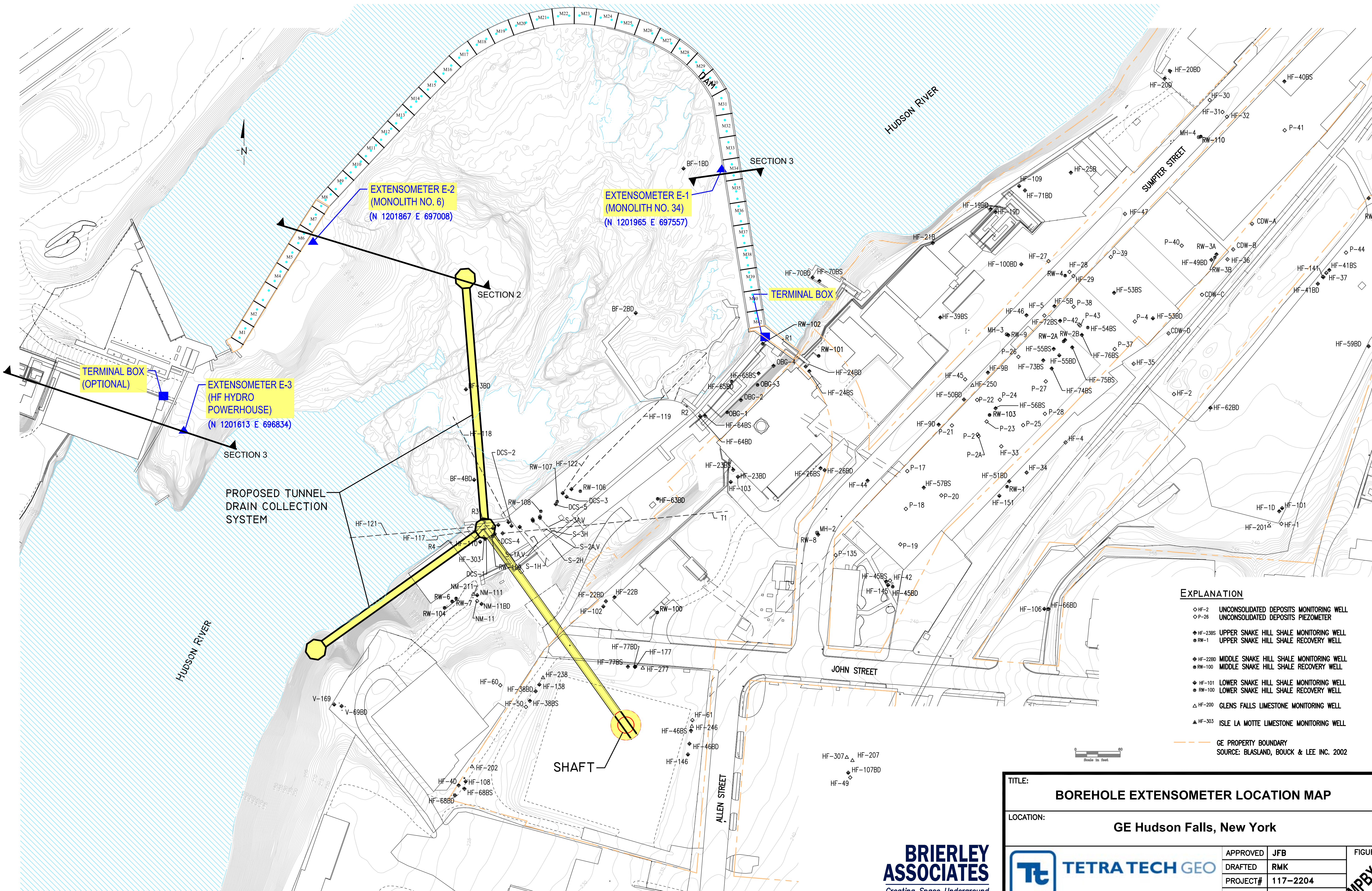
APPENDIX L

TDCS EXTENSOMOTER INSTALLATION DATA

Contents of Appendix L



TITLE:

BOREHOLE EXTENSOMETER LOCATION MAP

LOCATION:

GE Hudson Falls, New York

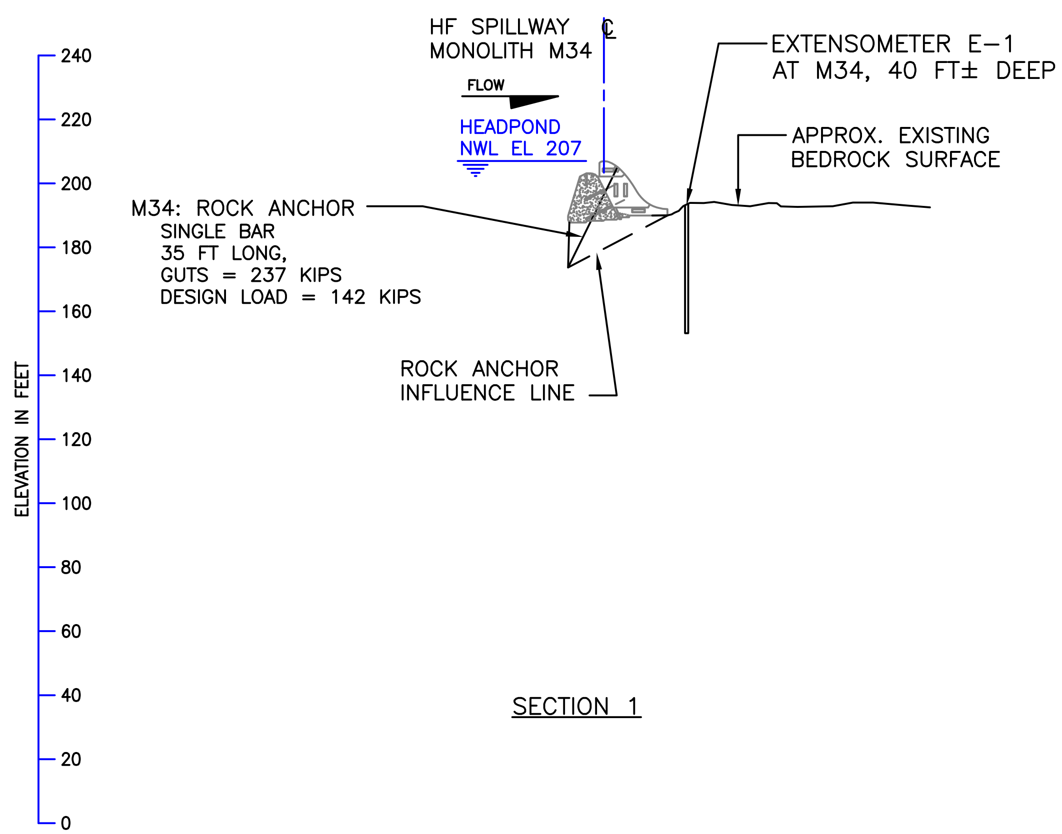
BRIERLEY ASSOCIATES
Creating Space Underground

TETRA TECH GEO

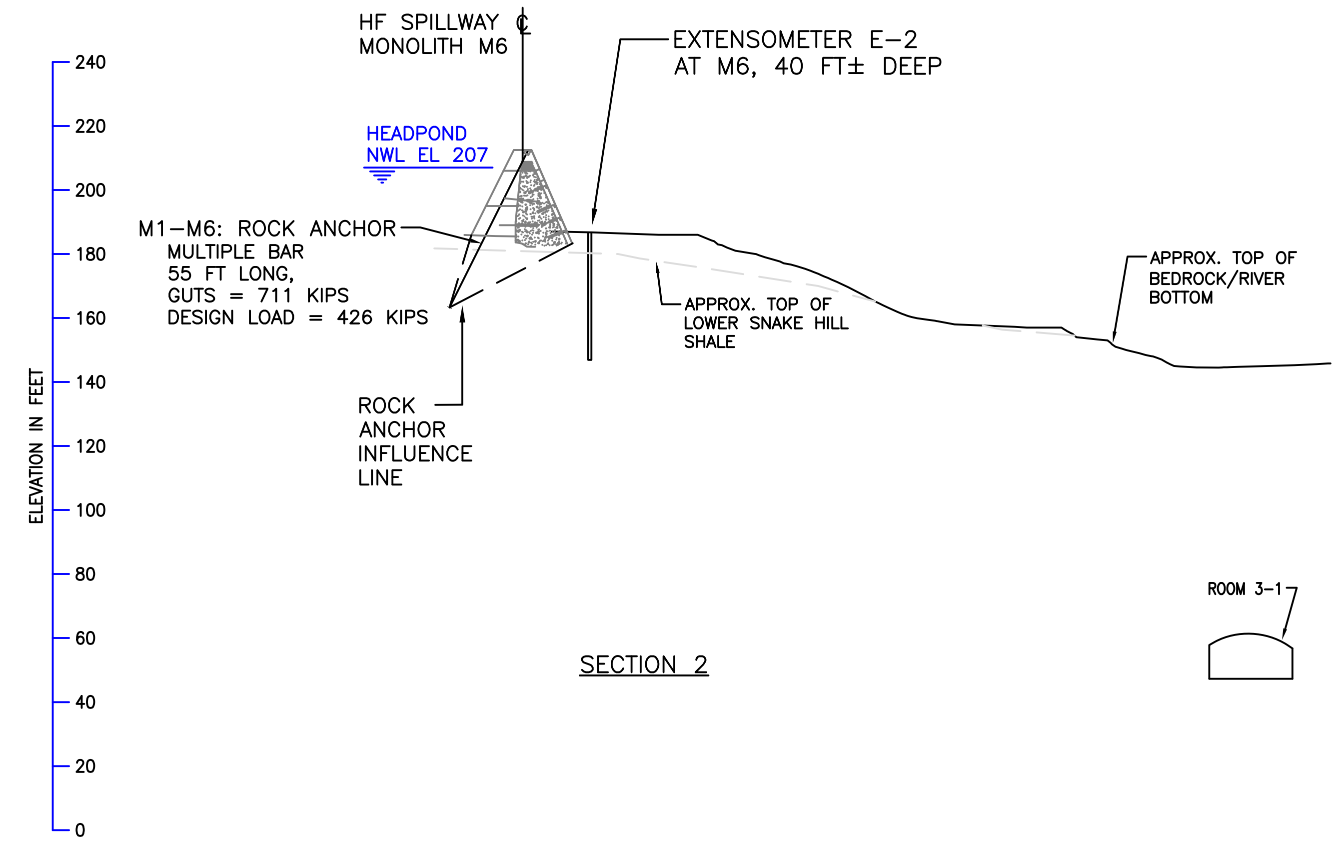
APPROVED	JFB
DRAFTED	RMK
PROJECT#	117-2204
DATE	APRIL 2011

FIGURE MPBX-1

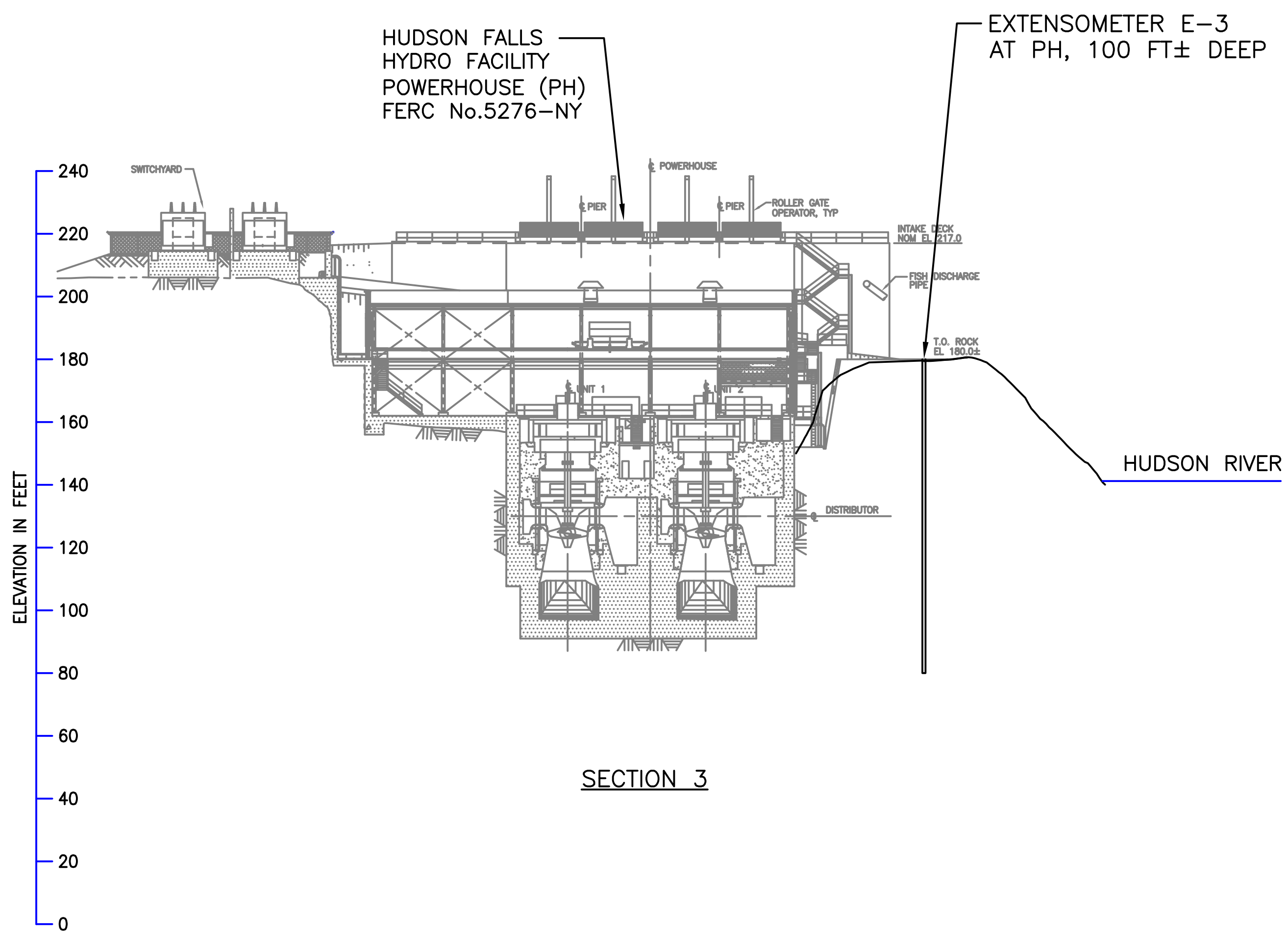
G:\GE_HUDS\2011\4-11_HYRO_MON_RPT\APPENDIX-FIGS\EXTENSO-LOCA_DETAILS.DWG



SECTION 1



SECTION 2



SECTION 3

G:\GE_HUDS\2011\4-11_HYRO_MON_RPT\APPENDIX-FIGS\EXTENSOSECT.DWG

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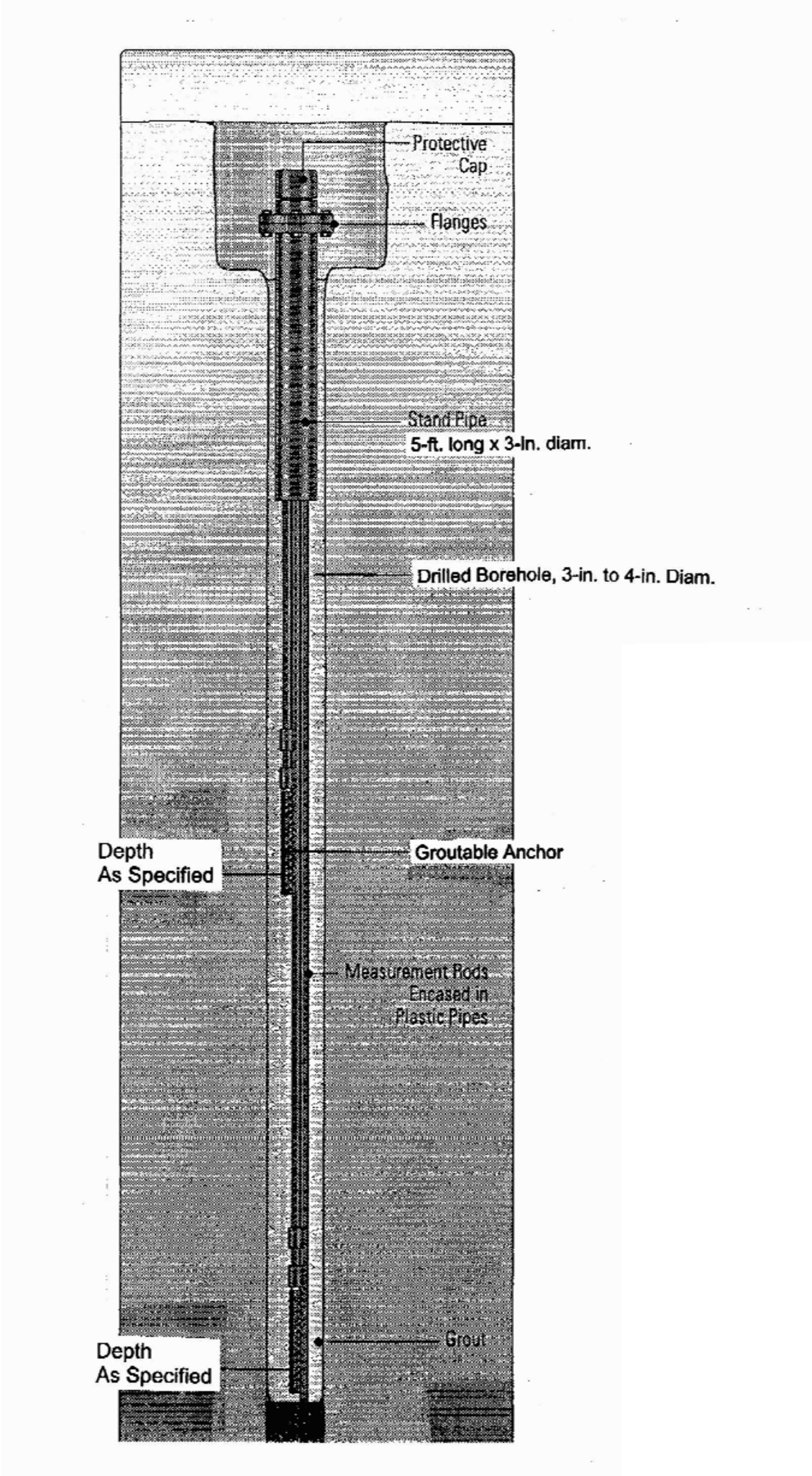
TITLE:	BOREHOLE EXTENSOMETER SECTION 1, 2 & 3
LOCATION:	GE Hudson Falls, New York
APPROVED	JFB
DRAFTED	RMK
PROJECT#	117-2204
DATE	APRIL 2011
FIGURE	MPBX-2



G:\GE_HUDS\2011\4-11_HYRO_MON_RPT\APPENDIX-FIGS\EXTENSO-LOCA_DETAILS.DWG

BRIERLEY ASSOCIATES
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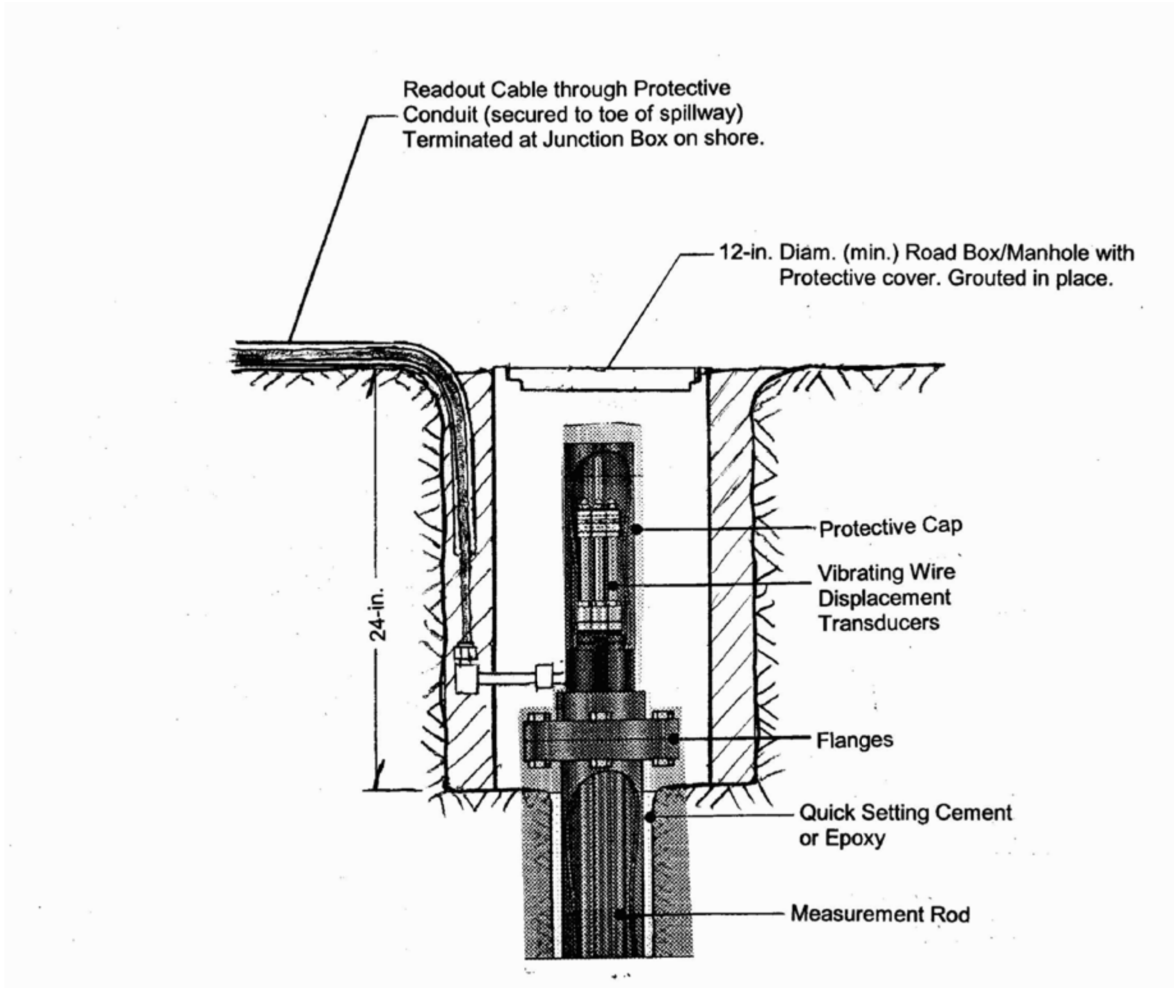
TITLE:	TYPICAL ROD-TYPE BOREHOLE EXTENSOMETER INSTALLATION
LOCATION:	GE Hudson Falls, New York

TETRA TECH GEO

APPROVED	JFB	FIGURE
DRAFTED	RMK	MPBX-3
PROJECT#	117–2204	
DATE	APRIL 2011	

G:\GE_HUDS\2011\4-11_HYRO_MON_RPT\APPENDIX-FIGS\EXTENSO-LOCA_DETAILS.DWG



TITLE:	VIBRATING WIRE DISPLACEMENT TRANDUCERS HEAD ASSEMBLY DETAILS
LOCATION:	GE Hudson Falls, New York

BRIERLEY ASSOCIATES
Creating Space Underground

TETRA TECH GEO

APPROVED	JFB	FIGURE
DRAFTED	RMK	MPBX-4
PROJECT#	117-2204	
DATE	APRIL 2011	

GeoTrans, Inc.
A TETRA TECH COMPANY

CORE BORING REPORT

BORING NO. **E-1**

PROJECT: **TDCS, Hudson Falls, NY**
CLIENT: **General Electric**
CONTRACTOR: **Alpine Construction Company**
EQUIPMENT USED: **Ingersoll Rand ECM590 - Hydraulic Hammer**

JOB NO.:	**117-2204177**
PAGE NO.:	**1 of 1**
ELEVATION:	**188.45**
DATE START:	**7/2/2008**
DATE FINISH:	**7/2/2008**
DRILLER:	**Alpine Cons.**
PREPARED BY:	**JAL**
LOCATION:	E-1

GROUND WATER		DEPTH TO:			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL	TYPE	NA
						HORIZONTAL	SIZE	NA
						INCLINED	Bit (ft)	NA
						BEARING	Barrel (ft)	NA
					0	ANG. FROM VERT.	Total (ft)	NA

DEPTH IN FEET	DRILL RATE MIN/FT	CORE NO. DEPTH RANGE	SAMPLE NUMBER	RECOVERY FT	RECOVERY %	RQD (%)	FIELD CLASSIFICATION AND REMARKS
							Extensometer #1 was not cored. In its place Hager-Richter Geoscience, Inc. completed the Optical Televiewer (OTV) and Acoustic Televiewer (ATV) logs on July 2, 2008.
5							A model A3 Multiple Position Borehole Extensometer (MPBX) was installed on July 3, 2008 at E-1. Two borehole anchors and 1/4" steel rods were grouted into the hole at 10 ft and 40 ft, as well as, two Vibrating Wire Displacement Transducers at the same depths encased in a 3/4" PVC pipe within the borehole. Installing both the 1/4" steel rods and transducers allows for both manual (Mitutoyo depth micrometer) and electric readings (Geokon 404 datalogger) to be taken. A watertight protective steel roadway box/manhole cover was installed at the collar of the installation to protect it from the elements.
10							
15							
20							
25							
30							
35							
40							Bottom of boring at 40 ft

FIELD HARDNESS	BEDDING	ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE	WEATHERING
V. HARD - KNIFE CAN'T SCRATCH	V. THIN <2"	HORIZONTAL (0-5°)	V. CLOSE <2"	FRESH
HARD - SCRATCHES DIFFICULT	THIN 2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE 2"-12"	V. SLIGHT
MOD. HARD - SCRATCHES EASILY	MEDIUM 12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE 12"-36"	SLIGHT
SOFT - GROVES	THICK 36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE 36"-120"	MODERATE
V. SOFT - CARVES	V. THICK >120"	VERTICAL (85-90°)	V. WIDE >120"	MOD. SEVERE
				V. SEVERE
				COMPLETE

CORE BORING REPORT

PROJECT:	TDCS, Hudson Falls, NY
CLIENT:	General electric
CONTRACTOR:	Alpine Construction, LLC
EQUIPMENT USED:	Ingersoll Rand ECM590 - Hydraulic Hammer

BORING NO.	E-2
JOB NO.:	117-2204177
PAGE NO.:	1 of 1
ELEVATION:	186.36
DATE START:	7/2/2008
DATE FINISH:	7/2/2008
DRILLER:	Alpine Cons.
PREPARED BY:	JAL
LOCATION:	E-2

GROUND WATER		DEPTH TO:			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL	TYPE	NA
						HORIZONTAL	SIZE	NA
						INCLINED	Bit (ft)	NA
						BEARING	Barrel (ft)	NA
					0	ANG. FROM VERT.	Total (ft)	NA

DEPTH IN FEET	DRILL RATE MIN/FT	CORE NO. DEPTH RANGE	SAMPLE NUMBER	RECOVERY FT	RECOVERY %	RQD (%)	FIELD CLASSIFICATION AND REMARKS
							Extensometer #2 was not cored. In its place Hager-Richter Geoscience, Inc. completed the Optical Televiewer (OTV) and Acoustic Televiewer (ATV) logs on July 2, 2008.
5							A model A3 Multiple Position Borehole Extensometer (MPBX) was installed on July 3, 2008 at E-2. Two borehole anchors and 1/4" steel rods were grouted into the hole at 10 ft and 40 ft, as well as, two Vibrating Wire Displacement Transducers at the same depths encased in a 3/4" PVC pipe within the borehole. Installing both the 1/4" steel rods and transducers allows for both manual (Mitutoyo depth micrometer) and electric readings (Geokon 404 datalogger) to be taken. A watertight protective steel roadway box/manhole cover was installed at the collar of the installation to protect it from the elements.
10							
15							
20							
25							
30							
35							
40							Bottom of boring at 40 ft

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
							COMPLETE

GeoTrans, Inc.
A TETRA TECH COMPANY

CORE BORING REPORT

PROJECT:	TDCS, Hudson Falls, NY	BORING NO.	E-3
CLIENT:	General Electric	JOB NO.:	117-2204177
CONTRACTOR:	Parrat-Wolff, Inc.	PAGE NO.:	1 of 2
EQUIPMENT USED:	CME-75	ELEVATION:	177.5
		DATE START:	4/29/2008
		DATE FINISH:	4/30/2009
		DRILLER:	Bill Rice
		PREPARED BY:	JAL / GP
		LOCATION:	E-3

GROUND WATER		DEPTH TO:			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL	TYPE	Wire Line
						HORIZONTAL	SIZE	HQ
						INCLINED	Bit (ft)	
						BEARING	Barrel (ft)	
					0	ANG. FROM VERT.	Total (ft)	

DEPTH IN FEET	DRILL RATE MIN/FT	CORE NO. DEPTH RANGE	SAMPLE NUMBER	RECOVERY FT	RECOVERY %	RQD (%)	FIELD CLASSIFICATION AND REMARKS
		0-2	1	1.8	90	75	Mod. Hard to hard, fresh, dark gray to black SHALE; med-gray horizontal laminar banding; calcite healed fractures at 60°,30°,0°,1/8" to 1" thick.
5		2-6	2	4	100	75	Hard, fresh, dark gray to black SHALE; med-gray horizontal laminar banding;4.0' - 9.3' numerous, irregular calcite healed fractures/veins imparting "marbled" appearance, micro "offsets", healed micro-brecciated shale, graphite coated shear fractures. NOTE- Lower Fault Plane at 9.0 ft.
10		6-11	3	5	100	51.7	Hard, fresh, dark gray to black SHALE; med-gray horizontal laminar banding; occasional calcite healed fractures and veins, close to moderate spacing, mostly midangle to subvertical (35° to 85°), 1/16" to 1/4" thick; occassional pyrite nodules (up to 1"; occasional horizontal pyrite partings/laminae (1/16" to 1/4" thick)
15		11-16	4	5.05	101	100	
20		16-21	5	5.05	101	99	
25		21-26	6	4.8	96	95.7	
30		26-31	7	4.95	99	100	
35		31-36	8	4.95	99	99	
40		36-41	9	4.95	99	99	
45		41-46	10	5	100	100	Hard, fresh, dark gray to black SHALE; med-gray horizontal laminar banding; occasional calcite healed fractures and veins, close to moderate spacing, mostly mid-angle to subvertical (35° - 85°), 1/16" to 1/4" thick; occasional pyrite nodules (up to 1"); occasional horizontal pyrite partings/laminae (1/16" to 1/4" thick).
50		46-51	11	5	100	100	
55		51-56	12	4.95	99	100	SHALE, similar to above, except calcite healed fractures moderate to wide spacing.
		56-61	13	4.95	99	100	

(Continued)

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
							COMPLETE

GeoTrans, Inc. A TETRA TECH COMPANY

CORE BORING REPORT

BORING NO. E-3

DEPTH IN FEET	DRILL RATE MIN/FT	CORE NO. DEPTH RANGE	SAMPLE NUMBER	RECOVERY FT	RECOVERY %	RQD (%)	FIELD CLASSIFICATION AND REMARKS
							SHALE, similar to above, except calcite healed fractures moderate to wide spacing. *(continued)*
65		61-66	14	5	100	100	
70		66-71	15	5	100	100	
75		71-76	16	5	100	100	SHALE, similar to above, except with wide to very widely spaced, very thin fossil shell horizons.
80		76-81	17	5	100	98	
85		81-86	18	4.95	99	100	
90		86-91	19	4.95	99	100	
95		91-96	20	4.95	99	100	
100		96-101	21	4.9	98	100	Hard, fresh, dark gray to black SHALE; med-gray horizontal laminar banding; occasional calcite healed fractures and veins, moderate to wide spacing, mostly mid-angle to subvertical (35° - 85°), 1/16" to 1/4" thick; occasional pyrite nodules (up to 1"); occasional horizontal pyrite partings/laminae (1/16" to 1/4" thick); occasional very thin fossil shell horizons.
105		101-106	22	5.05	101	100	
110							Bottom of Boring at Depth 106.0 ft
115							Note: See separate detailed Discontinuity Log for description of Joints and fractures observed in core for boring E-3. Note that with few exceptions, the fractures detailed in log are considered to be Drill Breaks (DB) or drilling induced (di) fractures along intact incipient features.
120							Hager Richter Optical and Acoustic Televiewer logs were done on May 22, 2008.
125							A model A3 Multiple Position Borehole Extensometer (MPBX) was installed on May 27, 2008 at E-3. Three borehole anchors and 1/4" steel rods were grouted into the hole at 24 ft, 48 ft, and 99 ft, as well as, three Vibrating Wire Displacement Transducers at the same depths encased in a 3/4" PVC pipe within the borehole. Installing both the 1/4" steel rods and transducers allows for both manual (Mitutoyo depth micrometer) and electric readings (Geokon 404 datalogger) to be taken. A watertight protective steel roadway box/manhole cover was installed at the collar of the installation to protect it from the elements.
130							

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
							COMPLETE

HAGER-RICHTER
GEOSCIENCE, INC.

BOREHOLE GEOPHYSICAL LOGGING
GENERAL ELECTRIC HUDSON FALLS TDCS
SOUTH GLENS FALLS, NEW YORK

Prepared for:

Alpine Construction, LLC
10 Broad Street
Schuylerville, New York

Prepared by:

Hager-Richter Geoscience, Inc.
846 Main Street
Fords, New Jersey 08863

File 08RG15
December 2008

December 4, 2008
File 08RG15

John Conley, P.E.
Alpine Construction, LLC
10 Broad Street
Schuylerville, New York

Tel: 518.695.6739
Fax: 518.695.6824
Cell: 518.312.6511
Email: JConley@alpineconstruction.biz

RE: Borehole Geophysical Logging
General Electric Hudson Falls TDCS
South Glens Falls, New York

Dear Mr. Conley:

In this report, we summarize the results of borehole geophysical logging conducted by Hager-Richter Geoscience, Inc. (Hager-Richter) in three (3) exploratory boreholes for the General Electric Hudson Falls TDCS Project in South Glens Falls, New York for Alpine Construction, LLC (Alpine). The scope of work was specified by Alpine.

Introduction

The three logged boreholes were located at a facility identified as the Boralex Powerhouse in South Glens Falls, New York. The general location of the site is shown in Figure 1, and Figure 2 is a site plan showing the approximate locations of the logged boreholes. Alpine requested acoustic televiewer (ATV) and optical televiewer (OTV) logging as part of a geotechnical investigation of the site. Alpine was interested in determining the depth and orientation (dip azimuth and dip angle) of bedrock fractures intersected by the exploratory boreholes.

The three logged boreholes were identified as E-1, E-2, and E-3. The datum for depths in this report is the top of bedrock at the location of each borehole. There was no overburden at the locations of the three logged boreholes. Therefore, the ground surface at the boreholes was the top of bedrock. Borehole E-1 was cased with 3-inch PVC casing to a depth of less than five feet and was open-hole in the remainder of the 3.5-inch diameter exploratory borehole to a depth of approximately 42 feet. Borehole E-2 was cased with 3-inch casing to a depth of less than 5 feet and was open-hole in the remainder of the 3.5-inch diameter exploratory borehole to a depth of approximately 43 feet. Borehole E-3 was cased with 4-inch PVC casing to a depth of less than four feet and was open-hole in the remainder of the HQ cored (3.8-inch diameter) exploratory borehole to a depth of approximately 106 feet. According to Alpine, the bedrock penetrated by the boreholes primarily consists of Snake Hill Shale.

Objective

The objective of the ATV logging was to determine the depth and orientation (dip azimuth and dip angle) of bedrock fractures intersected by the boreholes.

The Field Operations

Robert Garfield and Alexis Martinez of Hager-Richter conducted the field operations on May 2 and July 2, 2008. The project was coordinated with Mr. John Conley, P.E. of Alpine, who was present during field operations on May 2 and July 2, 2008. Mr. Gary Page, P.G., of Brierley Associates, LLC was present during field operations on May 2, 2008. Data analysis and interpretation were completed at the Hager-Richter offices. Original data and field notes reside in the Hager-Richter files and will be retained at least three years. Preliminary borehole geophysical logging data were provided to Alpine electronically on May 18, 2008. Final borehole geophysical logging data were provided to Alpine electronically on November 25, 2008.

Equipment

A Mount Sopris Matrix portable digital logging system was used with a 4MXA-1000 winch for the borehole geophysical logging. Data were recorded along with depth in digital format using a PC. Data were displayed in real time in the field and were processed in the office using WellCAD v. 4.2, commercially licensed software.

Optical Televiewer. An ALT OBI-40 optical televiewer (OTV) probe was used for this project. The OTV acquires a high resolution, effectively continuous, magnetically oriented, 360° image of the borehole wall. The image can be used to detect bedrock structures such as fractures, foliation, and bedding planes and to provide information about lithology. The probe includes a 3-axis magnetometer and three accelerometers to orient the image and to provide borehole deviation data that are used to correct structure orientations from apparent to true orientations.

Acoustic Televiewer. An ALT ABI-40 acoustic televiewer (ATV) probe was used for this project. The ATV acquires a high resolution, effectively continuous, magnetically oriented, 360° image of the borehole wall using the reflected signal of sound waves in the ultrasonic frequency range. Both amplitude and travel time of the reflected signal are displayed and can be used to detect bedrock structures such as fractures, foliation, and bedding planes. The probe includes a 3-axis magnetometer and three accelerometers to orient the image and to provide borehole deviation data that are used to correct structure orientations from apparent to true orientations.

ATV travel time data can also be used to calculate an acoustic caliper log. The acoustic caliper log measures the average borehole diameter as a function of depth. The acoustic caliper log is derived from the travel time data and the velocity of the acoustic signal in water. The acoustic caliper log is used to locate possible fractures and to aid in the interpretation of other borehole geophysical logs.

Limitations of the Method

With the 4MXA-1000 winch, the logging cable passes over a calibrated wheel, and an encoder counts the revolutions, which are converted to depth. Slippage of the logging cable may occur, resulting in errors in recorded depth. At the beginning and end of a logging run, fiducial depths (commonly ground surface or top of casing) are measured and are compared to determine if slippage occurred.

Optical Televiewer. The OTV can be acquired in both air and optically clear water-filled boreholes. If the borehole is water-filled, the clarity of the water directly affects the quality of the OTV image. The OTV probe must be centralized in the borehole to acquire optimal images of the borehole wall. If the borehole wall is rough and/or irregular or the diameter of the open borehole is larger than the diameter of the casing, the probe may not be adequately centralized and the quality of the optical images may be compromised.

The OTV logs are used to determine the depth and orientation of fractures and other planar features intersected by a borehole. In some cases, natural planar features in the bedrock, such as mineral veins, bedding, and foliation may appear to be fractures in the OTV logs, but are not actual discontinuities in the bedrock. The OTV images are also used to provide information about lithology.

The accuracy of the orientation measured by the OBI-40, as stated by the manufacturer, is ±0.5° for the inclination data and ±1° for the azimuth data. The OBI-40 relies on the earth's magnetic field to determine azimuth. Therefore, in areas where the magnetic field may be significantly affected by local magnetic objects, the dip azimuths reported in the logs may be compromised. Specifically, the dip azimuth of bedrock structures and the borehole deviation data within approximately five feet of steel casing are not accurate. However, the depth and dip angle of bedrock structures within five feet of steel casing are accurate.

Acoustic Televiewer. ATV logging requires that liquid be present in the portion of the borehole to be logged. However, the liquid does not need to be optically clear. The ATV probe must be centralized in the borehole to acquire optimal images of the borehole wall. If the borehole wall is rough and/or irregular or the diameter of the open borehole is larger than the diameter of the casing, the probe may not be adequately centralized and the quality of the acoustic images may be compromised.

The ATV logs are used to determine the depth and orientation of fractures and other planar features intersected by a borehole. In some cases, natural planar features in the bedrock, such as mineral veins, bedding, and foliation may appear to be fractures in the ATV logs, but are not actual discontinuities in the bedrock.

The accuracy of the orientation measured by the ABI-40, as stated by the manufacturer, is ±0.5° for the inclination data and ±1° for the azimuth data. The ABI-40 relies on the earth's magnetic field to determine azimuth. Therefore, in areas where the magnetic field may be significantly affected by local magnetic objects, the accuracy of dip azimuths reported in the logs may be reduced. Specifically, the dip azimuth data of bedrock structures and the borehole deviation data within approximately five feet of steel casing are not accurate. However, the depth and dip angle of bedrock structures within approximately five feet of steel casing are accurate.

The acoustic caliper data is unlikely to indicate the presence of high angle fractures and fractures with small apertures. High angle fractures with large apertures may show small enlargements in the caliper log at both the top and bottom of the intersection of the fracture with the borehole. It also may be difficult to identify fractures in the caliper log located near the bottom of casing where a significant enlargement commonly occurs and may be due to causes other than natural fractures.

Field Procedures & Data Acquisition

Adequate tension was maintained with the logging cable during the borehole geophysical logging and the depth encoder was cleaned after each logging run in order to maintain accurate depth measurements. Repeat sections were acquired to verify depth consistency. In addition, at the beginning and end of a logging run, a fiducial depth (top of casing or ground surface) was measured and checked for consistency. The data acquisition parameters are listed in Table 1.

Table 1 – Data Acquisition Parameters

Log	Sampling Interval	Logging Speed	Logging Direction
OTV	0.01 feet	5 feet per minute	down and up
ATV & Acoustic Caliper	0.01 feet	6 - 8 feet per minute	down and up

Data Processing

The processing consists mainly of selecting scales, filters, and the layout of the tracks. In addition, the OTV and ATV data require determining the depth, orientation, and category of the bedrock structures detected. To increase the quality of the images, the brightness and contrast of the OTV images were adjusted and the ATV travel time images were digitally centralized. The ATV amplitude images can be normalized, although normalization was not applied to the ATV amplitude data for this project.

Data Interpretation & Presentation

Fractures can be identified on the basis of the OTV images, ATV amplitude images, and/or the ATV travel time images. Some, if not most, of the criteria for the identifying fractures require a judgment call, and different log analysts will not necessarily make the same call. Hence, some of the bedrock structures identified as fractures may not be fractures. Bedding, foliation, veins, and other planar geologic features in the rock may appear similar to fractures in the borehole geophysical data.

The WellCAD software program reports the orientation of bedrock structures (fractures, bedding, foliation, veins, and other planar geologic features) as the dip azimuth (dip direction) and dip angle of each structure. The dip azimuth is perpendicular to the strike as used commonly by geologists. The dip azimuth data are referenced to magnetic north and the dip angle data are reported as the bedrock structure’s angle from horizontal. The datum for depths in this report is the ground surface at the location of each borehole. The WellCAD software program reports the depth of a bedrock structure as the average of the depth of the top and bottom intersections of the bedrock structure and the borehole wall.

Bedrock structures detected in the televiewer logs are grouped into five categories: Fracture Rank 1, Fracture Rank 2, Fracture Rank 3, Healed Fractures and Veins, and Bedding. The categories are shown as color-coded lines and symbols on the structure projection plots, tadpole plots, and on the structure statistics plots. Figure 3 explains the bedrock structure categories, and Figure 4 explains how to read the tadpole plots.

Fracture Rank 1 describes minor fractures that are not distinct and may not be continuous around the borehole. Fracture Rank 2 describes intermediate fractures that are distinct and continuous around the borehole with little or no apparent aperture. Fracture Rank 3 describes major fractures that are distinct and continuous around the borehole with apparent aperture. The Healed Fractures and Veins category describes planar structures in the bedrock interpreted as healed fractures or veins. The Bedding category describes planar structures in the bedrock interpreted as bedding.

The structure projection plots display the structural interpretation of the televiewer data and displays the bedrock structures as they appear in the televiewer images. The depth, orientation, and category of the bedrock structures can be read from the structure projection plots. The data in the structure projection plots are apparent data and are not corrected from apparent to true dip azimuth and dip angle.

The tadpole plots are created from the structure projection plots after the data are corrected from apparent to true dip azimuth and dip angle. The tadpole plots graphically display the depth, orientation, and category of the bedrock structures interpreted from the televiewer images. The orientation of bedrock structures are graphically displayed on the tadpole plots by a tadpole made up of a circle, the head, and a line, the tail. The position of the head, left to right on the tadpole plot, gives the dip angle of the bedrock structure. The left side of the track indicates a dip angle of 0° and the right side of the track indicates a dip angle of 90° from horizontal. The position of the tail gives the dip azimuth of the fracture and can be read like a compass. The tail pointing directly up is 0°, magnetic north. We note explicitly that the dip azimuth is perpendicular to the strike as the term is used by geologists.

Borehole deviation data are reported as Northing, Easting, and True Vertical Depth (TVD). The Northing and Easting data are the distance in feet the borehole has horizontally deviated from where the borehole would be if it was vertical. Zero Northing and zero Easting is located at the start of the data acquisition, typically the bottom of casing. TVD is the vertical depth of the hole, assuming the borehole is vertical for the cased portion of the hole. The depth track in the logs and tables is the depth along the borehole (i.e. the length of the borehole), which, if the borehole is vertical will be equal to the TVD. The deviation log can not be acquired in the steel casing due to the magnetic interference of the casing.

Results

The general location of the site is shown in Figure 1, and Figure 2 is a site plan showing the approximate locations of the logged boreholes. The borehole geophysical logs are given in Appendix 1, the tables of bedrock structures are given in Appendix 2, and the bedrock structure statistics plots are given in Appendix 3. The dip azimuth data are referenced to magnetic north, and the dip angle data are reported as the bedrock structure's angle from horizontal. The datum for depths in this report is the top of bedrock at the location of each borehole. There was no overburden at the locations of the three logged boreholes. Therefore, the ground surface at the boreholes was the top of bedrock.

The three logged boreholes were identified as E-1, E-2, and E-3. Borehole E-1 was cased with 3-inch PVC casing to a depth of less than five feet and was open-hole in the remainder of the 3.5-inch diameter exploratory borehole to a depth of approximately 42 feet. Borehole E-2 was cased with 3-inch casing to a depth of 4.4 feet and was open-hole in the remainder of the 3.5-inch diameter exploratory borehole to a depth of approximately 43 feet. Borehole E-3 was cased with 4-inch PVC casing to a depth of less than four feet and was open-hole in the remainder of the HQ cored (3.8-inch diameter) exploratory borehole to a depth of approximately 106 feet. According to Alpine the bedrock penetrated by the boreholes primarily consists of Snake Hill Shale.

ATV data can only be acquired in the water filled portion of the boreholes. The water level in borehole E-2 was in the casing at less than one foot below the ground surface at the time of logging. The water level in boreholes E-1 and E-3 were below the bottom of casing at the time of logging. Therefore, water was added from the top of casing before acquiring ATV data in boreholes E-1 and E-2 in order to acquire ATV data throughout the un-cased portion of the borehole.

The ATV data quality for boreholes E-1 and E-2 is not as high quality as the ATV data for borehole E-3 due to the conditions in boreholes E-1 and E-2. The surface casing used in boreholes E-1 and E-2 was 3 inches in diameter. However, the open boreholes were approximately 3.5 inches in diameter. Due to casing with smaller diameter than the open borehole, it was not possible to properly centralize the ATV probe in boreholes E-1 and E-2. In addition to having smaller casing diameter than the open boreholes, the deviation of boreholes E-1 and E-2 also caused poor ATV probe centralization. Borehole E-1 deviates a maximum of approximately 17° degrees from vertical, and borehole E-2 deviates a maximum of approximately 22° from vertical. The ATV data for borehole E-3 are high quality. Borehole E-3 only deviates a maximum of approximately 5° from vertical. Water clarity in the boreholes directly affects the quality of the OTV images. Due to poor water clarity in borehole E-2, it was not possible to detect bedding in borehole E-2 from the OTV data.

The number of bedrock structures interpreted as fractures in each borehole and the most prominent orientations of the fractures detected in each borehole are reported in Table 2 and are evident in the bedrock structure statistics plots in Appendix 3. The number of bedrock structures interpreted as bedding in each borehole and the mean orientation of the foliation and veins detected in each borehole are reported in Table 3 and are evident in the bedrock structure statistics plots in Appendix 3.

Table 2 - Bedrock Fracture Statistics

Borehole ID	Total Number of Fractures	Most Prominent Fracture Dip Azimuth(s)	Most Prominent Fracture Dip Angle(s)
E-1	81	southeast (120°- 165°)	no prominent fracture dip angle
E-2	29	southeast (135°- 150°)	no prominent fracture dip angle
E-3	81	southeast (120°- 180°)	no prominent fracture dip angle

Table 3 - Bedrock Foliation and Vein Statistics

Borehole ID	Total Number of Foliation and Veins	Mean Foliation and Vein Dip Azimuth	Mean Foliation and Vein Dip Angle
E-1	58	172° (south-southeast)	9°
E-2	bedding was not detected due to the water clarity in borehole E-2		
E-3	41	199° (south-southwest)	6°

Based on the borehole geophysical logging data, the most prominent orientation of bedrock fractures detected in the three logged boreholes is approximately parallel to bedding at the site. The bedrock in boreholes E-1, E-2, and E-3 is very competent with few open fractures based on the borehole geophysical logging data. Only two of the 191 fractures detected in the three logged boreholes have significant apparent aperture, the other 189 fractures are either healed or have little to no apparent aperture.

Limitations on the Use of this Report

This letter report was prepared for the exclusive use of Alpine Construction, LLC (Client). No other party shall be entitled to rely on this Report or any information, documents, records, data, interpretations, advice or opinions given to Client by Hager-Richter Geoscience, Inc. in the performance of its work. The Report relates solely to the specific project for which Hager-Richter has been retained and shall not be used or relied upon by Client or any third party for any variation or extension of this project, any other project or any other purpose without the express written permission of Hager-Richter. Any unpermitted use by Client or any third party shall be at Client's or such third party's own risk and without any liability to Hager-Richter.

Hager-Richter has used reasonable care, skill, competence and judgment in the performance of its services for this project consistent with professional standards for those providing similar services at the same time, in the same locale, and under like circumstances. Unless otherwise stated, the work performed by Hager-Richter should be understood to be exploratory and interpretational in character and any results, findings or recommendations contained in this Report or resulting from the work proposed may include decisions which are judgmental in nature and not necessarily based solely on pure science or engineering. It should be noted that our conclusions might be modified if subsurface conditions were better delineated with additional subsurface exploration including, but not limited to, test pits, soil borings with collection of soil and water samples, and laboratory testing.

Except as expressly provided in this limitations section, Hager-Richter makes no other representation or warranty of any kind whatsoever, oral or written, expressed or implied; and all implied warranties of merchantability and fitness for a particular purpose, are hereby disclaimed.

If you have any questions or comments on this report, please contact us at your convenience. It has been a pleasure to work with Alpine on this project. We look forward to working with you again in the future.

Sincerely yours,
HAGER-RICHTER GEOSCIENCE, INC.

Robert l. Garfield

Robert Garfield
Senior Borehole Geophysicist

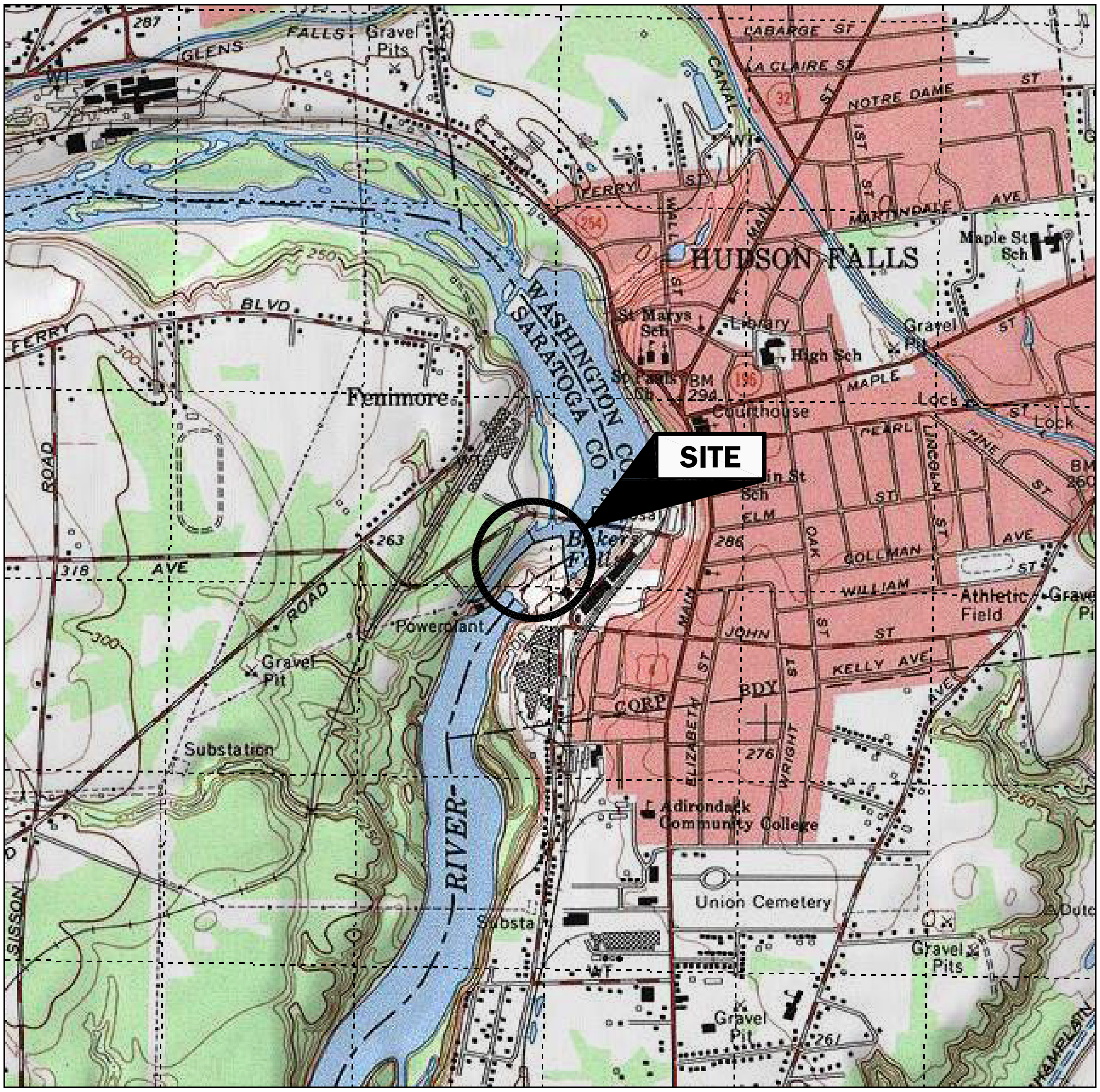
Dorothy Richter, P.G.
President

Enclosures:

Figures:
- Figure 1. General Site Location
- Figure 2. Site Plan
- Figure 3. Bedrock Structure Category Figure
- Figure 4. Tadpole Explanation Figure

Appendix 1: Borehole Geophysical Logs
Appendix 2: Tables of Bedrock Structures
Appendix 3: Bedrock Structure Statistics Plots

FIGURES



Map created with TOPO!® ©2003 National Geographic (www.nationalgeographic.com/topo)

LOCATION

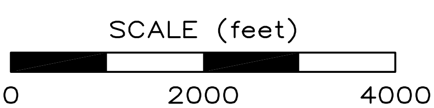


Figure 1 General Site Location General Electric Hudson Falls TDCS South Glens Falls, New York	
File 08RG15	December, 2008
HAGER—RICHTER GEOSCIENCE, INC. Fords, New Jersey	

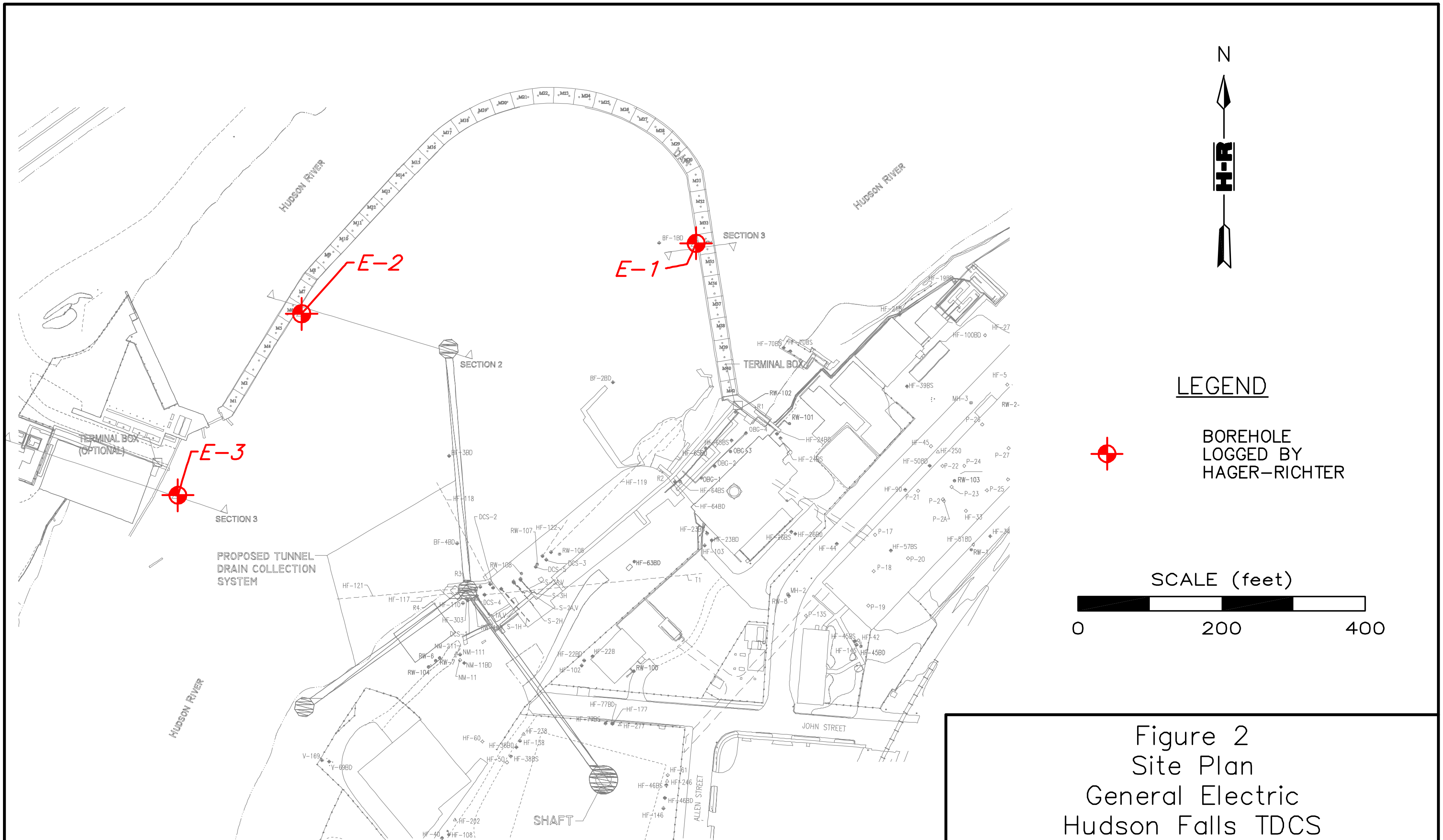


Figure 2
Site Plan
General Electric
Hudson Falls TDCS
South Glens Falls, New York

File 08RG15 | December, 2008

HAGER-RICHTER GEOSCIENCE, INC.
Fords, New Jersey

NOTE:

Modified from site plan provided by Brierley Associates.

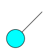
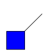
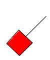
Tadpole	Structure Category (Symbol Color)	Description
	Bedding (Brown)	Planar structure interpreted to be bedding
	Healed Fracture or Vein (Orange)	Planar structure interpreted to be foliation or a vein
	Fracture Rank 1 (Light Blue)	Minor Fracture - not distinct and may not be continuous around the borehole
	Fracture Rank 2 (Blue)	Intermediate Fracture - distinct and continuous around the borehole with little or no apparent aperture
	Fracture Rank 3 (Red)	Major Fracture - distinct and continuous around the borehole with apparent aperture

Figure 3. Key to bedrock structure categories.

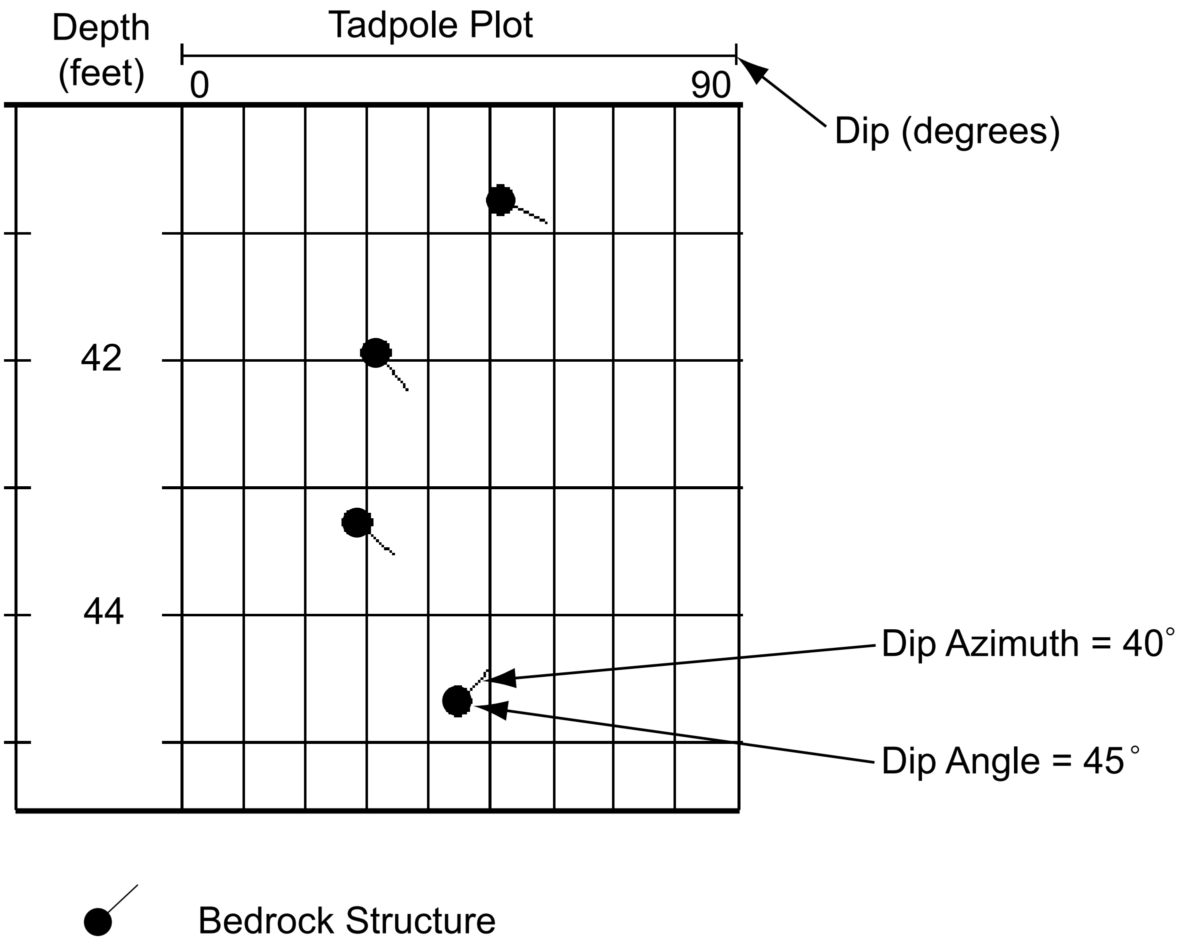


Figure 4. Key to tadpoles. The orientation of the bedrock structures is graphically displayed by a tadpole made up of a circle, the head, and a line, the tail. The position of the head, left to right on the tadpole plot, gives the dip angle of the structure. The left side of the track indicates a dip angle of 0°, and the right side of the track indicates a dip angle of 90°from horizontal. The position of the tail gives the dip azimuth of the structure and can be read like a compass. The tail pointing directly up is 0°, magnetic north.

APPENDIX 1

BOREHOLE GEOPHYSICAL LOGS

HAGER-RICHTER GEOSCIENCE, INC.

846 Main Street
Fords, NJ 08863
Phone: 732-661-0555
Fax: 732-661-0123

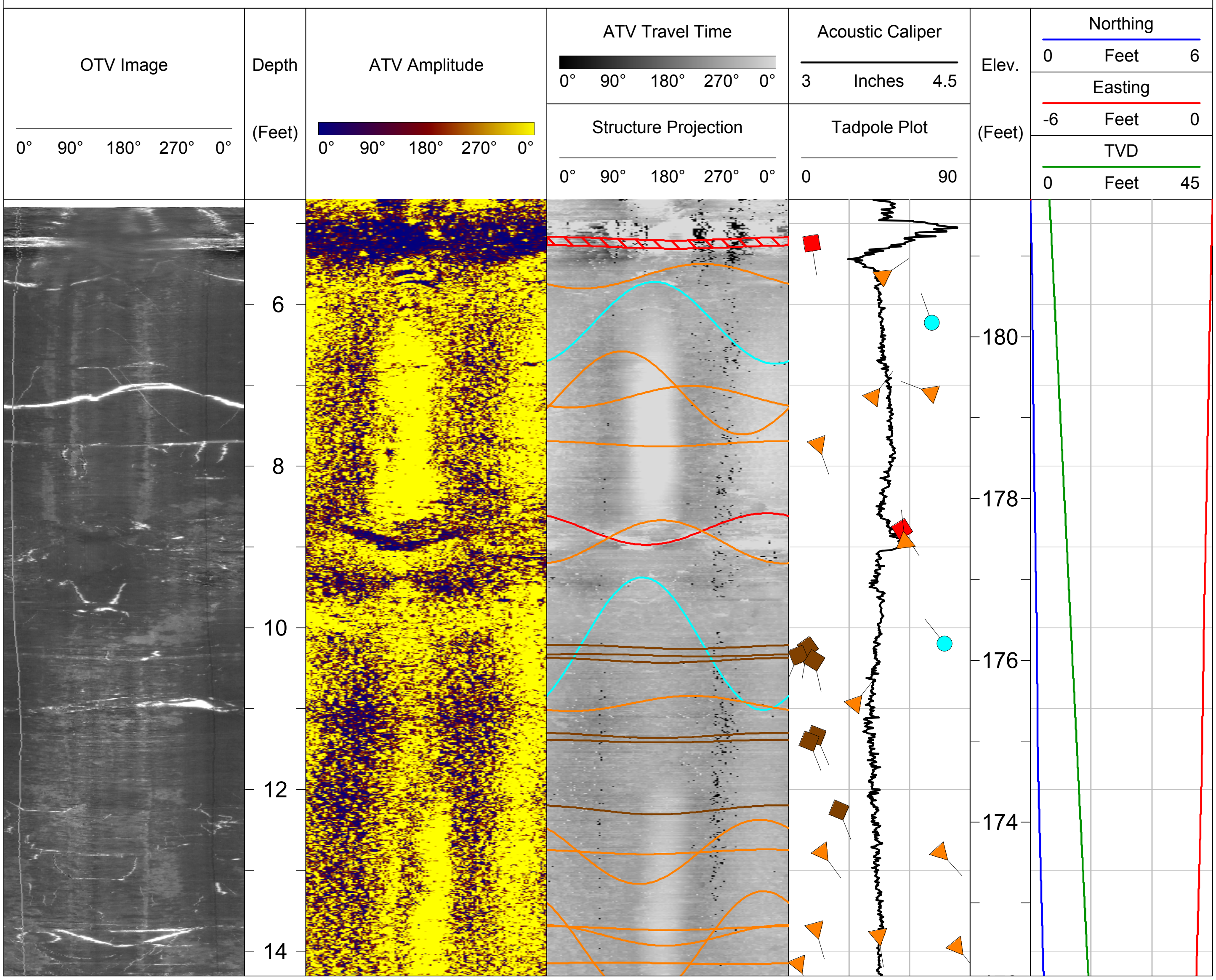
BOREHOLE ID:	E-1
DATE LOGGED:	July 2, 2008

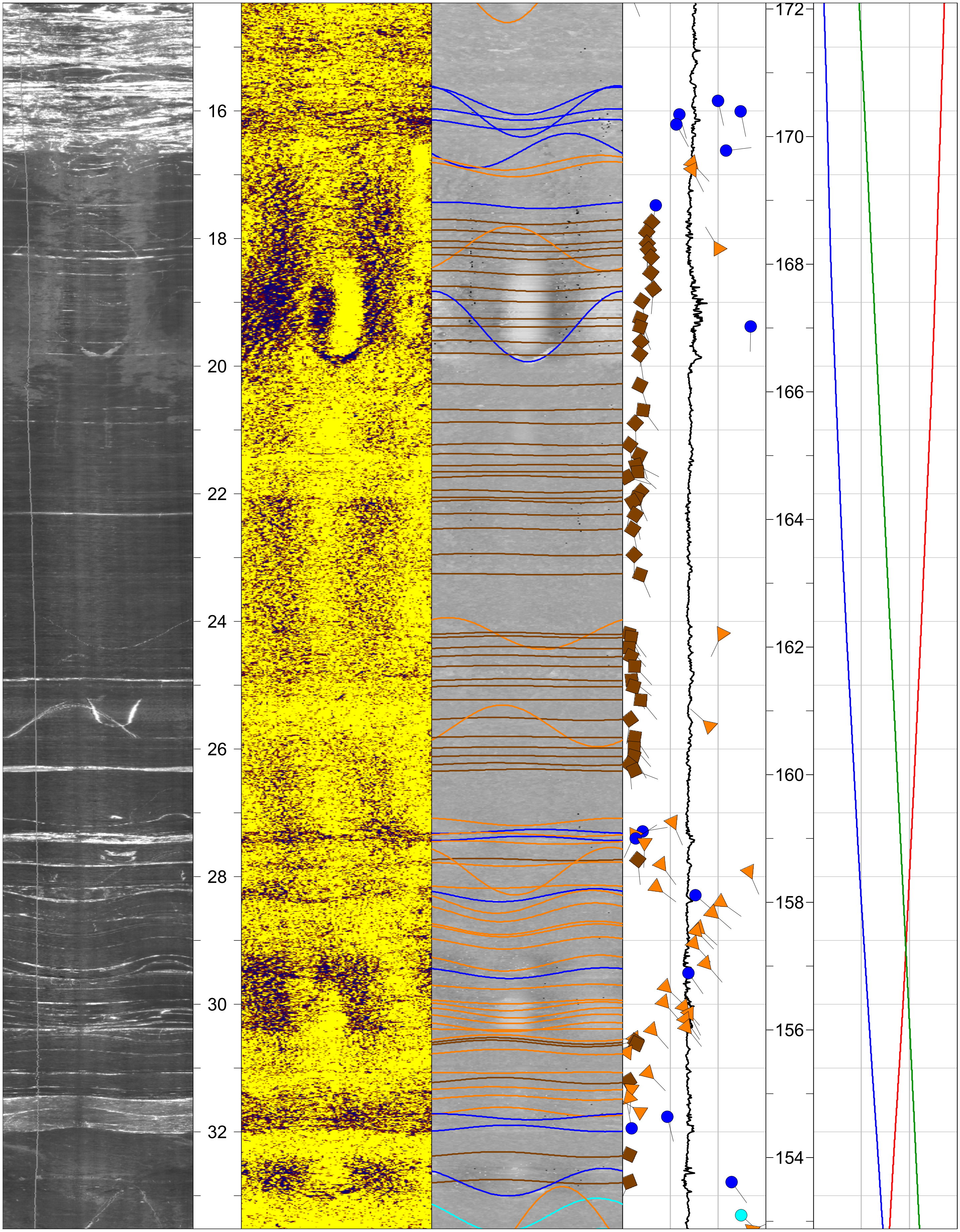
CLIENT:	Alpine Construction, LLC	H-R FILE:	08RG15
PROJECT:	General Electric Hudson Falls TDCS	LOG DATUM:	Top of Rock (TOR)
LOCATION:	Boralex Powerhouse	LOG DATUM ELEVATION:	186.4 Feet (NGVD)
CITY, STATE:	South Glens Falls, New York	ORIENTATION REFERENCE:	Magnetic North
INSTRUMENTATION:	Mount Sopris Matrix	CASING STICK-UP:	0.4 Feet Above TOR
LOGGING GEOPHYSICIST(S):	R. Garfield & A. Martinez	BOREHOLE DIAMETER:	3.5 Inches
PROJECT REPRESENTATIVE(S):	John Conley	WATER LEVEL DEPTH:	6.0 Feet

STRUCTURE LEGEND

Fracture Rank 1 Fracture Rank 2 Fracture Rank 3 Healed Fracture or Vein Bedding

NOTE: Water was added to the borehole in order to attempt to acquire ATV data for the entire un-cased portion of the borehole.

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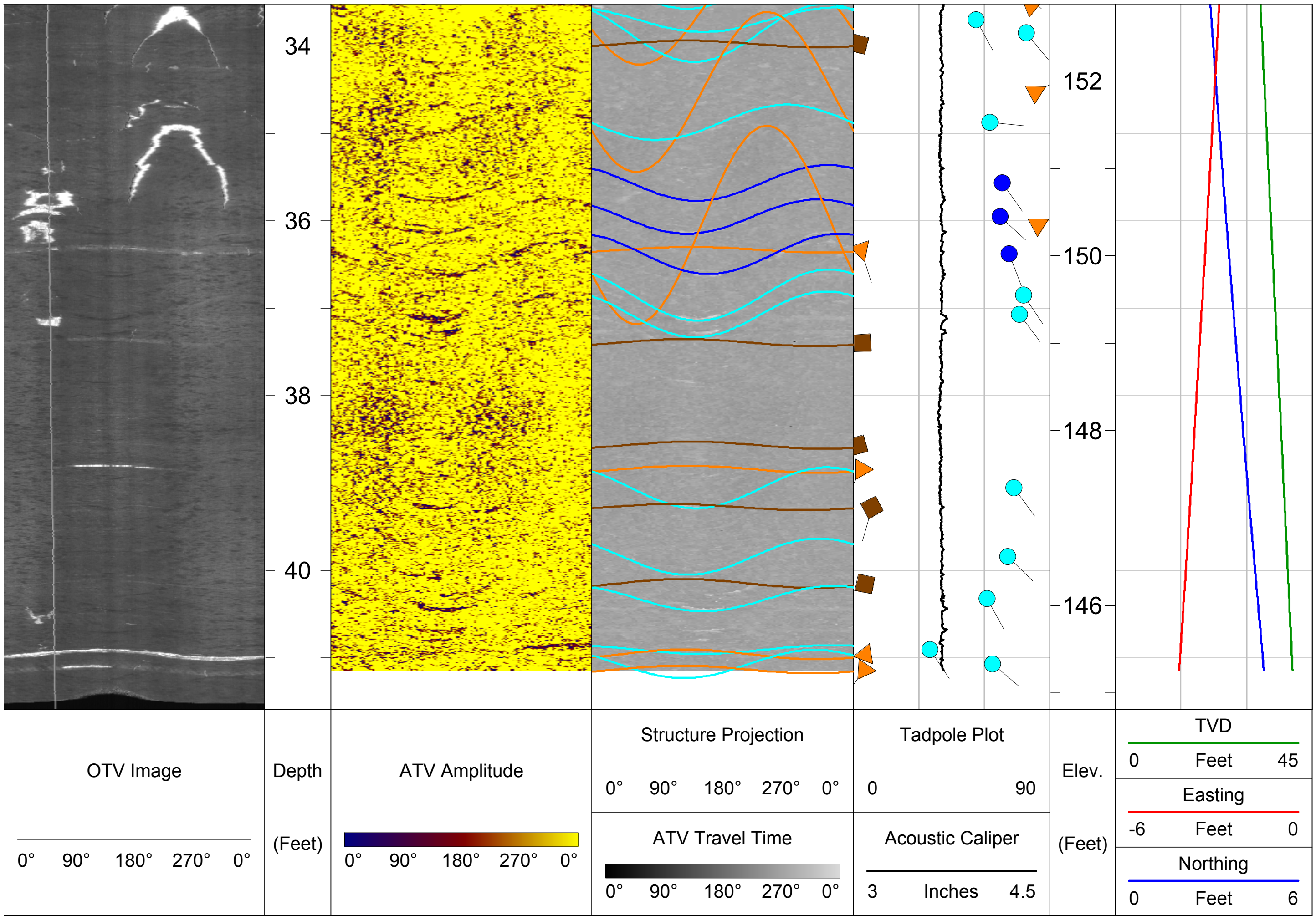

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OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Tadpole Plot
0 90
Acoustic Caliper
3 Inches 4.5
Elev.
(Feet)
TVD
0 Feet 45
Easting
-6 Feet 0
Northing
0 Feet 6

HAGER-RICHTER GEOSCIENCE, INC.

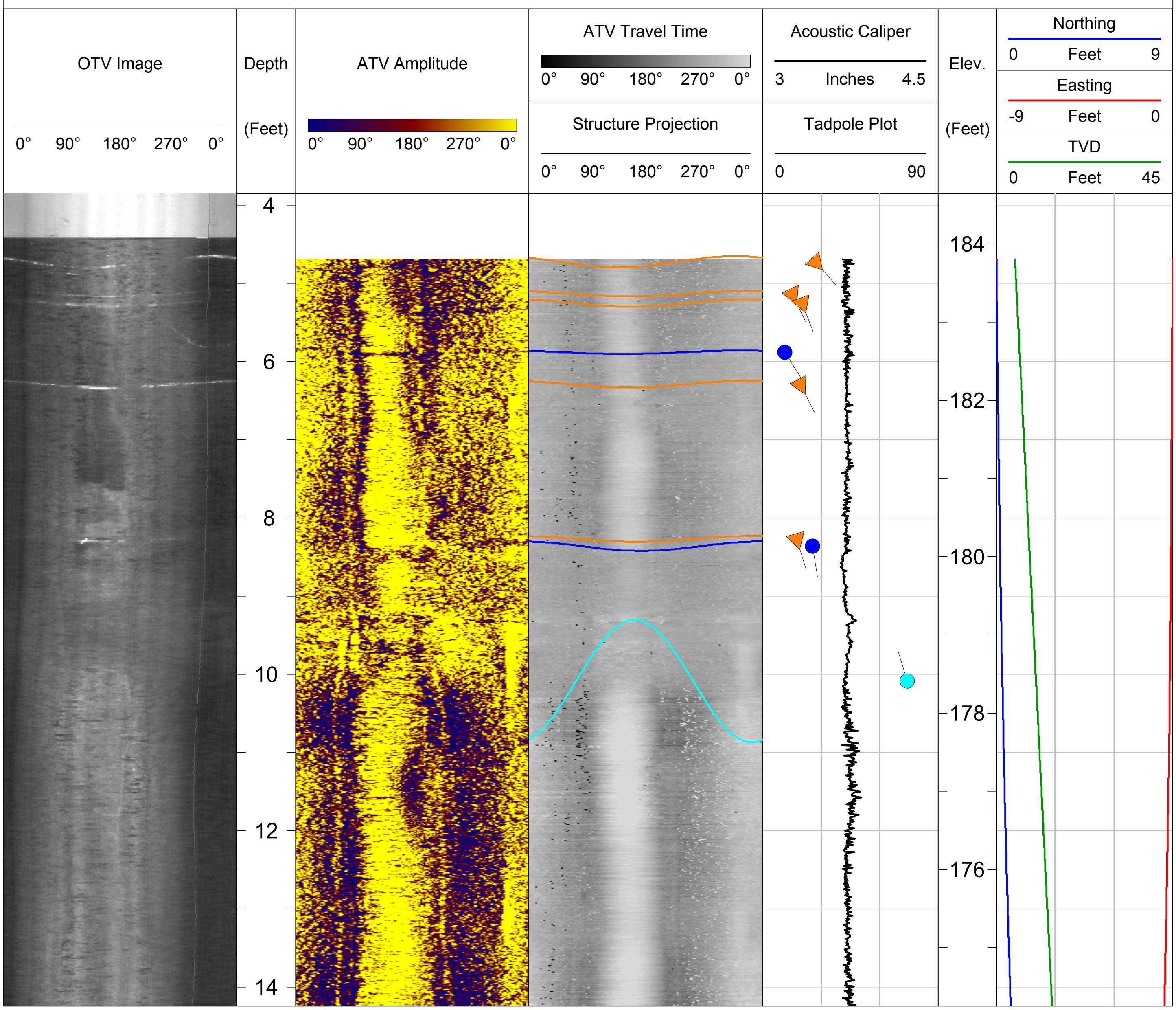
846 Main Street
Fords, NJ 08863
Phone: 732-661-0555
Fax: 732-661-0123

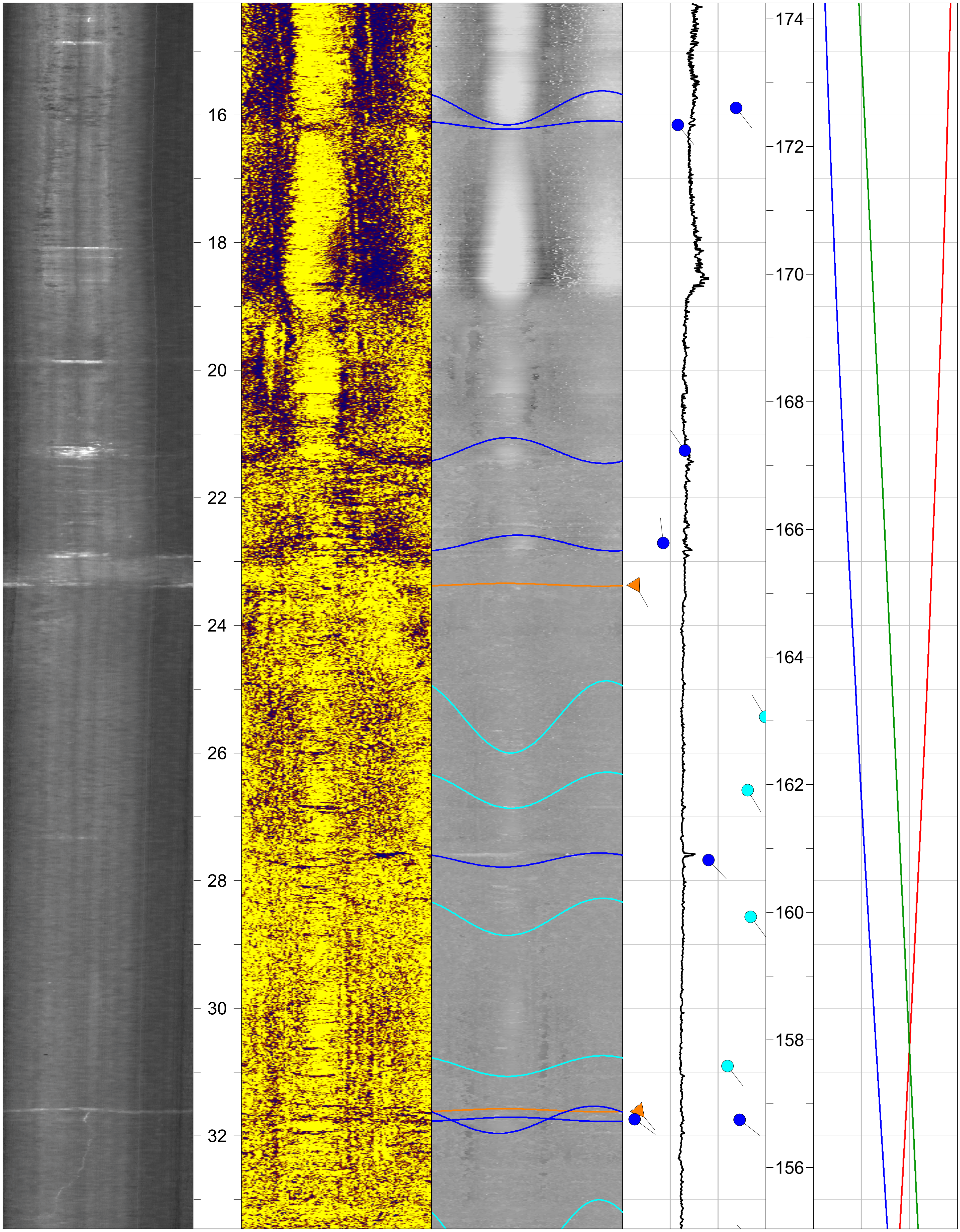
BOREHOLE ID:	E-2
DATE LOGGED:	July 2, 2008

CLIENT:	Alpine Construction, LLC	H-R FILE:	08RG15
PROJECT:	General Electric Hudson Falls TDCS	LOG DATUM:	Top of Rock (TOR)
LOCATION:	Boralex Powerhouse	LOG DATUM ELEVATION:	188.5 Feet (NGVD)
CITY, STATE:	South Glens Falls, New York	ORIENTATION REFERENCE:	Magnetic North
INSTRUMENTATION:	Mount Sopris Matrix	CASING STICK-UP:	0.4 Feet Above TOR
LOGGING GEOPHYSICIST(S):	R. Garfield & A. Martinez	BOREHOLE DIAMETER:	3.5 Inches
PROJECT REPRESENTATIVE(S):	John Conley	WATER LEVEL DEPTH:	0.8 Feet

STRUCTURE LEGEND

Fracture Rank 1 — Fracture Rank 2 — Healed Fracture or Vein

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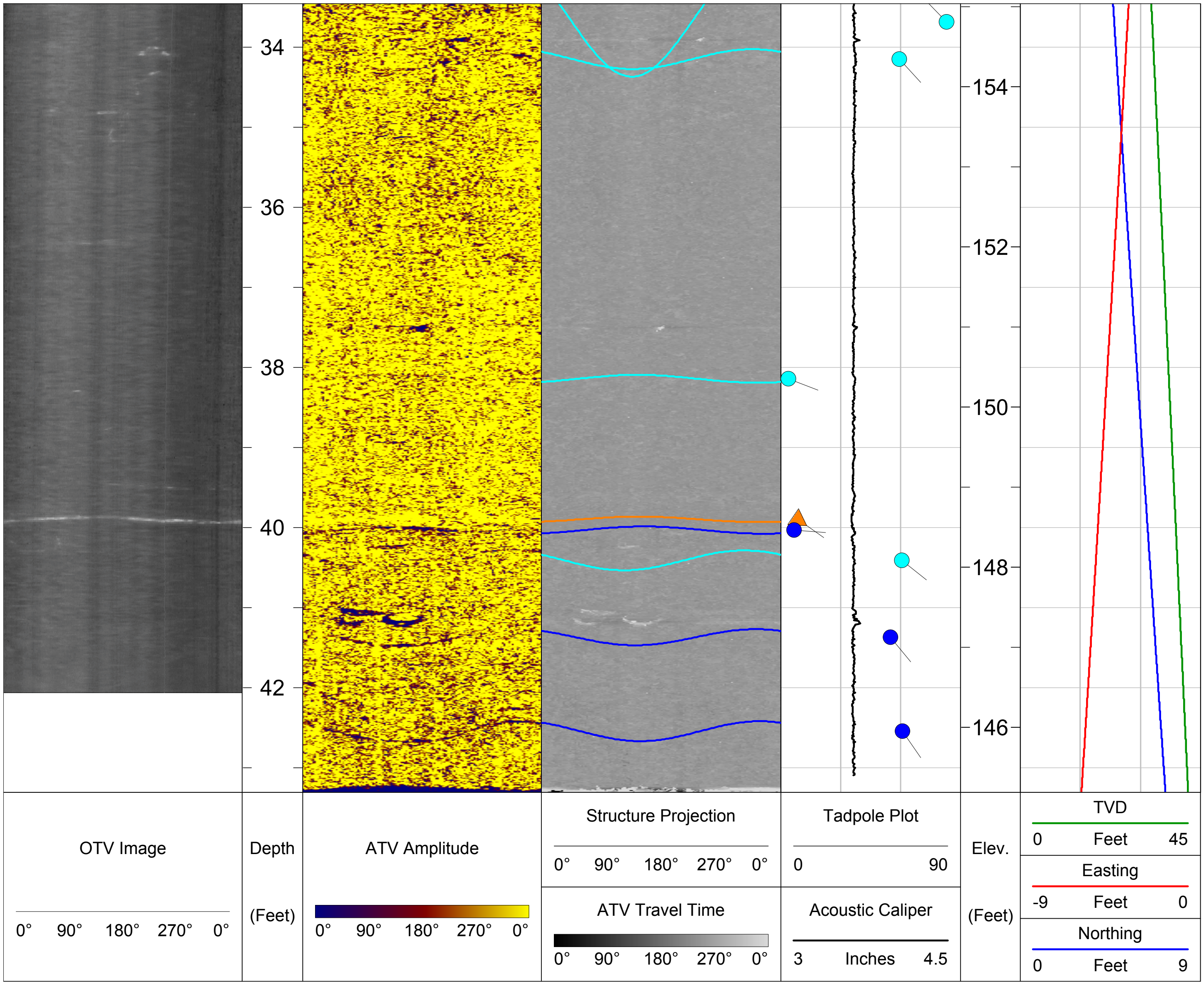
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Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Tadpole Plot
0 90
Acoustic Caliper
3 Inches 4.5
Elev.
(Feet)
TVD
0 Feet 45
Easting
-9 Feet 0
Northing
0 Feet 9

HAGER-RICHTER GEOSCIENCE, INC.	846 Main Street Fords, NJ 08863 Phone: 732-661-0555 Fax: 732-661-0123	BOREHOLE ID:	E-3
		DATE LOGGED:	May 2, 2008

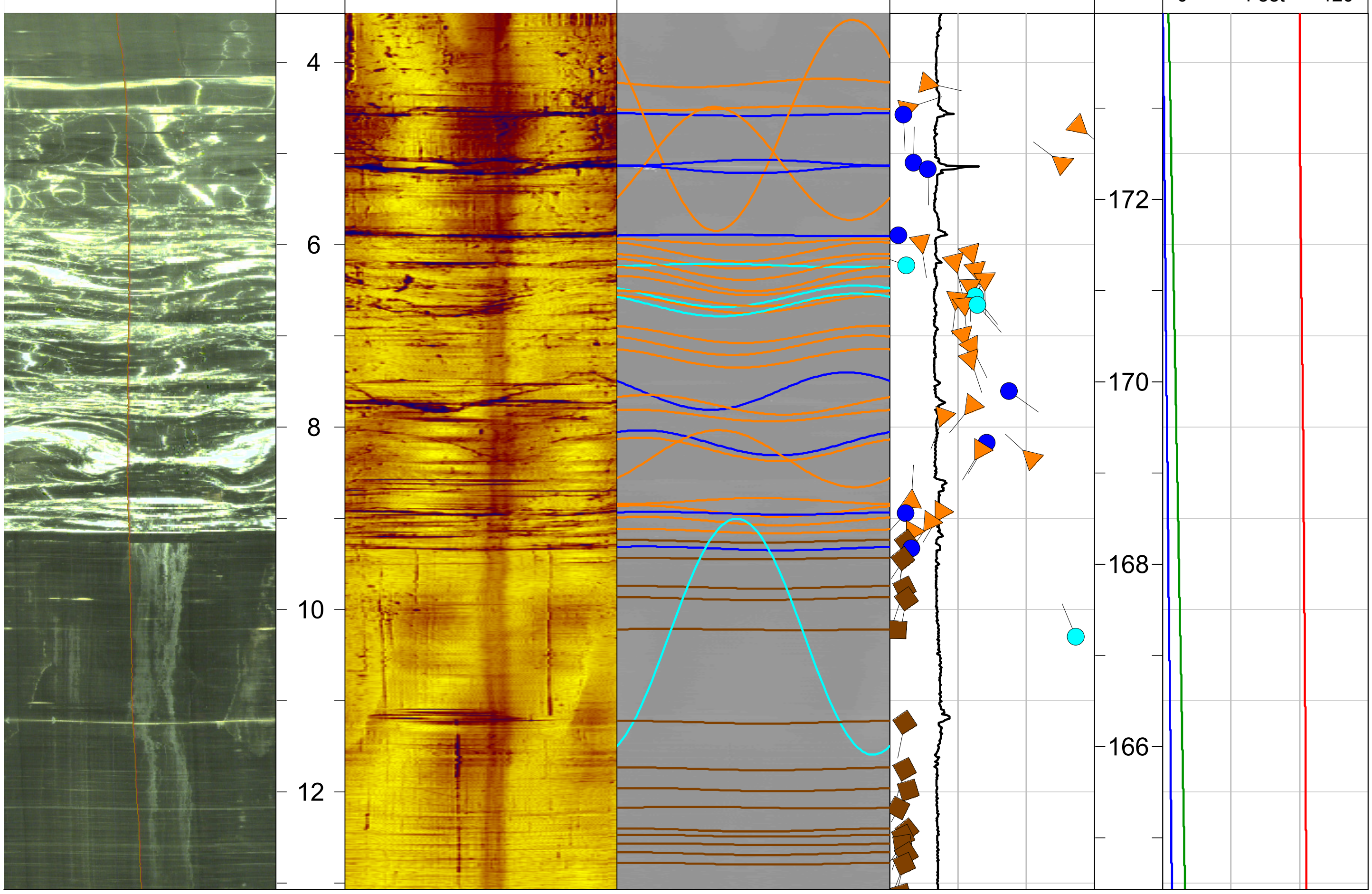
CLIENT:	Alpine Construction, LLC	H-R FILE:	08RG15
PROJECT:	General Electric Hudson Falls TDCS	LOG DATUM:	Top of Rock (TOR)
LOCATION:	Boralex Powerhouse	LOG DATUM ELEVATION:	177.5 Feet (NGVD)
CITY, STATE:	South Glens Falls, New York	ORIENTATION REFERENCE:	Magnetic North
INSTRUMENTATION:	Mount Sopris Matrix	CASING STICK-UP:	1.9 Feet Above TOR
LOGGING GEOPHYSICIST(S):	R. Garfield & A. Martinez	BOREHOLE DIAMETER:	3.8 Inches (HQ)
PROJECT REPRESENTATIVE(S):	J. Conley & G. Page	WATER LEVEL DEPTH:	26.2 Feet

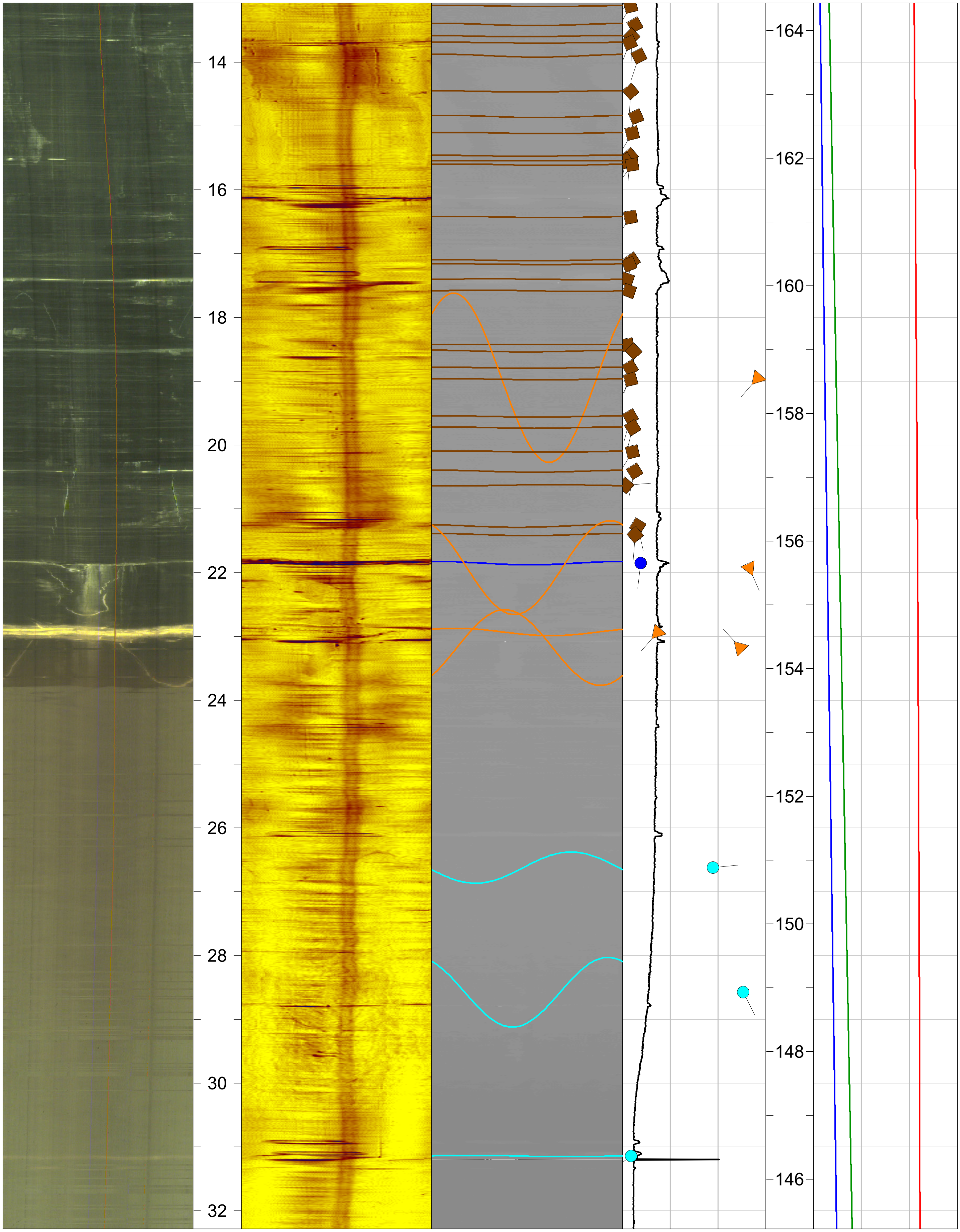
STRUCTURE LEGEND

Fracture Rank 1   Fracture Rank 2   Healed Fracture or Vein   Bedding

NOTE: Water was added to the borehole in order to acquire ATV data for the entire un-cased portion of the borehole.

OTV Image	Depth	ATV Amplitude	ATV Travel Time / Structure Projection	Acoustic Caliper / Tadpole Plot	Elev.	Northing / Easting / TVD
0° 90° 180° 270° 0°	(Feet)	0° 90° 180° 270° 0°	ATV Travel Time: 0° 90° 180° 270° 0° Structure Projection: 0° 90° 180° 270° 0°	Acoustic Caliper: 3.8 Inches 4.4 Tadpole Plot: 0 90	(Feet)	Northing: 0 Feet 6 Easting: -2 Feet 1 TVD: 0 Feet 120





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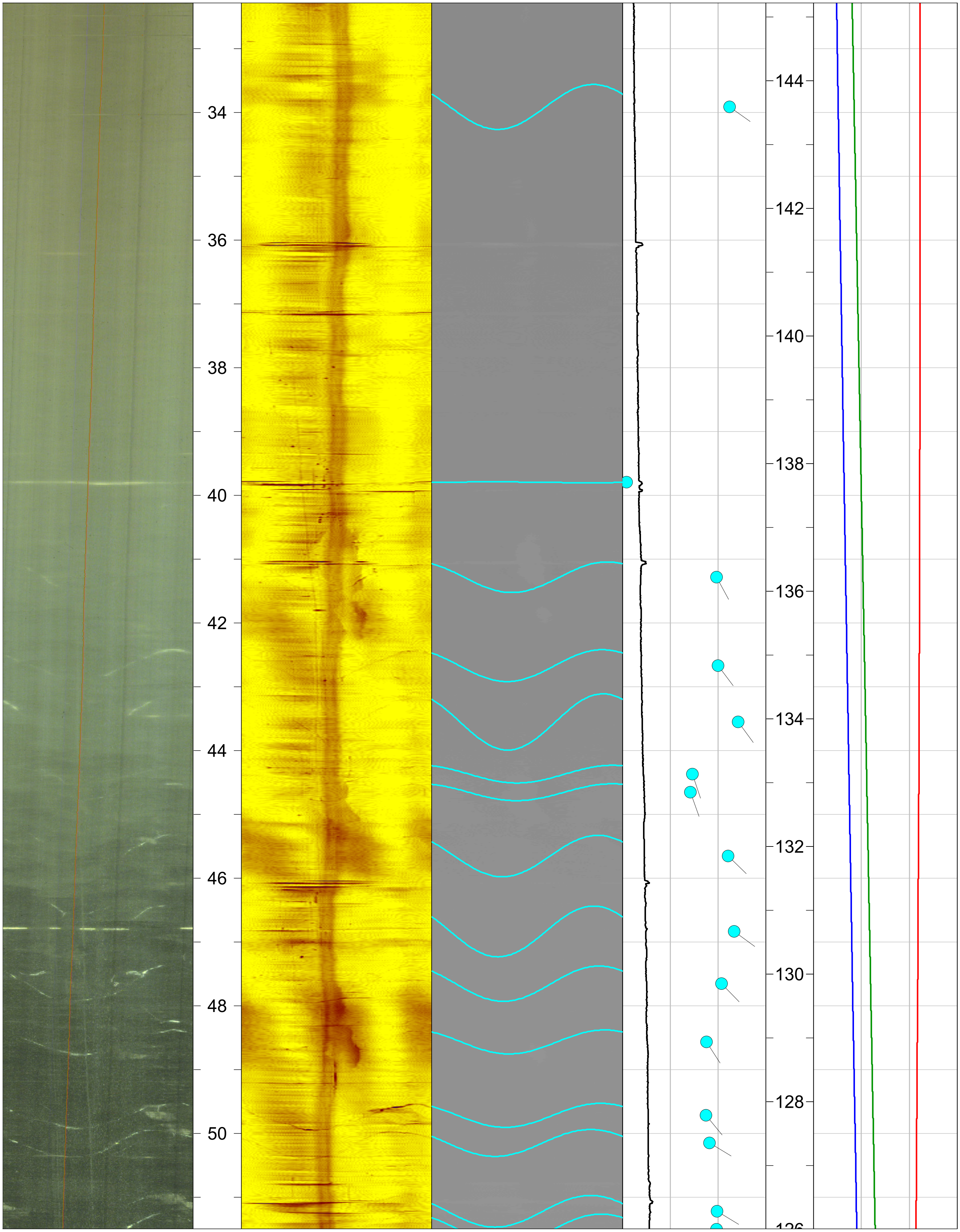
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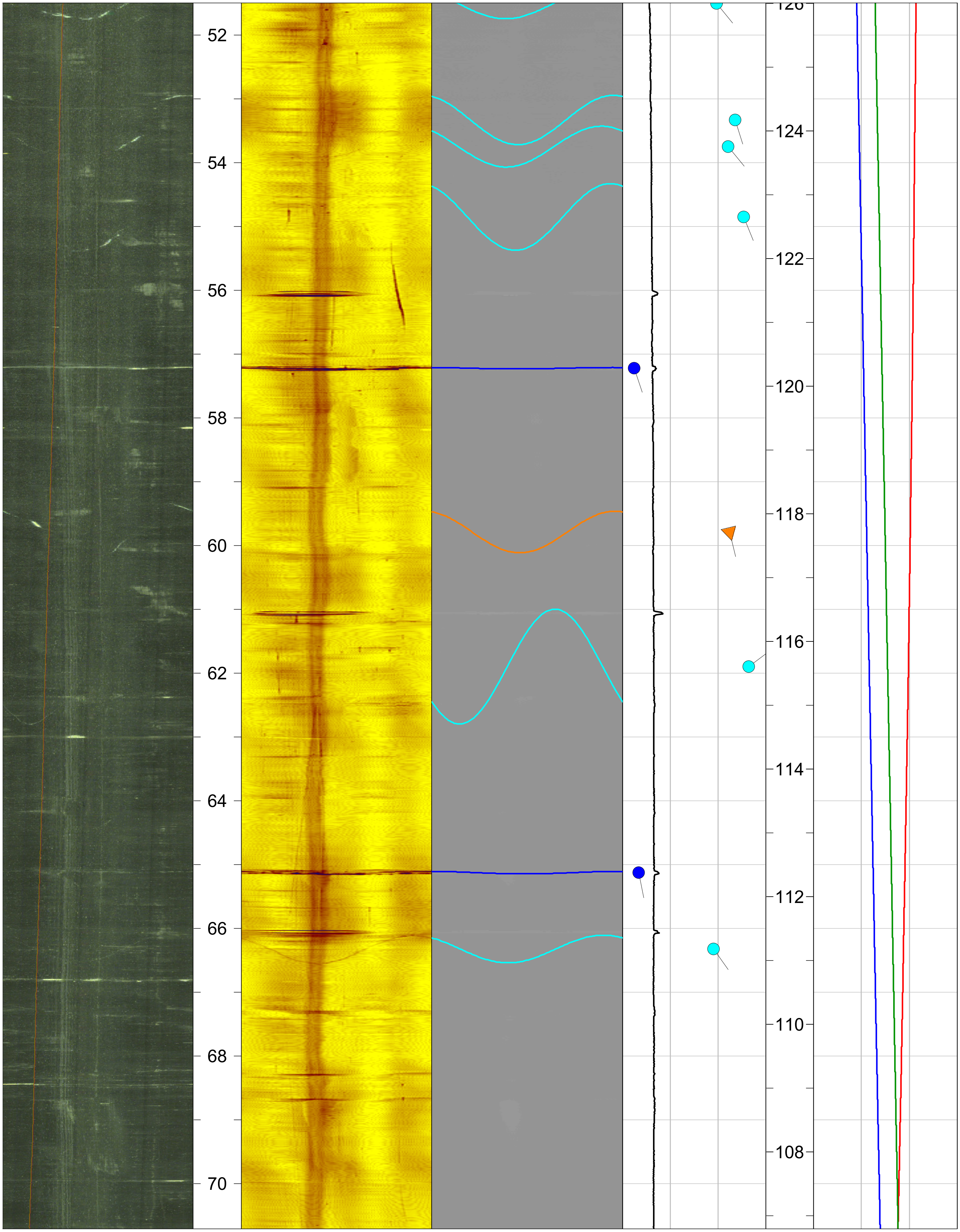

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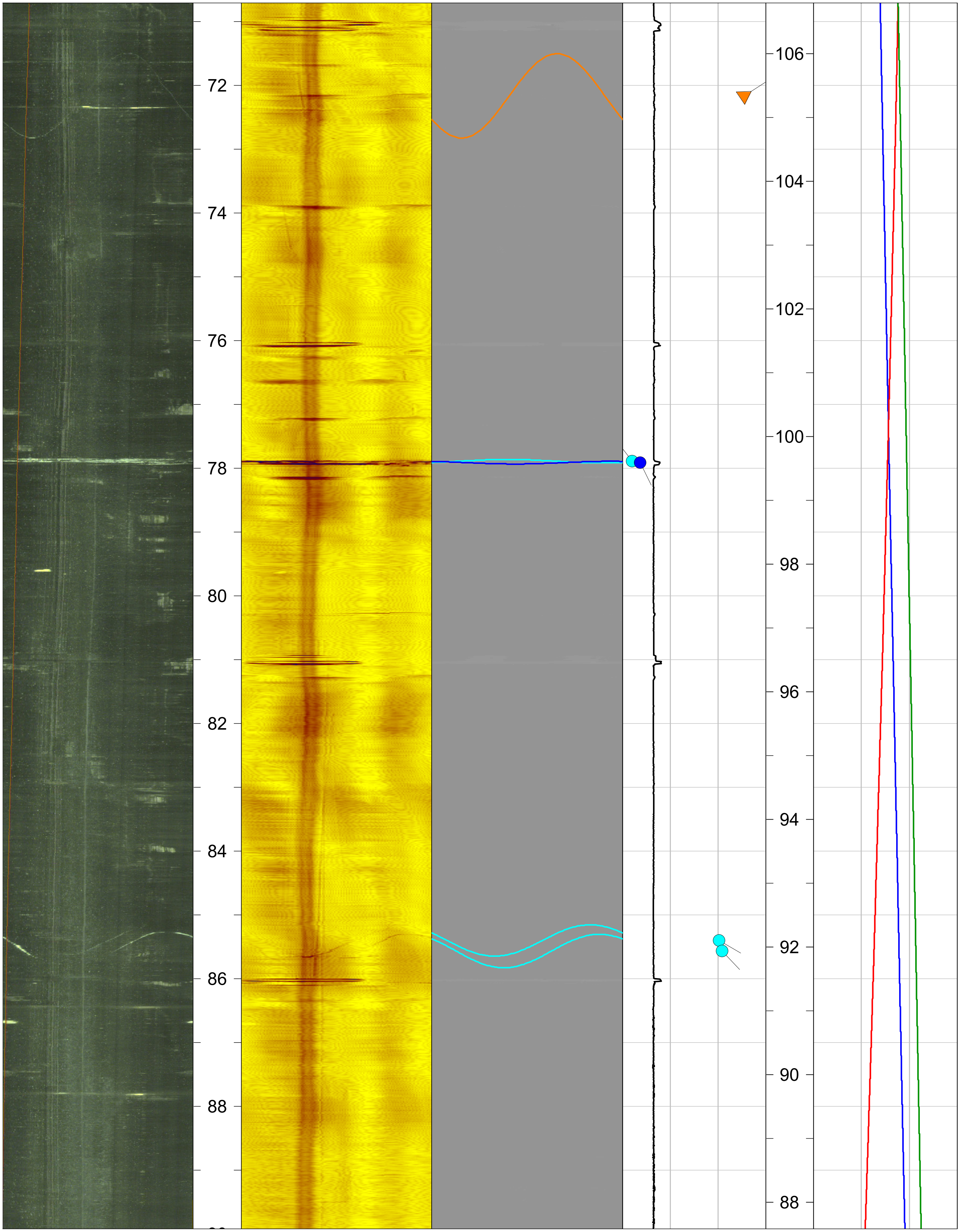
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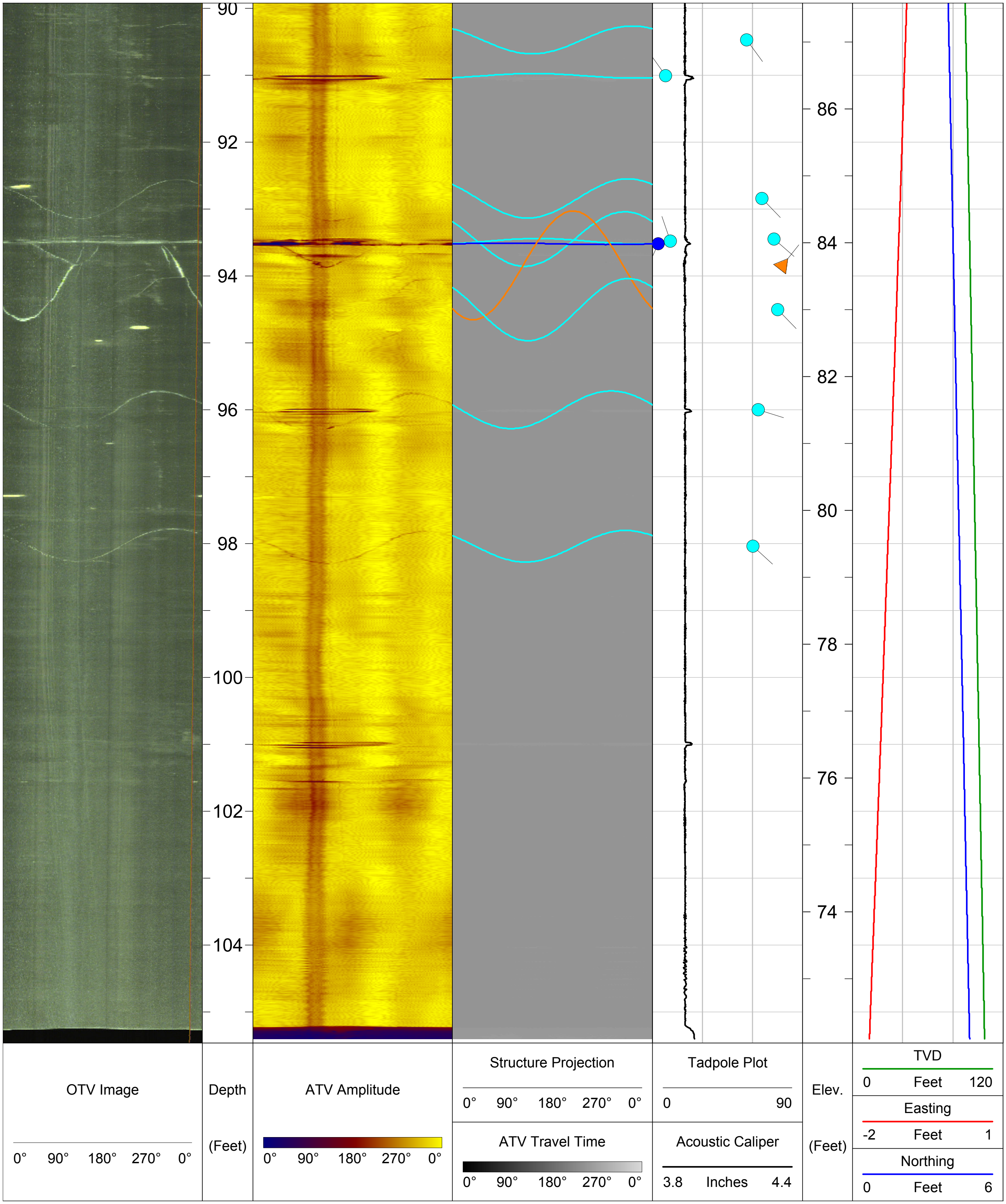
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OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Tadpole Plot
0 90
Acoustic Caliper
3.8 Inches 4.4
Elev.
(Feet)
TVD
0 Feet 120
Easting
-2 Feet 1
Northing
0 Feet 6

APPENDIX 2

TABLES OF BEDROCK STRUCTURES

CLIENT	Alpine Construction, LLC
PROJECT	General Electric Hudson Falls TDCS
LOCATION	Boralex Powerhouse
CITY, STATE	South Glens Falls, New York
H-R FILE	08RG15

BOREHOLE ID	E-1
DATE LOGGED	July 2, 2008
LOG DATUM	Top of Rock
LOG DATUM ELEV.	186.4 Feet (NGVD)
DIP AZIMUTH	Magnetic North
DIP ANGLE	Measured as the Angle from Horizontal

TABLE OF BEDROCK STRUCTURES FOR BOREHOLE E-1

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
5.2	181.2	171	11	Fracture Rank 3
5.7	180.8	56	47	Healed Fracture or Vein
6.2	180.2	341	71	Fracture Rank 1
7.1	179.3	292	71	Healed Fracture or Vein
7.1	179.3	38	42	Healed Fracture or Vein
7.7	178.7	161	14	Healed Fracture or Vein
8.8	177.6	147	56	Fracture Rank 3
8.9	177.5	353	58	Healed Fracture or Vein
10.2	176.2	322	77	Fracture Rank 1
10.2	176.2	189	10	Bedding
10.3	176.1	203	5	Bedding
10.4	176.0	167	13	Bedding
10.9	175.5	39	33	Healed Fracture or Vein
11.3	175.1	156	14	Bedding
11.4	175.0	157	10	Bedding
12.3	174.1	158	25	Bedding
12.8	173.6	137	75	Healed Fracture or Vein
12.8	173.6	143	16	Healed Fracture or Vein
13.7	172.7	163	13	Healed Fracture or Vein
13.8	172.6	171	45	Healed Fracture or Vein
13.9	172.5	142	83	Healed Fracture or Vein
14.2	172.3	158	5	Healed Fracture or Vein
15.8	170.6	168	60	Fracture Rank 2
16.0	170.4	169	74	Fracture Rank 2
16.1	170.3	164	36	Fracture Rank 2
16.2	170.2	151	34	Fracture Rank 2
16.6	169.8	83	65	Fracture Rank 2
16.8	169.6	137	44	Healed Fracture or Vein
16.9	169.5	152	43	Healed Fracture or Vein
17.5	168.9	190	21	Fracture Rank 2
17.7	168.7	180	18	Bedding

TABLE OF BEDROCK STRUCTURES FOR BOREHOLE E-1

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
17.9	168.5	176	15	Bedding
18.1	168.3	180	15	Bedding
18.2	168.2	330	60	Healed Fracture or Vein
18.2	168.2	183	16	Bedding
18.3	168.1	178	18	Bedding
18.5	167.9	174	18	Bedding
18.8	167.6	184	19	Bedding
19.0	167.4	171	12	Bedding
19.3	167.2	158	11	Bedding
19.4	167.0	155	11	Bedding
19.4	167.0	180	81	Fracture Rank 2
19.6	166.8	180	11	Bedding
19.8	166.6	172	11	Bedding
20.3	166.1	162	11	Bedding
20.7	165.7	144	13	Bedding
20.9	165.5	178	8	Bedding
21.2	165.2	173	4	Bedding
21.4	165.0	162	11	Bedding
21.6	164.9	117	9	Bedding
21.7	164.8	132	10	Bedding
21.7	164.7	106	3	Bedding
22.0	164.4	178	11	Bedding
22.1	164.3	155	9	Bedding
22.1	164.3	192	6	Bedding
22.3	164.1	169	8	Bedding
22.6	163.9	168	6	Bedding
23.0	163.4	180	7	Bedding
23.3	163.1	156	11	Bedding
24.2	162.2	205	62	Healed Fracture or Vein
24.2	162.2	153	4	Bedding
24.3	162.2	143	5	Bedding
24.4	162.0	139	4	Bedding
24.6	161.9	163	5	Bedding
24.7	161.7	137	8	Bedding
24.9	161.5	129	6	Bedding
25.0	161.4	153	7	Bedding
25.2	161.2	140	11	Bedding
25.5	160.9	187	5	Bedding
25.6	160.8	312	55	Healed Fracture or Vein
25.8	160.6	146	8	Bedding
26.0	160.4	139	7	Bedding
26.1	160.3	150	7	Bedding
26.2	160.2	174	4	Bedding
26.3	160.1	111	7	Bedding

TABLE OF BEDROCK STRUCTURES FOR BOREHOLE E-1

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
27.2	159.3	157	31	Healed Fracture or Vein
27.3	159.1	80	13	Fracture Rank 2
27.3	159.1	205	7	Healed Fracture or Vein
27.4	159.0	57	8	Fracture Rank 2
27.5	158.9	182	14	Healed Fracture or Vein
27.7	158.7	174	9	Bedding
27.8	158.6	144	24	Healed Fracture or Vein
27.9	158.5	156	79	Healed Fracture or Vein
28.2	158.2	126	21	Healed Fracture or Vein
28.3	158.1	131	46	Fracture Rank 2
28.4	158.0	125	62	Healed Fracture or Vein
28.6	157.8	131	56	Healed Fracture or Vein
28.8	157.6	132	48	Healed Fracture or Vein
28.9	157.6	136	46	Healed Fracture or Vein
29.0	157.4	138	44	Healed Fracture or Vein
29.4	157.1	138	52	Healed Fracture or Vein
29.5	156.9	145	42	Fracture Rank 2
29.7	156.7	133	27	Healed Fracture or Vein
30.0	156.4	139	26	Healed Fracture or Vein
30.0	156.4	139	38	Healed Fracture or Vein
30.1	156.3	152	42	Healed Fracture or Vein
30.2	156.2	144	39	Healed Fracture or Vein
30.4	156.1	141	40	Healed Fracture or Vein
30.4	156.0	138	18	Healed Fracture or Vein
30.5	155.9	265	7	Healed Fracture or Vein
30.6	155.8	258	8	Bedding
30.6	155.8	251	9	Bedding
30.8	155.7	275	3	Healed Fracture or Vein
31.1	155.3	135	16	Healed Fracture or Vein
31.2	155.2	283	4	Bedding
31.3	155.1	184	6	Healed Fracture or Vein
31.5	154.9	223	4	Healed Fracture or Vein
31.7	154.7	302	11	Healed Fracture or Vein
31.8	154.6	166	28	Fracture Rank 2
32.0	154.5	350	6	Fracture Rank 2
32.4	154.1	249	4	Bedding
32.8	153.6	203	4	Bedding
32.8	153.6	144	69	Fracture Rank 2
33.3	153.1	132	74	Fracture Rank 1
33.5	152.9	68	81	Healed Fracture or Vein
33.7	152.7	151	56	Fracture Rank 1
33.9	152.6	141	79	Fracture Rank 1
34.0	152.4	239	2	Bedding
34.5	151.9	63	83	Healed Fracture or Vein

TABLE OF BEDROCK STRUCTURES FOR BOREHOLE E-1

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
34.9	151.5	95	62	Fracture Rank 1
35.6	150.8	144	68	Fracture Rank 2
36.0	150.5	133	67	Fracture Rank 2
36.1	150.4	62	85	Healed Fracture or Vein
36.3	150.1	162	4	Healed Fracture or Vein
36.4	150.0	158	71	Fracture Rank 2
36.9	149.6	146	78	Fracture Rank 1
37.1	149.3	143	76	Fracture Rank 1
37.4	149.0	222	4	Bedding
38.6	147.8	210	2	Bedding
38.8	147.6	209	4	Healed Fracture or Vein
39.1	147.3	144	73	Fracture Rank 1
39.3	147.1	196	9	Bedding
39.9	146.6	134	71	Fracture Rank 1
40.2	146.2	238	5	Bedding
40.3	146.1	151	61	Fracture Rank 1
40.9	145.5	146	35	Fracture Rank 1
41.0	145.4	261	5	Healed Fracture or Vein
41.1	145.3	130	64	Fracture Rank 1
41.1	145.3	216	5	Healed Fracture or Vein

CLIENT	Alpine Construction, LLC
PROJECT	General Electric Hudson Falls TDCS
LOCATION	Boralex Powerhouse
CITY, STATE	South Glens Falls, New York
H-R FILE	08RG15

BOREHOLE ID	E-2
DATE LOGGED	July 2, 2008
LOG DATUM	Top of Rock
LOG DATUM ELEV.	188.5 Feet (NGVD)
DIP AZIMUTH	Magnetic North
DIP ANGLE	Measured as the Angle from Horizontal

TABLE OF BEDROCK STRUCTURES FOR BOREHOLE E-2

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
4.7	183.8	138	27	Healed Fracture or Vein
5.1	183.4	154	15	Healed Fracture or Vein
5.3	183.3	158	20	Healed Fracture or Vein
5.9	182.6	147	11	Fracture Rank 2
6.3	182.2	153	19	Healed Fracture or Vein
8.3	180.2	163	17	Healed Fracture or Vein
8.4	180.1	171	25	Fracture Rank 2
10.1	178.4	343	74	Fracture Rank 1
15.9	172.6	142	71	Fracture Rank 2
16.2	172.3	140	35	Fracture Rank 2
21.3	167.2	326	39	Fracture Rank 2
22.7	165.8	353	26	Fracture Rank 2
23.4	165.1	149	8	Healed Fracture or Vein
25.4	163.1	329	90	Fracture Rank 1
26.6	161.9	149	79	Fracture Rank 1
27.7	160.8	136	54	Fracture Rank 2
28.6	159.9	142	80	Fracture Rank 1
30.9	157.6	142	66	Fracture Rank 1
31.6	156.9	141	10	Healed Fracture or Vein
31.7	156.8	126	7	Fracture Rank 2
31.8	156.8	128	74	Fracture Rank 2
33.7	154.8	316	83	Fracture Rank 1
34.2	154.3	137	59	Fracture Rank 1
38.1	150.4	110	4	Fracture Rank 1
39.9	148.6	124	9	Healed Fracture or Vein
40.0	148.5	94	7	Fracture Rank 2
40.4	148.1	128	61	Fracture Rank 1
41.4	147.1	140	55	Fracture Rank 2
42.6	146.0	145	61	Fracture Rank 2

CLIENT	Alpine Construction, LLC
PROJECT	General Electric Hudson Falls TDCS
LOCATION	Boralex Powerhouse
CITY, STATE	South Glens Falls, New York
H-R FILE	08RG15

BOREHOLE ID	E-3
DATE LOGGED	May 2, 2008
LOG DATUM	Top of Rock
LOG DATUM ELEV.	177.5 Feet (NGVD)
DIP AZIMUTH	Magnetic North
DIP ANGLE	Measured as the Angle from Horizontal

TABLE OF BEDROCK STRUCTURES FOR BOREHOLE E-3

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
4.2	173.3	102	16	Healed Fracture or Vein
4.5	173.0	72	8	Healed Fracture or Vein
4.6	172.9	178	6	Fracture Rank 2
4.7	172.8	131	83	Healed Fracture or Vein
5.1	172.4	1	10	Fracture Rank 2
5.1	172.4	307	76	Healed Fracture or Vein
5.2	172.3	179	17	Fracture Rank 2
5.9	171.6	272	4	Fracture Rank 2
6.0	171.5	171	14	Healed Fracture or Vein
6.1	171.4	164	35	Healed Fracture or Vein
6.2	171.3	166	28	Healed Fracture or Vein
6.2	171.3	290	7	Fracture Rank 1
6.3	171.2	169	38	Healed Fracture or Vein
6.4	171.1	179	42	Healed Fracture or Vein
6.5	171.1	180	35	Healed Fracture or Vein
6.6	170.9	141	37	Fracture Rank 1
6.6	170.9	186	29	Healed Fracture or Vein
6.7	170.9	174	33	Healed Fracture or Vein
6.7	170.8	138	39	Fracture Rank 1
7.0	170.5	166	32	Healed Fracture or Vein
7.1	170.4	154	36	Healed Fracture or Vein
7.2	170.3	162	35	Healed Fracture or Vein
7.6	169.9	124	53	Fracture Rank 2
7.8	169.7	219	36	Healed Fracture or Vein
7.9	169.6	200	24	Healed Fracture or Vein
8.2	169.3	211	43	Fracture Rank 2
8.2	169.3	211	40	Healed Fracture or Vein
8.4	169.2	313	62	Healed Fracture or Vein
8.8	168.7	4	10	Healed Fracture or Vein
8.9	168.6	211	23	Healed Fracture or Vein
8.9	168.6	222	7	Fracture Rank 2

TABLE OF BEDROCK STRUCTURES FOR BOREHOLE E-3

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
9.0	168.5	215	18	Healed Fracture or Vein
9.1	168.4	209	10	Healed Fracture or Vein
9.3	168.3	188	7	Bedding
9.3	168.2	213	9	Fracture Rank 2
9.4	168.1	186	6	Bedding
9.8	167.8	198	7	Bedding
9.9	167.6	190	7	Bedding
10.2	167.3	228	4	Bedding
10.3	167.2	338	82	Fracture Rank 1
11.2	166.3	191	7	Bedding
11.8	165.8	196	7	Bedding
12.0	165.5	208	8	Bedding
12.2	165.3	254	4	Bedding
12.4	165.1	187	8	Bedding
12.5	165.0	198	6	Bedding
12.6	164.9	216	6	Bedding
12.7	164.8	193	7	Bedding
12.8	164.7	200	6	Bedding
13.1	164.4	209	5	Bedding
13.4	164.1	195	8	Bedding
13.6	163.9	180	6	Bedding
13.7	163.8	200	4	Bedding
13.9	163.6	198	10	Bedding
14.5	163.1	183	5	Bedding
14.9	162.7	202	8	Bedding
15.1	162.4	210	6	Bedding
15.5	162.0	185	5	Bedding
15.5	162.0	191	2	Bedding
15.6	161.9	216	6	Bedding
16.4	161.1	214	5	Bedding
17.1	160.4	192	6	Bedding
17.2	160.3	203	4	Bedding
17.4	160.1	244	3	Bedding
17.6	159.9	246	4	Bedding
18.4	159.1	216	3	Bedding
18.5	159.0	180	7	Bedding
18.8	158.7	192	5	Bedding
18.9	158.6	221	85	Healed Fracture or Vein
19.0	158.5	209	5	Bedding
19.6	158.0	194	5	Bedding
19.7	157.8	193	6	Bedding
20.1	157.4	212	6	Bedding
20.4	157.1	193	8	Bedding
20.6	156.9	86	2	Bedding

TABLE OF BEDROCK STRUCTURES FOR BOREHOLE E-3

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
21.3	156.2	167	9	Bedding
21.4	156.1	184	8	Bedding
21.9	155.7	186	11	Fracture Rank 2
21.9	155.6	156	80	Healed Fracture or Vein
22.9	154.6	221	22	Healed Fracture or Vein
23.2	154.3	317	74	Healed Fracture or Vein
26.6	150.9	84	57	Fracture Rank 1
28.6	148.9	153	76	Fracture Rank 1
31.1	146.4	233	5	Fracture Rank 1
33.9	143.6	125	67	Fracture Rank 1
39.8	137.7	228	2	Fracture Rank 1
41.3	136.2	151	59	Fracture Rank 1
42.7	134.8	143	60	Fracture Rank 1
43.6	134.0	144	72	Fracture Rank 1
44.4	133.1	161	44	Fracture Rank 1
44.7	132.9	160	43	Fracture Rank 1
45.7	131.9	134	66	Fracture Rank 1
46.8	130.7	126	70	Fracture Rank 1
47.7	129.9	136	62	Fracture Rank 1
48.6	128.9	147	53	Fracture Rank 1
49.7	127.8	140	53	Fracture Rank 1
50.2	127.4	121	55	Fracture Rank 1
51.2	126.3	121	59	Fracture Rank 1
51.5	126.0	140	59	Fracture Rank 1
53.3	124.2	163	71	Fracture Rank 1
53.7	123.8	141	66	Fracture Rank 1
54.9	122.7	157	76	Fracture Rank 1
57.2	120.3	161	7	Fracture Rank 2
59.8	117.7	166	67	Healed Fracture or Vein
61.9	115.6	53	79	Fracture Rank 1
65.1	112.4	169	10	Fracture Rank 2
66.3	111.2	144	57	Fracture Rank 1
72.2	105.3	57	76	Healed Fracture or Vein
77.9	99.6	322	6	Fracture Rank 1
77.9	99.6	153	11	Fracture Rank 2
85.4	92.1	120	61	Fracture Rank 1
85.6	91.9	136	63	Fracture Rank 1
90.5	87.0	144	57	Fracture Rank 1
91.0	86.5	326	8	Fracture Rank 1
92.8	84.7	136	66	Fracture Rank 1
93.4	84.1	130	73	Fracture Rank 1
93.5	84.0	341	11	Fracture Rank 1
93.5	84.0	204	4	Fracture Rank 2
93.8	83.7	38	78	Healed Fracture or Vein

TABLE OF BEDROCK STRUCTURES FOR BOREHOLE E-3

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
94.5	83.0	136	75	Fracture Rank 1
96.0	81.5	107	64	Fracture Rank 1
98.0	79.5	132	60	Fracture Rank 1

APPENDIX 3

BEDROCK STRUCTURE STATISTICS PLOTS

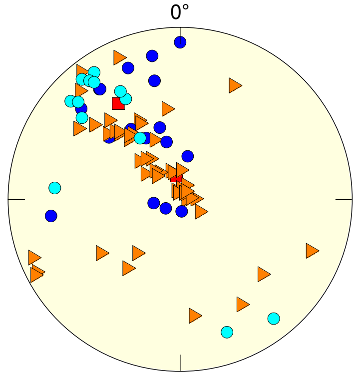
HAGER-RICHTER GEOSCIENCE, INC.	846 Main Street Fords, NJ 08863 Phone: 732-661-0555 Fax: 732-661-0123	FRACTURE STATISTICS PLOTS	
		BOREHOLE ID:	E-1
CLIENT:	Alpine Construction, LLC	H-R FILE:	08RG15
PROJECT:	General Electric Hudson Falls TDCS	DATE LOGGED:	July 2, 2008
LOCATION:	Boralex Powerhouse	ORIENTATION REFERENCE:	Magnetic North
CITY, STATE:	South Glens Falls, New York	MAGNETIC DECLINATION:	Not Applicable

STRUCTURE LEGEND

Fracture Rank 1 | Fracture Rank 2 | Fracture Rank 3 | Healed Fracture or Vein | Bedding

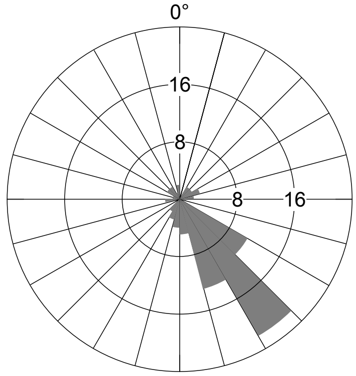
Stereogram of Fractures	Dip Azimuth Rose Diagram of Fractures	Dip Angle Histogram of Fractures

Schmidt Plot - LH - Fractures



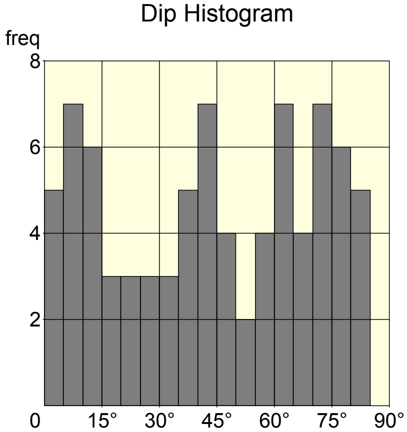
	Counts	Dip[deg]	Azi[deg]
Mean	81	43.68	146.07
■	2	33.76	159.00
▶	49	36.34	150.92
● (cyan)	13	67.78	134.78
● (blue)	17	46.59	142.16

Azimuth Count - Absolute



Counts: 81
Mean: 146.07
Std.Dev.: 59.33
Min: 37.79
Max: 353.13

Dip Histogram



Counts: 81
Mean: 43.68
Std.Dev.: 26.14
Min: 2.94
Max: 84.76

HAGER-RICHTER GEOSCIENCE, INC.	846 Main Street Fords, NJ 08863 Phone: 732-661-0555 Fax: 732-661-0123	BEDDING STATISTICS PLOTS BOREHOLE ID: E-1

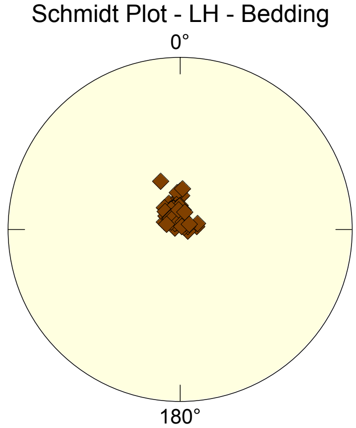
CLIENT:	Alpine Construction, LLC	H-R FILE:	08RG15
PROJECT:	General Electric Hudson Falls TDCS	DATE LOGGED:	July 2, 2008
LOCATION:	Boralex Powerhouse	ORIENTATION REFERENCE:	Magnetic North
CITY, STATE:	South Glens Falls, New York	MAGNETIC DECLINATION:	Not Applicable

STRUCTURE LEGEND

Fracture Rank 1 | Fracture Rank 2 | Fracture Rank 3 | Healed Fracture or Vein | Bedding

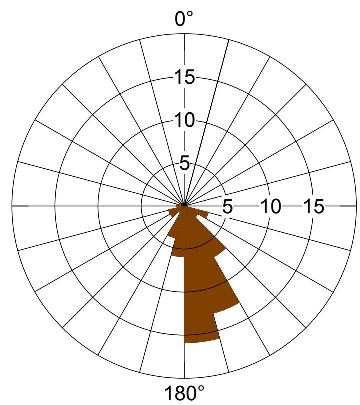
Stereogram of Bedding	Dip Azimuth Rose Diagram of Bedding	Dip Angle Histogram of Bedding

Schmidt Plot - LH - Bedding



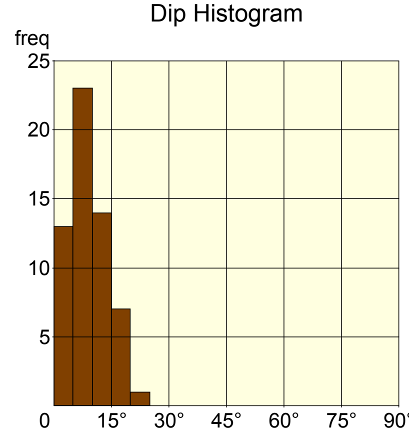
	Counts	Dip[deg]	Azi[deg]
Mean	58	9.08	171.75
◆	58	9.08	171.75

Azimuth Count - Absolute



Counts: 58
Mean: 171.75
Std.Dev.: 34.80
Min: 106.31
Max: 282.83

Dip Histogram



Counts: 58
Mean: 9.08
Std.Dev.: 4.72
Min: 1.79
Max: 24.92

HAGER-RICHTER GEOSCIENCE, INC.

846 Main Street
Fords, NJ 08863
Phone: 732-661-0555
Fax: 732-661-0123

FRACTURE STATISTICS PLOTS

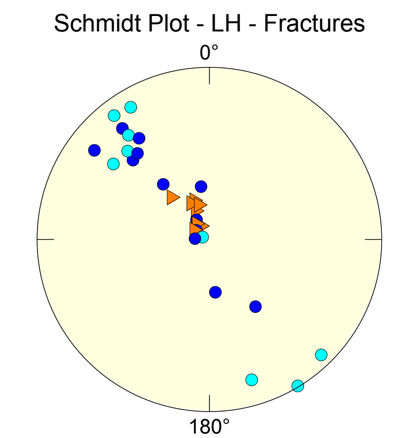
BOREHOLE ID: E-2

CLIENT:	Alpine Construction, LLC	H-R FILE:	08RG15
PROJECT:	General Electric Hudson Falls TDCS	DATE LOGGED:	July 2, 2008
LOCATION:	Boralex Powerhouse	ORIENTATION REFERENCE:	Magnetic North
CITY, STATE:	South Glens Falls, New York	MAGNETIC DECLINATION:	Not Applicable

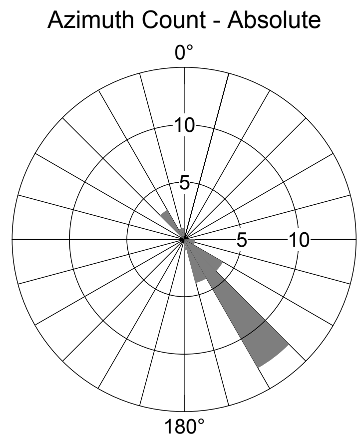
STRUCTURE LEGEND

● Fracture Rank 1   ● Fracture Rank 2   ◀ Healed Fracture or Vein

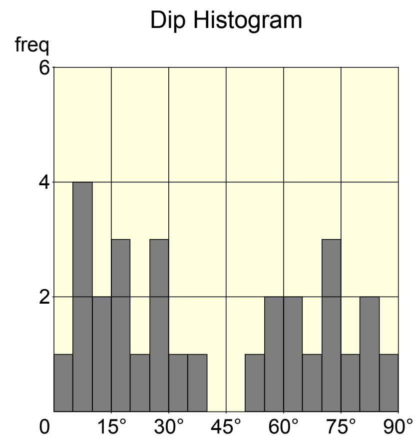
Stereogram of Fractures	Dip Azimuth Rose Diagram of Fractures	Dip Angle Histogram of Fractures



	Counts	Dip[deg]	Azi[deg]
Mean	29	40.66	136.74
▶	8	15.73	147.72
●	12	38.74	131.74
●	9	67.44	121.39



Counts: 29
Mean: 136.74
Std.Dev.: 54.73
Min: 94.37
Max: 353.20



Counts: 29
Mean: 40.66
Std.Dev.: 28.46
Min: 3.67
Max: 89.53

HAGER-RICHTER GEOSCIENCE, INC.	846 Main Street Fords, NJ 08863 Phone: 732-661-0555 Fax: 732-661-0123	FRACTURE STATISTICS PLOTS BOREHOLE ID: E-3

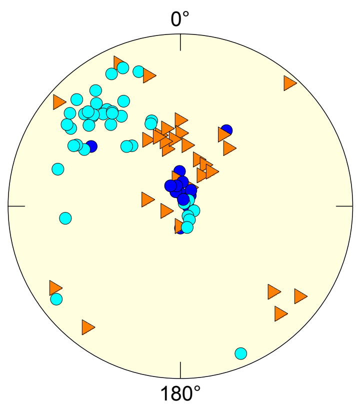
CLIENT:	Alpine Construction, LLC	H-R FILE:	08RG15
PROJECT:	General Electric Hudson Falls TDCS	DATE LOGGED:	May 2, 2008
LOCATION:	Boralex Powerhouse	ORIENTATION REFERENCE:	Magnetic North
CITY, STATE:	South Glens Falls, New York	MAGNETIC DECLINATION:	Not Applicable

STRUCTURE LEGEND

Fracture Rank 1   Fracture Rank 2   Filled Fracture or Vein   Bedding

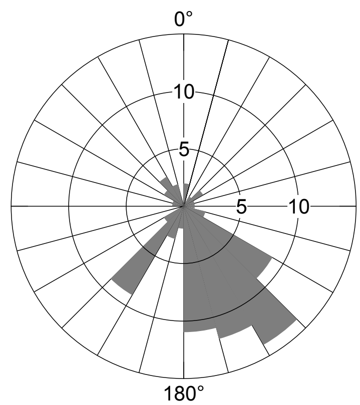
Stereogram of Fractures	Dip Azimuth Rose Diagram of Fractures	Dip Angle Histogram of Fractures

Schmidt Plot - LH - Fractures



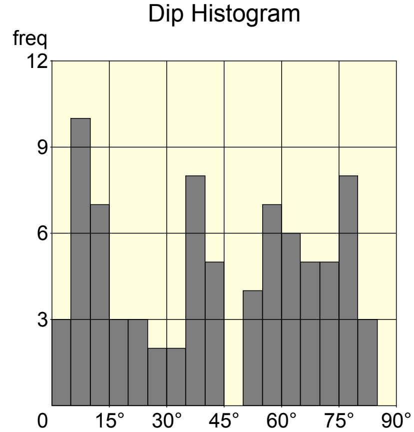
	Counts	Dip[deg]	Azi[deg]
Mean	81	42.78	160.61
	30	41.12	179.46
	13	14.47	189.05
	38	53.86	138.24

Azimuth Count - Absolute



Counts: 81
Mean: 160.61
Std.Dev.: 62.58
Min: 0.70
Max: 341.39

Dip Histogram



Counts: 81
Mean: 42.78
Std.Dev.: 26.20
Min: 2.39
Max: 84.89

HAGER-RICHTER GEOSCIENCE, INC.

846 Main Street
Fords, NJ 08863
Phone: 732-661-0555
Fax: 732-661-0123

BEDDING STATISTICS PLOTS

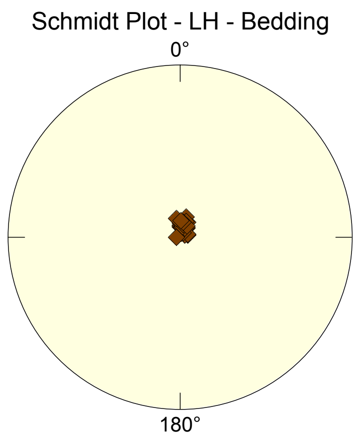
BOREHOLE ID: E-3

CLIENT:	Alpine Construction, LLC	H-R FILE:	08RG15
PROJECT:	General Electric Hudson Falls TDCS	DATE LOGGED:	May 2, 2008
LOCATION:	Boralex Powerhouse	ORIENTATION REFERENCE:	Magnetic North
CITY, STATE:	South Glens Falls, New York	MAGNETIC DECLINATION:	Not Applicable

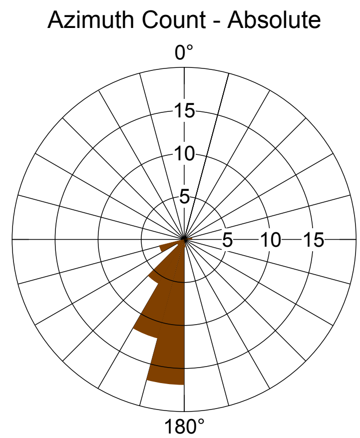
STRUCTURE LEGEND

Fracture Rank 1 — Fracture Rank 2 — Filled Fracture or Vein — Bedding

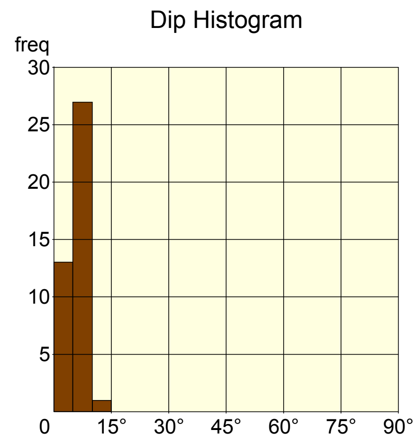
Stereogram of Bedding	Dip Azimuth Rose Diagram of Bedding	Dip Angle Histogram of Bedding



	Counts	Dip[deg]	Azi[deg]
Mean	41	5.87	199.28
◆	41	5.87	199.28



Counts: 41
Mean: 199.28
Std.Dev.: 23.51
Min: 85.56
Max: 254.09



Counts: 41
Mean: 5.87
Std.Dev.: 1.86
Min: 1.89
Max: 10.28