# Appendix E Non-Cored and Cored Borehole Logs and Photographs

# URS

Ε

43167888/Paling Yards Geotechnical Report/3

URS Non-	-cored Hole		BC	OREH	OLE BH-01			Sheet 1	of 1
JRS Australia Pty Ltd _vl 4, 407 Pacific Highway, Artarmon, NSW Drilling Contractor: <b>Strategic Drilli</b>		Reference:	Paling Yards Wind Farm	Client: Location:	Union Fenosa Wind A Paling Yards, NSW	ustra	lia		
Logged By: T Huang Checked By: D Tulasi Date Started: 18-7-11 Date Finished: 20-7-11	Bore Size: 150 mm Total Depth: 1.40 m Casing Size: mm	Project No.: 4 Relative Level: Coordinates: Permit No:	43167888 870.00 mRL 6215202.86 mN 750045.99 mE	Drill Type: Drill Model: Drill Fluid:	SFA Auger "TC" Bit CME 55LC track mounted N/A	drilling	g rig		
뉴     뽀庑   ᅙ호   Al	AMPLING GROUND ND OTHER WATER TESTING DATA AND COMMENTS	1 1 5	DESCRIPT			MOISTURE CONDITION	NSCS	CONSISTENCY/ DENSITY	<b>GEOLOGICAL</b> DESCRIPTION
- Contraction of the second se			SILTSTONE, Iow to weathered, pale brow	d gravel, gra	ss covered, overburden			-	

SYDNEY\_GEOTECH J:JUDBS/4316788815 WORKS/BOREHOLE LOGS AND PHOTOS/43167888-BH NON-CORED LOGS.GPJ URS1.GDT 28/7/11

# **URS** Cored Borehole

# **BOREHOLE BH-01**

URS Australia PTY Lv4, 407 Pacific H	Y LTD wy, Artarmon NSW 2064	Phone: +61 2 8925 5500 Fax: +61 2 8925 5555	Project Reference:	Paling Yards Wind Farm	Client:	Union Fenosa Wind Australia
Drilling Contracto	or: Strategic Drilling	g Services	Project No.: 4	13167888	Location:	Paling Yards, NSW
Logged By:	T Huang	Bore Size: 100 mm	Relative Leve	l: 870.00 mRL	Drill Type:	NMLC - Diamond Impreg. Bit
Checked By:	D Tulasi	Casing Size: mm Total Depth: 20.00 m	Coordinates:	6215202.86 mN	Drill Model	CME 55LC track mounted drilling rig
Date Started:	18-7-11	Borehole Inclination and		750045.99 mE		5.5
Date Finished:	20-7-11	Bearing: 90° from horizontal at ° True North	Permit No:		Drill Fluid:	N/A

DF	RILLING			MATERIAL DESCRIPTIO	N		MATERIAL DESCRIPTION DISCONTINUITY DESCRIP								
ME THOD WATER RUN/RECOVERY	FIELD TESTS/ SAMPLING	O DEPTH (m)	GRAPHIC LOG	DESCRIPTION OF STRATA (Rock type, strength, Weathering, color, fabric, grain size, inclusions, degree of fracturing)	WEATHERING	STRENGTH Is (50) MPa	RQD (%)	0-19 20-49 50-99 100-199 SPACING 500-599 (mm) 5600	DEFECT LOG	DEFECT DESCRIPTION (Defect type, inclination, shape, roughness, infill, thickness)					
NMLC- DIAMOND IMPREGNATED BIT				Continues from Non-Cored Log at 1.4m SANDSTONE, medium to high strength, distinctly weathered, pale grey and pale brown, fine to coarse grained sand, with a trace of medium to gravel size quartz, with a trace of clay infilling along joints, slight fractured SILTSTONE, medium to high strength, extremely weathered to distinctly weathered, pale brown to orange, with some fine to coarse grained sand, with some medium to gravel size quartz, with some clay infilling along joints, slightly fractured With iron staining, 2.63 to 2.72m	DW		1.4 58 2 35 3			<ul> <li>JN, 80*, PI, SR, Qz</li> <li>JN, 45', PI, SR, Qz</li> <li>DZ, 20*, 1.72 to 1.77m</li> <li>JN, 60*, PI-Ir, SR, Qz</li> <li>Hand Break</li> <li>Organic Roots</li> <li>JN, 45', PI, SR, along with CS, 2mm thick</li> <li>JN, 45', PI, SR, along with CS, 8mm thick</li> <li>JN, 60', PI, SR, along with CS, 8mm thick</li> <li>JN, 60', PI, SR, Qz</li> <li>Drilling Induced Break</li> <li>JN, 60', PI, SR, Fe</li> <li>JN, 60', PI, SR, Fe</li> <li>JN, 60', PI, SR, Qz</li> <li>Drilling Induced Break</li> <li>JN, 65*, PI, S, Qz</li> <li>Drilling Induced Break</li> <li>DZ, 0'', 3.21 to 3.23m</li> <li>JN, 60', PI, SR, SR</li> <li>JN, 60', PI, SR</li> <li>JN, 60', PI, SR</li> <li>JN, 60', PI, SR</li> <li>JN, 60', PI, SR</li> </ul>					
NMLC - UIAN		 - - - - - - - - -	× × × × × × × × × × × × × × × × × × ×	Colour changes to pale grey, mottled pale brown and orange SILTSTONE, high strength, slightly weathered, pale brown and pale grey, with some fine to	DW XW		16 4 66			→JN, 70*, PI, SR — DZ, 60*, 3.54 to 3.8m — JN, 70*, PI, SR → JN, 70*, PI, SR → Hand Break → DZ, 70*, 4 to 4.23m					
			× × × × × × × × × × × × × × × × × × ×	coarse grained sand, with some interbeded sandstone band and medium to gravel size quartz, with some clay infilling along joints, slightly fractured			5			— Hand Break — JN, 60*, PI, SR, Qz					

## **Cored Borehole**

### **BOREHOLE BH-01**

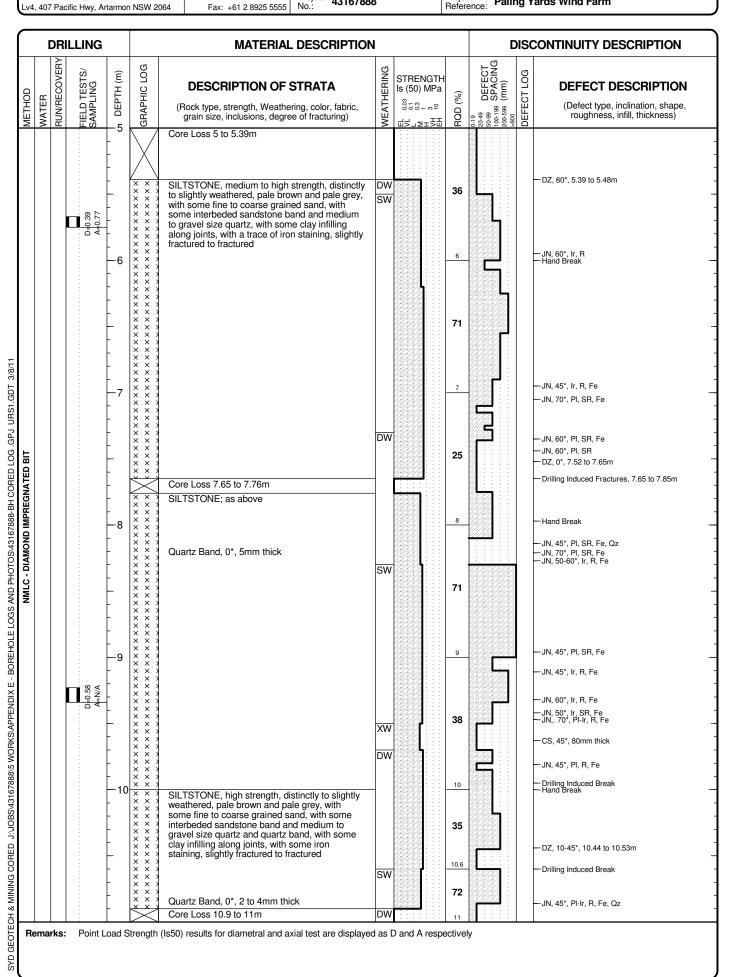
URS Australia PTY LTD

PC

Phone: +61 2 8925 5500 Fax: +61 2 8925 5555

Project **43167888** 

Project Reference: Paling Yards Wind Farm Sheet 2 of 4



### **BOREHOLE BH-01**

URS Australia PTY LTD Lv4, 407 Pacific Hwy, Artarmon NSW 2064

Phone: +61 2 8925 5500 Fax: +61 2 8925 5555

**Cored Borehole** 

Project No.

43167888

Project Reference: Paling Yards Wind Farm Sheet 3 of 4

DRILLING MATERIAL DESCRIPTION DISCONTINUITY DESCRIPTION DEFECT SPACING (mm) RUN/RECOVER' LOG NEATHERING Ē DEFECT LOG STRENGTH FIELD TEST **DESCRIPTION OF STRATA DEFECT DESCRIPTION** DEPTH ( Is (50) MPa GRAPHIC RQD (%) METHOD WATER 0.03 (Defect type, inclination, shape, (Rock type, strength, Weathering, color, fabric, grain size, inclusions, degree of fracturing) 0-19 20-49 50-99 100-199 200-599 roughness, infill, thickness) 600 ΞF לב SILTSTONE; as above SW Quartz Band, 60\*, 4 to 5mm thick Quartz Band, 70\*, 2 to 6mm thick 92 Quartz Band, 70\*, 2 to 6mm thick 12 -Hand Break -JN, 45\*, PI, SR, Fe 93 -JN, 60\*, PI-Ir, SR, Fe - Drilling Induced Break SYD GEOTECH & MINING CORED J: UOBS/4316788815 WORKS/APPENDIX E - BOREHOLE LOGS AND PHOTOS/43167888-BH CORED LOG (GPJ URS1, GDT 3/8/1 D=1.68 A=1.46 13 -Hand Break Quartz Band, 55\*, 4 to 6mm thick Quartz Band, 70\*, 2 to 5mm thick 71 NMLC - DIAMOND IMPREGNATED BIT -JN, 45\*, PI-Ir, R, Fe, Qz שח SW Quartz Band, 70-80\*, 2 to 15mm thick - Drilling Induced Break - Hand Break 14 14 - Drilling Induced Break Quartz Band, 70\*, 2 to 3mm thick 67 DZ, 45\*, 14.47 to 14.6m, along with CS Quartz Band, 50\*, 2 to 4mm thick DW -JN, 60\*, PI-Ir, R, Qz -Drilling Induced Break SW -JN, 45\*, PI-Ir, R, Fe, Qz JN, 60\*, PI, SR, Fe, Qz 15 \* -Hand Break SILTSTONE, high strength, distinctly to slightly - Drilling Induced Break `JN, 70\*, PI, SR, Fe weathered, pale brown and pale grey, with some fine to coarse grained sand, with some interbeded sandstone band and medium to gravel size quartz and quartz band, with some clay infilling along joints, with some iron clay infiniting along joints, with some staining, factured Quartz Band, 70\*, 3 to 6mm thick Quartz Band, 70\*, 3 to 8mm thick Quartz Band, 70\*, 3 to 12mm thick 34 -JN, 60\*, PI-Ir, R, Fe, Qz D=0.41 A=0.88 -DZ, 60\*, 15.74 to 15.87m DW -JN, 60\*, PI, SR, Fe 16 -Hand Break 16 Quartz Band, 70\*, 5 to 20mm thick - Drilling Induced Break - DZ, 10\*, 16.28 to 16.44m 42 Quartz Band, 70\*, 2 to 5mm thick -JN, 45\*, PI, SR, Fe Quartz Band, 60\*, 5 to 6mm thick

### **BOREHOLE BH-01**

**Cored Borehole** 

URS Australia PTY LTD Lv4, 407 Pacific Hwy, Artarmon NSW 2064

URS

Phone: +61 2 8925 5500 Fax: +61 2 8925 5555 Project **43167888** No.: Project Reference: Paling Yards Wind Farm

				MATERIAL DESCRIPTION	1				oisc	CONTINUITY DESCRIPTION
METHOD WATER RUN/RECOVERY	FIELD TESTS/ SAMPLING	DEPTH (m)	GRAPHIC LOG	DESCRIPTION OF STRATA (Rock type, strength, Weathering, color, fabric, grain size, inclusions, degree of fracturing)	WEATHERING	STRENGTH Is (50) MPa	(QD (%)	19 +49 -99 -99 20-199 20-599 (mm) 20-599 (mm)	DEFECT LOG	DEFECT DESCRIPTION (Defect type, inclination, shape, roughness, infill, thickness)
NMLC - DIAMOND IMPREGNATED BIT     METH       WATE     WATE	SAMPI	17 $17$ $17$ $17$ $17$ $18$ $18$ $19$ $19$ $19$ $19$ $19$ $19$ $19$ $19$ $21$ $$		(Rock type, strength, Weathering, color, fabric, grain size, inclusions, degree of fracturing) SILTSTONE, high strength, distinctly to slightly weathered, pale brown and pale grey, with some fine to coarse grained sand, with some interbeded sandstone band and medium to gravel size quartz and quartz band, with some clay infilling along joints, with Core Loss 17.73 to 18.53m SILTSTONE; as above Quartz Band, 60°, 5 to 6mm thick Quartz Band, 20°, 4 to 10mm thick Quartz Band, 70°, 2 to 5mm thick Quartz Band, 65°, 2 to 6mm thick BH1 Coring Terminated at 20m, Target Depth Reached	WEAT		333 18 50 19 42		DEFEC	(Defect type, inclination, shape, roughness, infill, thickness)

SYD GEOTECH & MINING CORED J: UOBS/43167888/5 WORKS/APPENDIX E - BOREHOLE LOGS AND PHOTOS/43167888-BH CORED LOG .GPJ URS1. GDT 3/8/11

Sheet 4 of 4

	Project: Paling Yards Drilled Date: 18/7/20 Title: BH1 1.4m to 6m Box: 1 of 4	11		
	BHI STARTS CORING AT 1.4m 2m 3m 4m 4m CORE LOSS 390mm			
URS	TITLE: CORE PHOTOGRAPHY BH1 1.4m to 5m Box 1 of 4	CLIENTS: Union Fenosa Wind Australia	PROJECT: Paling Yards V DATE: 26/07/2011	Vind Farm PROJECT NO: 43167888





	Title: BH1 15m to 20 Box: 4 of 4	m	CORE 1955 BOOM	
URS	TITLE: CORE PHOTOGRAPHY BH1 15m to 20m Box 4 of 4	CLIENTS: Union Fenosa Wind Australia	PROJECT: Paling Yards W DATE: 26/07/2011	/ind Farm PROJECT NO: 43167888

	l	J	R	S	No	n-e	cored	d Hole			BC	DREH	OLE BH-02			Sheet <sup>-</sup>	1 of 2
1	_vl 4,	407	alia Pty Pacific I	Highway, A				-61.2.8925 5500 -61.2.8925 5555	Projec Refere	ence:	Paling Yards Wind Farm 43167888	Client: Location:	Union Fenosa Wind A Paling Yards, NSW	lustra	lia		
(	_ogge Check Date S Date I	ked E Starte	By: ed:	T Huang D Tulasi 7-7-11 7-7-11			Bore Size: Total Depth: Casing Size		Relativ	ve Leve inates:	1000.00 mRL 6217768.20 mN 753669.52 mE	Drill Type: Drill Model: Drill Fluid:	SFA Auger "TC" Bit CME 55LC track mounted N/A	drilling	g rig		
		SAMPLE TYPE	RUN (m)	FIELD SHEAR STRENGTH (kPa)	PENETROMETER BLOWS (N)	AN	mpling Dother Esting	GROUND WATER DATA AND COMMENTS	<b>0</b> DEPTH (m)	GRAPHIC LOG	DESCRIPT			MOISTURE CONDITION	NSCS	CONSISTENCY/ DENSITY	GEOLOGICAL DESCRIPTION
SYDNEY_GEOTECH J:JOBS/4316788815 WORKSIBOREHOLE LOGS AND PHOTOS/43167888-BH NON-CORED LOGS.GPJ URS1.GDT 2877/11	-	SPT			n = 18 n = 12	6, 8,	10		- 1 		brown, with a trace of	m to high pl of gravel, Re	asticity, brown and pale	D/M	- CH		Residua
DNEY_GEOTECH J:\JOBS\43167888\5 WOHKS\		SPT							-		۲						

SYDNEY GEOTECH J: JOBS/43167888/5 WORKS/BOREHOLE LOGS AND PHOTOS/43167888-BH NON-CORED LOGS/GPJ URS1 (BDT 28/7/11

# URS Non-cored Hole

### **BOREHOLE BH-02**

Sheet 2 of 2

URS Australia Pty Ltd Lvl 4, 407 Pacific Highway, Artarmon, NSW Phone: +61.2.8925 5500 Fax: +61.2.8925 5555 Project **43167888** No.:

67888

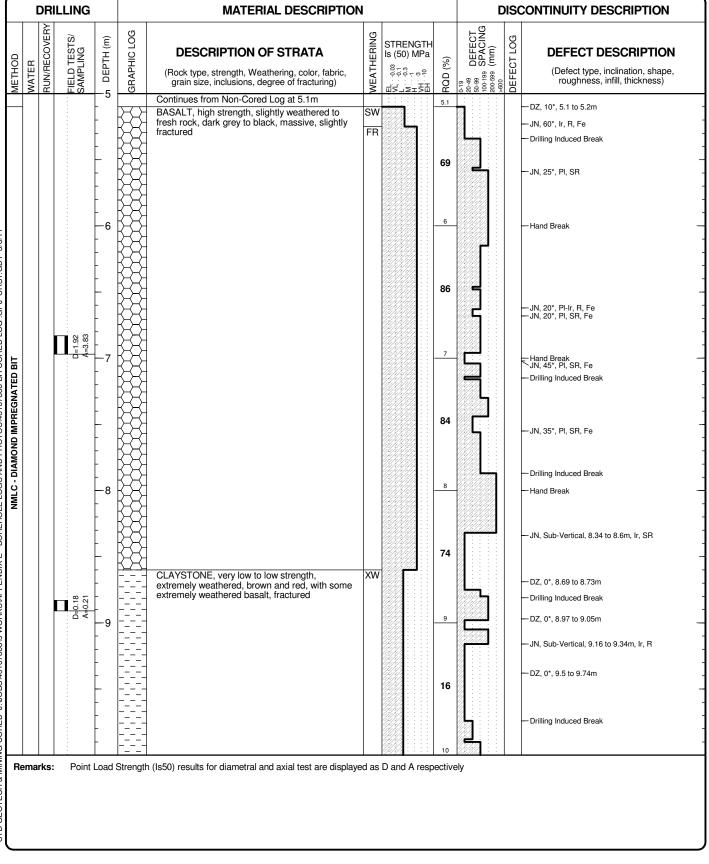
Project Paling Yards Wind Farm Reference:

		SAMPLE TYPE	RUN (m)	FIELD SHEAR STRENGTH (kPa)	PENETROMETER BLOWS (N)	Sampling And other Testing	GROUND WATER DATA AND COMMENTS	– DEPTH (m)	GRAPHIC LOG	DESCRIPTION OF STRATA	MOISTURE CONDITION		CONSISTENCY/ DENSITY	<b>GEOLOGICAL</b> DESCRIPTION
SYDNEY_GEOTECH J:UOBS(43167888)5 WORKSIBOREHOLE LOGS AND PHOTOS(43167888-BH NON-CORED LOGS.GPJ URS1.GDT 28/7/11	-									Sitly CLAY, medium plasticity, pale brown, mottled orange, With a trace of gravel, Residual TC Bit Refusal, End of Non-Cored Log at 5.1m, Continues as Cored Log	D/M	CL	VSt	Residual
SYDNE														

URS Core	d Borehole	BC	DREF	IOLE BH-02
URS Australia PTY LTD Lv4, 407 Pacific Hwy, Artarmon NSW 2064	Phone: +61 2 8925 5500 Fax: +61 2 8925 5555	Paling Yards Wind Farm	Client:	Union Fenosa Wind Australia

Drilling Contract	or: Strategic Drillin	g Services	Project No.: 4	3167888	Location:	Paling Yards, NSW
Logged By:	T Huang		Relative Level	: 1000.00 mRL	Drill Type:	NMLC - Diamond Impreg. Bit
Checked By:	D Tulasi	Casing Size: mm	Coordinates:	6217768.20 mN		
Date Started:	20-7-11	Total Depth: 19.72 m Borehole Inclination and		753669.52 mE		CME 55LC track mounted drilling rig
Date Finished:	21-7-11	Bearing: 90° from horizontal at ° True North	Permit No:		Drill Fluid:	N/A

Sheet 1 of 3



SYD GEOTECH & MINING CORED J: UOBS/43167888/5 WORKS/APPENDIX E - BOREHOLE LOGS AND PHOTOS/43167888-BH CORED LOG GPJ URS1.GDT 3/8/11

# **Cored Borehole**

### **BOREHOLE BH-02**

URS Australia PTY LTD Lv4, 407 Pacific Hwy, Artarmon NSW 2064

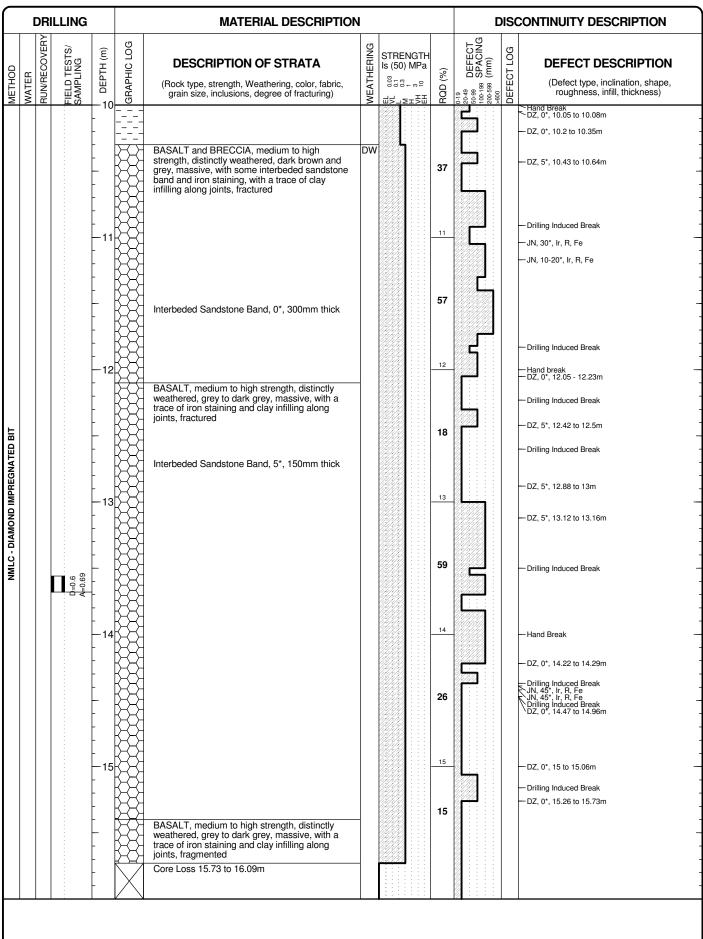
**P**S

[]

Phone: +61 2 8925 5500 Fax: +61 2 8925 5555

Project **43167888** No.: Project Reference: **Pal** 

ence: Paling Yards Wind Farm



SYD GEOTECH & MINING CORED J: UOBS/4316788815 WORKS/APPENDIX E - BOREHOLE LOGS AND PHOTOS/43167888-BH CORED LOG (GPJ URS1, GDT 3/8/1

Sheet 2 of 3

## **Cored Borehole**

### **BOREHOLE BH-02**

URS Australia PTY LTD Lv4, 407 Pacific Hwy, Artarmon NSW 2064

RS

[]

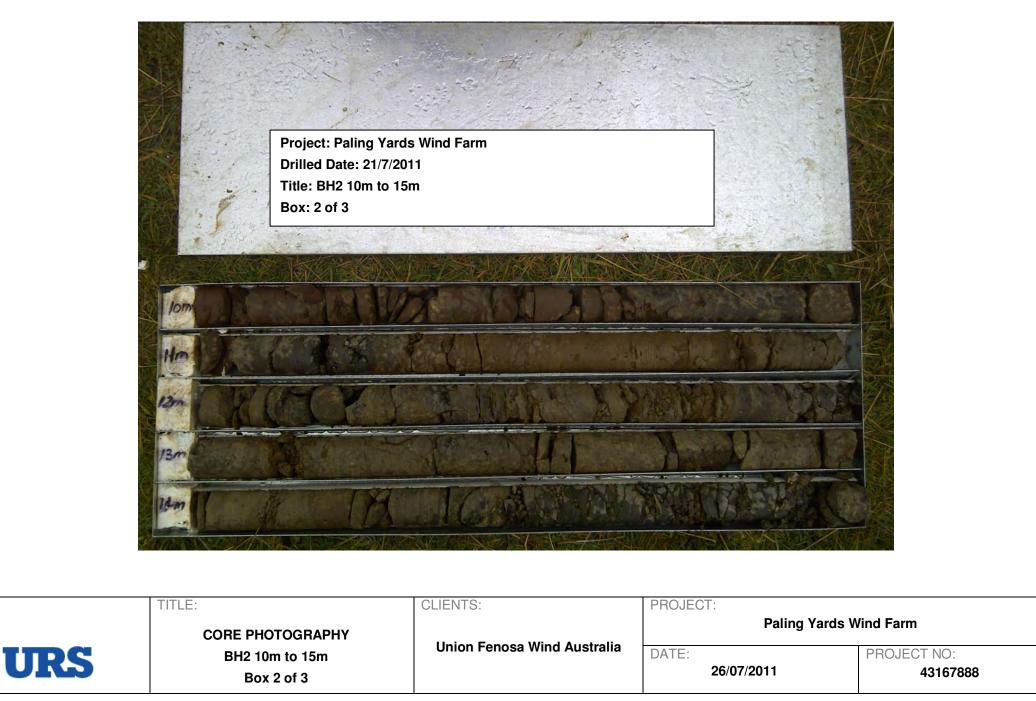
Phone: +61 2 8925 5500 Fax: +61 2 8925 5555

Project No.: 43167888 Project Reference: Paling Yards Wind Farm

DRILLING MATERIAL DESCRIPTION **DISCONTINUITY DESCRIPTION** DEFECT SPACING (mm) RUN/RECOVER/ LOG NEATHERING õ £ DEFECT LOG STRENGTH FIELD TEST SAMPLING **DESCRIPTION OF STRATA DEFECT DESCRIPTION** DEPTH ( GRAPHIC ls (50) MPa METHOD RQD (%) WATER (Rock type, strength, Weathering, color, fabric, grain size, inclusions, degree of fracturing) 0.0 10 10 10 10 0-19 20-49 50-99 100-199 200-599 (Defect type, inclination, shape, roughness, infill, thickness) <u>ਜ਼ੑ੨ੵਙਸ਼ਲ਼</u>ਜ਼ 16.09 -DZ. 0\*. 16.09 to 16.23m BASALT, medium to high strength, distinctly weathered, grey to dark grey, massive, with a trace of iron staining and clay infilling along -DZ, 0\*, 16.28 to 17m joints, fragmented 14 Core Loss 17 to 17.13m 17.15 - DZ, 0\*, 17.13 to 17.7m BASALT; as above NMLC - DIAMOND IMPREGNATED BIT 25 - DZ, 0\*, 17.77 to 17.85m SYD GEOTECH & MINING CORED J: UOBS/4316788815 WORKS/APPENDIX E - BOREHOLE LOGS AND PHOTOS/43167888-BH CORED LOG GPJ URS1.GDT 3/8/11 18 JN, 45\*, Ir, R, Fe Become fractured to slightly fractured Drilling Induced Break Drilling Induced Break
 DZ, 0\*, 18.35 to 18.59m 21 D=0.92 Drilling Induced Break
 DZ, 0\*, 18.92 to 19m 19 -JN, Sub-Vertical, 19.19 to 19.42m, Ir, SR, 18 JN, 45\*, PI, R, Fe DZ, 0\*, 19.4 to 19.5m – JN, 20\*, Ir, R, Fe ∽ JN, 20\*, Ir, R, Fe BH2 Coring Terminated at 19.72m, Target Depth Reached 20 21

Sheet 3 of 3







## Appendix F Laboratory Test Results



F

43167888/Paling Yards Geotechnical Report/3



### ANALYTICAL REPORT

9 June 2011

SGS Industrial CMT Eastern Sydney Unit 15, 33 Maddox Street PO Box 6432 ALEXANDRIA NSW 2015

Attention:	Simon Rosam		
Your Reference:	URS Aust Paling Yards Wind Far	m Project 4316	57888
Our Reference:	SE88017	Samples: Received:	10 Soils 2/06/2011
Preliminary Report S	Sent: Not Issued		2,00,2011

These samples were analysed in accordance with your written instructions.

For and on Behalf of: SGS ENVIRONMENTAL SERVICES

Sample Receipt: Production Manager: Angela Mamalicos Huong Crawford AU.SampleReceipt.Sydney@sgs.com Huong.Crawford@sgs.com

Results Approved and/or Authorised by:

Dong Liang Inorganic/Metal Supervisor



This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562 (4354). This report must not be reproduced except in full.

Page 1 of 7

SGS Australia Pty Ltd ABN 44 000 964 278 Environmental Services Unit 16/33 Maddox Street Alexandria NSW 2015 Australia t+61 (0)2 8594 0400 f + 61 (0)2 8594 0499 www.au.sgs.com

#### PROJECT: URS Aust Paling Yards Wind Farm Project 43167888 REPORT NO: SE88017

Inorganics						
Our Reference:	UNITS	SE88017-1	SE88017-2	SE88017-3	SE88017-4	SE88017-5
Your Reference		TP08	TP17	TP25	TP33	TP39
		0.4-0.7m	0.4-0.7m	0.5-0.8m	0.4-0.7m	0.4-0.7m
Sample Matrix		Soil	Soil	Soil	Soil	Soil
Date Extracted- (pH 1:5 soil: Water)		9/06/2011	9/06/2011	9/06/2011	9/06/2011	9/06/2011
Date Analysed (pH 1:5 Soil: Water)		9/06/2011	9/06/2011	9/06/2011	9/06/2011	9/06/2011

Inorganics Our Reference:	UNITS	SE88017-6	SE88017-7	SE88017-8	SE88017-9	SE88017-1 0
Your Reference		TP53 0.4-0.7m	TP12 1.6-1.7m	TP16 1.1-1.2m	TP38 1.3-1.4m	TP60 1.5-1.6m
Sample Matrix		Soil	Soil	Soil	Soil	Soil
Date Extracted- (pH 1:5 soil: Water)		9/06/2011	9/06/2011	9/06/2011	9/06/2011	9/06/2011
Date Analysed (pH 1:5 Soil: Water)		9/06/2011	9/06/2011	9/06/2011	9/06/2011	9/06/2011
pH 1:5 soil:water	pH Units	6.2	6.8	6.9	6.0	5.9



This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562 (4354). This report must not be reproduced except in full.

Page 2 of 7

SGS Australia Pty Ltd ABN 44 000 964 278 Environmental Services Unit 16/33 Maddox Street Alexandria NSW 2015 Australia t+61 (0)2 8594 0400 f + 61 (0)2 8594 0499 www.au.sgs.com

#### PROJECT: URS Aust Paling Yards Wind Farm Project 43167888

Anions in soil						
Our Reference:	UNITS	SE88017-1	SE88017-2	SE88017-3	SE88017-4	SE88017-5
Your Reference		TP08	TP17	TP25	TP33	TP39
		0.4-0.7m	0.4-0.7m	0.5-0.8m	0.4-0.7m	0.4-0.7m
Sample Matrix		Soil	Soil	Soil	Soil	Soil
Date Extracted		9/06/2011	9/06/2011	9/06/2011	9/06/2011	9/06/2011
Date Analysed		9/06/2011	9/06/2011	9/06/2011	9/06/2011	9/06/2011
Chloride, Cl 1:5 soil:water	mg/kg	22	14	3.7	30	56
Sulphate, SO4 1:5 soil:water	mg/kg	6.4	47	11	12	16

Anions in soil Our Reference:	UNITS	SE88017-6	SE88017-7	SE88017-8	SE88017-9	SE88017-1
Your Reference		TP53 0.4-0.7m	TP12 1.6-1.7m	TP16 1.1-1.2m	TP38 1.3-1.4m	0 TP60 1.5-1.6m
Sample Matrix		Soil	Soil	Soil	Soil	Soil
Date Extracted		9/06/2011	9/06/2011	9/06/2011	9/06/2011	9/06/2011
Date Analysed		9/06/2011	9/06/2011	9/06/2011	9/06/2011	9/06/2011
Chloride, Cl 1:5 soil:water	mg/kg	4.3	23	2.4	4.8	7.3
Sulphate, SO4 1:5 soil:water	mg/kg	27	8.7	1.4	0.7	<0.5



This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562 (4354). This report must not be reproduced except in full.

Page 3 of 7

SGS Australia Pty Ltd ABN 44 000 964 278

Environmental Services Unit 16/33 Maddox Street Alexandria NSW 2015 Australia t +61 (0)2 8594 0400 f + 61 (0)2 8594 0499 www.au.sgs.com

#### PROJECT: URS Aust Paling Yards Wind Farm Project 43167888

REPORT NO: SE88017

Moisture						
Our Reference:	UNITS	SE88017-1	SE88017-2	SE88017-3	SE88017-4	SE88017-5
Your Reference		TP08	TP17	TP25	TP33	TP39
		0.4-0.7m	0.4-0.7m	0.5-0.8m	0.4-0.7m	0.4-0.7m
Sample Matrix		Soil	Soil	Soil	Soil	Soil
Date Analysed (moisture)		7/06/2011	7/06/2011	7/06/2011	7/06/2011	7/06/2011
Moisture	%	18	25	16	17	11

Moisture Our Reference:	UNITS	SE88017-6	SE88017-7	SE88017-8	SE88017-9	SE88017-1 0
Your Reference		TP53 0.4-0.7m	TP12 1.6-1.7m	TP16 1.1-1.2m	TP38 1.3-1.4m	TP60 1.5-1.6m
Sample Matrix		Soil	Soil	Soil	Soil	Soil
Date Analysed (moisture)		7/06/2011	7/06/2011	7/06/2011	7/06/2011	7/06/2011
Moisture	%	18	19	21	25	19



This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562 (4354). This report must not be reproduced except in full.

> SGS Australia Pty Ltd ABN 44 000 964 278

Page 4 of 7 Environmental Services Unit 16/33 Maddox Street Alexandria NSW 2015 Australia t+61 (0)2 8594 0400 f+61 (0)2 8594 0499 www.au.sgs.com

Method ID	Methodology Summary
AN101	pH - Measured using pH meter and electrode based on APHA 21st Edition, 4500-H+. For water analyses the results reported are indicative only as the sample holding time requirement specified in APHA was not met (APHA requires that the pH of the samples are to be measured within 15 minutes after sampling).
AN245	A water sample is injected into an eluent stream that passes through the ion chromatographic system where the anions of interest ie Br, Cl, NO2, NO3 and SO4 are separated on their relative affinities for the active sites on the column packing material. Changes to the conductivity and the UV-visible absorbance of the eluent enable identification and quantitation of the anions based on their retention time and peak height or area. APHA 4110 B
AN002	



This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562 (4354). This report must not be reproduced except in full.

> SGS Australia Pty Ltd ABN 44 000 964 278

 Page 5 of 7

 Environmental Services
 Unit 16/33 Maddox Street
 Alexandria NSW 2015
 Australia

 t +61 (0)2 8594 0400
 f + 61 (0)2 8594 0499
 www.au.sgs.com

#### PROJECT: URS Aust Paling Yards Wind Farm Project 43167888 REPORT NO: SE88017

QUALITY CONTROL	UNITS	LOR	METHOD	Blank	Duplicate Sm#	Duplicate
Inorganics						Base + Duplicate + %RPD
Date Extracted- (pH 1:5 soil: Water)				[NT]	SE88017-1 0	9/06/2011    9/06/2011
Date Analysed (pH 1:5 Soil: Water)				[NT]	SE88017-1 0	9/06/2011    9/06/2011
pH 1:5 soil:water	pH Units	0	AN101	[NT]	SE88017-1 0	5.9    5.9    RPD: 0

QUALITY CONTROL Anions in soil	UNITS	LOR	METHOD	Blank	Duplicate Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Matrix Spike % Recovery Duplicate + %RPD
Date Extracted				9/06/20 11	SE88017-1	9/06/2011    9/06/2011	SE88017-2	9/06/2011
Date Analysed				9/06/20 11	SE88017-1	9/06/2011    9/06/2011	SE88017-2	9/06/2011
Chloride, Cl 1:5 soil:water	mg/kg	0.25	AN245	<0.2	SE88017-1	22    22    RPD: 0	SE88017-2	101%
Sulphate, SO4 1:5 soil:water	mg/kg	0.5	AN245	<0.5	SE88017-1	6.4    6.7    RPD: 5	SE88017-2	99%

QUALITY CONTROL	UNITS	LOR	METHOD	Blank
Moisture				
Date Analysed (moisture)				[NT]
Moisture	%	1	AN002	<1



This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562 (4354). This report must not be reproduced except in full.

Page 6 of 7

SGS Australia Pty Ltd ABN 44 000 964 278 Environmental Services Unit 16/33 Maddox Street Alexandria NSW 2015 Australia t+61 (0)2 8594 0400 f + 61 (0)2 8594 0499 www.au.sgs.com

#### **Result Codes** [INS] Insufficient Sample for this test : [NR] Not Requested [NT] Not tested :

[LOR] :

**Report Comments** 

[RPD] : Relative Percentage Difference : Not part of NATA Accreditation [N/A] : Not Applicable

Samples analysed as received. Solid samples expressed on a dry weight basis.

Date Organics extraction commenced:

Limit of reporting

NATA Corporate Accreditation No. 2562, Site No 4354

Note: Test results are not corrected for recovery (excluding Air-toxics and Dioxins/Furans\*) This document is issued by the Company subject to its General Conditions of Service (www.sgs.com/terms\_and\_conditions.htm). Attention is drawn to the limitations of liability, indemnification and jurisdictional issues established therein.

This document is to be treated as an original within the meaning of UCP 600. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

#### **Quality Control Protocol**

Method Blank: An analyte free matrix to which all reagents are added in the same volume or proportions as used in sample processing. The method blank should be carried through the complete sample preparation and analytical procedure. A method blank is prepared every 20 samples.

Duplicate: A separate portion of a sample being analysed that is treated the same as the other samples in the batch. One duplicate is processed at least every 10 samples.

Surrogate Spike: An organic compound which is similar to the target analyte(s) in chemical composition and behavior in the analytical process, but which is not normally found in environmental samples. Surrogates are added to samples before extraction to monitor extraction efficiency and percent recovery in each sample.

Internal Standard: Added to all samples requiring analysis for organics (where relevant) or metals by ICP after the extraction/digestion process; the compounds/elements serve to give a standard of retention time and/or response, which is invariant from run-to-run with the instruments.

Laboratory Control Sample: A known matrix spiked with compound(s) representative of the target analytes. It is used to document laboratory performance. When the results of the matrix spike analysis indicates a potential problem due to the sample matrix itself, the LCS results are used to verify that the laboratory can perform the analysis in a clean matrix.

Matrix Spike: An aliquot of sample spiked with a known concentration of target analyte(s). The spiking occurs prior to sample preparation and analysis. A matrix spike is used to document the bias of a method in a given sample matrix.

#### **Quality Acceptance Criteria**

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: http://www.au.sgs.com/sgs-mp-au-env-qu-022-ga-gc-plan-en-09.pdf



This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562 (4354). This report must not be reproduced except in full.

Page 7 of 7

SGS Australia Ptv I td ABN 44 000 964 278 t +61 (0)2 8594 0400 f + 61 (0)2 8594 0499

Environmental Services Unit 16/33 Maddox Street Alexandria NSW 2015 Australia www.au.sgs.com

#### **TEST CERTIFICATE**



The document is issued by the Company shaped to its identical Confliction of Service (new squarements, well, confliction, Harrison is alread to the instance of tables, identification and justicional assessments and the service of t

SGS Australia Pty Ltd Unit 15, 33 Maddox Street (PO Box 6432) Alexandria NSW 2015 Australia

### **POINT LOAD STRENGTH INDEX**

#### CLIENT: URS Australia Pty Ltd

Level 4, 407 Pacific Highway Artarmon NSW 2064

#### PROJECT: Paling Yard Wind Farm

LAB.	SAMPLE	LITHOLOGY		ATEN	TEST	POINT	POINT	Туре
NO.	SOURCE			RATION	ORIENTATION	LOAD		OF
			DIAM (mm)	HEIGHT (mm)		Is (MPa)	STRENGTH Is <sub>(50)</sub> (MPa)	FAILURE
68234	BH1-1 5.67 to 5.75m	Not supplied.	60.7	38.2	Diametral Axial	0.36 0.74	0.39 0.77	FOB FOB
68235	BH1-2 9.23 to 9.34m		61.1	*	Diametral Axial	0.53 -	0.58 -	FOB -
68236	BH1-3 12.79 to 13m		60.7	39.9	Diametral Axial	1.54 1.39	1.68 1.46	FOB FOB
68237	BH1-4 15.6 to 15.7m		61.1	46.0	Diametral Axial	0.38 0.82	0.41 0.88	FIP FIP
68238	BH2-1 6.83 to 6.97m		60.7	43.5	Diametral Axial	1.76 3.59	1.92 3.83	FOB FOB
68239	BH2-2 8.83 to 8.91m		60.9	41.0	Diametral Axial	0.17 0.20	0.18 0.21	CPF FOB
68240	BH2-3 13.56 to 13.68m	"	61.1	42.4	Diametral Axial	0.55 0.65	0.60 0.69	FOB FOB
68241	BH2-4 18.68 to 18.8m	'n	60.2	*	Diametral Axial	0.84 -	0.92 -	FIP -
NOTES	TO TESTING	à			L			
Testing		ELE Point Load Tester Unsoaked	Failure T FOB	Fracture	through fabric of s		ique to beddii	ng
Sample	History d By:	Client	FB FIP	Fracture Fracture	along bedding influenced by pre- mical alteration		e, microfractu	ure,
Job Nu	mber:	119-259	CPF		partial fracture			
Date Te	ested:	02.08.11	* Insuffic	cient samp	ble to test due to fa	ailure on dian	netral test.	
Test Me	ethod:	AS 4133.4.1 2007					Page 1 of	1
Approv	ved Signatory:	Chris Lloyd			<b>Date:</b> 03	3.08.11		
and the	N	This document is issued in acc	cordance with NA	TA's accredi	tation requirements			]

Accreditation No. 1452

This is a re-issue of the report dated 02.08.11

This document is to be treated as an original within the meaning of UCP 600. Any hobber of this document is adviced that information contained hereconnelleds the Company's findings at the time of ta intervention only and within the limits of client's instructions, if any. The company's adviced to the sequence document document document adviced attraction to meaning all their rights and addipators under the transaction documents. Any unauthorized attraction, the sequence document document adviced to the later sequence attraction.

in to the limitations of liability, inde

ion and jurisdictional issues established therein.



SGS Australia Pty Ltd Unit 15, 33 Maddox Street (PO Box 6432) Alexandria NSW 2015 Australia

# **EMERSON CRUMB TEST**

#### CLIENT: URS Australia Pty Ltd

Level 4, 407 Pacific Highway Artarmon NSW 2064 PROJECT: Paling Yards Wind Farm Project (43167888)

d by the Company subject to its General Conditions of Se

Laboratory Numbe	er: 65694					
Sample Source:	TP08 0.4m to 0.	7m				
Sample Descriptio	n: SILTY CLAY: lig	ht brown, high plasticity,	with fine to coarse (	gravel, trace of fi	ne to coarse	e sand.
1. IMMERSI	ON					
	Does not slake		Class 7 swells (	Organic Soils)		
	Slakes	X	Class 8 does no	t swell (Lateris	ed)	
2. COMPLE	TE DISPERSION					
	Class 1 complete Class 2 partial No Dispersion	x				
3. REMOUL	DING					
Sample Source:       TP08 0.4m to 0.7m         Sample Description:       SILTY CLAY: light brown, high plasticity, with fine to coarse gravel, trace of fine to coarse star         IMMERSION       Does not slake       Class 7 swells (Organic Soils)						
4. CARBON	ATE & GYPSUM (Ac	id Indicator)				
	-	X				
5. VIGOROU	JS SHAKING					
	•					
EMERSION	CLASS NO.:	5				
Water used:	Distilled water at 20°C		Date Tested:	3.5.11		
Tested By:	AB		Sampled By:	Client		
Sample Description:       SILTY CLAY: light brown, high plasticity, with fine to coarse gravel, trace of fine to coarse sand.         1. IMMERSION       Does not slake       Class 7 swells (Organic Soils)       Image: Solar Soils Solar S						
Sample Source:       TP08 0.4m to 0.7m         Sample Description:       SILTY CLAY: light brown, high plasticity, with fine to coarse gravel, trace of fine to coarse sand.         1. IMMERSION       Does not slake       Class 7 swells (Organic Soils)         Slakes       X       Class 8 does not swell (Laterised)         Slakes       X       Class 8 does not swell (Laterised)         2. COMPLETE DISPERSION       Class 2 partial No Dispersion       X         3. REMOULDING       Class 3 disperses Does not disperse       X         4. CARBONATE & GYPSUM (Acid Indicator)       Class 4 present Absent       X         5. VIGOROUS SHAKING       Class 5 disperses Class 6 no dispersion       X         EMERSION CLASS NO:       5       5         Water used:       Distilied water at 20°C       Date Tested:       3.5.11         Tested By:       AB       Sampled By:       Client         Test Procedure: AS 1289 3.8.1       Job Number:       119-253         Approved Signatory:       Chris Lloyd       Date:       10.5.11		10.5.11				
The Andrews	This document is	s issued in accordance with N	ATA's accreditation req	uirements		

PF-(AU)-[IND(MTE)]-(GEN)-RPT-618.VER1.09.02.2011 - Page 1 of 1

#### **TEST CERTIFICATE**

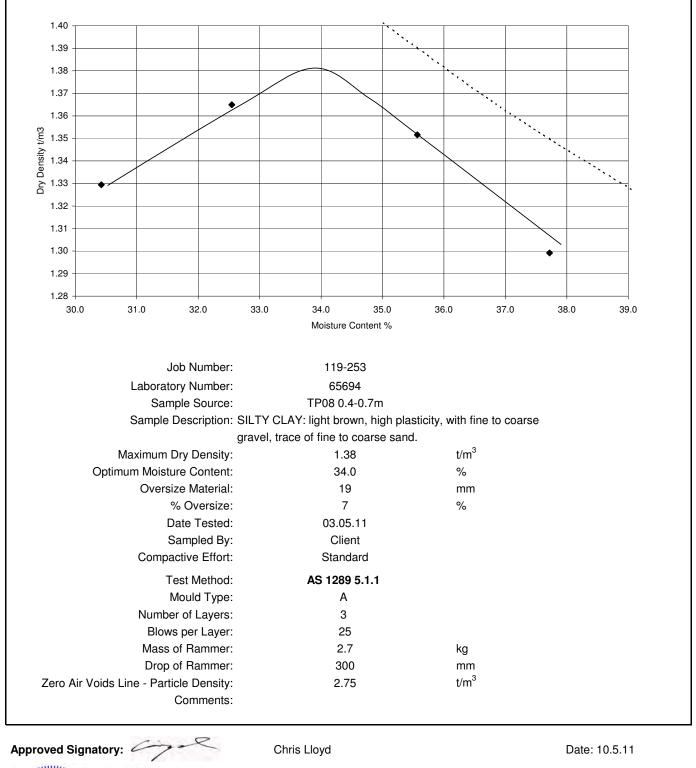


SGS Australia Pty Ltd Unit 15, 33 Maddox Street (PO Box 6432) Alexandria NSW 2015 Australia

# DRY DENSITY/MOISTURE CONTENT RELATION

#### CLIENT: URS Australia Pty Ltd

Level 4, 407 Pacific Highway Artarmon NSW 2064 PROJECT: Paling Yards Wind Farm Project (43167888)





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

Accreditation No. 1459 PF-(AU)-[IND(MTE)]-(GEN)-RPT-622.VER1.09.02.2011 – Page 1 of 1

#### **TEST CERTIFICATE**





SGS Australia Pty Ltd Unit 15, 33 Maddox Street (PO Box 6432) Alexandria NSW 2015 Australia

# **CALIFORNIA BEARING RATIO**

#### CLIENT: URS Australia Pty Ltd

Level 4, 407 Pacific Highway Artarmon NSW 2064

PROJECT: Paling Yards Wind Farm Project (43167888)

Sample Source:	TP08 0.4-0.7m	000r00	
Sample Description:	SILTY CLAY: light brown, high plasticity, with fine to	coarse	
Job Number:	gravel, trace of fine to coarse sand. 119-253		
Laboratory Number:	65694		
CBR Value @ 2.5mm	3.0	(%)	
CBR Value @ 5.0mm	2.5	(%)	
Sample Data			
Compaction Specification	95% of MDD at OMC		
Maximum Dry Density (MDD)	1.38	(t/m <sup>3</sup> )	
Optimum Moisture Content (OMC)	34.0	(%)	
Mass of Surchages	4.5	(kg)	
Number of Days Soaked	4		
Sample Preparation			
Dry Density - Before Soaking	1.31	(t/m <sup>3</sup> )	
Dry Density - After Soaking	1.29	(t/m <sup>3</sup> )	
Retained on 19mm Sieve	7% excluded	(%)	
Moisture Content - Before Soaking	33.1	(%)	
Laboratory Density Ratio	95.0	(%)	
Laboratory Moisture Ratio	97.0	(%)	
Moisture Content - After Soaking			
Top 30mm of Test Sample	44.8	(%)	
Remainder of Test Sample	36.9	(%)	
Swell After Soaking	1.5	(%)	
Compactive Effort	Standard	(70)	
Number of Layers	3		
Blows per Layer	50		
Mass of Rammer	2.7	(kg)	
Drop of Rammer	300	(mm)	
Comments			
Date Tested:	9.5.11		
Tested in accordance with AS1289.6.1.1	Determination of the California Bearing Ratio of a soil		
Standard Laboratory Method for a remou	ulded specimen.		
Approved Signatory:	Chris Lloyd	Date:	10.5.11
antine A		_	
This docume	nt is issued in accordance with NATA's accreditation requirements		

File C:\Electronic Excel Reports\AS1289 6.1.1 California Bearing Ratio, Issue 2, May 2010, JL

Accreditation No. 1459

This document is to be treated as an original within the meaning of UCP 600. Any hobber of this document is adviced that information contained hereconnelleds the Company's findings at the time of ta intervention only and within the limits of client's instructions, if any. The company's adviced to the sequence document document document adviced attraction to meaning all their rights and addipators under the transaction documents. Any unauthorized attraction, the sequence document document adviced to the later sequence attraction.

in to the limitations of liability, inde

ion and jurisdictional issues established therein.



SGS Australia Pty Ltd Unit 15, 33 Maddox Street (PO Box 6432) Alexandria NSW 2015 Australia

# **EMERSON CRUMB TEST**

#### CLIENT: URS Australia Pty Ltd

Level 4, 407 Pacific Highway Artarmon NSW 2064 PROJECT: Paling Yards Wind Farm Project (43167888)

d by the Company subject to its General Conditions of Se

Laboratory Number:	65695						
Sample Source:	TP17 0.4m to 0.7m	I					
Sample Description:	SILTY CLAY: red-b	SILTY CLAY: red-brown, high plasticity, trace of fine to coarse sand, trace of fine to coarse gravel.					
1. IMMERSION	N						
[	Does not slake —		Class 7 swells (Organic Soils)				
5	Slakes	X	Class 8 does not swell (Laterised)				
2. COMPLETE DISPERSION							
(	Class 1 complete Class 2 partial No Dispersion	x					
3. REMOULDI	NG						
	Class 3 disperses Does not disperse	X					
4. CARBONAT	TE & GYPSUM (Acid	Indicator)					
	Class 4 present Absent	X					
5. VIGOROUS	SHAKING						
	Class 5 disperses Class 6 no dispersion	X					
EMERSION C	LASS NO.:	5					
Water used: [	Distilled water at 20°C		Date Tested:	3.5.11			
Tested By: A	AB		Sampled By:	Client			
Test Procedure: A	AS 1289 3.8.1		Job Number:	119-253			
Approved Signatory:	<u> </u>	Chris Lloyd	TA's accreditation require		<b>)ate:</b> 10	.5.11	

Accreditation No. 1459 PF-(AU)-[IND(MTE)]-(GEN)-RPT-618.VER1.09.02.2011 - Page 1 of 1

#### **TEST CERTIFICATE**



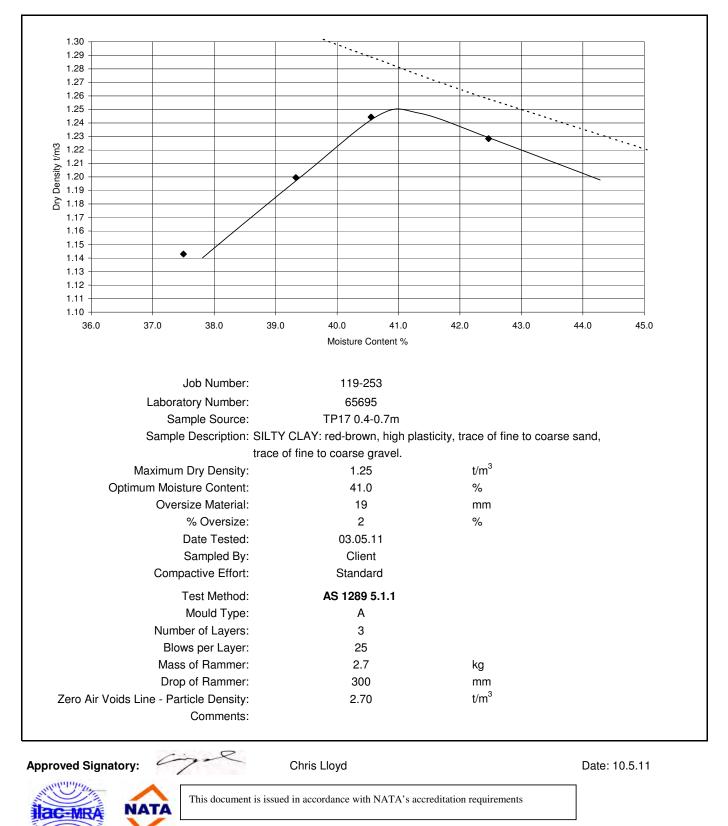
SGS Australia Pty Ltd Unit 15, 33 Maddox Street (PO Box 6432) Alexandria NSW 2015 Australia

at the time of its intervention only and within the limits of client's he transaction documents. Any unauthorized alteration, forcery or

# DRY DENSITY/MOISTURE CONTENT RELATION

#### CLIENT: URS Australia Pty Ltd

Level 4, 407 Pacific Highway Artarmon NSW 2064 PROJECT: Paling Yards Wind Farm Project (43167888)



Accreditation No. 1459 PF-(AU)-[IND(MTE)]-(GEN)-RPT-622.VER1.09.02.2011 - Page 1 of 1

"Intertedad

#### **TEST CERTIFICATE**





SGS Australia Pty Ltd Unit 15, 33 Maddox Street (PO Box 6432) Alexandria NSW 2015 Australia

# **CALIFORNIA BEARING RATIO**

#### CLIENT: URS Australia Pty Ltd

Level 4, 407 Pacific Highway Artarmon NSW 2064

PROJECT: Paling Yards Wind Farm Project (43167888)

Sample Source: Sample Description:	TP17 0.4-0.7m SILTY CLAY: red-brown, high plasticity, trace gravel, trace of fine to coarse sand.	e of fine to coarse sand,
Job Number: Laboratory Number:	119-253 65695	
CBR Value @ 2.5mm	1.5	(%)
CBR Value @ 5.0mm	1.5	(%)
Sample Data		
Compaction Specification	95% of MDD at OMC	
Maximum Dry Density (MDD)	1.25	(t/m <sup>3</sup> )
Optimum Moisture Content (OMC)	41.0	(%)
Mass of Surchages	4.5	(kg)
Number of Days Soaked	4	
Sample Preparation		
Dry Density - Before Soaking	1.17	(t/m <sup>3</sup> )
Dry Density - After Soaking	1.13	(t/m <sup>3</sup> )
Retained on 19mm Sieve	2% excluded	(%)
Moisture Content - Before Soaking	41.6	(%)
Laboratory Density Ratio	94.0	(%)
Laboratory Moisture Ratio	101.0	(%)
Moisture Content - After Soaking		
Top 30mm of Test Sample	54.2	(%)
Remainder of Test Sample	46.1	(%)
Swell After Soaking	3.9	(%)
Compactive Effort	Standard	
Number of Layers	3	
Blows per Layer	50	
Mass of Rammer	2.7	(kg)
Drop of Rammer	300	(mm)
Comments		
Date Tested:	9.5.11	
	1 Determination of the California Bearing Ratio of a s	soil
Standard Laboratory Method for a rem	oulded specimen.	
Approved Signatory:	Chris Lloyd	Date: 10.5.11
and a state of the		
This docur	nent is issued in accordance with NATA's accreditation requirements	,

File C:\Electronic Excel Reports\AS1289 6.1.1 California Bearing Ratio, Issue 2, May 2010, JL

Accreditation No. 1459

This document is to be treated as an original within the meaning of UCP 600. Any hobber of this document is adviced that information contained hereconnelleds the Company's findings at the time of ta intervention only and within the limits of client's instructions, if any. The company's adviced to the sequence document document document adviced attraction to meaning all their rights and addipators under the transaction documents. Any unauthorized attraction, the sequence document document adviced to the later sequence attraction.

in to the limitations of liability, inde

tion and jurisdictional issues established therein.



SGS Australia Pty Ltd Unit 15, 33 Maddox Street (PO Box 6432) Alexandria NSW 2015 Australia

# **EMERSON CRUMB TEST**

#### CLIENT: URS Australia Pty Ltd

Level 4, 407 Pacific Highway Artarmon NSW 2064 PROJECT: Paling Yards Wind Farm Project (43167888)

d by the Company subject to its General Conditions of Se

Laboratory Numbe	r: 65696								
Sample Source:	TP21 0.4m to 0.7	TP21 0.4m to 0.7m							
Sample Descriptio	n: SILTY CLAY: bro	SILTY CLAY: brown, high plasticty, trace of fine to coarse sand, trace of fine to coarse							
1. IMMERSI	ON								
Does not slake –			Class 7 swells (	Organic Soils)					
	Slakes	X	Class 8 does not swell (Lateris		:d)				
2. COMPLE	TE DISPERSION								
	Class 1 complete Class 2 partial No Dispersion	X							
3. REMOUL	DING								
	Class 3 disperses Does not disperse	x							
4. CARBON	ATE & GYPSUM (Aci	id Indicator)							
	Class 4 present Absent	x							
5. VIGOROL	JS SHAKING								
	Class 5 disperses Class 6 no dispersion	X							
EMERSION	CLASS NO.:	5							
Water used:	Distilled water at 20°C		Date Tested:	3.5.11					
Tested By:	AB		Sampled By:	Client					
Test Procedure	e: AS 1289 3.8.1		Job Number:	119-253					
Approved Signatory	in age	Chris Lloyd			Date:	10.5.11			
Accreditation No. 1459	This document is	issued in accordance with N.	ATA's accreditation req	uirements	]				

PF-(AU)-[IND(MTE)]-(GEN)-RPT-618.VER1.09.02.2011 - Page 1 of 1

#### **TEST CERTIFICATE**



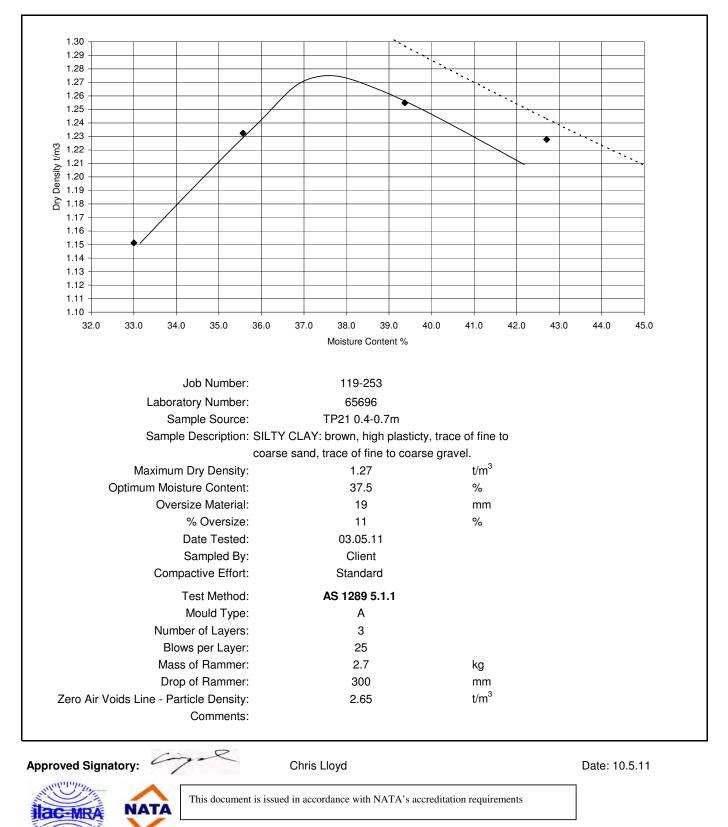
SGS Australia Pty Ltd Unit 15, 33 Maddox Street (PO Box 6432) Alexandria NSW 2015 Australia

gs at the time of its intervention only and within the limits of client's the transaction documents. Any unauthorized alteration, forcery or

# DRY DENSITY/MOISTURE CONTENT RELATION

#### CLIENT: URS Australia Pty Ltd

Level 4, 407 Pacific Highway Artarmon NSW 2064 PROJECT: Paling Yards Wind Farm Project (43167888)



Accreditation No. 1459 PF-(AU)-[IND(MTE)]-(GEN)-RPT-622.VER1.09.02.2011 - Page 1 of 1

"Intalalas





SGS Australia Pty Ltd Unit 15, 33 Maddox Street (PO Box 6432) Alexandria NSW 2015 Australia

# **CALIFORNIA BEARING RATIO**

### CLIENT: URS Australia Pty Ltd

Level 4, 407 Pacific Highway Artarmon NSW 2064

PROJECT: Paling Yards Wind Farm Project (43167888)

Sample Source:	TP21 0.4-0.7m		
Sample Description:	SILTY CLAY: brown, high plasticty, trace of fine to		
Job Number:	gravel, trace of fine to coarse sand.		
Laboratory Number:	119-253 65696		
Laboratory Number:	00090		
CBR Value @ 2.5mm	1.5	(%)	
CBR Value @ 5.0mm	1.5	(%)	
Sample Data			
Compaction Specification	95% of MDD at OMC		
Maximum Dry Density (MDD)	1.27	(t/m <sup>3</sup> )	
Optimum Moisture Content (OMC)	37.5	(%)	
Mass of Surchages	4.5	(kg)	
Number of Days Soaked	4		
Sample Preparation			
Dry Density - Before Soaking	1.21	(t/m <sup>3</sup> )	
Dry Density - After Soaking	1.18	(t/m <sup>3</sup> )	
Retained on 19mm Sieve	11% excluded	(%)	
Moisture Content - Before Soaking	35.4	(%)	
Laboratory Density Ratio	96.0	(%)	
Laboratory Moisture Ratio	94.0	(%)	
Moisture Content - After Soaking			
Top 30mm of Test Sample	48.5	(%)	
Remainder of Test Sample	44.6	(%)	
Swell After Soaking	3.1	(%)	
Compactive Effort	Standard		
Number of Layers	3		
Blows per Layer	50		
Mass of Rammer	2.7	(kg)	
Drop of Rammer	300	(mm)	
Comments			
Date Tested:	9.5.11		
	Determination of the California Bearing Ratio of a soil		
Standard Laboratory Method for a remo	_		
Approved Signatory:	Chris Lloyd	Date:	10.5.11
			10.0.11
This docume	ent is issued in accordance with NATA's accreditation requirements		
Hac-MRA NATA	······································		

File C:\Electronic Excel Reports\AS1289 6.1.1 California Bearing Ratio, Issue 2, May 2010, JL

in to the limitations of liability, inde

ion and jurisdictional issues established therein.



SGS Australia Pty Ltd Unit 15, 33 Maddox Street (PO Box 6432) Alexandria NSW 2015 Australia

# **EMERSON CRUMB TEST**

### CLIENT: URS Australia Pty Ltd

Level 4, 407 Pacific Highway Artarmon NSW 2064 PROJECT: Paling Yards Wind Farm Project (43167888)

d by the Company subject to its General Conditions of Se

Laboratory Numbe	<b>r:</b> 65697					
Sample Source:	TP25 0.5m to 0.8	8m				
Sample Description	n: SILTY CLAY: da gravel.	ırk red-brown, medium p	lasticity, trace of fine	e to coarse sand,	trace of fine	e to coarse
1. IMMERSI	NO					
	Does not slake	>	Class 7 swells (	Organic Soils)		
	Slakes	X	Class 8 does no	ot swell (Laterise	ed)	
2. COMPLE	TE DISPERSION					
	Class 1 complete Class 2 partial No Dispersion	x				
3. REMOUL	DING					
	Class 3 disperses Does not disperse	X				
4. CARBON	ATE & GYPSUM (Ac	id Indicator)				
	Class 4 present Absent	X				
5. VIGOROL	IS SHAKING					
	Class 5 disperses Class 6 no dispersion	X				
EMERSION	CLASS NO.:	6				
Water used:	Distilled water at 20°C		Date Tested:	3.5.11		
Tested By:	AB		Sampled By:	Client		
Test Procedure	e: AS 1289 3.8.1		Job Number:	119-253		
Approved Signatory	God	Chris Lloyd			Date:	10.5.11
Accreditation No. 1459	This document is	s issued in accordance with N	ATA's accreditation req	uirements		



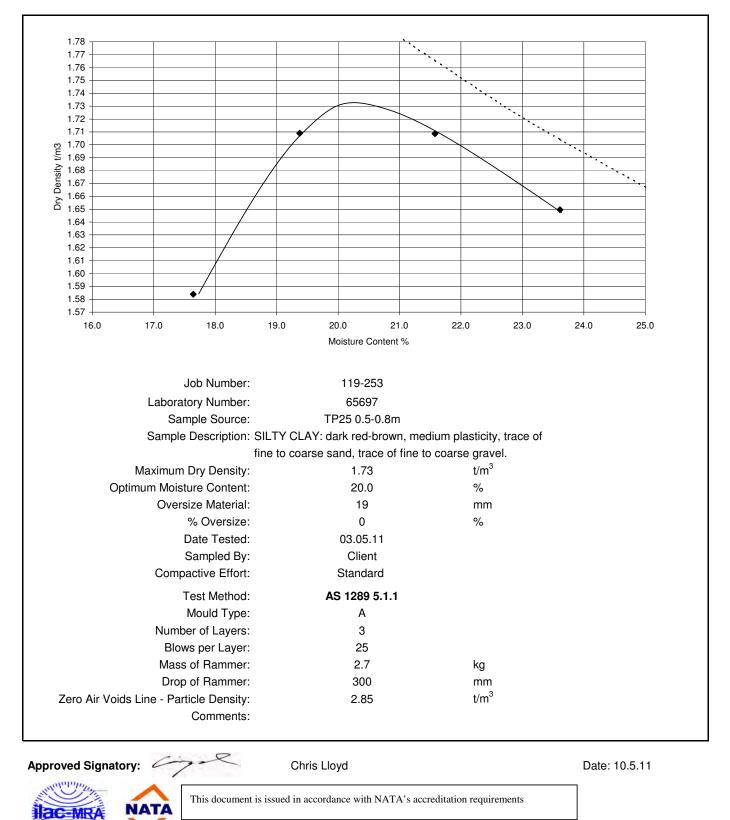
SGS Australia Pty Ltd Unit 15, 33 Maddox Street (PO Box 6432) Alexandria NSW 2015 Australia

at the time of its intervention only and within the limits of client's he transaction documents. Any unauthorized alteration, forcery or

# DRY DENSITY/MOISTURE CONTENT RELATION

#### CLIENT: URS Australia Pty Ltd

Level 4, 407 Pacific Highway Artarmon NSW 2064 PROJECT: Paling Yards Wind Farm Project (43167888)



Accreditation No. 1459 PF-(AU)-[IND(MTE)]-(GEN)-RPT-622.VER1.09.02.2011 – Page 1 of 1

"Intertedad





SGS Australia Pty Ltd Unit 15, 33 Maddox Street (PO Box 6432) Alexandria NSW 2015 Australia

# **CALIFORNIA BEARING RATIO**

### CLIENT: URS Australia Pty Ltd

Level 4, 407 Pacific Highway Artarmon NSW 2064

PROJECT: Paling Yards Wind Farm Project (43167888)

Sample Source: Sample Description:	TP25 0.5-0.8m SILTY CLAY: dark red-brown, medium pla	asticity, trace of
	gravel, trace of fine to coarse sand.	,,,,
Job Number:	119-253	
Laboratory Number:	65697	
CBR Value @ 2.5mm	8	(%)
CBR Value @ 5.0mm	6	(%)
Sample Data		
Compaction Specification	95% of MDD at OMC	
Maximum Dry Density (MDD)	1.73	(t/m <sup>3</sup> )
Optimum Moisture Content (OMC)	20.0	(%)
Mass of Surchages	4.5	(kg)
Number of Days Soaked	4	
Sample Preparation		
Dry Density - Before Soaking	1.64	(t/m <sup>3</sup> )
Dry Density - After Soaking	1.63	(t/m <sup>3</sup> )
Retained on 19mm Sieve	0	(%)
Moisture Content - Before Soaking	19.8	(%)
Laboratory Density Ratio	95.0	(%)
Laboratory Moisture Ratio	99.0	(%)
Moisture Content - After Soaking		
Top 30mm of Test Sample	23.7	(%)
Remainder of Test Sample	22.2	(%)
Swell After Soaking	0.1	(%)
Compactive Effort	Standard	
Number of Layers	3	
Blows per Layer	50	
Mass of Rammer	2.7	(kg)
Drop of Rammer	300	(mm)
Comments		
Date Tested:	9.5.11	
	Determination of the California Bearing Ratio of	a soil
Standard Laboratory Method for a removed Signatory:		
Approved Signatory:	Chris Lloyd	Date: 10.5.11
This docume	nt is issued in accordance with NATA's accreditation requirement	ents

File C:\Electronic Excel Reports\AS1289 6.1.1 California Bearing Ratio, Issue 2, May 2010, JL



SGS Australia Pty Ltd Unit 15, 33 Maddox Street (PO Box 6432) Alexandria NSW 2015 Australia

ion and jurisdictional issues established therein.

# **EMERSON CRUMB TEST**

### CLIENT: URS Australia Pty Ltd

Level 4, 407 Pacific Highway Artarmon NSW 2064 PROJECT: Paling Yards Wind Farm Project (43167888)

any subject to its General Conditions of Se

Laboratory Number:	65698					
Sample Source:	TP30 0.5m to 0.8n	n				
Sample Description:	SILTY CLAY: red b	prown, medium plastici	ty, trace of fine to coa	arse sand, trace c	of fine to co	oarse gravel.
1. IMMERSION	1					
[	Does not slake –		Class 7 swells (C	Organic Soils)		
5	Slakes	X	Class 8 does not	swell (Laterised	d)	
2. COMPLETE	DISPERSION					
(	Class 1 complete Class 2 partial No Dispersion	x				
3. REMOULDI	NG					
	Class 3 disperses Does not disperse	X				
4. CARBONAT	E & GYPSUM (Acid	Indicator)				
	Class 4 present Absent	X				
5. VIGOROUS	SHAKING					
	Class 5 disperses Class 6 no dispersion	X				
EMERSION C	LASS NO.:	5				
Water used:	Distilled water at 20°C		Date Tested:	3.05.11		
Tested By: A	AB		Sampled By:	Client		
Test Procedure: A	AS 1289 3.8.1		Job Number:	119-253		
Approved Signatory:	Cycl	Chris Lloyd			Date:	10.5.11
Accreditation No. 1459	This document is is	sued in accordance with NA	ATA's accreditation requi	rements		



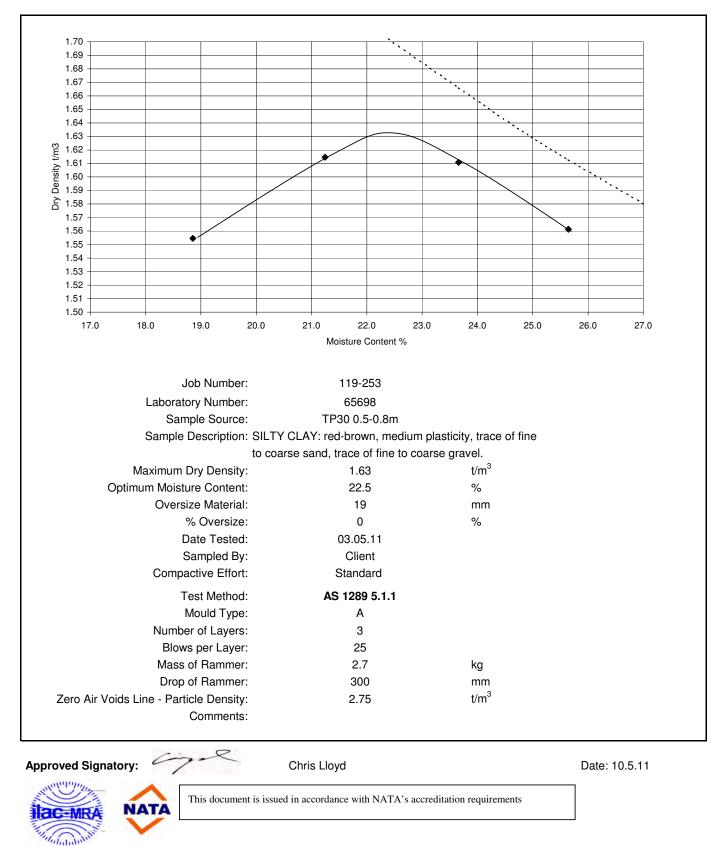
SGS Australia Pty Ltd Unit 15, 33 Maddox Street (PO Box 6432) Alexandria NSW 2015 Australia

at the time of its intervention only and within the limits of client's retransaction documents. Any unauthorized alteration, forners or

# DRY DENSITY/MOISTURE CONTENT RELATION

#### CLIENT: URS Australia Pty Ltd

Level 4, 407 Pacific Highway Artarmon NSW 2064 PROJECT: Paling Yards Wind Farm Project (43167888)



Accreditation No. 1459 PF-(AU)-[IND(MTE)]-(GEN)-RPT-622.VER1.09.02.2011 - Page 1 of 1





SGS Australia Pty Ltd Unit 15, 33 Maddox Street (PO Box 6432) Alexandria NSW 2015 Australia

# **CALIFORNIA BEARING RATIO**

### CLIENT: URS Australia Pty Ltd

Level 4, 407 Pacific Highway Artarmon NSW 2064

PROJECT: Paling Yards Wind Farm Project (43167888)

Sample Source:         TP30 0.5-0.8m           Sample Description:         SILTY CLAY: red-brown, medium plasticity, trace of fine					
	gravel, trace of fine to coarse sand.				
Job Number:	119-253				
Laboratory Number:	65698				
CBR Value @ 2.5mm	8	(%)			
CBR Value @ 5.0mm	6	(%)			
Sample Data					
Compaction Specification	95% of MDD at OMC				
Maximum Dry Density (MDD)	1.63	(t/m <sup>3</sup> )			
Optimum Moisture Content (OMC)	22.5	(%)			
Mass of Surchages	4.5	(kg)			
Number of Days Soaked	4				
Sample Preparation					
Dry Density - Before Soaking	1.54	(t/m <sup>3</sup> )			
Dry Density - After Soaking	1.53	(t/m <sup>3</sup> )			
Retained on 19mm Sieve	0	(%)			
Moisture Content - Before Soaking	22.7	(%)			
Laboratory Density Ratio	94.0	(%)			
Laboratory Moisture Ratio	101.0	(%)			
Moisture Content - After Soaking					
Top 30mm of Test Sample	28.0	(%)			
Remainder of Test Sample	13.2	(%)			
Swell After Soaking	0.3	(%)			
Compactive Effort	Standard				
Number of Layers	3				
Blows per Layer	50				
Mass of Rammer	2.7	(kg)			
Drop of Rammer	300	(mm)			
Comments					
Date Tested:	9.5.11				
	ermination of the California Bearing Ratio of a soil				
Standard Laboratory Method for a remoulder	d specimen.				
Approved Signatory:	Chris Lloyd	Date:	10.5.11		
Multimeter A					
This document is i	ssued in accordance with NATA's accreditation requirements				
Hac-MRA NATA					

File C:\Electronic Excel Reports\AS1289 6.1.1 California Bearing Ratio, Issue 2, May 2010, JL

in to the limitations of liability, inde

ion and jurisdictional issues established therein.



SGS Australia Pty Ltd Unit 15, 33 Maddox Street (PO Box 6432) Alexandria NSW 2015 Australia

# **EMERSON CRUMB TEST**

### CLIENT: URS Australia Pty Ltd

Level 4, 407 Pacific Highway Artarmon NSW 2064 PROJECT: Paling Yards Wind Farm Project (43167888)

d by the Company subject to its General Conditions of Se

Laboratory Numbe	r: 65699					
Sample Source:	TP33 0.4m to 0.7	'n				
Sample Description	n: CLAYEY SANDY	GRAVEL: brown, fine t	o coarse gravel, fine	to coarse sand,	low plastic	y.
1. IMMERSI	N					
	Does not slake		Class 7 swells (	Organic Soils)		
	Slakes	X	Class 8 does no	t swell (Laterise	ed)	
2. COMPLE	TE DISPERSION					
	Class 1 complete Class 2 partial No Dispersion	X				
3. REMOUL	DING					
	Class 3 disperses Does not disperse	X				
4. CARBON	ATE & GYPSUM (Aci	d Indicator)				
	Class 4 present Absent	x				
5. VIGOROL	IS SHAKING					
	Class 5 disperses Class 6 no dispersion	X				
EMERSION	CLASS NO.:	5				
Water used:	Distilled water at 20°C		Date Tested:	3.05.11		
Tested By:	AB		Sampled By:	Client		
Test Procedure	: AS 1289 3.8.1		Job Number:	119-253		
Approved Signatory	<b>^</b>	Chris Lloyd			Date:	10.5.11
Accreditation No. 1459	This document is	issued in accordance with N	A I A's accreditation requ	lirements		

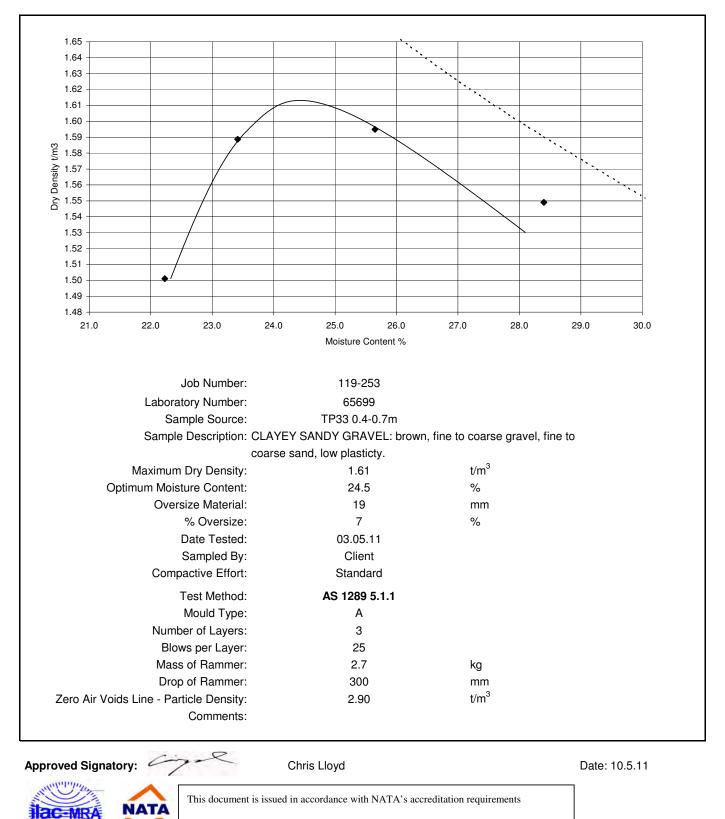


SGS Australia Pty Ltd Unit 15, 33 Maddox Street (PO Box 6432) Alexandria NSW 2015 Australia

# DRY DENSITY/MOISTURE CONTENT RELATION

#### CLIENT: URS Australia Pty Ltd

Level 4, 407 Pacific Highway Artarmon NSW 2064 PROJECT: Paling Yards Wind Farm Project (43167888)



Accreditation No. 1459 PF-(AU)-[IND(MTE)]-(GEN)-RPT-622.VER1.09.02.2011 - Page 1 of 1

"haladala





SGS Australia Pty Ltd Unit 15, 33 Maddox Street (PO Box 6432) Alexandria NSW 2015 Australia

# **CALIFORNIA BEARING RATIO**

### CLIENT: URS Australia Pty Ltd

Level 4, 407 Pacific Highway Artarmon NSW 2064

PROJECT: Paling Yards Wind Farm Project (43167888)

Sample Source: Sample Description:	TP33 0.4-0.7m CLAYEY SANDY GRAVEL: brown, fine to coarse gravel, fine to coarse sand, low plasticty.				
Job Number: Laboratory Number:	119-253 65699				
CBR Value @ 2.5mm CBR Value @ 5.0mm	10 12	(%) (%)			
Sample Data					
Compaction Specification Maximum Dry Density (MDD) Optimum Moisture Content (OMC) Mass of Surchages Number of Days Soaked	95% of MDD at OMC 1.61 24.5 4.5 4	(t/m <sup>3</sup> ) (%) (kg)			
Sample Preparation					
Dry Density - Before Soaking Dry Density - After Soaking	1.55 1.55	(t/m <sup>3</sup> ) (t/m <sup>3</sup> )			
Retained on 19mm Sieve	0	(%)			
Moisture Content - Before Soaking	25.2	(%)			
Laboratory Density Ratio	96.0	(%)			
Laboratory Moisture Ratio	103.0	(%)			
Moisture Content - After Soaking					
Top 30mm of Test Sample Remainder of Test Sample	25.4 26.9	(%) (%)			
Swell After Soaking	0	(%)			
Compactive Effort	Standard				
Number of Layers Blows per Layer Mass of Rammer Drop of Rammer	3 50 2.7 300	(kg) (mm)			
Comments Date Tested:	9.5.11				
	Determination of the California Bearing Ratio of a soil				
Standard Laboratory Method for a remound Approved Signatory:	Chris Lloyd	Date:	10.5.11		
and a second sec	nt is issued in accordance with NATA's accreditation requirements		10.3.11		

File C:\Electronic Excel Reports\AS1289 6.1.1 California Bearing Ratio, Issue 2, May 2010, JL

in to the limitations of liability, inde

ion and jurisdictional issues established therein.



SGS Australia Pty Ltd Unit 15, 33 Maddox Street (PO Box 6432) Alexandria NSW 2015 Australia

# **EMERSON CRUMB TEST**

### CLIENT: URS Australia Pty Ltd

Level 4, 407 Pacific Highway Artarmon NSW 2064 PROJECT: Paling Yards Wind Farm Project (43167888)

d by the Company subject to its General Conditions of Se

Laboratory Numbe	<b>r:</b> 65700					
Sample Source:	TP39 0.4m to 0.7	m				
Sample Description	n: SILTY CLAY: red	-brown, medium plastic	ity, trace of fine coar	se sand, trace of	f fine to coa	rse gravel.
1. IMMERSI	ON					
	Does not slake -		Class 7 swells (	Organic Soils)		
	Slakes	X	Class 8 does no	t swell (Laterise	ed)	
2. COMPLE	TE DISPERSION					
	Class 1 complete Class 2 partial No Dispersion	x				
3. REMOUL	DING					
	Class 3 disperses Does not disperse	X				
4. CARBON	ATE & GYPSUM (Aci	d Indicator)				
	Class 4 present Absent	x				
5. VIGOROL	IS SHAKING					
	Class 5 disperses Class 6 no dispersion	X				
EMERSION	CLASS NO.:	6				
Water used:	Distilled water at 20°C		Date Tested:	3.05.11		
Tested By:	AB		Sampled By:	Client		
Test Procedure	e: AS 1289 3.8.1		Job Number:	119-253		
Approved Signatory	Cy-e	Chris Lloyd			Date:	10.5.11
Accreditation No. 1459	This document is	issued in accordance with N.	ATA's accreditation requ	irements		

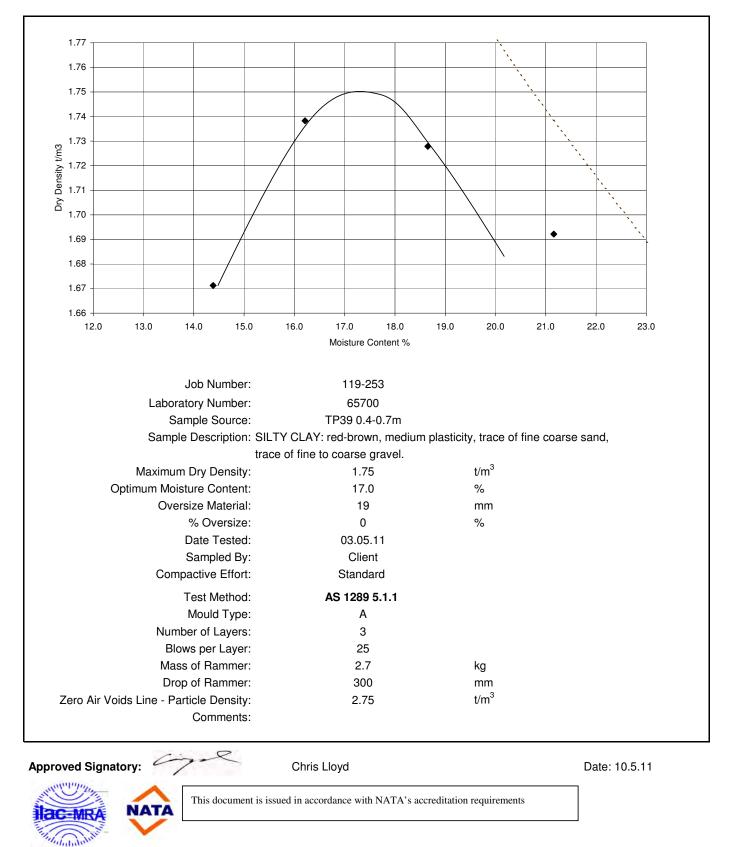


SGS Australia Pty Ltd Unit 15, 33 Maddox Street (PO Box 6432) Alexandria NSW 2015 Australia

# DRY DENSITY/MOISTURE CONTENT RELATION

#### CLIENT: URS Australia Pty Ltd

Level 4, 407 Pacific Highway Artarmon NSW 2064 PROJECT: Paling Yards Wind Farm Project (43167888)



Accreditation No. 1459 PF-(AU)-[IND(MTE)]-(GEN)-RPT-622.VER1.09.02.2011 – Page 1 of 1





SGS Australia Pty Ltd Unit 15, 33 Maddox Street (PO Box 6432) Alexandria NSW 2015 Australia

# **CALIFORNIA BEARING RATIO**

### CLIENT: URS Australia Pty Ltd

Level 4, 407 Pacific Highway Artarmon NSW 2064

PROJECT: Paling Yards Wind Farm Project (43167888)

Sample Source: Sample Description:	TP39 0.4-0.7m SILTY CLAY: red-brown, medium plasticity, trace of fine coarse sand,				
	trace of fine to coarse gravel.				
lob Number:	119-253				
aboratory Number:	65700				
CBR Value @ 2.5mm	5	(%)			
CBR Value @ 5.0mm	4	(%)			
Sample Data					
Compaction Specification	95% of MDD at OMC				
Aaximum Dry Density (MDD)	1.75	(t/m <sup>3</sup> )			
Optimum Moisture Content (OMC)	17.0	(%)			
Aass of Surchages	4.5	(kg)			
Number of Days Soaked	4				
Sample Preparation					
Dry Density - Before Soaking	1.66	(t/m <sup>3</sup> )			
Dry Density - After Soaking	1.66	(t/m <sup>3</sup> )			
Retained on 19mm Sieve	0	(%)			
Ioisture Content - Before Soaking	17.6	(%)			
aboratory Density Ratio	95.0	(%)			
aboratory Moisture Ratio	104.0	(%)			
Moisture Content - After Soaking					
op 30mm of Test Sample	21.8	(%)			
Remainder of Test Sample	21.6	(%)			
Swell After Soaking	0.2	(%)			
Compactive Effort	Standard				
Number of Layers	3				
Blows per Layer	50				
Mass of Rammer	2.7	(kg)			
Drop of Rammer	300	(mm)			
Comments					
Date Tested:	9.5.11				
fested in accordance with AS1289.6.1.	1 Determination of the California Bearing Ratio of	a soil			
Standard Laboratory Method for a rem					
Approved Signatory:	Chris Lloyd	Date: 10.5.11			
and a start of the					
This docum	nent is issued in accordance with NATA's accreditation requireme	ents			

File C:\Electronic Excel Reports\AS1289 6.1.1 California Bearing Ratio, Issue 2, May 2010, JL



SGS Australia Pty Ltd Unit 15, 33 Maddox Street (PO Box 6432) Alexandria NSW 2015 Australia

ion and jurisdictional issues established therein.

# **EMERSON CRUMB TEST**

### CLIENT: URS Australia Pty Ltd

Level 4, 407 Pacific Highway Artarmon NSW 2064 PROJECT: Paling Yards Wind Farm Project (43167888)

any subject to its General Conditions of S

Laboratory Numbe	<b>r:</b> 65701					
Sample Source:	TP48 0.4m to 0.7	'n				
Sample Description	n: SANDY GRAVEL	LY CLAY: yellow-brown	n, medium plasticity,	fine to coarse gra	avel, fine to	coarse sand.
1. IMMERSI	ON					
	Does not slake		Class 7 swells (	Organic Soils)		
	Slakes	X	Class 8 does no	t swell (Laterise	ed)	
2. COMPLE	TE DISPERSION					
	Class 1 complete Class 2 partial No Dispersion	X				
3. REMOUL	DING					
	Class 3 disperses Does not disperse	X				
4. CARBON	ATE & GYPSUM (Aci	d Indicator)				
	Class 4 present Absent	x				
5. VIGOROL	JS SHAKING					
	Class 5 disperses Class 6 no dispersion	X				
EMERSION	CLASS NO.:	5				
Water used:	Distilled water at 20°C		Date Tested:	3.5.11		
Tested By:	AB		Sampled By:	Client		
Test Procedure	e: AS 1289 3.8.1		Job Number:	119-253		
Approved Signatory	- Gol	Chris Lloyd			Date:	10.5.11
Accreditation No. 1459	This document is	issued in accordance with N	ATA's accreditation req	uirements	]	

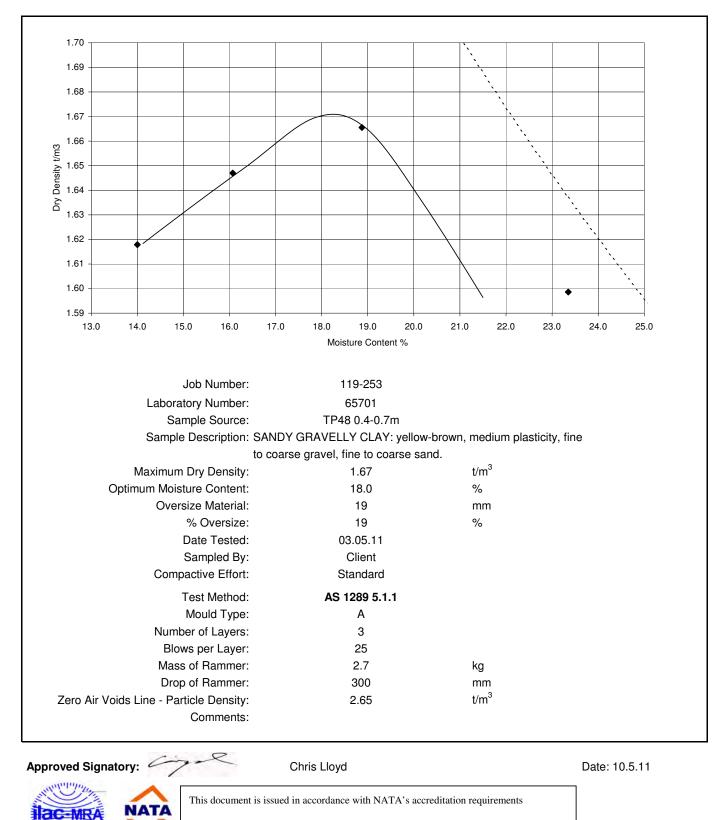


SGS Australia Pty Ltd Unit 15, 33 Maddox Street (PO Box 6432) Alexandria NSW 2015 Australia

# DRY DENSITY/MOISTURE CONTENT RELATION

#### CLIENT: URS Australia Pty Ltd

Level 4, 407 Pacific Highway Artarmon NSW 2064 PROJECT: Paling Yards Wind Farm Project (43167888)



Accreditation No. 1459 PF-(AU)-[IND(MTE)]-(GEN)-RPT-622.VER1.09.02.2011 – Page 1 of 1

"haladala





SGS Australia Pty Ltd Unit 15, 33 Maddox Street (PO Box 6432) Alexandria NSW 2015 Australia

# **CALIFORNIA BEARING RATIO**

### CLIENT: URS Australia Pty Ltd

Level 4, 407 Pacific Highway Artarmon NSW 2064

PROJECT: Paling Yards Wind Farm Project (43167888)

ample Description: ob Number: aboratory Number: BR Value @ 2.5mm BR Value @ 5.0mm <u>ample Data</u> ompaction Specification laximum Dry Density (MDD) ptimum Moisture Content (OMC) lass of Surchages	SANDY GRAVELLY CLAY: yellow-brown, n to coarse gravel, fine to coarse sand. 119-253 65701 2.0 2.5 95% of MDD at OMC 1.67 18.0 4.5 4	(%) (%) (t/m <sup>3</sup> ) (%) (kg)
aboratory Number: BR Value @ 2.5mm BR Value @ 5.0mm <u>ample Data</u> ompaction Specification laximum Dry Density (MDD) uptimum Moisture Content (OMC) lass of Surchages	119-253 65701 2.0 2.5 95% of MDD at OMC 1.67 18.0 4.5	(%) (t/m³) (%)
aboratory Number: BR Value @ 2.5mm BR Value @ 5.0mm <u>ample Data</u> ompaction Specification laximum Dry Density (MDD) uptimum Moisture Content (OMC) lass of Surchages	65701 2.0 2.5 95% of MDD at OMC 1.67 18.0 4.5	(%) (t/m³) (%)
BR Value @ 2.5mm BR Value @ 5.0mm ample Data ompaction Specification laximum Dry Density (MDD) optimum Moisture Content (OMC) lass of Surchages	2.0 2.5 95% of MDD at OMC 1.67 18.0 4.5	(%) (t/m³) (%)
BR Value @ 5.0mm ample Data ompaction Specification laximum Dry Density (MDD) uptimum Moisture Content (OMC) lass of Surchages	2.5 95% of MDD at OMC 1.67 18.0 4.5	(%) (t/m³) (%)
ample Data ompaction Specification laximum Dry Density (MDD) ptimum Moisture Content (OMC) lass of Surchages	95% of MDD at OMC 1.67 18.0 4.5	(t/m <sup>3</sup> ) (%)
ompaction Specification laximum Dry Density (MDD) ptimum Moisture Content (OMC) lass of Surchages	1.67 18.0 4.5	(%)
laximum Dry Density (MDD) ptimum Moisture Content (OMC) lass of Surchages	1.67 18.0 4.5	(%)
ptimum Moisture Content (OMC) lass of Surchages	18.0 4.5	(%)
lass of Surchages	4.5	
-		(kg)
	4	
umber of Days Soaked		
ample Preparation		
ry Density - Before Soaking	1.60	(t/m <sup>3</sup> )
ry Density - After Soaking	1.56	(t/m <sup>3</sup> )
etained on 19mm Sieve	0	(%)
loisture Content - Before Soaking	17.6	(%)
aboratory Density Ratio	96.0	(%)
aboratory Moisture Ratio	98.0	(%)
loisture Content - After Soaking		
op 30mm of Test Sample	28.4	(%)
emainder of Test Sample	24.5	(%)
well After Soaking	2.2	(%)
compactive Effort	Standard	
umber of Layers	3	
lows per Layer	50	
lass of Rammer	2.7	(kg)
rop of Rammer	300	(mm)
omments		
ate Tested:	9.5.11	
ested in accordance with AS1289.6.1.1 Det	ermination of the California Bearing Ratio of a	soil
tandard Laboratory Method for a remoulde	_	
Approved Signatory:	Chris Lloyd	Date: 10.5.11
	,	
This document is	issued in accordance with NATA's accreditation requirement	ts

File C:\Electronic Excel Reports\AS1289 6.1.1 California Bearing Ratio, Issue 2, May 2010, JL

in to the limitations of liability, inde

ion and jurisdictional issues established therein.



SGS Australia Pty Ltd Unit 15, 33 Maddox Street (PO Box 6432) Alexandria NSW 2015 Australia

# **EMERSON CRUMB TEST**

### CLIENT: URS Australia Pty Ltd

Level 4, 407 Pacific Highway Artarmon NSW 2064 PROJECT: Paling Yards Wind Farm Project (43167888)

d by the Company subject to its General Conditions of Se

Laboratory Numbe	r: 65702					
Sample Source:	TP53 0.4m to 0.7	m				
Sample Description	n: GRAVELLY CLAY	1: dark brown, medium	plasticity, fine to coar	se gravel, trace o	f fine to co	arse sand.
1. IMMERSI	ON					
	Does not slake -		Class 7 swells (C	Organic Soils)		
	Slakes	X	Class 8 does not	swell (Laterised	l)	
2. COMPLE	TE DISPERSION					
	Class 1 complete Class 2 partial No Dispersion	x				
3. REMOUL	DING					
	Class 3 disperses Does not disperse	x				
4. CARBON	ATE & GYPSUM (Acid	d Indicator)				
	Class 4 present Absent	x				
5. VIGOROL	JS SHAKING					
	Class 5 disperses Class 6 no dispersion	X				
EMERSION	CLASS NO.:	5				
Water used:	Distilled water at 20°C		Date Tested:	3.05.11		
Tested By:	AB		Sampled By:	Client		
Test Procedure	e: AS 1289 3.8.1		Job Number:	119-253		
Approved Signatory	<b>^</b>	Chris Lloyd	ATA's accreditation requi		Date:	10.5.11
Hac-MRA						

Accreditation No. 1459



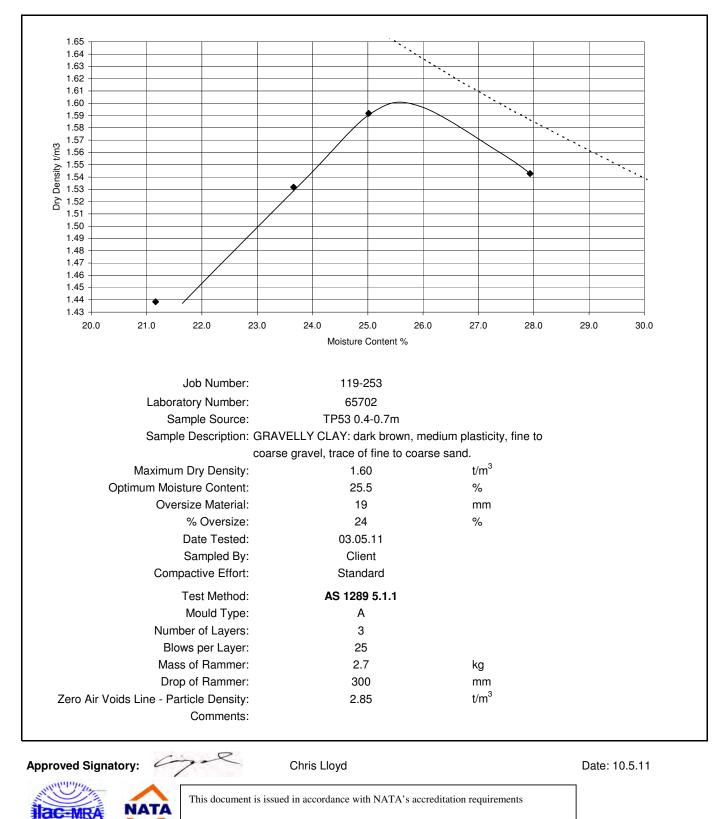
SGS Australia Pty Ltd Unit 15, 33 Maddox Street (PO Box 6432) Alexandria NSW 2015 Australia

gs at the time of its intervention only and within the limits of client's the transaction documents. Any unauthorized alteration, forcery or

# DRY DENSITY/MOISTURE CONTENT RELATION

#### CLIENT: URS Australia Pty Ltd

Level 4, 407 Pacific Highway Artarmon NSW 2064 PROJECT: Paling Yards Wind Farm Project (43167888)



Accreditation No. 1459 PF-(AU)-[IND(MTE)]-(GEN)-RPT-622.VER1.09.02.2011 - Page 1 of 1

"Intertedad





SGS Australia Pty Ltd Unit 15, 33 Maddox Street (PO Box 6432) Alexandria NSW 2015 Australia

# **CALIFORNIA BEARING RATIO**

### CLIENT: URS Australia Pty Ltd

Level 4, 407 Pacific Highway Artarmon NSW 2064

PROJECT: Paling Yards Wind Farm Project (43167888)

oarse gravel, trace of fine to coarse sand. 119-253 65702 6 5 95% of MDD at OMC 1.60 25.5 4.5 4 1.53 1.53 24% excluded 24.2 96.0	(%) (%) (t/m <sup>3</sup> ) (%) (t/m <sup>3</sup> ) (%) (%) (%)
65702 6 5 95% of MDD at OMC 1.60 25.5 4.5 4 1.53 1.53 24% excluded 24.2	(%) (t/m <sup>3</sup> ) (%) (t/m <sup>3</sup> ) (t/m <sup>3</sup> ) (%) (%)
6 5 95% of MDD at OMC 1.60 25.5 4.5 4 1.53 1.53 24% excluded 24.2	(%) (t/m <sup>3</sup> ) (%) (t/m <sup>3</sup> ) (t/m <sup>3</sup> ) (%) (%)
5 95% of MDD at OMC 1.60 25.5 4.5 4 1.53 1.53 24% excluded 24.2	(%) (t/m <sup>3</sup> ) (%) (t/m <sup>3</sup> ) (t/m <sup>3</sup> ) (%) (%)
95% of MDD at OMC 1.60 25.5 4.5 4 1.53 1.53 24% excluded 24.2	(t/m <sup>3</sup> ) (%) (kg) (t/m <sup>3</sup> ) (t/m <sup>3</sup> ) (%) (%)
1.60 25.5 4.5 4 1.53 1.53 24% excluded 24.2	(%) (kg) (t/m <sup>3</sup> ) (t/m <sup>3</sup> ) (%) (%)
1.60 25.5 4.5 4 1.53 1.53 24% excluded 24.2	(%) (kg) (t/m <sup>3</sup> ) (t/m <sup>3</sup> ) (%) (%)
25.5 4.5 4 1.53 1.53 24% excluded 24.2	(%) (kg) (t/m <sup>3</sup> ) (t/m <sup>3</sup> ) (%) (%)
4.5 4 1.53 1.53 24% excluded 24.2	(kg) (t/m <sup>3</sup> ) (%) (%)
4 1.53 1.53 24% excluded 24.2	(t/m <sup>3</sup> ) (t/m <sup>3</sup> ) (%) (%)
1.53 1.53 24% excluded 24.2	(t/m³) (%) (%)
1.53 24% excluded 24.2	(t/m³) (%) (%)
1.53 24% excluded 24.2	(t/m³) (%) (%)
24% excluded 24.2	(%) (%)
24.2	(%)
96.0	(%)
*	\ · · · /
95.0	(%)
30.6	(%)
26.2	(%)
0	(%)
Standard	
3	
50	
2.7	(kg)
300	(mm)
9.5.11	
tion of the California Bearing Ratio of a s	soil
men.	
hris Lloyd	Date: 10.5.11
accordance with NATA's accreditation requirement	s
;	3 50 2.7 300 9.5.11

File C:\Electronic Excel Reports\AS1289 6.1.1 California Bearing Ratio, Issue 2, May 2010, JL

in to the limitations of liability, inde

ion and jurisdictional issues established therein.



SGS Australia Pty Ltd Unit 15, 33 Maddox Street (PO Box 6432) Alexandria NSW 2015 Australia

# **EMERSON CRUMB TEST**

### CLIENT: URS Australia Pty Ltd

Level 4, 407 Pacific Highway Artarmon NSW 2064 PROJECT: Paling Yards Wind Farm Project (43167888)

d by the Company subject to its General Conditions of Se

Laboratory Number	r: 65703					
Sample Source:	TP57 0.4m to 0.7r	n				
Sample Description	n: SILTY CLAY: dark	k brown, high plasticity,	trace of fine to coarse	e sand, trace of f	ine to coar	se gravel.
1. IMMERSIO	NC					
	Does not slake -		Class 7 swells (O	rganic Soils)		
	Slakes	X	Class 8 does not	swell (Laterised	(b	
2. COMPLET	<b>TE DISPERSION</b>					
	Class 1 complete Class 2 partial No Dispersion	X				
3. REMOULI	DING					
	Class 3 disperses Does not disperse	X				
4. CARBON	ATE & GYPSUM (Acid	Indicator)				
	Class 4 present Absent	x				
5. VIGOROU	IS SHAKING					
	Class 5 disperses Class 6 no dispersion	X				
EMERSION	CLASS NO.:	5				
Water used:	Distilled water at 20°C		Date Tested:	3.05.11		
Tested By:	AB		Sampled By:	Client		
Test Procedure	: AS 1289 3.8.1		Job Number:	119-253		
Approved Signatory	God R	Chris Lloyd			Date:	10.5.11
ilac-mRA	This document is i	ssued in accordance with Na	ATA's accreditation requin	rements		

Accreditation No. 1459

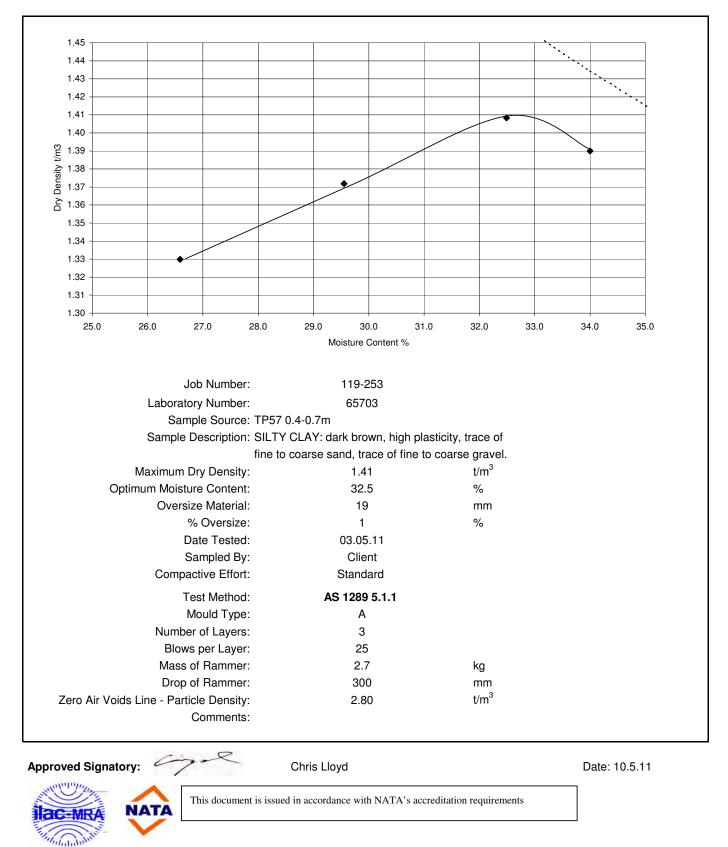


SGS Australia Pty Ltd Unit 15, 33 Maddox Street (PO Box 6432) Alexandria NSW 2015 Australia

# DRY DENSITY/MOISTURE CONTENT RELATION

#### CLIENT: URS Australia Pty Ltd

Level 4, 407 Pacific Highway Artarmon NSW 2064 PROJECT: Paling Yards Wind Farm Project (43167888)



Accreditation No. 1459 PF-(AU)-[IND(MTE)]-(GEN)-RPT-622.VER1.09.02.2011 - Page 1 of 1





SGS Australia Pty Ltd Unit 15, 33 Maddox Street (PO Box 6432) Alexandria NSW 2015 Australia

# **CALIFORNIA BEARING RATIO**

### CLIENT: URS Australia Pty Ltd

Level 4, 407 Pacific Highway Artarmon NSW 2064

PROJECT: Paling Yards Wind Farm Project (43167888)

	SILTY CLAY: dark brown, high plasticity, trace of					
ample Description:	fine to coarse sand, trace of fine to coarse gravel.					
ob Number:	119-253					
aboratory Number:	65703					
BR Value @ 2.5mm	4.0	(%)				
BR Value @ 5.0mm	4.0	(%)				
ample Data						
ompaction Specification	95% of MDD at OMC					
aximum Dry Density (MDD)	1.41	(t/m <sup>3</sup> )				
ptimum Moisture Content (OMC)	32.5	(%)				
ass of Surchages	4.5	(kg)				
umber of Days Soaked	4					
ample Preparation						
ry Density - Before Soaking	1.34	(t/m <sup>3</sup> )				
ry Density - After Soaking	1.31	(t/m <sup>3</sup> )				
etained on 19mm Sieve	1% excluded	(%)				
oisture Content - Before Soaking	32.4	(%)				
aboratory Density Ratio	95.0	(%)				
aboratory Moisture Ratio	100.0	(%)				
loisture Content - After Soaking						
op 30mm of Test Sample	40.9	(%)				
emainder of Test Sample	35.7	(%)				
well After Soaking	1.8	(%)				
ompactive Effort	Standard					
umber of Layers	3					
lows per Layer	50					
ass of Rammer	2.7	(kg)				
rop of Rammer	300	(mm)				
omments						
ate Tested:	9.5.11					
	termination of the California Bearing Ratio of a soil					
tandard Laboratory Method for a remoulde						
Approved Signatory:	Chris Lloyd	Date:	10.5.11			
		7				
This document is	issued in accordance with NATA's accreditation requirements					

File C:\Electronic Excel Reports\AS1289 6.1.1 California Bearing Ratio, Issue 2, May 2010, JL

in to the limitations of liability, inde

ion and jurisdictional issues established therein.



SGS Australia Pty Ltd Unit 15, 33 Maddox Street (PO Box 6432) Alexandria NSW 2015 Australia

# **EMERSON CRUMB TEST**

### CLIENT: URS Australia Pty Ltd

Level 4, 407 Pacific Highway Artarmon NSW 2064 PROJECT: Paling Yards Wind Farm Project (43167888)

d by the Company subject to its General Conditions of Se

Laboratory Number	r: 65704					
Sample Source:	TP12 1.6m to 1.7r	n				
Sample Description	1: SILTY GRAVELLY	Y SAND: yellow-brown,	fine to coarse sand, t	fine to medium gr	avel, low p	plasticity.
1. IMMERSIO	N					
	Does not slake –		Class 7 swells (O	organic Soils)		
	Slakes	X	Class 8 does not	swell (Laterised	l)	
2. COMPLET	<b>TE DISPERSION</b>					
	Class 1 complete Class 2 partial No Dispersion	X				
3. REMOULI	DING					
	Class 3 disperses Does not disperse	X				
4. CARBON	ATE & GYPSUM (Acid	Indicator)				
	Class 4 present Absent	x				
5. VIGOROU	IS SHAKING					
	Class 5 disperses Class 6 no dispersion	X				
EMERSION	CLASS NO.:	5				
Water used:	Distilled water at 20°C		Date Tested:	3.05.11		
Tested By:	AB		Sampled By:	Client		
Test Procedure	: AS 1289 3.8.1		Job Number:	119-253		
Approved Signatory	Ge	Chris Lloyd			Date:	10.5.11
ilac-MRA	This document is i	ssued in accordance with Na	ATA's accreditation requin	rements		

Accreditation No. 1459

in to the limitations of liability, inde

ion and jurisdictional issues established therein.



SGS Australia Pty Ltd Unit 15, 33 Maddox Street (PO Box 6432) Alexandria NSW 2015 Australia

# **EMERSON CRUMB TEST**

### CLIENT: URS Australia Pty Ltd

Level 4, 407 Pacific Highway Artarmon NSW 2064 PROJECT: Paling Yards Wind Farm Project (43167888)

d by the Company subject to its General Conditions of Se

Laboratory Numbe	<b>r:</b> 65705					
Sample Source:	TP16 1.1m to 1.5	2m				
Sample Descriptio	n: SILTY CLAY: bro	own, high plasticity, trace	e of fine to coarse sa	and, with fine to me	edium grav	vel.
1. IMMERSI	ON					
	Does not slake		Class 7 swells (	Organic Soils)		
	Slakes	X	Class 8 does no	ot swell (Laterised	d)	
2. COMPLE	TE DISPERSION					
	Class 1 complete Class 2 partial No Dispersion	x				
3. REMOUL	DING					
	Class 3 disperses Does not disperse	X				
4. CARBON	ATE & GYPSUM (Ac	id Indicator)				
	Class 4 present Absent	X				
5. VIGOROL	JS SHAKING					
	Class 5 disperses Class 6 no dispersion	X				
EMERSION	CLASS NO.:	5				
Water used:	Distilled water at 20°C		Date Tested:	3.05.11		
Tested By:	AB		Sampled By:	Client		
Test Procedure	e: AS 1289 3.8.1		Job Number:	119-253		
Approved Signatory	in and	Chris Lloyd			Date:	10.5.11
Accreditation No. 1459	This document is	s issued in accordance with N	ATA's accreditation req	uirements		



SGS Australia Pty Ltd Unit 15, 33 Maddox Street (PO Box 6432) Alexandria NSW 2015 Australia

ion and jurisdictional issues established therein.

# **EMERSON CRUMB TEST**

### CLIENT: URS Australia Pty Ltd

Level 4, 407 Pacific Highway Artarmon NSW 2064 PROJECT: Paling Yards Wind Farm Project (43167888)

any subject to its General Conditions of Se

Laboratory Numbe	er: 65706					
Sample Source:	TP22 1.4m to 1	l.5m				
Sample Descriptio	n: SILTY CLAY: y	ellow-brown, medium pla	sticity, trace of fine t	o coarse sand an	d fine to co	arse gravel.
1. IMMERSI	ON					
	Does not slake		Class 7 swells (	Organic Soils)		
	Slakes	X	Class 8 does no	ot swell (Laterise	ed)	
2. COMPLE	TE DISPERSION					
	Class 1 complete Class 2 partial No Dispersion	x				
3. REMOUL	DING					
	Class 3 disperses Does not disperse	x				
4. CARBON	ATE & GYPSUM (A	cid Indicator)				
	Class 4 present Absent	x				
5. VIGOROU	JS SHAKING					
	Class 5 disperses Class 6 no dispersio	on X				
EMERSION	CLASS NO.:	6				
Water used:	Distilled water at 20°C		Date Tested:	3.05.11		
Tested By:	AB		Sampled By:	Client		
Test Procedure	e: AS 1289 3.8.1		Job Number:	119-253		
Approved Signatory	i God	Chris Lloyd			Date:	10.5.11
Accreditation No. 1459	This document	is issued in accordance with N	ATA's accreditation req	uirements		



SGS Australia Pty Ltd Unit 15, 33 Maddox Street (PO Box 6432) Alexandria NSW 2015 Australia

ion and jurisdictional issues established therein.

# **EMERSON CRUMB TEST**

### CLIENT: URS Australia Pty Ltd

Level 4, 407 Pacific Highway Artarmon NSW 2064 PROJECT: Paling Yards Wind Farm Project (43167888)

any subject to its General Conditions of Se

Laboratory Number	: 65707					
Sample Source:	BH24 1.2 to 1.3m					
Sample Description	CLAYEY SAND: c	dark-brown, fine to coar	se sand, low plastici	ty, trace of fine gr	avel.	
1. IMMERSIC	ON					
	Does not slake -		Class 7 swells (	Organic Soils)		
	Slakes	X	Class 8 does no	t swell (Laterise	d)	
2. COMPLET	E DISPERSION					
	Class 1 complete Class 2 partial No Dispersion	x				
3. REMOULI	DING					
	Class 3 disperses Does not disperse	x				
4. CARBONA	ATE & GYPSUM (Acid	d Indicator)				
	Class 4 present Absent	x				
5. VIGOROU	S SHAKING					
	Class 5 disperses Class 6 no dispersion	X				
EMERSION	CLASS NO.:	5				
Water used:	Distilled water at 20°C		Date Tested:	3.05.11		
Tested By:	AB		Sampled By:	Client		
Test Procedure	: AS 1289 3.8.1		Job Number:	119-253		
Approved Signatory:	ape	Chris Lloyd			Date:	03.08.11
Accreditation No. 1459	This document is i	ssued in accordance with N.			]	

in to the limitations of liability, inde

ion and jurisdictional issues established therein.



SGS Australia Pty Ltd Unit 15, 33 Maddox Street (PO Box 6432) Alexandria NSW 2015 Australia

# **EMERSON CRUMB TEST**

### CLIENT: URS Australia Pty Ltd

Level 4, 407 Pacific Highway Artarmon NSW 2064 PROJECT: Paling Yards Wind Farm Project (43167888)

d by the Company subject to its General Conditions of Se

Laboratory Number	r: 65708					
Sample Source:	TP28 1.1m to 1.2	m				
Sample Description	n: SILTY CLAY: red	-brown, high plasticity, t	trace of fine to coarse	e sand and fine g	ravel.	
1. IMMERSIC	NC					
	Does not slake -		Class 7 swells (C	Organic Soils)		
	Slakes	X	Class 8 does not	swell (Laterised	d)	
2. COMPLET	<b>TE DISPERSION</b>					
	Class 1 complete Class 2 partial No Dispersion	x				
3. REMOULI	DING					
	Class 3 disperses Does not disperse	X				
4. CARBON	ATE & GYPSUM (Acid	d Indicator)				
	Class 4 present Absent	x				
5. VIGOROU	IS SHAKING					
	Class 5 disperses Class 6 no dispersion	x				
EMERSION	CLASS NO.:	6				
Water used:	Distilled water at 20°C		Date Tested:	3.05.11		
Tested By:	AB		Sampled By:	Client		
Test Procedure	: AS 1289 3.8.1		Job Number:	119-253		
Approved Signatory	Ge	Chris Lloyd			Date:	10.5.11
ilac-MRA	This document is i	issued in accordance with N	ATA's accreditation requi	rements		

Accreditation No. 1459

in to the limitations of liability, inde

ion and jurisdictional issues established therein.



SGS Australia Pty Ltd Unit 15, 33 Maddox Street (PO Box 6432) Alexandria NSW 2015 Australia

# **EMERSON CRUMB TEST**

### CLIENT: URS Australia Pty Ltd

Level 4, 407 Pacific Highway Artarmon NSW 2064 PROJECT: Paling Yards Wind Farm Project (43167888)

d by the Company subject to its General Conditions of Se

Laboratory Number	r: 65709					
Sample Source:	TP34 1.4m to 1.5r	n				
Sample Description	n: SILTY CLAY: grey	r-brown∕ brown, high pl	asticity, trace of fine to	o coarse sand ar	nd fine grav	vel.
1. IMMERSIO	N					
	Does not slake –		Class 7 swells (O	rganic Soils)		
	Slakes	X	Class 8 does not	swell (Laterised	(k	
2. COMPLET	<b>TE DISPERSION</b>					
	Class 1 complete Class 2 partial No Dispersion	x				
3. REMOULI	DING					
	Class 3 disperses Does not disperse	X				
4. CARBON	ATE & GYPSUM (Acid	Indicator)				
	Class 4 present Absent					
5. VIGOROU	IS SHAKING					
	Class 5 disperses Class 6 no dispersion					
EMERSION	CLASS NO.:	3				
Water used:	Distilled water at 20°C		Date Tested:	3.05.11		
Tested By:	AB		Sampled By:	Client		
Test Procedure	: AS 1289 3.8.1		Job Number:	119-253		
Approved Signatory	Cy-e	Chris Lloyd			Date:	10.5.11
Iac-mRA	This document is i	ssued in accordance with NA	ATA's accreditation requin	rements		

Accreditation No. 1459

in to the limitations of liability, inde

ion and jurisdictional issues established therein.



SGS Australia Pty Ltd Unit 15, 33 Maddox Street (PO Box 6432) Alexandria NSW 2015 Australia

# **EMERSON CRUMB TEST**

### CLIENT: URS Australia Pty Ltd

Level 4, 407 Pacific Highway Artarmon NSW 2064 PROJECT: Paling Yards Wind Farm Project (43167888)

d by the Company subject to its General Conditions of Se

Laboratory Numbe	<b>r:</b> 65710					
Sample Source:	TP38 1.3m to 1.4	m				
Sample Descriptio	n: SANDY SILT: red	-brown, low plasticity, f	ine to medium sand.			
1. IMMERSI	ON					
	Does not slake -		Class 7 swells (C	Organic Soils)		
	Slakes	X	Class 8 does not	swell (Laterise	d)	
2. COMPLE	TE DISPERSION					
	Class 1 complete Class 2 partial No Dispersion	x				
3. REMOUL	DING					
	Class 3 disperses Does not disperse	X				
4. CARBON	ATE & GYPSUM (Aci	d Indicator)				
	Class 4 present Absent	x				
5. VIGOROU	JS SHAKING					
	Class 5 disperses Class 6 no dispersion	x				
EMERSION	CLASS NO.:	6				
Water used:	Distilled water at 20°C		Date Tested:	3.05.11		
Tested By:	AB		Sampled By:	Client		
Test Procedure	e: AS 1289 3.8.1		Job Number:	119-253		
Approved Signatory	<b>^</b>	Chris Lloyd	ATA's accreditation requi	rements	Date:	10.5.11
the first of the light of the	$\mathbf{v}$					

Accreditation No. 1459



SGS Australia Pty Ltd Unit 15, 33 Maddox Street (PO Box 6432) Alexandria NSW 2015 Australia

dictional issues established therein.

ned hereon reflects the Company's findings at the time of its intervention only and within the limits of client's cising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or

# **EMERSON CRUMB TEST**

### CLIENT: URS Australia Pty Ltd

Level 4, 407 Pacific Highway Artarmon NSW 2064 PROJECT: Paling Yards Wind Farm Project (43167888)

instructions, if any. The con

ny subject to its General Co

ted as an original within the meaning of UCP 600. Any holder of this document is advised that information contain gamy's sole responsibility it to its client and this document does not exonerate parties to a transaction from exem r appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

Laboratory Numbe	<b>r:</b> 65711					
Sample Source:	TP42 1.2m to 1.3	3m				
Sample Description	n: SILTY CLAY: dar	rk red-brown, high plasti	city, trace of fine to	coarse sand, trace	of fine to o	coarse gravel.
1. IMMERSI	ON					
	Does not slake		Class 7 swells (	Organic Soils)		
	Slakes	X	Class 8 does no	t swell (Laterised	)	
2. COMPLE	TE DISPERSION					
	Class 1 complete Class 2 partial No Dispersion	X				
3. REMOUL	DING					
	Class 3 disperses Does not disperse	X				
4. CARBON	ATE & GYPSUM (Aci	d Indicator)				
	Class 4 present Absent	x				
5. VIGOROL	JS SHAKING					
	Class 5 disperses Class 6 no dispersion	X				
EMERSION	CLASS NO.:	5				
Water used:	Distilled water at 20°C		Date Tested:	3.05.11		
Tested By:	AB		Sampled By:	Client		
Test Procedure	e: AS 1289 3.8.1		Job Number:	119-253		
Approved Signatory	cy &	Chris Lloyd			Date:	10.5.11
Accreditation No. 1459	This document is	issued in accordance with N.	ATA's accreditation requ	uirements		

in to the limitations of liability, inde

ion and jurisdictional issues established therein.



SGS Australia Pty Ltd Unit 15, 33 Maddox Street (PO Box 6432) Alexandria NSW 2015 Australia

# **EMERSON CRUMB TEST**

### CLIENT: URS Australia Pty Ltd

Level 4, 407 Pacific Highway Artarmon NSW 2064 PROJECT: Paling Yards Wind Farm Project (43167888)

d by the Company subject to its General Conditions of Se

Laboratory Numbe	r: 65712					
Sample Source:	TP50 1.5m to 1	.6m				
Sample Descriptio	n: SILTYCLAY: br	own, high plasticity, trace	of fine to medium s	and.		
1. IMMERSI	ON					
	Does not slake	>	Class 7 swells (	Organic Soils)		
	Slakes	X	Class 8 does no	t swell (Laterise	ed)	
2. COMPLE	TE DISPERSION					
	Class 1 complete Class 2 partial No Dispersion	x				
3. REMOUL	DING					
	Class 3 disperses Does not disperse	x				
4. CARBON	ATE & GYPSUM (Ad	cid Indicator)				
	Class 4 present Absent	x				
5. VIGOROL	JS SHAKING					
	Class 5 disperses Class 6 no dispersio	n X				
EMERSION	CLASS NO.:	5				
Water used:	Distilled water at 20°C		Date Tested:	3.05.11		
Tested By:	AB		Sampled By:	Client		
Test Procedure	e: AS 1289 3.8.1		Job Number:	119-253		
Approved Signatory	i gol	Chris Lloyd			Date:	10.5.11
Accreditation No. 1459	This document	is issued in accordance with N	ATA's accreditation req	uirements		

en to the limitations of liability inde

tion and jurisdictional issues established therein.



SGS Australia Pty Ltd Unit 15, 33 Maddox Street (PO Box 6432) Alexandria NSW 2015 Australia

# **EMERSON CRUMB TEST**

### CLIENT: URS Australia Pty Ltd

Level 4, 407 Pacific Highway Artarmon NSW 2064 PROJECT: Paling Yards Wind Farm Project (43167888)

d by the Company subject to its General Conditions of Se

Laboratory Numbe	<b>r:</b> 65713					
Sample Source:	TP60 1.5m to 1.6r	n				
Sample Description	n: SILTYCLAY: brow	n, high plasticity, trace	of fine to coarse sa	nd, trace of fine g	gravel.	
1. IMMERSI	ON					
	Does not slake –		Class 7 swells (	Organic Soils)	Г	
	Slakes	X	Class 8 does no		ad)	 
	TE DISPERSION				<u>,</u>	]
2. COMPLE	Class 1 complete Class 2 partial No Dispersion	x				
3. REMOUL	DING					
	Class 3 disperses Does not disperse	X				
4. CARBON	ATE & GYPSUM (Acid	I Indicator)				
	Class 4 present Absent	X				
5. VIGOROL	JS SHAKING					
	Class 5 disperses Class 6 no dispersion	X				
EMERSION	CLASS NO.:	6				
Water used:	Distilled water at 20°C		Date Tested:	3.05.11		
Tested By:	AB		Sampled By:	Client		
Test Procedure	e: AS 1289 3.8.1		Job Number:	119-253		
Approved Signatory	God a	Chris Lloyd			Date:	10.5.11
Accreditation No. 1459	This document is in	ssued in accordance with N	ATA's accreditation requ	irements		



**PROJECT:** 

This document is issued by the Company subject to its General Conditions of Service (new sign combiners, and conditions.htm). Abartion is drawn to the limitations of lability, Indemnification and jurisdictoral issues established therein. This document is to be treated as an original within the meaning of UCP 600, Any holder of this document is advanted that information contained herein-reflects the Company's findings at the time of its intervention only and within the limits of client's instructions, if any. The company's solve approximation is advanted to be extended on a procession of the antitransformed in company's solve approximation in the solve and the document is advanted particle to a transaction tom exercised that their right said biligations under the transaction documents. Any instructions, if the other company is advanted and the document of the holder elevent of the lability of the lability of the lability. SGS Australia Pty Ltd Unit 15, 33 Maddox Street (PO Box 6432) Alexandria NSW 2015 Australia

# SOIL CLASSIFICATION TEST DATA

### CLIENT: URS Australia Pty Ltd

Level 4, 407 Pacific Highway Artarmon NSW 2064

Paling Yards Wind Farm Project (43167888)

LAB NO.	SAMPLE SOURCE	SAMPLE DESCRIPTION	MOISTURE CONTENT (%)	DRY DENSITY (t/m <sup>3</sup> )	Liquid Limit	PLASTIC INDEX	PREPAR- ATION & HISTORY	LINEAR SHRINK. (%)
			1	(,	2	3	4	5
65694	TP08 0.4m to 0.7m	SILTY CLAY: light brown, high plasticity, plasticity, with fine to coarse gravel, trace trace of fine to coarse sand.	26.1	-	-	-	-	-
65695	TP17 0.4m to 0.7m	SILTY CLAY: red-brown, high plasticity, plasticity, trace of fine to coarse sand and fine to coarse gravel.	32.6	-	-	-	-	-
65696	TP21 0.4m to 0.7m	SILTY CLAY: red-brown, high plasticity, plasticity, trace of fine to coarse sand and fine to coarse gravel.	32.6	-	-	-	-	-
65697	TP25 0.5m to 0.8m	SILTY CLAY: dark red-brown, medium plasticity, trace of fine to coarse sand and fine to coarse grav.	19.6	-	-	-	-	-
65698	TP30 0.5m to 0.8m	SILTY CLAY: red-brown, medium plasticity, trace of fine to coarse sand and fine to coarse gravel.	16.1	-	-	-	-	-
65699	TP33 0.4m to 0.7m	CLAYEY SANDY GRAVEL: brown, fine to coarse gravel, fine to coarse sand, low plasticity.	19.7	-	-	-	-	-
65700	TP39 0.4m to 0.7m	SILTY CLAY: red-brown, medium plasticity, trace of fine to coarse sand and fine to coarse gravel.	14.4	-	-	-	-	-
65701	TP48 0.4m to 0.7m	SANDY GRAVELLY CLAY: yellow- brown, medium plasticity, fine to coarse gravel, fine to coarse sand.	17.6	-	-	-	-	-
NOTES 7	TO TESTING			<u> </u>				
	lest Method:	AS 1289 2.1.1		Sampled	By:	Client		
				Job Numb	ber:	119-253		
				Date Test	ed:	3.5.11		

Approved Signatory: 6

NATA

7-

Chris Lloyd

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

Date: 10.5.11





**PROJECT:** 

This document is to be treated as an original within the meaning of UCP 600. Any holder of this document instructions, if any. The company's sole responsibility it to its cleart and this document does not exonance tabilitation of the content or appearance of this document is instead. If and interference may be one content of appearance of the content or appearance of this document is instead. the Company's findings at the time of its intervention only and within the limits of client's and obligations under the transaction documents. Any unauthorized alteration, forgery or SGS Australia Pty Ltd Unit 15, 33 Maddox Street (PO Box 6432) Alexandria NSW 2015 Australia

# SOIL CLASSIFICATION TEST DATA

#### CLIENT: **URS Australia Pty Ltd**

Level 4, 407 Pacific Highway Artarmon NSW 2064

Paling Yards Wind Farm Project (43167888)

LAB	SAMPLE	SAMPLE DESCRIPTION	MOISTURE			PLASTIC	PREPAR-	LINEAR
NO.	SOURCE				LIMIT	INDEX	ATION & HISTORY	SHRINK.
			(%) 1	(t/m <sup>3</sup> )	2	3	4	(%) 5
65702	TP53 0.4m to 0.7m	GRAVELLY CLAY: dark-brown, medium plasticity, fine to coarse gravel, trace of fine to coarse sand.	24.2	-	-	-	-	-
65703	TP57 0.4m to 0.7m	SILTY CLAY: dark-brown, high plasticity, trace of fine to coarse sand and fine to coarse gravel.	28.5	-	-	-	-	-
65704	TP12 1.6m to 1.7m	SILTY GRAVELLY SAND: yellow-brown, fine to coarse sand, fine to medium gravel, low plasticity.	26.8	-	-	-	-	-
65705	TP16 1.1m to 1.2m	SILTY CLAY: brown, high plasticity, trace of fine to coarse sand, with fine to medium gravel.	32.5	-	-	-	-	-
65706	TP22 1.4m - 1.5m	SILTY CLAY: yellow-brown, medium plasticity, trace of fine to coarse sand and fine to coarse gravel.	22.7	-	-	-	-	-
65707	TP24 1.2m to 1.3m	CLAYEY SAND: dark-brown, fine to coarse sand, low plasticity, trace of fine gravel.	17.8	-	-	-	-	-
65708	TP28 1.1m to 1.2m	SILTY CLAY: red-brown, high plasticity, trace of fine to coarse sand and fine gravel.	28.0	-	-	-	-	-
65709	TP34 1.4m to 1.5m	SILTY CLAY: grey-brown/ brown, high plasticity, trace of fine to coarse sand and fine gravel.	40.0	-	-	-	-	-
NOTES	TO TESTING							
	Test Method:	AS 1289 2.1.1		Sampled	By:	Client		
				Job Numb	ber:	119-253		
				Date Test	ed:	3.5.11		

Approved Signatory:

NATA

Chris Lloyd

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





**PROJECT:** 

The document is issued by the Company subject to its General Conditions of Series (www.spacemittems\_and\_conditions.thm). Attention is deamto the Initiations of lability, indemitication and jurisdeformal issues satisfied therein. The document is to be treated as an object and the meaning of UUP GID. Any holder of the document is advised that information container thereins relations of the Company issues (satisfied at the time) and object and the document is advised that information container thereins relations of a streated as an object at the streated at the information container thereins and that information container thereins and the information container therein the information container thereins and the information container the information container thereins and the information cont SGS Australia Pty Ltd Unit 15, 33 Maddox Street (PO Box 6432) Alexandria NSW 2015 Australia

# SOIL CLASSIFICATION TEST DATA

### CLIENT: URS Australia Pty Ltd

Level 4, 407 Pacific Highway Artarmon NSW 2064

Paling Yards Wind Farm Project (43167888)

LAB	SAMPLE	SAMPLE DESCRIPTION	MOISTURE			PLASTIC	PREPAR-	LINEAR
NO.	SOURCE		CONTENT		LIMIT	INDEX	ATION &	SHRINK.
			(%) 1	(t/m³)	2	3	HISTORY 4	(%) 5
					2	3	4	5
65710	TP38 1.3m to 1.4m	SANDY SILT: red-brown, low plasticity, fine to medium sand.	31.8	-	-	-	-	-
65711	1.2m to 1.3m	SILTY CLAY: dark red-brown, high plasticity, trace of fine to coarse sand, trace of fine gravel.	26.1	-	-	-	-	-
65712	TP50 1.5m to 1.6m	SILTY CLAY: brown, high plasticity, trace of fine to medium sand.	35.9	-	-	-	-	-
65713	1.5m to 1.6m	SILTY CLAY: brown, high plasticity, trace of fine to coarse sand, trace of fine gravel.	20.7	-	-	-	-	-
NOTES	TO TESTING Test Method:	AS 1289 2.1.1		Sampled	By:	Client		
				Job Numb	ber:	119-253		
				Date Test	ed:	3.5.11		
Appro	oved Signatory:	Coper	Chris Lloyd			٦	Date: 10.5.11	
lac	MRA NAT	This document is issued in accordance with NAT.	A's accreditation	n requirements	5			

Head Office: 32 Fiveways Boulevard

KEYSBOROUGH VIC 3173



Job No.: Project: Client:		306540 Paling Yards Wind Farm URS Australia Pty Ltd			_ Sample No.: _ Date:	<b>1103299</b> 11/08/11		
		at Pit No:			Donáh	-		
			8		Depth:	0.50 - 0.80m		
est N	lethod	Used :	Reference Doc	. IEEE Guide for Soil F	Resistivity Measure	ments. (IEEE Std 442 - 1981	)	
	ŝ	Sample Histor	y: 1	00% Standard E	-	cieved Moisture Co		
Resi	stivity	Meter:	TC1396 N	eedle ID.:	0239	Needle Resistance:	82.93 Ohm/m:	
Sam	ple D	escription:	Clay					
				т	EST RESULTS	6		
Μ	loistu	ure Content	Compacted Wet Density		Thermal Co	-	Thermal Resistivity	
		<u>(%)</u> 2.3		<u>t/m<sup>3</sup></u>	<b>(W / r</b> 0.2	-	(m K / W) 4.76	
		9.9			0.3		2.86	
12.5		12.5 27.0	 1.582		0.3		<u>2.63</u> 1.32	
Thermal Resistivity (m K/W)	4 - 2 -				Thermal Resistivity (m K/W)			
	0 -		0 ź Moisture Conter	20 30 nt (%)	0	10 Moisture Cont		



	Job No Project: Client:	: <u> </u>		rds Wind Farm tralia Pty Ltd		_ Sample No.: _ Date:	<b>1103338</b> 15/08/11	
	Test Pit	-	15		Depth:	– 0.50 - 0.80m		
est N	lethod Used	: 1	Reference I	Doc. IEEE Guide for Soil F	Resistivity Measuren	nents. (IEEE Std 442 - 198	1)	
	Samp	ole History:		100% Standard E	Effort @ as red	cieved Moisture Co	ontent	
Resi	stivity Mete	er:	TC1396	Needle ID.:	0239	Needle Resistance:	82.93 Ohm/m:	
Sam	ple Descri	ption:	Clay					
				т	EST RESULTS			
Μ	loisture C	ontent	Compa	cted Wet Density	Thermal Co	-	Thermal Resistivity	
	<b>(%)</b> 3.5	5	t/m <sup>3</sup>		<b>(W / n</b> 0.2	•	(m K / W) 4.55	
	12.4				0.3	3	3.03	
	19.4 29.0		 1.546		0.4		2.44	
	6	Thermal Res	sistivity Dr			mal Resistivity Dry Out C		
Thermal Resistivity (m K/W)		•	sistivity Dr		Ther			



					GEOTECHNIC		Page 1 of 1	
			The	rmal Resistiv	ity Dryout	Curve Reports		
Job No.:		306540			Sample No.:	1103300		
Project:			ards Wind Farm		Date:	11/08/11		
	С	lient:	URS Aus	stralia Pty Ltd		_		
	Tes	st Pit No:	17		Depth:	0.50 - 0.80m		
st N	/lethod	Used :	Reference	Doc. IEEE Guide for Soil	Resistivity Measure	ments. (IEEE Std 442 - 198	1)	
	:	Sample Histor	y:	100% Standard	Effort @ as re	cieved Moisture Co	ontent	
si	stivity	/ Meter:	TC1396	Needle ID.:	0239	Needle Resistance:	82.93 Ohm/m:	
зm	ple D	escription:	Clay					
				TEST RESUL				
Μ	loistı	ure Content (%)	Compacted Wet Density t/m <sup>3</sup>   1.392		Thermal Co (W / 1	-	Thermal Resistivity (m K / W) 4.00	
		4.3			0.2			
		11.7			0.42		2.38	
		14.4 32.3			0.4		<u>2.17</u> 1.33	
	6 · 4 · 2 ·				Thermal Resistivity (m K/W)			
	0 ·		20 Moisture Co	30 40 ntent (%)	0 1	10 Moisture Con	tent (%)	
			Date :	5 - 10 Aug 11	Chackad h		: 11-Aug-11	
516	ed by	. AU/KK	Date	5 - 10-Aug-11	Checked by	y: AC Date	. II-Aug-II	



		<b>T</b> I:		t. D		Page 1 of 1
		Inermal	Resistivi	ty Dryout C	Curve Reports	
	Job No.:	306540			Sample No.:	1103301
Project:		Paling Yards Wir	d Farm		Date:	11/08/11
	Client:	URS Australia Pt	y Ltd		-	
	Test Pit No:	21		Depth:	0.50 - 0.80m	
est N	Nethod Used :	Reference Doc. IEEE	Guide for Soil F	Resistivity Measuren	nents. (IEEE Std 442 - 198	1)
	Sample History	/: <b>100%</b>	Standard E	Effort @ as red	cieved Moisture Co	ontent
lesis	stivity Meter:	TC1396 Needle	e ID.:	0239	Needle Resistance:	82.93 Ohm/m:
Sam	ple Description:	Clay				
		т	EST RESUL	TS		
M	loisture Content	Compacted We		Thermal Co	nductivity	Thermal Resistivity
	(%)	t/m <sup>3</sup>	2 onony	(W / n	-	(m K / W)
	2.9	   1.529		0.2	-	4.00
	11.3			0.37 0.41		2.70
	13.9					2.44
	32.3			0.9	5	1.05
Thermal Resistivity (m K/W)		Resistivity Dry Out Cu		Thermal Resistivity (m K/W)	mal Resistivity Dry Out Cl	
	0 10	20 30 Moisture Content (%)	40	0	10 Moisture Con	tent (%)
em	arks:					
este	ed by : AC/KK	Date : 5 - 1	0-Aug-11	Checked by	: AC Date	: 11-Aug-11



	Job No.:	306540			Sample No.		
	Project: Client:		ards Wind Farm tralia Pty Ltd		Date:	11/08/11	
	Chent.		ala Fly Llu				
	Test Pit No:	25		Depth	: 0.50 - 0.80m		
est N	/lethod Used :	Reference	Doc. IEEE Guide for Soil	Resistivity Measu	urements. (IEEE Std 442 -	1981)	
	Sample History	/:	100% Standard	Effort @ as	recieved Moisture	Content	
Resi	stivity Meter:	TC1396	Needle ID.:	0239	Needle Resistan	ce: 82.93 Ohm/m:	
Sam	ple Description:	Clay					
			TEST RESUL	.TS			
Ν	loisture Content	Compa	cted Wet Density		Conductivity	Thermal Resistivity	
	(%)		t/m <sup>3</sup>	•	/ m K)	(m K / W)	
	2.5 5.2			0.55		1.82	
	6.7				0.84	1.19	
	19.2		1.947		2.51	0.40	
Thermal Resistivity (m K/W)	2		y Out Curve	Thermal Resistivity (m K/W)	hermal Resistivity Dry O		
		0 Moisture Co	20 30 ntent (%)	0 <b> </b> 1	10 Moisture	100 Content (%)	



		Thermal Resistiv	vity Diyout			
Job No.:		306540		Sample No.:	1103303	
Project:		Paling Yards Wind Farm		Date:	11/08/11	
	Client:	URS Australia Pty Ltd				
	Test Pit No:	30	Depth:	0.50 - 0.80m		
est N	Nethod Used :	Reference Doc. IEEE Guide for So	bil Resistivity Measure	ments. (IEEE Std 442 - 1981	)	
	Sample H	istory: 100% Standard	d Effort @ as re	cieved Moisture Co	ntent	
Resis	stivity Meter:	TC1396 Needle ID.:	0239	Needle Resistance:	82.93 Ohm/m:	
Sam	ple Description	: Clay				
		TEST RESU	ILTS			
М	loisture Conte (%)	nt Compacted Wet Density t/m <sup>3</sup>	Thermal Co (W / r		Thermal Resistivity (m K / W)	
	2.4		0.2		4.17 3.33 2.56 1.82	
	6.4		0.			
	<u>8.0</u> 17.1	1.600	0.3			
Thermal Resistivity (m K/W)	4		Thermal Resistivity (m K/W)			
	0	10 20 Moisture Content (%)	0 1	Moisture Cont	ent (%)	



			<b>-</b> .				<b>–</b> (	Page 1 of 1
			Ine	rmal Resistiv	ity Dryo	ut Cur	ve Reports	
Job No.:		306540				Sample No.:	1103305	
Project:			ards Wind Farm			Date:	11/08/11	
	C	lient:	URS AUS	tralia Pty Ltd				
	Tes	st Pit No:	39		Dept	h: 0.	50 - 0.80m	
st N	/lethod	Used :	Reference	Doc. IEEE Guide for Soil	Resistivity Mea	surements	s. (IEEE Std 442 - 1981	)
	S	Sample Histor	y:	100% Standard	Effort @ as	s reciev	ved Moisture Co	ntent
si	stivity	v Meter:	TC1396	Needle ID.:	0239	Ne	edle Resistance:	82.93 Ohm/m:
Im	ple D	escription:	Clay					
				TEST RESUL				
Μ	loistu	ure Content (%)	Compa	cted Wet Density t/m <sup>3</sup>		l Condu N / m K)	-	Thermal Resistivity (m K / W)
		2.6	  1.820		0.5 0.62 0.63 1.36			2.00
		4.1						1.61 1.59 0.74
		4.9 13.7						
	4 · 2 ·				Thermal Resistivity (m K/W) 5		Resistivity Dry Out Cu	
m	0 -		10 Moisture Co	20 ntent (%)	0 - 1		10 Moisture Cont	ent (%)
	ed by		Date :	5 - 10-Aug-11	Checke	d by :	AC Date:	11-Aug-11
ι	eu by	. AC/NN	Date .	5 - 10-Aug-11	CHECKE	uby.	AC Dale.	TT-Aug-TT



Job No.: Project: Client:		306540 Paling Yards Wind Farm URS Australia Pty Ltd		Sample No.: Date:	<b>1103339</b> 15/08/11
	Test Pit No:	41	Depth:	0.50 - 0.80m	
est N	Nethod Used :	Reference Doc. IEEE Guide for S	Soil Resistivity Measure	ments. (IEEE Std 442 - 1981	)
	Sample Hist	ory: 100% Standar	d Effort @ as re	cieved Moisture Co	ntent
Resi	stivity Meter:	TC1396 Needle ID.:	0239	Needle Resistance:	82.93 Ohm/m:
Sam	ple Description:	Clay			
			TEST RESULTS	6	
N	loisture Content			-	Thermal Resistivity
	<b>(%)</b> 0.0	<u>t/m<sup>3</sup></u>	<b>(W / r</b> 0.2	-	(m K / W) 4.17
	11.4		0.3	33	3.03
	20.3 31.0	1.642	0.4		<u> </u>
Thermal Resistivity (m K/W)	4		Thermal Resistivity (m K/W)		
-	0 10	20 30 4 Moisture Content (%)	0 1	Moisture Cont	100 ent (%)

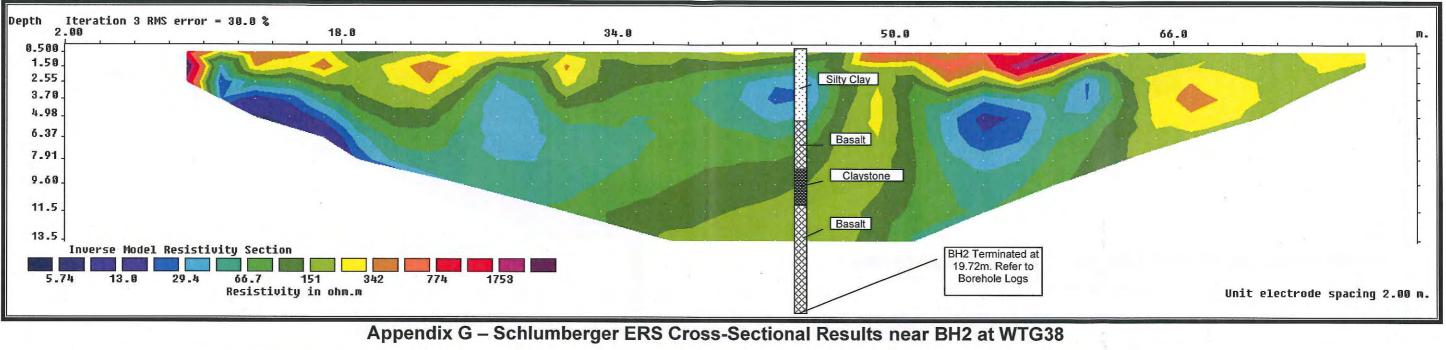


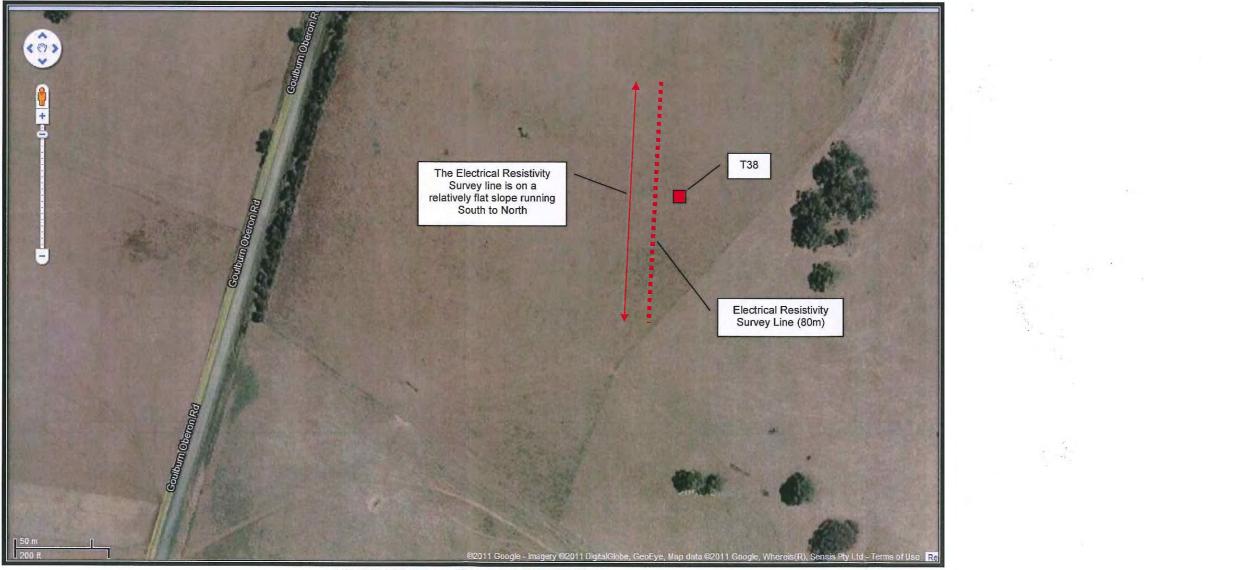
Job No.: Project:		306540			Sample No.:	1103308	
		-	ards Wind Farm		Date:	11/08/11	
	CI	lient:	URS AUS	stralia Pty Ltd		-	
	Tes	t Pit No:	57		Depth:	0.50 - 0.80m	
est N	lethod	Used :	Reference	Doc. IEEE Guide for Soil	Resistivity Measurer	ments. (IEEE Std 442 - 198	1)
	5	Sample History	:	100% Standard	Effort @ as re	cieved Moisture Co	ontent
lesis	stivity	Meter:	TC1396	Needle ID.:	0239	Needle Resistance:	82.93 Ohm/m:
am	ple De	escription:	Clay				
				TEST RESUL			
Μ	oistu	ire Content (%)	Compa	cted Wet Density	Thermal Co (W / r	-	Thermal Resistivity (m K / W)
		4.3	4.3        11.6		0.3	•	3.33
		11.6			0.4		2.38
		14.5 32.3		 1.596	0.4		2.22
Thermal Resistivity (m K/W)	2 -	Q	×	· · · · · · · · · · · · · · · · · · ·	Thermal Resistivity (m K/W)		
	0 -		20 Aoisture Co	30 40 ntent (%)	0	Moisture Con	100 tent (%)

## Appendix G Electrical Resistivity Results

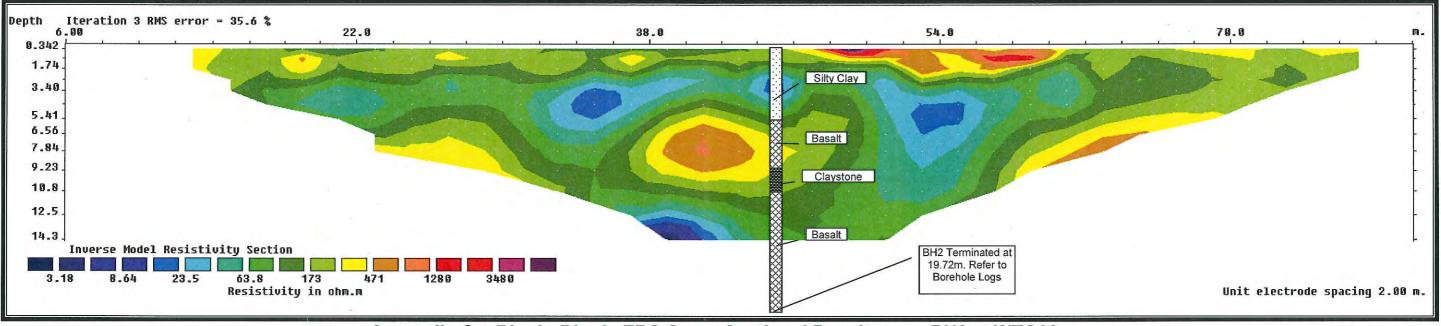


G

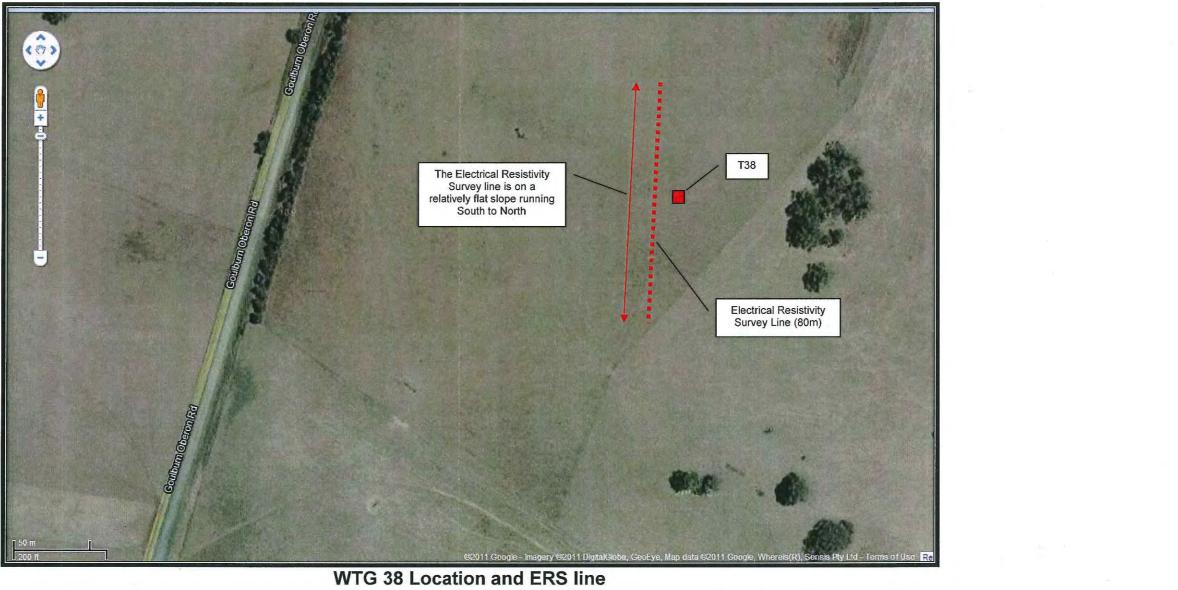


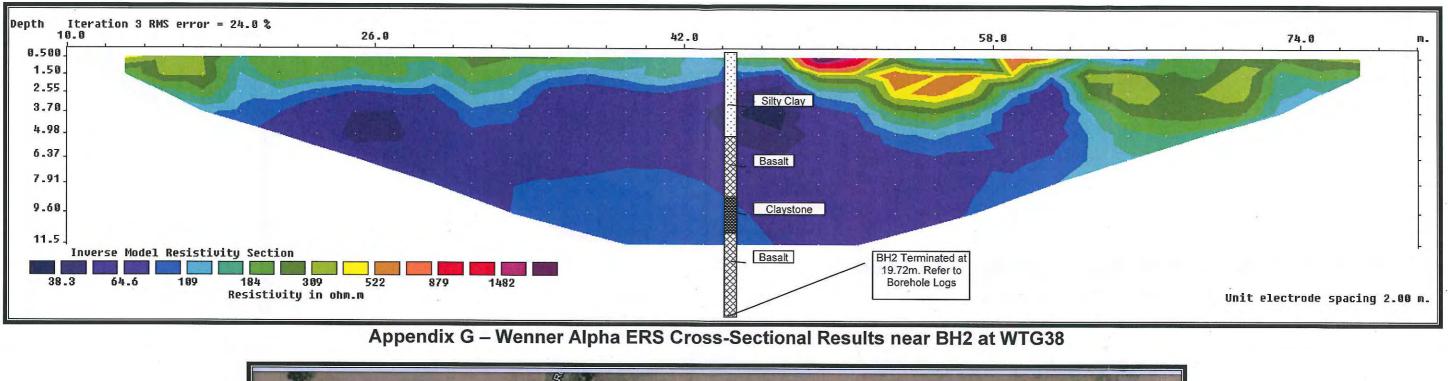


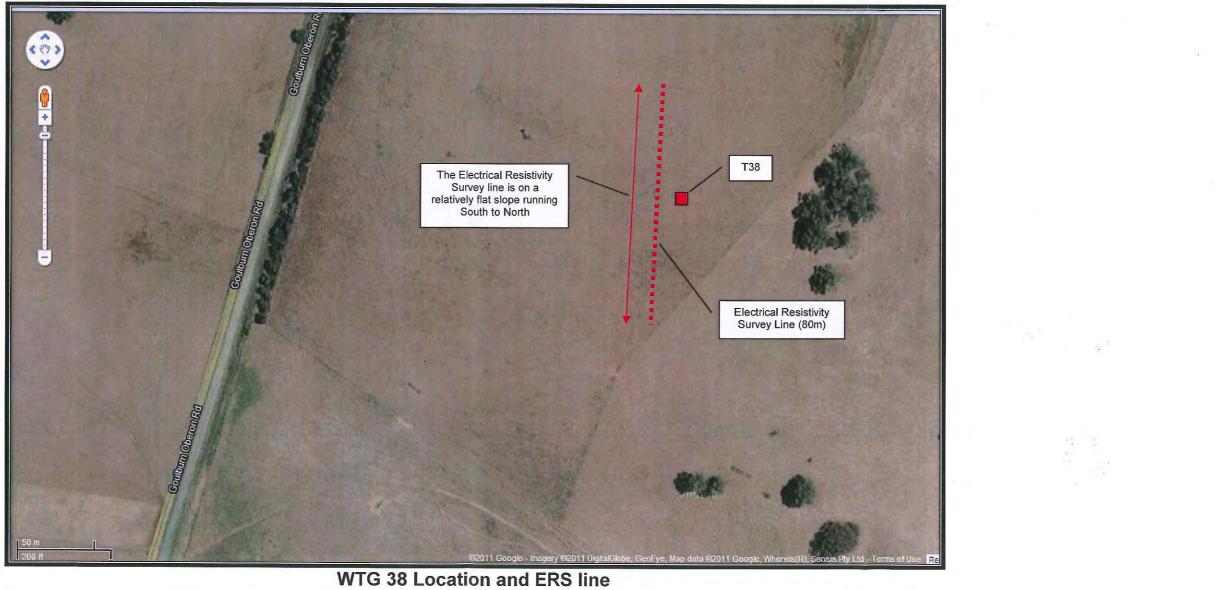
WTG 38 Location and ERS line

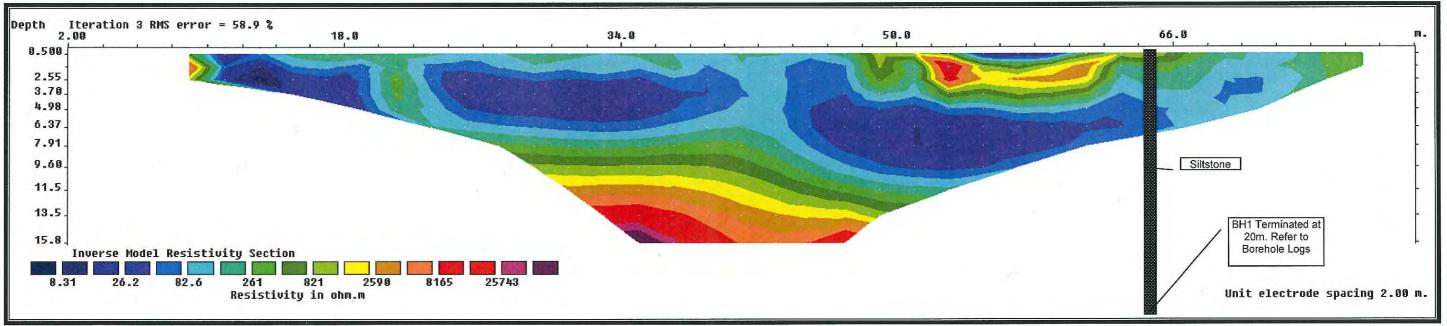


Appendix G – Dipole-Dipole ERS Cross-Sectional Results near BH2 at WTG38



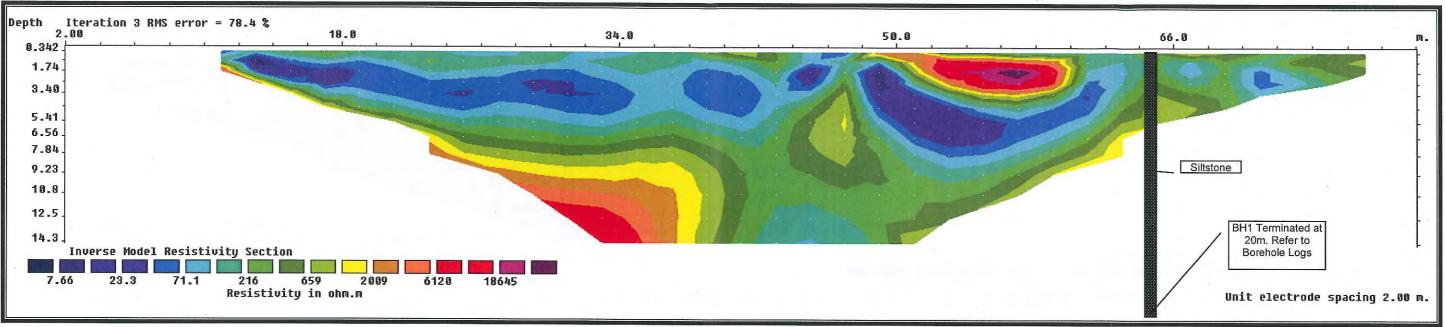






Appendix G – Schlumberger ERS Cross-Sectional Results near BH1 at WTG9

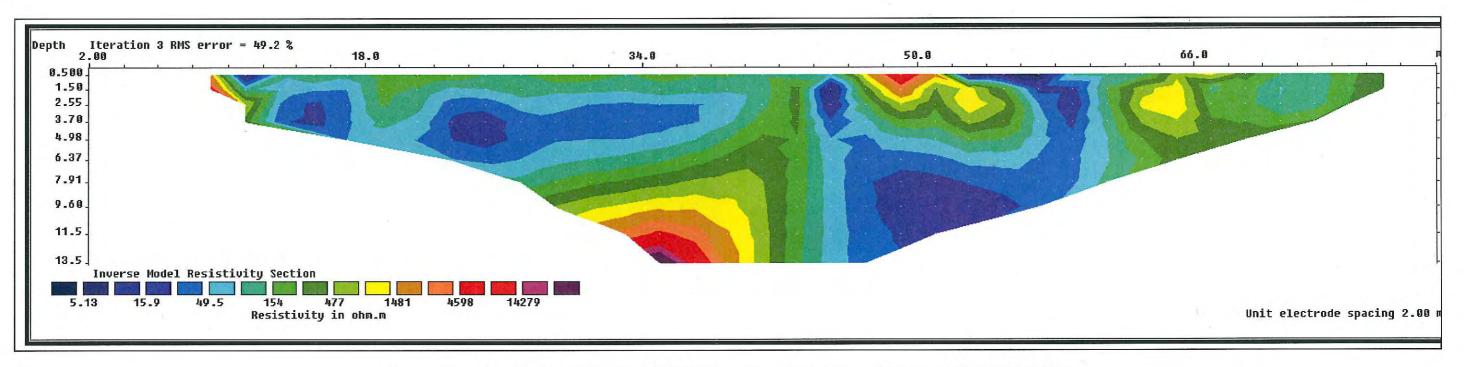




Appendix G – Dipole-Dipole ERS Cross-Sectional Results near BH1 at WTG9



WTG 9 Location and ERS line



Appendix G – Wenner Alpha ERS Cross-Sectional Results near BH1 at WTG9



WTG 9 Location and ERS line





URS Australia Pty Ltd Level 4, 407 Pacific Highway Artarmon NSW 2064 Australia T: 61 2 8925 5500 F: 61 2 8925 5555

www.ap.urscorp.com