title	Action
2	Quantum Geophysics Investigation Report	For NYSDEC review
2 sets	Adirondack Environmental Services Laboratory Data Packages	For NYSDEC validation

Please find enclosed the report received from Quantum Geophysics for the geophysical investigation conducted at the Former Norton-Nashua Tape Products Site in Watervliet during October 2004. Also enclosed are the final laboratory data packages received from Adirondack Environmental Services for the soil and ground-water samples collected at the Site during the October 2004 mobilization. November 2004 sampling results are pending. Please notify us following validation of the data by the NYSDEC. We are currently reviewing the enclosed results and will provide you with summary data tables after the November data are received.

Very truly yours,

FORENSIC ENVIRONMENTAL SERVICES, INC.

Robert W. Zei
Sr. Project Manager

QUANTUMGEOPHYSICS, INC.

Engineering, Groundwater & Environmental Geophysics

December 6, 2004

Bob Zei
Forensic Environmental Services, Inc.
113 John Robert Thomas Drive
Exton, PA 19341

Re: Final Report
Geophysical Investigation
Former Norton/Nashua Tape Products Facility
Alden Street and Craig Street
Watervliet, New York

Bob,

This report presents the findings of Quantum Geophysics, Inc.'s geophysical investigation in Watervliet, New York. The investigation focused on the northern perimeter of the former Norton/Nashua Tape Products facility, and the adjacent Alden Street and Craig Street. The investigation included a 2-D electrical resistivity imaging (ERI) survey, an EM61 metal detector survey, and a ground penetrating radar survey to identify a potential conduit in the vicinity of MP-6. This potential conduit could be a buried pipe or a permeable channel deposit of sands and gravels in the underlying till, and is suspected as a pathway for the migration of elevated toluene observed in Alden Street. The conduit, if present, would be located within the overburden soils (as opposed to rock).

The surveys were carried-out October 25 and 26, 2004 by Quantum's principal Richard Lee and technicians Justin Dietrich and Dan Stiansen. The ERI survey included a total of 4 lines designated A-A', B-B', C-C', and D-D'. A-A' is located in Alden Street, B-B' is located in Craig Street, C-C' is located just south of the Delaware & Hudson RR track, and D-D' is located just north of the Lands N/F Consolidated RR track on the former Norton/Nashua property. The EM61 was run only along A-A', inaccessibility and interference from underground utilities and parked vehicles precluded using EM61 on other lines. The GPR was run along lines A-A', C-C', and D-D'. No GPR data were acquired along B-B' because of extensive brush cover.

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Forensic Environmental Services, Inc. provided an electronic copy of a sitemap (Craig-St.dwg) for the purpose of plotting the geophysical findings.

TECHNICAL APPROACH

A. 2-D ERI Survey

The survey was conducted using an Advanced Geoscience Inc. (AGI) SuperSting R8 earth resistivity imaging system and 34 18" stainless steel, non-polarizing stakes (electrodes). Data were acquired using the Dipole-Dipole Array with electrodes spaced 3 meters apart. The relative elevation along each line was measured using a 2X handlevel and stadia rod, and recorded in a fieldbook so that the electrical resistivity profile can be constructed with respect to ground surface. Contact resistance measurements (conducted prior to data collection as a means of gauging electrode-to-earth coupling) were generally less than 1,000 ohms (Ω). Good quality data can be expected when contact resistance is less than about 1,000 Ω.

In the office, the electrical resistivity data were downloaded onto a PC, elevations were incorporated into the data files and then the data were inverted into a model of true electrical resistivity using the AGI software program ***EarthImager 2D. EarthImager 2D*** divides the subsurface into a number of rectangular blocks and determines the resistivities of the rectangular blocks that will produce an apparent resistivity pseudosection that agrees with the actual measurements. Several iterations of modeling are conducted to reduce the difference between the calculated and measured apparent resistivity values by adjusting the resistivity of the model blocks.

The processed data were entered into the surface applications program Surfer for Windows, gridded using the Kriging Method with an octant search, contoured at an interval of 50 ohm-feet, annotated , and then printed at a scale of 1" = 50 feet.

B. EM61 Survey

The EM61 was operated in the "wheel-mode" whereby data were automatically acquired every 0.86 feet of traverse. In the office, a profile of the data was constructed using Grapher for Windows and printed at a scale of 1" = 40 feet.

C. Ground Penetrating Radar (GPR) Survey

The GPR survey was conducted using a Geophysical Survey Systems, Inc. SIR2 subsurface radar system and a 400 MHz antenna. Radar data were acquired at 8-bits/sample, 512 samples/scan, and 32 scans/second, with a recording period of 60 nanoseconds (nsec). The system was configured to explore to a depth of roughly 6 feet below ground surface (based upon an approximate velocity of 1-foot/10 nsec 2-way travel-time). The antenna was hand-towed along the ground surface at a rate of approximately 2 feet per second.

FINDINGS

A sitemap with the 4 geophysical survey lines is shown in Figure 1. Fully annotated electrical resistivity profiles for A-A', B-B', C-C' and D-D' are provided in Figures 2, 3, 4, and 5, respectively. The EM61 profile along A-A' is shown in Figure 6. The GPR profile along A-A' through the section of elevated toluene is shown in Figure 7. The GPR profile along C-C' through the section of elevated toluene (and potential conduit) is shown in Figure 8.

The center portion of the ERI profile along A-A' (from station 140 to 200) is impacted by buried utilities/piping, monitoring wells, and/or other identified man-made structures, and all of D-D' is impacted by buried utilities/piping. Buried metal piping attracts electrical current. In so doing, it creates a low current density field which leads to very low, ***artificial*** electrical resistivity measurements.

Based upon the geophysical data:

- No linear electrical resistivity anomaly suggestive of a buried channel deposit was observed in the overburden soils trending from the former plant facility to Alden Street. No Gaussian-shaped anomaly in the EM61 data suggestive of a buried pipe was observed on A-A' where elevated toluene is reported. Lastly, no linear trend of high-amplitude, parabolic-shaped radar anomalies was observed between the former facility and Alden Street.

- Two (2) parabolic-shaped GPR targets suggestive of buried pipes were observed on A-A', specifically at stations 137 and 142 (Figure 7), which are located at least 10 to 15 feet west of the area of elevated toluene. It appears that they are not pipes because similar GPR responses that would form a linear trend from the former Norton/Nashua property to Alden Street are not observed on profile C-C'. The EM61 data (see Figure 6) indicate these GPR targets are not constructed of metal.

- Fracture-like anomalies were identified on profiles B-B' and C-C'. They are observed in the ERI data as a thin, near-vertical zone of relatively low electrical resistivity measurements. The potential fracture trend projects into a portion of profile A-A' where the data is impacted by buried utilities/piping.

Quantum is pleased to be of service to Forensic Environmental Services, Inc. Please call if you have any questions or if we can be of further assistance.

Sincerely,

***Quantum** Geophysics, Inc.*

Richard K. Lee

Richard K. Lee, P.G., R. GP.
President and Principal Geophysicist

RKL/jas

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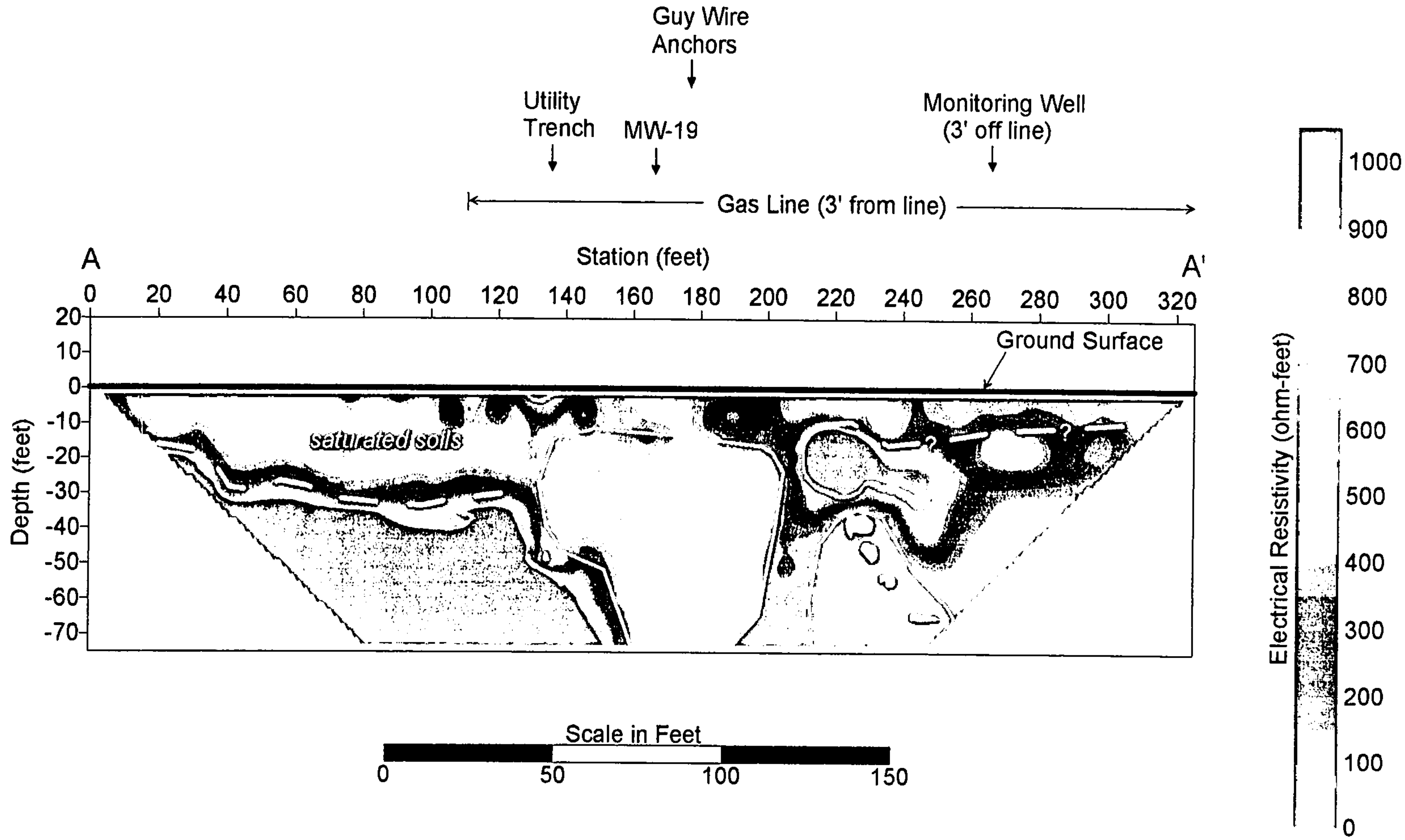

LEGEND

Probable Top of Rock,
Querried Where Questionable.

Anomalously Low Electrical Resistivity Measurements
Caused by Nearby Buried Piping, Monitoring Wells,
and/or Other Man-Made Structures.

QUANTUM GEOPHYSICS, INC.
Engineering, Groundwater, and Environmental Geophysics
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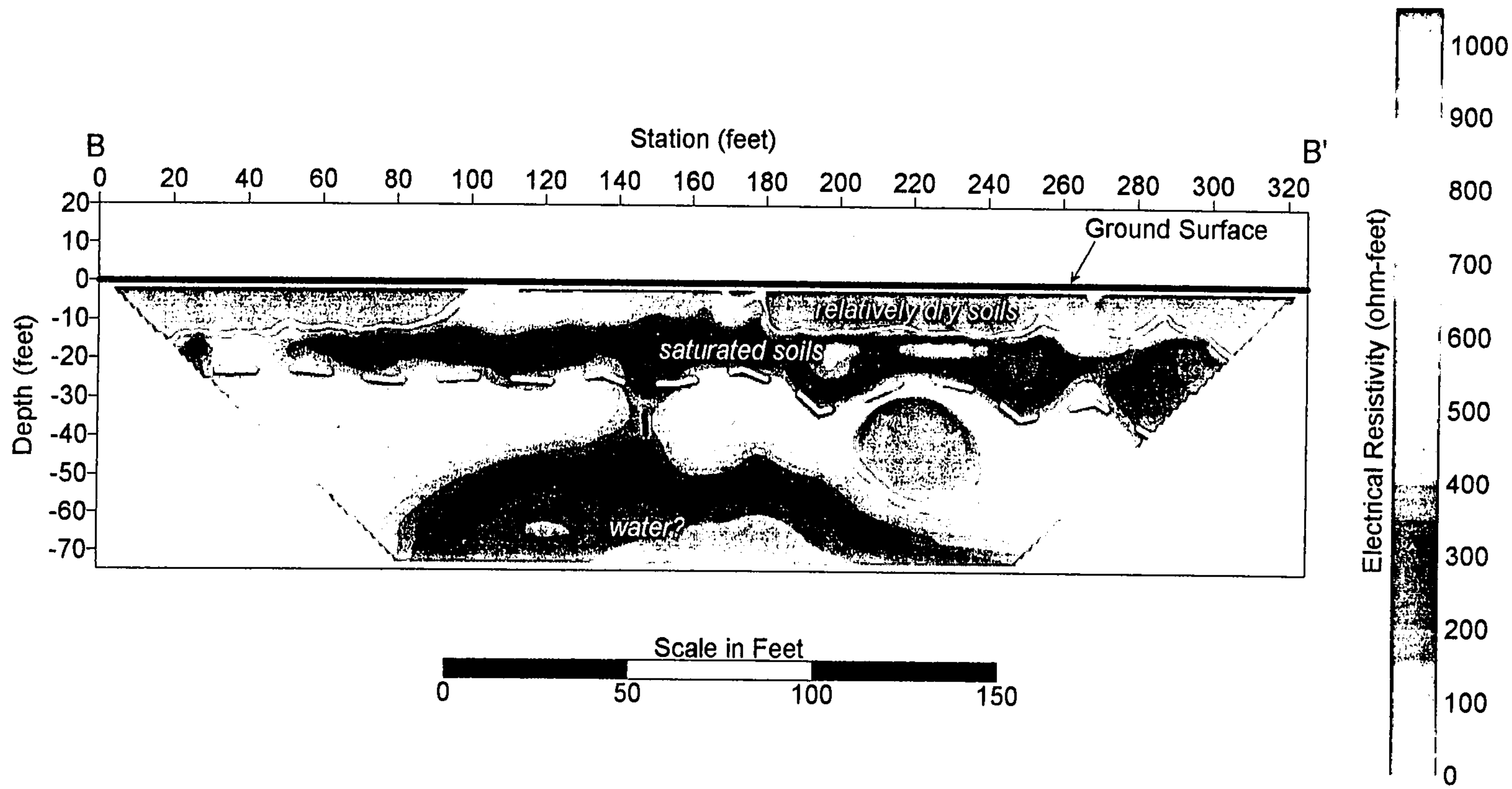
ERI Profile A-A'
Alden Street and Craig Street
Albany, New York

For:	Forensic Environmental		Figure 2
Date: 12-6-04	Project No.: 04-0139	File: C:\Forensic\Albany\Figure 2.dwg	



LEGEND

Probable Top of Rock.

Potential Fracture.

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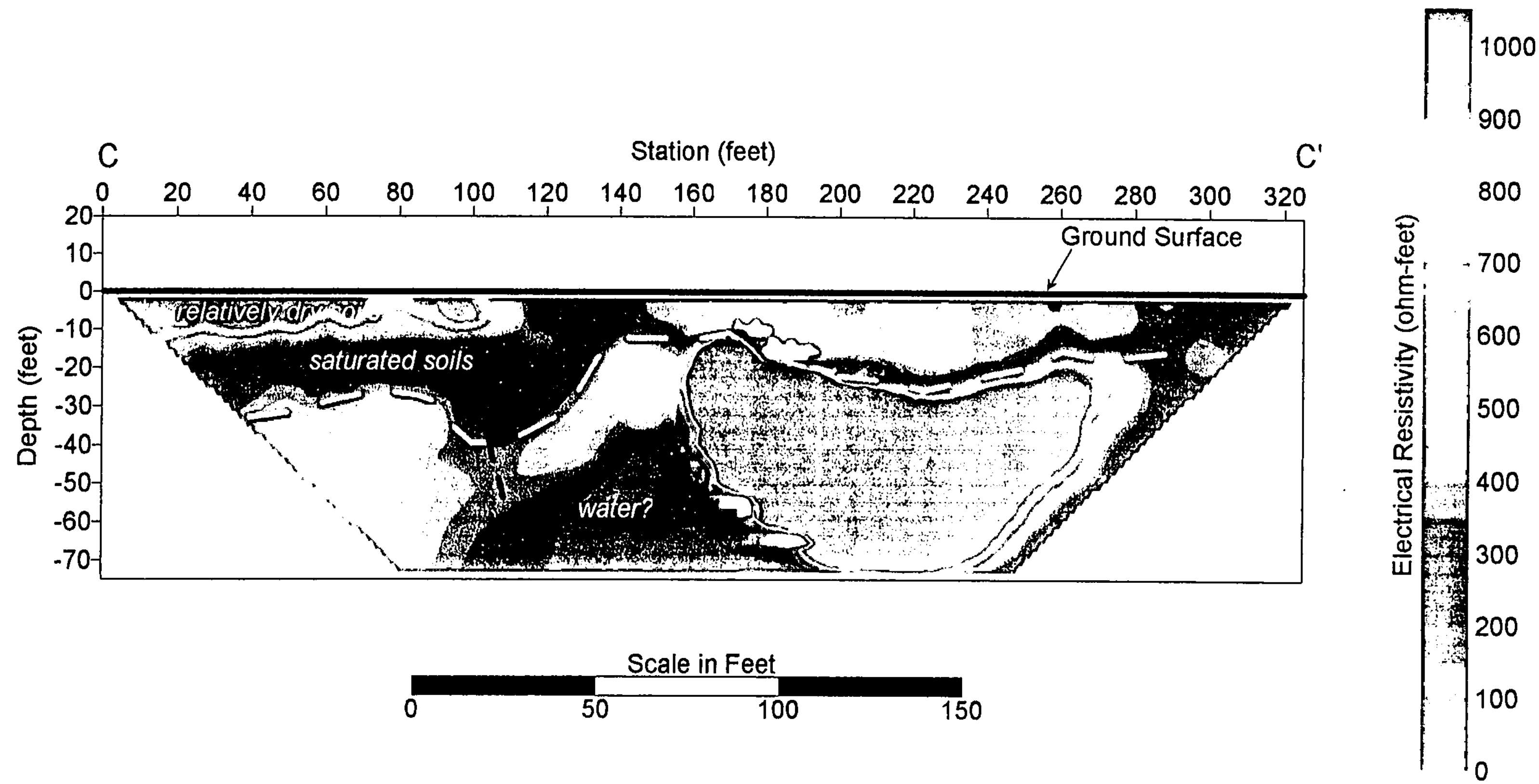
ERI Profile B-B'
Alden Street and Craig Street
Albany, New York

For:	Forensic Environmental		Figure
Date: 12-6-04	Project No.: 04-0139	File: C:\Forensic\Albany\Figure 3.dwg	3



LEGEND

Probable Top of Rock.

Potential Fracture.

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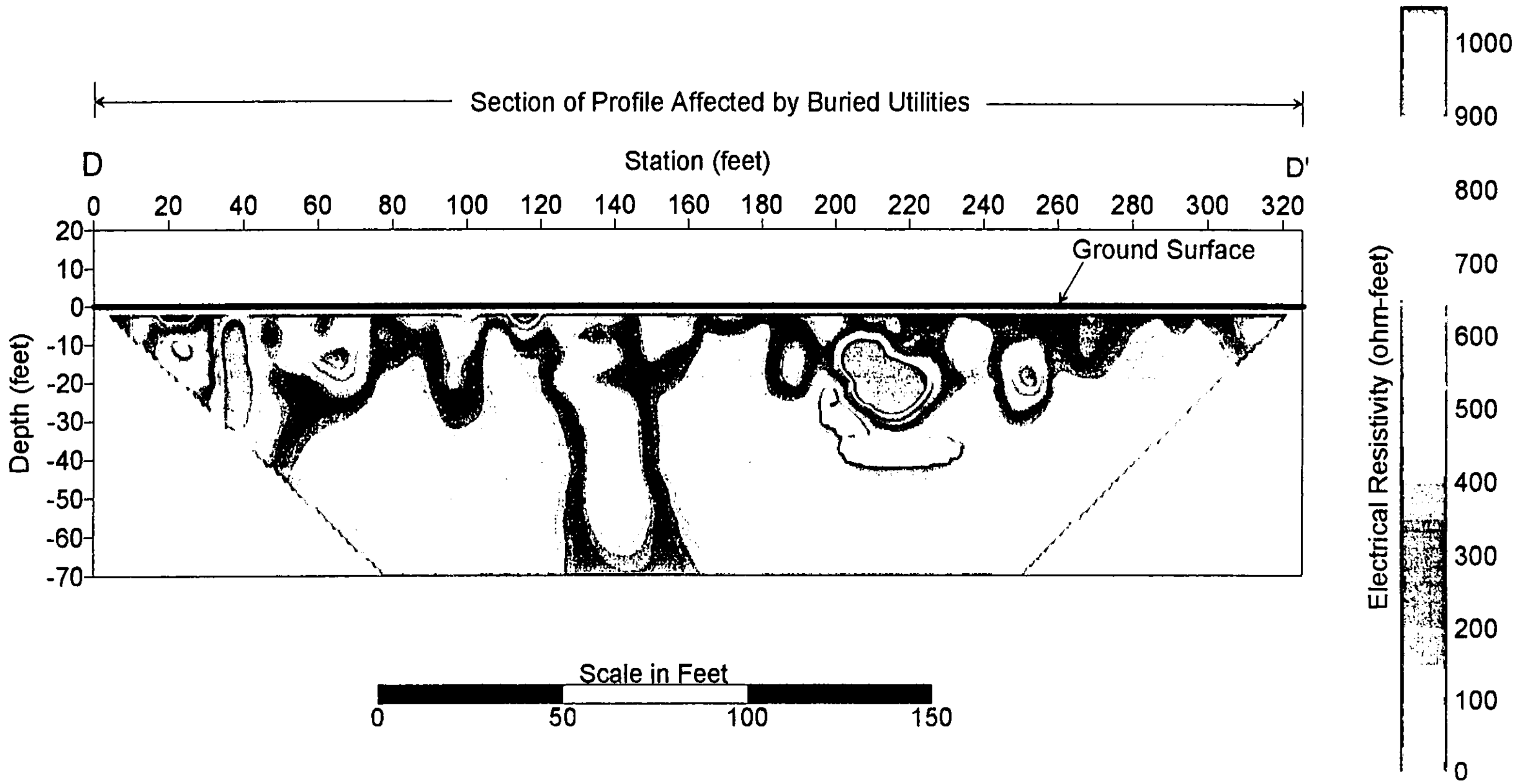
ERI Profile C-C'

Alden Street and Craig Street

Albany, New York

For:	Forensic Environmental		Figure
Date: 12-6-04	Project No.: 04-0139	File: C:\Forensic\Albany\Figure 4.dwg	4



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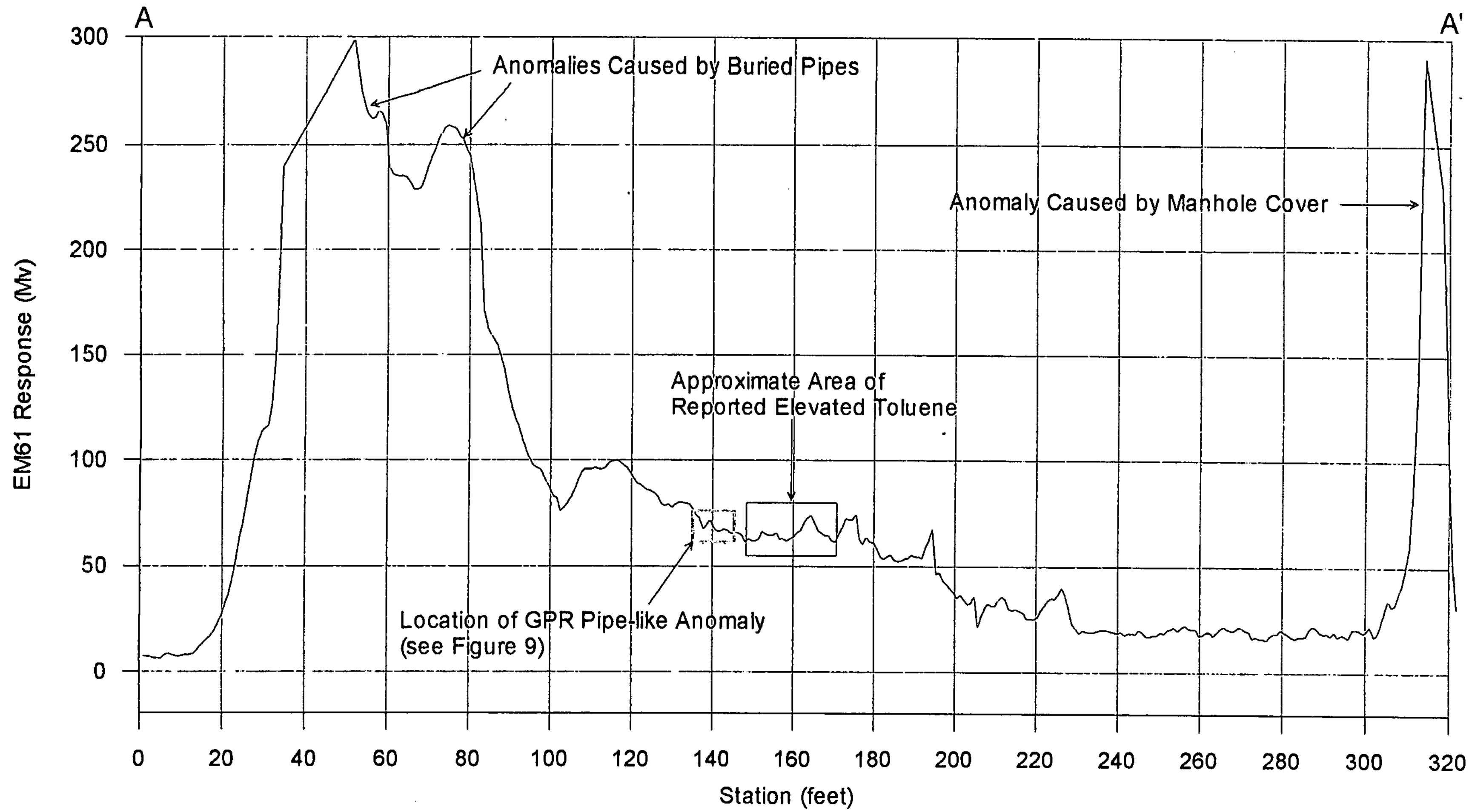
ERI Profile D-D'
Alden Street and Craig Street
Albany, New York

For:	Forensic Environmental		Figure 5
Date: 12-6-04	Project No.: 04-0139	File: C:\Forensic\Albany\Figure 5.dwg	



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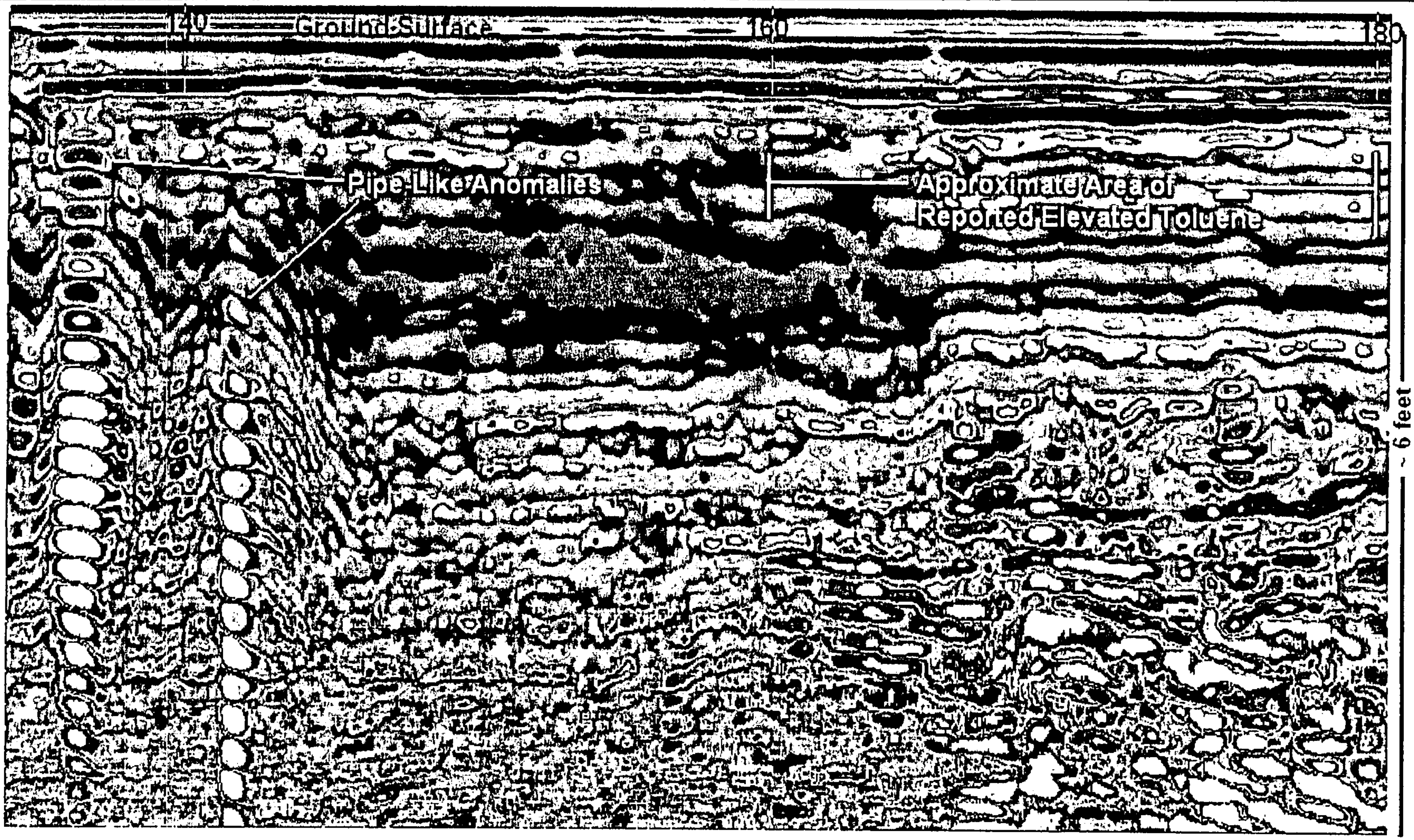
EM61 Profile A-A'
Alden Street and Craig Street
Albany, New York

For:	Forensic Environmental		Figure 6
Date: 12-6-04	Project No.: 04-0139	File: C:\Forensic\Albany\Figure 6.dwg	



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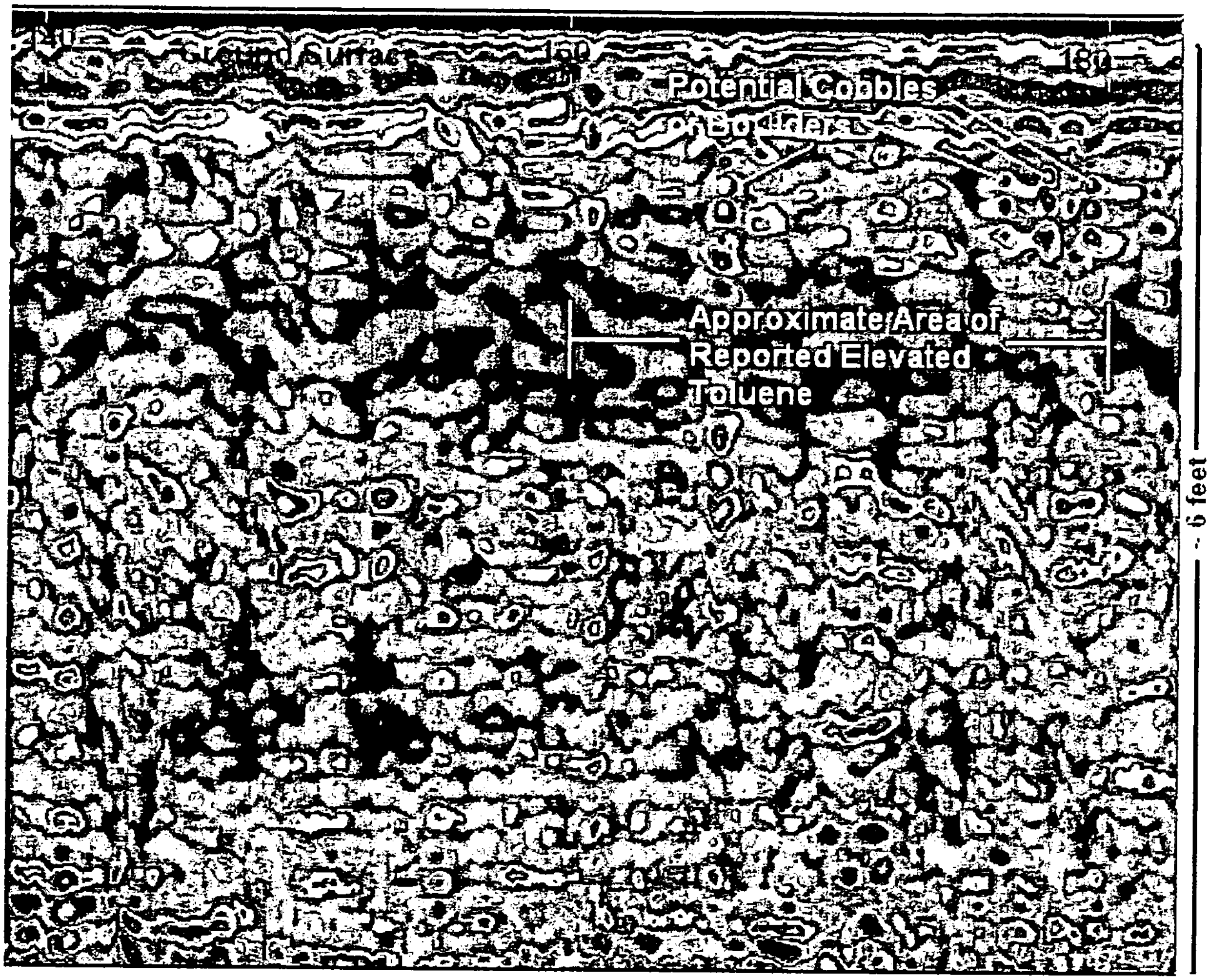
GPR Profile A-A', Station 140 to 180
Alden Street and Craig Street
Albany, New York

For:	Forensic Environmental		Figure 7
Date: 12-6-04	Project No.: 04-0139	File: C:\Forensic\Albany\Figure 7.dwg	



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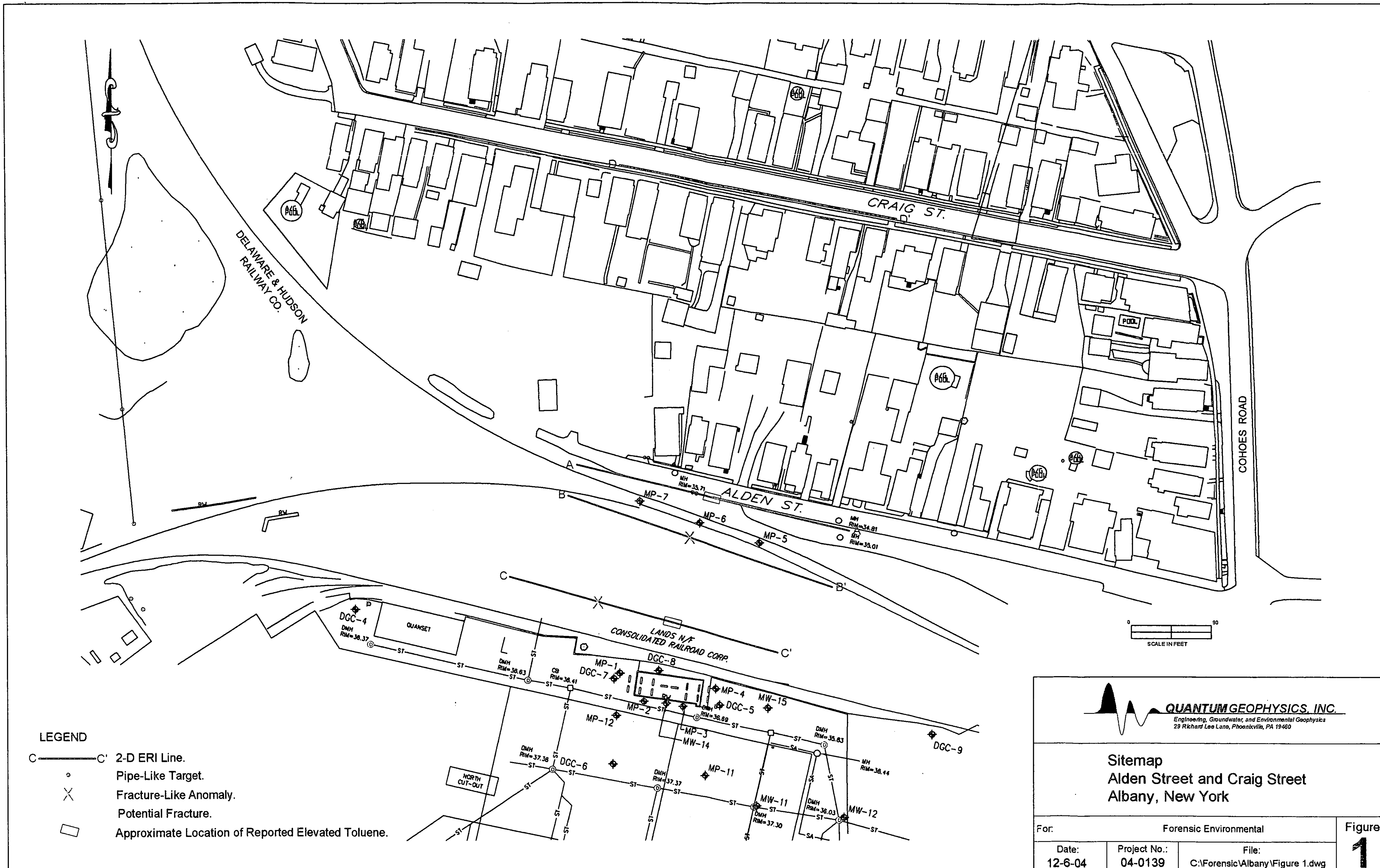
GPR Profile C-C', Station 140 to 180
Alden Street and Craig Street
Albany, New York

For:	Forensic Environmental		Figure 8
Date: 12-6-04	Project No.: 04-0139	File: C:\Forensic\Albany\Figure 8.dwg	


CRAIG ST.
ALDEN ST.
COHOES ROAD
DELAWARE & HUDSON RAILWAY CO.
LANDS N/F CONSOLIDATED RAILROAD CORP.
QUANSET
NORTH CUT-OUT
POOL
MP-1
MP-2
MP-3
MP-4
MP-5
MP-6
MP-7
MP-11
MP-12
DGC-4
DGC-5
DGC-6
DGC-7
DGC-8
DGC-9
MW-11
MW-12
MW-14
MW-15
A
B
B'
C
C'
SCALE IN FEET
LEGEND
C——C' 2-D ERI Line.
Pipe-Like Target.
Fracture-Like Anomaly.
Potential Fracture.
Approximate Location of Reported Elevated Toluene.
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Engineering, Groundwater, and Environmental Geophysics
29 Richard Lee Lane, Phoenixville, PA 19460
Sitemap
Alden Street and Craig Street
Albany, New York
For: Forensic Environmental
Date: 12-6-04
Project No.: 04-0139
File: C:\Forensic\Albany\Figure 1.dwg
Figure 1