Soil Surveys Engineering Pty. Limited
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BOREHOLE RECORD SHEET

Location Number: BH 320
Project Number: 110-12936
Project Name: Cross River Rail
Location: Brisbane
Client: AECOM
Date: 15/02/2012

Easting: 502052 Northing: 6956698 RL: 6.46 m
Logger: SO/CB Operator: SO Machine: Scout

Depth	Description	Weathering	Rec (%)	RQD	Samples and Remarks
0.00	FILL Clayey Sandy GRAVEL (GP) Dense, fine to coarse size, brown, fine to coarse grained sand, low to medium plasticity fines, moist.				
0.60	NATURAL Sandy CLAY (CH) Very stiff, high plasticity, brown red and orange, fine to medium grained sand, moist.				U50 PP=270
2.60	Sandy CLAY (CI) / Clayey SAND (SC) medium dense, fine to medium grained, light grey, low to medium plasticity fines, moist.				SPT 12, 12, 12 N=24
					SPT 17, 18, 20 N=38
5.80	SANDSTONE (DW) Weak, fine to medium grained				SPT 60/60mm N=R
6.10	SANDSTONE, fine to medium grained, light grey mottled orange, massively bedded, closely to widely spaced fractures, with trace carbonaceous laminae from 7.60m.	DW	100	100	6.53 m; DI, **5°**, P, R, O, W 6.63 m; J, **10°,** T, R, O, W 6.75 m; J, **5°,** S, R, O, L 6.88 m; J, **10°,** S, R, O, Z
		SW			
8.06	Interbedded SANDSTONE and CONGLOMERATE, Sandstone is fine grained, Conglomerate is coarse grained of f-m gravel, with trace fine cobbles, thinly bedded with widely spaced fractures.				
8.59	SANDSTONE, fine to medium grained, light grey, massively bedded, with widely spaced fractures, with trace carbonaceous laminae , with a band of coarse grained sandstone and fine sized gravel from 11.87m, 12.08m,and 12.78m to 13.15m	FR	100	100	8.84 m; DI, **5°**, P, R, O, Z
10.00					

Drilling Method: TC, WB, RR, NMLC, Casing

Strength Estimated: RS VW W MS S VS ES
Defect Spacing: 20 60 200 600

Comments:
1) Groundwater not observed. 2) ATV survey carried out.
3) Monitoring well installed to 25.5m on completion.

Water First Noted Water Steady Level

Defects - 1.54m : F,60°,P,R,O,C
Depth (m) Type Dip (deg) Planarity Roughness Aperature Infill
B - Bedding C - Curvilinear L - Slickensides C - Closed C - Clay
C - Clay seam D - Discontinuous P - Polished F - Filled F - Iron Oxide
F - Foliation P - Planar R - Rough N - Clean K - Calcite
H - Schistosity S - Subplanar S - Smooth O - Open L - Limonite
J - Joint T - Stepped V - Very rough S - Stain Q - Quartz
L - Cleavage U - Undulating S- Secondary mineral
R - Fracture U - Unidentified mineral
S - Shear zone W - Weathered rock
T - Contact X - Carbonaceous
V - Vein Z - Clean
Z - Decomposed Zone
DI - Drilling Induced break

Weathering Grades
RS - Residual Soil
XW - Extremely weathered
DW - Distinctly weathered
SW - Slightly weathered
FR - Fresh

Rock Strength
VW - Very weak
W - Weak
MS - Medium strong
S - Strong
VS - Very strong
ES - Extremely strong

Samples
U50
SPT
Disturbed Sample

Approved:
Date:

SOIL SURVEYS 00 LIBRARY 2012-05.GLB Log SOIL SURVEY BOREHOLE LOG 111-12936 NEW.GPJ <<DrawingFile>> 21/05/2012 14:33 8.30.002 Developed by Datgel

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BOREHOLE RECORD SHEET

Location Number: BH 320

Project Number: 110-12936
Project Name: Cross River Rail
Location: Brisbane
Client: AECOM
Date: 15/02/2012

Easting: 502052 Northing: 6956698 RL: 6.46 m
Logger: SO/CB Operator: SO Machine: Scout

Drilling Method (TC / WB / RR / NMLC / Casing)	Depth	Graphic	Description	Weathering	Strength (Estimated)	Defect Spacing	Rec (%)	RQD	Samples and Remarks
NMLC	11.0		SANDSTONE, fine to medium grained, light grey, massively bedded, with widely spaced fractures, with trace carbonaceous laminae , with a band of coarse grained sandstone and fine sized gravel from 11.87m, 12.08m,and 12.78m to 13.15m *(continued)*	FR			100	100	10.21 m; DI, **15°,** S, R, O, X 10.80 m; J, **10°,** S, R, O, X 10.91 m; J, **5°,** P, S, O, Z 11.12 m; J, **5°,** P, S, O, X 11.45 m; J, **5°,** S, S, O, X
	12.0								
	13.0								12.75 m; J, **20°,** P, R, O, X 12.88 m; J, **40°,** S, V, O, Z
	13.15		SANDSTONE, fine to coarse grained, light grey, massively bedded, widely spaced fractures, with some subrounded fine to medium size gravel clasts, with a coarse grained sandstone/gravel band from 14.07m to 14.92m.				100	96	
	14.0								14.09 m; J, **5°,** U, R, O, C
	14.92								
	15.0		SANDSTONE, fine to medium grained, light grey, massively bedded, widely spaced fractures, with fine to medium size gravel band from 15.70m to 15.90m, with coal band from 15.90m to 16.00m and non- intact gravel band from 16.15m to 16.28m.						15.10 m; DI, **5°,** U, V, O, Z 15.23 m; DI, **5°,** S, R, O, Z
	16.0			XW - DW			100	79	
				FR					16.50 m; J, **70°,** S, R, O, Z
	17.0								
	17.32		SANDSTONE, fine grained, light grey, laminated, very closely to closely spaced fractures.						17.30-17.73 m; B, **15°,** P, R, O, Z
	18.0								
	19.0						100	92	18.00-19.50 m; DI, **5°,** P, R, O, Z
	19.50		SANDSTONE, fine to medium grained, light grey, massively bedded, widely spaced fractures, with a dark grey siltstone band from 20.19m to 20.27m.						
	20.0								

Comments:
1) Groundwater not observed. 2) ATV survey carried out.
3) Monitoring well installed to 25.5m on completion.

Water First Noted Water Steady Level

Defects - 1.54m : F,60°,P,R,O,C

Depth (m) | Type: B - Bedding, C - Clay seam, F - Foliation, H - Schistosity, J - Joint, L - Cleavage, R - Fracture, S - Shear zone, T - Contact, V - Vein, Z - Decomposed Zone, DI - Drilling Induced break | Dip (deg) | Planarity: C - Curvilinear, D - Discontinuous, P - Planar, S - Subplanar, T - Stepped, U - Undulating | Roughness: L - Slickensides, P - Polished, R - Rough, S - Smooth, V - Very rough | Aperature: C - Closed, F - Filled, N - Clean, O - Open, S - Stain | Infill: C - Clay, F - Iron Oxide, K - Calcite, L - Limonite, Q - Quartz, S- Secondary mineral, U - Unidentified mineral, W - Weathered rock, X - Carbonaceous, Z - Clean

Weathering Grades
RS - Residual Soil
XW - Extremely weathered
DW - Distinctly weathered
SW - Slightly weathered
FR - Fresh

Rock Strength
VW - Very weak
W - Weak
MS - Medium strong
S - Strong
VS - Very strong
ES - Extremely strong

Samples
U50
SPT
Disturbed Sample

Approved:
Date:

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BOREHOLE RECORD SHEET

Location Number: BH 320

Project Number: 110-12936
Project Name: Cross River Rail
Location: Brisbane
Client: AECOM
Date: 15/02/2012

Easting: 502052 Northing: 6956698 RL: 6.46 m
Logger: SO/CB Operator: SO Machine: Scout

Depth	Graphic	Description	Weathering	Strength (Estimated)	Defect Spacing	Rec (%)	RQD	Samples and Remarks
		SANDSTONE, fine to medium grained, light grey, massively bedded, widely spaced fractures, with a dark grey siltstone band from 20.19m to 20.27m. *(continued)*	FR			100	92	20.12 m; J, **10°,** P, R, O, Coal
21.74		Interlaminated SANDSTONE and SILTSTONE, fine grained, alternating light grey and dark grey, thinly laminated, widely spaced fractures.				100	93	22.86 m; J, **85°,** P, R, O, Z
24.00		SANDSTONE, fine grained, light grey, granular, widely spaced fractures, with some interlaminations of siltstone to 25.50m.				100	88	23.62 m; J, **80°,** P, C, C 24.23 m; J, **5°,** P, R, O, Z 24.59 m; J, **5°,** P, R, O, Z 24.84 m; J, **10°,** P, R, O, Z 25.15 m; J, **15°,** P, R, O, X 25.33 m; DI, **5°,** P, S, O, Z 25.43 m; Z, **5°,** W 26.14 m; J, **10°,** S, R, O, Coal
27.50		Interlaminated SILTSTONE and MUDSTONE, fine grained, alternating dark grey and light brown, laminated, with closely spaced fractures.	SW - FR			100	67	27.31 m; J, **15°,** S, R, O, Coal 27.54 m; J, **50°,** P, S, O, Z 27.45-27.80 m; Z, **3°,** W 28.11 m; J, **5°,** P, R, O, Z 28.29 m; J, **5°,** P, R, O, Z 28.57 m; J, **10°,** P, R, O, Z
						100	78	

Drilling Method: TC, WB, RR, NMLC, Casing

Comments:
1) Groundwater not observed. 2) ATV survey carried out.
3) Monitoring well installed to 25.5m on completion.

Water First Noted Water Steady Level

Defects - 1.54m : F,60°,P,R,O,C
Depth (m) | Type: B - Bedding, C - Clay seam, F - Foliation, H - Schistosity, J - Joint, L - Cleavage, R - Fracture, S - Shear zone, T - Contact, V - Vein, Z - Decomposed Zone, DI - Drilling Induced break | Dip (deg) | Planarity: C - Curvilinear, D - Discontinuous, P - Planar, S - Subplanar, T - Stepped, U - Undulating | Roughness: L - Slickensides, P - Polished, R - Rough, S - Smooth, V - Very rough | Aperature: C - Closed, F - Filled, N - Clean, O - Open, S - Stain | Infill: C - Clay, F - Iron Oxide, K - Calcite, L - Limonite, Q - Quartz, S- Secondary mineral, U - Unidentified mineral, W - Weathered rock, X - Carbonaceous, Z - Clean

Weathering Grades
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XW - Extremely weathered
DW - Distinctly weathered
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FR - Fresh

Rock Strength
VW - Very weak
W - Weak
MS - Medium strong
S - Strong
VS - Very strong
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Samples
U50
SPT
Disturbed Sample

Approved:
Date:

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BOREHOLE RECORD SHEET

Location Number: BH 320

Project Number: 110-12936
Project Name: Cross River Rail
Location: Brisbane
Client: AECOM
Date: 15/02/2012

Easting: 502052 Northing: 6956698 RL: 6.46 m
Logger: SO/CB Operator: SO Machine: Scout

Depth	Description	Weathering	Strength (Estimated)	Defect Spacing	Rec (%)	RQD	Samples and Remarks
31.0	Interlaminated SILTSTONE and MUDSTONE, fine grained, alternating dark grey and light brown, laminated, with closely spaced fractures. *(continued)*	SW - FR	RS VW W MS S VS ES	20 60 200 600	100	78	
32.0							
33.0							
34.0					100	59	
35.0							30.00-39.00 m; DI, **8°,** P, S, O, Z
36.0							35.30 m; J, **85°,** P, R, O, Z
37.0					100	75	
38.0							
39.0		FR					38.25 m; J, **80°,** S, R, O, Z
40.0 40.00					100	100	

Drilling Method: TC WB RR NMLC Casing

Graphic

Comments:
1) Groundwater not observed. 2) ATV survey carried out.
3) Monitoring well installed to 25.5m on completion.

BOREHOLE BH 320 TERMINATED AT 40.00m

Water First Noted Water Steady Level

Depth (m) Type Dip (deg) Planarity Roughness Aperature Infill
B - Bedding C - Curvilinear L - Slickensides C - Closed C - Clay
C - Clay seam D - Discontinuous P - Polished F - Filled F - Iron Oxide
F - Foliation P - Planar R - Rough N - Clean K - Calcite
H - Schistosity S - Subplanar S - Smooth O - Open L - Limonite
J - Joint T - Stepped V - Very rough S - Stain Q - Quartz
L - Cleavage U - Undulating S- Secondary mineral
R - Fracture U - Unidentified mineral
S - Shear zone W - Weathered rock
T - Contact X - Carbonaceous
V - Vein Z - Clean
Z - Decomposed Zone
DI - Drilling Induced break

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Rock Strength
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W - Weak
MS - Medium strong
S - Strong
VS - Very strong
ES - Extremely strong

Samples
U50
SPT
Disturbed Sample

Approved:
Date:

SOIL SURVEYS

TITLE

AECOM
Brisbane
Cross River Rail
Core Photo - BH 320

DRAWN	DT	DATE	26/04/2012
CHECKED	CB	DATE	26/04/2012
SCALE	Not To Scale		A4
PROJECT No	110-12936	FIGURE No	1/2

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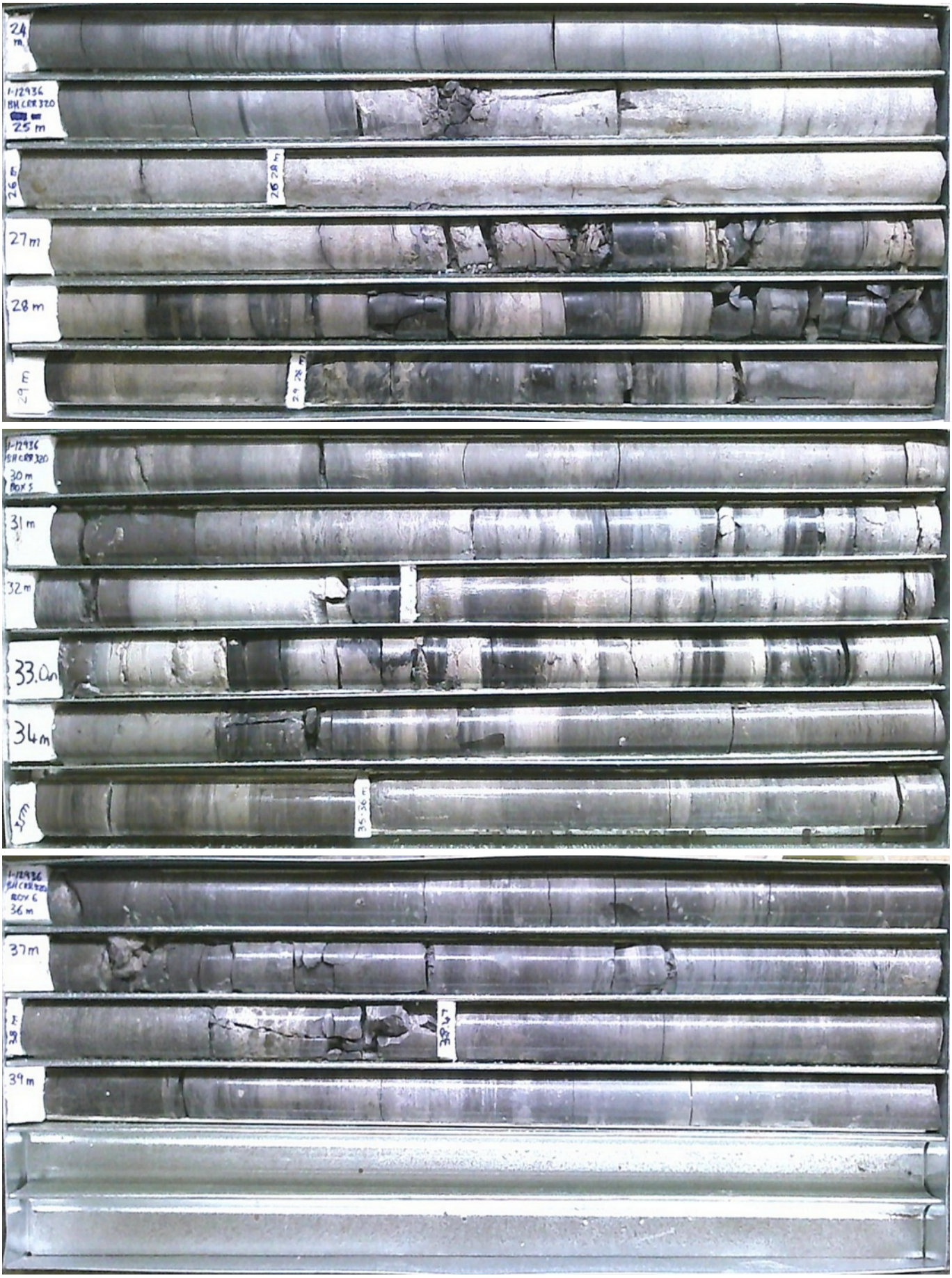


SOIL SURVEYS

TITLE	AECOM Brisbane Cross River Rail Core Photo - BH 320	DRAWN: DT	DATE: 26/04/2012
		CHECKED: CB	DATE: 26/04/2012
		SCALE: Not To Scale	A4
		PROJECT No: 110-12936	FIGURE No: 2/2

SOIL_SURVEYS_00 LIBRARY.GLB GrfcTbl DG PHOTO CORE PHOTO 4 PER PAGE 111-12936 NEW.GPJ <<DrawingFile>> 26/04/2012 14:47 8.2.856 Developed by Datgel

COMPOSITE LOG

BOREHOLE TELEVIEWER LOGS AND STRUCTURES

SOIL SURVEYS

SURTRON INTERPRETATION SERVICES

Hole Name	CRR320	**Drill Depth**	40m	**Grid Name**	N/A	**Logging Unit**	SV031
Field	Brisbane City	**Bit Size**	76mm	**Collar Easting**	N/A	**Engineer**	J.Mackay
Log Date	8th Mar,2012	**Casing Type**	PVC	**Collar Northing**	N/A	**Client Represent**	Julian Irons
Location	QLD	**Casing Depth**	N/A	**Reduced Level**	N/A	**Service Type**	Televiewer

TELEVIEWER LOGS

MF	Mag Field
GR	Gamma
INC	Tool Inclination (0 = Vertical Down)
AZIM	Tool Azimuth
TT	Travel Time Image
AMP	Amplitude Image
AMP - DYN1	Amplitude Image Dynamic 1

STRUCTURAL LOGS

DIPA	Structures Apparent (Sinusoid Presentation)
DIPT	Structures True (Tadpole Presentation)
PP - DIP	Polar Projection Dip (Schmidt)
RD - AZIM	Rose Diagram - Azimuth
CS	Cross Section

PROCESSED LOGS

CALI - ATV	Calliper Average from ATV	**RHI**	Rock Hardness Index

TADPOLES

- **Open Fracture**
- **Partially Open Fracture**
- **Closed Fracture**
- **Foliation/Banding/Bedding**

COMMENTS

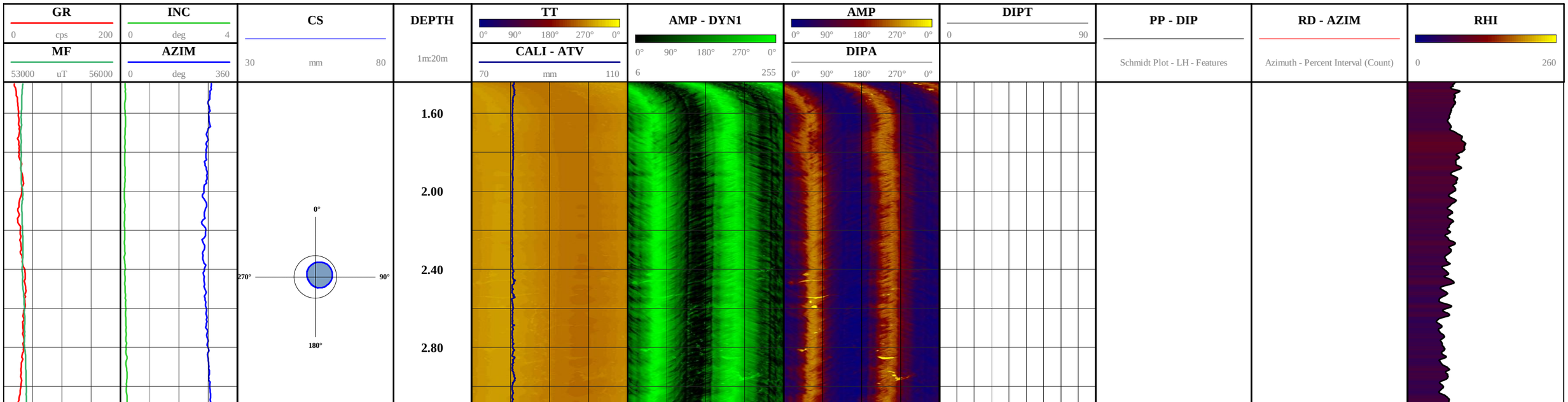
Image data is presented oriented to True North.

Magnetic Declination = 10.97 deg

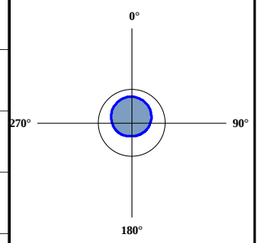
Cross Sections are plotted at 2m intervals: White : Tool Position, Light Blue : Nominal Hole Size and Blue : Actual Hole Size

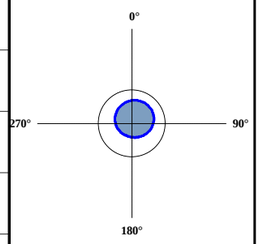
IMPORTANT NOTE

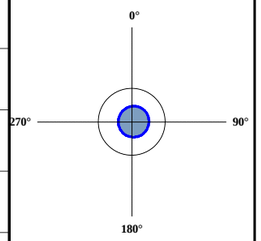
The following interpretations are opinions based upon inferences from borehole logs,
Surtron Technologies (Australia) Pty Ltd cannot and does not guarantee the correctness or accuracy of any interpretations.
Therefore Surtron Technologies (Australia) Pty Ltd shall not be liable or responsible for any loss, damage, cost or expense incurred or sustained by anyone resulting from any interpretations.

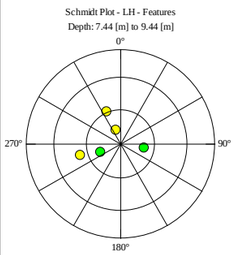


3.20
3.60
4.00
4.40
4.80
5.20
5.60
6.00
6.40
6.80
7.20
7.60
8.00
8.40
8.80









	Counts	Dip[deg]	Azi[deg]
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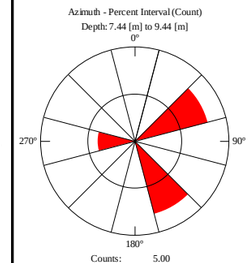
	2	5.50	347.41



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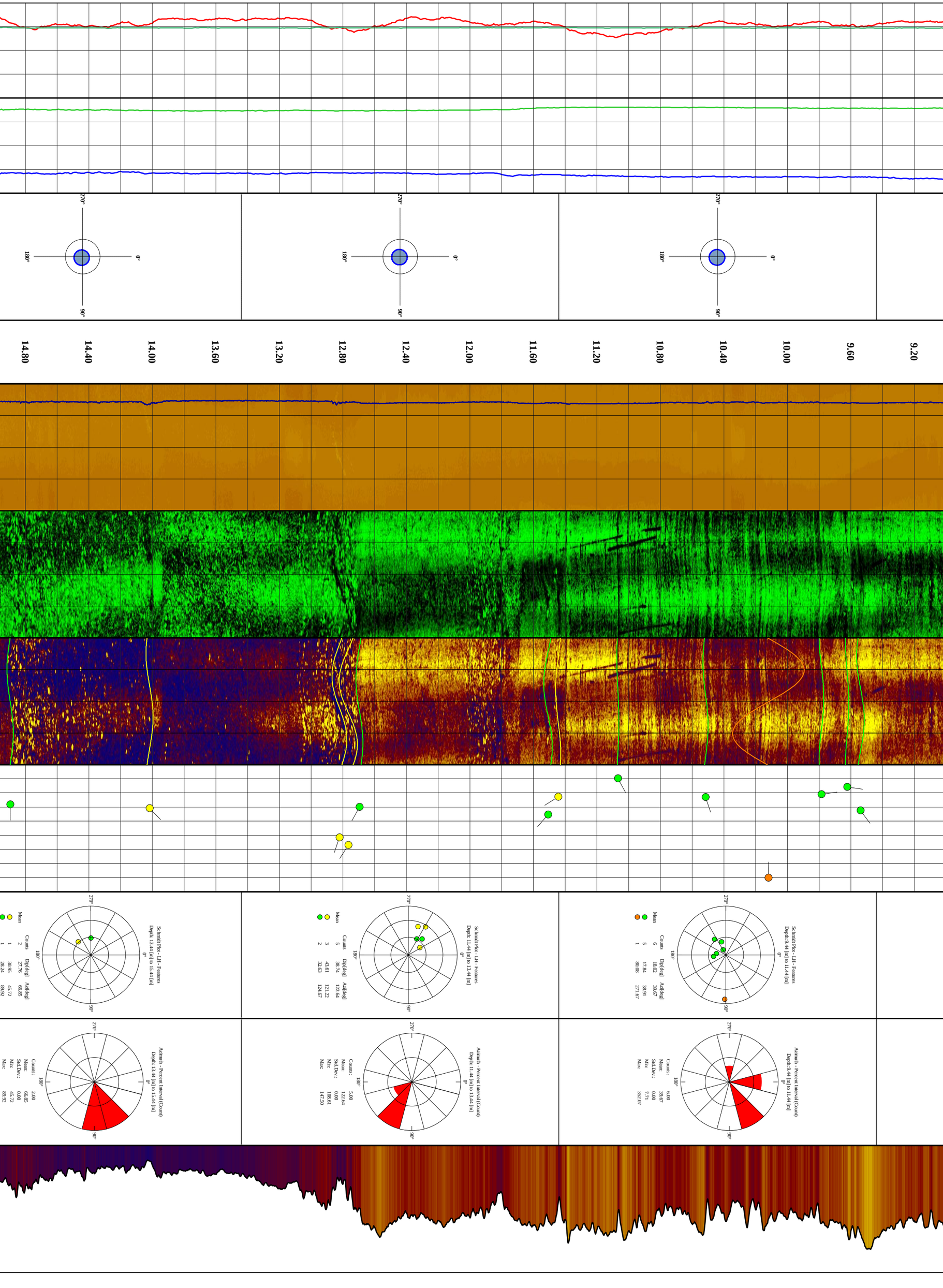
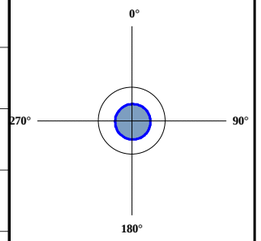
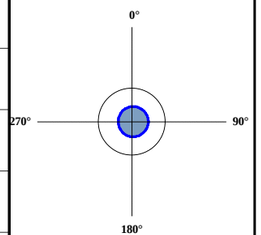
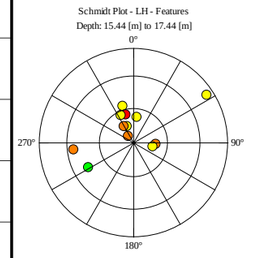
Mean:	113.25
Std.Dev.:	0.00
Min:	68.51
Max:	279.43



15.20
15.60
16.00
16.40
16.80
17.20
17.60
18.00
18.40
18.80
19.20
19.60
20.00
20.40
20.80







	Counts	Dip[deg]	Azi[deg]
Mean	12	14.28	153.23
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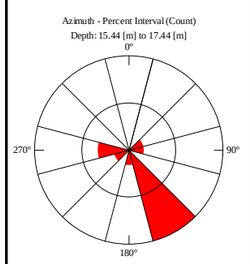
	6	20.81	185.01
	1	25.62	163.78
	4	10.41	117.70



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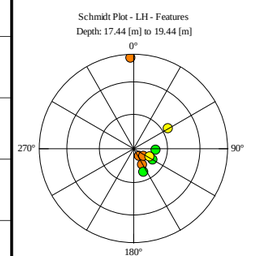
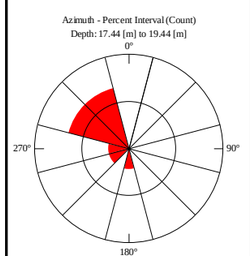
Mean:	153.23
Std.Dev.:	0.00
Min:	61.52
Max:	280.82



	Counts	Dip[deg]	Azi[deg]
Mean	9	15.33	297.04
	4	13.80	328.00
	3	18.24	304.97
	2	22.99	256.87



Counts:	9.00
Mean:	297.04
Std.Dev.:	0.00
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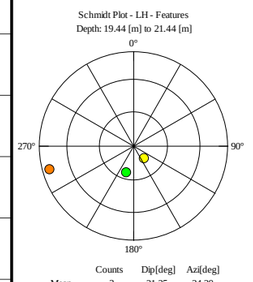
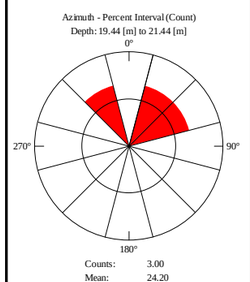
Max:	337.23

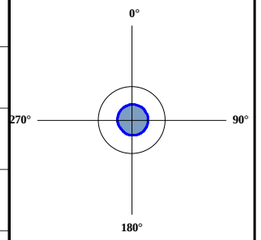


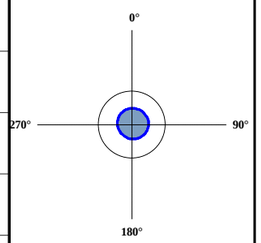
	Counts	Dip[deg]	Azi[deg]
Mean	3	21.25	24.20
	1	14.45	319.01

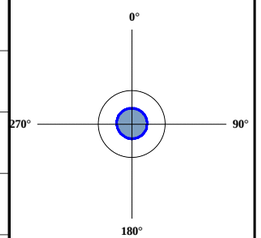


Counts:	3.00
Mean:	24.20
Std.Dev.:	0.00
Min:	15.96

21.20
21.60
22.00
22.40
22.80
23.20
23.60
24.00
24.40
24.80
25.20
25.60
26.00
26.40
26.80



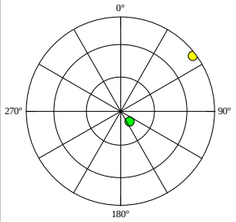




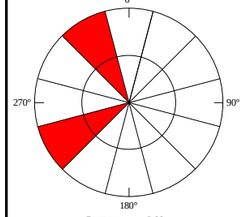
		Counts	Dip[deg]	Azi[deg]
		1	24.09	15.96
		1	82.19	74.44

	Counts	Dip[deg]	Azi[deg]
Mean	2	44.98	244.38
	1	12.23	319.23
	1	86.78	232.56

Schmidt Plot - LH - Features
Depth: 21.44 [m] to 23.44 [m]

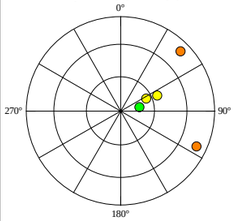


Azimuth - Percent Interval (Count)
Depth: 21.44 [m] to 23.44 [m]



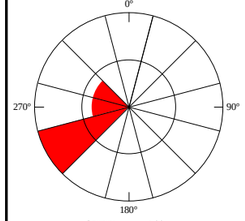
Counts:	2.00
Mean:	244.38
Std.Dev.:	0.00
Min:	232.56
Max:	319.23

Schmidt Plot - LH - Features
Depth: 23.44 [m] to 25.44 [m]



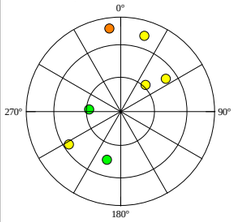
	Counts	Dip[deg]	Azi[deg]
Mean	5	39.02	252.89
	2	76.11	260.26
	1	16.90	257.94
	2	30.11	246.19

Azimuth - Percent Interval (Count)
Depth: 23.44 [m] to 25.44 [m]



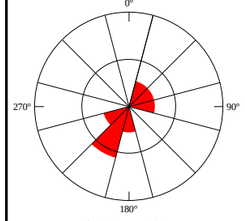
Counts:	5.00
Mean:	252.89
Std.Dev.:	0.00
Min:	225.52
Max:	295.12

Schmidt Plot - LH - Features
Depth: 25.44 [m] to 27.44 [m]

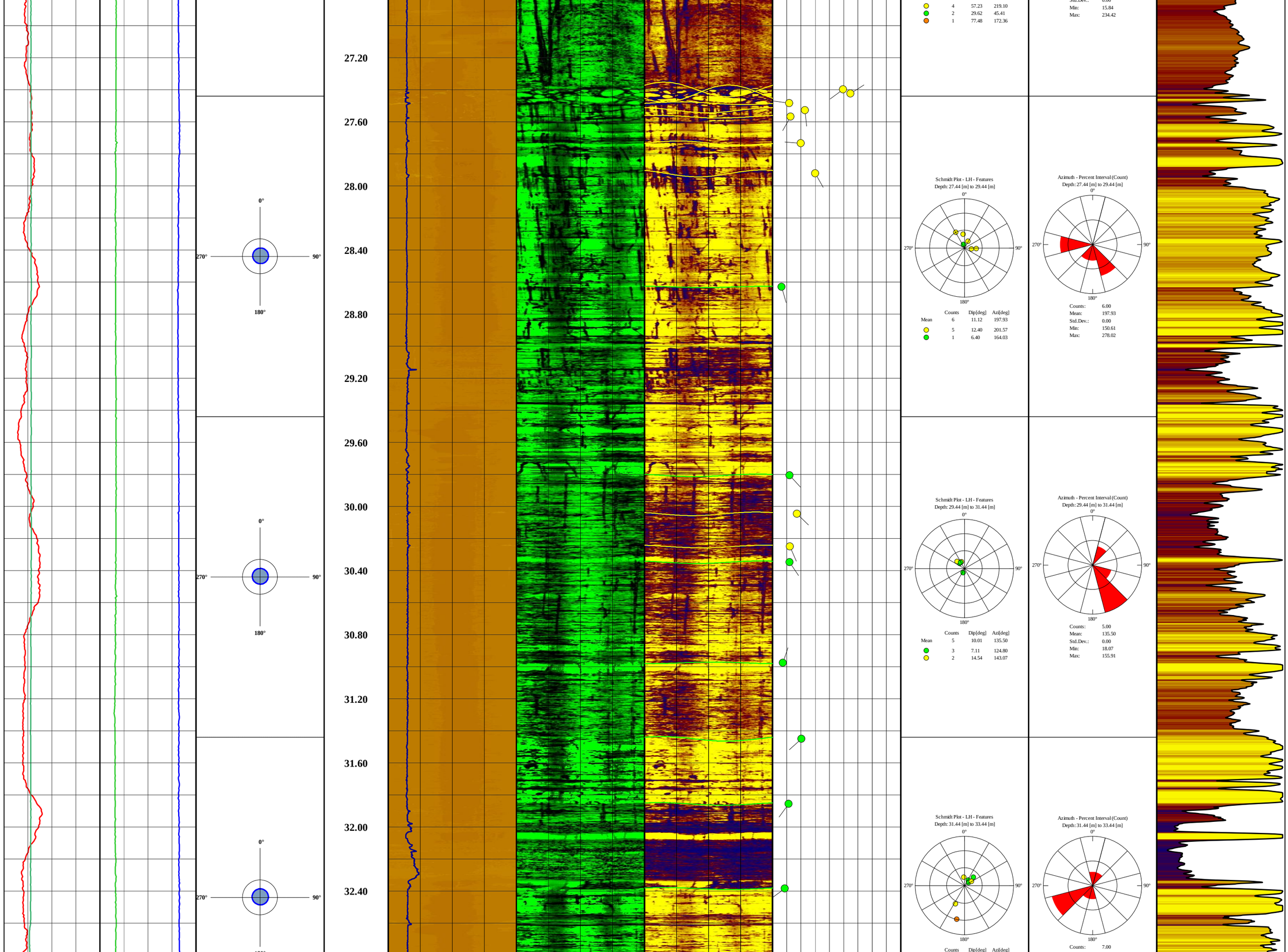


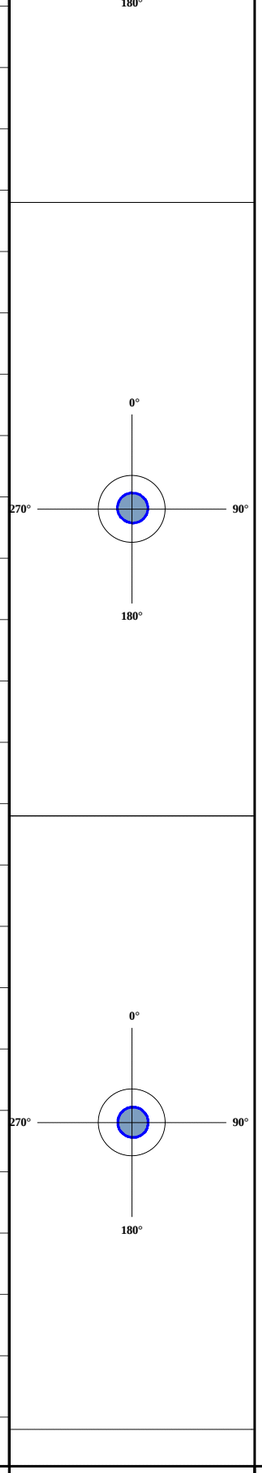
	Counts	Dip[deg]	Azi[deg]
Mean	7	60.76	202.77

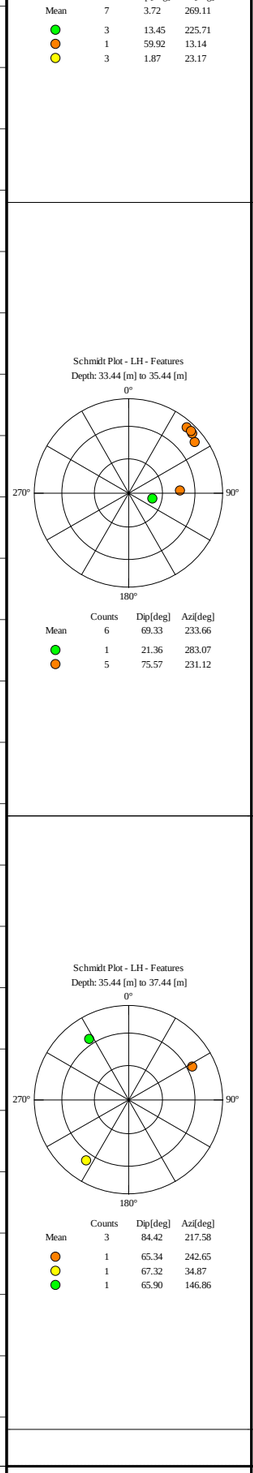
Azimuth - Percent Interval (Count)
Depth: 25.44 [m] to 27.44 [m]

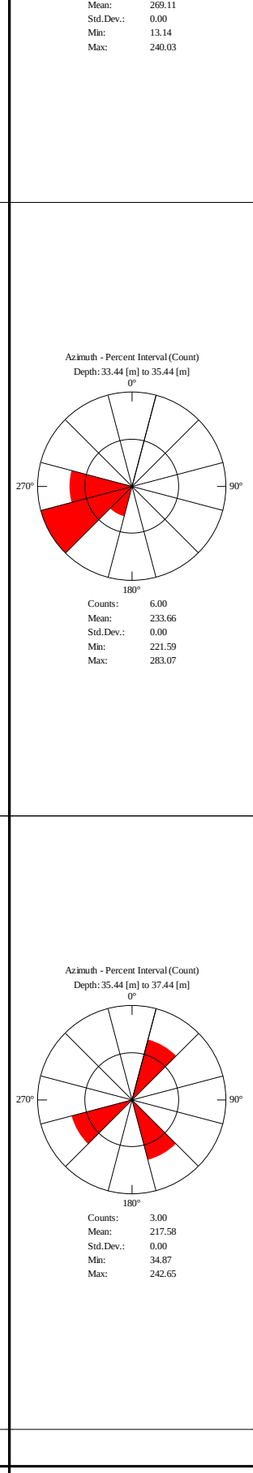


Counts:	7.00
Mean:	202.77









MF	AZIM	CS	DEPTH	CALI - ATV	AMP - DYN1	DIPA		PP - DIP	RD - AZIM	RHI
53000 uT 56000	0 deg 360			70 mm 110		0° 90° 180° 270° 0°				
GR	**INC**			**TT**		**AMP**	**DIPT**			
0 cps 200	0 deg 4	30 mm 80	1m:20m	0° 90° 180° 270° 0°	0° 90° 180° 270° 0° 6 255	0° 90° 180° 270° 0°	0 90	Schmidt Plot - LH - Features	Azimuth - Percent Interval (Count)	0 260

IN-SITU PACKER PERMEABILITY TEST RESULT

PROJECT: CRR
PROJECT No.: 110-12936
BH No.: 320
Test No.: 1
Date: 16/02/2012

Packer type: Double
Packer pressure: 2500kPa
Gauge pressures measured in: kPa
Tested by: CS

Vertical depth to:

Top of test section (m):	30.00
Base of test section (m):	31.50
Centre of test section(m):	30.75
Base of casing (m):	29.00
Ground water (m)	NR

Depth of centre of test section (m)	30.75
Length of test section (m):	1.50

Gauge Height above ground level	0.00
Hole Diameter in test section (mm	75

1st period	Time (mins)	0	5	10	15	Average
Gauge Pressure	Flow reading	1734.0	1734.0	1734.0	1734.0	Flow (l/min)
150	Water Take	0.00	0.00	0.00	0.00	0.000
2nd period	Time (mins)	0	5	10	15	Average
Gauge Pressure	Flow reading	1733.0	1733.0	1733.0	1733.0	Flow (l/min)
250	Water Take	0.00	0.00	0.00	0.00	0.000
3rd period	Time (mins)	0	5	10	15	Average
Gauge Pressure	Flow reading	1733.0	5.0	1733.6	1733.8	1733.800
400	Water Take	0.00	-1728.00	1728.60	0.20	0.053
4th period	Time (mins)	0	5	10	15	Average
Gauge Pressure	Flow reading	1735.2	1735.2	1735.4	1735.6	Flow (l/min)
600	Water Take	0.00	0.00	0.20	0.20	0.027
5th period	Time (mins)	0	5	10	15	Average
Gauge Pressure	Flow reading	1730.2	1730.2	1730.2	1730.2	Flow (l/min)
300	Water Take	0.00	0.00	0.00	0.00	0.000

Period	Flow (q) (l/min)	Gauge Press (kPa)	Gauge Press (m of water)	Friction Loss (m)*		Total Head (m)	Lugeon Value	Perm. (m/s)
				Basic	In extra rods			
1st	0.000	150.00	15.330	0.000	0.000	46.080	0.000	0.00E+00
2nd	0.000	250.00	25.550	0.000	0.000	56.300	0.000	0.00E+00
3rd	0.053	400.00	40.880	0.000	0.000	71.630	0.051	4.85E-09
4th	0.027	600.00	61.320	0.000	0.000	92.070	0.020	1.89E-09
5th	0.000	300.00	30.660	0.000	0.000	61.410	0.000	0.00E+00

*Where friction loss is assumed to be negligible.

N.B. Pressure Conversion: 1 bar = 100 kPa = 14.503 psi

SOIL SURVEYS ENGINEERING

IN-SITU PACKER PERMEABILITY TEST RESULT

PROJECT: CRR
PROJECT No.: 110-12936
BH No.: 320
Test No.: 2
Date: 16/02/2012

Packer type: Double
Packer pressure: 2500kPa
Gauge pressures measured in: kPa
Tested by: CS

Vertical depth to:

Top of test section (m):	19.00
Base of test section (m):	20.50
Centre of test section(m):	19.75
Base of casing (m):	18.00
Ground water (m)	NR

Depth of centre of test section (m)	19.75
Length of test section (m):	1.50

Gauge Height above ground level	0.00
Hole Diameter in test section (mm	75

1st period	Time (mins)	0	5	10	15	Average
Gauge Pressure	Flow reading	1735.0	1765.0	1788.8	1809.0	Flow (l/min)
100	Water Take	0.00	30.00	23.80	20.20	4.933
2nd period	Time (mins)	0	5	10	15	Average
Gauge Pressure	Flow reading	1820.0	1871.0	1897.8	1930.0	Flow (l/min)
200	Water Take	0.00	51.00	26.80	32.20	7.333
3rd period	Time (mins)	0	5	10	15	Average
Gauge Pressure	Flow reading	1961.0	2022.6	2077.0	2149.0	1733.800
300	Water Take	0.00	61.60	54.40	72.00	12.533
4th period	Time (mins)	0	5	10	15	Average
Gauge Pressure	Flow reading	2150.0	2197.7	2231.2	2276.0	Flow (l/min)
200	Water Take	0.00	47.70	33.50	44.80	8.400
5th period	Time (mins)	0	5	10	15	Average
Gauge Pressure	Flow reading	2276.0	2290.0	2308.0	2322.8	Flow (l/min)
100	Water Take	0.00	14.00	18.00	14.80	3.120

Period	Flow (q) (l/min)	Gauge Press (kPa)	Gauge Press (m of water)	Friction Loss (m)*		Total Head (m)	Lugeon Value	Perm. (m/s)
				Basic	In extra rods			
1st	4.933	100.00	10.220	0.000	0.000	29.970	11.210	1.07E-06
2nd	7.333	200.00	20.440	0.000	0.000	40.190	12.427	1.19E-06
3rd	12.533	300.00	30.660	0.000	0.000	50.410	16.932	1.62E-06
4th	8.400	200.00	20.440	0.000	0.000	40.190	14.234	1.36E-06
5th	3.120	100.00	10.220	0.000	0.000	29.970	7.090	6.78E-07

*Where friction loss is assumed to be negligible.

N.B. Pressure Conversion: 1 bar = 100 kPa = 14.503 psi

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