sian.harpley@sgs.com
ABN: 44 000 964 278
ph: 1300 781 744
fx: (08) 9458 3700

TEST CERTIFICATE

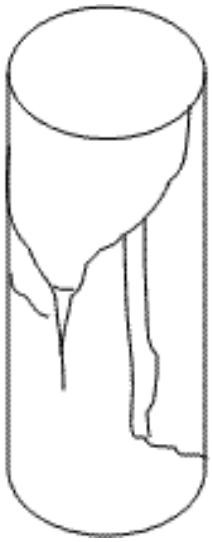
SGS Australia Pty Ltd
PO Box 219 Bentley WA 6982
36 Railway Parade
Welshpool WA 6106

Client:	Redbank Operations Pty Ltd	Client Job No:	
Client Address:	Level 1 143 Hay Street Subiaco WA 6008	Order No:	
Project:	Submitted Samples	Tested Date:	9/11/2009
Location:	Redbank	SGS Job Number:	09-01-3096
Sample No:	09-MT-14603	Lab:	Welshpool
Sample ID:	SFDH09-004 (45.81 - 46.06)		

UNIAXIAL COMPRESSIVE STRENGTH OF ROCK

AS4133.4.2.1

Failure Diagram approx to scale



Sample Type:	PQ3 Core
INITIAL SPECIMEN DETAILS	
Core Diameter (mm):	82.9
Length/Diameter Ratio:	2.7
Bulk Dry Density (t/m3):	**2.099**
Moisture Content (%):	**1.6**
UNIAXIAL COMPRESSIVE STRENGTH (MPa):	**26.7**
Moisture Condition:	Specimen tested at the moisture condition as received
Mode of Failure:	Failed through Irregularities
Duration of Tests	6.8 mins

Note: Sample supplied by client.
Bulk Density value was determined by the Calliper method
Tested on a hydraulic compression machine

Approved Signatory: (John.Reid) Date: 13/11/2009

sian.harpley@sgs.com
ABN: 44 000 964 278
ph: 1300 781 744
fx: (08) 9458 3700

TEST CERTIFICATE

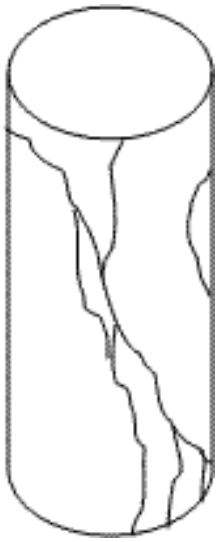
SGS Australia Pty Ltd
PO Box 219 Bentley WA 6982
36 Railway Parade
Welshpool WA 6106

Client:	Redbank Operations Pty Ltd	Client Job No:	
Client Address:	Level 1 143 Hay Street Subiaco WA 6008	Order No:	
Project:	Submitted Samples	Tested Date:	9/11/2009
Location:	Redbank	SGS Job Number:	09-01-3096
Sample No:	09-MT-14604	Lab:	Welshpool
Sample ID:	SFDH09-004 (237.33 - 237.56)		

UNIAXIAL COMPRESSIVE STRENGTH OF ROCK

AS4133.4.2.1

Failure Diagram approx to scale



Sample Type:	PQ3 Core
INITIAL SPECIMEN DETAILS	
Core Diameter (mm):	82.5
Length/Diameter Ratio:	2.6
Bulk Dry Density (t/m3):	**2.114**
Moisture Content (%):	**1.4**
UNIAXIAL COMPRESSIVE STRENGTH (MPa):	**29.0**
Moisture Condition:	Specimen tested at the moisture condition as received
Mode of Failure:	Shear Failure
Duration of Tests	6.1 mins

Note: Sample supplied by client.
Bulk Density value was determined by the Calliper method
Tested on a hydraulic compression machine

Approved Signatory: (John.Reid) Date: 13/11/2009

sian.harpley@sgs.com
ABN: 44 000 964 278
ph: 1300 781 744
fx: (08) 9458 3700

TEST CERTIFICATE

SGS Australia Pty Ltd
PO Box 219 Bentley WA 6982
36 Railway Parade
Welshpool WA 6106

Client:	Redbank Operations Pty Ltd	Client Job No:	
Client Address:	Level 1 143 Hay Street Subiaco WA 6008	Order No:	
Project:	Submitted Samples	Tested Date:	9/11/2009
Location:	Redbank	SGS Job Number:	09-01-3096
Sample No:	09-MT-14605	Lab:	Welshpool
Sample ID:	SFDH09-002 (60.08 - 60.30)		

UNIAXIAL COMPRESSIVE STRENGTH OF ROCK

AS4133.4.2.1

Failure Diagram approx to scale

Sample Type:	PQ3 Core
INITIAL SPECIMEN DETAILS	
Core Diameter (mm):	82.5
Length/Diameter Ratio:	2.6
Bulk Dry Density (t/m3):	**2.533**
Moisture Content (%):	**0.3**
UNIAXIAL COMPRESSIVE STRENGTH (MPa):	**124**
Moisture Condition:	Specimen tested at the moisture condition as received
Mode of Failure:	Shattered
Duration of Tests	6. mins

Note: Sample supplied by client.
Bulk Density value was determined by the Calliper method
Tested on a hydraulic compression machine

Approved Signatory: (John.Reid) Date: 13/11/2009

sian.harpley@sgs.com
ABN: 44 000 964 278
ph: 1300 781 744
fx: (08) 9458 3700

TEST CERTIFICATE

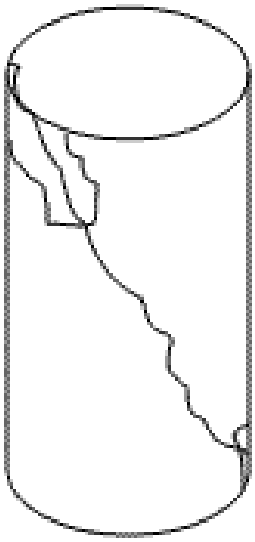
SGS Australia Pty Ltd
PO Box 219 Bentley WA 6982
36 Railway Parade
Welshpool WA 6106

Client:	Redbank Operations Pty Ltd	Client Job No:	
Client Address:	Level 1 143 Hay Street Subiaco WA 6008	Order No:	
Project:	Submitted Samples	Tested Date:	10/11/2009
Location:	Redbank	SGS Job Number:	09-01-3096
Sample No:	09-MT-14606	Lab:	Welshpool
Sample ID:	BLDH09-002 (12.83 - 13.04)		

UNIAXIAL COMPRESSIVE STRENGTH OF ROCK

AS4133.4.2.1

Failure Diagram approx to scale



Sample Type:	PQ3 Core
INITIAL SPECIMEN DETAILS	
Core Diameter (mm):	82.8
Length/Diameter Ratio:	2.2
Bulk Dry Density (t/m3):	**2.070**
Moisture Content (%):	**1.4**
UNIAXIAL COMPRESSIVE STRENGTH (MPa):	**28.2**
Moisture Condition:	Specimen tested at the moisture condition as received
Deviation from Standard:	Less than required minimum of 2.5
Mode of Failure:	Shear Failure
Duration of Tests	5.4 mins

Note: Sample supplied by client.
Bulk Density value was determined by the Calliper method
Tested on a hydraulic compression machine

Approved Signatory: (John.Reid) Date: 13/11/2009

sian.harpley@sgs.com
ABN: 44 000 964 278
ph: 1300 781 744
fx: (08) 9458 3700

TEST CERTIFICATE

SGS Australia Pty Ltd
PO Box 219 Bentley WA 6982
36 Railway Parade
Welshpool WA 6106

Client:	Redbank Operations Pty Ltd	Client Job No:	
Client Address:	Level 1 143 Hay Street Subiaco WA 6008	Order No:	
Project:	Submitted Samples	Tested Date:	9/11/2009
Location:	Redbank	SGS Job Number:	09-01-3096
Sample No:	09-MT-14607	Lab:	Welshpool
Sample ID:	BLDH09-002 (119.30 - 119.55)		

UNIAXIAL COMPRESSIVE STRENGTH OF ROCK

AS4133.4.2.1

Failure Diagram approx to scale

Sample Type:	PQ3 Core
INITIAL SPECIMEN DETAILS	
Core Diameter (mm):	82.8
Length/Diameter Ratio:	2.7
Bulk Dry Density (t/m3):	**2.282**
Moisture Content (%):	**0.5**
UNIAXIAL COMPRESSIVE STRENGTH (MPa):	**52.6**
Moisture Condition:	Specimen tested at the moisture condition as received
Mode of Failure:	Shattered
Duration of Tests	11.3 mins

Note: Sample supplied by client.
Bulk Density value was determined by the Calliper method
Tested on a hydraulic compression machine

Approved Signatory: (John.Reid) Date: 13/11/2009

sian.harpley@sgs.com
ABN: 44 000 964 278
ph: 1300 781 744
fx: (08) 9458 3700

TEST CERTIFICATE

SGS Australia Pty Ltd
PO Box 219 Bentley WA 6982
36 Railway Parade
Welshpool WA 6106

Client:	Redbank Operations Pty Ltd	Client Job No:	
Client Address:	Level 1 143 Hay Street Subiaco WA 6008	Order No:	
Project:	Submitted Samples	Tested Date:	10/11/2009
Location:	Redbank	SGS Job Number:	09-01-3096
Sample No:	09-MT-14609	Lab:	Welshpool
Sample ID:	BLDH09-003 (55.82 - 56.06)		

UNIAXIAL COMPRESSIVE STRENGTH OF ROCK

AS4133.4.2.1

Failure Diagram approx to scale

Sample Type:	PQ3 Core
INITIAL SPECIMEN DETAILS	
Core Diameter (mm):	82.1
Length/Diameter Ratio:	2.8
Bulk Dry Density (t/m3):	**2.452**
Moisture Content (%):	**0.4**
UNIAXIAL COMPRESSIVE STRENGTH (MPa):	**81.0**
Moisture Condition:	Specimen prepared at the moisture condition as received. Polished wet
Mode of Failure:	Shear Failure
Duration of Tests	9.8 mins

Note: Sample supplied by client.
Bulk Density value was determined by the Calliper method
Tested on a hydraulic compression machine

Approved Signatory: (John.Reid) Date: 13/11/2009

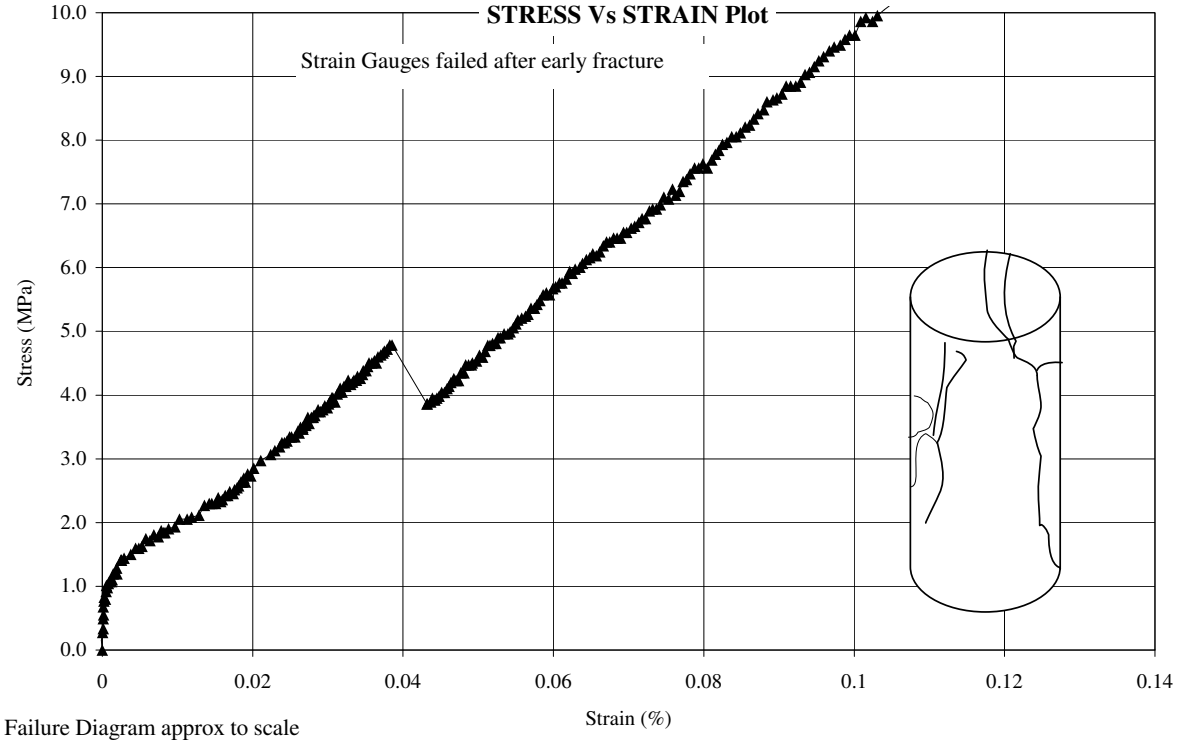
PO Box 219, Bentley, WA, 6982
ph: 1300 781 744 fx: 9458 3700

COMPRESSIVE STRENGTH / MODULUS TEST
REPORT CERTIFICATE

AS 4133 4.3 - 1993

CLIENT : **Redbank Operations Pty Ltd**
PROJECT : **Submitted Samples**
LOCATION : **Redbank**
Sample No.: SFDH09-004
Sample Id :
Initial Specimen Details :
Length/Diameter Ratio : 2.7
Bulk Dry Density (t/m³) : 2.021
Moisture Content (%) : 1.4 (AS 4133.1.1.1)

JOB NO. : 09-01-3096
LAB NO. : 09-MT-14610
Client Job No.:
Date Tested : 10/11/09
Test Type : Modulus Compression
Sample Type :
Rock Type : PQ3 Core
Depth (m): (120.00 - 120.20)



Failure Diagram approx to scale

COMPRESSIVE STRENGTH / MODULUS DATA

U.C.S. (MPa) = 17.4 **Young's Modulus, E** (GPa) = 10.7

Mode of Failure : Axial Failure

Note(s) :
1. Young's Modulus determined from the straight line portion of the stress-strain plot.
2. Strain measured using electrical resistance strain gauges.
3. Sample supplied by client.
4. Young's Modulus indicative values only, may require engineering interpretation

Certificate No. : 09-MT-14610 / R301

Approved Signatory : _____ (J. Reid) **Date** 13/11/2009

Accreditation No. 2418

This document is issued in accordance with NATA's accreditation requirements

SN 2411

CLIENT : Redbank Operations Pty Ltd
JOB NO. : 09-01-3096
LAB NO. : 09-MT-14610

Uniaxial compressive strength & Modulus with Bulk Dry Density notes on test AS 4133.4.3

Sample Storage

4(c) Prior to testing the specimen was conditioned in a stable environment.

Specimen Preparation & conditioning

¨ 4 (a) Specimens were taken from selected pieces of core nominated by the Client. The depth range was adjusted, when required, to obtain the best possible specimen.

¨ 4 (c) Specimens were tested in the "As Received" condition –ie: removed from the protective wrapping, cut to length with a diamond saw, end polished (wet), measured, weighed and tested as quickly as practicable with the intention of retaining the existing moisture content

Test Equipment

¨ 3(a) &(h) The compression machine used was an "Avery" hydraulic compression machine, "A" Grade calibrated through its full range: Specimens were loaded at a constant rate of stress. Force was recorded through a pressure transducer & strain was captured through two opposing electronic strain gauges.

Deviations from the Standard Method

notes on test AS 4133.2.1.1

¨ 4 (a) Single specimens only were prepared.

¨ 4(b)(i)(ii)(iii)Dimensions & Mass for Bulk density calculation were determined on specimens immediately before loading. Dry Mass was calculated from the moisture content determination (AS 4133.1.1.1) taken from the UCS specimen.

¨ 4(b)(iv) Bulk density specimens were not immersed hence Porosity has not been calculated or reported. Bulk Dry Density has been reported. Full immersion would have affected the "As Received" condition.

Approved Signatory…… (J. Reid)

Date: 13/11/2009

Certificate No. : 09-MT-14610 / R301

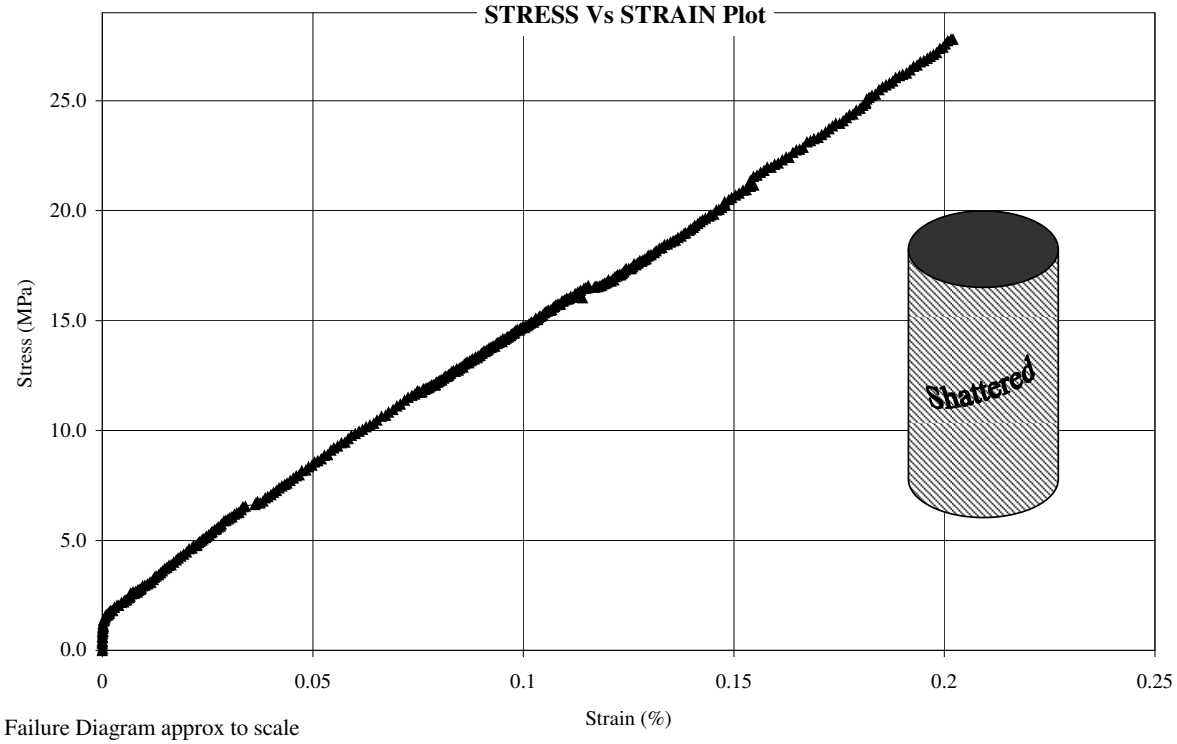
PO Box 219, Bentley, WA, 6982
ph: 1300 781 744 fx: 9458 3700

COMPRESSIVE STRENGTH / MODULUS TEST
REPORT CERTIFICATE

AS 4133 4.3 - 1993

CLIENT : **Redbank Operations Pty Ltd**
PROJECT : **Submitted Samples**
LOCATION : **Redbank**
Sample No.: SFDH09-002
Sample Id :
Initial Specimen Details :
Length/Diameter Ratio : 2.3
Bulk Dry Density (t/m^3) : 2.194
Moisture Content (%) : 1.0 (AS 4133.1.1.1)

JOB NO. : 09-01-3096
LAB NO. : 09-MT-14611
Client Job No.:
Date Tested : 10/11/09
Test Type : Modulus Compression
Sample Type :
Rock Type : PQ3 Core
Depth (m): (228.79 - 229.02)
Grain Size greater than 10 x Diam.



Failure Diagram approx to scale

COMPRESSIVE STRENGTH / MODULUS DATA

U.C.S. (MPa) = 29.0 **Young's Modulus, E** (GPa) = 12.6

Mode of Failure : Shattered

Note(s) :
1. Young's Modulus determined from the straight line portion of the stress-strain plot.
2. Strain measured using electrical resistance strain gauges.
3. Sample supplied by client. Specimen tested in the as received condition. Polished wet
4. Young's Modulus indicative values only, may require engineering interpretation
5. Deviation from standard, length/diameter ratio does not conform with standard requirements

Certificate No. : 09-MT-14611 / R301

Approved Signatory : _____ (J. Reid) **Date** 2/07/2009

Accreditation No. 2418

This document is issued in accordance with NATA's accreditation requirements

SN 2411

Client Address: Level 1□□143 Hay Street□□Subiaco WA 6008

CLIENT : Redbank Operations Pty Ltd
JOB NO. : 09-01-3096
LAB NO. : 09-MT-14611

Uniaxial compressive strength & Modulus with Bulk Dry Density notes on test AS 4133.4.3

Sample Storage

4(c) Prior to testing the specimen was conditioned in a stable environment.

Specimen Preparation & conditioning

¨ 4 (a) Specimens were taken from selected pieces of core nominated by the Client. The depth range was adjusted, when required, to obtain the best possible specimen.

¨ 4 (c) Specimens were tested in the "As Received" condition –ie: removed from the protective wrapping, cut to length with a diamond saw, end polished, measured, weighed and tested as quickly as practicable with the intention of retaining the existing moisture content

Test Equipment

¨ 3(a) &(h) The compression machine used was an "Avery" hydraulic compression machine, "A" Grade calibrated through its full range: Specimens were loaded at a constant rate of stress. Force was recorded through a pressure transducer & strain was captured through two opposing electronic strain gauges.

Deviations from the Standard Method

¨ 4(a)(i) The Length to Diameter ratio may be less than 2.5, in some instances, due to the length of suitable sample available at the Client nominated depth

¨ 4(a)(i) The diameter of the specimen may not be greater than ten times the size of the largest grain of rock.

notes on test AS 4133.2.1.1

¨ 4 (a) Single specimens only were prepared.

¨ 4(b)(i)(ii)(iii)Dimensions & Mass for Bulk density calculation were determined on specimens immediately before loading. Dry Mass was calculated from the moisture content determination (AS 4133.1.1.1) taken from the UCS specimen.

¨ 4(b)(iv) Bulk density specimens were not immersed hence Porosity has not been calculated or reported. Bulk Dry Density has been reported. Full immersion would have affected the "As Received" condition.

Approved Signatory……

(J. Reid)

Date: 2/07/2009

Certificate No. : 09-MT-14611 / R301

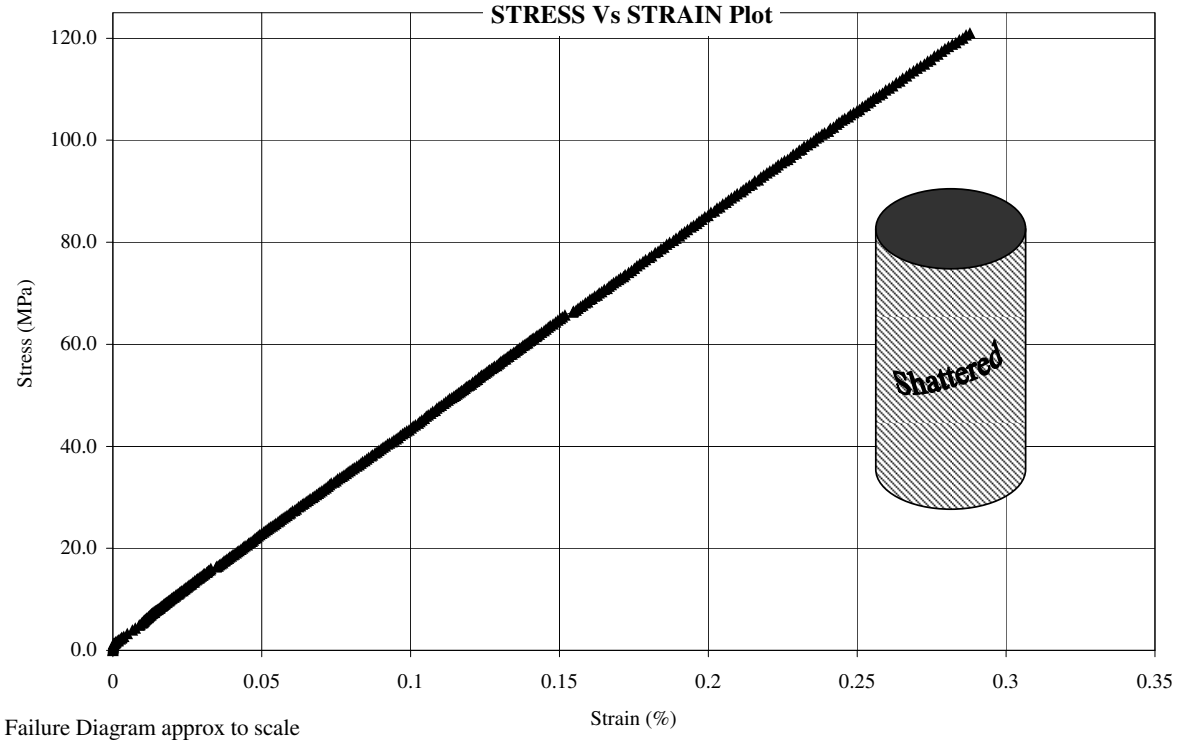
PO Box 219, Bentley, WA, 6982
ph: 1300 781 744 fx: 9458 3700

COMPRESSIVE STRENGTH / MODULUS TEST
REPORT CERTIFICATE

AS 4133 4.3 - 1993

CLIENT : **Redbank Operations Pty Ltd**
PROJECT : **Submitted Samples**
LOCATION : **Redbank**
Sample No.: BLDH09-002
Sample Id :
Initial Specimen Details :
Length/Diameter Ratio : 2.4
Bulk Dry Density (t/m^3) : 2.710
Moisture Content (%) : 0.2 (AS 4133.1.1.1)

JOB NO. : 09-01-3096
LAB NO. : 09-MT-14612
Client Job No.:
Date Tested : 10/11/09
Test Type : Modulus Compression
Sample Type :
Rock Type : PQ3 Core
Depth (m): (230.28 - 230.51)



Failure Diagram approx to scale

COMPRESSIVE STRENGTH / MODULUS DATA

U.C.S. (MPa) = 121 **Young's Modulus, E** (GPa) = 41.7

Mode of Failure : Shattered

Note(s) :
1. Young's Modulus determined from the straight line portion of the stress-strain plot.
2. Strain measured using electrical resistance strain gauges.
3. Sample supplied by client. Specimen tested in the as received condition. Polished wet
4. Young's Modulus indicative values only, may require engineering interpretation
5. Deviation from standard, length/diameter ratio does not conform with standard requirements

Certificate No. : 09-MT-14612 / R301

Approved Signatory : _____ (J. Reid) **Date** 2/07/2009

Accreditation No. 2418

This document is issued in accordance with NATA's accreditation requirements

SN 2411

Client Address: Level 1□□143 Hay Street□□Subiaco WA 6008

CLIENT : Redbank Operations Pty Ltd
JOB NO. : 09-01-3096
LAB NO. : 09-MT-14612

Uniaxial compressive strength & Modulus with Bulk Dry Density notes on test AS 4133.4.3

Sample Storage

4(c) Prior to testing the specimen was conditioned in a stable environment.

Specimen Preparation & conditioning

¨ 4 (a) Specimens were taken from selected pieces of core nominated by the Client. The depth range was adjusted, when required, to obtain the best possible specimen.

¨ 4 (c) Specimens were tested in the “As Received” condition –ie: removed from the protective wrapping, cut to length with a diamond saw, end polished, measured, weighed and tested as quickly as practicable with the intention of retaining the existing moisture content

Test Equipment

¨ 3(a) &(h) The compression machine used was an “Avery” hydraulic compression machine, “A” Grade calibrated through its full range: Specimens were loaded at a constant rate of stress. Force was recorded through a pressure transducer & strain was captured through two opposing electronic strain gauges.

Deviations from the Standard Method

¨ 4(a)(i) The Length to Diameter ratio may be less than 2.5, in some instances, due to the length of suitable sample available at the Client nominated depth

notes on test AS 4133.2.1.1

¨ 4 (a) Single specimens only were prepared.

¨ 4(b)(i)(ii)(iii)Dimensions & Mass for Bulk density calculation were determined on specimens immediately before loading. Dry Mass was calculated from the moisture content determination (AS 4133.1.1.1) taken from the UCS specimen.

¨ 4(b)(iv) Bulk density specimens were not immersed hence Porosity has not been calculated or reported. Bulk Dry Density has been reported. Full immersion would have affected the “As Received” condition.

Approved Signatory…… (J. Reid)

Date: 2/07/2009

Certificate No. : 09-MT-14612 / R301

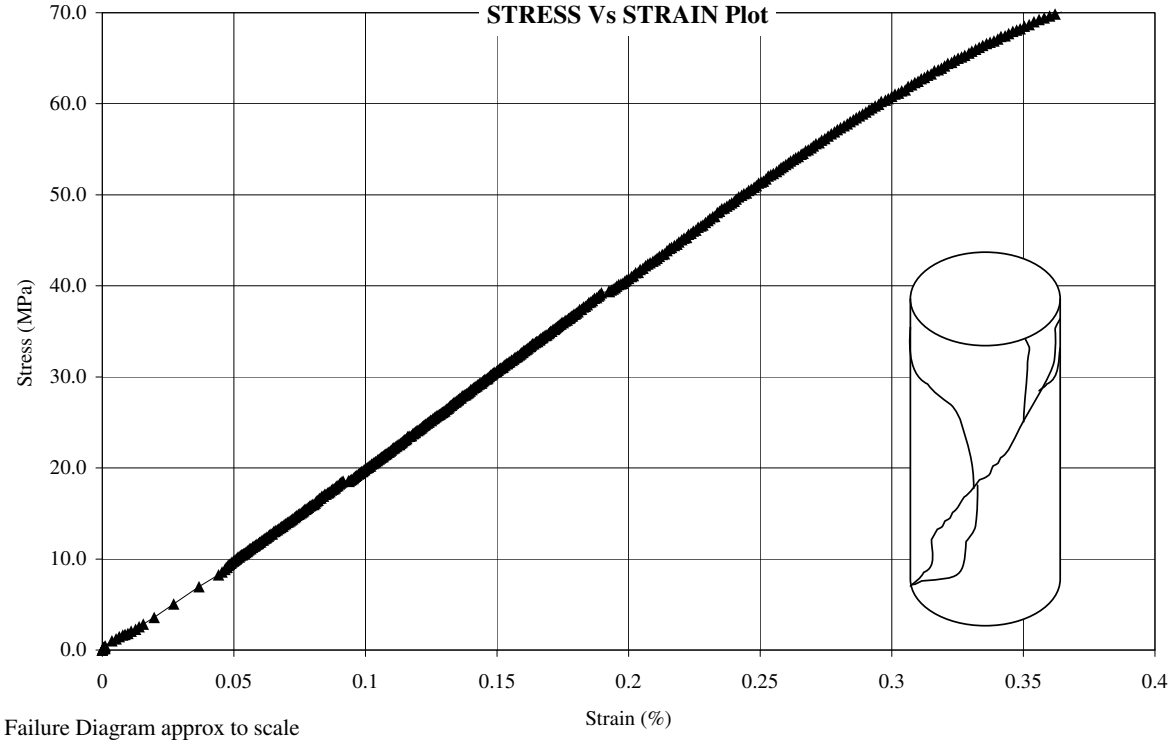
PO Box 219, Bentley, WA, 6982
ph: 1300 781 744 fx: 9458 3700

COMPRESSIVE STRENGTH / MODULUS TEST
REPORT CERTIFICATE

AS 4133 4.3 - 1993

CLIENT : **Redbank Operations Pty Ltd**
PROJECT : **Submitted Samples**
LOCATION : **Redbank**
Sample No.: BLDH09-003
Sample Id :
Initial Specimen Details :
Length/Diameter Ratio : 2.8
Bulk Dry Density (t/m^3) : 2.274
Moisture Content (%) : 0.4 (AS 4133.1.1.1)

JOB NO. : 09-01-3096
LAB NO. : 09-MT-14613
Client Job No.:
Date Tested : 10/11/09
Test Type : Modulus Compression
Sample Type :
Rock Type : PQ3 Core
Depth (m): (132.20 - 132.52)



Failure Diagram approx to scale

COMPRESSIVE STRENGTH / MODULUS DATA

U.C.S. (MPa) = 70.1 **Young's Modulus, E** (GPa) = 21.0

Mode of Failure : Shear Failure

Note(s) :
1. Young's Modulus determined from the straight line portion of the stress-strain plot.
2. Strain measured using electrical resistance strain gauges.
3. Sample supplied by client. Specimen tested in the as received condition. Polished wet
4. Young's Modulus indicative values only, may require engineering interpretation

Certificate No. : 09-MT-14613 / R301

Approved Signatory : _____ (J. Reid) **Date** 2/07/2009

Accreditation No. 2418

This document is issued in accordance with NATA's accreditation requirements

SN 2411

CLIENT : Redbank Operations Pty Ltd
JOB NO. : 09-01-3096
LAB NO. : 09-MT-14613

Uniaxial compressive strength & Modulus with Bulk Dry Density notes on test AS 4133.4.3

Sample Storage

4(c) Prior to testing the specimen was conditioned in a stable environment.

Specimen Preparation & conditioning

¨ 4 (a) Specimens were taken from selected pieces of core nominated by the Client. The depth range was adjusted, when required, to obtain the best possible specimen.

¨ 4 (c) Specimens were tested in the "As Received" condition –ie: removed from the protective wrapping, cut to length with a diamond saw, end polished, measured, weighed and tested as quickly as practicable with the intention of retaining the existing moisture content

Test Equipment

¨ 3(a) &(h) The compression machine used was an "Avery" hydraulic compression machine, "A" Grade calibrated through its full range: Specimens were loaded at a constant rate of stress. Force was recorded through a pressure transducer & strain was captured through two opposing electronic strain gauges.

Deviations from the Standard Method

¨ 4(a)(iii) The ends of the specimens have been polished to achieve flat ends to 0.02mm. In some instances, solution cavities are present at the specimen ends and the specimen may not meet this requirement.

notes on test AS 4133.2.1.1

¨ 4 (a) Single specimens only were prepared.

¨ 4(b)(i)(ii)(iii)Dimensions & Mass for Bulk density calculation were determined on specimens immediately before loading. Dry Mass was calculated from the moisture content determination (AS 4133.1.1.1) taken from the UCS specimen.

¨ 4(b)(iv) Bulk density specimens were not immersed hence Porosity has not been calculated or reported. Bulk Dry Density has been reported. Full immersion would have affected the "As Received" condition.

Approved Signatory……

(J. Reid)

Date: 2/07/2009

Certificate No. : 09-MT-14613 / R301

sian.harpley@sgs.com
ABN: 44 000 964 278
ph: 1300 781 744
fx: (08) 9458 3700

TEST CERTIFICATE

SGS Australia Pty Ltd
PO Box 219 Bentley WA 6982
36 Railway Parade
Welshpool WA 6106

Client:	Redbank Operations Pty Ltd	Client Job No:	
Client Address:	Level 1 143 Hay Street Subiaco WA 6008	Order No:	
Project:	Submitted Samples	Tested Date:	10/11/2009
Location:	Redbank	SGS Job Number:	09-01-3096
Sample No:	09-MT-14614	Lab:	Welshpool
Sample ID:	SFDH09-004 (45.56 - 45.67)		

INDIRECT TENSILE STRENGTH

ISRM Doc 8 Pt 2 (Brazil Method)

Initial Specimen Details

Height / Diameter Ratio:	0.5
Bulk Dry Density (t/m3)	2.134
Water Content (%):	0.6
Specimen Height (mm):	43
Specimen Diameter (mm):	83
INDIRECT TENSILE STRENGTH (MPa):	**9.68**

Note: Sample supplied by client.

Bulk Density Value was determined by the Calliper Method

Approved Signatory: (John.Reid) Date: 13/11/2009

sian.harpley@sgs.com
ABN: 44 000 964 278
ph: 1300 781 744
fx: (08) 9458 3700

TEST CERTIFICATE

SGS Australia Pty Ltd
PO Box 219 Bentley WA 6982
36 Railway Parade
Welshpool WA 6106

Client:	Redbank Operations Pty Ltd	Client Job No:	
Client Address:	Level 1 143 Hay Street Subiaco WA 6008	Order No:	
Project:	Submitted Samples	Tested Date:	11/11/2009
Location:	Redbank	SGS Job Number:	09-01-3096
Sample No:	09-MT-14615	Lab:	Welshpool
Sample ID:	SFDH09-004 (237.94 - 238.04)		

INDIRECT TENSILE STRENGTH

ISRM Doc 8 Pt 2 (Brazil Method)

Initial Specimen Details

Height / Diameter Ratio:	0.5
Bulk Dry Density (t/m3)	2.152
Water Content (%):	0.7
Specimen Height (mm):	43
Specimen Diameter (mm):	82
INDIRECT TENSILE STRENGTH (MPa):	**5.79**

Note: Sample supplied by client.

Bulk Density Value was determined by the Calliper Method

Approved Signatory: (John.Reid) Date: 13/11/2009

sian.harpley@sgs.com
ABN: 44 000 964 278
ph: 1300 781 744
fx: (08) 9458 3700

TEST CERTIFICATE

SGS Australia Pty Ltd
PO Box 219 Bentley WA 6982
36 Railway Parade
Welshpool WA 6106

Client:	Redbank Operations Pty Ltd	Client Job No:	
Client Address:	Level 1 143 Hay Street Subiaco WA 6008	Order No:	
Project:	Submitted Samples	Tested Date:	10/11/2009
Location:	Redbank	SGS Job Number:	09-01-3096
Sample No:	09-MT-14616	Lab:	Welshpool
Sample ID:	SFDH09-002 (59.95 - 60.08)		

INDIRECT TENSILE STRENGTH

ISRM Doc 8 Pt 2 (Brazil Method)

Initial Specimen Details

Height / Diameter Ratio:	0.5
Bulk Dry Density (t/m3)	2.485
Water Content (%):	0.2
Specimen Height (mm):	42
Specimen Diameter (mm):	82
INDIRECT TENSILE STRENGTH (MPa):	**13.6**

Note: Sample supplied by client.

Bulk Density Value was determined by the Calliper Method

Approved Signatory: (John.Reid) Date: 13/11/2009

sian.harpley@sgs.com
ABN: 44 000 964 278
ph: 1300 781 744
fx: (08) 9458 3700

TEST CERTIFICATE

SGS Australia Pty Ltd
PO Box 219 Bentley WA 6982
36 Railway Parade
Welshpool WA 6106

Client:	Redbank Operations Pty Ltd	Client Job No:	
Client Address:	Level 1 143 Hay Street Subiaco WA 6008	Order No:	
Project:	Submitted Samples	Tested Date:	10/11/2009
Location:	Redbank	SGS Job Number:	09-01-3096
Sample No:	09-MT-14617	Lab:	Welshpool
Sample ID:	SFDH09-002 (229.02 - 229.27)		

INDIRECT TENSILE STRENGTH

ISRM Doc 8 Pt 2 (Brazil Method)

Initial Specimen Details

Height / Diameter Ratio:	0.5
Bulk Dry Density (t/m3)	2.210
Water Content (%):	0.8
Specimen Height (mm):	43
Specimen Diameter (mm):	82
INDIRECT TENSILE STRENGTH (MPa):	**3.69**

Note: Sample supplied by client.

Bulk Density Value was determined by the Calliper Method

Approved Signatory: (John.Reid) Date: 13/11/2009

sian.harpley@sgs.com
ABN: 44 000 964 278
ph: 1300 781 744
fx: (08) 9458 3700

TEST CERTIFICATE

SGS Australia Pty Ltd
PO Box 219 Bentley WA 6982
36 Railway Parade
Welshpool WA 6106

Client:	Redbank Operations Pty Ltd	Client Job No:	
Client Address:	Level 1 143 Hay Street Subiaco WA 6008	Order No:	
Project:	Submitted Samples	Tested Date:	10/11/2009
Location:	Redbank	SGS Job Number:	09-01-3096
Sample No:	09-MT-14618	Lab:	Welshpool
Sample ID:	BLDH09-002 (119.55 - 119.66)		

INDIRECT TENSILE STRENGTH

ISRM Doc 8 Pt 2 (Brazil Method)

Initial Specimen Details

Height / Diameter Ratio:	0.5
Bulk Dry Density (t/m3)	2.272
Water Content (%):	0.4
Specimen Height (mm):	43
Specimen Diameter (mm):	83
INDIRECT TENSILE STRENGTH (MPa):	**4.48**

Note: Sample supplied by client.

Bulk Density Value was determined by the Calliper Method

Approved Signatory: (John.Reid) Date: 13/11/2009

sian.harpley@sgs.com
ABN: 44 000 964 278
ph: 1300 781 744
fx: (08) 9458 3700

TEST CERTIFICATE

SGS Australia Pty Ltd
PO Box 219 Bentley WA 6982
36 Railway Parade
Welshpool WA 6106

Client:	Redbank Operations Pty Ltd	Client Job No:	
Client Address:	Level 1 143 Hay Street Subiaco WA 6008	Order No:	
Project:	Submitted Samples	Tested Date:	10/11/2009
Location:	Redbank	SGS Job Number:	09-01-3096
Sample No:	09-MT-14619	Lab:	Welshpool
Sample ID:	BLDH09-002 (227.33 - 227.46)		

INDIRECT TENSILE STRENGTH

ISRM Doc 8 Pt 2 (Brazil Method)

Initial Specimen Details

Height / Diameter Ratio:	0.5
Bulk Dry Density (t/m3)	2.700
Water Content (%):	0.3
Specimen Height (mm):	43
Specimen Diameter (mm):	83
INDIRECT TENSILE STRENGTH (MPa):	**6.19**

Note: Sample supplied by client.

Bulk Density Value was determined by the Calliper Method

Approved Signatory: (John.Reid) Date: 13/11/2009

sian.harpley@sgs.com
ABN: 44 000 964 278
ph: 1300 781 744
fx: (08) 9458 3700

TEST CERTIFICATE

SGS Australia Pty Ltd
PO Box 219 Bentley WA 6982
36 Railway Parade
Welshpool WA 6106

Client:	Redbank Operations Pty Ltd	Client Job No:	
Client Address:	Level 1 143 Hay Street Subiaco WA 6008	Order No:	
Project:	Submitted Samples	Tested Date:	10/11/2009
Location:	Redbank	SGS Job Number:	09-01-3096
Sample No:	09-MT-14620	Lab:	Welshpool
Sample ID:	BLDH09-002 (205.66 - 205.78)		

INDIRECT TENSILE STRENGTH

ISRM Doc 8 Pt 2 (Brazil Method)

Initial Specimen Details

Height / Diameter Ratio:	0.5
Bulk Dry Density (t/m3)	2.626
Water Content (%):	0.5
Specimen Height (mm):	42
Specimen Diameter (mm):	83
INDIRECT TENSILE STRENGTH (MPa):	**5.67**

Note: Sample supplied by client.

Bulk Density Value was determined by the Calliper Method

Approved Signatory: (John.Reid) Date: 13/11/2009

This document is issued in accordance with NATA's accreditation requirements

sian.harpley@sgs.com
ABN: 44 000 964 278
ph: 1300 781 744
fx: (08) 9458 3700

TEST CERTIFICATE

SGS Australia Pty Ltd
PO Box 219 Bentley WA 6982
36 Railway Parade
Welshpool WA 6106

Client:	Redbank Operations Pty Ltd	Client Job No:	
Client Address:	Level 1 143 Hay Street Subiaco WA 6008	Order No:	
Project:	Submitted Samples	Tested Date:	10/11/2009
Location:	Redbank	SGS Job Number:	09-01-3096
Sample No:	09-MT-14621	Lab:	Welshpool
Sample ID:	BLDH09-003 (132.52 - 132.71)		

INDIRECT TENSILE STRENGTH

ISRM Doc 8 Pt 2 (Brazil Method)

Initial Specimen Details

Height / Diameter Ratio:	0.5
Bulk Dry Density (t/m3)	2.282
Water Content (%):	0.3
Specimen Height (mm):	43
Specimen Diameter (mm):	82
INDIRECT TENSILE STRENGTH (MPa):	**6.09**

Note: Sample supplied by client.

Bulk Density Value was determined by the Calliper Method

Approved Signatory: (John.Reid) Date: 13/11/2009

sian.harpley@sgs.com
ABN: 44 000 964 278
ph: 1300 781 744
fx: (08) 9458 3700

TEST CERTIFICATE

SGS Australia Pty Ltd
PO Box 219 Bentley WA 6982
36 Railway Parade
Welshpool WA 6106

Client:	Redbank Operations Pty Ltd	Client Job No:	
Client Address:	Level 1 143 Hay Street Subiaco WA 6008	Order No:	
Project:	Submitted Samples	Tested Date:	11/11/2009
Location:	Redbank	SGS Job Number:	09-01-3096
Sample No:	09-MT-14622	Lab:	Welshpool
Sample ID:	SFDH09-004 (237.82 - 237.94)		

SLAKE DURABILITY

AS4133.3.4

Slaking Fluid	Tap Water
Temperature of Fluid - degrees C	24
First Cycle	
SLAKE DURABILITY INDEX (%)	**99.9**
Appearance Particles Retained	No change
Appearance Particles Passing	Slightly cloudy
Second Cycle	
SLAKE DURABILTY INDEX (%)	**99.4**
Appearance Particles Retained	slight rounding of particles
Appearance Particles Passing	cloudy

Note: Sample supplied by client.

Approved Signatory: (John.Reid) Date: 13/11/2009

sian.harpley@sgs.com
ABN: 44 000 964 278
ph: 1300 781 744
fx: (08) 9458 3700

TEST CERTIFICATE

SGS Australia Pty Ltd
PO Box 219 Bentley WA 6982
36 Railway Parade
Welshpool WA 6106

Client:	Redbank Operations Pty Ltd	Client Job No:	
Client Address:	Level 1 143 Hay Street Subiaco WA 6008	Order No:	
Project:	Submitted Samples	Tested Date:	11/11/2009
Location:	Redbank	SGS Job Number:	09-01-3096
Sample No:	09-MT-14623	Lab:	Welshpool
Sample ID:	SFDH09-002 (86.70 - 86.86)		

SLAKE DURABILITY

AS4133.3.4

Slaking Fluid	Tap Water
Temperature of Fluid - degrees C	24
First Cycle	
SLAKE DURABILITY INDEX (%)	**100.0**
Appearance Particles Retained	No Change
Appearance Particles Passing	Slightly cloudy
Second Cycle	
SLAKE DURABILTY INDEX (%)	**99.7**
Appearance Particles Retained	No change
Appearance Particles Passing	slightly cloudy

Note: Sample supplied by client.

Approved Signatory: (John.Reid) Date: 13/11/2009

sian.harpley@sgs.com
ABN: 44 000 964 278
ph: 1300 781 744
fx: (08) 9458 3700

TEST CERTIFICATE

SGS Australia Pty Ltd
PO Box 219 Bentley WA 6982
36 Railway Parade
Welshpool WA 6106

Client:	Redbank Operations Pty Ltd	Client Job No:	
Client Address:	Level 1 143 Hay Street Subiaco WA 6008	Order No:	
Project:	Submitted Samples	Tested Date:	13/11/2009
Location:	Redbank	SGS Job Number:	09-01-3096
Sample No:	09-MT-14624	Lab:	Welshpool
Sample ID:	BLDH09-002 (70.50 - 70.65)		

SLAKE DURABILITY

AS4133.3.4

Slaking Fluid	Tap Water
Temperature of Fluid - degrees C	24
First Cycle	
SLAKE DURABILITY INDEX (%)	**99.4**
Appearance Particles Retained	Slight rounding - few broke
Appearance Particles Passing	cloudy
Second Cycle	
SLAKE DURABILTY INDEX (%)	**98.8**
Appearance Particles Retained	Slight rounding - few more broke
Appearance Particles Passing	cloudy

Note: Sample supplied by client.

Approved Signatory: (John.Reid) Date: 18/11/2009

sian.harpley@sgs.com
ABN: 44 000 964 278
ph: 1300 781 744
fx: (08) 9458 3700

TEST CERTIFICATE

SGS Australia Pty Ltd
PO Box 219 Bentley WA 6982
36 Railway Parade
Welshpool WA 6106

Client:	Redbank Operations Pty Ltd	Client Job No:	
Client Address:	Level 1 143 Hay Street Subiaco WA 6008	Order No:	
Project:	Submitted Samples	Tested Date:	13/11/2009
Location:	Redbank	SGS Job Number:	09-01-3096
Sample No:	09-MT-14625	Lab:	Welshpool
Sample ID:	BLDH09-002 (227.46 - 227.61)		

SLAKE DURABILITY

AS4133.3.4

Slaking Fluid	Tap Water
Temperature of Fluid - degrees C	24
First Cycle	
SLAKE DURABILITY INDEX (%)	**99.7**
Appearance Particles Retained	Very slight rounding
Appearance Particles Passing	cloudy
Second Cycle	
SLAKE DURABILTY INDEX (%)	**99.2**
Appearance Particles Retained	Slight rounding
Appearance Particles Passing	cloudy

Note: Sample supplied by client.

Approved Signatory: (John.Reid) Date: 18/11/2009

This document is issued in accordance with NATA's accreditation requirements

DIRECT SHEAR TEST

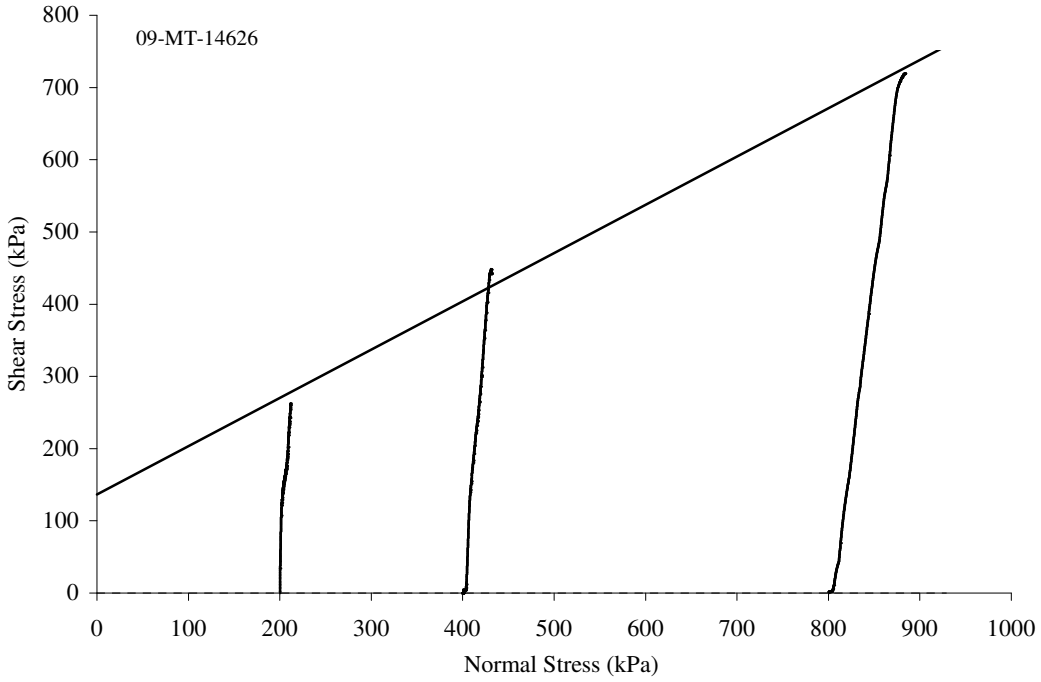
REPORT CERTIFICATE

(Reference Method : ISRM - Doc. 1 (Field), Part 2)

CLIENT : Redbank Operations Pty Ltd
PROJECT : Submitted Samples
LOCATION : Redbank
Sample Id : , Sample No. : , Depth : (193.00 - 193.20)
Test Type : Direct Shear , Multi-Stage on Existing Discontinuity
Initial Specimen Details :
Core Diameter : 82.1 mm
Shear Plane Dip Angle : 52°

JOB NO. : 09-01-3096
Lab No. : 09-MT-14626
Date Tested : 18-Nov-09
Discontinuity Type : Existing joint

Peak/Residual SHEAR STRESS Vs NORMAL STRESS



SHEAR STAGE DATA				Normal Stress		Shear Stress
Stage No	Strain Rate (mm/min)	Δ_{sf} (mm)	ε_{sf} (%)	σ_{no} (kPa)	σ_{nf} (kPa)	τ_f (kPa)
1	0.625	4.57	4.4	200	212	262
2	0.625	5.93	5.7	400	431	448
3	0.625	7.73	7.4	800	884	719

Peak - Cohesion, C (kPa) : 136 **Friction Angle, Ø (degrees) :** 34

Shear Plane description : Pre-test : Rough, Undulating..
Post-test : As above with significant grinding and slight crumbling.

Notes : Shear plane dip angle in relation to core axis only.
Line of best fit has been used to determine cohesion & friction angle values.
Sample supplied by client.

Sample tested in "as received" condition.

Certificate No. : 09-MT-14626 RDS

Authorised Signatory : _____ (L. Harris) **Date:** 18/11/2009

36 Railway Parade Welshpool WA 6106 Phone 1300 781 744 Fax (08) 9458 3700

DIRECT SHEAR TEST

REPORT CERTIFICATE

(Reference Method : ISRM - Doc. 1 (Field), Part 2)

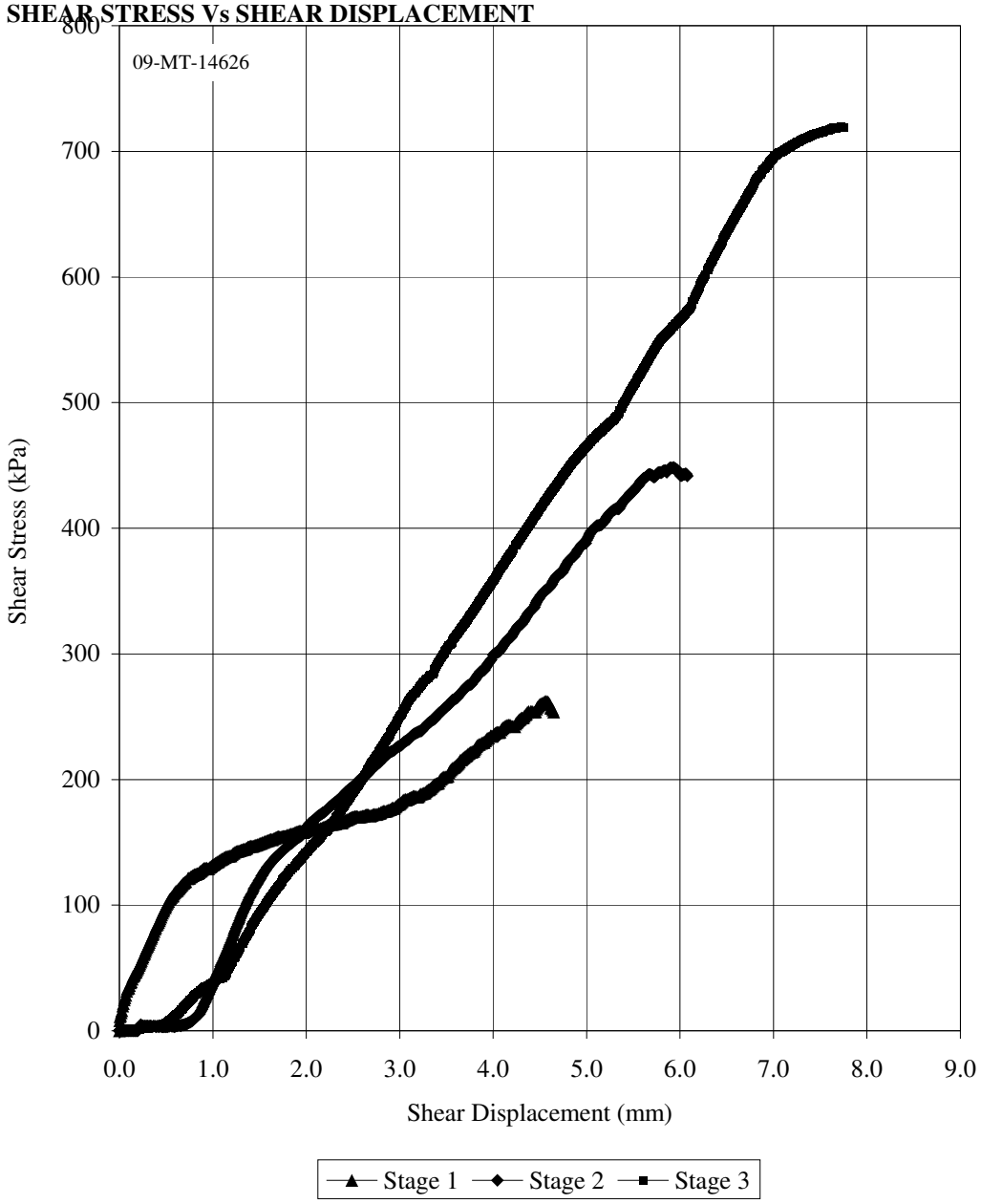
CLIENT : Redbank Operations Pty Ltd
PROJECT : Submitted Samples
LOCATION : Redbank
Sample Id : , Sample No. : , Depth : (193.00 - 193.20)
Test Type : Direct Shear , Multi-Stage on Existing Discontinuity

JOB NO. : 09-01-3096
Lab No. : 09-MT-14626
Date Tested : 18-Nov-09
Discontinuity Type : Existing joint

Initial Specimen Details :

Core Diameter : 82.1 mm
Shear Plane Dip Angle : 52°

SHEAR STRESS Vs SHEAR DISPLACEMENT



Authorised Signatory : _____ L. Harris _____ (L. Harris) **Date:** 18/11/2009

DIRECT SHEAR TEST

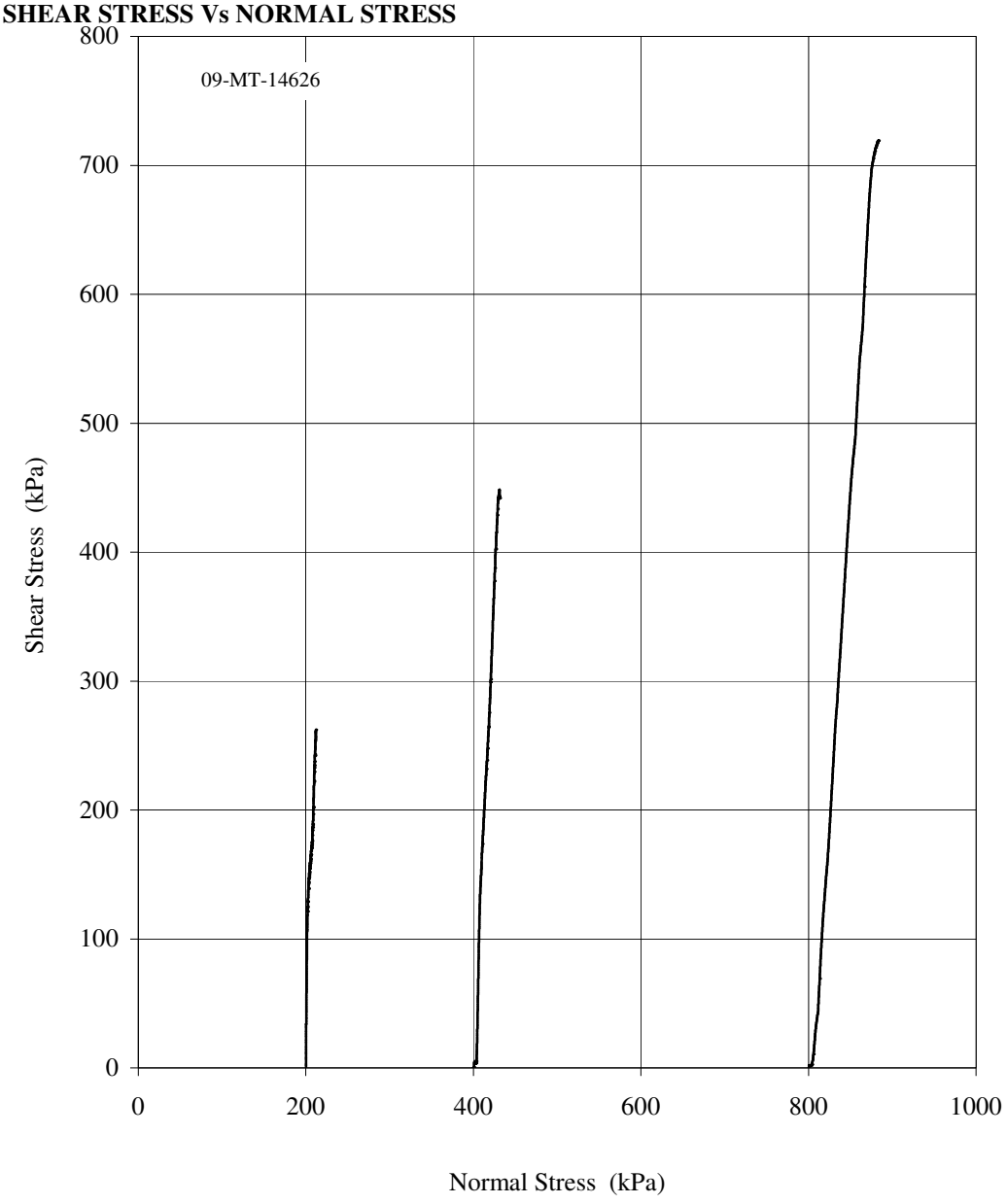
REPORT CERTIFICATE

(Reference Method : ISRM - Doc. 1 (Field), Part 2)

CLIENT : Redbank Operations Pty Ltd
PROJECT : Submitted Samples
LOCATION : Redbank
Sample Id : , Sample No. : , Depth : (193.00 - 193.20)
Test Type : Direct Shear , Multi-Stage on Existing Discontinuity
Initial Specimen Details :
Core Diameter : 82.1 mm
Shear Plane Dip Angle : 52°

JOB NO. : 09-01-3096
Lab No. : 09-MT-14626
Date Tested : 18-Nov-09
Discontinuity Type : Existing joint

SHEAR STRESS Vs NORMAL STRESS



Authorised Signatory : _____ L.Harris _____ (L. Harris) **Date:** 18/11/2009

SPECIMEN DESCRIPTION

REPORT CERTIFICATE

(Reference Method : ISRM - Doc. 1 (Field), Part 2)

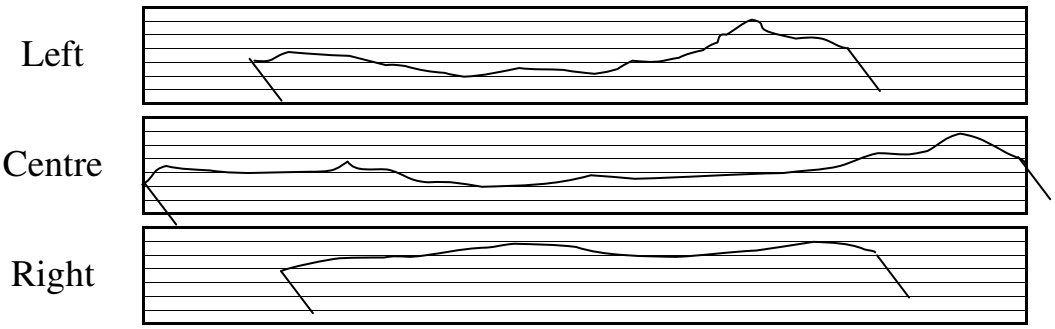
CLIENT : Redbank Operations Pty Ltd
PROJECT : Submitted Samples
LOCATION : Redbank
Sample Id : , Sample No. : , Depth : (193.00 - 193.20)
Test Type : Direct Shear , Multi-Stage on Existing Discontinuity

JOB NO. : 09-01-3096
Lab No. : 09-MT-14626
Date Tested : 18-Nov-09
Discontinuity Type : Existing joint

Initial Specimen Details :

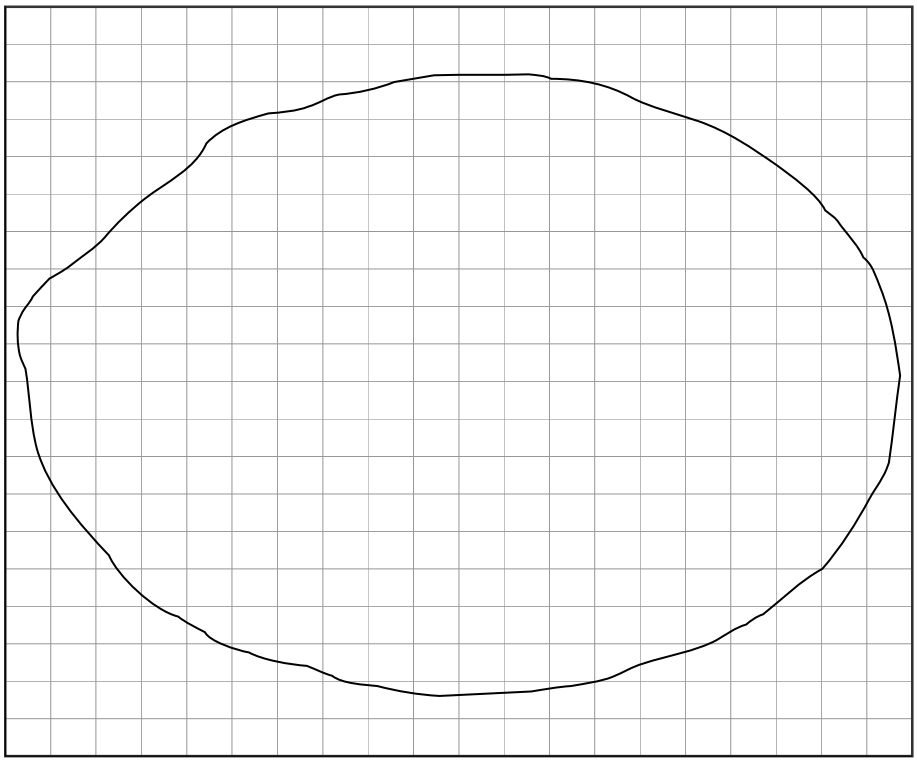
Core Diameter : 82.1 mm
Shear Plane Dip Angle : 52°

SPECIMEN PROFILE OF LOWER HALF



>>>>> DIRECTION OF SHEAR >>>>>

SHEAR SURFACE AREA OF LOWER HALF



>>>>> DIRECTION OF SHEAR >>>>>

Authorised Signatory : _____ _____ (L. Harris) **Date:** 18/11/2009

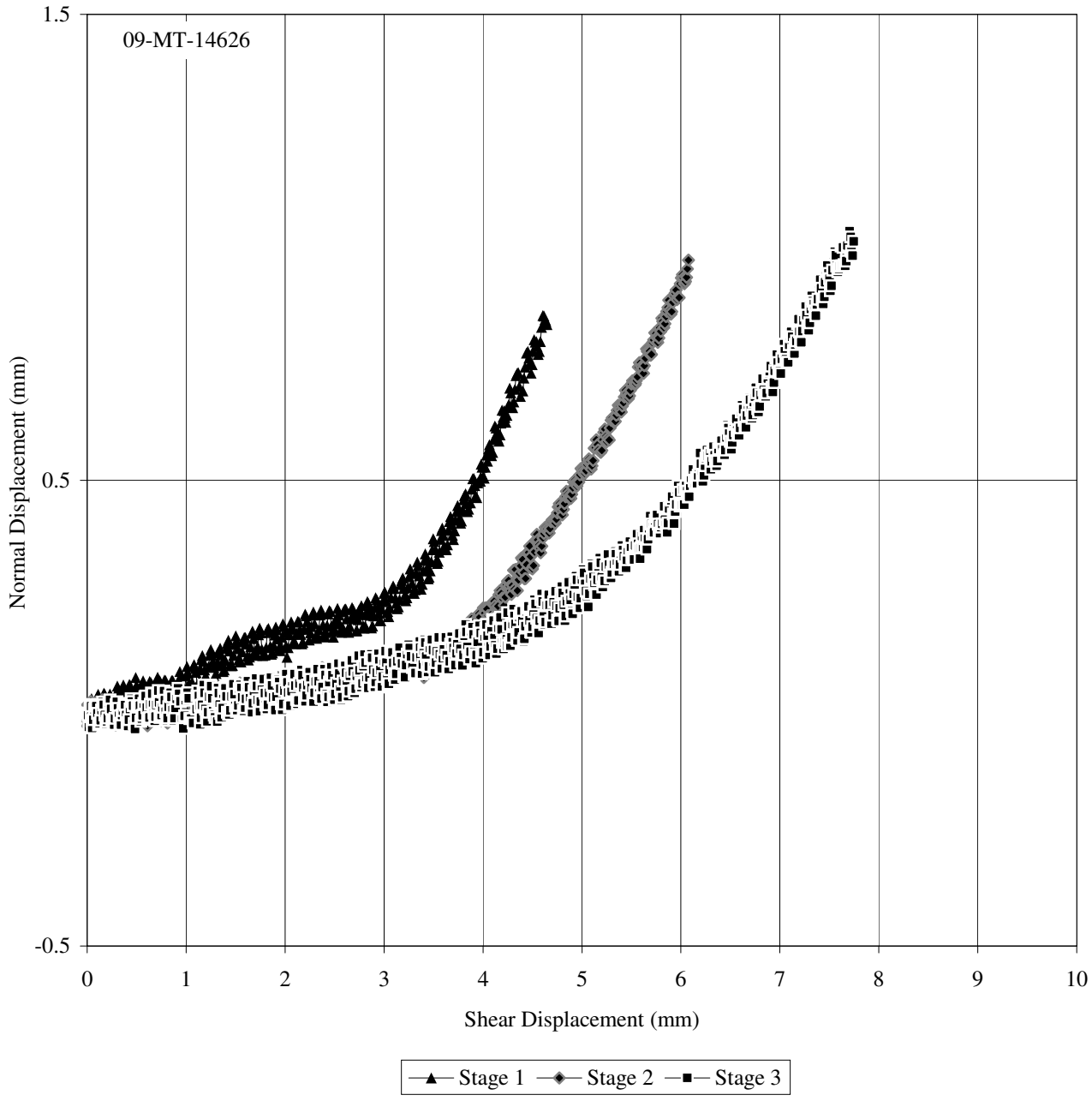
DIRECT SHEAR TEST
REPORT CERTIFICATE
(Reference Method : ISRM - Doc. 1 (Field), Part 2)

CLIENT :	Redbank Operations Pty Ltd	**JOB NO. :**	09-01-3096
PROJECT :	Submitted Samples	**Lab No. :**	09-MT-14626
LOCATION :	Redbank	**Date Tested :**	18-Nov-09
Sample Id :	, Sample No. : , Depth : (193.00 - 193.20)	**Discontinuity Type :**	Existing joint
Test Type :	Direct Shear , Multi-Stage on Existing Discontinuity		

Initial Specimen Details :

Core Diameter :	82.1 mm
Shear Plane Dip Angle :	52°

NORMAL DISPLACEMENT Vs SHEAR DISPLACEMENT



Authorised Signatory : _____ L. Harris _____ (L. Harris) **Date:** 18/11/2009

DIRECT SHEAR TEST

REPORT CERTIFICATE

(Reference Method : ISRM - Doc. 1 (Field), Part 2)

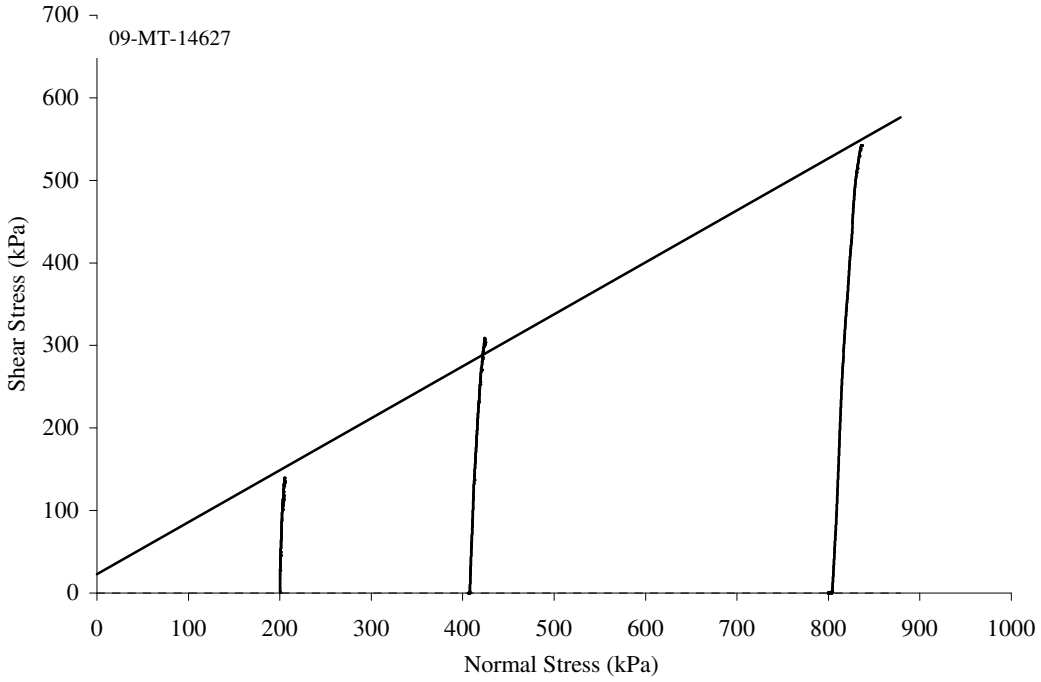
CLIENT : Redbank Operations Pty Ltd
PROJECT : Submitted Samples
LOCATION : Redbank
Sample Id : , Sample No. : , Depth : (101.90 - 102.23)
Test Type : Direct Shear , Multi-Stage on Existing Discontinuity

JOB NO. : 09-01-3096
Lab No. : 09-MT-14627
Date Tested : 18-Nov-09
Discontinuity Type : Existing joint

Initial Specimen Details :

Core Diameter : 82.9 mm
Shear Plane Dip Angle : 38°

Peak/Residual SHEAR STRESS Vs NORMAL STRESS



SHEAR STAGE DATA

Stage No	Strain Rate (mm/min)	Δ_{sf} (mm)	ε_{sf} (%)	Normal Stress σ_{no} (kPa)	Normal Stress σ_{nf} (kPa)	Shear Stress τ_f (kPa)
1	0.625	2.66	2.0	200	205	139
2	0.625	4.39	3.3	406	424	309
3	0.625	4.59	3.4	800	836	543

Peak - Cohesion, C (kPa) : 23 **Friction Angle, Ø (degrees) :** 32

Shear Plane description : Pre-test : Rough, Planar.
Post-test : As above with significant grinding..

Notes : Shear plane dip angle in relation to core axis only.
Line of best fit has been used to determine cohesion & friction angle values.
Sample supplied by client.

Sample tested in "as received" condition.

Certificate No. : 09-MT-14627 RDS

Authorised Signatory : _____ L. Harris _____ (L. Harris) **Date:** 18/11/2009

36 Railway Parade Welshpool WA 6106 Phone 1300 781 744 Fax (08) 9458 3700

DIRECT SHEAR TEST

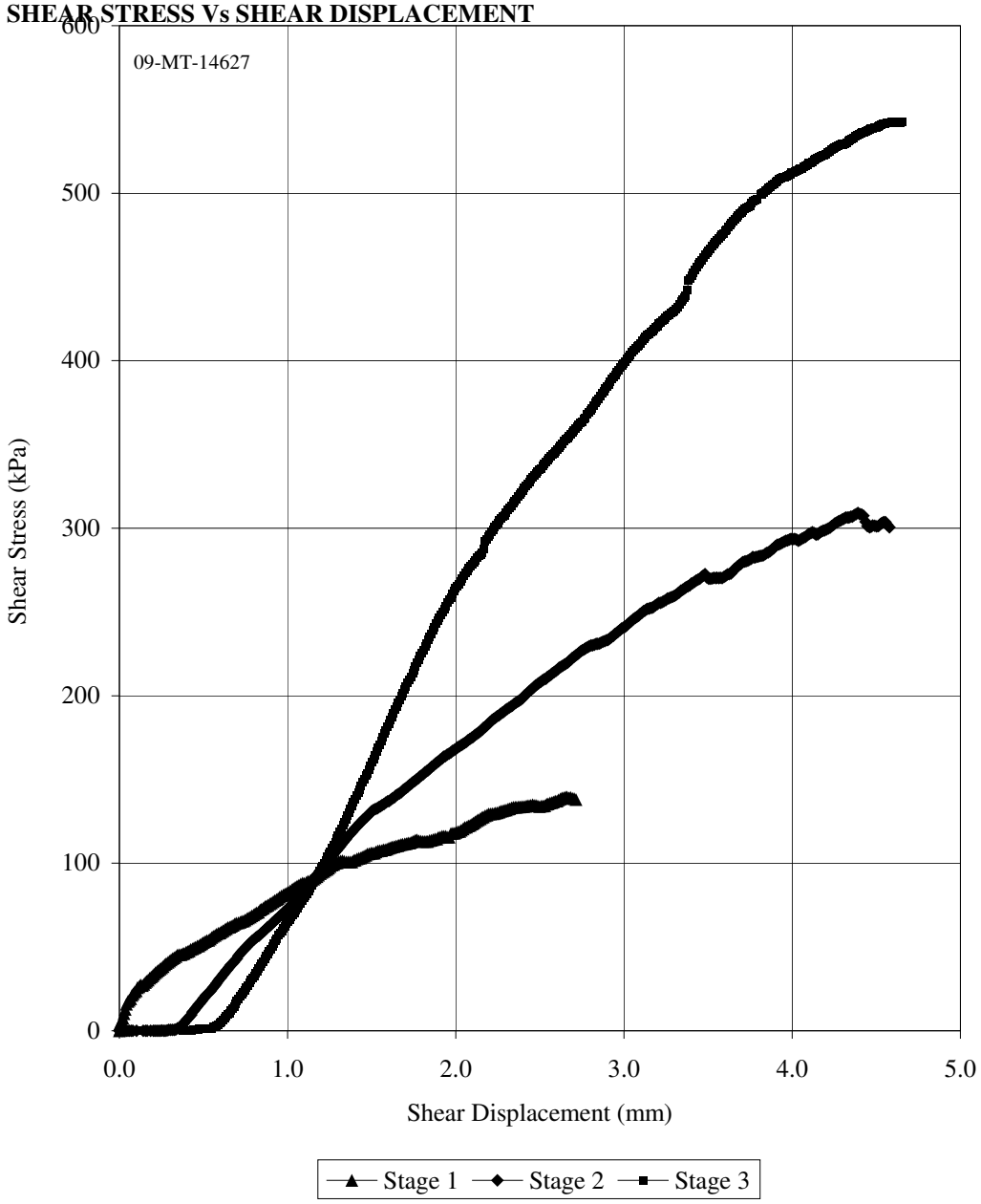
REPORT CERTIFICATE

(Reference Method : ISRM - Doc. 1 (Field), Part 2)

CLIENT : Redbank Operations Pty Ltd
PROJECT : Submitted Samples
LOCATION : Redbank
Sample Id : , Sample No. : , Depth : (101.90 - 102.23)
Test Type : Direct Shear , Multi-Stage on Existing Discontinuity
Initial Specimen Details :
Core Diameter : 82.9 mm
Shear Plane Dip Angle : 38°

JOB NO. : 09-01-3096
Lab No. : 09-MT-14627
Date Tested : 18-Nov-09
Discontinuity Type : Existing joint

SHEAR STRESS Vs SHEAR DISPLACEMENT



Authorised Signatory : _____ L. Harris _____ (L. Harris) **Date:** 18/11/2009

DIRECT SHEAR TEST

REPORT CERTIFICATE

(Reference Method : ISRM - Doc. 1 (Field), Part 2)

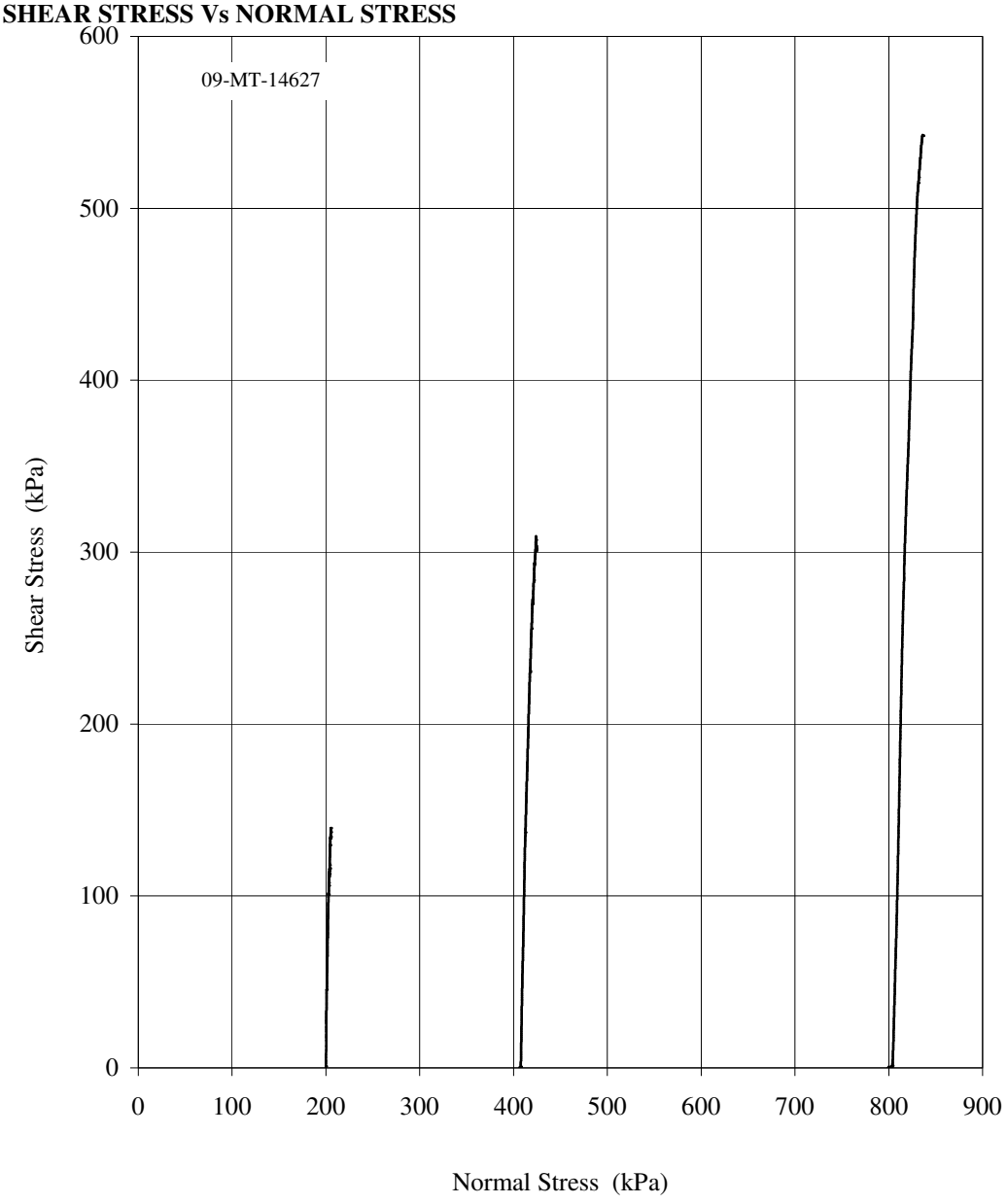
CLIENT : Redbank Operations Pty Ltd
PROJECT : Submitted Samples
LOCATION : Redbank
Sample Id : , Sample No. : , Depth : (101.90 - 102.23)
Test Type : Direct Shear , Multi-Stage on Existing Discontinuity

JOB NO. : 09-01-3096
Lab No. : 09-MT-14627
Date Tested : 18-Nov-09
Discontinuity Type : Existing joint

Initial Specimen Details :

Core Diameter :	82.9 mm
Shear Plane Dip Angle :	38°

SHEAR STRESS Vs NORMAL STRESS



Authorised Signatory : _____ L. Harris _____ (L. Harris) **Date:** 18/11/2009

SPECIMEN DESCRIPTION

REPORT CERTIFICATE

(Reference Method : ISRM - Doc. 1 (Field), Part 2)

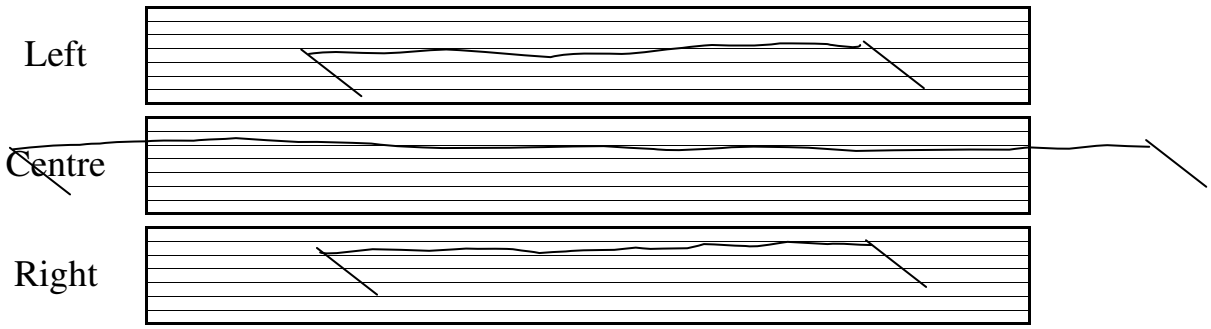
CLIENT : Redbank Operations Pty Ltd
PROJECT : Submitted Samples
LOCATION : Redbank
Sample Id : , Sample No. : , Depth : (101.90 - 102.23)
Test Type : Direct Shear , Multi-Stage on Existing Discontinuity

JOB NO. : 09-01-3096
Lab No. : 09-MT-14627
Date Tested : 18-Nov-09
Discontinuity Type : Existing joint

Initial Specimen Details :

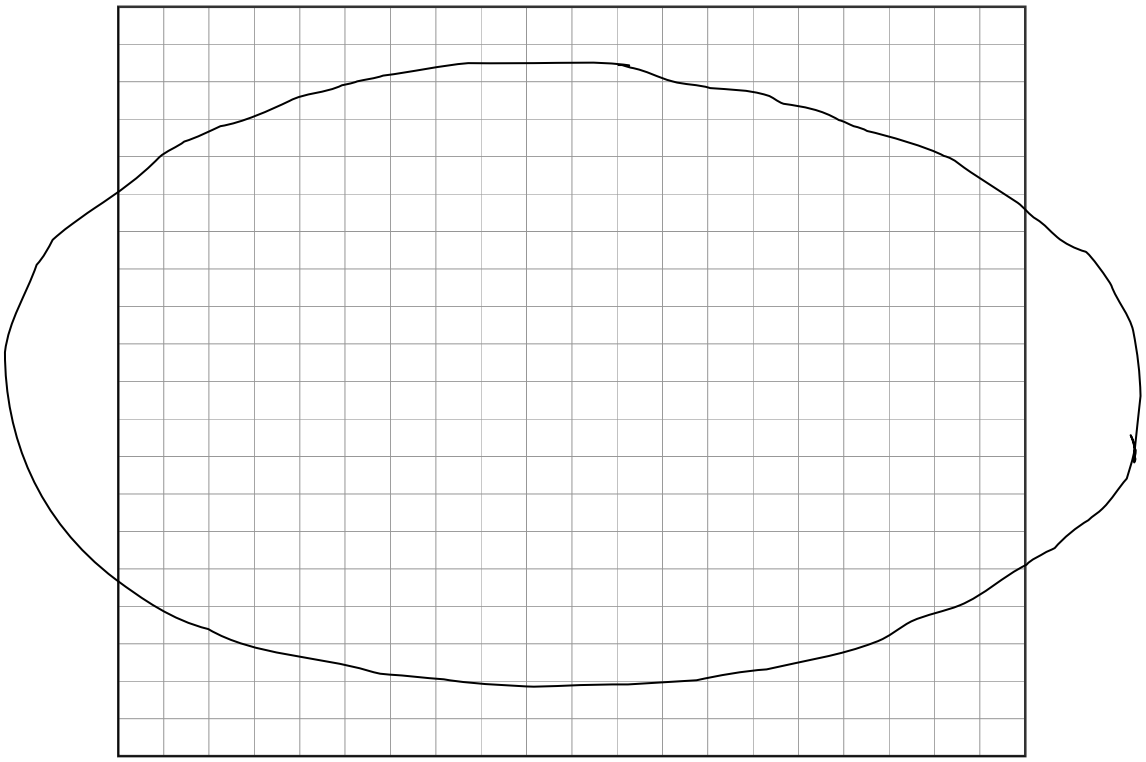
Core Diameter :	82.9 mm
Shear Plane Dip Angle :	38°

SPECIMEN PROFILE OF LOWER HALF



>>>>> DIRECTION OF SHEAR >>>>>

SHEAR SURFACE AREA OF LOWER HALF



>>>>> DIRECTION OF SHEAR >>>>>

Authorised Signatory : _____ L. Harris _____ (L. Harris) **Date:** 18/11/2009

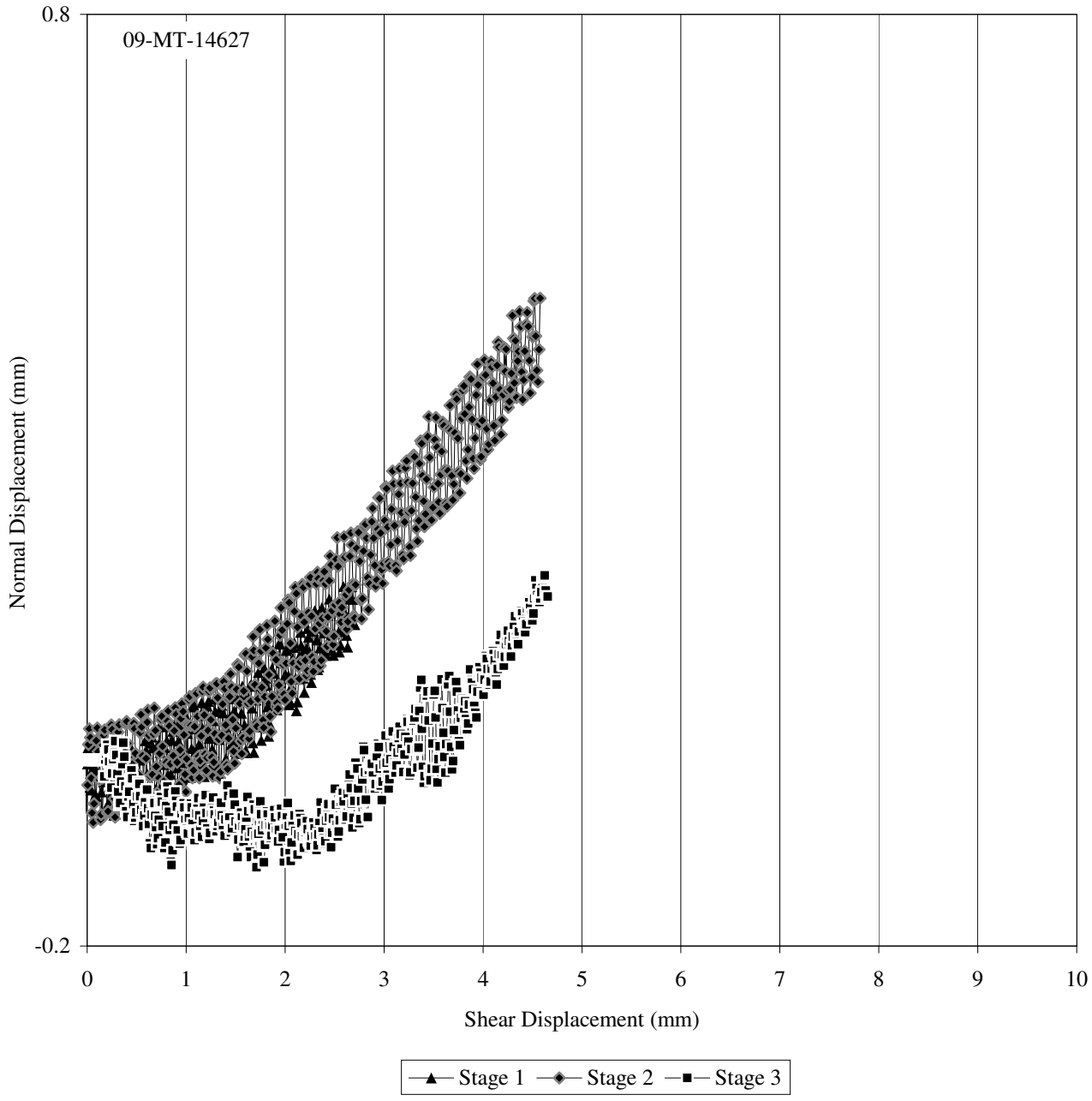
DIRECT SHEAR TEST
REPORT CERTIFICATE
(Reference Method : ISRM - Doc. 1 (Field), Part 2)

CLIENT :	Redbank Operations Pty Ltd	**JOB NO. :**	09-01-3096
PROJECT :	Submitted Samples	**Lab No. :**	09-MT-14627
LOCATION :	Redbank	**Date Tested :**	18-Nov-09
Sample Id :	, Sample No. : , Depth : (101.90 - 102.23)	**Discontinuity Type :**	Existing joint
Test Type :	Direct Shear , Multi-Stage on Existing Discontinuity		

Initial Specimen Details :

Core Diameter :	82.9 mm
Shear Plane Dip Angle :	38°

NORMAL DISPLACEMENT Vs SHEAR DISPLACEMENT



Authorised Signatory : _____ L. Harris _____ (L. Harris) **Date:** 18/11/2009

DIRECT SHEAR TEST

REPORT CERTIFICATE

(Reference Method : ISRM - Doc. 1 (Field), Part 2)

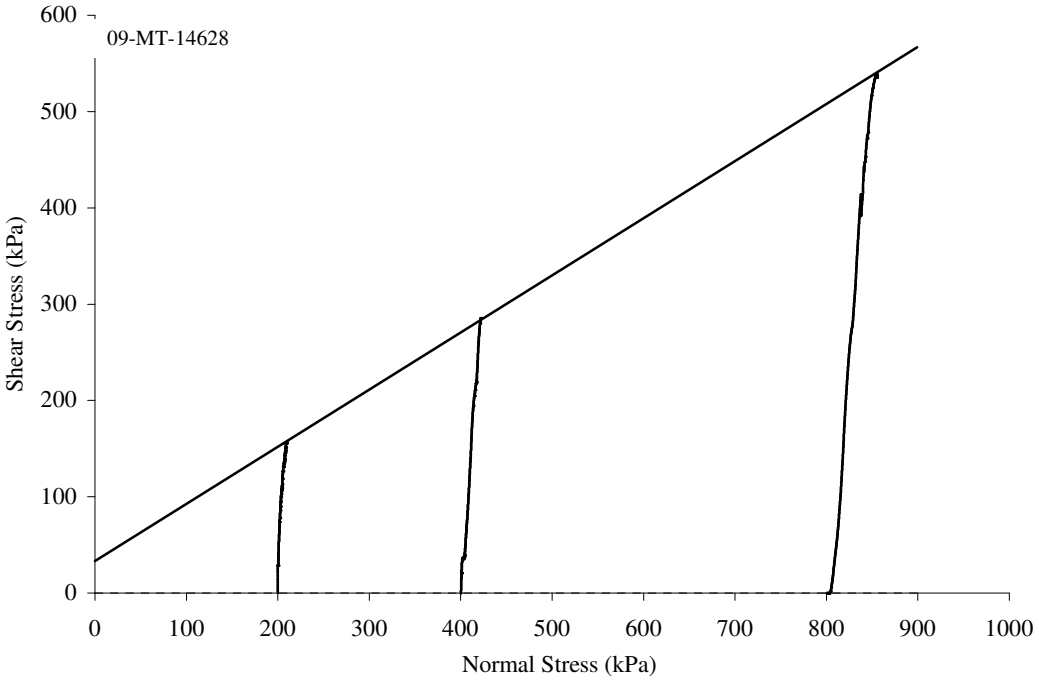
CLIENT : Redbank Operations Pty Ltd
PROJECT : Submitted Samples
LOCATION : Redbank
Sample Id : , Sample No. : , Depth : (228.33 - 228.50)
Test Type : Direct Shear , Multi-Stage on Existing Discontinuity

JOB NO. : 09-01-3096
Lab No. : 09-MT-14628
Date Tested : 18-Nov-09
Discontinuity Type : Existing Joint

Initial Specimen Details :

Core Diameter : 82.8 mm
Shear Plane Dip Angle : 67°

Peak/Residual SHEAR STRESS Vs NORMAL STRESS



SHEAR STAGE DATA

Stage No	Strain Rate (mm/min)	Δ_{sf} (mm)	ε_{sf} (%)	Normal Stress σ_{no} (kPa)	Normal Stress σ_{nf} (kPa)	Shear Stress τ_f (kPa)
1	0.625	3.17	3.5	200	209	156
2	0.625	3.66	4.1	400	422	285
3	0.625	4.53	5.0	800	855	540

Peak - Cohesion, C (kPa) : 33 **Friction Angle, Ø (degrees) :** 31

Shear Plane description : Pre-test : Smooth, Planar.
Post-test : As above with slight grinding..

Notes : Shear plane dip angle in relation to core axis only.
Line of best fit has been used to determine cohesion & friction angle values.
Sample supplied by client.

Sample tested in "as received" condition.

Certificate No. : 09-MT-14628 RDS

Authorised Signatory : _____ L. Harris _____ (L. Harris) **Date:** 18/11/2009

36 Railway Parade Welshpool WA 6106 Phone 1300 781 744 Fax (08) 9458 3700

DIRECT SHEAR TEST

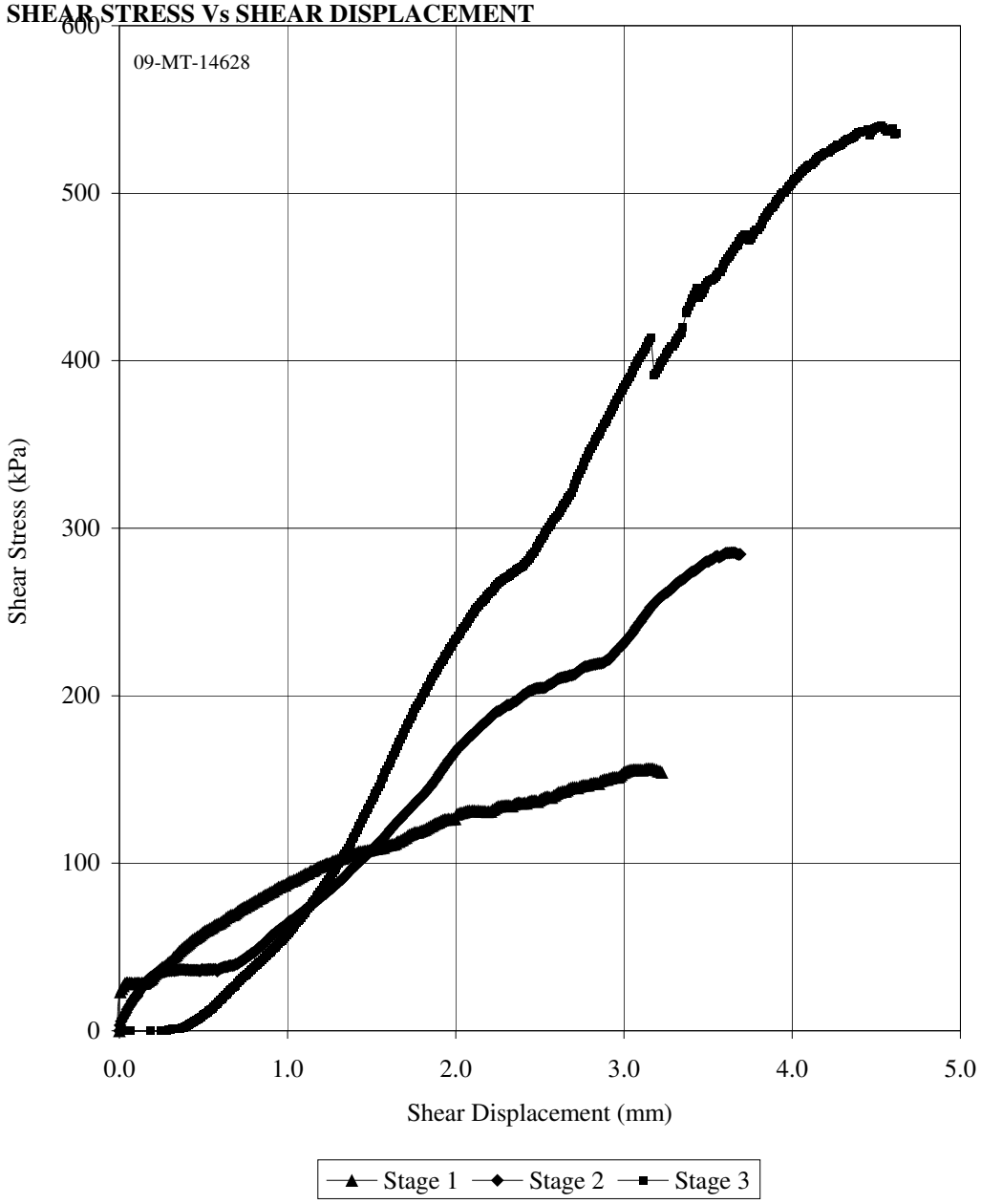
REPORT CERTIFICATE

(Reference Method : ISRM - Doc. 1 (Field), Part 2)

CLIENT : Redbank Operations Pty Ltd
PROJECT : Submitted Samples
LOCATION : Redbank
Sample Id : , Sample No. : , Depth : (228.33 - 228.50)
Test Type : Direct Shear , Multi-Stage on Existing Discontinuity
Initial Specimen Details :
Core Diameter : 82.8 mm
Shear Plane Dip Angle : 67°

JOB NO. : 09-01-3096
Lab No. : 09-MT-14628
Date Tested : 18-Nov-09
Discontinuity Type : Existing Joint

SHEAR STRESS Vs SHEAR DISPLACEMENT



Authorised Signatory : _____ L. Harris _____ (L. Harris) **Date:** 18/11/2009

DIRECT SHEAR TEST

REPORT CERTIFICATE

(Reference Method : ISRM - Doc. 1 (Field), Part 2)

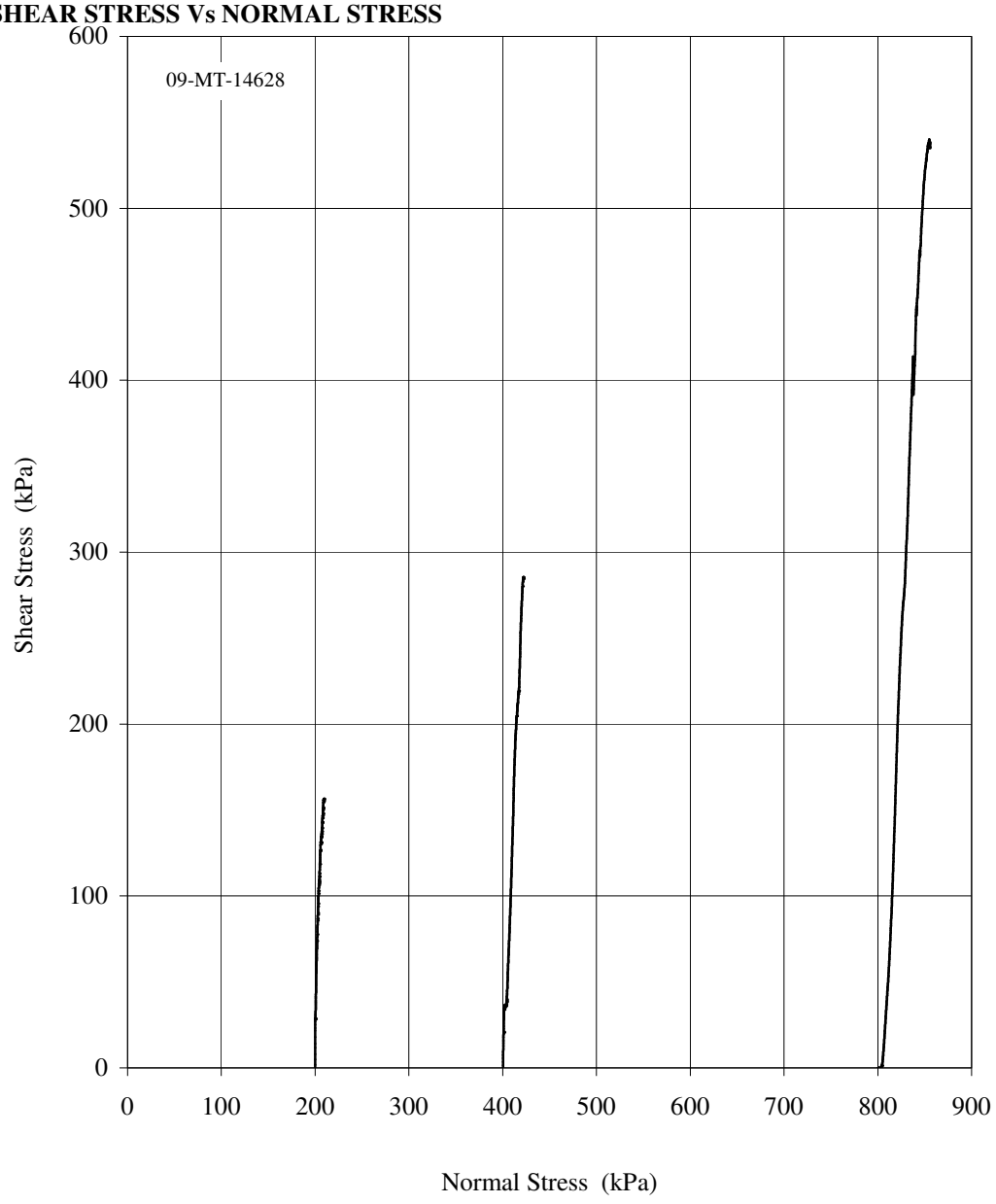
CLIENT : Redbank Operations Pty Ltd
PROJECT : Submitted Samples
LOCATION : Redbank
Sample Id : , Sample No. : , Depth : (228.33 - 228.50)
Test Type : Direct Shear , Multi-Stage on Existing Discontinuity

JOB NO. : 09-01-3096
Lab No. : 09-MT-14628
Date Tested : 18-Nov-09
Discontinuity Type : Existing Joint

Initial Specimen Details :

Core Diameter : 82.8 mm
Shear Plane Dip Angle : 67°

SHEAR STRESS Vs NORMAL STRESS



Authorised Signatory : _____ L. Harris _____ (L. Harris) **Date:** 18/11/2009

SPECIMEN DESCRIPTION

REPORT CERTIFICATE

(Reference Method : ISRM - Doc. 1 (Field), Part 2)

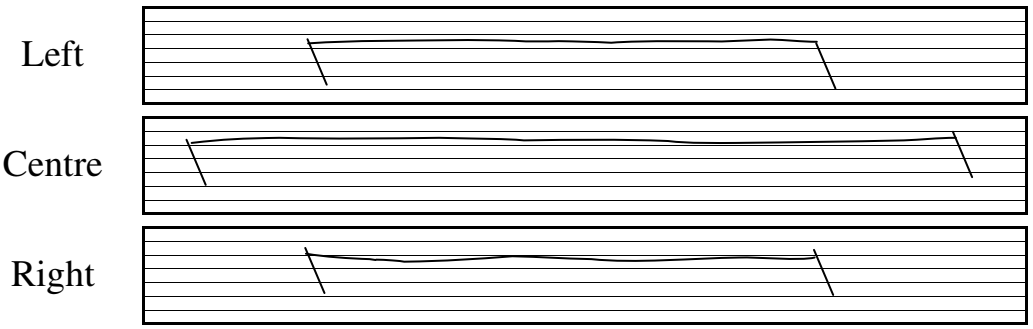
CLIENT : Redbank Operations Pty Ltd
PROJECT : Submitted Samples
LOCATION : Redbank
Sample Id : , Sample No. : , Depth : (228.33 - 228.50)
Test Type : Direct Shear , Multi-Stage on Existing Discontinuity

JOB NO. : 09-01-3096
Lab No. : 09-MT-14628
Date Tested : 18-Nov-09
Discontinuity Type : Existing Joint

Initial Specimen Details :

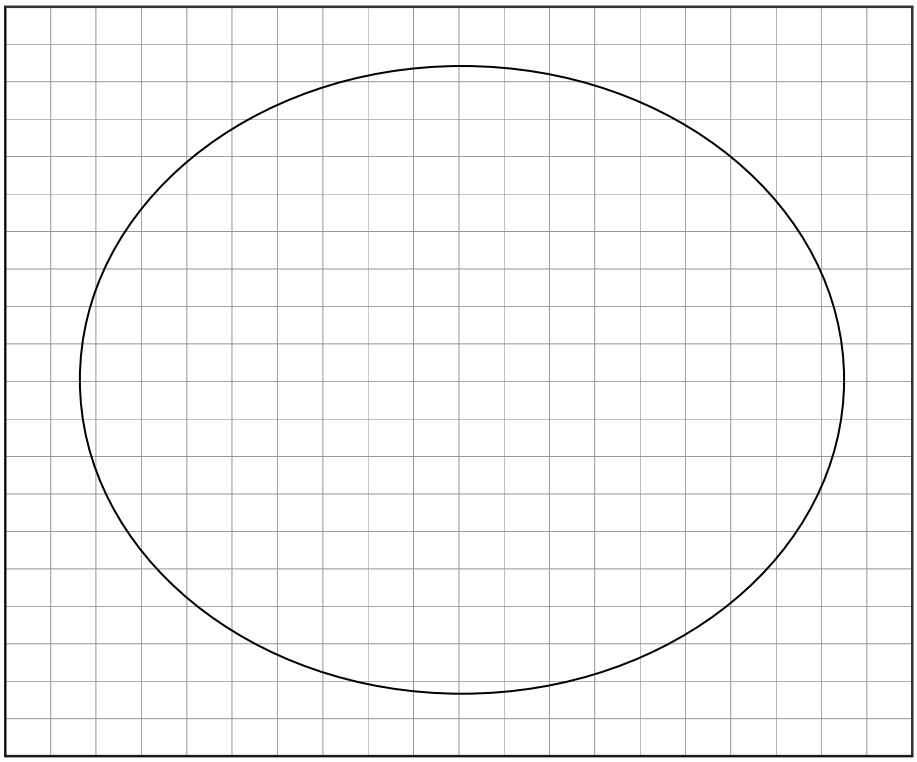
Core Diameter : 82.8 mm
Shear Plane Dip Angle : 67°

SPECIMEN PROFILE OF LOWER HALF



>>>>> DIRECTION OF SHEAR >>>>>

SHEAR SURFACE AREA OF LOWER HALF



>>>>> DIRECTION OF SHEAR >>>>>

Authorised Signatory : _____ L. Harris _____ (L. Harris) **Date:** 18/11/2009

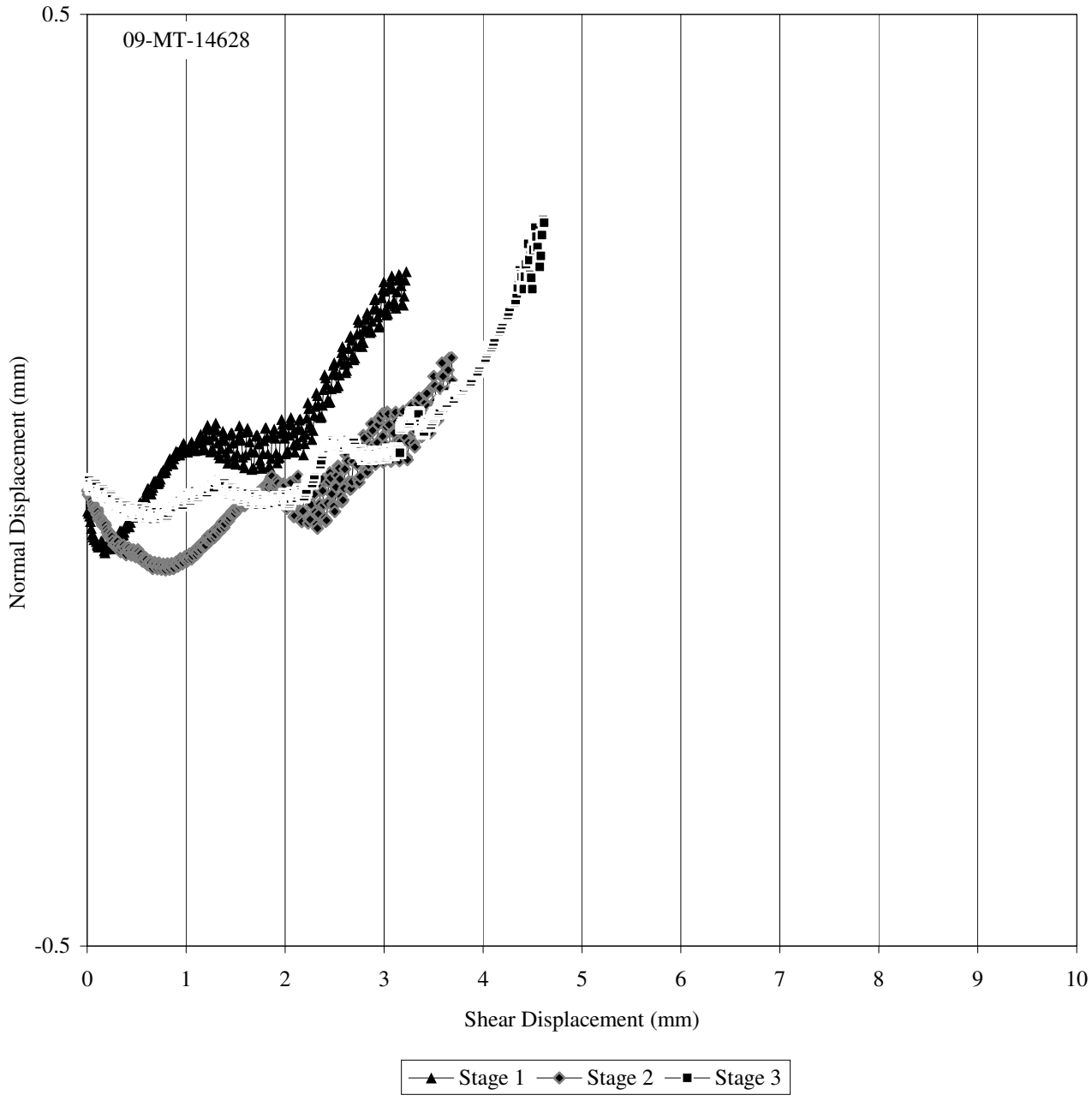
DIRECT SHEAR TEST
REPORT CERTIFICATE
(Reference Method : ISRM - Doc. 1 (Field), Part 2)

CLIENT :	Redbank Operations Pty Ltd	**JOB NO. :**	09-01-3096
PROJECT :	Submitted Samples	**Lab No. :**	09-MT-14628
LOCATION :	Redbank	**Date Tested :**	18-Nov-09
Sample Id :	, Sample No. : , Depth : (228.33 - 228.50)	**Discontinuity Type :**	Existing Joint
Test Type :	Direct Shear , Multi-Stage on Existing Discontinuity		

Initial Specimen Details :

Core Diameter :	82.8 mm
Shear Plane Dip Angle :	67°

NORMAL DISPLACEMENT Vs SHEAR DISPLACEMENT



Authorised Signatory : _____ L. Harris _____ (L. Harris) **Date:** 18/11/2009

DIRECT SHEAR TEST

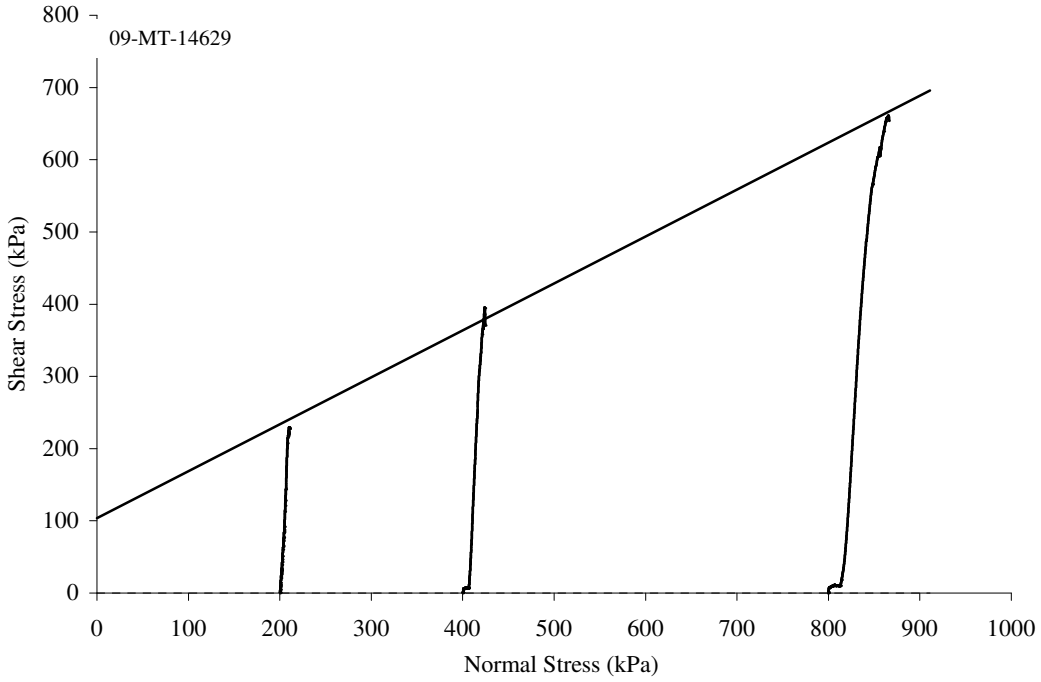
REPORT CERTIFICATE

(Reference Method : ISRM - Doc. 1 (Field), Part 2)

CLIENT : Redbank Operations Pty Ltd
PROJECT : Submitted Samples
LOCATION : Redbank
Sample Id : , Sample No. : , Depth : (149.76 - 150.18)
Test Type : Direct Shear , Multi-Stage on Existing Discontinuity
Initial Specimen Details :
Core Diameter : 82.1 mm
Shear Plane Dip Angle : 50°

JOB NO. : 09-01-3096
Lab No. : 09-MT-14629
Date Tested : 18-Nov-09
Discontinuity Type : Existing Joint

Peak/Residual SHEAR STRESS Vs NORMAL STRESS



SHEAR STAGE DATA				Normal Stress		Shear Stress
Stage No	Strain Rate (mm/min)	Δ_{sf} (mm)	ε_{sf} (%)	σ_{no} (kPa)	σ_{nf} (kPa)	τ_f (kPa)
1	0.625	3.50	3.6	200	210	229
2	0.625	4.24	4.4	400	424	396
3	0.625	5.72	5.9	800	866	661

Peak - Cohesion, C (kPa) : 104 **Friction Angle, Ø (degrees) :** 33

Shear Plane description : Pre-test : Smooth, Stepped.
Post-test : As above with significant grinding and fracturing..

Notes : Shear plane dip angle in relation to core axis only.
Line of best fit has been used to determine cohesion & friction angle values.
Sample supplied by client.

Sample tested in "as received" condition.

Certificate No. : 09-MT-14629 RDS

Authorised Signatory : _____ L. Harris _____ (L. Harris) **Date:** 18/11/2009

36 Railway Parade Welshpool WA 6106 Phone 1300 781 744 Fax (08) 9458 3700

DIRECT SHEAR TEST

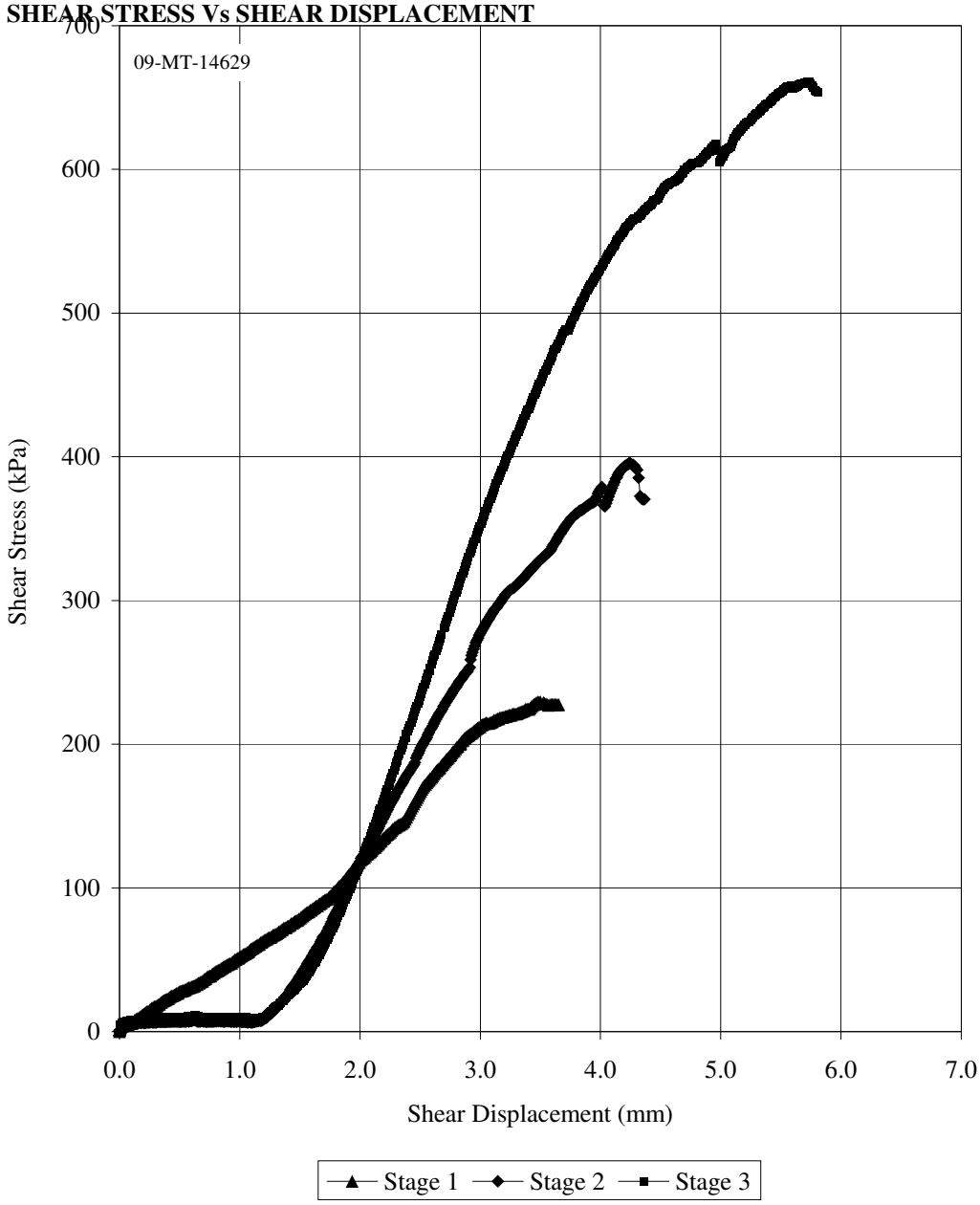
REPORT CERTIFICATE

(Reference Method : ISRM - Doc. 1 (Field), Part 2)

CLIENT : Redbank Operations Pty Ltd
PROJECT : Submitted Samples
LOCATION : Redbank
Sample Id : , Sample No. : , Depth : (149.76 - 150.18)
Test Type : Direct Shear , Multi-Stage on Existing Discontinuity
Initial Specimen Details :
Core Diameter : 82.1 mm
Shear Plane Dip Angle : 50°

JOB NO. : 09-01-3096
Lab No. : 09-MT-14629
Date Tested : 18-Nov-09
Discontinuity Type : Existing Joint

SHEAR STRESS Vs SHEAR DISPLACEMENT



Authorised Signatory : _____ L. Harris _____ (L. Harris) **Date:** 18/11/2009

DIRECT SHEAR TEST

REPORT CERTIFICATE

(Reference Method : ISRM - Doc. 1 (Field), Part 2)

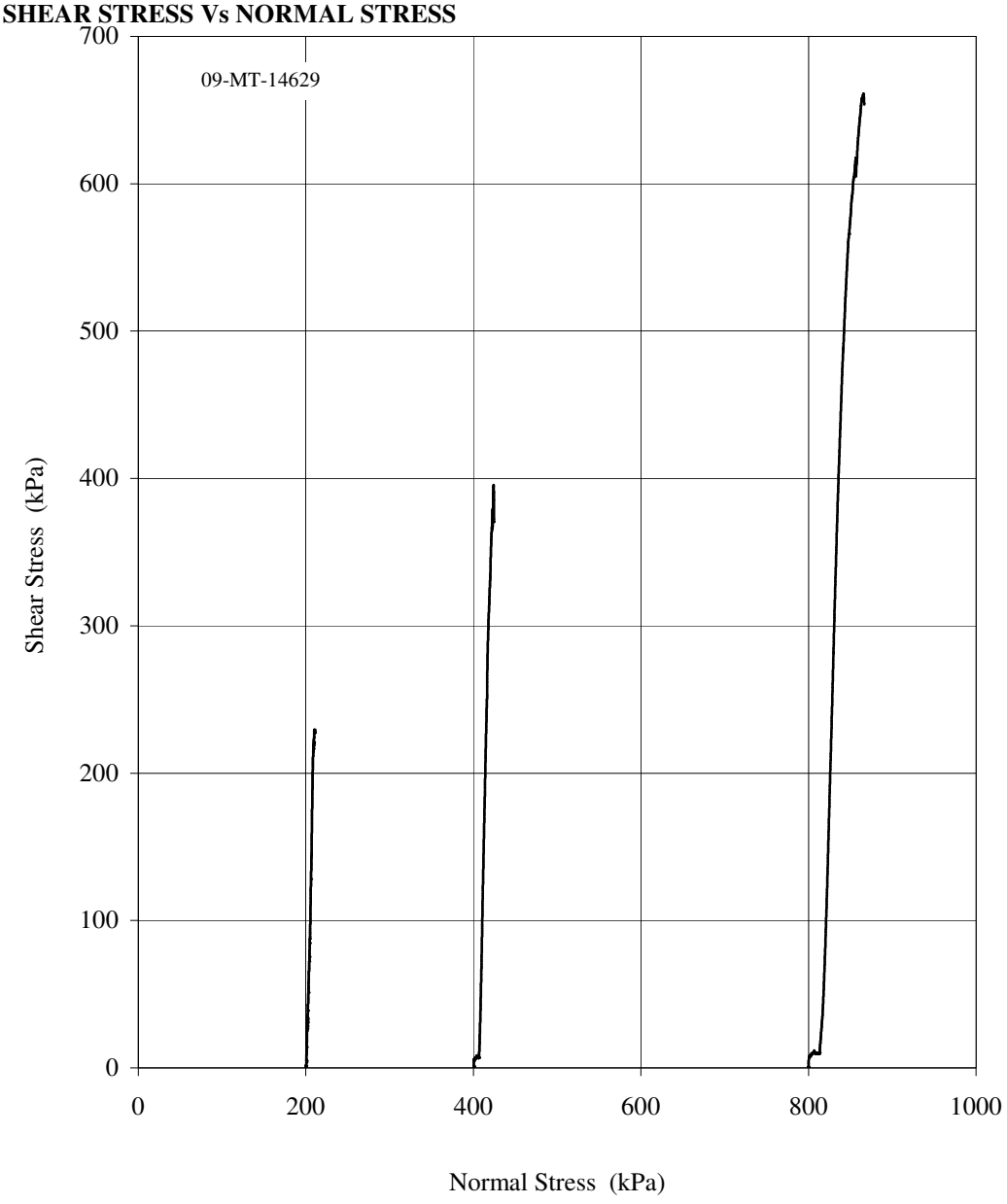
CLIENT : Redbank Operations Pty Ltd
PROJECT : Submitted Samples
LOCATION : Redbank
Sample Id : , Sample No. : , Depth : (149.76 - 150.18)
Test Type : Direct Shear , Multi-Stage on Existing Discontinuity

JOB NO. : 09-01-3096
Lab No. : 09-MT-14629
Date Tested : 18-Nov-09
Discontinuity Type : Existing Joint

Initial Specimen Details :

Core Diameter :	82.1 mm
Shear Plane Dip Angle :	50°

SHEAR STRESS Vs NORMAL STRESS



Authorised Signatory : _____ L. Harris _____ (L. Harris) **Date:** 18/11/2009

SPECIMEN DESCRIPTION

REPORT CERTIFICATE

(Reference Method : ISRM - Doc. 1 (Field), Part 2)

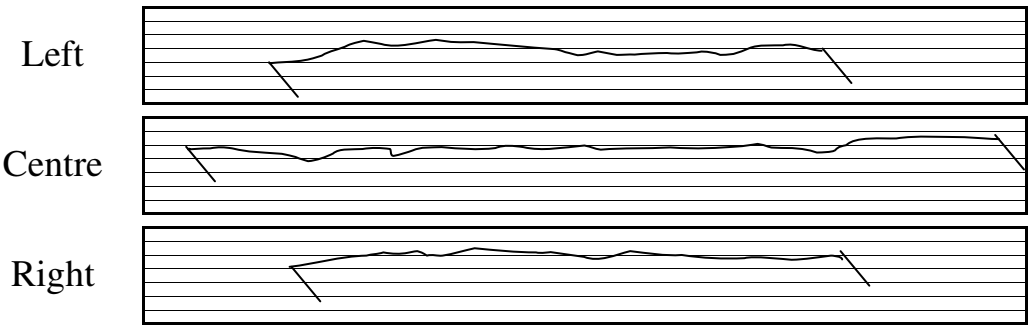
CLIENT : Redbank Operations Pty Ltd
PROJECT : Submitted Samples
LOCATION : Redbank
Sample Id : , Sample No. : , Depth : (149.76 - 150.18)
Test Type : Direct Shear , Multi-Stage on Existing Discontinuity

JOB NO. : 09-01-3096
Lab No. : 09-MT-14629
Date Tested : 18-Nov-09
Discontinuity Type : Existing Joint

Initial Specimen Details :

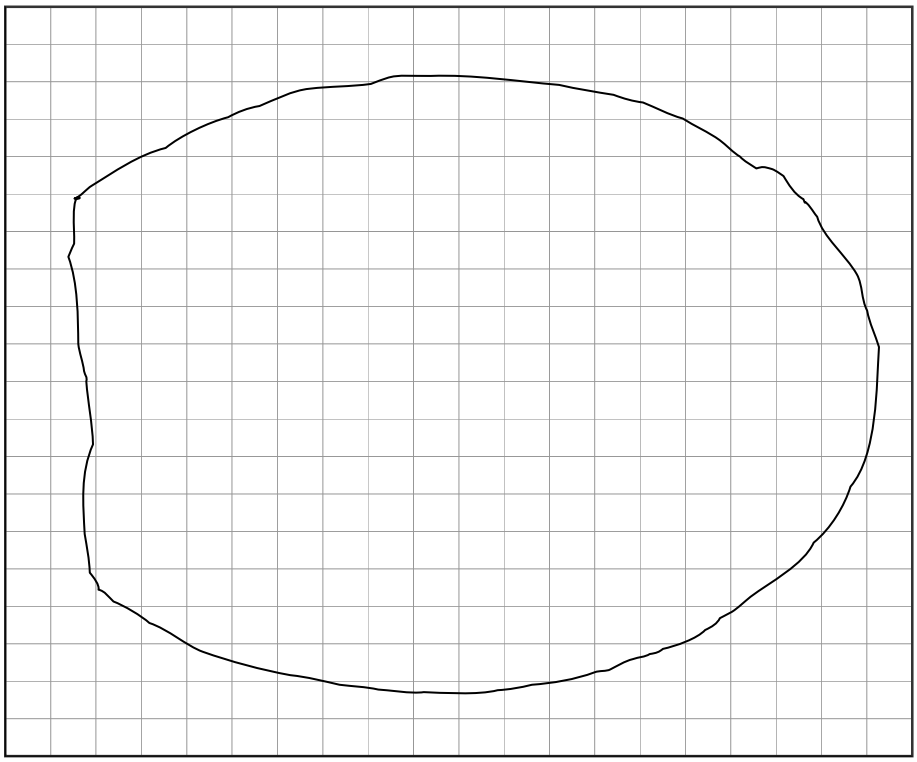
Core Diameter :	82.1 mm
Shear Plane Dip Angle :	50°

SPECIMEN PROFILE OF LOWER HALF



>>>>> DIRECTION OF SHEAR >>>>>

SHEAR SURFACE AREA OF LOWER HALF



>>>>> DIRECTION OF SHEAR >>>>>

Authorised Signatory : _____ L. Harris _____ (L. Harris) **Date:** 18/11/2009

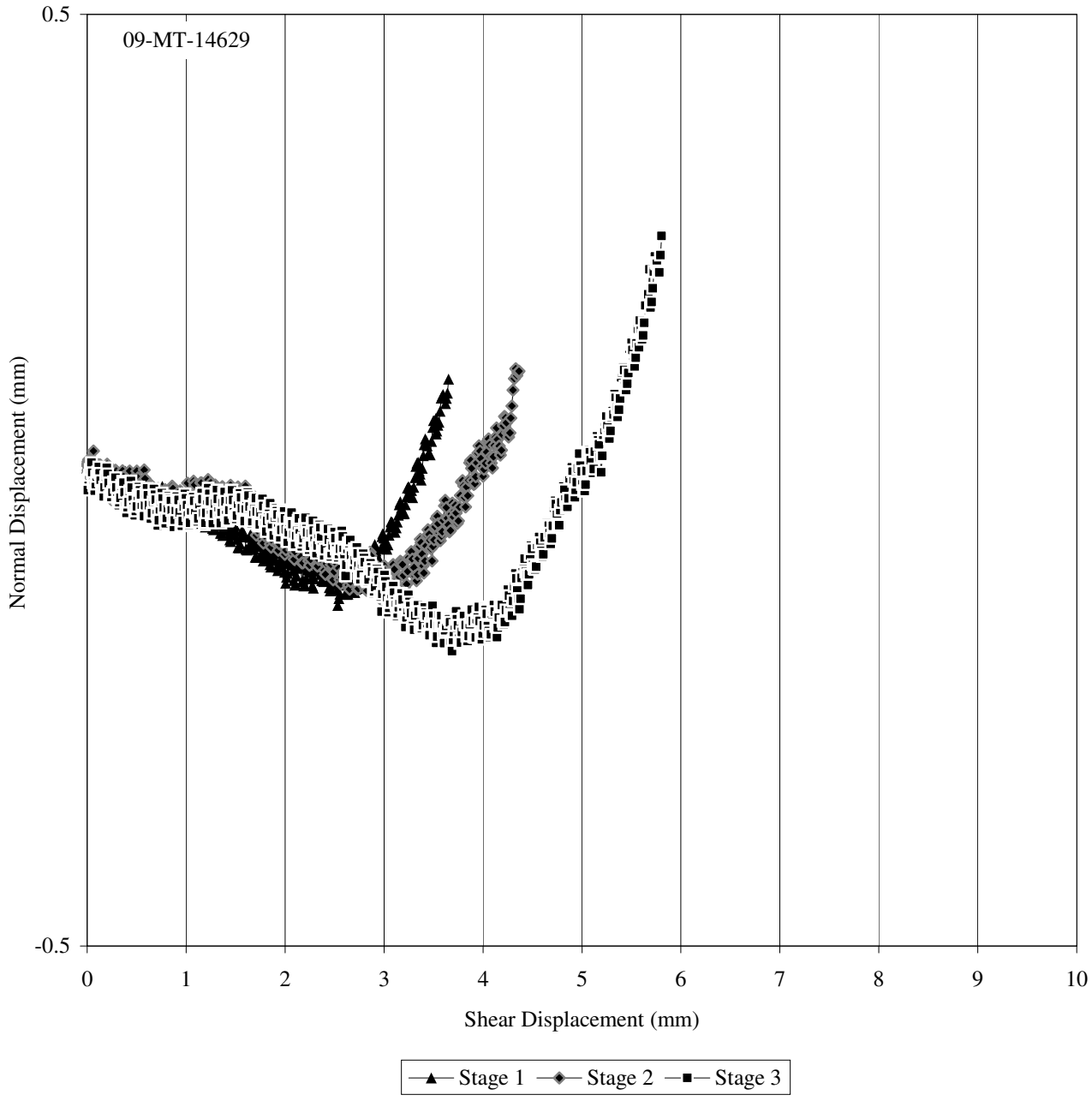
DIRECT SHEAR TEST
REPORT CERTIFICATE
(Reference Method : ISRM - Doc. 1 (Field), Part 2)

CLIENT :	Redbank Operations Pty Ltd	**JOB NO. :**	09-01-3096
PROJECT :	Submitted Samples	**Lab No. :**	09-MT-14629
LOCATION :	Redbank	**Date Tested :**	18-Nov-09
Sample Id :	, Sample No. : , Depth : (149.76 - 150.18)	**Discontinuity Type :**	Existing Joint
Test Type :	Direct Shear , Multi-Stage on Existing Discontinuity		

Initial Specimen Details :

Core Diameter :	82.1 mm
Shear Plane Dip Angle :	50°

NORMAL DISPLACEMENT Vs SHEAR DISPLACEMENT



Authorised Signatory : _____ L. Harris ___ (L. Harris) **Date:** 18/11/2009

NOTES ON TESTING

Job No.	Lab Sample No:	Client Sample ID:	Observations / Comments / Reason Unable to Test
09-01-3096	09-MT-14608	BLDH09-002 (205.46-205.66m	Sample fractured during preparation. Insufficient suitable sample remaining for UCS testing.

This form is used to record reasons as to why changes or deviations in testing occur or as to why a test could not be performed. Must be kept with head sheet.