Queensland Government
Department of Main Roads

ENGINEERING BOREHOLE LOG

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

BOREHOLE No BH037
SHEET 1 of 2
REFERENCE No H10588

PROJECT BRUCE HIGHWAY (COOROY - CURRA) SECTION A GEOTECHNICAL INVESTIGATION
LOCATION Cut 13 COORDINATES 484749.3 E; 7081202.1 N
PROJECT No FG5825 SURFACE R.L. 158.03m PLUNGE DATE STARTED 28/7/09 GRID DATUM MGA94
JOB No 128/10A/901 HEIGHT DATUM AHD BEARING DATE COMPLETED 28/7/09 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	158.03				**Silty CLAY (Residual)** Mottled red to brown, moist, firm.		(Cl)				2,3,2 N=5	A SPT
1	156.53				**PHYLLITE (XW):** Generally exhibits the engineering properties of pale grey, moist, very stiff to hard, silty Clay.		XW				Soil descriptions based on driller's log only. (Missing SPT samples.) 11,19,30/150 N>50	B SPT
2				C							7,8,9 N=17	C SPT
3	154.93		(0)		**PHYLLITE (MW - SW):** Pale grey to slightly green, fine grained, foliated.						Is(50) = 0.37MPa Is(50) = 0.49MPa	x o
4			100 (0) 100 (0)		Folaition dips at ~10°. Defects are generally close to medium spaced.							
5			100 (0)		Prominent defect set parallel to foliation with other sets at 50 and 70°. Defect surfaces are typically iron stained or thinly clay infilled.							
6					**Detailed defect descriptions are shown on Form GEOT533/8 attached.**		MW-SW					
7			91 (0)								Is(50) = 0.47MPa Is(50) = 0.54MPa	x o
8			100 (7)									
9			100 (9)								Is(50) = 0.05MPa	x
10												

REMARKS **Detailed defect descriptions are shown on Form GEOT533/8 attached.** RAAX images taken of borehole.

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 10:30

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ENGINEERING BOREHOLE LOG

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

BOREHOLE No BH037
SHEET 2 of 2
REFERENCE No H10588

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

LOCATION Cut 13 COORDINATES 484749.3 E; 7081202.1 N

PROJECT No FG5825 SURFACE R.L. 158.03m PLUNGE DATE STARTED 28/7/09 GRID DATUM MGA94

JOB No 128/10A/901 HEIGHT DATUM AHD BEARING DATE COMPLETED 28/7/09 DRILLER R & D Drilling

DEPTH (m)	R.L. (m)	MATERIAL DESCRIPTION	USC	WEATHERING	RQD ( )% CORE REC %	SAMPLE	ADDITIONAL DATA AND TEST RESULTS	SAMPLES	TESTS
10	148.03	**PHYLLITE (MW - SW):** (Cont'd) 10.0 - 10.3: Broken zone.	MW-SW				Broken zone Is(50) = 0.24MPa		o
	147.31	**PHYLLITE (SW):** Pale and dark grey interbeds, fine grained, foliated.			100 (9)				
11		Foliations dip at 10°.					Is(50) = 0.28MPa Is(50) = 0.34MPa		o x
		Defect spacing mainly medium.							
12		Prominent defect set parallel to foliation with another set at 45°.							
		Defect surfaces are typically iron stained.			100 (26)				
		Occasional quartz seams up to 10mm thick.							
13			SW				Is(50) = 0.11MPa Is(50) = 4.12MPa		x o
		Detailed defect descriptions are shown on Form GEOT533/8 attached.							
14					100 (16)		MC = 2.8%; UCS=5.30MPa		UCS
15							Is(50) = 0.40MPa		x
					100 (55)				
16	141.87				100		Is(50) = 0.95MPa		o
		Borehole terminated at 16.16m							
17									
18									
19									
20									

INTACT STRENGTH: EH VH H M L VL EL
DEFECT SPACING (mm): 20 60 200 600 2000
GRAPHIC LOG

REMARKS **Detailed defect descriptions are shown on Form GEOT533/8 attached.** RAAX images taken of borehole.

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 10:30

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

Borehole No: **BH37**

Start Depth: 3.50m
Finish Depth: 16.16m
Project No: FG5825
H No: 10588

0 100 200 300 400 500 600mm

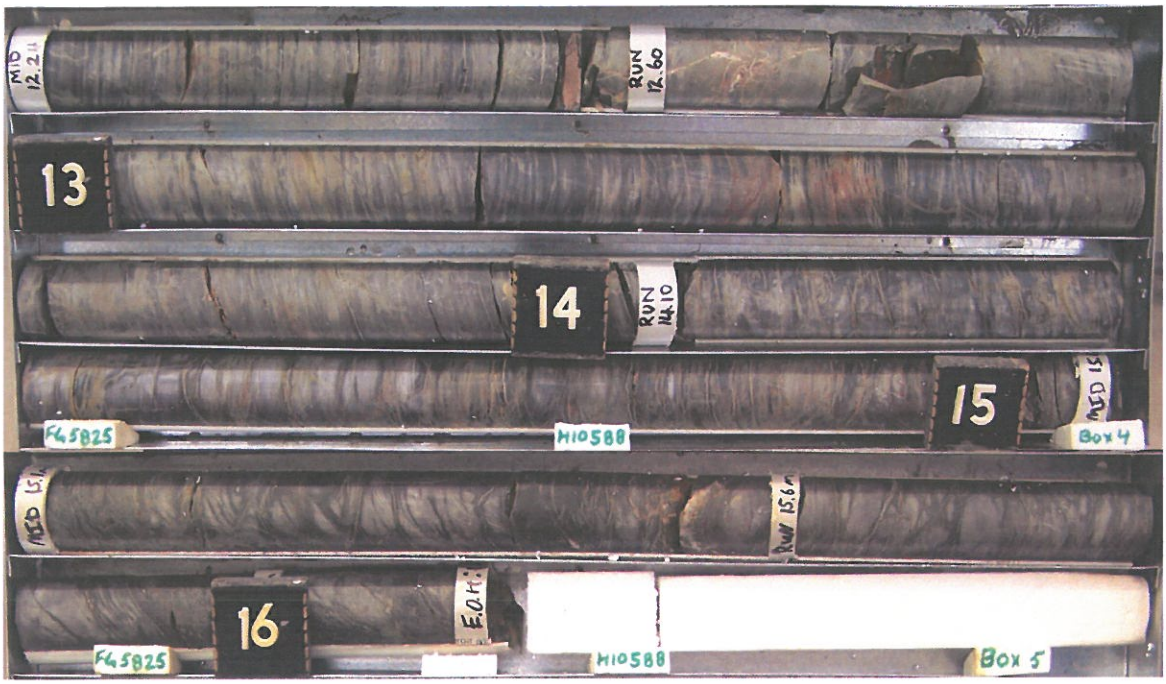
SCALE 1:5

F:GEOT043/1

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

Borehole No: **BH37**

Start Depth: 3.50m
Finish Depth: 16.16m
Project No: FG5825
H No: 10588



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.:	BH37
SHEET:	1 of 6
REFERENCE NO.:	H10588

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

LOCATION: Cut 13

PROJECT NO.:	FG5825	**SURFACE R.L.:**	158.02	**DRILLER:**	R&D Drilling
JOB NO.:	128/10A/901	**DATUM:**	MGA94	**DATE DRILLED:**	28/7/09

DEPTH	DEFECT TYPE	DIP°	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
3.02	J	10°	Pl	S	O	FeSt	
3.09	J	10°	Pl	S	O	FeSt	
3.62	J	10°	Pl	S	O	FeSt	
3.64	J	10°	Pl	S	O	FeSt	
3.66	J	20°	Pl		C	FeSt	
3.70	J	20°	Pl	SR	O	FeSt	
3.76	J	20°	Ir	SR	O	FeSt	
3.80	J	20°	Pl	SR	O	FeSt	
3.85	J	10°	Pl	R	O	FeSt	
3.85	J	Subvertical	Pl	S	T	FeSt	
3.85	J	20°	Pl	S	T	FeSt	
3.91	J	20°	Pl	S	T	FeSt	
3.92	J	20°	Pl	SR	T	FeSt	
4.05	J	10°	Pl	SR	T	FeSt	
4.09	J	20°	Pl	S	O	FeSt	
4.14	J	30°	Pl	S	O	FeSt	
4.22	J	20°	Pl	S	O	FeSt	
4.36	J	45°	Pl	S	O		Cn

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.:	BH37
SHEET:	2 of 6
REFERENCE NO.:	H10588

DEPTH	DEFECT TYPE	DIP°	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
4.39	J	10°	Pl	S	O	FeSt	
4.41	J	10°	Pl	S	O	FeSt	
4.45	J	10°	Pl	SR	T	FeSt	
4.47	J	20°	Pl	S	T	FeSt	
4.49	J	60°	Pl		C	FeSt	
4.50	J	10°	Pl	S	T	FeSt	
4.63	J	10°	Ir	R	T	FeSt	
4.68	J	20°	Pl	S	O	FeSt	
4.69	J	20°	Pl	S	O	FeSt	
4.72	J	45°	Pl	S	T		Cl
4.75	J	20°	Ir	SR	T	FeSt	
4.81	J	20°	Pl	S	T	FeSt	
4.82	J	10°	Pl	S	T		Cl
4.84	J	45°	St	R	T	FeSt	
4.85	J	70°	Ir	R	O		Cl
4.90	J	10°	Pl	S	O	FeSt	
4.91	J	10°	Pl	S	O	FeSt	
4.91	J	Subvertical	Pl	S	T		Cl
4.92	J	10°	Pl	S	O	FeSt	
4.93	J	10°	Pl	S	O	FeSt	
4.96	J	10°	Pl	S	O	FeSt	
5.05	J	20°	Pl	S	O	FeSt	
5.10	J	20°	Pl	S	O	FeSt	
5.13	J	20°	Pl	S	O	FeSt	
5.16	J	20°	Pl	S	O	FeSt	
5.22	J	20°	Pl	S	O	FeSt	
5.24	J	Subvertical	Ir	SR	O	FeSt	
5.32	J	30°	Pl	S	O	FeSt	
5.36	J	20°	Pl	S	O	FeSt	
5.38	J	45°	Pl	S	T	FeSt	
5.39	J	10°	Pl	S	T	FeSt	
5.42	J	10°	Pl	S	T	FeSt	
5.44	J	10°	Pl	S	T	FeSt	
5.47	J	10°	Pl	S	T	FeSt	
5.47	J	Subvertical	Pl	S	T	FeSt	
5.52	J	20°	Pl	S	T	FeSt	
5.54	J	20°	Pl	S	T	FeSt	
5.55	J	20°	Pl	S	T	FeSt	
5.56	J	20°	Pl	S	T	FeSt	
5.57	J	20°	Pl	S	T	FeSt	
5.59	J	20°	Pl	S	T	FeSt	
5.60	J	20°	Pl	S	T	FeSt	
5.60	J	30°	Pl	S	O	FeSt	
5.64	J	10°	Pl	S	O	FeSt	
5.65	J	10°	Pl	S	T	FeSt	
5.67	J	10°	Pl	S	T	FeSt	
5.69	J	10°	Pl	S	T	FeSt	
5.71	J	20°	Pl	S	O	FeSt	
5.72	J	20°	Pl	S	T	FeSt	
5.73	J	20°	Pl	S	T	FeSt	
5.74	J	20°	Pl	S	T	FeSt	
5.77	J	20°	Pl	S	T	FeSt	
5.80	J	70°	Pl	S	T		Cl
5.83	J	20°	Pl	SR	T	FeSt	
5.86	J	20°	Pl	S	T	FeSt	
5.90	J	20°	Pl	S	T	FeSt	
5.93	J	20°	Pl	S	T	FeSt	

BOREHOLE NO.:	BH37
SHEET:	3 of 6
REFERENCE NO.:	H10588

DEPTH	DEFECT TYPE	DIP°	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
6.10	J	10°	Pl	SR	T	FeSt	
6.13	J	10°	Pl	SR	T	FeSt	
6.16	J	10°	Pl	SR	T	FeSt	
6.19	J	10°	Pl	SR	T	FeSt	
6.22	J	10°	Pl	SR	T	FeSt	
6.24	J	10°	Pl	SR	T	FeSt	
6.27	J	10°	Pl	SR	T	FeSt	
6.27	J	60°	Pl	SR	T	FeSt	
6.31	J	20°	Pl	S	T	FeSt	
6.33	J	20°	Ir	S	T	FeSt	
6.35	J	10°	Pl	S	T	FeSt	
6.39	J	10°	Pl	S	O	FeSt	
6.41	J	10°	Pl	S	O	FeSt	
6.45	J	10°	Pl	S	O	FeSt	
6.57	J	10°	Pl	S	O	FeSt	
6.71	J	Subvertical	Pl	S	O	FeSt	
6.73	J	20°	Pl	S	T	FeSt	
6.81	J	10°	St	SR	O	FeSt	
6.81	J	45°	Pl		C	FeSt	
6.85	J	10°	Ir	R	O		Cl
6.98	J	Subvertical	Ir		C	FeSt	
7.00	J	20°	Ir	S	T	FeSt	
7.16	J	10°	Pl	S	T	FeSt	
7.22	J	10°	Pl	S	T	FeSt	
7.25	J	10°	Pl	S	T	FeSt	
7.35	J	10°	Pl	S	O	FeSt	
7.42	J	10°	Pl	S	T	FeSt	
7.44	J	10°	Pl	S	T	FeSt	
7.47	J	10°	Pl	S	T	FeSt	
7.52	J	10°	Pl	S	T	FeSt	
7.59	J	10°	Pl	S	T	FeSt	
7.60	J	10°	Pl	S	T	FeSt	
7.62	J	10°	Pl	S	T	FeSt	
7.65	J	10°	Pl	SR	O	FeSt	
7.66	J	20°	Pl	S	O	FeSt	
7.71	J	20°	Pl	S	O	FeSt	
7.72	J	10°	Ir	SR	T	FeSt	
7.78	J	10°	Un	S	T	FeSt	
7.80	J	10°	Pl	S	T	FeSt	
7.86	J	20°	Pl	S	T	FeSt	
7.88	J	20°	Pl	S	O	FeSt	
7.88	J	60°	Ir		C	FeSt	
7.91	J	20°	Pl	S	T	FeSt	
7.96	J	20°	Pl	S	T	FeSt	
7.98	J	Subvertical	Pl	R	T	FeSt	
8.01	J	20°	Pl	S	T	FeSt	
8.04	J	20°	Ir	R	O	FeSt	
8.10	J	20°	Pl	S	T	FeSt	
8.18	J	10°	Pl	S	O	FeSt	
8.20	J	10°	Pl	S	O	FeSt	
8.23	J	10°	Pl	S	T	FeSt	
8.27	J	10°	St	SR	O	FeSt	
8.28	J	45°	Pl	SR	O	FeSt	
8.33	J	10°	Pl	S	O	FeSt	
8.38	J	20°	Pl	S	O	FeSt	
8.41	J	10°	Ir	SR	T	FeSt	
8.42	J	20°	Ir		C		Cl

BOREHOLE NO.:	BH37
SHEET:	4 of 6
REFERENCE NO.:	H10588

DEPTH	DEFECT TYPE	DIP°	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
8.46	J	30°	Pl	S	T	FeSt	
8.47	J	20°	Pl	S	T	FeSt	
8.50	J	20°	Pl	S	T	FeSt	
8.51	J	20°	Pl	S	T	FeSt	
8.58	J	20°	Pl	S	O	FeSt	
8.61	J	10°	Pl	S	O	FeSt	
8.67	J	30°	Pl	S	O	FeSt	
8.77	J	20°	Pl	S	T	FeSt	
8.80	J	20°	Pl	SR	O	FeSt	
8.88	J	10°	Pl	S	T	FeSt	
8.91	J	30°	Pl	SR	T	FeSt	
8.97	J	10°	Pl	S	T	FeSt	
9.07	J	20°	Pl	S	T	FeSt	
9.15	J	20°	Pl	S	O	FeSt	
9.19	J	20°	Pl	SR	T		Cl
9.27	J	20°	Pl	S	O	FeSt	
9.30	J	20°	Pl	S	O	FeSt	
9.33	J	20°	Pl	S	T	FeSt	
9.36	J	30°	Pl	S	O	FeSt	
9.38	J	20°	Pl	S	T	FeSt	
9.44	J	20°	Pl	S	O	FeSt	
9.49	J	20°	Pl	S	T	FeSt	
9.65	J	20°	Pl	S	O	FeSt	
9.72	J	20°	Pl	S	O	FeSt	
9.74	J	20°	Pl	S	T	FeSt	
9.77	J	20°	Pl	S	O	FeSt	
9.81	J	20°	Pl	S	O	FeSt	
9.87	J	20°	Pl	S	O	FeSt	
9.93	J	20°	Pl	S	O	FeSt	
9.98	J	20°	Pl	S	O	FeSt	
10.01	J	20°	Pl	S	O	FeSt	
10.03	J	20°	Pl	S	O	FeSt	
10.05	J	20°	Pl	S	O	FeSt	
10.07	J	20°	Pl	S	O	FeSt	
10.09	J	20°	Pl	S	O	FeSt	
10.10	J	20°	Pl	S	O	FeSt	
10.12	J	20°	Pl	S	O	FeSt	
10.23	J	20°	Pl	S	O	FeSt	
10.25	J	20°	Pl	S	O	FeSt	
10.29	J	20°	Pl	S	O	FeSt	
10.30	J	20°	Pl	S	O	FeSt	
10.31	J	20°	Pl	S	O	FeSt	
10.41	J	20°	Pl	S	O	FeSt	
10.41	J	Subvertical	Ir	R	T	FeSt	
10.55	J	20°	Pl	S	O	FeSt	
10.58	J	Subvertical	Pl	S	T	FeSt	
10.60	J	20°	Pl	S	O	FeSt	
10.71	J	20°	Pl	S	T	FeSt	
10.75	J	20°	Pl	S	T	FeSt	
10.82	J	30°	Pl	R	O	FeSt	
10.86	J	20°	Pl	S	O	FeSt	
11.00	J	20°	Pl	S	O	FeSt	
11.01	J	20°	Pl	S	O	FeSt	
11.06	J	20°	Pl	S	O	FeSt	
11.13	J	20°	Pl	S	O		Cl
11.19	J	10°	Pl	S	T	FeSt	
11.24	J	20°	Pl	S	O		Cl

BOREHOLE NO.:	BH37
SHEET:	5 of 6
REFERENCE NO.:	H10588

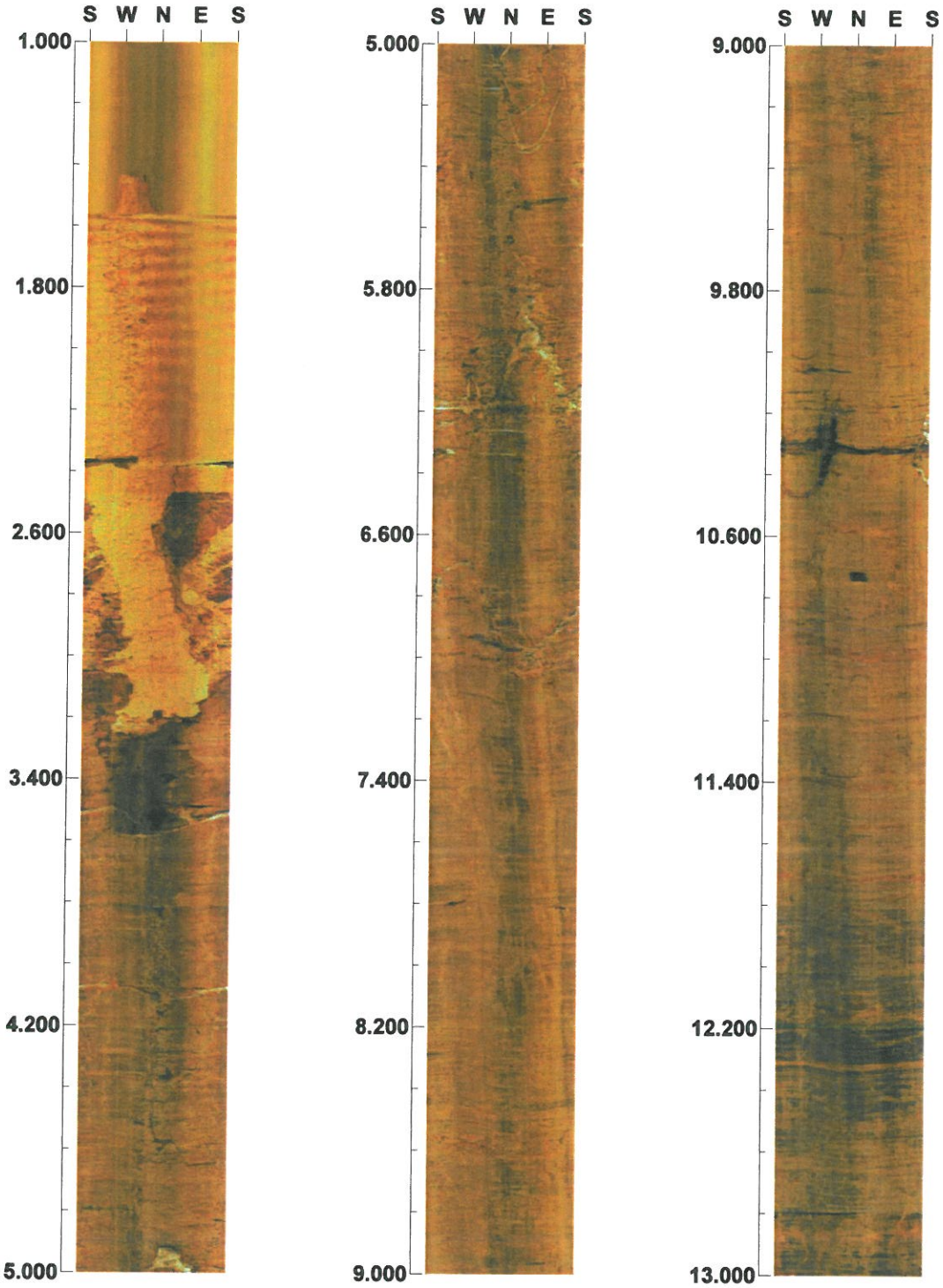
DEPTH	DEFECT TYPE	DIP°	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
11.36	J	10°	Pl	S	O	FeSt	
11.39	J	10°	Pl	S	O	FeSt	
11.41	J	10°	Pl	S	O	FeSt	
11.42	J	10°	Pl	S	O	FeSt	
11.43	J	10°	Pl	S	O	FeSt	
11.47	J	10°	Pl	S	T	FeSt	
11.53	J	20°	Pl	S	O	FeSt	
11.65	J	20°	Pl	S	O	FeSt	
11.70	J	20°	Pl	S	O	FeSt	
11.82	J	20°	Pl	S	O	FeSt	
11.85	J	20°	Pl	S	O	FeSt	
11.86	J	20°	Pl	S	O	FeSt	
11.95	J	10°	Pl	S	T	FeSt	
11.99	J	30°	Pl		C	FeSt	
12.16	J	10°	Pl	S	O	FeSt	
12.19	J	10°	Pl	S	O	FeSt	
12.29	J	10°	Pl	S	T	FeSt	
12.32	J	10°	Pl	S	T	FeSt	
12.35	J	30°	Pl	S	O	FeSt	
12.42	J	10°	Pl	S	T	FeSt	
12.44	J	10°	Pl	S	T	FeSt	
12.45	J	10°	Pl	S	T	FeSt	
12.47	J	10°	Pl	S	T	FeSt	
12.56	J	10°	Pl	S	O	FeSt	
12.59	J	10°	Pl	S	O		Cn
12.61	J	10°	Pl	S	O		Cn
12.62	J	10°	Pl	S	O		Cn
12.67	J	20°	Pl	S	O		Cn
12.77	J	10°	Pl	S	O		Cn
12.77	J	Subvertical	Pl	SR	O		Cn
12.87	J	20°	Pl	S	O	FeSt	
13.02	J	20°	Pl	S	O	FeSt	
13.05	J	10°	Pl	S	O	FeSt	
13.10	J	45°	Pl	S	O		Cn
13.28	J	10°	Pl	S	O		Cn
13.35	J	10°	Pl	S	O		Cn
13.47	J	10°	Pl	S	O	FeSt	
13.49	J	10°	Pl	S	O	FeSt	
13.62	J	20°	Pl	S	T	FeSt	
13.65	J	20°	Pl	S	T	FeSt	
13.67	J	10°	Pl	S	O		Cn
13.69	J	10°	Pl	S	O		Cn
13.78	J	20°	Pl	SR	O	FeSt	
13.87	J	20°	Pl	S	T	FeSt	
13.92	J	20°	Pl	S	O		Cn
13.96	J	20°	Pl	S	O		Cn
14.02	J	20°	Pl	SR	O		Cn
14.05	J	20°	Pl	SR	O		Cn
14.10	J	30°	Ir	R	O		Cn
14.40	J	20°	Pl	S	O		Cn
14.54	J	20°	Pl	S	O		Cn
14.77	J	10°	Pl	SR	T	FeSt	
14.83	J	10°	Pl	S	T		Cn
14.91	J	20°	Pl	S	T		Cl
15.00	J	10°	Ir	R	T		Cn
15.04	J	10°	Ir	R	T		Cn
15.06	J	10°	Pl	SR	T		Cn

BOREHOLE NO.:	BH37
SHEET:	6 of 6
REFERENCE NO.:	H10588

DEPTH	DEFECT TYPE	DIP°	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
15.07	J	10°	Pl	SR	T		Cn
15.10	J	10°	Pl	SR	T		Cn
15.21	J	10°	Ir	R	O		Cn
15.28	J	20°	Pl	S	T		Cn
15.29	J	45°	Pl	S	T		Cn
15.42	J	20°	Pl	S	O	FeSt	
15.42	J	45°	Pl	S	O		Cn
15.54	J	20°	Ir	R	O		Cn
15.60	J	20°	Pl	S	O		Cn
15.94	J	10°	Pl	SR	O		Cn

Project name: BRUCE HIGHWAY UPGRADE
Bore hole No.: BH37 **Azimuth: 0** **Inclination: -90**

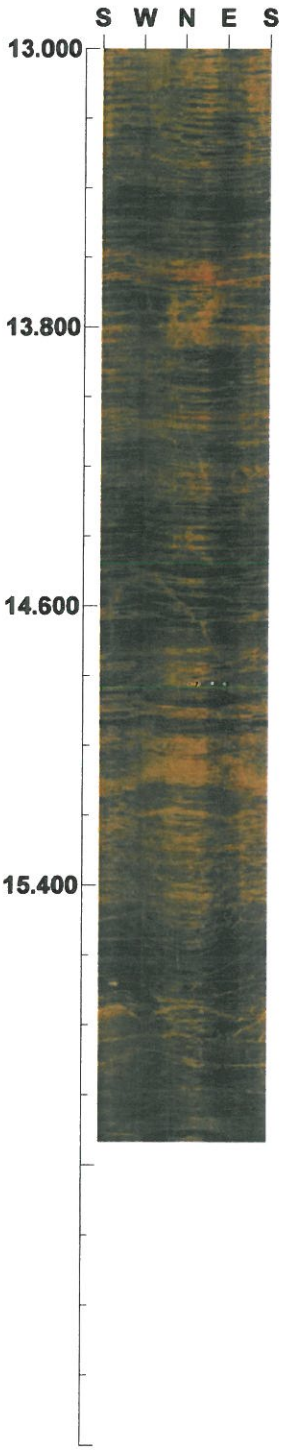
Depth range: 1.000 - 13.000 m



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

Project name: BRUCE HIGHWAY UPGRADE
Bore hole No.: BH37 **Azimuth: 0** **Inclination: -90**

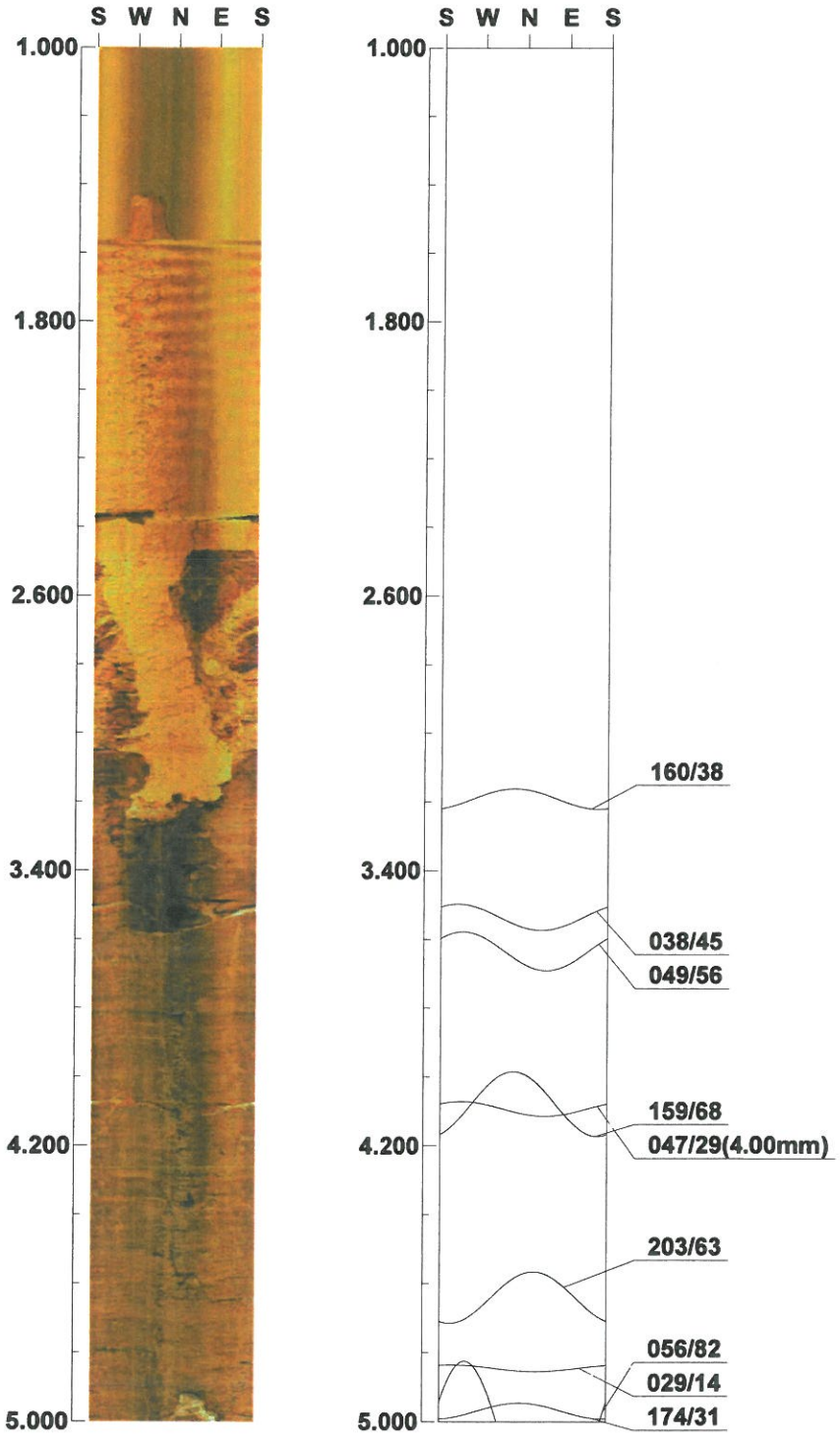
Depth range: 13.000 - 16.133 m



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

Project name: BRUCE HIGHWAY UPGRADE
Bore hole No.: BH37 **Azimuth: 0** **Inclination: -90**

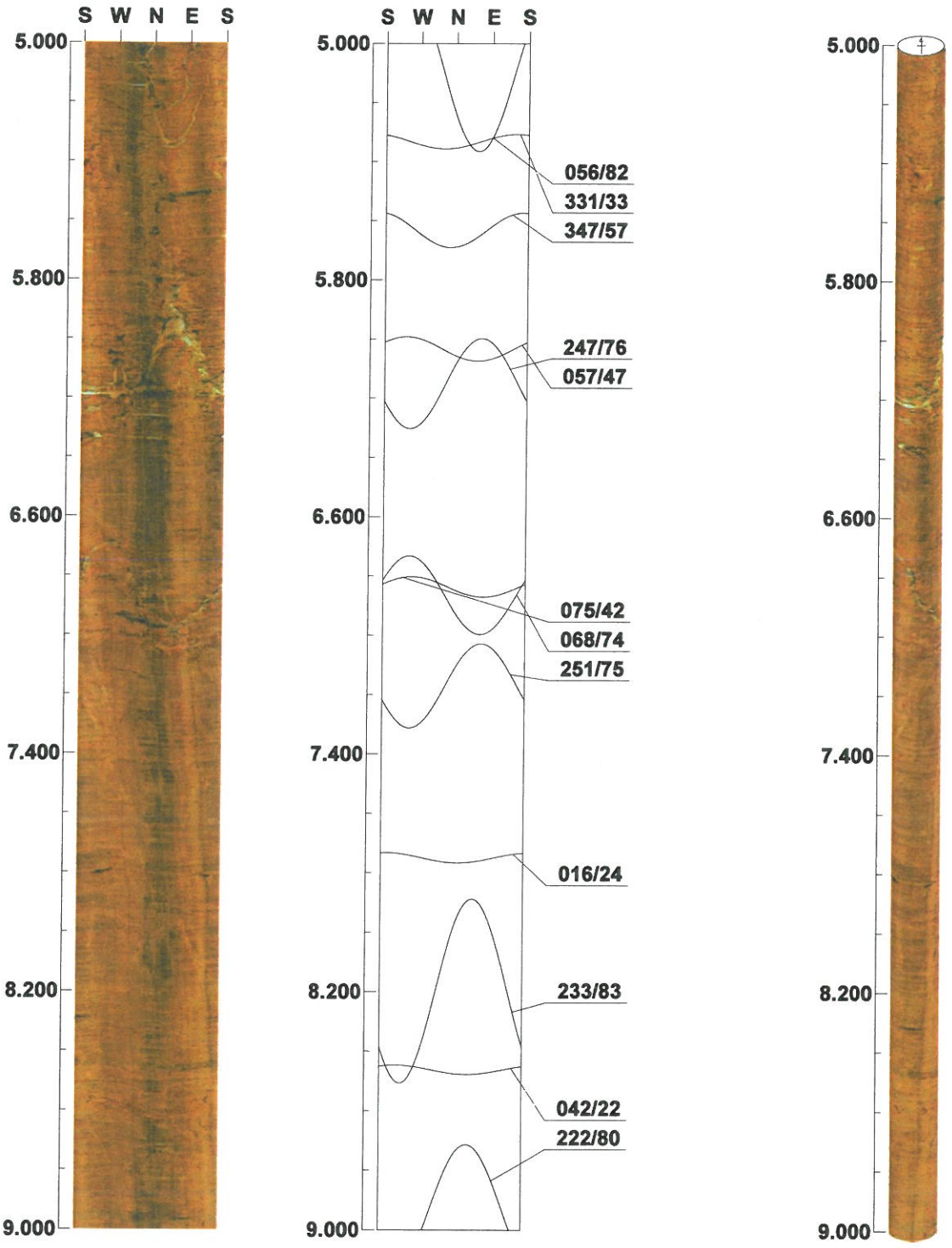
Depth range: 1.000 - 5.000 m



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

Project name: BRUCE HIGHWAY UPGRADE
Bore hole No.: BH37 **Azimuth: 0** **Inclination: -90**

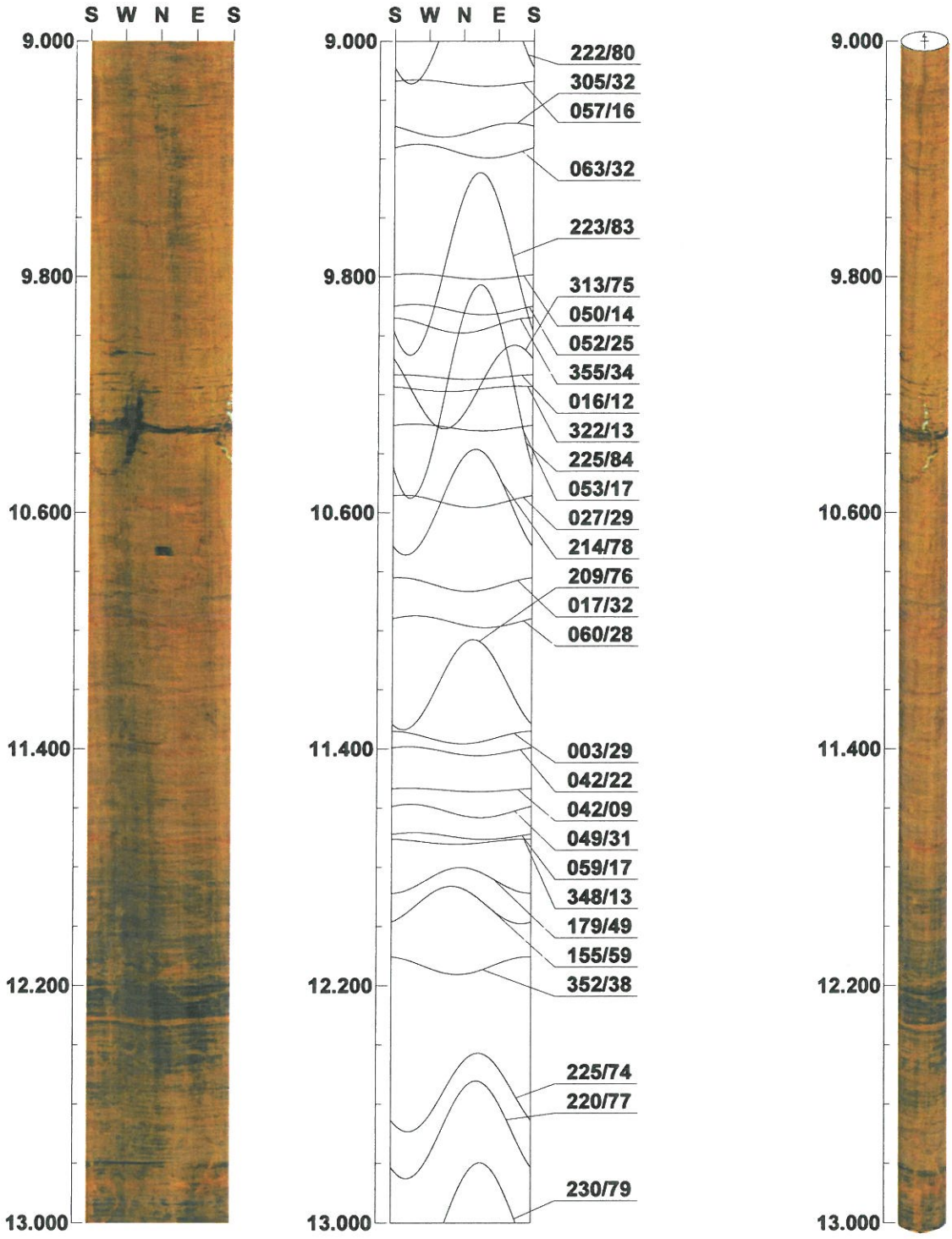
Depth range: 5.000 - 9.000 m



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

Project name: BRUCE HIGHWAY UPGRADE
Bore hole No.: BH37 **Azimuth: 0** **Inclination: -90**

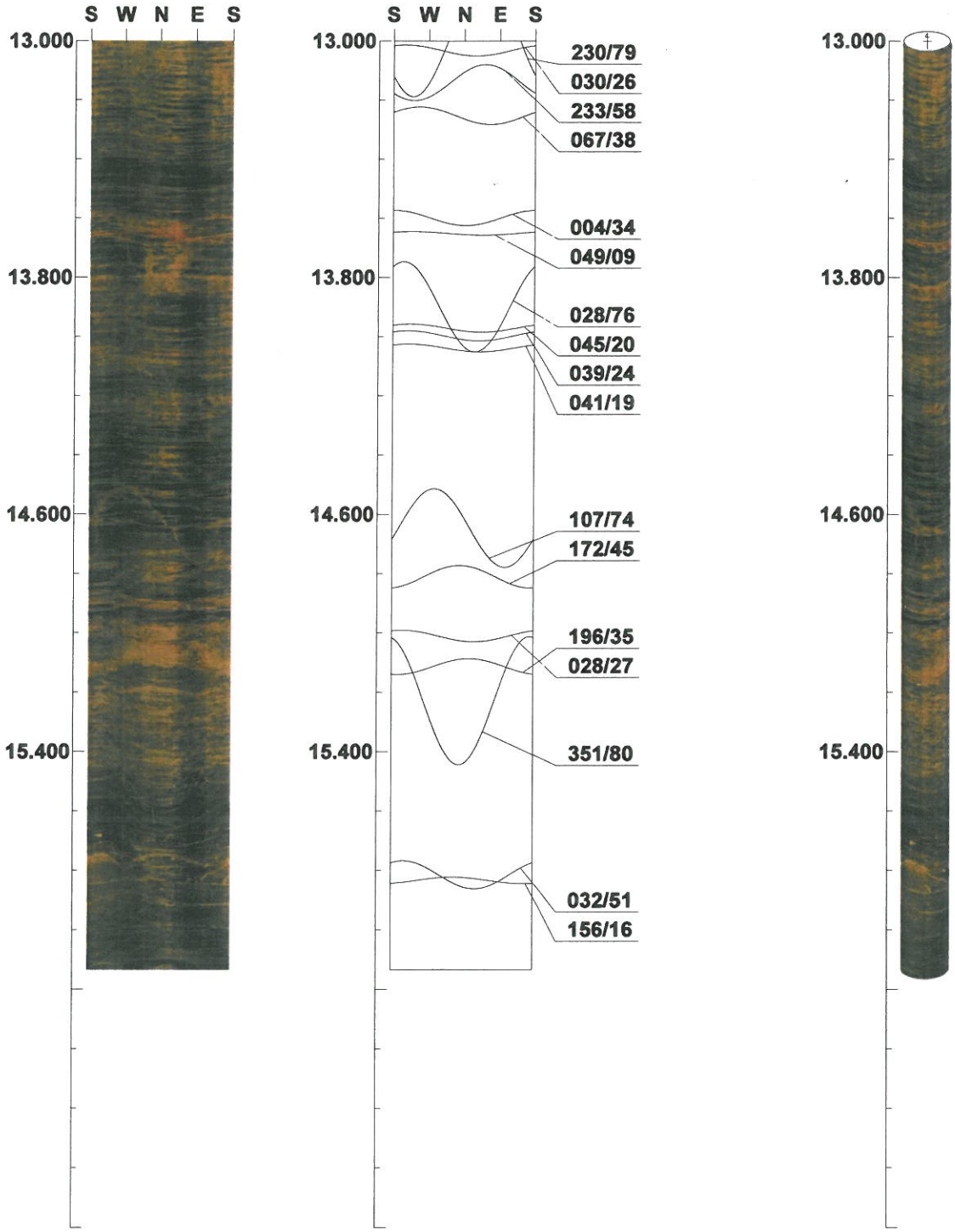
Depth range: 9.000 - 13.000 m



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

Project name: BRUCE HIGHWAY UPGRADE
Bore hole No.: BH37 **Azimuth: 0** **Inclination: -90**

Depth range: 13.000 - 16.133 m



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

Tab. Table of Discontinuity (1 / 2)

File name: BH37.STR
[ ]

No.	Depth (m)	Dir/Dip	Sort	Aperture (mm)	Form	Condition	Remark
1	3.191	160/38	Joint	1.0	Planar	Weathered	Open
2	3.535	038/45	Joint	4.0	Undulating	Weathered	Open/loose
3	3.634	049/56	Joint	0.3	Planar	Rough	Open
4	4.078	159/68	Joint	0.3	Irregular	Rough	Tight
5	4.092	047/29	Joint	4.0	Planar	Weathered	Open/loose
6	4.640	203/63	Joint	0.3	Planar	Rough	Tight
7	4.845	029/14	Parting	0.5	Planar	Rough	Open
8	4.969	174/31	Joint	0.3	Planar	Rough	Tight
9	5.095	056/82	Joint	0.5	Undulating	Rough	Tight/Fil'd
10	5.332	331/33	Joint	0.3	Planar	Smooth	Open
11	5.632	347/57	Joint	0.3	Planar	Smooth	Tight
12	6.033	057/47	Joint	0.3	Planar	Rough	Tight
13	6.150	247/76	Joint	0.5	Planar	Weathered	Open/fil'd
14	6.836	075/42	Joint	0.3	Planar	Rough	Tight
15	6.864	068/74	Joint	1.0	Undulating	Sheared	Open/loose
16	7.170	251/75	Joint	0.3	Undulating	Rough	Open
17	7.749	016/24	Joint	0.5	Planar	Rough	Open
18	8.197	233/83	Joint	0.3	Undulating	Rough	Open
19	8.462	042/22	Parting	0.3	Planar	Rough	Tight
20	8.929	222/80	Joint	0.3	Undulating	Rough	Tight
21	9.142	057/16	Parting	0.5	Planar	Rough	Open
22	9.302	305/32	Joint	0.5	Planar	Smooth	Open
23	9.373	063/32	Parting	0.5	Planar	Smooth	Open
24	9.756	223/83	Joint	0.3	Undulating	Rough	Open
25	9.799	050/14	Parting	0.5	Planar	Rough	Open
26	9.911	052/25	Parting	0.3	Planar	Rough	Open
27	9.965	355/34	Joint	0.3	Planar	Rough	Open
28	10.140	016/12	Parting	0.5	Planar	Rough	Open
29	10.174	313/75	Joint	0.3	Planar	Rough	Open
30	10.180	322/13	Joint	0.5	Planar	Rough	Open
31	10.189	225/84	Joint	9.0	Planar	Weathered	Open/loose
32	10.311	053/17	ShearZn	18.0	Planar	Brec/crus'd	Open/loose
33	10.561	027/29	Parting	0.3	Planar	Rough	Open
34	10.564	214/78	Joint	0.3	Undulating	Rough	Open
35	10.843	017/32	Parting	0.3	Planar	Rough	Open
36	10.969	060/28	Parting	0.5	Planar	Smooth	Open
37	11.182	209/76	Joint	0.3	Planar	Rough	Open
38	11.361	003/29	Joint	0.3	Planar	Smooth	Open
39	11.407	042/22	Parting	0.3	Planar	Smooth	Open
40	11.538	042/09	Parting	0.3	Planar	Smooth	Open
41	11.609	049/31	Joint	0.3	Planar	Smooth	Open
42	11.694	059/17	Parting	0.3	Planar	Rough	Open
43	11.713	348/13	Parting	0.3	Planar	Rough	Open
44	11.844	179/49	Joint	0.3	Planar	Rough	Open
45	11.927	155/59	Joint	0.3	Planar	Rough	Tight
46	12.132	352/38	Joint	0.3	Planar	Smooth	Open
47	12.560	225/74	Joint	0.3	Undulating	Rough	Tight
48	12.686	220/77	Joint	0.3	Irregular	Rough	Tight
49	12.993	230/79	Joint	0.3	Undulating	Rough	Tight
50	13.029	030/26	Parting	0.3	Planar	Rough	Open

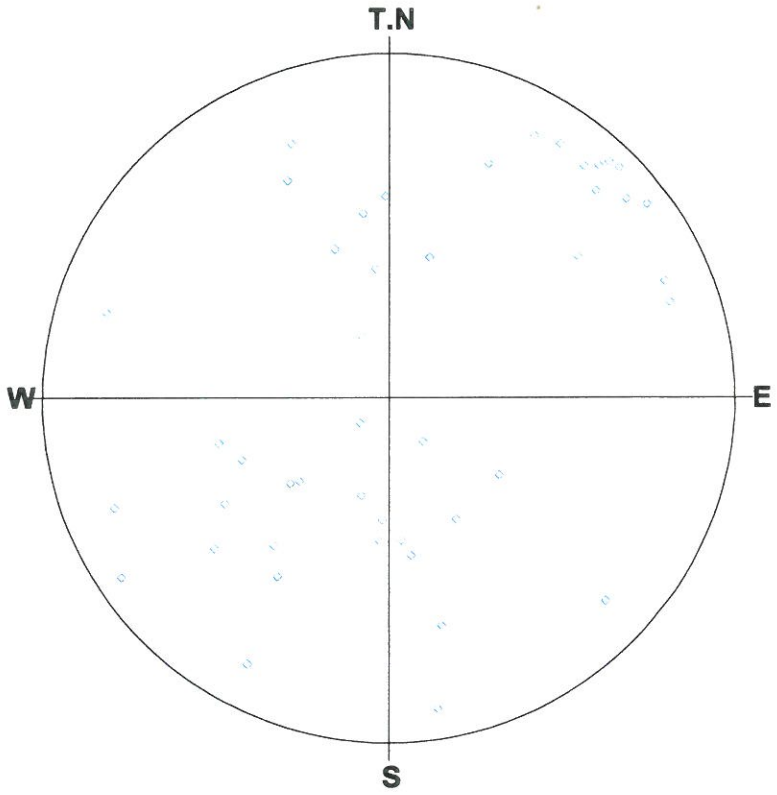
Tab. Table of Discontinuity (2 / 2)

File name: BH37.STR
[ ]

No.	Depth (m)	Dir/Dip	Sort	Aperture (mm)	Form	Condition	Remark
51	13.141	233/58	Joint	0.3	Planar	Rough	Tight
52	13.253	067/38	Joint	0.3	Planar	Smooth	Tight
53	13.599	004/34	Joint	0.3	Planar	Smooth	Open
54	13.651	049/09	Joint	0.3	Planar	Rough	Open
55	13.899	028/76	Joint	0.3	Undulating	Rough	Tight
56	13.973	045/20	Parting	0.3	Planar	Rough	Open
57	13.991	039/24	Parting	0.5	Planar	Rough	Open
58	14.038	041/19	Parting	0.3	Planar	Rough	Open
59	14.646	107/74	Joint	0.5	Undulating	Rough	Open
60	14.810	172/45	Joint	0.3	Planar	Rough	Open
61	15.010	028/27	Parting	0.5	Planar	Smooth	Open
62	15.113	196/35	Joint	0.3	Planar	Rough	Tight
63	15.228	351/80	Joint	0.3	Undulating	Rough	Open
64	15.814	032/51	Joint	4.0	Planar	Sheared	Open
65	15.833	156/16	Joint	0.3	Planar	Rough	Tight/Fil'd

BH37.STR

<<JOINT>>



Number of Data : 45/65

<Legend>

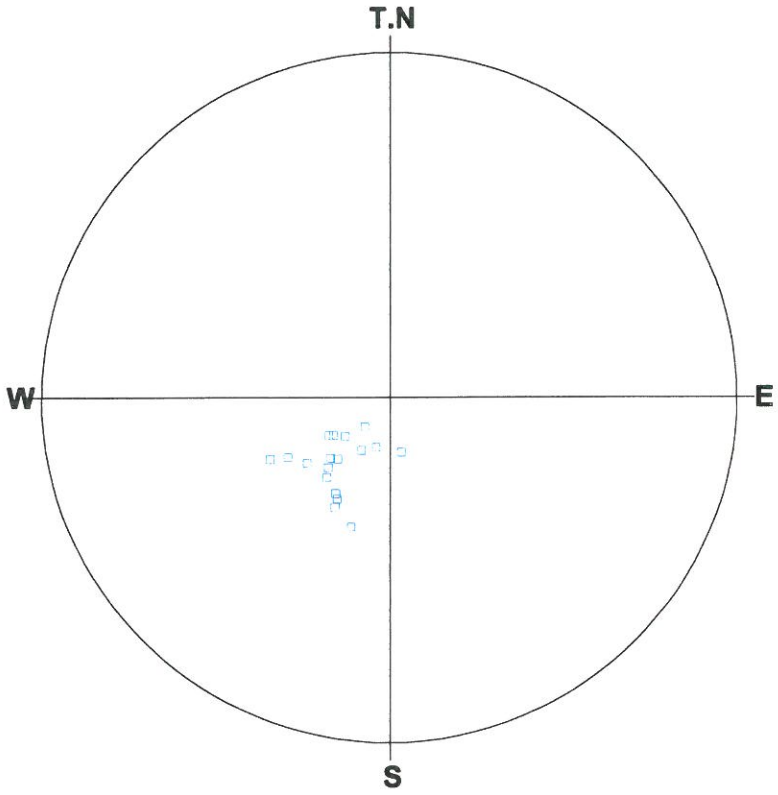
:Bed/foliat	-- 0	:Boundary	-- 0
:Joint	-- 45		
:Parting	-- 0		
:ShearZn	-- 0		
:Fault	-- 0		
:Vein	-- 0		

Schmidt (L.H)

Depth : 3.191 - 15.833 m

BH37.STR

<<PARTING>>



Number of Data : 19/65

<Legend>

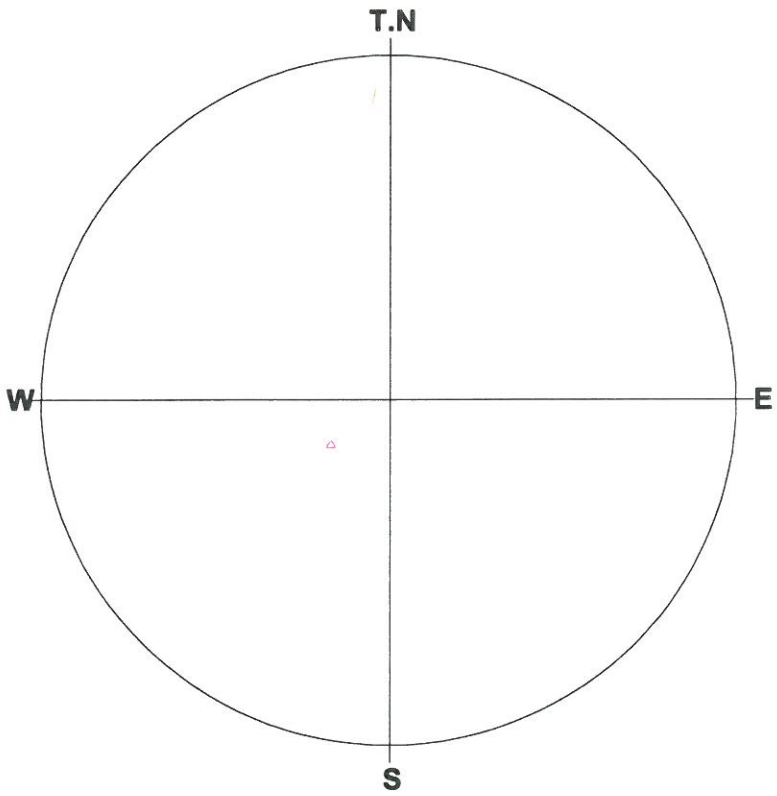
:Bed/foliat	-- 0	:Boundary	-- 0
:Joint	-- 0		
:Parting	-- 19		
:ShearZn	-- 0		
:Fault	-- 0		
:Vein	-- 0		

Schmidt (L.H)

Depth : 3.191 - 15.833 m

BH37.STR

<<SHEAR ZONE>>



Number of Data : 1/65

<Legend>

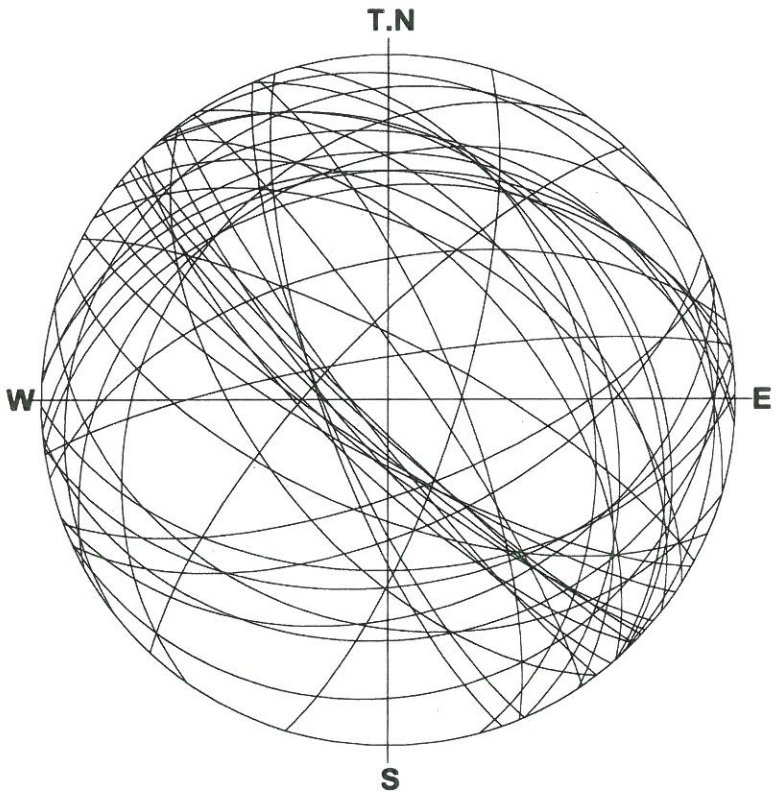
:Bed/foliat	-- 0	:Boundary	-- 0
:Joint	-- 0		
:Parting	-- 0		
:ShearZn	-- 1		
:Fault	-- 0		
:Vein	-- 0		

Schmidt (L.H)

Depth : 3.191 - 15.833 m

BH37.STR

<<JOINT>>



Number of Data:45/65

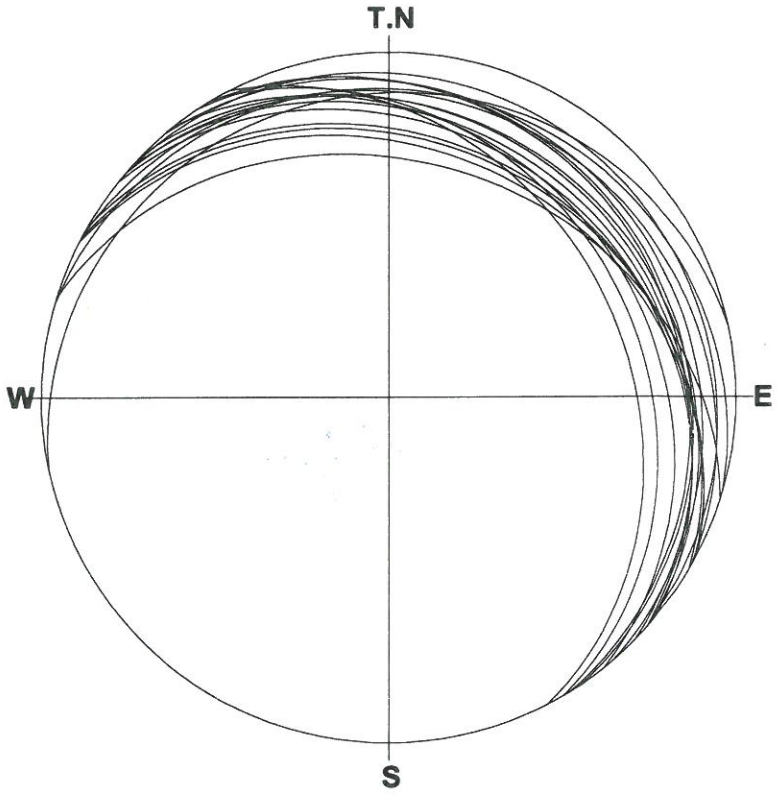
1 : 160/38(1)	**6 : 203/63(6)**
2 : 038/45(2)	**7 : 174/31(8)**
3 : 049/56(3)	**8 : 056/82(9)**
4 : 159/68(4)	**9 : 331/33(10)**
5 : 047/29(5)	**10 : 347/57(11)**

Schmidt (L.H)

Depth : 3.191 - 15.833 m

BH37.STR

<<PARTING>>



Number of Data:19/65

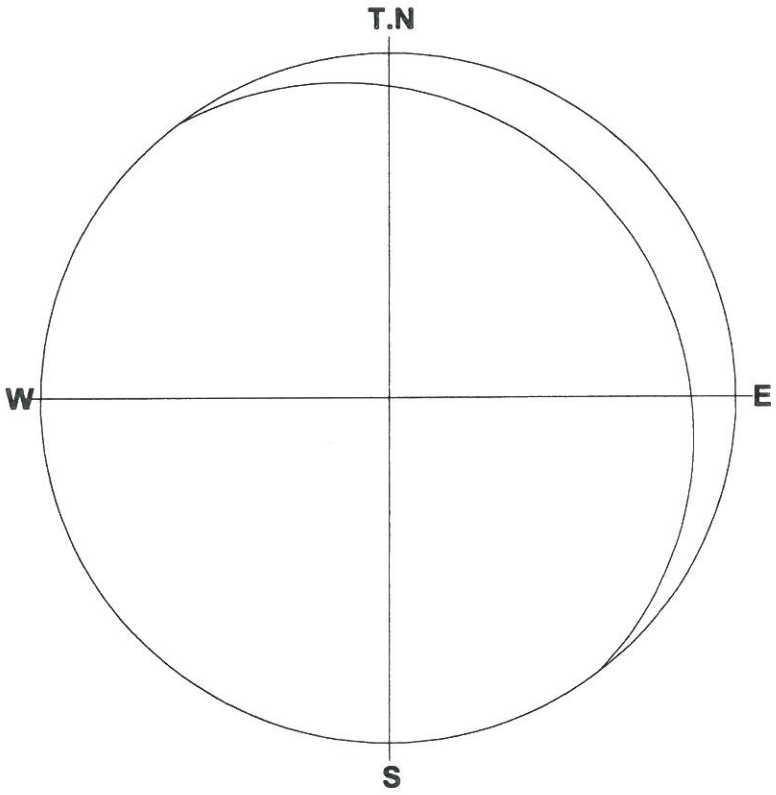
1 : 029/14(7)	**6 : 052/25(26)**
2 : 042/22(19)	**7 : 016/12(28)**
3 : 057/16(21)	**8 : 027/29(33)**
4 : 063/32(23)	**9 : 017/32(35)**
5 : 050/14(25)	**10 : 060/28(36)**

Schmidt (L.H)

Depth : 3.191 - 15.833 m

BH37.STR

<<SHEAR ZONE>>



Number of Data:1/65

1 : 053/17(32)

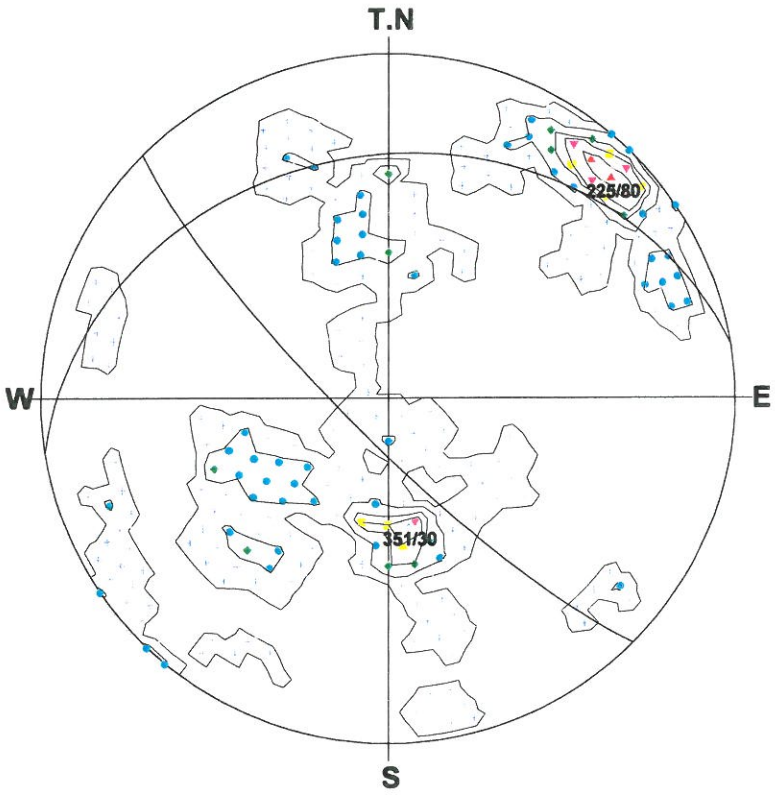
Schmidt (L.H)

Depth : 3.191 - 15.833 m

BH37.STR

<<JOINT>>

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



Number of Data : 45

<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 ☐

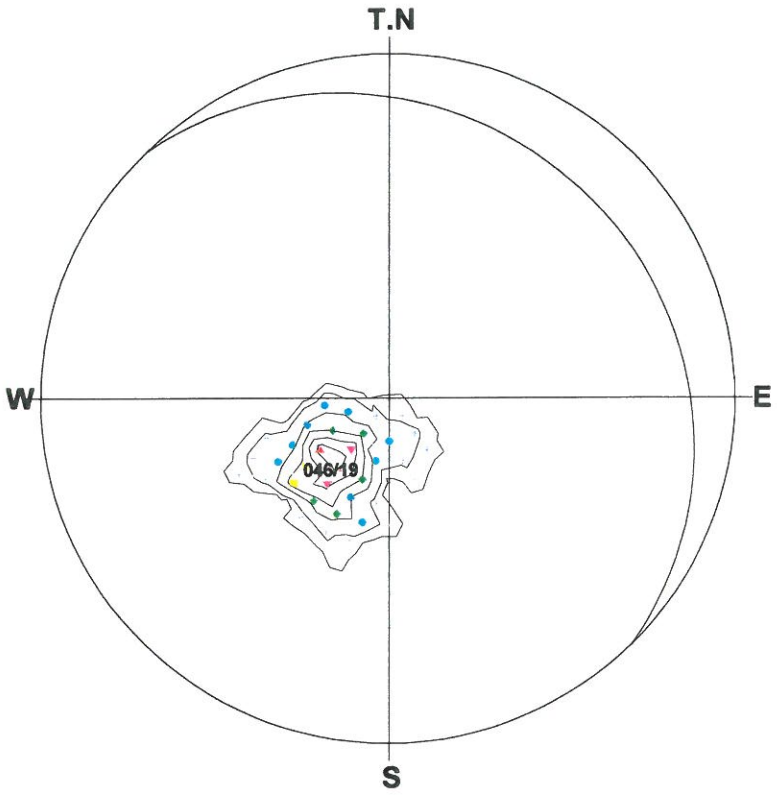
Schmidt (L.H)

Depth : 3.191 - 15.833 m

BH37.STR

<<PARTING>>

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



Number of Data : 19

<Legend> Sym. (%)	
▲	57
▼	46 - 57
■	34 - 46
◆	23 - 34
●	11 - 23
···	0 - 11

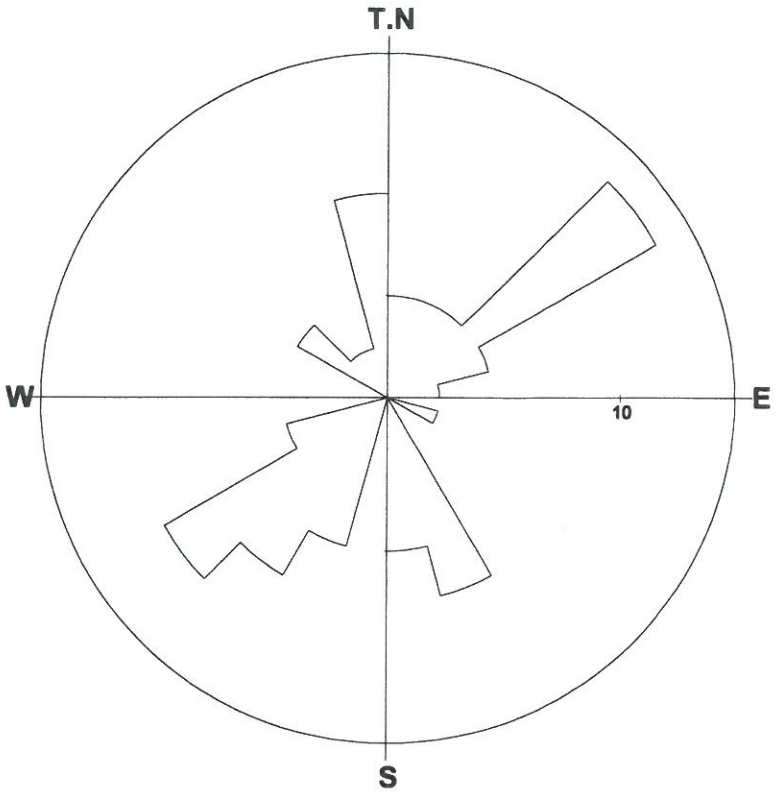
Contour Value (%)	
Contour 1 :	0
Contour 2 :	11
Contour 3 :	23
Contour 4 :	34
Contour 5 :	46
Contour 6 :	57

Schmidt (L.H)

Depth : 3.191 - 15.833 m

BH37.STR

<<JOINT>>



Number of Data : 45/65

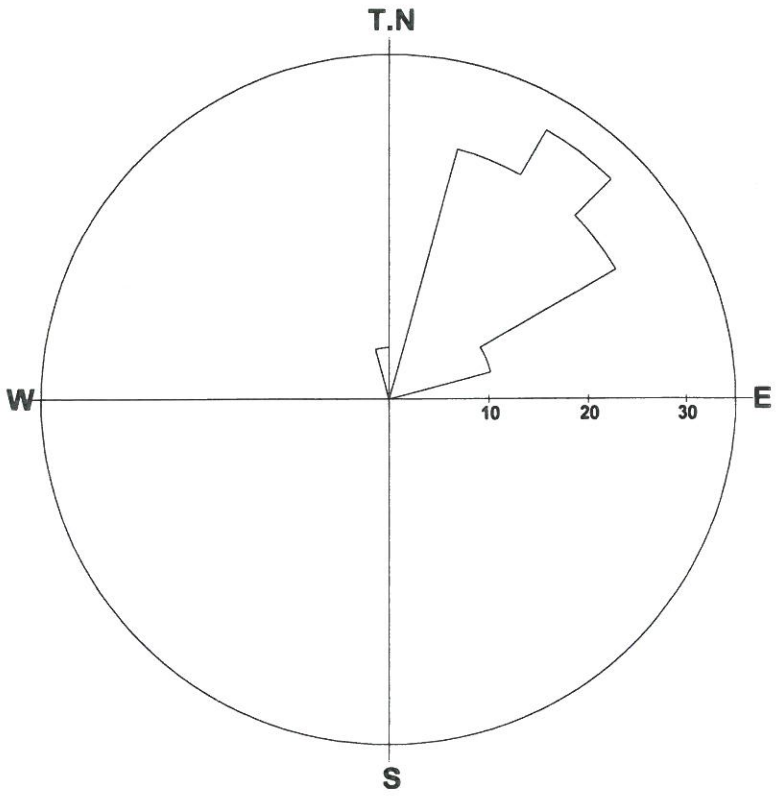
Max : 13.3% **Grouping Angle : 15 deg**

Dir	%	Dir	%	Dir	%
0-	4	135-	0	270-	0
15-	4	150-	9	285-	0
30-	4	165-	7	300-	4
45-	13	180-	0	315-	2
60-	4	195-	7	330-	2
75-	2	210-	9	345-	9
90-	0	225-	11		
105-	2	240-	4		
120-	0	255-	0		

Depth : 3.191 - 15.833 m

BH37.STR

<<PARTING>>



Number of Data : 19/65

Max : 31.6%

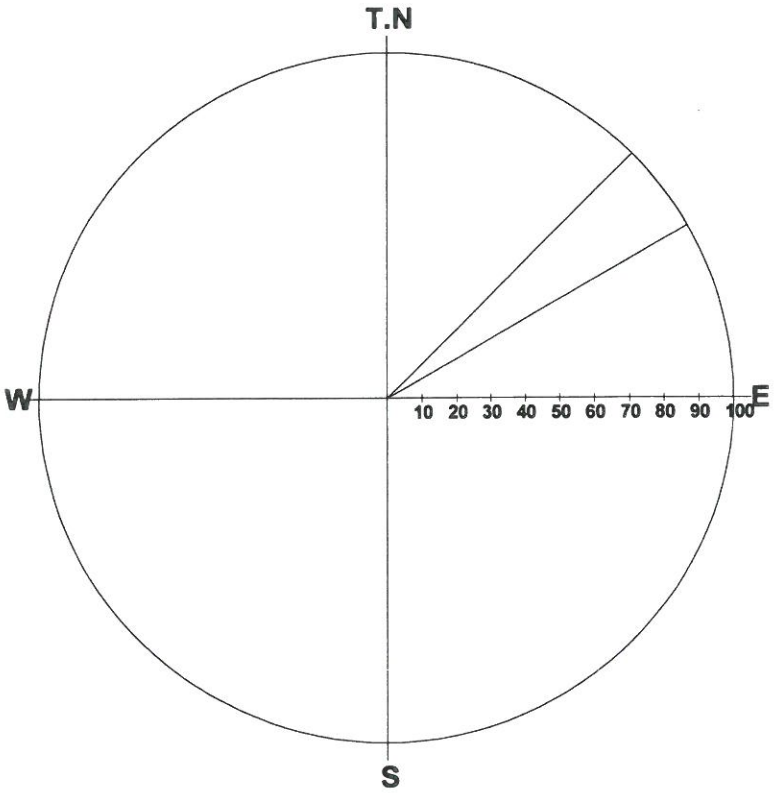
Grouping Angle : 15 deg

Dir	%	Dir	%	Dir	%
0-	0	135-	0	270-	0
15-	26	150-	0	285-	0
30-	32	165-	0	300-	0
45-	26	180-	0	315-	0
60-	11	195-	0	330-	0
75-	0	210-	0	345-	5
90-	0	225-	0		
105-	0	240-	0		
120-	0	255-	0		

Depth : 3.191 - 15.833 m

BH37.STR

<<SHEAR ZONE>>



Number of Data : 1/65

Max : 100.0%

Grouping Angle : 15 deg

Dir	%	Dir	%	Dir	%
0-	0	135-	0	270-	0
15-	0	150-	0	285-	0
30-	0	165-	0	300-	0
45-	100	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 : 3.191 - 15.833 m

Title: BH37.STR
Comment: JOINT
Depth: 3.191 - 15.833 m
Aperture: 0.3 - 18.0 mm

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

2009/ 9/ 2

Elevation: 0.000m
Water Level: 0.000m

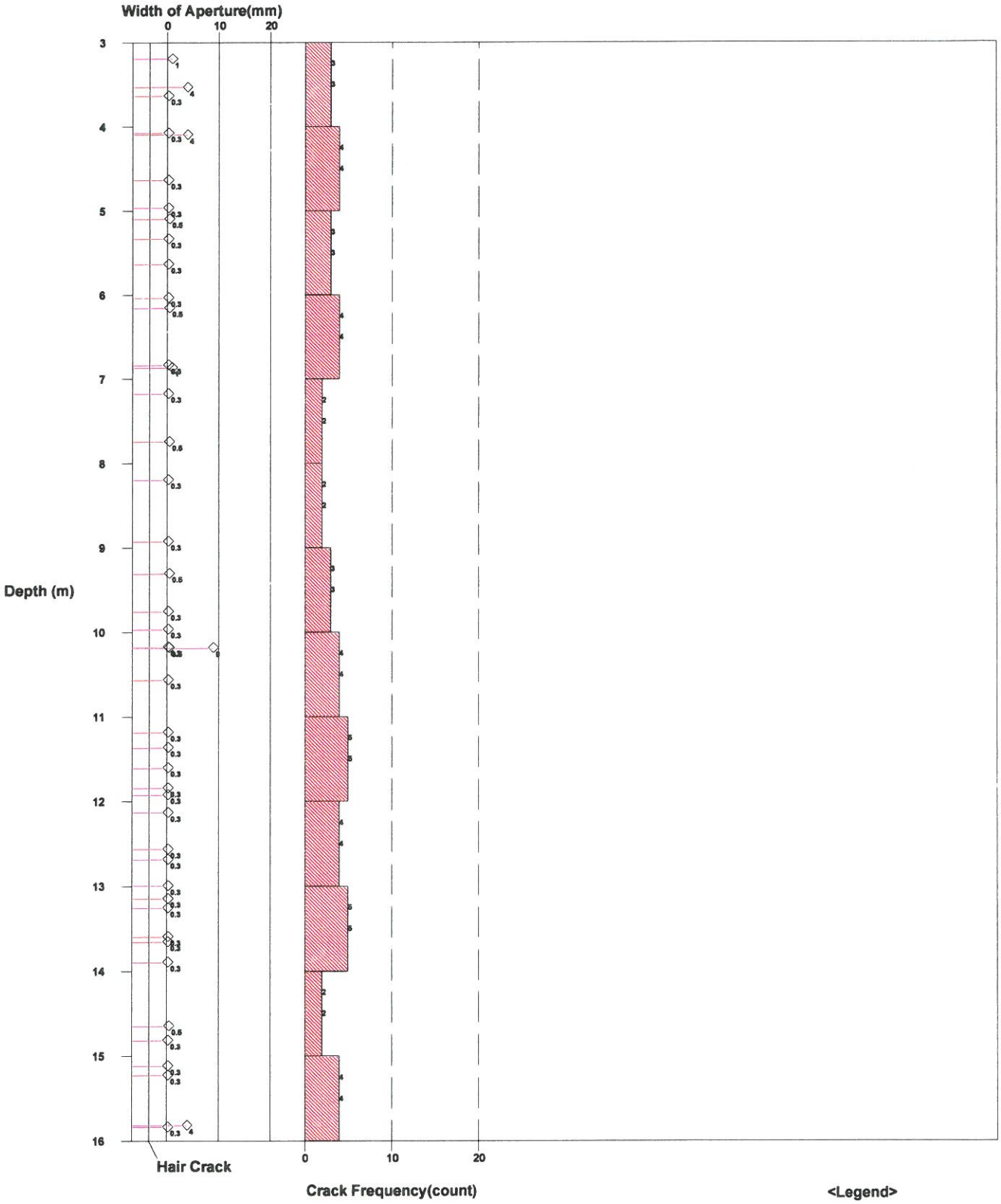


Fig. Rock Mass Condition Graph

Title: BH37.STR
Comment: PARTING
Depth: 3.191 - 15.833 m
Aperture: 0.3 - 18.0 mm

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

2009/ 9/ 2

Elevation: 0.000m
Water Level: 0.000m

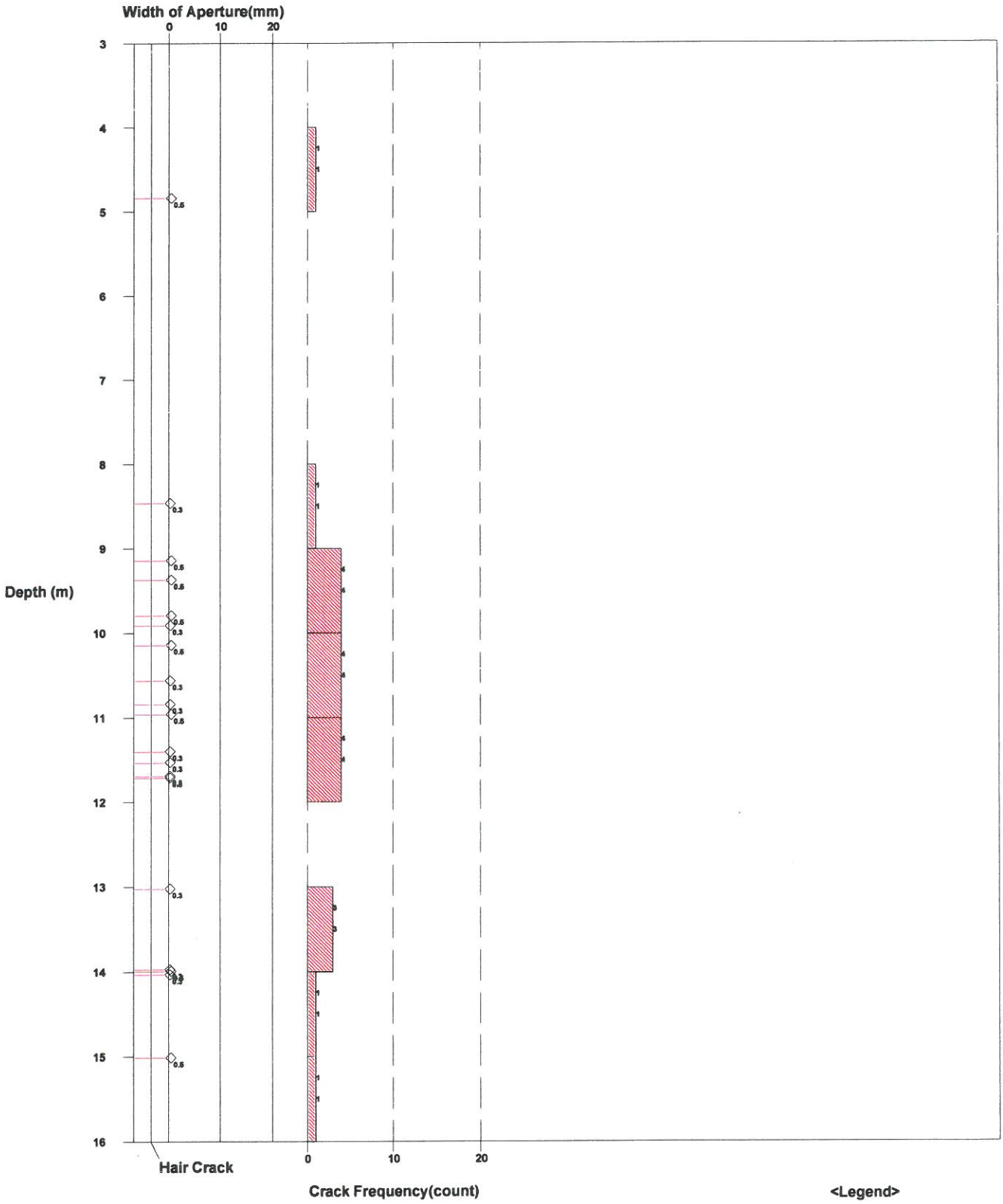


Fig. Rock Mass Condition Graph

Title: BH37.STR
Comment: SHEAR ZONE
Depth: 3.191 - 15.833 m
Aperture: 0.3 - 18.0 mm

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

2009/ 9/ 2

Elevation: 0.000m
Water Level: 0.000m

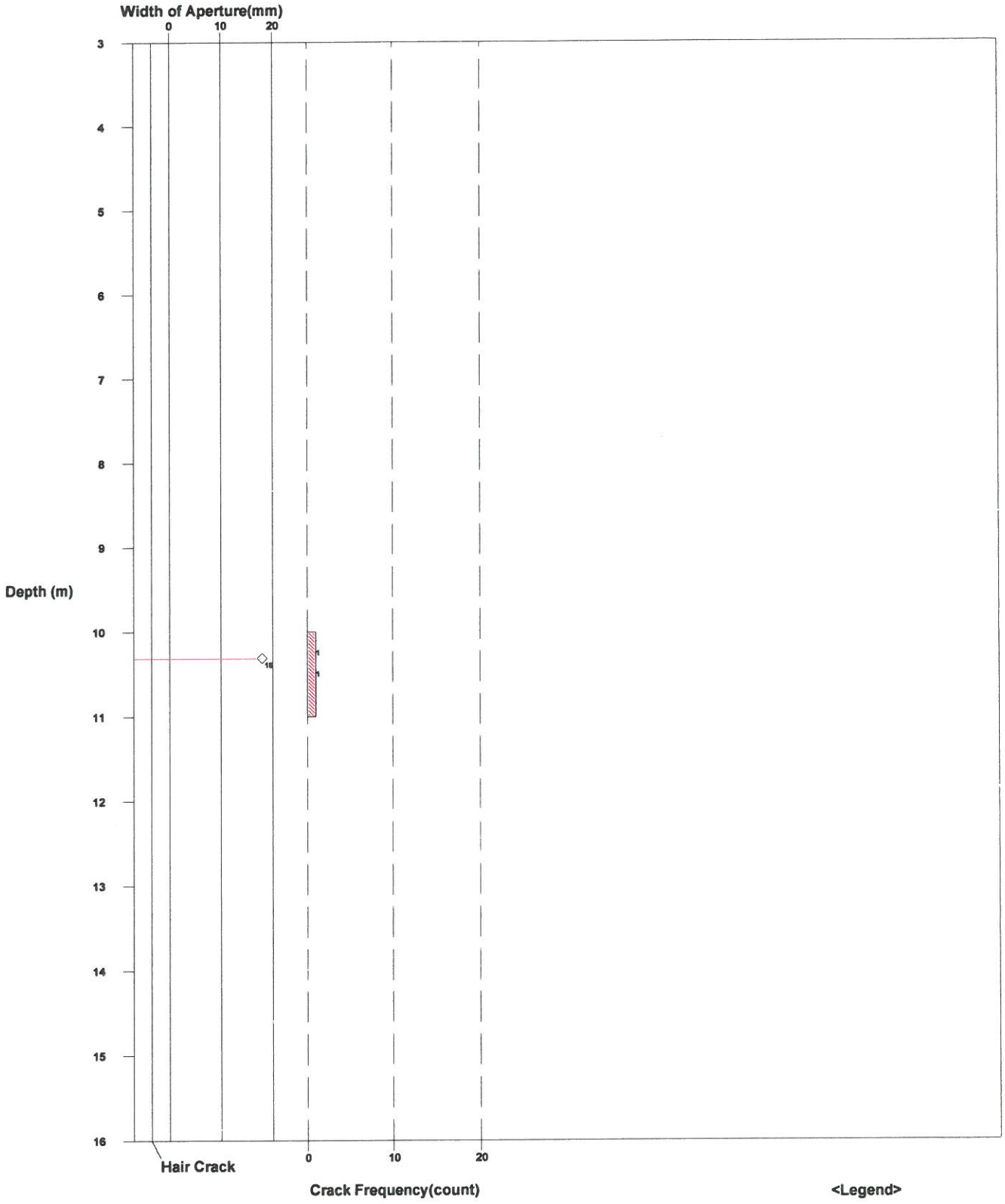
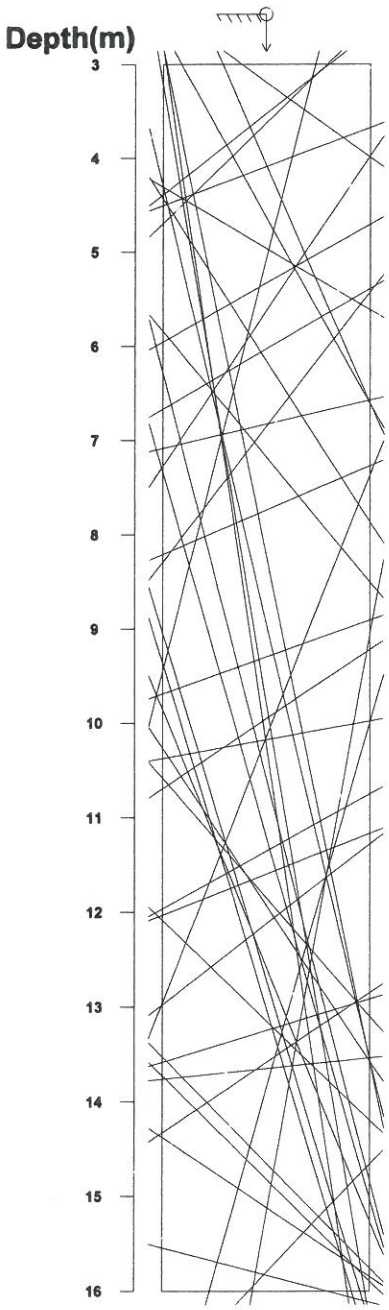


Fig. Rock Mass Condition Graph

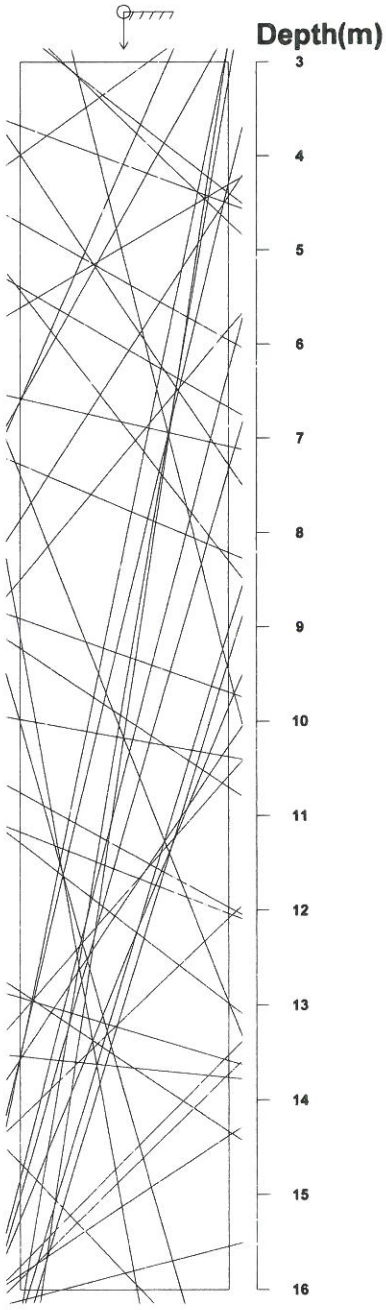
Title: BH37.STR
Comment: JOINT
Depth: 3.191 - 15.833 m
Aperture: 0.3 - 18.0 mm

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

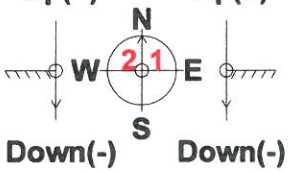
View Point 2
Profile of Apparent Borehole



View Point 1
Profile of Apparent Borehole



View Point2 View Point1
Up(+) Up(+)



Down(-) Down(-)

Direction: 0 deg
Inclination: Vertical(Down)

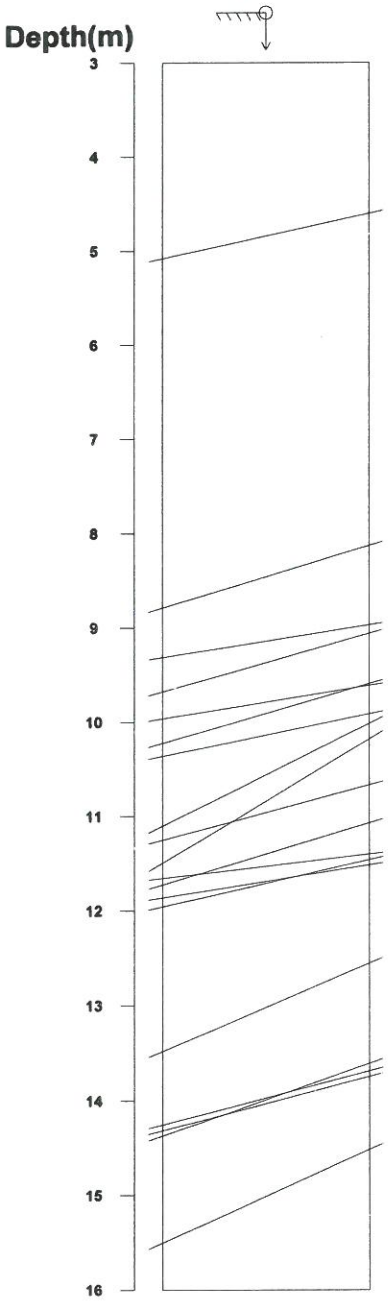
<Legend>
Entrance G.L
Bottom

Fig. Apparent Dip

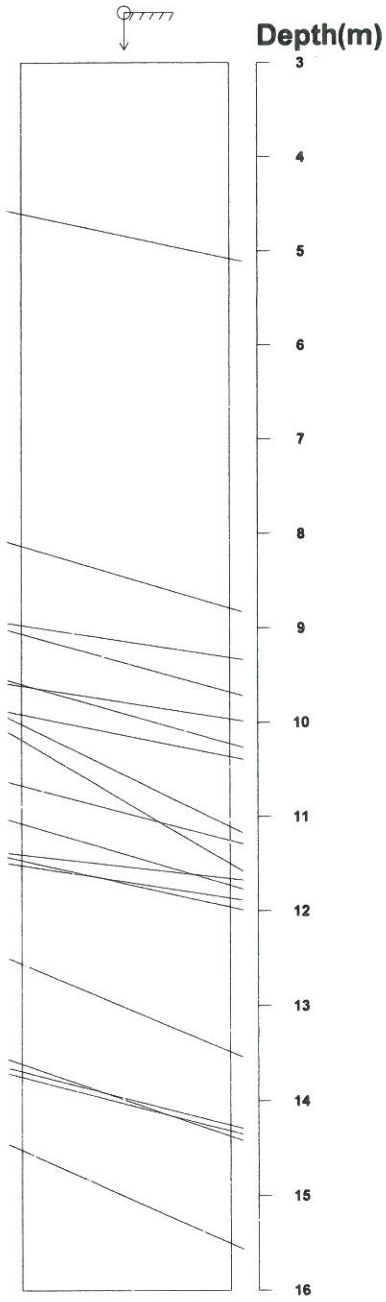
Title: BH37.STR
Comment: PARTING
Depth: 3.191 - 15.833 m
Aperture: 0.3 - 18.0 mm

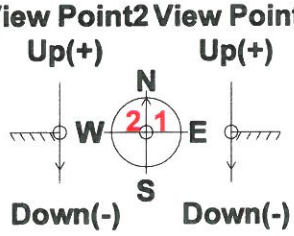
Sort: 1/ 7
Form: 8/ 8
Condition: 11/11
Remark: 11/11

View Point 2
Profile of Apparent Borehole



View Point 1
Profile of Apparent Borehole





Direction: 0 deg
Inclination: Vertical(Down)

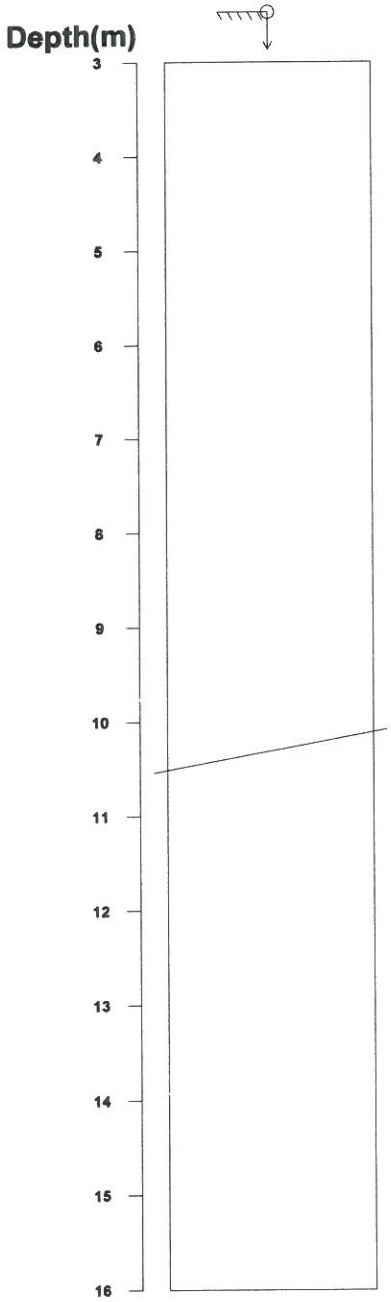
<Legend>
Entrance G.L
Bottom

Fig. Apparent Dip

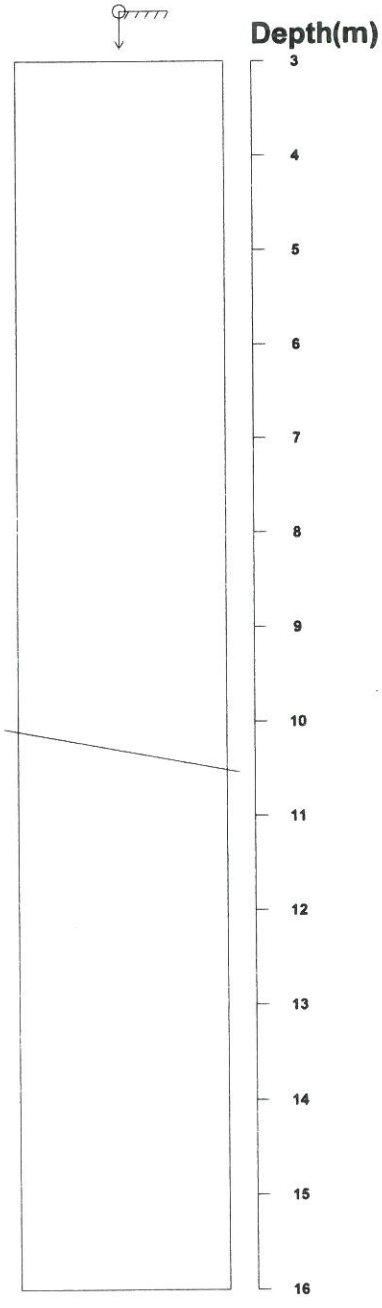
Title: BH37.STR
Comment: SHEAR ZONE
Depth: 3.191 - 15.833 m
Aperture: 0.3 - 18.0 mm

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

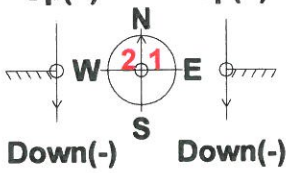
View Point 2
Profile of Apparent Borehole



View Point 1
Profile of Apparent Borehole



View Point2 View Point1
Up(+) Up(+)



Down(-) Down(-)

Direction: 0 deg
Inclination: Vertical(Down)

<Legend>
Entrance G.L
Bottom

Fig. Apparent Dip