Queensland Government
Department of Main Roads

ENGINEERING BOREHOLE LOG

FOR GEOTECHNICAL TERMS AND SYMBOLS REFER FORM F:GEOT 017/5-2009

BOREHOLE No BH043
SHEET 1 of 3
REFERENCE No H10595

PROJECT BRUCE HIGHWAY (COOROY - CURRA) SECTION A GEOTECHNICAL INVESTIGATION

LOCATION Cut 14 COORDINATES 484250.9 E; 7081269.9 N

PROJECT No FG5825 SURFACE R.L. 152.98m PLUNGE DATE STARTED 4/8/09 GRID DATUM MGA94

JOB No 128/10A/901 HEIGHT DATUM AHD BEARING DATE COMPLETED 5/8/09 DRILLER R & D Drilling

DEPTH (m)	R.L. (m)	AUGER / CASING / WASH BORING / CORE DRILLING	RQD ( )% CORE REC %	SAMPLE	MATERIAL DESCRIPTION	LITHOLOGY	USC	WEATHERING	INTACT STRENGTH (EH VH H M L VL EL)	DEFECT SPACING (mm) (20 60 200 600 2000)	GRAPHIC LOG	ADDITIONAL DATA AND TEST RESULTS	SAMPLES	TESTS
0	152.98													
	152.88				**FILL**									
					Clayey SILT (RESIDUAL) Mottled red-brown to grey, moist, firm to stiff.									
				A	Occasional coarse grained sand particles; traces of organics.		(ML)					4,3,5 N=8		SPT
1														
	151.18			B	**PHYLLITE (XW):** Generally exhibits the engineering properties of pale grey to mottled red, moist, very stiff, clayey Silt.		XW					3,7,13 N=20		SPT
2														
	150.48			C	Traces of organics.		HW					19,30,30/100 N>50		SPT
	149.98				**PHYLLITE (HW):** As above; no organics.									
3			(40)		**PHYLLITE (MW):** Grey to red-brown, fine grained, foliated.		MW							
	149.23				Foliations dip at 30°.							Clay seam		
4					Defect sets with foliation and at 45°.							Is(50) = 0.14MPa		x
					Defect surfaces are clay infilled.							Is(50) = 0.09MPa		o
			100 (18)		**PHYLLITE (MW - SW):** Pale grey with distinct dark grey mottling, fine grained, foliated.									
5					Foliations dip at 30-40°.									
					Defects are generally medium spaced.									
					Defect sets dip at 10, 30 and 50°.									
6			100 (51)		Defect surfaces are typically clay infilled or iron stained.							Is(50) = 0.41MPa		x
					Detailed defect descriptions are shown on Form GEOT533/8 attached.		MW-SW					Is(50) = 0.62MPa		o
7														
			100 (39)											
8														
			100 (31)									Is(50) = 0.61MPa		o
9												Is(50) = 0.66MPa		x
												Is(50) = 1.05MPa		x
10												Is(50) = 0.92MPa		o

REMARKS **Detailed defect descriptions are shown on Form GEOT533/8 attached;** RAAX images taken of borehole; Minor water loss throughout hole.

LOGGED BY JA

QLD_DMR_LIB_01.GLB Log A_ENGINEERING BOREHOLE LOG W LITHOLOGY FG5825 BRUCE HWY COOROY-CURRA SECTION A BHS.GPJ DWG95012.GDW Datgel CPT Tool gINt Add-In 12/05/2010 10:31

Queensland Government
Department of Main Roads

ENGINEERING BOREHOLE LOG

FOR GEOTECHNICAL TERMS AND SYMBOLS REFER FORM F:GEOT 017/5-2009

BOREHOLE No BH043
SHEET 2 of 3
REFERENCE No H10595

PROJECT BRUCE HIGHWAY (COOROY - CURRA) SECTION A GEOTECHNICAL INVESTIGATION
LOCATION Cut 14 COORDINATES 484250.9 E; 7081269.9 N
PROJECT No FG5825 SURFACE R.L. 152.98m PLUNGE ____ DATE STARTED 4/8/09 GRID DATUM MGA94
JOB No 128/10A/901 HEIGHT DATUM AHD BEARING ____ DATE COMPLETED 5/8/09 DRILLER R & D Drilling

DEPTH (m)	R.L. (m)	RQD ( ) % / CORE REC %	MATERIAL DESCRIPTION	USC	WEATHERING	GRAPHIC LOG	ADDITIONAL DATA AND TEST RESULTS	SAMPLES	TESTS
10	142.98		**PHYLLITE (MW - SW):** (Cont'd)		MW-SW		Crushed zone		
		100 (23)							
11	141.88		**ANDESITE (MW):** Orange-brown, fine grained, massive, heavily altered.		MW		Core broken from handling		
	141.19	100	Clay seams up to 20mm throughout.				Is(50) = 0.50MPa		x
		(37)	**PHYLLITE (MW - SW):** Pale grey with distinct dark grey mottling, fine grained, foliated.				Is(50) = 0.28MPa		o
12			Foliations dip at 30°.				Clay seam		
		100 (30)	Defects are generally medium spaced.				Broken quartz vein		
13			Defect sets dip at 10, 30 and 50°.				Quartz vein		
			Defect surfaces are typically clay infilled or iron stained.				Crushed zone		
							Is(50) = 0.44MPa		x
14		100 (35)	**Detailed defect descriptions are shown on Form GEOT533/8 attached.**				Is(50) = 1.14MPa Quartz vein		o
							Quartz vein		
15			13.0 - EOH: Regular quartz veins up to 280mm wide throughout.				Is(50) = 0.23MPa		o
		100 (44)					Is(50) = 0.16MPa		x
					MW-SW		Quartz vein		
16		100					Quartz vein		
		100 (0)					Quartz vein		
		(31)							
17							Quartz vein		
							Quartz vein		
		100 (45)	17.5 - 18.0m: Clayey weathered zone.				UCS=4.5MPa		UCS
							Clayey zone with quartz veins		
18							Crushed quartz vein		
			18.5m: Dark grey mottling becoming more prominent.				Is(50) = 0.59MPa		x
		100 (32)					Is(50) = 0.88MPa		o
19									
							Quartz vein		
							Quartz vein		
20							Quartz vein		

REMARKS **Detailed defect descriptions are shown on Form GEOT533/8 attached;** RAAX images taken of borehole; Minor water loss throughout hole.

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ENGINEERING BOREHOLE LOG

FOR GEOTECHNICAL TERMS AND SYMBOLS REFER FORM F:GEOT 017/5-2009

BOREHOLE No BH043
SHEET 3 of 3
REFERENCE No H10595

PROJECT BRUCE HIGHWAY (COOROY - CURRA) SECTION A GEOTECHNICAL INVESTIGATION
LOCATION Cut 14 COORDINATES 484250.9 E; 7081269.9 N
PROJECT No FG5825 SURFACE R.L. 152.98m PLUNGE ____ DATE STARTED 4/8/09 GRID DATUM MGA94
JOB No 128/10A/901 HEIGHT DATUM AHD BEARING ____ DATE COMPLETED 5/8/09 DRILLER R & D Drilling

DEPTH (m)	R.L. (m)	AUGER / CASING / WASH BORING / CORE DRILLING	RQD ( ) % / CORE REC %	SAMPLE	MATERIAL DESCRIPTION	LITHOLOGY	USC	WEATHERING	INTACT STRENGTH (EH VH H M L VL EL)	DEFECT SPACING (mm) (20 60 200 600 2000)	GRAPHIC LOG	ADDITIONAL DATA AND TEST RESULTS	SAMPLES	TESTS
20	132.98				**PHYLLITE (MW - SW):** (Cont'd)									
			100 (39)				MW-SW							
21	131.98				**PHYLLITE (MW):** Pale grey with distinct dark grey mottling, fine grained, foliated. Foliations dip at 30°.							Is(50) = 0.20MPa Is(50) = 0.21MPa		x o
			100 (36)		Defects are generally medium spaced. Defect sets dip at 10, 30 and 50°. Defect surfaces are typically clay infilled or iron stained.							Healed fractured zone Clay seam Quartz vein Increase in water loss from 22.3m		
22														
23			100 (35)									Crushed quartz vein Quartz vein		
					Detailed defect descriptions are shown on Form GEOT533/8 attached.							Quartz vein Is(50) = 0.65MPa Is(50) = 0.68MPa		x o
24							MW					Crushed quartz vein Quartz vein Quartz vein		
25			100 (26)									Crushed zone; total water loss Quartz vein Is(50) = 0.59MPa Quartz vein Is(50) = 0.57MPa Quartz vein		x o
26			100 (39)									Quartz vein		
27	125.50		100									UCS=10.9MPa Is(50) = 0.62MPa Is(50) = 0.23MPa	UCS	x o
					Borehole terminated at 27.48m									
28														
29														
30														

REMARKS **Detailed defect descriptions are shown on Form GEOT533/8 attached;** RAAX images taken of borehole; Minor water loss throughout hole.

LOGGED BY JA

QLD_DMR_LIB_01.GLB Log A_ENGINEERING BOREHOLE LOG W LITHOLOGY FG5825 BRUCE HWY COOROY-CURRA SECTION A BHS.GPJ DWG95012.GDW Datgel CPT Tool gINt Add-In 12/05/2010 10:31

Project: **Bruce Highway Upgrade (Cooroy – Curra) Section A**

Borehole No: **BH43**

Start Depth: 3.00m
Finish Depth: 27.50m
Project No: FG5825
H No: 10595

0 100 200 300 400 500 600mm

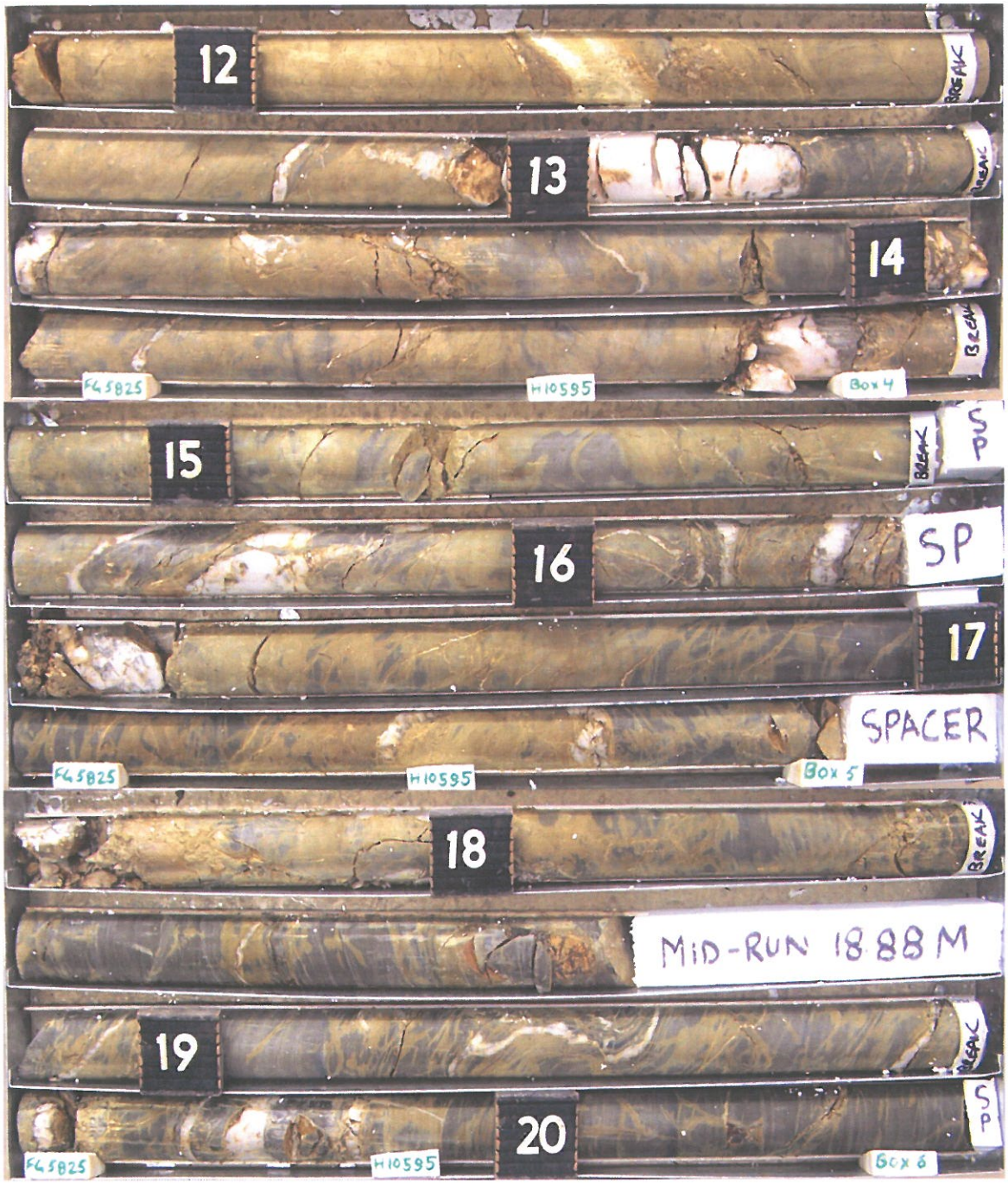
SCALE 1:5

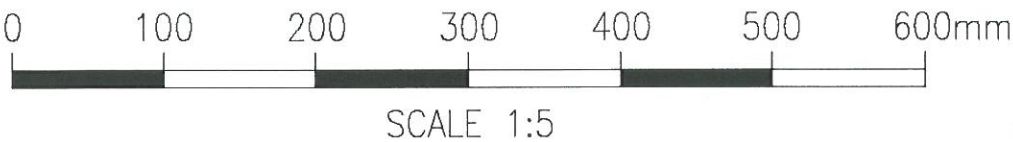
F:GEOT043/1

Project: **Bruce Highway Upgrade (Cooroy – Curra) Section A**

Borehole No: **BH43**

Start Depth: 3.00m
Finish Depth: 27.50m
Project No: FG5825
H No: 10595





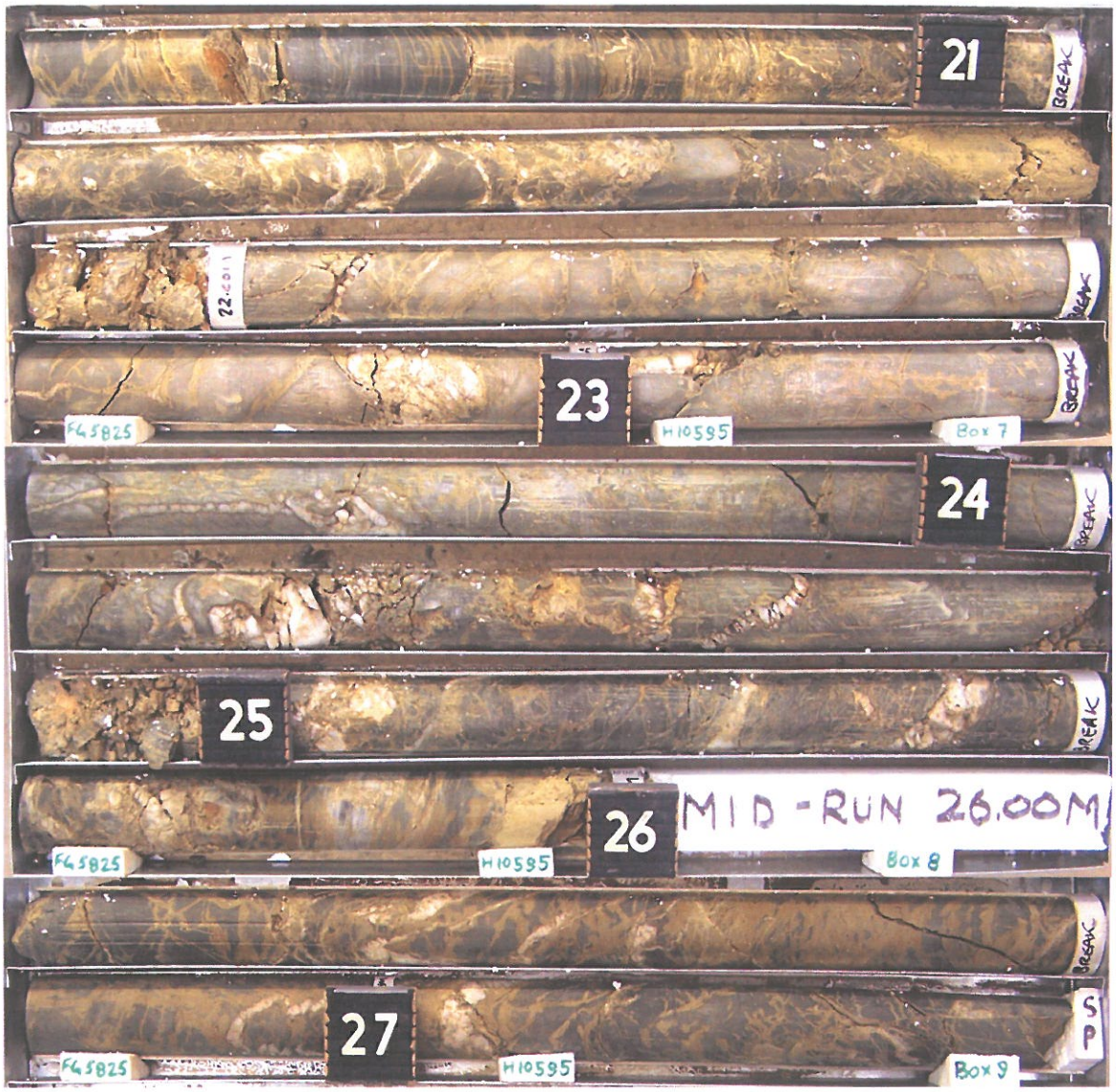
SCALE 1:5

F:GEOT043/1

Project: **Bruce Highway Upgrade (Cooroy – Curra) Section A**

Borehole No: **BH43**

Start Depth: 3.00m
Finish Depth: 27.50m
Project No: FG5825
H No: 10595



0 100 200 300 400 500 600mm

SCALE 1:5

F:GEOT043/1

GEOTECHNICAL BRANCH LABORATORY
Materials Services - Brisbane
35 Butterfield Street, HERSTON Q 4006
Phone: (07) 3115 3035 Fax: (07) 3115 3011

Queensland Government
Department of Main Roads

DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

[CHARACTERISATION OF DEFECTS ARE IN ACCORDANCE WITH ISRM SUGGESTED METHODS (1981)]

BOREHOLE NO.:	BH43
SHEET:	1 of 6
REFERENCE NO.:	H10595

PROJECT: Bruce Highway (Cooroy – Curra) Section A Geotechnical Investigation

LOCATION: Cut 14

PROJECT NO.: FG5825 **SURFACE R.L.:** 153 **DRILLER:** R & D Drilling

JOB NO.: 128/10A/901 **DATUM:** MGA **DATE DRILLED:** 4/8/09

DEPTH	DEFECT TYPE	DIP°	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
3.37	J	30°	Ir	R	O		Cl
3.44	J	20°	Ir		C		Cl
3.68	J	70°	Ir	R	T		Cl
3.72	J	20°	Ir	R	O	FeSt	
3.81	J	30°	Pl		C		Cl
3.94	J	20°	Pl	SR	T	FeSt	
4.03	J	30°	Pl	SR	T		Cl
4.24	J	10°	Pl	SR	O		Cl
4.36	J	10°	Ir	SR	T	FeSt	
4.47	J	30°	Pl	SR	O		Cl
4.49	J	30°	Pl		C		Cl
4.52	J	10°	Ir	SR	O		Cl
4.6	J	10°	Pl	S	O	FeSt	
4.62	J	30°	Pl	S	T	FeSt	
4.68	J	10°	Ir		C		Cl
4.71	J	30°	Pl		C		Cl
4.75	J	30°	Pl		C		Cl
4.8	J	20°	Pl	S	T	FeSt	

Abbreviations (as per F: GEOT 017/5 – 2009)

ROUGHNESS		WALL ALTERATIONS		TYPE		OTHER	
R	Rough	FeSt	Iron Stained	J, Js	Joint, Joints	Cl	Clay Infill
Sr	Slightly Rough	W	Weathered	B	Bedding	CLy	Clayey
S	Smooth	Smn	Secondary Mineralisation	BP	Bedding Parting	Co	Coal Seam
SL	Slickensided	Cn	Clean	FP	Foliation Parting	Carb	Carbonaceous
PO	Polished	MnSt	Manganese Stained	LP	Lamination Parting	Sl	Sand Infill
PLANARITY		**APERTURE**		CLV	Cleavage	QZ	Quartz
Pl	Planar	C	Closed	Fr	Fracture	CA	Calcite
St	Stepped	O	Open	SZ	Sheared Zone	Chl	Chlorite
Un	Undulating	F	Filled	CZ	Crushed Zone	In	Incipient
Cu	Curved	T	Tight	BZ	Broken Zone	Int	Intersecting
Ir	Irregular			HFZ	Highly Fractured Zone	Lam (s)	Lamination (s)
				WS	Weathered Seam	Di	Drilling Induced
				Vn	Vein	H	Horizontal
						V	Vertical

NOTE: This sheet should be read in conjunction with appropriate Engineering Borelog. Defect angles were measured with respect to horizontal plane.

BOREHOLE NO.:	BH43
SHEET:	2 of 6
REFERENCE NO.:	H10595

DEPTH	DEFECT TYPE	DIP°	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
4.94	J	30°	Ir	R	T	FeSt	
4.96	J	30°	Ir	R	T	FeSt	
5.09	J	10°	Pl	SR	T	FeSt	
5.34	J	20°	Pl		C	FeSt	
5.43	J	20°	Pl		C	FeSt	
5.5	J	30°	Pl	SR	T		Cl
5.63	J	10°	Ir	R	T	FeSt	
5.72	J	30°	Pl	S	T	FeSt	
5.87	J	10°	Ir	R	T		Cl
5.93	J	10°	Ir	R	T		Cl
6.11	J	10°	Pl		C		Cl
6.14	J	30°	Pl	SR	O	FeSt	
6.19	J	30°	Pl	SR	O	FeSt	
6.32	J	30°	Pl	SR	T	FeSt	
6.37	J	20°	Ir		C		Cl
6.41	J	20°	Ir		C		
6.48	J	30°	Pl	SR	T	FeSt	
6.51	J	30°	Pl	SR	O	FeSt	
6.52	J	45°	Pl	S	O	FeSt	
6.55	J	20°	Pl	SR	O	FeSt	
6.68	J	10°	Pl	S	O	FeSt	
6.81	J	20°	Pl	SR	O	FeSt	
6.91	J	20°	Pl	SR	O	FeSt	
7.00	J	45°	Ir	R	O	FeSt	
7.03	J	10°	Pl	SR	T	FeSt	
7.08	J	20°	Pl	S	O	FeSt	
7.30	J	30°	Pl	S	O	FeSt	
7.37	J	10°	Pl	S	O		Cl
7.40	J	20°	Pl	S	O	FeSt	
7.54	J	30°	Pl	S	O		Cl
7.61	J	10°	Pl	S	O	FeSt	
7.70	J	20°	Pl		C		Cl
7.73	J	10°	Ir	R	O		Cl
7.75	J	10°	Ir	R	O		Cl
7.77	J	10°	Ir	R	O		Cl
7.83	J	30°	Pl	S	T		Cl
7.93	J	10°	Ir	R	O		Cl
8.09	J	10°	Ir	SR	O		Cl
8.10	J	30°	Pl	S	O	FeSt	
8.23	J	20°	Pl	S	O	FeSt	
8.29	J	30°	Pl	S	O		Cl
8.35	J	30°	Pl	S	O		Cl
8.38	J	30°	Pl		C	FeSt	
8.42	J	30°	Pl		C	FeSt	
8.56	J	30°	Pl	S	T		Cl
8.63	J	30°	Pl	S	O	FeSt	
8.69	J	20°	Pl	S	T	FeSt	
8.76	J	20°	Pl	S	O	FeSt	
8.85	J	30°	Pl	SR	O	FeSt	
9.00	J	10°	Ir	R	T	FeSt	
9.06	J	10°	Ir	R	O		Cl
9.22	J	10°	Ir	SR	O	FeSt	
9.28	J	30°	Pl	S	T	FeSt	
9.40	J	30°	Pl	SR	T	FeSt	
9.46	J	10°	Pl	SR	O	FeSt	
9.64	J	20°	Pl	SR	T		Cl
9.67	J	10°	Pl	SR	O	FeSt	

BOREHOLE NO.:	BH43
SHEET:	3 of 6
REFERENCE NO.:	H10595

DEPTH	DEFECT TYPE	DIP°	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
9.69	J	45°	Pl	SR	T		Cl
9.72	J	20°	Pl	S	O	FeSt	
9.80	J	30°	Pl	R	O	FeSt	
9.82	J	30°	Pl	R	O	FeSt	
9.88	J	70°	Pl	S	T	FeSt	
9.91	J	70°	Pl	S	O	FeSt	
10.1	J	50°	Pl	SR	O	FeSt	
10.23	J	70°	Pl	S	T	FeSt	
10.52	J	30°	Pl	S	O		Cl
10.58	J	30°	Ir	S	T	FeSt	
10.69	J	20°	Pl	S	T	FeSt	
10.75	J	Subvertical	Un		C		Cl
11.02	J	30°	Pl	SR	O		Cl
11.26	J	45°	Ir	SR	T	FeSt	
11.40	J	10°	Ir	SR	T	FeSt	
11.41	J	30°	Ir	SR	T	FeSt	
11.56	J	30°	Pl	SR	T	FeSt	
11.66	J	45°	Pl	S	O		Cl
11.68	J	10°	Ir	R	O		Cl
11.81	J	10°	Pl	R	O		Cl
11.85	J	10°	Ir	R	O	FeSt	
11.88	J	10°		SR	O	FeSt	
12.04	J	20°	Pl	SR	O	FeSt	
12.10	J	10°	Pl	S	T	FeSt	
12.13	J	10°	Pl	S	T	FeSt	
12.18	J	10°	Ir	SR	T	FeSt	
12.45	J	45°	Pl	S	T		Cl
12.54	J	45°	Pl	C			
12.72	J	30°	Pl	S	O	FeSt	
12.79	J	20°	Ir	R	O	FeSt	
12.81	J	30°	Pl	SR	O	FeSt	
12.92	J	10°	Ir	R	O	FeSt	
12.96	J	10°	Ir	R	O	FeSt	
13.03	J	10°	Ir	R	O	FeSt	
13.07	J	20°	Ir	R	O		Cn
13.09	J	10°	Pl	R	O	FeSt	
13.11	J	10°	Ir	R	O	FeSt	
13.13	J	10°	Ir	R	O	FeSt	
13.13	J	Subvertical	Pl	R	O	FeSt	
13.19	J	10°	Ir	R	O	FeSt	
13.34	J	30°	Pl	SR	O	FeSt	
13.38	J	10°	Pl	R	O	FeSt	
13.52	J	30°	Pl	S	O		Cl
13.72	J	30°	Pl	SR	O	FeSt	
13.91	J	30°	Ir	R	O	FeSt	
14.11	J	20°	Ir	R	O	FeSt	
14.36	J	30°	Pl	R	O	FeSt	
14.41	J	30°	Pl	R	O		Cl
14.63	J	10°	Pl	SR	T	FeSt	
14.67	J	30°	Ir	R	O	FeSt	
14.78	J	45°	Cu	SR	T		Cl
14.81	J	10°	Pl	SR	O	FeSt	
14.88	J	10°	Ir	R	T	FeSt	
14.98	J	20°	Ir	R	O	FeSt	
15.08	J	30°	Pl	SR	O	FeSt	
15.16	J	30°	Pl	S	O		Cl
15.20	J	60°	Pl	S	O	FeSt	

BOREHOLE NO.:	BH43
SHEET:	4 of 6
REFERENCE NO.:	H10595

DEPTH	DEFECT TYPE	DIP°	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
15.44	J	30°	Pl	R	O	FeSt	
15.46	J	30°	Ir	R	O	FeSt	
15.70	J	60°	Pl	SR	T	FeSt	
15.74	J	60°	Pl	SR	T		Cl
15.86	J	20°	Ir	R	O		Cl
15.90	J	60°	Pl	SR	T		Cl
16.03	J	60°	Pl		C		Cl
16.11	J	30°	Pl	SR	T	FeSt	
16.15	J	30°	Pl	SR	T	FeSt	
16.18	J	30°	Pl	R	T	FeSt	
16.24	J	20°	Pl	SR	T	FeSt	
16.25	J	20°	Pl	SR	T	FeSt	
16.27	J	20°	Pl	SR	O	FeSt	
16.39	J	30°	Pl	SR	O		Cl
16.45	J	30°	Pl	S	O		Cl
16.49	J	30°	Pl		C	FeSt	
16.51	J	30°	Pl	S	O	FeSt	
16.57	J	45°	Cu	SR	O	FeSt	
16.60	J	45°	Pl	SR	O	FeSt	
16.63	J	30°	Pl		C	FeSt	
16.73	J	30°	Pl		C	FeSt	
16.80	J	10°	Pl	S	O	FeSt	
17.10	J	20°	Pl	SR	T		Cl
17.24	J	45°	Ir	R	T		Cl
17.61	J	10°	Pl	S	T	FeSt	
17.63	J	20°	Pl	SR	O	FeSt	
17.80	J	Subvertical	Ir	R	O		Cl
17.93	J	20°	Ir	R	O	FeSt	
18.02	J	10°	Ir	R	O	FeSt	
18.04	J	30°	Pl	SR	T		Cl
18.15	J	45°	Pl	SR	T	FeSt	
18.33	J	45°	Pl	SR	T		Cl
18.36	J	45°	Pl	SR	T		Cl
18.39	J	10°	Pl	SR	O	FeSt	
18.43	J	30°	Pl	SR	O	FeSt	
18.61	J	10°	Pl	SR	T	FeSt	
18.62	J	Subvertical	Pl	R	T	FeSt	
18.72	J	10°	St	SR	T	FeSt	
18.86	J	20°	Pl	S	O		Cn
18.90	J	20°	Pl	SR	T	FeSt	
18.98	J	20°	Pl	SR	O		Cl
19.18	J	20°	Ir	SR	O		Cl
19.21	J	20°	Ir	SR	T	FeSt	
19.3	J	30°	Pl	R	T	FeSt	
19.41	J	20°	Pl	S	T		Cl
19.42	J	30°	Ir	R	O	FeSt	
19.53	J	30°	Pl	S	T	FeSt	
19.56	J	30°	Ir	R	T	FeSt	
19.57	J	30°	Ir	R	T	FeSt	
19.63	J	10°	Ir	R	O	FeSt	
19.74	J	30°	Pl	S	O		Cl
19.83	J	30°	Pl	S	O	FeSt	
19.94	J	20°	Pl	S	T	FeSt	
20.00	J	30°	Pl	S	O		Cl
20.16	J	20°	Pl	S	O	FeSt	
20.22	J	45°	Ir	R	O		Cl
20.36	J	20°	Pl	S	O	FeSt	

BOREHOLE NO.:	BH43
SHEET:	5 of 6
REFERENCE NO.:	H10595

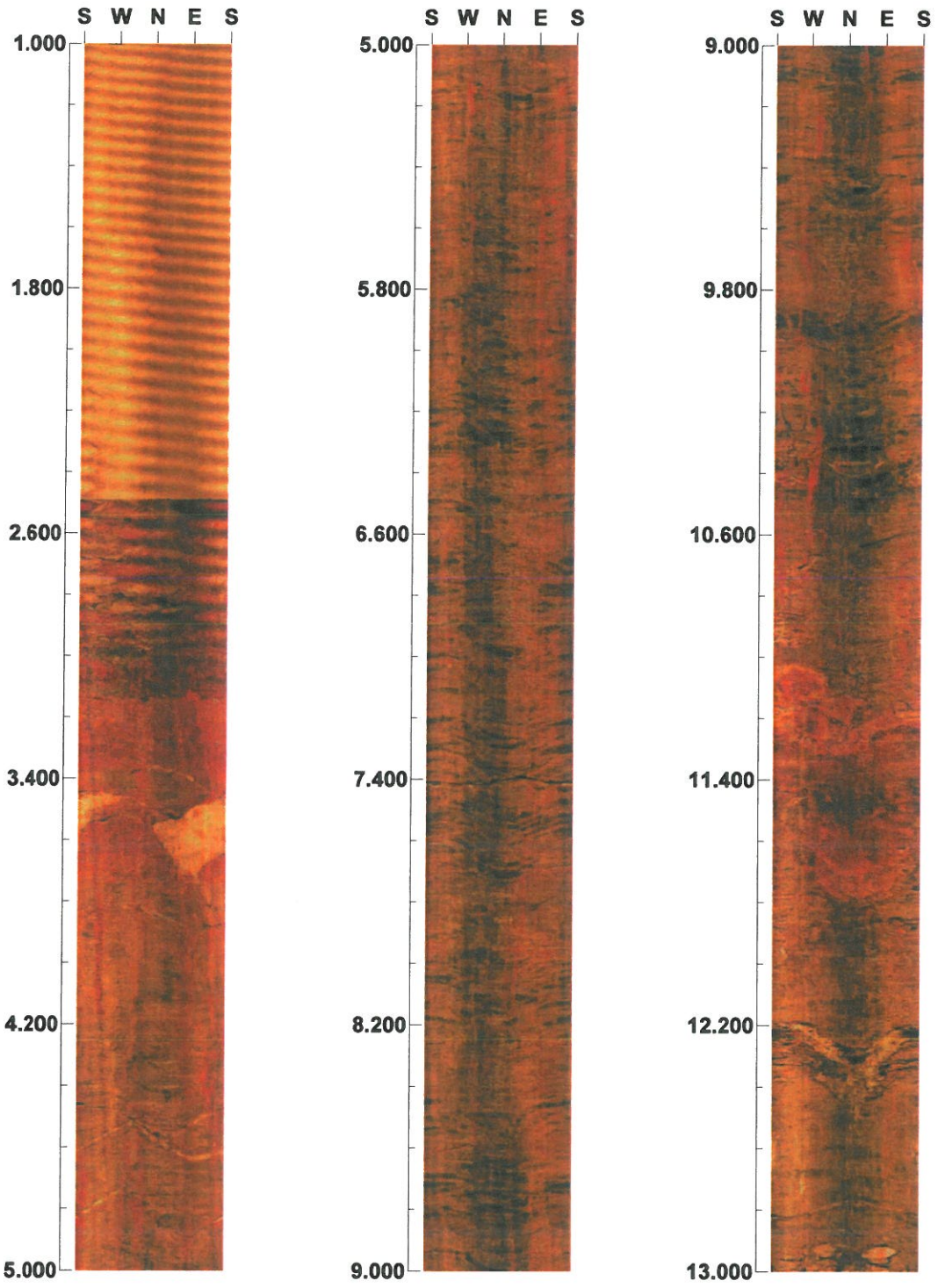
DEPTH	DEFECT TYPE	DIP°	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
20.44	J	20°	Ir	R	O		Cl
20.46	J	20°	Pl		C		Cl
20.49	J	20°	Pl	S	O	FeSt	
20.52	J	10°	Ir	R	O	FeSt	
20.54	J	10°	Pl	S	O		Cl
20.67	J	30°	Pl	SR	O	FeSt	
20.76	J	30°	Pl	SR	O	FeSt	
20.83	J	10°	Ir	R	T	FeSt	
20.93	J	30°	Pl	SR	T	FeSt	
20.97	J	80°	Ir	R	T	FeSt	
21.14	J	60°	Pl		C	FeSt	
21.41	J	30°	Pl	R	O	FeSt	
21.49	J	10°	Pl	R	T	FeSt	
21.60	J	30°	Pl	SR	O	FeSt	
21.68	J	45°	Pl		C		Cl
22.00	J	70°	Pl	R	T		Cl
22.27	J	10°	Ir	R	T	FeSt	
22.32	J	30°	Pl	SR	T	FeSt	
22.39	J	20°	Pl	R	O		Cl
22.48	J	30°	Pl	SR	O		Cl
22.67	J	45°	Pl	R	O		Cl
22.81	J	30°	Pl	R	C		Cl
23.07	J	45°	Pl	R	O		Cl
23.41	J	20°	Pl	R	O	FeSt	
23.58	J	30°	Pl	R	T	FeSt	
23.68	J	10°	Un	R	O	FeSt	
23.70	J	30°	Pl	R	O		Cl
24.05	J	30°	Ir	R	T	FeSt	
24.12	J	20°	Pl	S	T	FeSt	
24.15	J	30°	Ir	R	O	FeSt	
24.62	J	60°	Pl	SR	T	FeSt	
24.64	J	60°	Pl	SR	T	FeSt	
24.84	J	45°	Pl	SR	O		Cl
25.25	J	30°	Pl	SR	T	FeSt	
25.30	J	30°	Ir	R	O	FeSt	
25.32	J	30°	Ir	R	T	FeSt	
25.35	J	20°	Ir	R	T	FeSt	
25.46	J	45°	Pl	R	T	FeSt	
25.55	J	20°	Pl	SR	T		Cl
25.65	J	60°	Pl	R	O	FeSt	
25.75	J	10°	Un	R	O	FeSt	
25.90	J	30°	Pl	SR	O		Cl
25.92	J	45°	Pl		C		Cl
25.95	J	30°	Pl	R	O		Cl
25.97	J	30°	Pl	R	O		Cl
26.00	J	30°	Pl	R	O		Cl
26.05	J	30°	Pl	SR	O		Cl
26.18	J	10°	Ir	R	T		Cl
26.21	J	60°	Pl	SR	T	FeSt	
26.38	J	45°	Pl		C		QZ
26.48	J	45°	Pl	R	T		Cl
26.56	J	10°	Ir		C	FeSt	
26.62	J	70°	Pl	R	O		Cl
26.72	J	30°	Pl		C		QZ
27.04	J	30°	Pl	R	O	FeSt	
27.12	J	20°	Pl	S	O	FeSt	
27.27	J	Subvertical	Pl	S	O	FeSt	

BOREHOLE NO.:	BH43
SHEET:	6 of 6
REFERENCE NO.:	H10595

DEPTH	DEFECT TYPE	DIP°	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
27.29	J	30°	Pl	S	O	FeSt	
27.35	J	10°	Un	R	O	FeSt	

Project name: BRUCE HIGHWAY UPGRADE
Bore hole No.: BH43 **Azimuth: 0** **Inclination: -90**

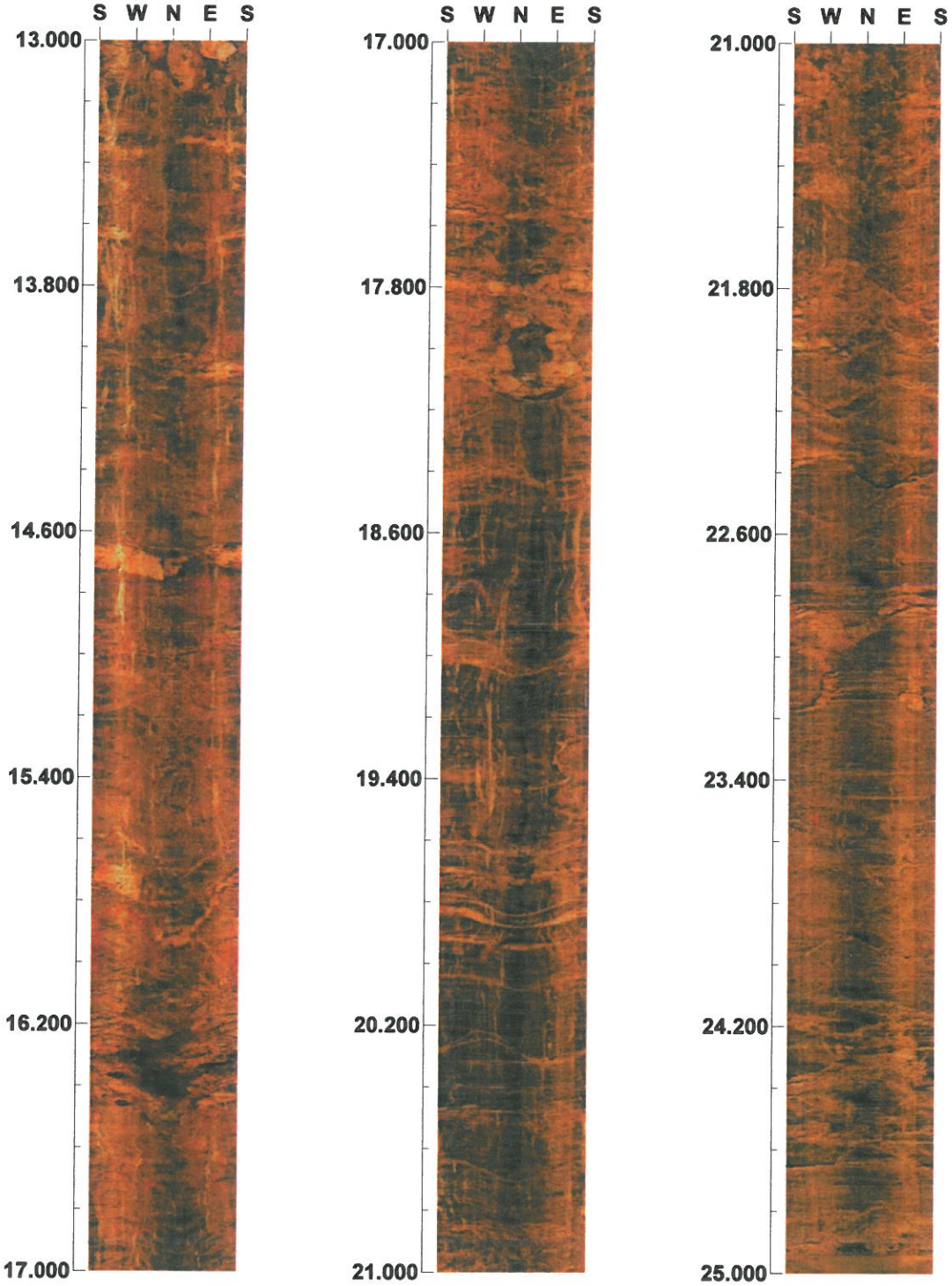
Depth range: 1.000 - 13.000 m



Scale: 1/20 **Aspect ratio: 200 %**

Project name: BRUCE HIGHWAY UPGRADE
Bore hole No.: BH43 **Azimuth: 0** **Inclination: -90**

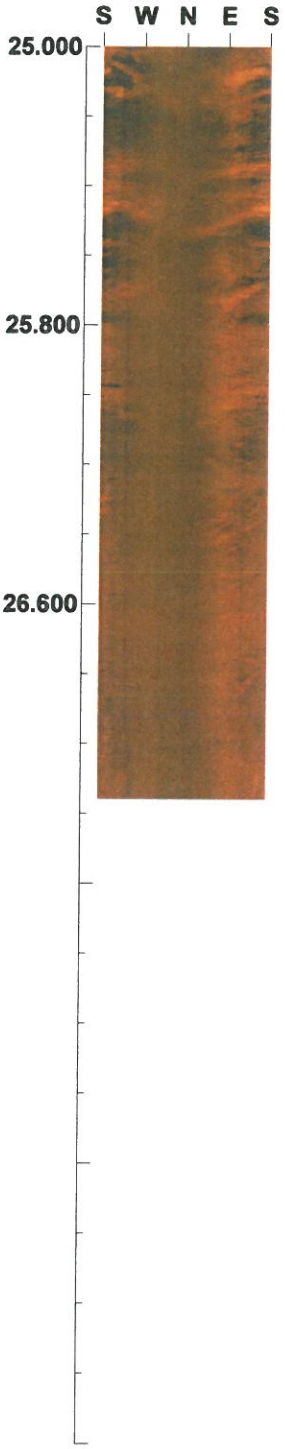
Depth range: 13.000 - 25.000 m



Scale: 1/20 **Aspect ratio: 200 %**

Project name: BRUCE HIGHWAY UPGRADE
Bore hole No.: BH43 **Azimuth: 0** **Inclination: -90**

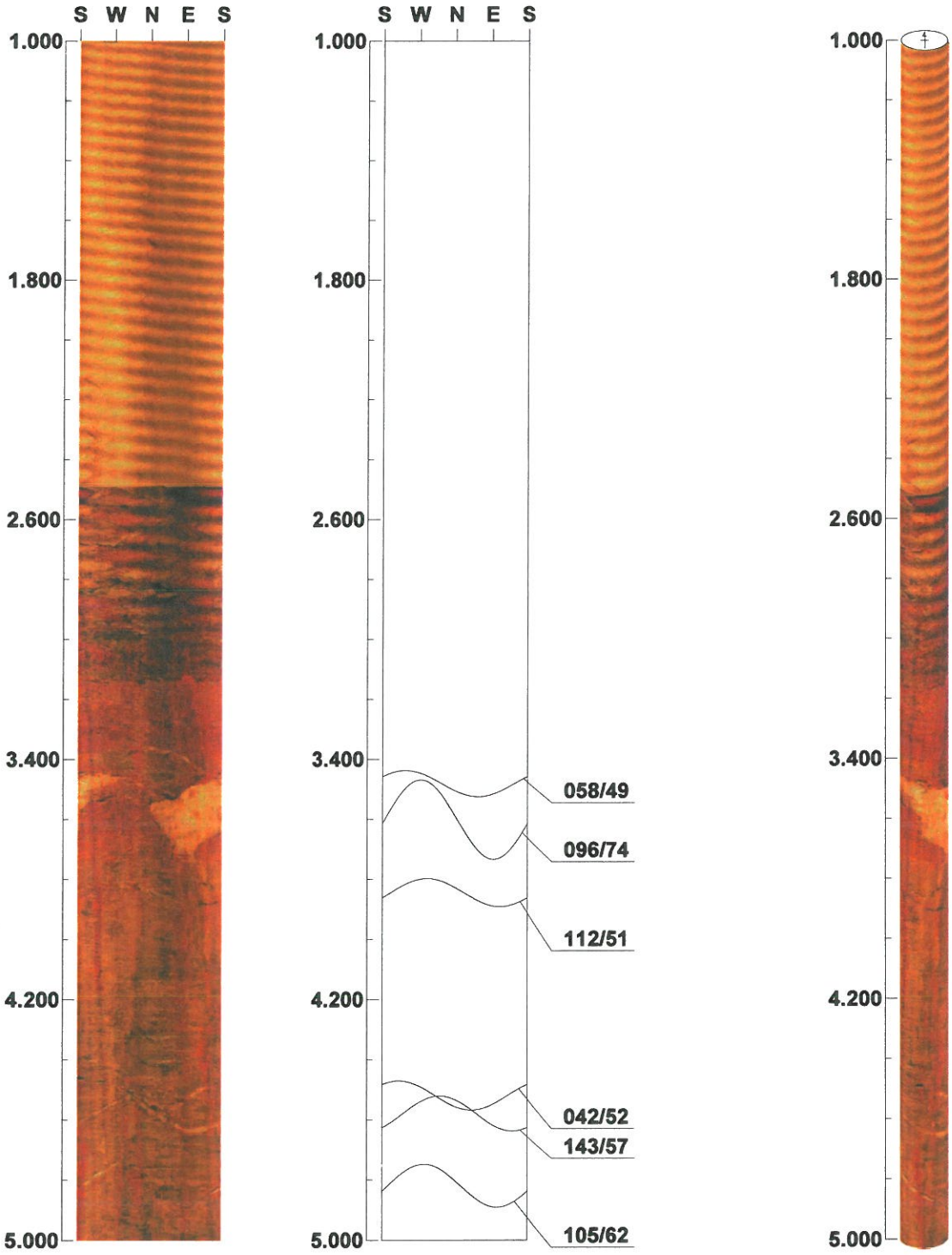
Depth range: 25.000 - 27.157 m



Scale: 1/20 **Aspect ratio: 200 %**

Project name: BRUCE HIGHWAY UPGRADE
Bore hole No.: BH43 **Azimuth: 0** **Inclination: -90**

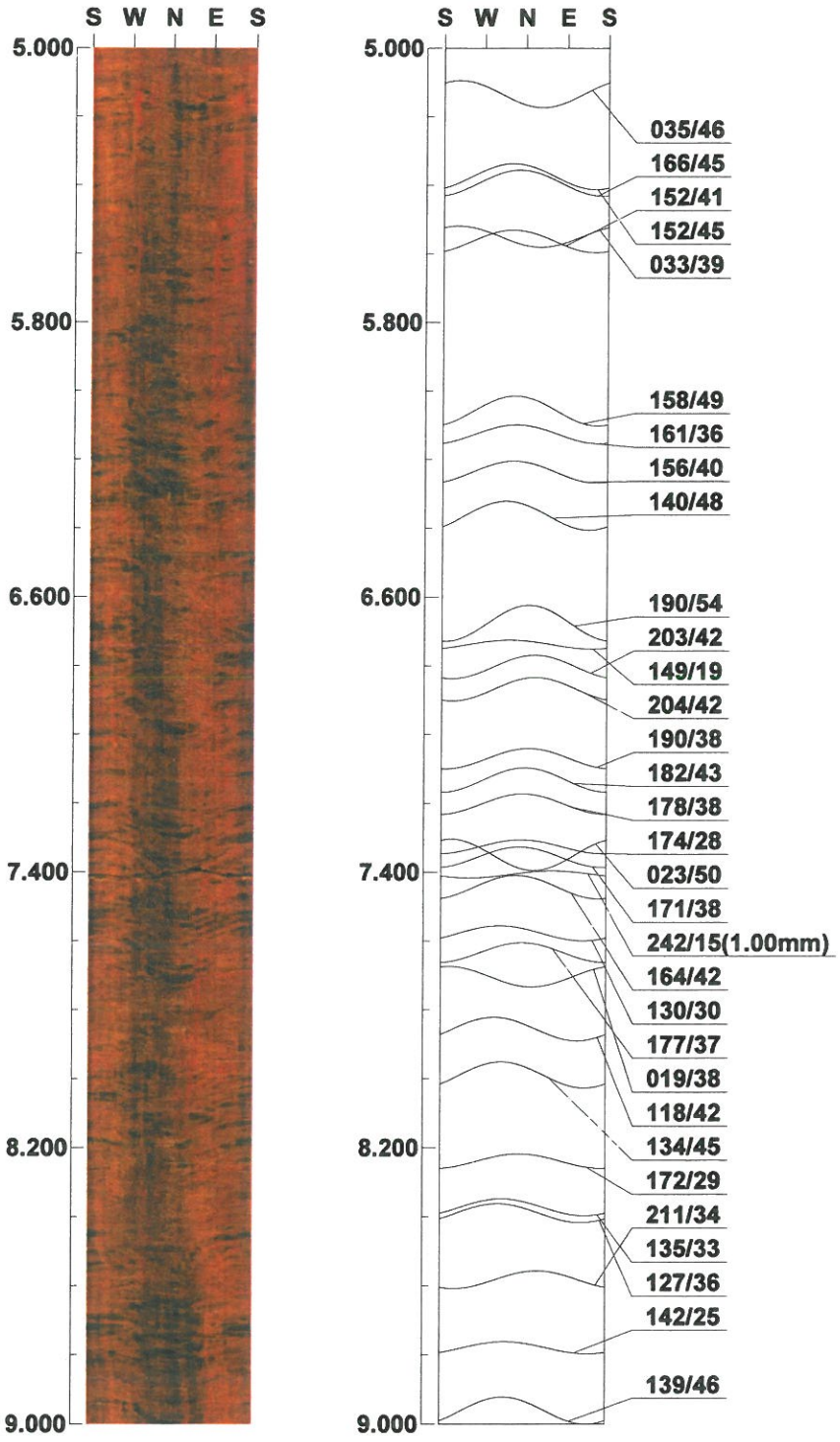
Depth range: 1.000 - 5.000 m



Scale: 1/20 **Aspect ratio: 200 %**

Project name: BRUCE HIGHWAY UPGRADE
Bore hole No.: BH43 **Azimuth: 0** **Inclination: -90**

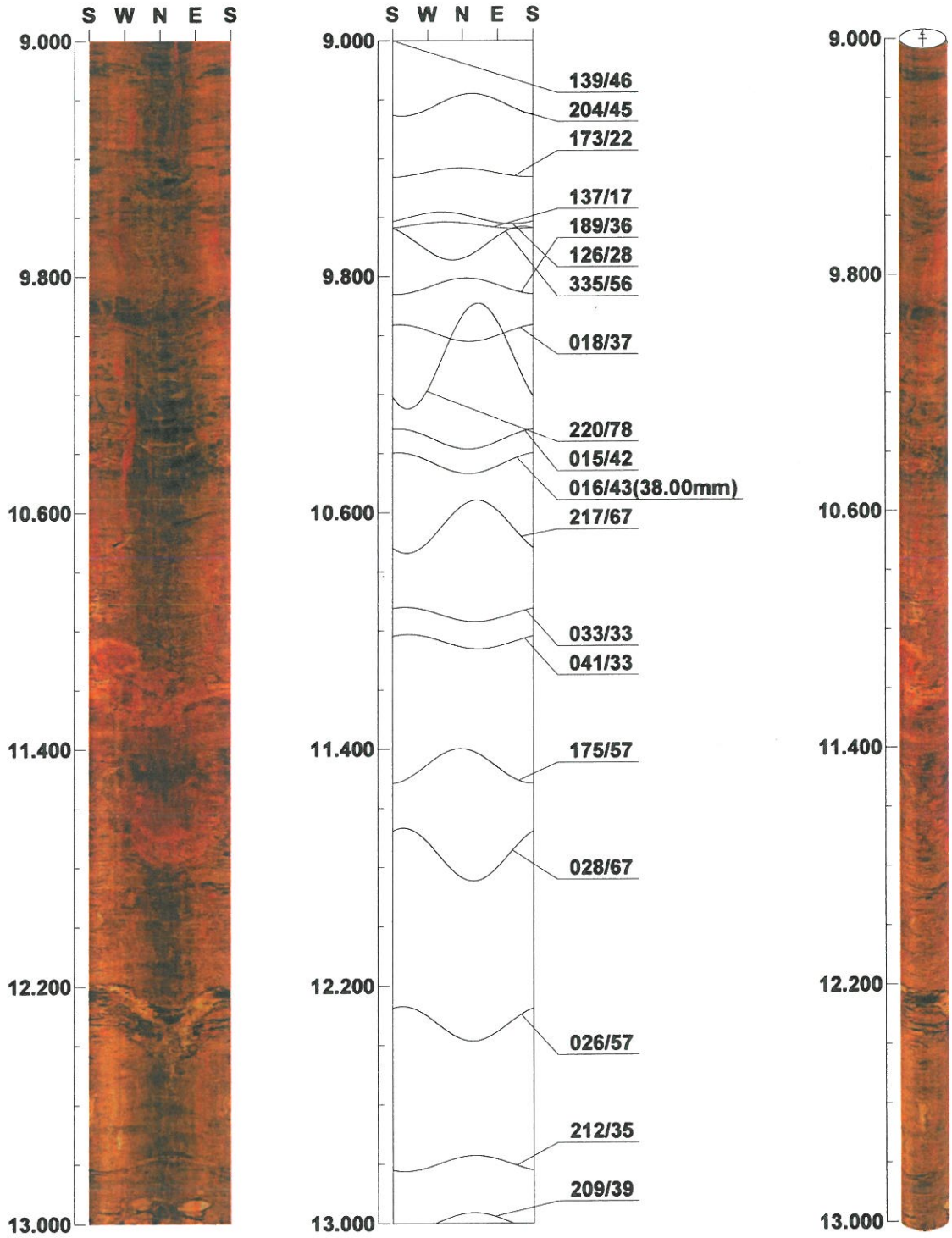
Depth range: 5.000 - 9.000 m



Scale: 1/20 **Aspect ratio: 200 %**

Project name: BRUCE HIGHWAY UPGRADE
Bore hole No.: BH43 **Azimuth: 0** **Inclination: -90**

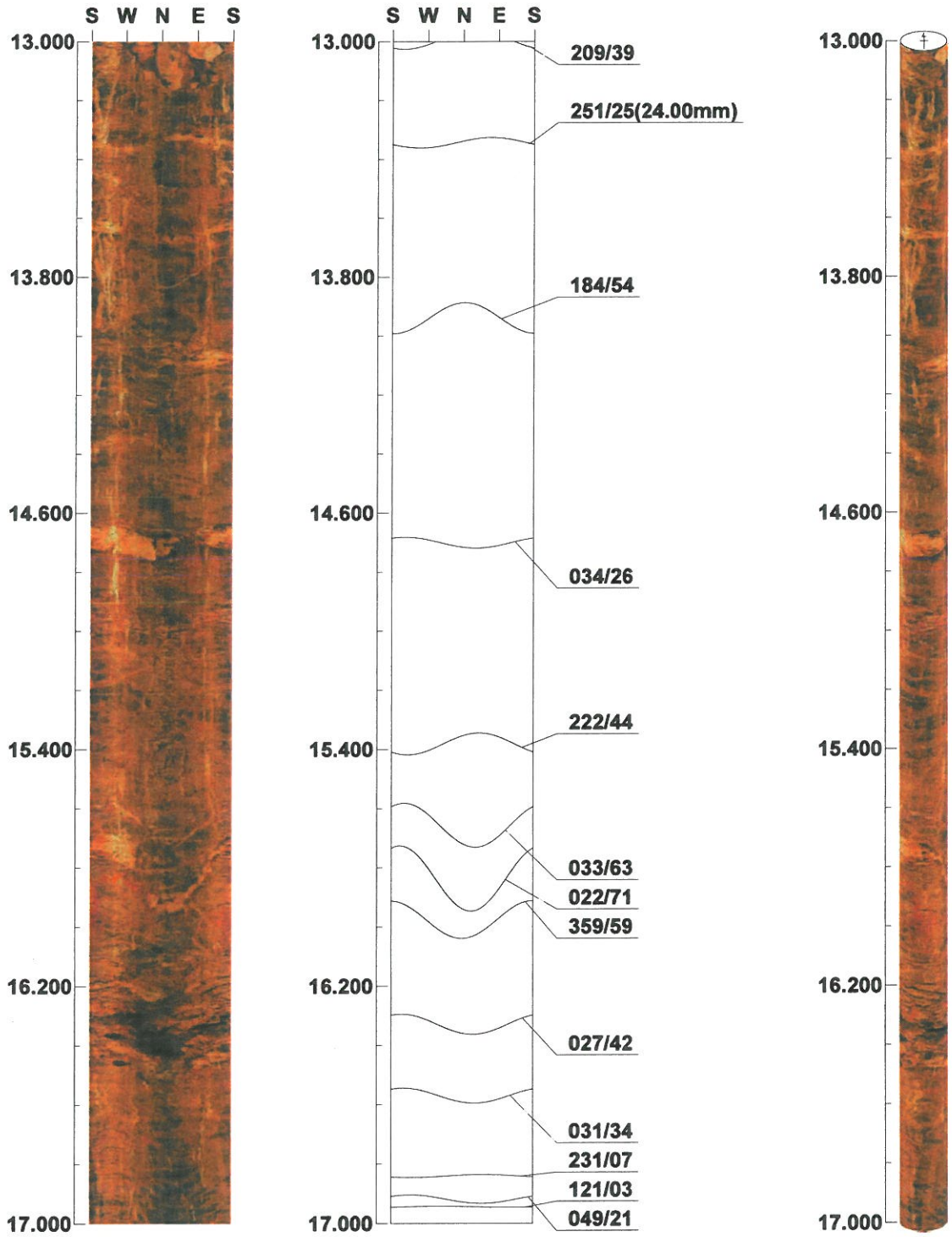
Depth range: 9.000 - 13.000 m



Scale: 1/20 **Aspect ratio: 200 %**

Project name: BRUCE HIGHWAY UPGRADE
Bore hole No.: BH43 **Azimuth: 0** **Inclination: -90**

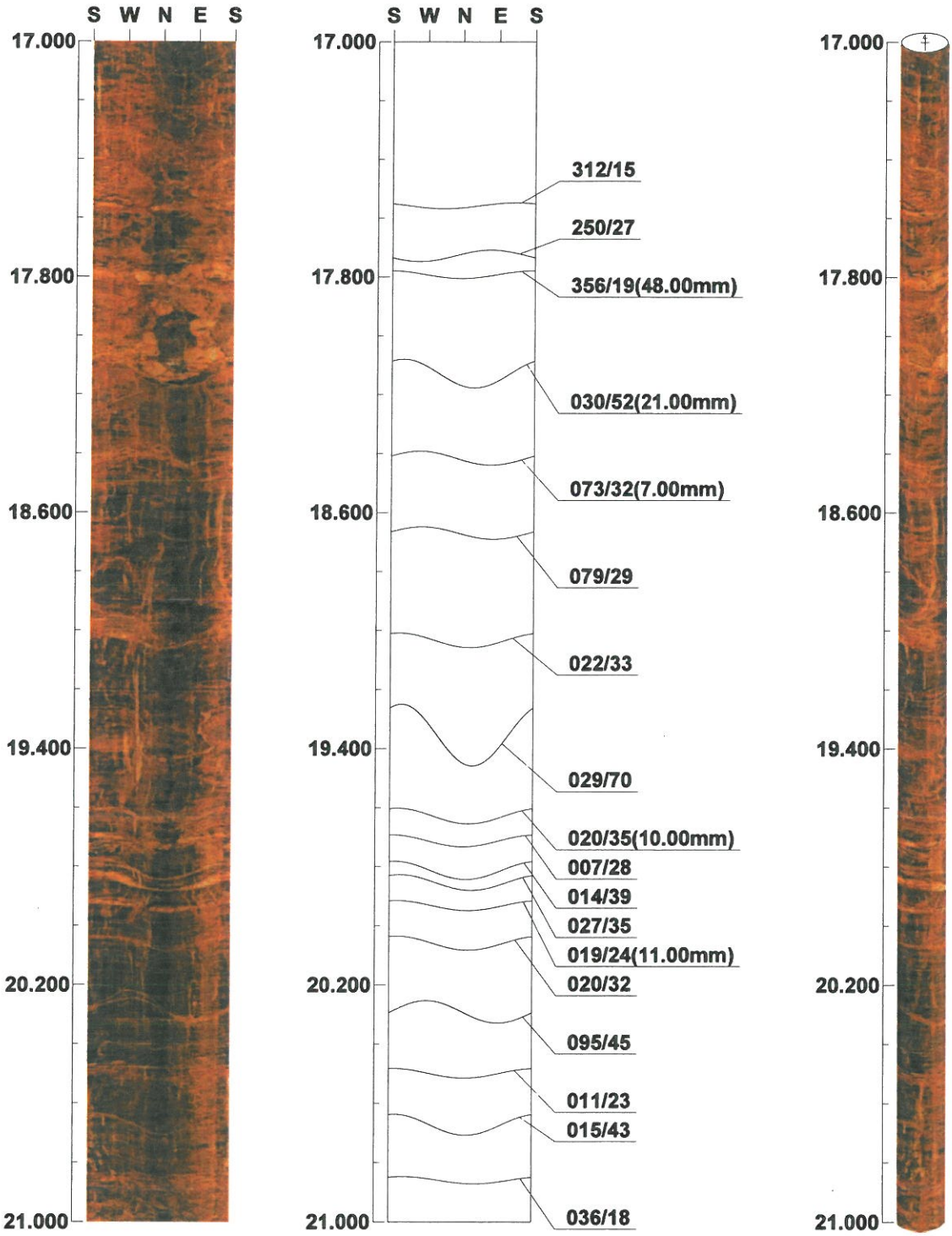
Depth range: 13.000 - 17.000 m



Scale: 1/20 **Aspect ratio: 200 %**

Project name: BRUCE HIGHWAY UPGRADE
Bore hole No.: BH43 **Azimuth: 0** **Inclination: -90**

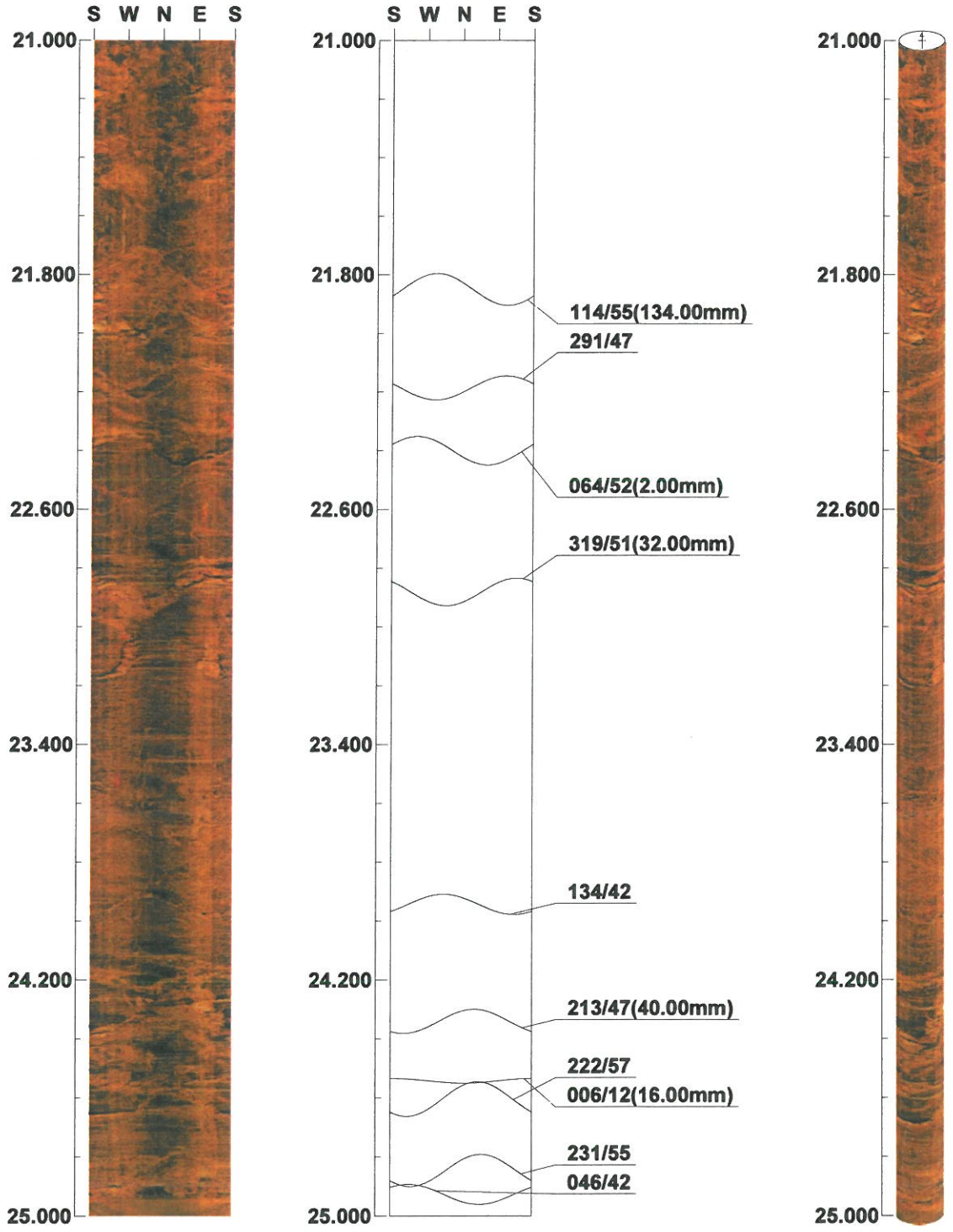
Depth range: 17.000 - 21.000 m



Scale: 1/20 **Aspect ratio: 200 %**

Project name: BRUCE HIGHWAY UPGRADE
Bore hole No.: BH43 **Azimuth: 0** **Inclination: -90**

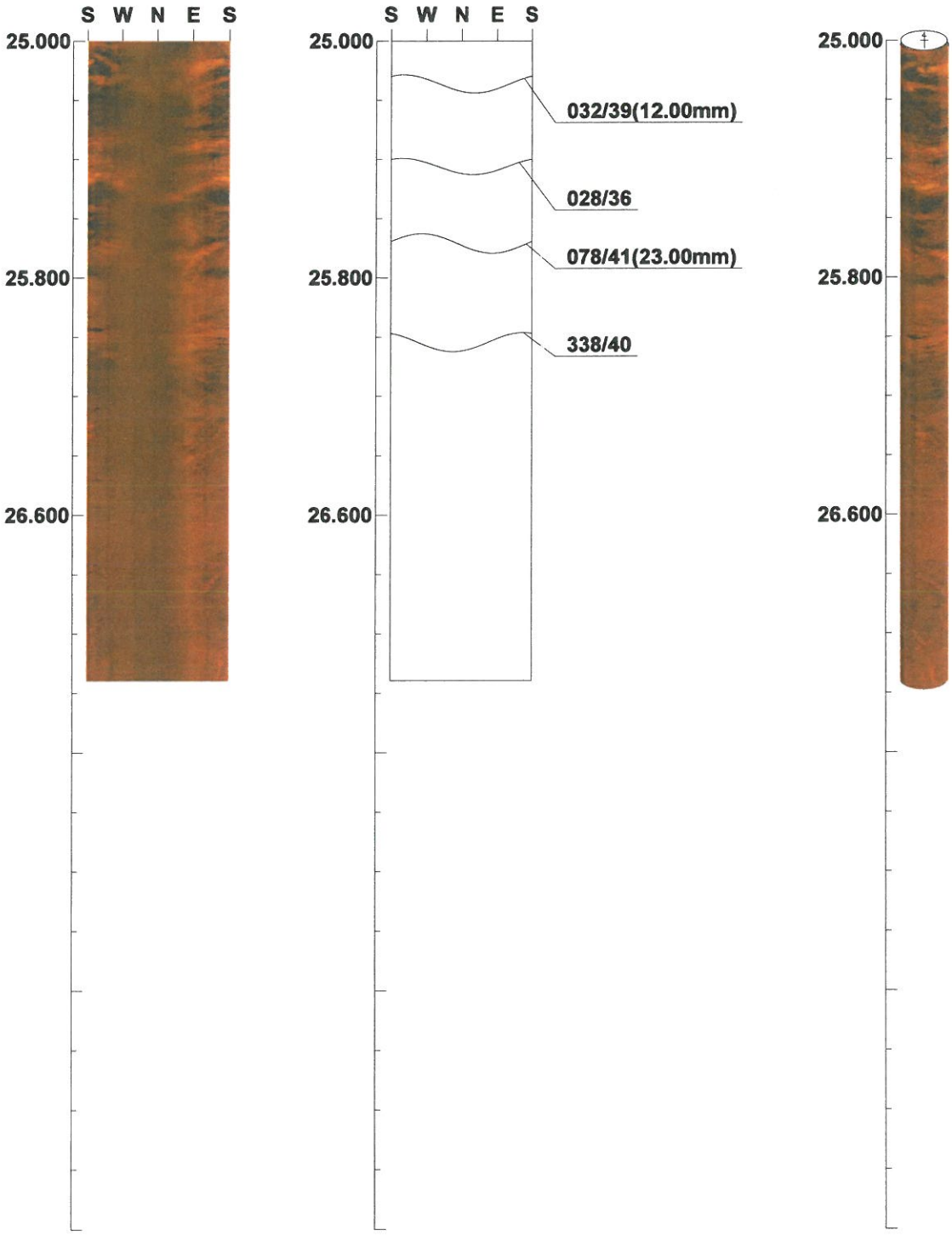
Depth range: 21.000 - 25.000 m



Scale: 1/20 **Aspect ratio: 200 %**

Project name: BRUCE HIGHWAY UPGRADE
Bore hole No.: BH43 **Azimuth: 0** **Inclination: -90**

Depth range: 25.000 - 27.157 m



Scale: 1/20 **Aspect ratio: 200 %**

Tab. Table of Discontinuity (1 / 2)

File name: BH43.STR
[ ]

No.	Depth (m)	Dir/Dip	Sort	Aperture (mm)	Form	Condition	Remark
1	3.481	058/49	Joint	0.5	Undulating	Weathered	Open
2	3.601	096/74	Joint	0.5	Undulating	Weathered	Open
3	3.844	112/51	Joint	0.3	Planar	Rough	Tight
4	4.519	042/52	Parting	0.5	Planar	Weathered	Open
5	4.579	143/57	Joint	0.5	Planar	Rough	Open
6	4.819	105/62	Joint	0.5	Planar	Rough	Open
7	5.134	035/46	Parting	0.5	Planar	Smooth	Open
8	5.375	152/45	Joint	0.3	Planar	Rough	Open
9	5.394	166/45	Joint	0.3	Planar	Rough	Open
10	5.550	033/39	Parting	0.5	Planar	Rough	Open
11	5.564	152/41	Joint	0.3	Planar	Rough	Tight
12	6.058	158/49	Joint	0.3	Planar	Rough	Tight
13	6.126	161/36	Joint	0.3	Planar	Rough	Open
14	6.236	156/40	Joint	0.3	Planar	Rough	Open
15	6.363	140/48	Joint	0.3	Planar	Smooth	Open
16	6.676	190/54	Joint	0.3	Planar	Smooth	Tight
17	6.741	149/19	Joint	0.3	Planar	Rough	Open
18	6.803	203/42	Joint	0.3	Planar	Rough	Open
19	6.868	204/42	Joint	0.3	Planar	Rough	Open
20	7.070	190/38	Joint	0.3	Planar	Rough	Open
21	7.132	182/43	Joint	0.3	Planar	Rough	Open
22	7.202	178/38	Joint	0.3	Planar	Rough	Open
23	7.326	174/28	Joint	0.3	Planar	Smooth	Open
24	7.349	023/50	Parting	0.5	Planar	Rough	Open
25	7.356	171/38	Joint	0.3	Planar	Rough	Open
26	7.406	242/15	Joint	1.0	Planar	Rough	Open/loose
27	7.443	164/42	Joint	0.3	Planar	Rough	Open
28	7.577	130/30	Joint	0.3	Planar	Rough	Open
29	7.633	177/37	Joint	0.3	Planar	Rough	Tight
30	7.703	019/38	Parting	0.5	Planar	Rough	Open
31	7.855	118/42	Joint	0.3	Planar	Rough	Open
32	7.988	134/45	Joint	0.3	Planar	Rough	Tight
33	8.238	172/29	Joint	0.3	Planar	Smooth	Open
34	8.372	135/33	Joint	0.3	Planar	Smooth	Open
35	8.389	127/36	Joint	0.3	Planar	Smooth	Open
36	8.582	211/34	Joint	0.3	Planar	Smooth	Open
37	8.779	142/25	Joint	0.3	Planar	Smooth	Open
38	8.961	139/46	Joint	0.3	Planar	Rough	Tight
39	9.218	204/45	Joint	0.3	Planar	Smooth	Tight
40	9.448	173/22	Joint	0.3	Planar	Smooth	Tight
41	9.602	126/28	Joint	0.3	Planar	Smooth	Open
42	9.627	137/17	Joint	0.3	Planar	Smooth	Open
43	9.688	335/56	Joint	0.3	Planar	Rough	Open
44	9.833	189/36	Joint	0.3	Planar	Smooth	Open
45	9.992	018/37	Parting	2.0	Planar	Smooth	Open/loose
46	10.070	220/78	Joint	0.3	Undulating	Rough	Tight
47	10.351	015/42	ShearZn	10.0	Planar	Brec/crus'd	Open
48	10.433	016/43	ShearZn	38.0	Planar	Brec/crus'd	Open
49	10.648	217/67	Joint	0.3	Planar	Smooth	Tight
50	10.945	033/33	ShearZn	12.0	Planar	Brec/crus'd	Open

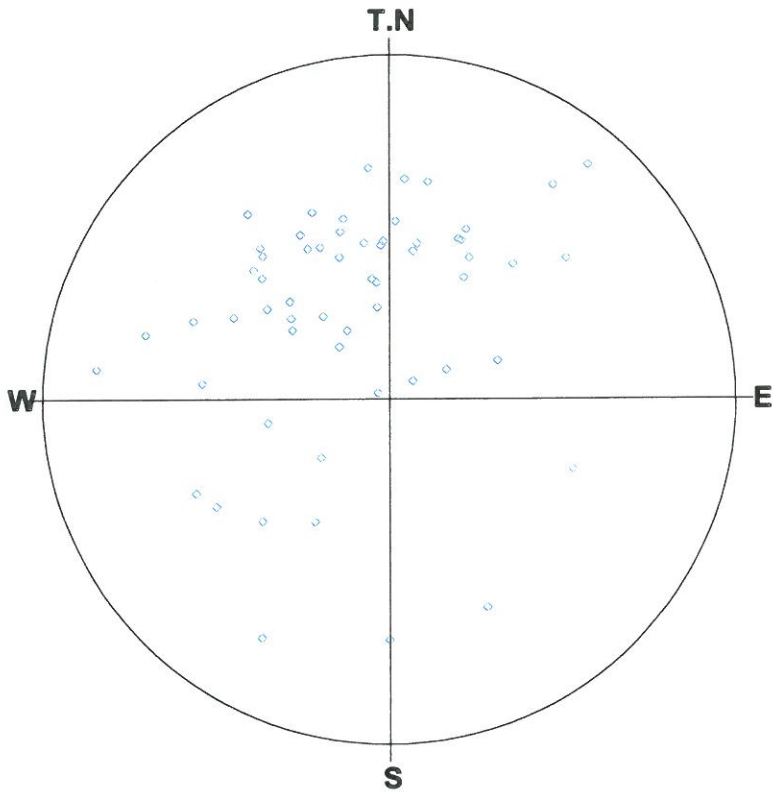
Tab. Table of Discontinuity (2 / 2)

File name: BH43.STR
[ ]

No.	Depth (m)	Dir/Dip	Sort	Aperture (mm)	Form	Condition	Remark
51	11.037	041/33	ShearZn	12.0	Planar	Brec/crus'd	Open
52	11.457	175/57	Joint	0.3	Planar	Smooth	Tight
53	11.756	028/67	Joint	0.3	Planar	Rough	Open
54	12.327	026/57	ShearZn	94.0	Planar	Brec/crus'd	Open/loose
55	12.798	212/35	ShearZn	8.0	Planar	Brec/crus'd	Open
56	12.995	209/39	Joint	0.5	Planar	Rough	Open/loose
57	13.344	251/25	Vein	24.0	Planar	Rough	Tight
58	13.939	184/54	Joint	0.3	Planar	Rough	Tight
59	14.700	034/26	ShearZn	89.0	Planar	Brec/crus'd	Open/fil'd
60	15.381	222/44	Joint	0.3	Planar	Rough	Tight
61	15.656	033/63	Vein	3.0	Planar	Rough	Tight
62	15.836	022/71	Vein	10.0	Planar	Rough	Tight
63	15.975	000/59	Joint	0.3	Planar	Rough	Tight
64	16.328	027/42	ShearZn	176.0	Planar	Brec/crus'd	Loose/caved
65	16.569	031/34	Joint	0.5	Planar	Smooth	Open
66	16.840	231/07	Joint	0.5	Planar	Smooth	Open
67	16.918	049/21	Joint	0.3	Planar	Rough	Tight
68	16.944	121/03	Joint	0.3	Planar	Smooth	Open
69	17.558	312/15	ShearZn	19.0	Planar	Brec/crus'd	Open/loose
70	17.728	250/27	Joint	0.3	Planar	Smooth	Open
71	17.792	356/19	Vein	48.0	Planar	Rough	Open/loose
72	18.128	030/52	ShearZn	21.0	Planar	Brec/crus'd	Open
73	18.415	073/32	ShearZn	7.0	Planar	Brec/crus'd	Open
74	18.669	079/29	Joint	0.3	Planar	Rough	Open
75	19.033	022/33	ShearZn	18.0	Planar	Brec/crus'd	Open
76	19.354	029/70	Vein	7.0	Undulating	Rough	Tight
77	19.628	020/35	ShearZn	10.0	Planar	Brec/crus'd	Open
78	19.712	007/28	Vein	17.0	Planar	Brec/crus'd	Open/loose
79	19.812	014/39	Vein	7.0	Planar	Smooth	Tight
80	19.931	019/24	Vein	11.0	Planar	Brec/crus'd	Open/loose
81	20.058	020/32	Parting	0.5	Planar	Smooth	Open
82	20.290	095/45	Joint	0.5	Planar	Smooth	Open/fil'd
83	20.498	011/23	Parting	0.5	Planar	Rough	Open
84	20.657	015/43	Parting	0.5	Planar	Smooth	Open
85	20.859	036/18	ShearZn	48.0	Planar	Brec/crus'd	Open
86	21.850	114/55	ShearZn	134.0	Planar	Brec/crus'd	Open
87	22.186	291/47	Joint	0.5	Planar	Rough	Open
88	22.400	064/52	Joint	2.0	Planar	Rough	Open/loose
89	22.881	319/51	ShearZn	32.0	Planar	Brec/crus'd	Open/loose
90	23.943	134/42	Joint	0.5	Planar	Rough	Open
91	24.340	213/47	ShearZn	40.0	Planar	Brec/crus'd	Open/loose
92	24.542	006/12	ShearZn	16.0	Planar	Brec/crus'd	Open
93	24.604	222/57	ShearZn	10.0	Planar	Brec/crus'd	Open
94	24.846	231/55	Joint	0.3	Planar	Rough	Tight
95	24.927	046/42	Joint	0.3	Planar	Smooth	Tight
96	25.145	032/39	ShearZn	12.0	Planar	Brec/crus'd	Open/loose
97	25.424	028/36	ShearZn	157.0	Planar	Brec/crus'd	Open
98	25.684	078/41	ShearZn	23.0	Planar	Brec/crus'd	Open/loose
99	26.017	338/40	ShearZn	82.0	Planar	Brec/crus'd	Open

BH43.STR

<<JOINT>>



Number of Data : 59/99

<Legend>

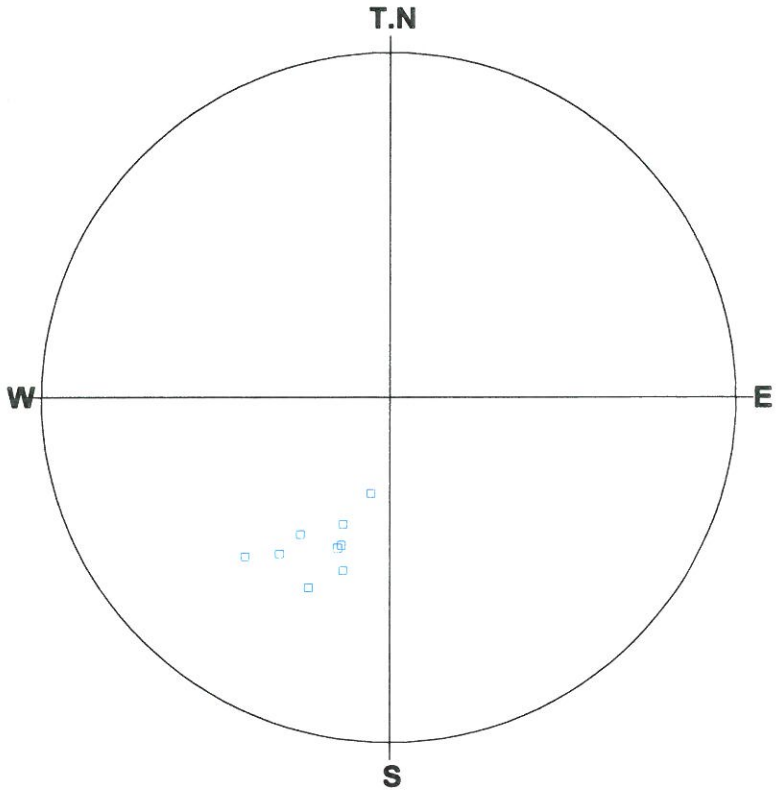
:Bed/foliat	-- 0	:Boundary	-- 0
:Joint	-- 59		
:Parting	-- 0		
:ShearZn	-- 0		
:Fault	-- 0		
:Vein	-- 0		

Schmidt (L.H)

Depth : 3.481 - 26.017 m

BH43.STR

<<PARTING>>



Number of Data : 9/99

<Legend>

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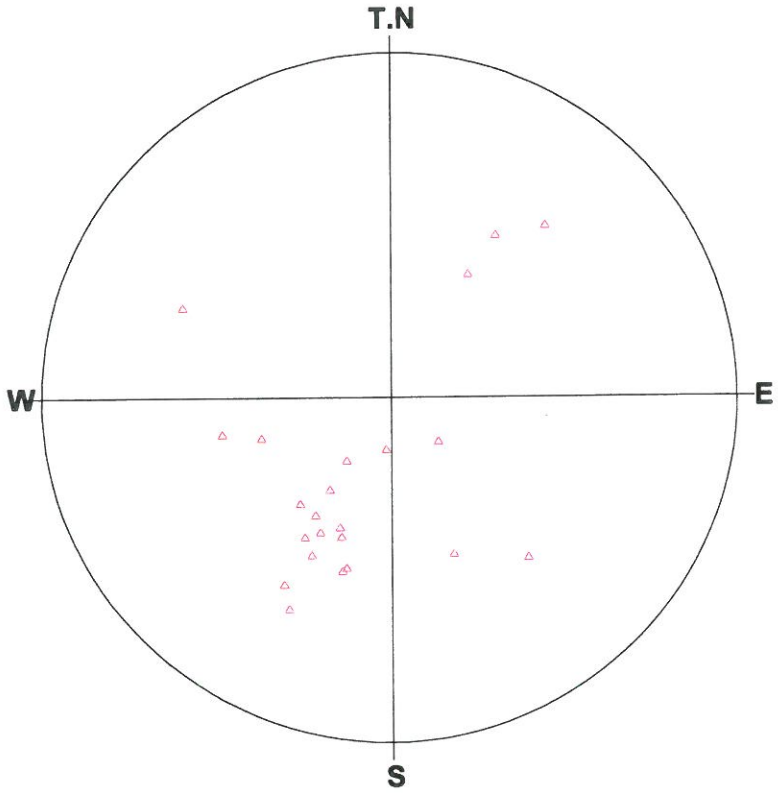
:Joint	-- 0		
:Parting	-- 9		
:ShearZn	-- 0		
:Fault	-- 0		
:Vein	-- 0		

Schmidt (L.H)

Depth : 3.481 - 26.017 m

BH43.STR

<<SHEAR ZONE>>



Number of Data : 23/99

<Legend>

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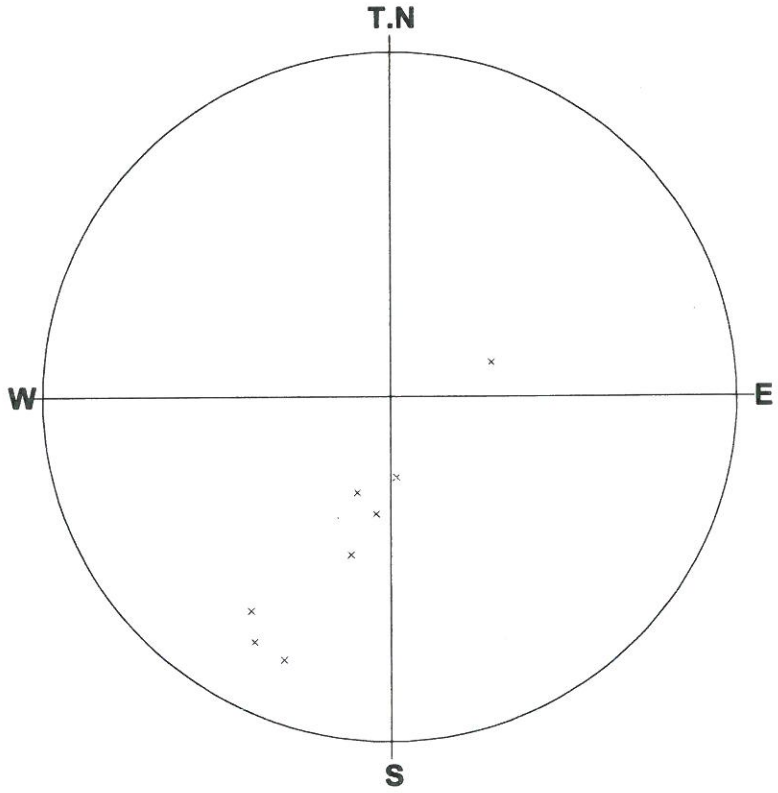
:Joint	-- 0		
:Parting	-- 0		
:ShearZn	-- 23		
:Fault	-- 0		
:Vein	-- 0		

Schmidt (L.H)

Depth : 3.481 - 26.017 m

BH43.STR

<<VEIN>>



Number of Data : 8/99

<Legend>

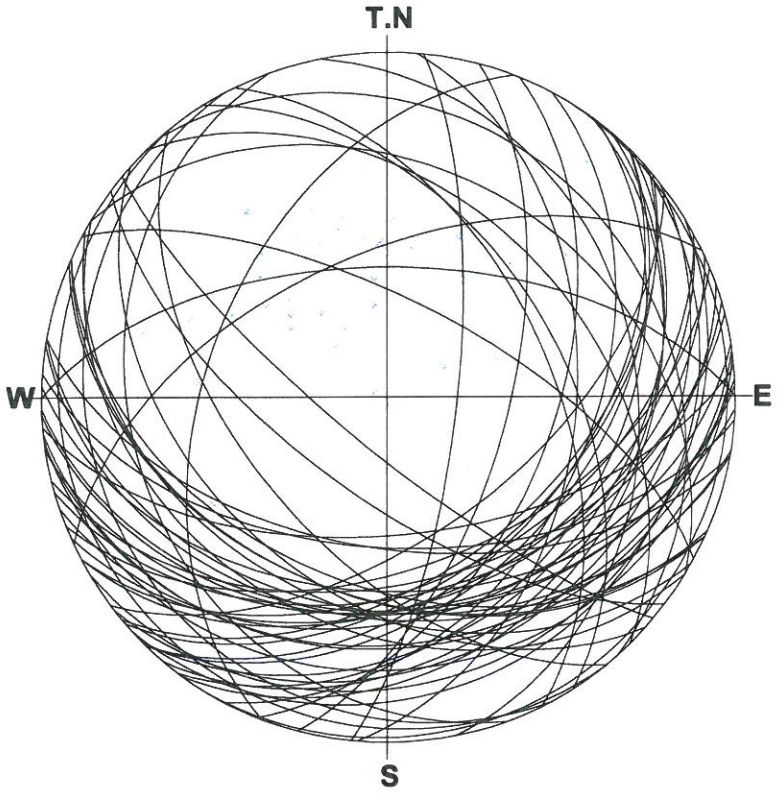
:Bed/foliat	-- 0	:Boundary	-- 0
:Joint	-- 0		
:Parting	-- 0		
:ShearZn	-- 0		
:Fault	-- 0		
:Vein	-- 8		

Schmidt (L.H)

Depth : 3.481 - 26.017 m

BH43.STR

<<JOINT>>



Number of Data:59/99

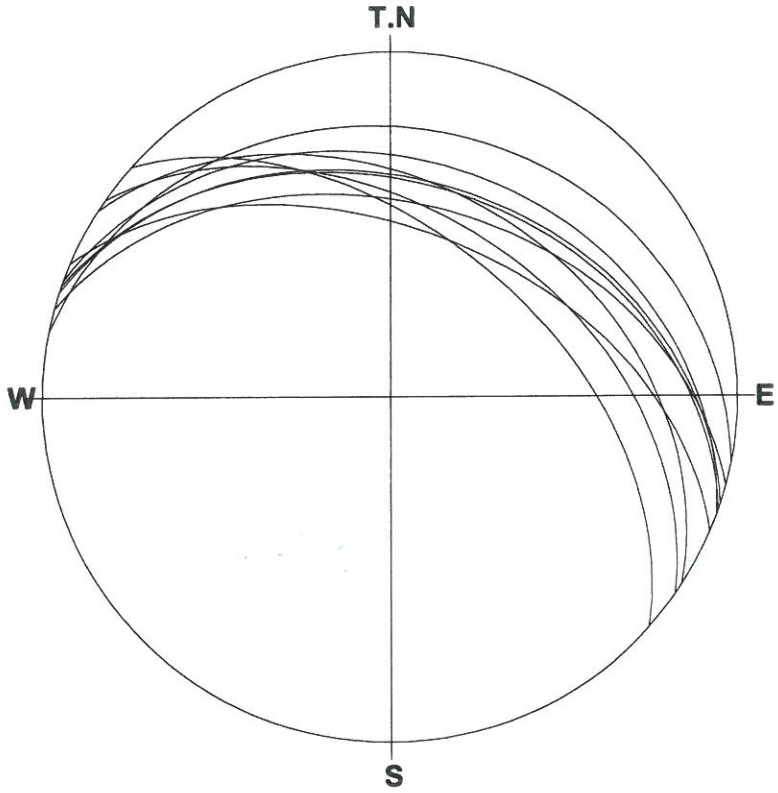
1 : 058/49(1)	**6 : 152/45(8)**
2 : 096/74(2)	**7 : 166/45(9)**
3 : 112/51(3)	**8 : 152/41(11)**
4 : 143/57(5)	**9 : 158/49(12)**
5 : 105/62(6)	**10 : 161/36(13)**

Schmidt (L.H)

Depth : 3.481 - 26.017 m

BH43.STR

<<PARTING>>



Number of Data:9/99

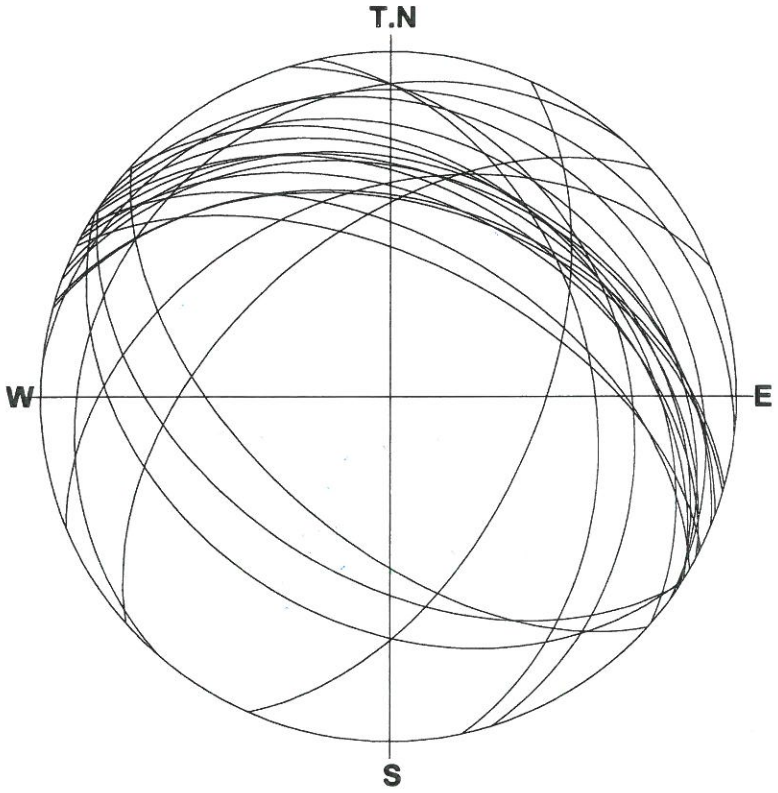
1 : 042/52(4)	**6 : 018/37(45)**
2 : 035/46(7)	**7 : 020/32(81)**
3 : 033/39(10)	**8 : 011/23(83)**
4 : 023/50(24)	**9 : 015/43(84)**
5 : 019/38(30)	

Schmidt (L.H)

Depth : 3.481 - 26.017 m

BH43.STR

<<SHEAR ZONE>>



Number of Data:23/99

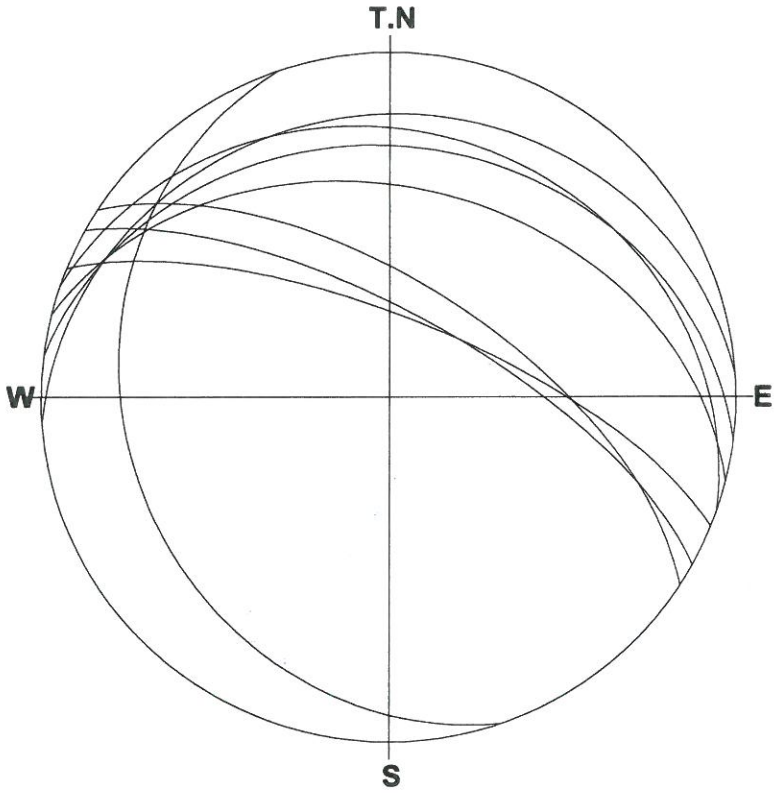
1 : 015/42(47)	**6 : 212/35(55)**
2 : 016/43(48)	**7 : 034/26(59)**
3 : 033/33(50)	**8 : 027/42(64)**
4 : 041/33(51)	**9 : 312/15(69)**
5 : 026/57(54)	**10 : 030/52(72)**

Schmidt (L.H)

Depth : 3.481 - 26.017 m

BH43.STR

<<VEIN>>



Number of Data:8/99

1 : 251/25(57)	**6 : 007/28(78)**
2 : 033/63(61)	**7 : 014/39(79)**
3 : 022/71(62)	**8 : 019/24(80)**
4 : 356/19(71)	
5 : 029/70(76)	

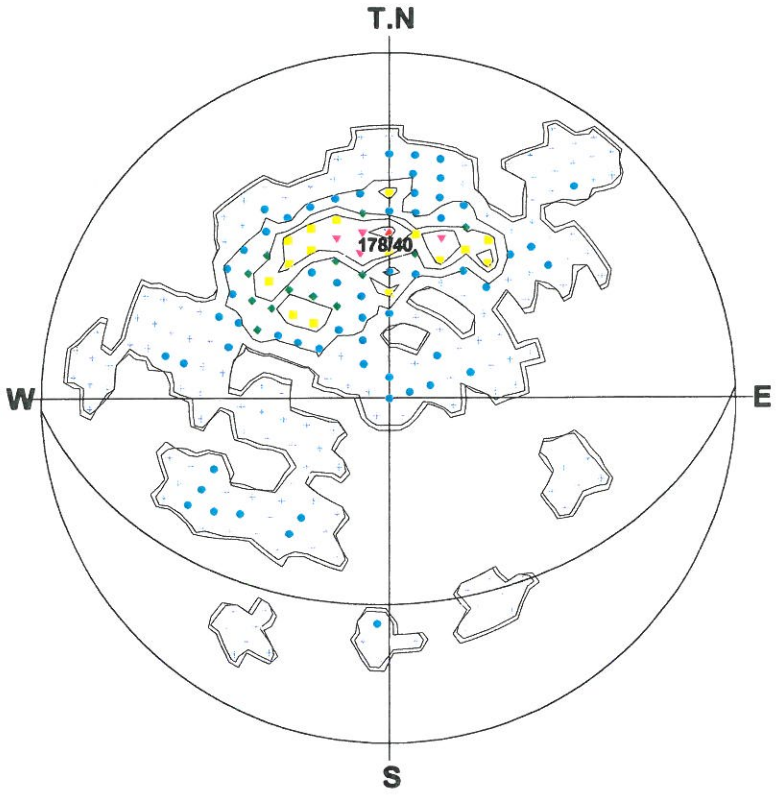
Schmidt (L.H)

Depth : 3.481 - 26.017 m

BH43.STR

<<JOINT>>

******** % Diagram ********



Number of Data : 59

<Legend> Sym. (%)	Contour Value (%)
▲ : 13	Contour 1 : 0 ☐
▼ : 10 - 13	Contour 2 : 2 ☐
■ : 8 - 10	Contour 3 : 5 ☐
◆ : 5 - 8	Contour 4 : 8 ☐
● : 2 - 5	Contour 5 : 10 ☐
····· : 0 - 2	Contour 6 : 13 ☐

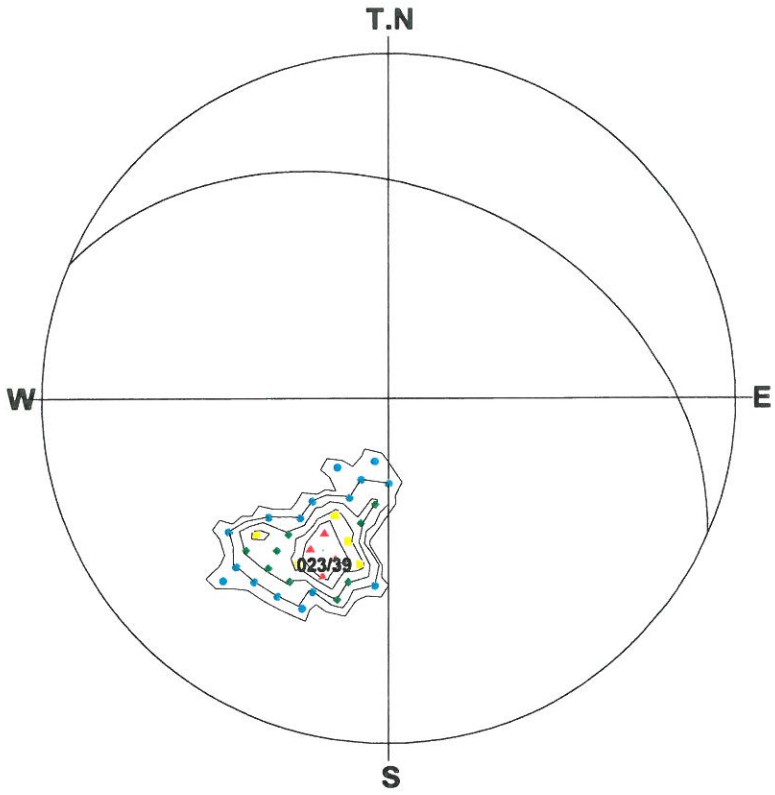
Schmidt (L.H)

Depth : 3.481 - 26.017 m

BH43.STR

<<PARTING>>

******** % Diagram ********



Number of Data : 9

<Legend> Sym. (%)	Contour Value (%)
▲ : 44	Contour 1 : 0
▼ : 35 - 44	Contour 2 : 8
■ : 26 - 35	Contour 3 : 17
◆ : 17 - 26	Contour 4 : 26
● : 8 - 17	Contour 5 : 35
· : 0 - 8	Contour 6 : 44

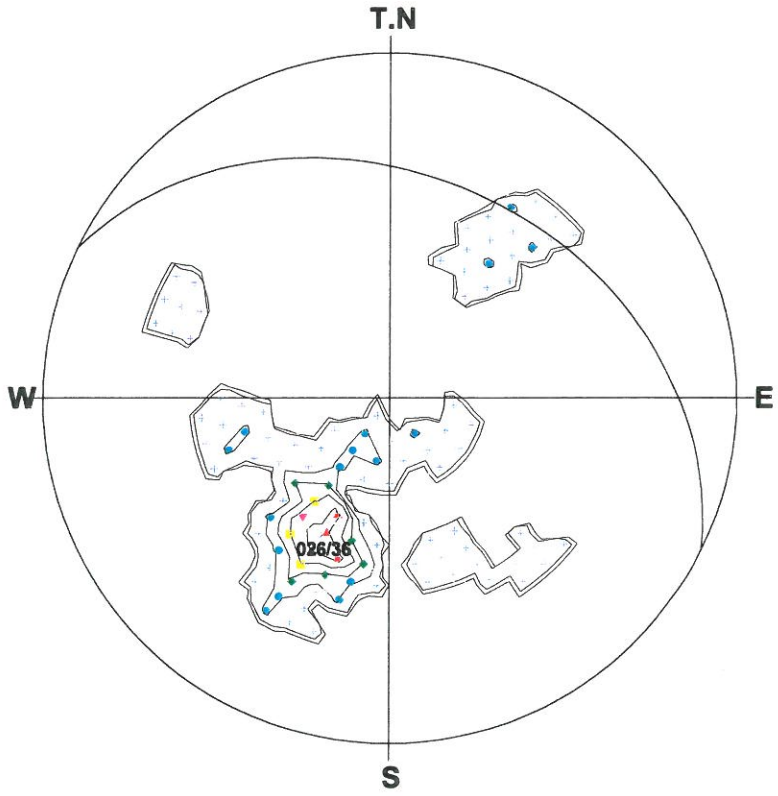
Schmidt (L.H)

Depth : 3.481 - 26.017 m

BH43.STR

<<SHEAR ZONE>>

******** % Diagram ********



Number of Data : 23

<Legend> Sym. (%)	Contour Value (%)
▲ : 26	Contour 1 : 0 ☐
▼ : 20 - 26	Contour 2 : 5 ☐
■ : 15 - 20	Contour 3 : 10 ☐
◆ : 10 - 15	Contour 4 : 15 ☐
● : 5 - 10	Contour 5 : 20 ☐
· : 0 - 5	Contour 6 : 26 ☐

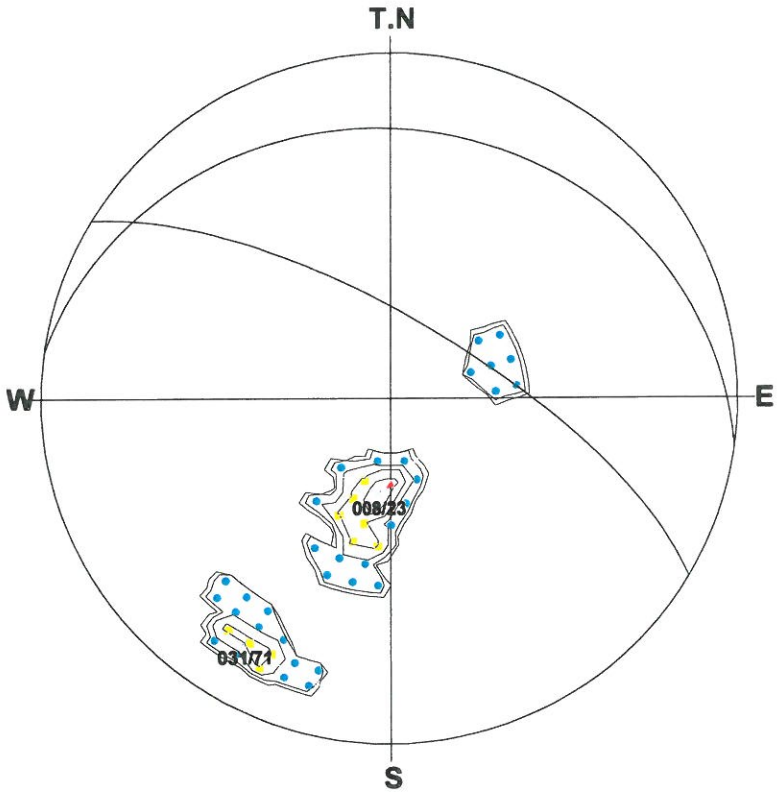
Schmidt (L.H)

Depth : 3.481 - 26.017 m

BH43.STR

<<VEIN>>

******** % Diagram ********



Number of Data : 8

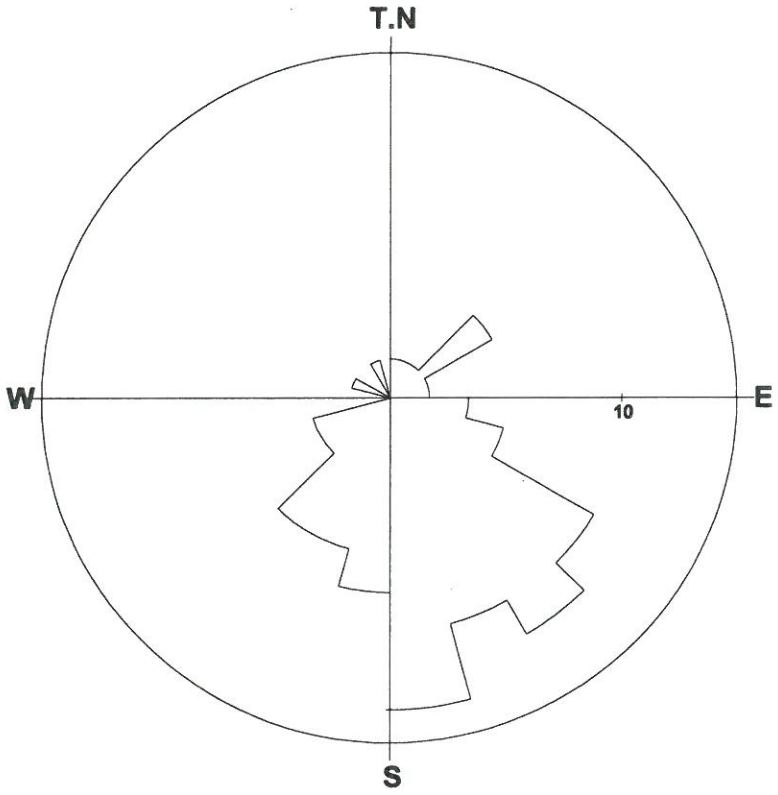
<Legend> Sym. (%)	Contour Value (%)
▲ : 37	Contour 1 : 0 ☐
▼ : 30 - 37	Contour 2 : 7 ☐
■ : 22 - 30	Contour 3 : 15 ☐
◆ : 15 - 22	Contour 4 : 22 ☐
● : 7 - 15	Contour 5 : 30 ☐
····· : 0 - 7	Contour 6 : 37 ☐

Schmidt (L.H)

Depth : 3.481 - 26.017 m

BH43.STR

<<JOINT>>



Number of Data : 59/99

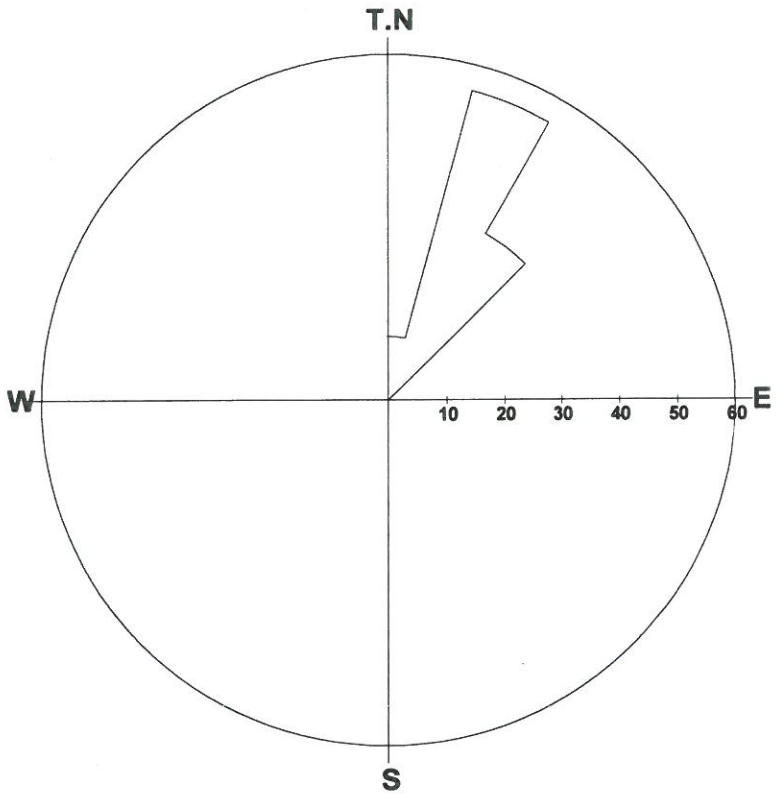
Max : 13.6% **Grouping Angle : 15 deg**

Dir	%	Dir	%	Dir	%
0-	2	135-	12	270-	0
15-	2	150-	10	285-	2
30-	2	165-	14	300-	0
45-	5	180-	8	315-	0
60-	2	195-	7	330-	2
75-	2	210-	7	345-	0
90-	3	225-	3		
105-	5	240-	3		
120-	10	255-	0		

Depth : 3.481 - 26.017 m

BH43.STR

<<PARTING>>



Number of Data : 9/99

Max : 55.6%

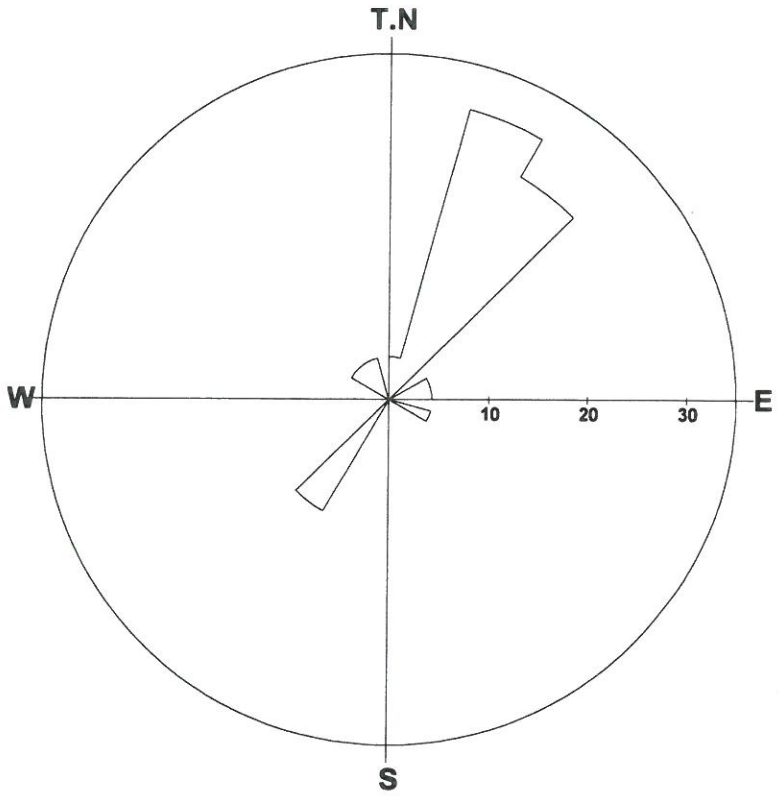
Grouping Angle : 15 deg

Dir	%	Dir	%	Dir	%
0-	11	135-	0	270-	0
15-	56	150-	0	285-	0
30-	33	165-	0	300-	0
45-	0	180-	0	315-	0
60-	0	195-	0	330-	0
75-	0	210-	0	345-	0
90-	0	225-	0		
105-	0	240-	0		
120-	0	255-	0		

Depth : 3.481 - 26.017 m

BH43.STR

<<SHEAR ZONE>>



Number of Data : 23/99

Max : 30.4%

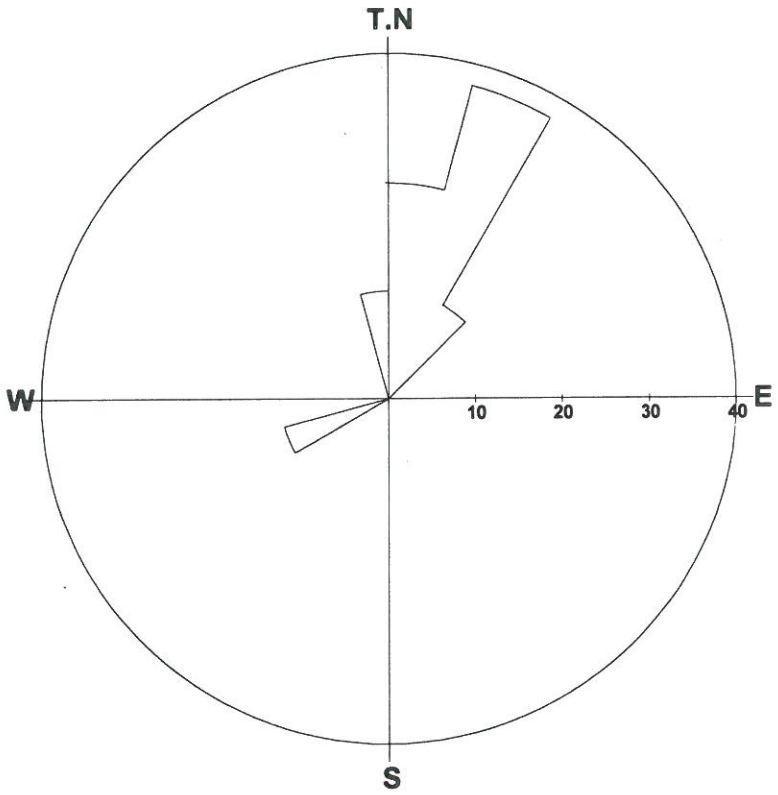
Grouping Angle : 15 deg

Dir	%	Dir	%	Dir	%
0-	4	135-	0	270-	0
15-	30	150-	0	285-	0
30-	26	165-	0	300-	4
45-	0	180-	0	315-	4
60-	4	195-	0	330-	4
75-	4	210-	13	345-	0
90-	0	225-	0		
105-	4	240-	0		
120-	0	255-	0		

Depth : 3.481 - 26.017 m

BH43.STR

<<VEIN>>



Number of Data : 8/99

Max : 37.5%

Grouping Angle : 15 deg

Dir	%	Dir	%	Dir	%
0-	25	135-	0	270-	0
15-	38	150-	0	285-	0
30-	13	165-	0	300-	0
45-	0	180-	0	315-	0
60-	0	195-	0	330-	0
75-	0	210-	0	345-	13
90-	0	225-	0		
105-	0	240-	13		
120-	0	255-	0		

Depth : 3.481 - 26.017 m

Title: BH43.STR
Comment: JOINT
Depth: 3.481 - 26.017 m
Aperture: 0.3 - 176.0 mm

Sort: 1/ 7
Form: 8/ 8
Condition: 11/11
Remark: 11/11

2009/ 9/ 1

Elevation: 0.000m
Water Level: 24.940m

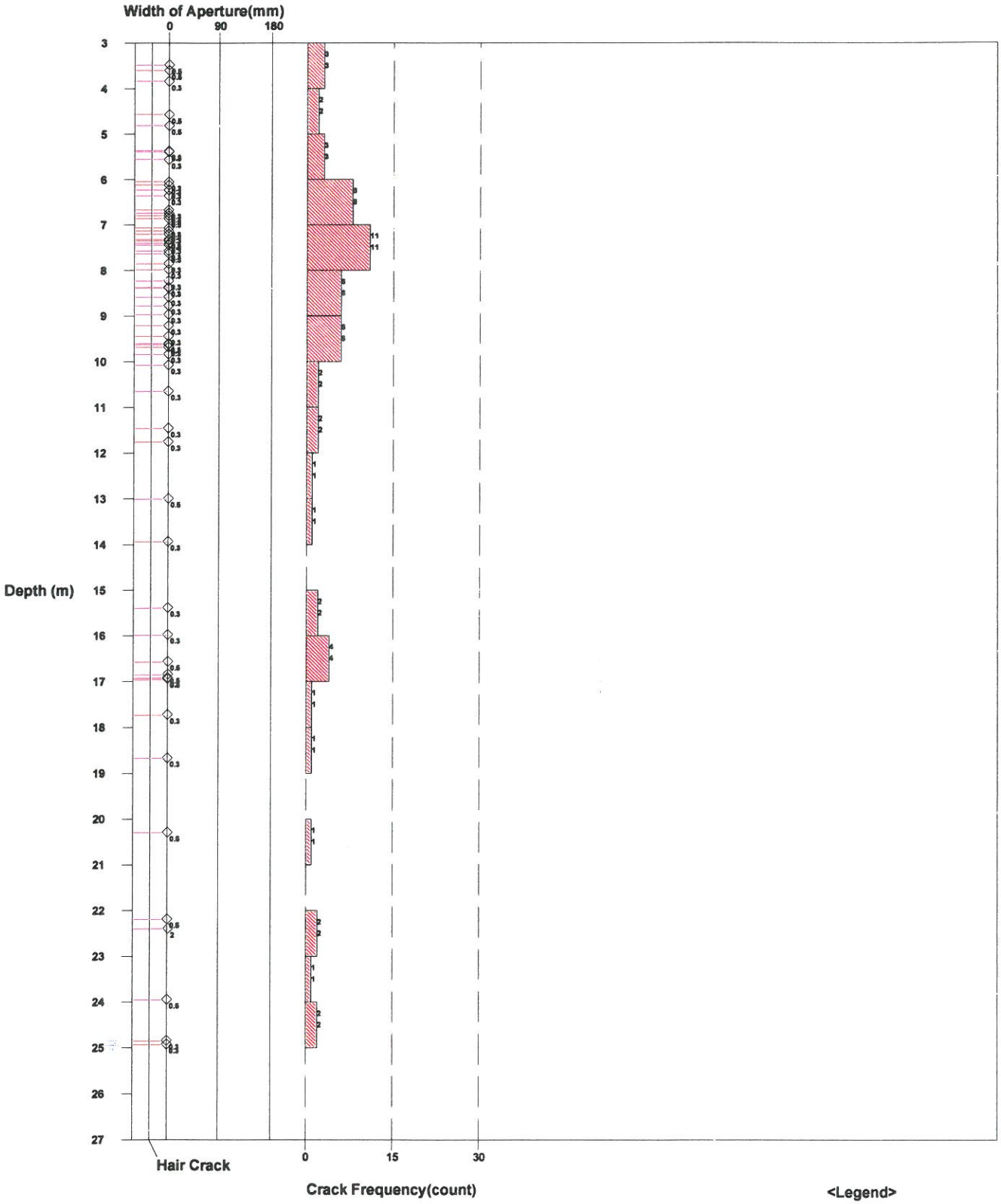


Fig. Rock Mass Condition Graph

Title: BH43.STR
Comment: PARTING
Depth: 3.481 - 26.017 m
Aperture: 0.3 - 176.0 mm

Sort: 1/ 7
Form: 8/ 8
Condition: 11/11
Remark: 11/11

2009/ 9/ 1

Elevation: 0.000m
Water Level: 24.940m

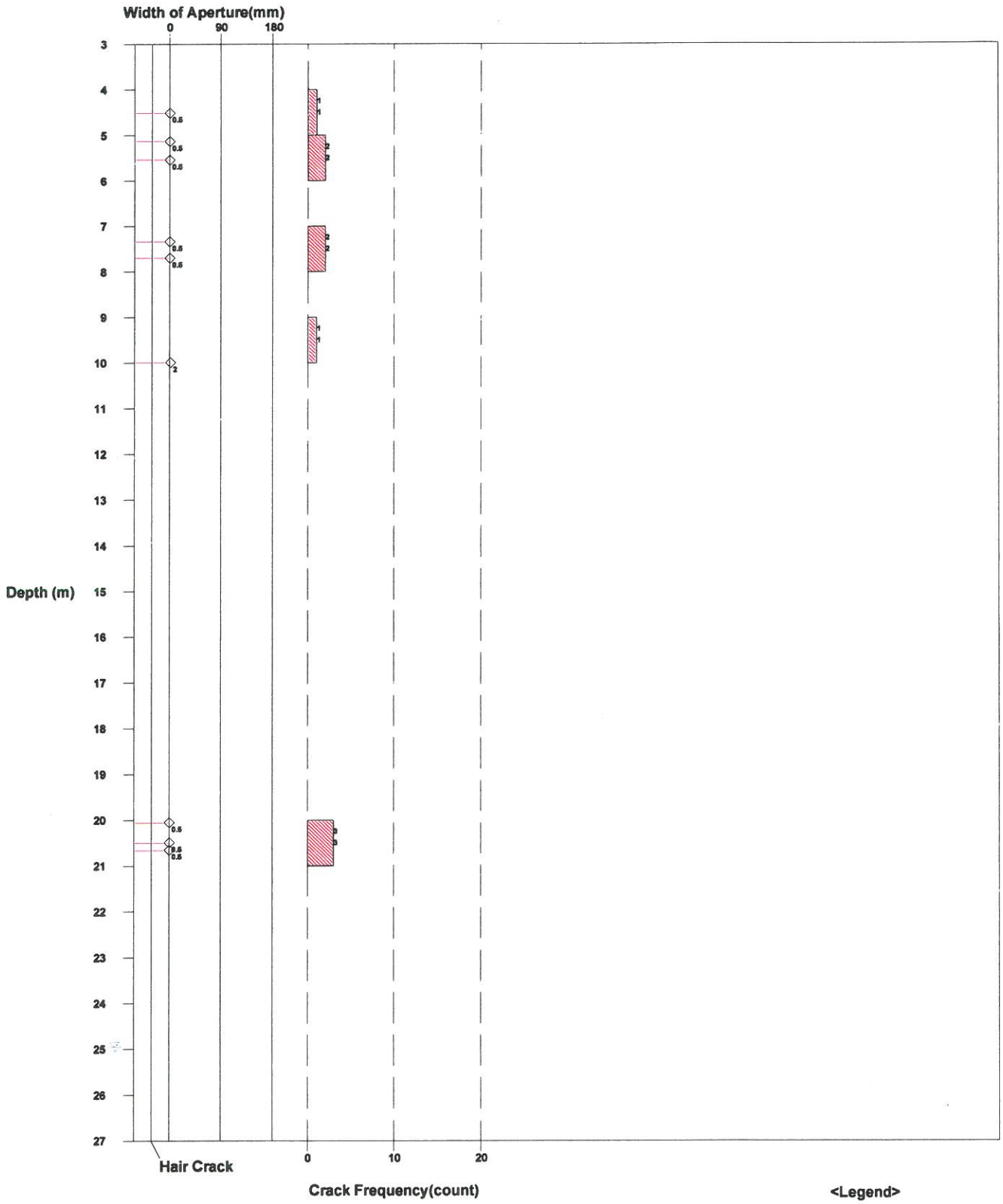


Fig. Rock Mass Condition Graph

Title: BH43.STR
Comment: SHEAR ZONE
Depth: 3.481 - 26.017 m
Aperture: 0.3 - 176.0 mm

Sort: 1/ 7
Form: 8/ 8
Condition: 11/11
Remark: 11/11

2009/ 9/ 1

Elevation: 0.000m
Water Level: 24.940m

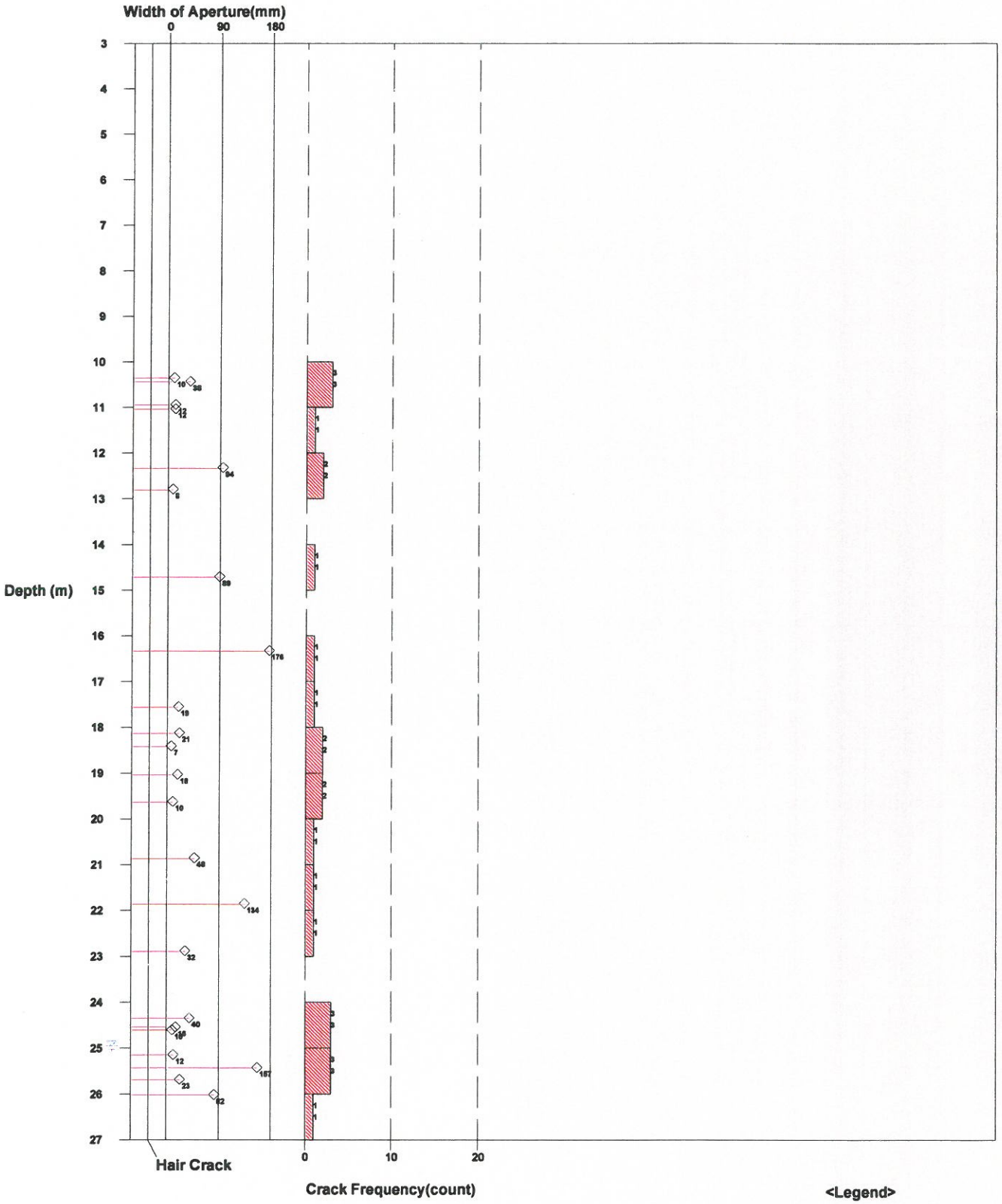


Fig. Rock Mass Condition Graph

Title: BH43.STR
Comment: VEIN
Depth: 3.481 - 26.017 m
Aperture: 0.3 - 176.0 mm

Sort: 1/ 7
Form: 8/ 8
Condition: 11/11
Remark: 11/11

2009/ 9/ 1

Elevation: 0.000m
Water Level: 24.940m

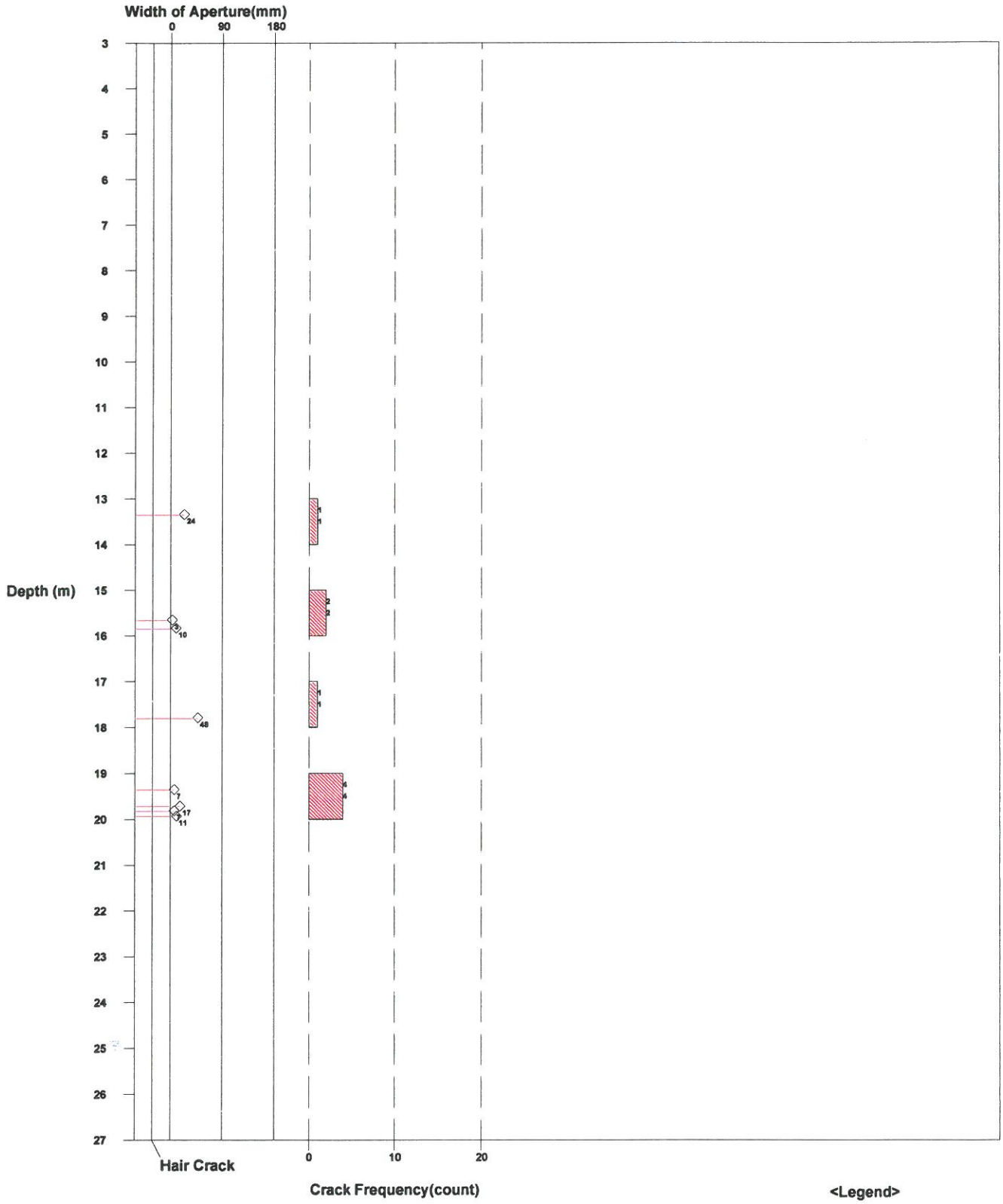
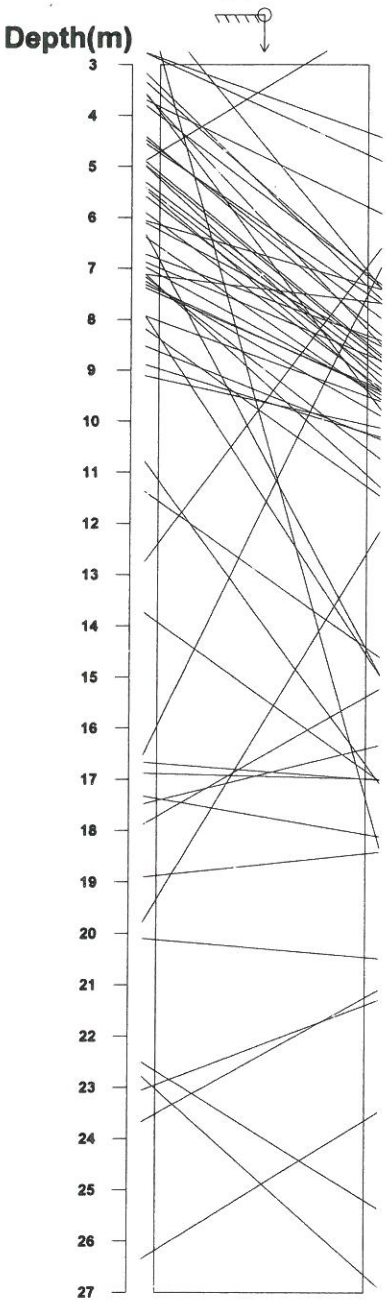


Fig. Rock Mass Condition Graph

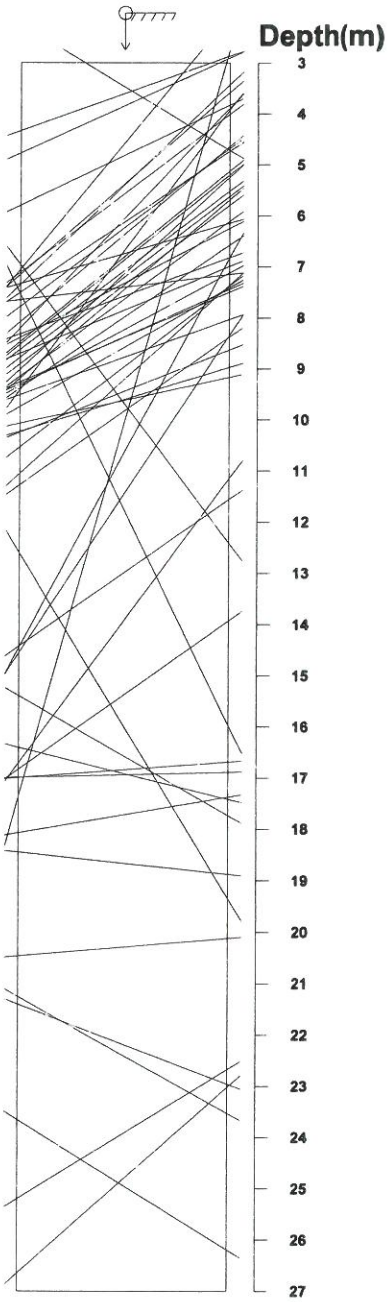
Title: BH43.STR
Comment: JOINT
Depth: 3.481 - 26.017 m
Aperture: 0.3 - 176.0 mm

Sort: 1/ 7
Form: 8/ 8
Condition: 11/11
Remark: 11/11

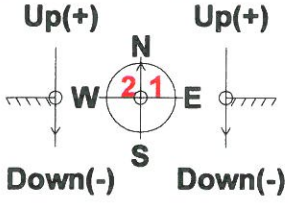
View Point 2
Profile of Apparent Borehole



View Point 1
Profile of Apparent Borehole



View Point2 View Point1



Direction: 0 deg
Inclination: Vertical(Down)

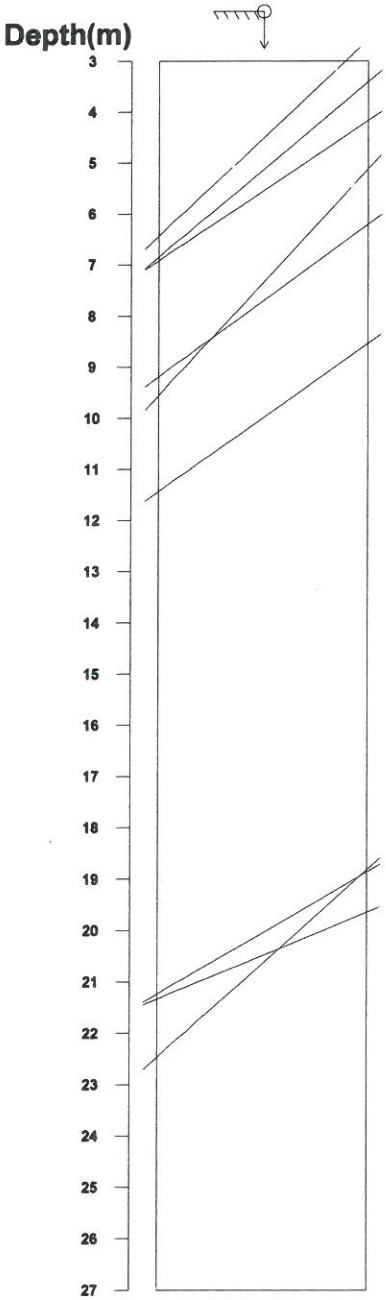
<Legend>
Entrance G.L
Bottom

Fig. Apparent Dip

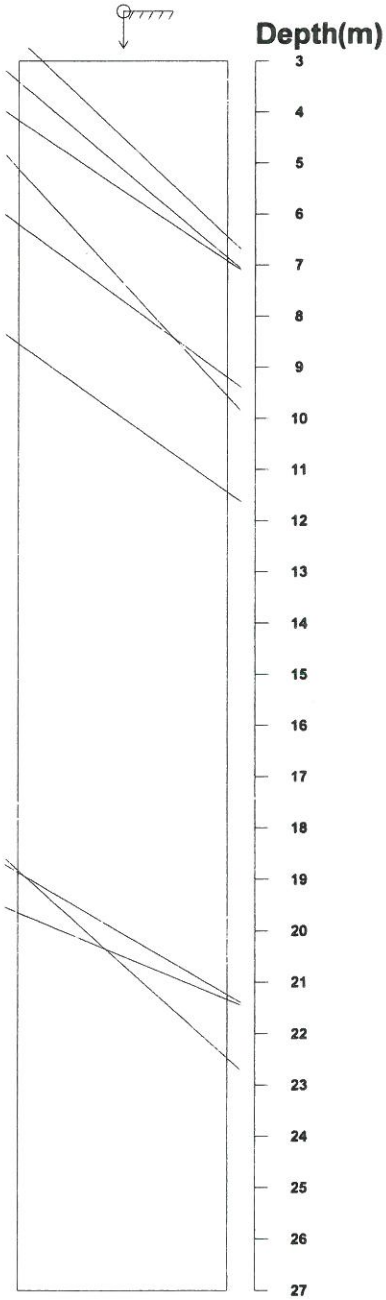
Title: BH43.STR
Comment: PARTING
Depth: 3.481 - 26.017 m
Aperture: 0.3 - 176.0 mm

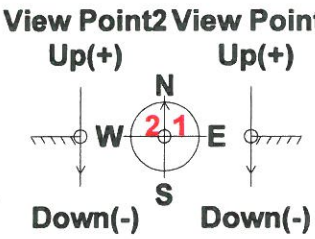
Sort: 1/ 7
Form: 8/ 8
Condition: 11/11
Remark: 11/11

View Point 2
Profile of Apparent Borehole



View Point 1
Profile of Apparent Borehole





Direction: 0 deg
Inclination: Vertical(Down)

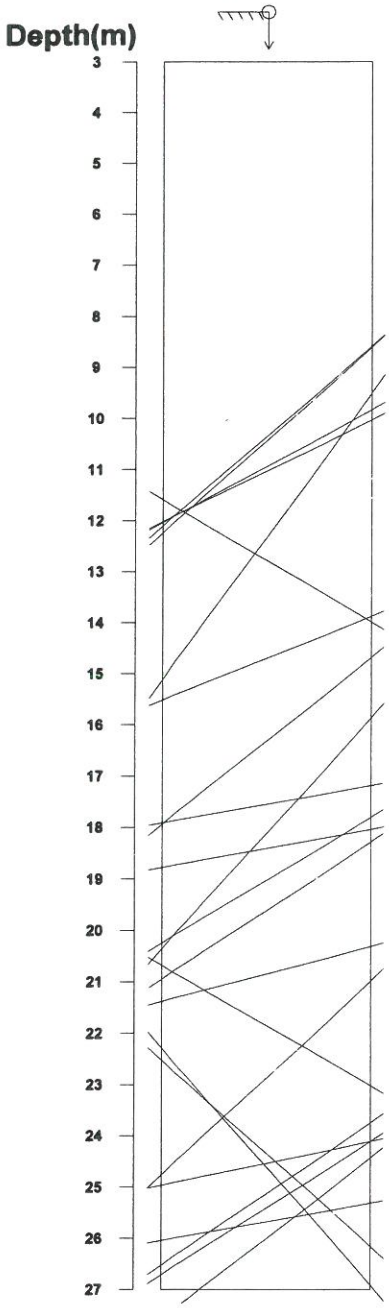
<Legend>
Entrance G.L
Bottom

Fig. Apparent Dip

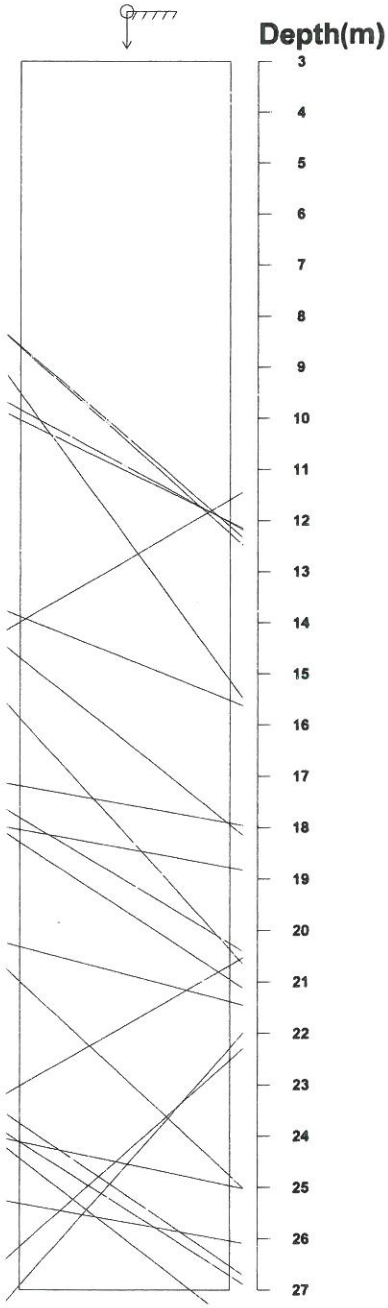
Title: BH43.STR
Comment: SHEAR ZONE
Depth: 3.481 - 26.017 m
Aperture: 0.3 - 176.0 mm

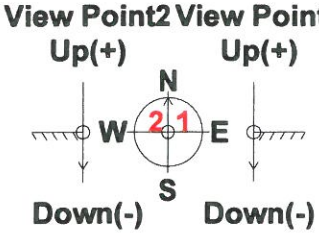
Sort: 1/ 7
Form: 8/ 8
Condition: 11/11
Remark: 11/11

View Point 2
Profile of Apparent Borehole



View Point 1
Profile of Apparent Borehole





Direction: 0 deg
Inclination: Vertical(Down)

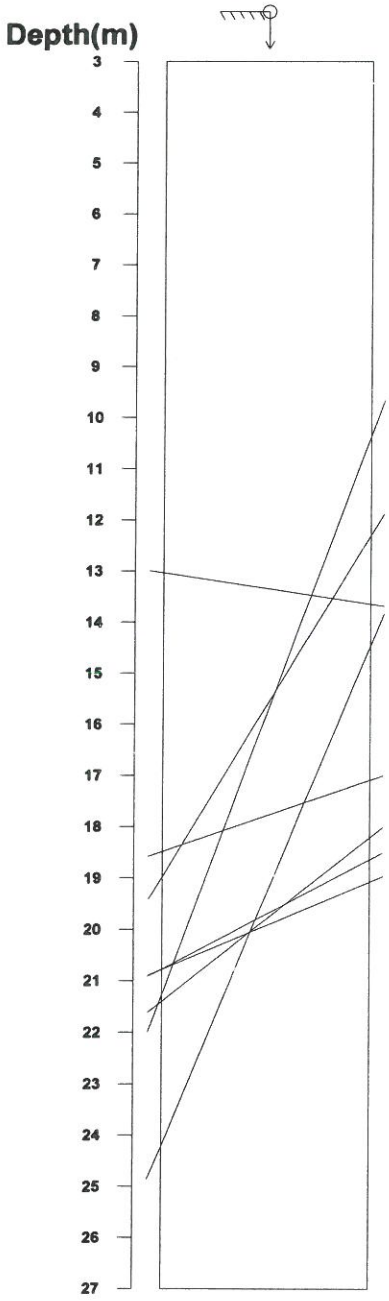
<Legend>
Entrance G.L
Bottom

Fig. Apparent Dip

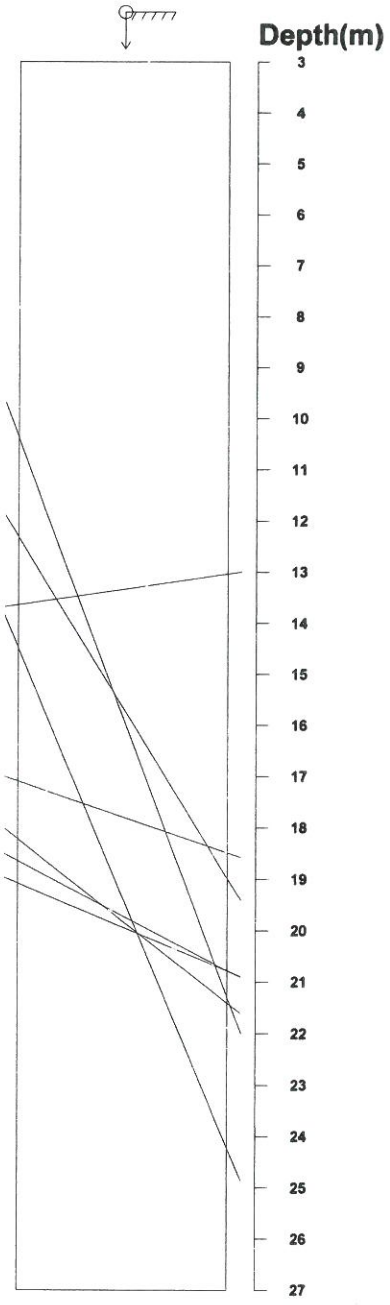
Title: BH43.STR
Comment: VEIN
Depth: 3.481 - 26.017 m
Aperture: 0.3 - 176.0 mm

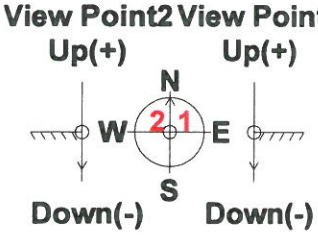
Sort: 1/ 7
Form: 8/ 8
Condition: 11/11
Remark: 11/11

View Point 2
Profile of Apparent Borehole



View Point 1
Profile of Apparent Borehole





Direction: 0 deg
Inclination: Vertical(Down)

<Legend>
Entrance G.L
Bottom

Fig. Apparent Dip