# APPENDIX B ENGINEERING PARAMETERS



#### **APPENDIX B**

#### **ENGINEERING PARAMETERS**

#### **B1.** AVAILABLE INFORMATION

Stability analyses undertaken for this study were based on parameters summarised in Table B1.

The values adopted were based on the following:

- 1. Coffey and Partners Report S8463/3-AG "Old Mans Valley Geotechnical Investigations" dated 18 July 1990. This information included laboratory triaxial and direct shear tests which are summarised in more detail in Appendix G.
- 2. UCS and point load testing on samples collected by PSM for this study (refer to Section B2 below).
- 3. Extensive experience and laboratory strength testing of breccia rocks from a gold mine in Central Kalimantan considered similar to those found at the Hornsby Quarry.
- 4. Experience and testing of sandstone in the Sydney region.



# TABLE B1 MATERIAL STRENGTH PARAMETERS

		FILLING			BRECCIA SANDSTONE											DEFECTS		
ROCK MASS	EASTERN/ SOUTH WESTERN/ NORTHERN	CRUSHER	SOUTH WESTERN	RESIDUAL	EW	RES/EW	НW	HW/MW	SW/FR	RESIDUAL	EW	RES/EW	HW/MW	SW/FR	MUDDY BRECCIA ZONES	SEAMS IN SW/FR BRECCIA	SHEARS IN MUDDY BRECCIA	
Unit Weight γ (kN/m³)	20	20	20	19.5	19.5	19.5	20	23.5	23.5	19.5	19.5	19.5	24	24	22	-	-	
Substance UCS (MPa)	NA	NA	NA	0.5 to 1	1 to 2	1	1 to 3	2 to 5	3 to 80	0.5 to 1	1 to 2	1	2 to 25	12 to 40	1 to 5	1 to 3	1 to 2	
Design Shear Strength c' (kPa)	10	0 <sup>A.</sup>	10	5	20	20	28	75	300	20	75	50	400	1000	35	0	0	
Design Friction Angle \( \psi' \)(deg)	30	35 <sup>A.</sup>	30	28.5	25	25	39	40	45	30	25	30	45	45	40	35	28	
Modulus E (MPa)	30	25	30	40	40	40	300	350	1500	50	50	50	800	2000	300	-	-	
Poissons Ratio	0.3	0.35	0.3	0.3	0.3	0.3	0.25	0.2	0.2	0.3	0.3	0.3	0.2	0.2	0.25	-	-	

A. Find values based on back analysis of fill at Cross Section 11 for an assumed FOS of 1.1 (refer to Appendix H).



### B2. UCS AND POINT LOAD TEST DATA FOR MUDDY BRECCIA

Lump samples of slightly weathered to fresh and moderately weathered muddy breccia were taken from the quarry to perform UCS (unconfined compressive strength) testing and point load testing. This rock type was tested to supplement the comprehensive testing data available in the Coffey and Partners Report.

TABLE B2
UCS AND POINT LOAD TEST FOR MUDDY BRECCIA

ID	WEATHERING GRADE	SATURATION	WET DENSITY	UCS (MPa)	POINT LOAD AVERAGE (MPa)	RATIO	COMMENT
1	SW/FR	DRY	2.4	13.0	0.43	30.6	UCS failure by axial splitting
2	SW/FR	DRY	2.4	9.8	0.49	20.1	UCS failure by axial splitting
3	SW/FR	DRY	2.3	2.2	0.36	6.3	UCS failure by axial splitting
4	SW/FR	DRY	2.4	5.1	0.53	9.8	UCS failure by axial splitting
5	SW/FR	SATURATED	2.4	5.8	0.43	13.6	UCS failure by axial splitting
6	MW	SATURATED	-	-	0.31	-	UCS sample disintegrated after soaking.
AVERAGE			2.4	7.2	0.44	16.1	

Testing certificates are included as Attachment B1.



### **B3.** TEST PIT SOIL TEST RESULTS

The following soil testing was undertaken on bulk samples collected from testpits.

- 1. Particle size distribution (PSD),
  - undertaken on samples from testpits TP1 (crusher plant area)

TP3 (crusher plant area)
TP4 (south western fill area)
TP6 (south western fill area)
TP8 (above drainage diversion

works)

TP10 (eastern fill area) TP12 (eastern fill area) TP14 (eastern fill area)

- Results are included in Attachment B2.
- 2. Atterberg Limits
  - Undertaken on samples for testpits
     TP3 (crusher plant area)

TP4 (south western fill area)
TP6 (south western fill area)
TP8 (above drainage diversion

works)

TP12 (eastern fill area) TP14 (eastern fill area)

Results are included in Attachment B2.



# ATTACHMENT B1 ROCK MATERIAL LABORATORY TEST CERTIFICATES





1/29 Finchley Street, Milton, Qld. 4064 P.O. Box 434, Paddington, Qld. 4064 Telephone: (07) 3217 5535

Facsimile: (07) 3217 5311 Email: aglabs@bigpond.net.au

POINT	LOAD	<b>TEST</b>	REPO	)RT
-------	------	-------------	------	-----

Test Method: AS 413 3.4.1

Client: Pells Sullivan Meynink Pty Ltd Report No. 610246-PTL

Sample No.	Client ID	Depth (m)	I <sub>S</sub>	I <sub>S(50)</sub>	Load Direction	*Descriptive
			(MPa)	(MPa)	200.0.200	Term
610246	1	-	0.58	0.55	Irregular Lump	M
610246	1	-	0.34	0.30	Irregular Lump	M
610247	2	-	0.25	0.30	Irregular Lump	M
610247	2	-	0.69	0.67	Irregular Lump	M
610248	3	-	0.35	0.33	Irregular Lump	M
610248	3	-	0.41	0.38	Irregular Lump	M
610249	4	-	0.46	0.46	Irregular Lump	M
610249	4	_	0.62	0.59	Irregular Lump	M

Remarks: The specimens tested as received.

\*EL: Extremely Low, VL: Very Low, L: Low, M: Medium, H: High, VH: Very High, EH: Extremely High

Sample/s supplied by the client

Page: 1 of 1



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Accredited for compliance with ISO/IEC 17025

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N ATA Accredited Laboratory Number 9926

Form Number: GT024-5

Authorised Signatory

ames le

J. Russell

Manager



1/29 Finehley Street, Milton, Qld, 4064
P.O. Box 434, Paddington, Qld, 4064
Telephone: (07) 3217 5535

Facsimile: (07) 3217 5311 Email: aglabs@bigpond.net.au

## **UNCONFINED COMPRESSIVE STRENGTH TEST REPORT**

Test Method: AS 1289 6.4.1

Client: Pells Sullivan Meynink Pty Ltd Report No. 610246-UCS

UCS (MPa):	13.0*	9.75*	2.23*	5.14*
Test Duration (Min:Sec):	1:23	2:31	1:30	0:53
	Splitting	Splitting	Splitting	Splitting
Mode of Failure:	Axial	Axial	Axial	Axial
Specimen Dimensions (mm)	60.4 x 72.0	77.6 x 64.5	94.3 x 70.3	41.7 x 55.0
Specimen Length (mm)	119.3	80.6	102.3	63.3
Moisture Content (%):	2.6	3.4	3.8	3.8
Wet Density (t/m <sup>3</sup> ):	2.37	2.40	2.31	2.40
Description:	-	-	-	-
Depth (m):	-	-	-	-
Client ID:	1	2	3	4
Sample No.:	610246	610247	610248	610249

Remarks: Stored and tested as received. Block samples were supplied by the client and the specimens were cut into rectangular prism.

Sample/s supplied by the client

Test Apparatus: ELE 1000kN Concrete Compression Machine Iment is issued in accordance with Authorised Signatory

Page 1 of 1



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N ATA Accredited Laboratory Number 9926

Form Number: GT017-5

Manager

J. Russell

ames Kushl



1/29 Finchley Street, Milton, Qld. 4064
P.O. Box 434, Paddington, Qld. 4064
Telephone: (07) 3217 5535

Facsimile: (07) 3217 5311 Email: aglabs@bigpond.net.au

POINT	LOAD	<b>TEST</b>	REPORT
-------	------	-------------	--------

Test Method: AS 413 3.4.1

Client: Pells Sullivan Meynink Pty Ltd Report No. 611168-PTL

Project: PSM1059 Test Date: 7/11/06 to 8/11/06

Report Date: 10/11/06

Sample No.	Client ID	Depth (m)	I <sub>S</sub> (MPa)	I <sub>S(50)</sub> (MPa)	Load Direction	*Descriptive Term
611168	5	-	0.41	0.48	Irregular Lump	M
611168	5	-	0.31	0.37	Irregular Lump	M
611169	6	-	0.32	0.31	Irregular Lump	M
611169	6	-	0.32	0.30	Irregular Lump	L

Remarks: The specimens tested after 24 hours soaking in water.

\*EL: Extremely Low, VL: Very Low, L: Low, M: Medium, H: High, VH: Very High, EH: Extremely High

Sample/s supplied by the client

Page: 1 of 1



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N ATA Accredited Laboratory Number 9926

Form Number: GT024-5

Authorised Signatory

Tames Lustes
J. Russell

Manager



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P.O. Box 434; Paddington, Qld, 4064
Telephone: (07) 3217 5535

Facsimile: (07) 3217 5311 Email: aglabs@bigpond.net.au

LINCONFINED	<b>COMPRESSIVE</b>	STRENGTH	TEST REPORT
ONCONTINED	COMPRESSIVE	SINCINGIA	IESI KEPUKI

Test Method: AS 1289 6.4.1

Client: Pells Sullivan Meynink Pty Ltd Report No. 611168-UCS

Project: PSM1059 Test Date: 7/11/06 to 9/11/06

Report Date: 10/11/06

Sample No.:	611168
Client ID:	5
Depth (m):	-
Wet Density (t/m³):	2.30
Moisture Content (%):	1.0
Specimen Length (mm)	66.7*
Specimen Diameter (mm)	52.9 x 59.6
Mode of Failure:	Axial
	Splitting
Test Duration (Min:Sec):	2:05
UCS (MPa):	5.77*

Remarks: Stored and tested after 24 hours of soaking in water.

Sample/s supplied by the client Test Apparatus: ELE 1000kN Concrete Compression Machine

Page 1 of 1



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N ATA Accredited Laboratory Number 9926

Form Number: GT017-5

Authorised Signatory

J. Russell

Manager

# ATTACHMENT B2 SOIL MATERIAL LABORATORY TEST CERTIFICATES





# test results

client: PELLS SULLIVAN MEYNINK PTY LTD.

job no:

LCOVLAB4329BH

principal:

project: LABORATORY TESTING - PSM 1059.TF2

laboratory:

SYDNEY

location: HORNSBY QUARRY

report date:

October 24, 2006

test report no. : BH 1

est procedure.: A\$1289.3.6.1	·	test date : 2	23/10/06
SAMPLE	A.S SIEVE SIZE (DIAMETER)	PERCENT PASSING	
IDENTIFICATION	(mm)	(%)	
P 1/S 1 (mixed fill) rdney Lab No. 610021	150.0	100.0	
	75.0	100.0	
	63.0	100	
	53.0	100	
	37.5	97.5	
	26.5	92.4	
	19.0	88.7	
	13.2	85.7	
	9.5	81.8	
	6.7	78.6	
	<i>4.75</i>	75.3	
	2.36	68.3	
	1.18	58.6	
	0.600	52.3	
	0.425	47.5	
	0.300	37.1	
	0.150	24.8	
	0.075	19.8	
			Page 1 of 2

remarks: Sample received from the Client on the 16/10/06

except in full.



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NATA Accredited Laboratory No. 431

Approved Signatory:

Garry K Collins Specialised Testing Manager



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NATA Accredited Laboratory Date: No. 431

Approved Signatory:
Garry K Collins
Specialised Testing Manager

22/10/0



# test results

PELLS SULLIVAN MEYNINK PTY LTD. client :

job no:

LCOVLAB4329BH

principal:

project: LABORATORY TESTING - PSM 1059.TF2

laboratory: report date: SYDNEY

location: HORNSBY QUARRY

test report no.: BH 3

October 24, 2006

SAMPLE	A.S SIEVE SIZE (DIAMETER)	PERCENT PASSING	
IDENTIFICATION	(mm)	(%)	
P 3/S 3 (mixed fill) ydney Lab No. 610023	150.0	100.0	
yuney Lab No. 010023	75.0	100.0	
	63.0	100	
	<i>53.0</i>	96.2	
	37.5	95.4	
	26.5	94.3	
	19.0	91.7	
	13.2	81.9	
	9.5	72.6	
	6.7	66.1	
	4.75	60.2	
	2.36	48.4	
	1.18	38.6	
	0.600	31.0	
	0.425	27.9	
	0.300	24.7	
	0.150	19.5	
	0.075	16.1	
			Page 1 of 2

remarks: Sample received from the Client on the 16/10/06



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NATA Accredited Laboratory No. 431

Approved Signatory:

Garry K Collins Specialised Testing Manager

Date:



Unit 8, 12 Mars Road, Lane Cove West, NSW, 2066

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NATA Accredited Laboratory Date No. 431

Approved Signatory:

Garry K Collins
Specialised Testing Manager



# test results

client: PELLS SULLIVAN MEYNINK PTY LTD.

job no:

LCOVLAB4329BH

principal:

project : LABORATORY TESTING - PSM 1059.TF2

laboratory:

location: HORNSBY QUARRY

report date:

October 24, 2006

test report no. : BH 4

st procedure · AS1289.3.6.1

SYDNEY

est procedure: AS1289.3.6.1		test date :	23/10/06	
SAMPLE	A.S SIEVE SIZE (DIAMETER)	PERCEN PASSIN	T G	
IDENTIFICATION	(mm)	(%)		
P 4/S 5 (mixed fill) Sydney Lab No. 610024	150.0	100.0		
yuncy 245 No. 070024	75.0	80.6		
	63.0	80.6		
	53.0	78.2		
	37.5	71.5		
	26.5	67.8		
	19.0	64.6		
	13.2	60.9		
	9.5	58.9		
	6.7	56.8		
	4.75	<i>55.1</i>		
	2.36	48.9		
	1.18	42.4		
	0.600	36.4		
	0.425	33.4		
	0.300	29.7		
	0.150	23.3		
	0.075	19.2		

Page 1 of 2

remarks: 1. Sample received from the Client on the 16/10/06

2.Sample did not meet Minimum Mass of Sub-sample requirement as per AS1289.1.1 Section 5.7 Table 1



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Approved Signatory:

Garry K Collins Specialised Testing Manager



Unit 8, 12 Mars Road, Lane Cove West, NSW, 2066

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NATA Accredited Laboratory No. 431

Approved Signatory:

Garry K Collins Specialised Testing Manager



## test results

client : PELLS SULLIVAN MEYNINK PTY LTD. job no:

LCOVLAB4329BH

principal:

laboratory:

SYDNEY

project: LABORATORY TESTING - PSM 1059.TF2

report date:

October 24, 2006

location: HORNSBY QUARRY

test report no.: BH 6

est procedure.: AS1289.3.6.1		test date :	23/10/06
SAMPLE	A.S SIEVE SIZE (DIAMETER)	PERCEN PASSIN	IT G
IDENTIFICATION	(mm)	(%)	
	,,		
P 6/S 7 (mixed fill) ydney Lab No. 610026	150.0	100.0	
	75.0	76.6	
	63.0	70.3	
	53.0	64.9	
	37.5	<b>59.3</b>	
	26.5	54.0	
	19.0	52.3	
	13.2	51.1	
	9.5	50.0	
	6.7	49.3	
	4.75	48.4	
	2.36	43.7	
	1.18	35.7	
	0.600	29.0	
	0.425	25.5	
	0.300	21.9	
	0.150	16.1	
	0.075	12.3	
			Page 1 of 2

remarks: 1.Sample received from the Client on the 16/10/06

2. Sample did not meet Minimum Mass of Sub-sample requirement as per AS1289.1.1 Section 5.7 Table 1



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NATA Accredited Laboratory No. 431

Approved Signatory:

Garry K Collins Specialised Testing Manager

Collins



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NATA Accredited Laboratory No. 431

Approved Signatory:

Garry K Collins
Specialised Testing Manager

e: **23/10/06** 



## test results

client : PELLS SULLIVAN MEYNINK PTY LTD. job no:

LCOVLAB4329BH

principal:

project: LABORATORY TESTING - PSM 1059.TF2

laboratory: report date: SYDNEY

location: HORNSBY QUARRY

test report no. : BH 8

October 24, 2006

test procedure: AS1289.3.6.1		test date :	23/10/06
SAMPLE	A.S SIEVE SIZE (DIAMETER)	PERCENT PASSING	T
IDENTIFICATION	(mm)	(%)	
	<u>,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</u>		
TP 8/S 9 (mixed fill) Sydney Lab No. 610028	150.0	100.0	
	75.0	87.6	
	63.0	87.6	
	53.0	87.6	
	37.5	80.8	
	26.5	76.2	
	19.0	73.0	
	13.2	70.7	
	9.5	68.4	
	6.7	66.1	
	4.75	63.6	
	2.36	53.2	
	1.18	38.9	
	0.600	28.7	
	0.425	24.7	
	0.300	20.6	
	0.150	15.0	
	0.075	11.8	
			Page 1 of 2

remarks: 1.Sample received from the Client on the 16/10/06

2. Sample did not meet Minimum Mass of Sub-sample requirement as per AS1289.1.1 Section 5.7 Table 1



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NATA Accredited Laboratory No. 431

Approved Signatory:

Garry K Collins Specialised Testing Manager



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NATA Accredited Laboratory No. 431

Approved Signatory:

Garry K Collins
Specialised Testing Manager

23/10/06

23/10



# test results

client : PELLS SULLIVAN MEYNINK PTY LTD. job no:

LCOVLAB4329BH

principal:

project: LABORATORY TESTING - PSM 1059.TF2

laboratory: report date: SYDNEY

location: HORNSBY QUARRY

test report no. : BH 10

October 24, 2006

101200 26 1

est procedure : AS1289.3.6.1		test date :	23/10/06		
SAMPLE	A.S SIEVE SIZE (DIAMETER)	PERCEN PASSING			
IDENTIFICATION	(mm)	(%)			
TP 10/S 11 (mixed fill) Sydney Lab No. 610030	150.0	100.0			
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	75.0	100.0			
	63.0	100.0			
	53.0	100.0			
	37.5	98.4			
	26.5	92.3			
	19.0	83.1			
	13.2	74.9			
	9.5	70.4			
	6.7	66.3			
	4.75	63.2			
	2.36	56.6			
	1.18	<b>49</b> .7			
	0.600	43.2			
	0.425	<i>37.9</i>			
	0.300	30.0			
	0.150	20.0			
	0.075	16.2			
			Pé	age 1 of 2	
l I					

remarks: 1. Sample received from the Client on the 16/10/06

except in full.

2. Sample did not meet Minimum Mass of Sub-sample requirement as per AS1289.1.1 Section 5.7 Table 1



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NATA Accredited Laboratory No. 431

Approved Signatory:

Garry K Collins Specialised Testing Manager

Date:



Unit 8, 12 Mars Road, Lane Cove West, NSW, 2066

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Approved Signatory:

Garry K Collins Specialised Testing Manager



test results

PELLS SULLIVAN MEYNINK PTY LTD. client :

project: LABORATORY TESTING - PSM 1059.TF2

job no:

LCOVLAB4329BH

principal:

laboratory:

SYDNEY

location: HORNSBY QUARRY

report date:

October 24, 2006

test report no. : BH 11

SAMPLE	A.S SIEVE SIZE (DIAMETER)	PERCENT PASSING	
IDENTIFICATION	(mm)	(%)	
12/S 12 (mixed fill)			
Iney Lab No. 610031	150.0	100.0	
	75.0	86.6	
	63.0	80.0	
	53.0	76.4	
	37.5	63.2	
	26.5	51.9	
	19.0	47.8	
	13.2	45.0	
	9.5	43.1	
	6.7	40.8	
	4.75	38.3	
	2.36	30.3	
	1.18	23.0	
	0.600	17.3	
	0.425	14.9	
	0.300	12.5	
	0.150	9.1	
	0.075	6.9	

Page 1 of 2

remarks: 1. Sample received from the Client on the 16/10/06

2.Sample did not meet Minimum Mass of Sub-sample requirement as per AS1289.1.1 Section 5.7 Table 1



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Approved Signatory:

Garry K Collins Specialised Testing Manager

Date:



client: PELLS SULLIVAN MEYNINK PTY LTD.  Job no: LCOVLAB43298H  principal: laboratory: SYDNEY  report date: October 24, 2006 test report no: BH 171  test procedure: A51289.3.1.2.3.2.1,3.3.1.3.4.1,3.6.1  sample Identification: TP12/S12 (mixed filled)  A.S. sieve size  B	part	icle	9 8	size	) (	teik	tri	ibı	ut	ic	on	&	a	tte	erk	Э	erg li	m	it	S	-					]
project: LABORATORY TESTING - PSM 1059.172 report date: October 24, 2006 location: HORNSRY QUARRY test procedure: A51289.3.1.2.3.2.1.3.3.1.3.4.1.3.6.1 sample indentification: TP12/S12 (mixed filled)  A.S. sieve size  S. S	client :	PELLS .	SULI	LIVAN	MEY	/NINK	PTY	LTE	).						_		job no :			LC	OVL	AB432	9BH			1
	principal	:															laboratory	<i>י</i> :		SY	DNE	Y				
test procedure : A\$1289.3.1.2.3.2.1,3.3.1,3.4.1,3.6.1  sample no : 610031  sample identification: 7P12/312 (mixed filled)  A.S. sieve size	project :	LABOR	ATO	RY TE	STIN	IG - PS	M :	1059	TF:	2							report dat	e:		Oc	tobe	24, 2	006			
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plastic limit % Non Plastic  plasticity index % Not Obtainable linear shrinkage % Not Obtainable natural moisture % - natural state	liquid limi	it	%	Not C	Obtai	inable						Pre	parati	on N	letho	,										ic) Corn
plasticity index % Not Obtainable in air dried in oven dried in oven dried in other	plastic lin	nit	%	Nor	n Pla	stic	ž	nat	ural	sta	te 🗌	1			$\boxtimes$											ay Georg
linear shrinkage % Not Obtainable oven dried Mould size 250 mm crumbing Note: Sample did not meet Minimum Mass of	plasticity	index	%	Not C	Obtai	inable	Histo	air	drie	d		<b>├</b> ──			ப_ age	$\dashv$										ecrinic
natural moisture % - other Curling Note: Sample did not meet Minimum Mass of	linear shri	inkage	%	Not C	Obtai	inable	nple	ove	n dr	ried	$\boxtimes$	Мо	uld si	ze <b>2</b> :	-	ım										
curling U Sub-Sample as per AS1289.1.1 Section 5.7 Table 1		-74-74	%		-		San	oth	er					)		1	Note: Samp Sub-Sample	ole di	id n	ot m	eet i	Minimu 1.1.94	m M	lass of	hle 1	200



The tests, calibrations or measurements covered by this document have been performed in accordance with NATA requirements which include the requirements of ISO/IEC 17025 and are traceable to national standards of measurement. This document shall not be reproduced except in full.

NATA Accredited Laboratory No. 431

Approved Signatory:

Garry K Collins Specialised Testing Manager



# test results

client: PELLS SULLIVAN MEYNINK PTY LTD.

job no:

LCOVLAB4329BH

principal:

project: LABORATORY TESTING - PSM 1059.TF2

laboratory : report date :

SYDNEY

location: HORNSBY QUARRY

,

October 24, 2006

test report no.: BH 12

AS1289.3.6.1

		23/10/06
A.S SIEVE SIZE (DIAMETER)	PERCENT PASSING	i
(mm)	(%)	
150.0	100.0	
63.0	94.8	
53.0	94.8	
37.5	90.0	
26.5	86.0	
19.0	84.2	
13.2	82.5	
9.5	81.2	
6.7	79.3	
4.75	77.4	
2.36	71.6	
1.18	<i>65.1</i>	
0.600	57.3	
0.425	50.1	
0.300	40.0	
0.150	26.6	
0.075	21.2	
	A.S SIEVE SIZE (DIAMETER)  (mm)  150.0  75.0  63.0  53.0  37.5  26.5  19.0  13.2  9.5  6.7  4.75  2.36  1.18  0.600  0.425  0.300  0.150	A.S SIEVE SIZE (DIAMETER)  (mm)  (mm)  (%)  150.0  100.0  75.0  94.8  63.0  94.8  53.0  94.8  37.5  90.0  26.5  86.0  19.0  34.2  13.2  82.5  9.5  81.2  6.7  79.3  4.75  77.4  2.36  1.18  65.1  0.600  57.3  0.425  50.1  0.300  40.0  0.150  26.6

remarks: 1.Sample received from the Client on the 16/10/06

2.Sample did not meet Minimum Mass of Sub-sample requirement as per AS1289.1.1 Section 5.7 Table 1



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NATA Accredited Laboratory No. 431

Approved Signatory:

Garry K Collins Specialised Testing Manager Date:

24/10/06

Alms



Unit 8, 12 Mars Road, Lane Cove West, NSW, 2066

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	A	.S. s	ieve :	size							75 um	7. C.		300 um	425 um	mn 009	1.18 mm	)	- 2.36 mm	7 7	4.75 mm	DE / 0	EE C.S.	EEE 7.61	mm 6.	26.5 mm	37.5 mm 53 mm	75 mm		EE 061	FORM NUMBER ELLONZ VERSION OLO
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Atterberg	Limit	:																cl	assifi	catio	n :										-
liquid limit %		%	34							Preparation Method																(0)					
plastic lim		%		20			Sample History	natural state air dried				dry sieving																	200,000		
plasticity i		% 14			□ 로 oven dried 🔀			_ ₹]	Linear Shrinkage Mould size 250 mm																						
linear shrinkage % natural moisture %					. <b>0</b> -		Sami	other				crumbing			No	Note: Sample did not meet Minimum Mass of Sub-Sample as per AS1289.1.1 Section 5.7 Table 1						continuent to come accommon the re-									



The tests, calibrations or measurements covered by this document have been performed in accordance with NATA requirements which include the requirements of ISO/IEC 17025 and are traceable to national standards of measurement. This document shall not be reproduced except in full.

NATA Accredited Laboratory No. 431

Garry K Collins
Specialised Testing Manager



: 8

## ALS Environmental

#### **CERTIFICATE OF ANALYSIS**

COFFEY ENVIRONMENTS PTY LTD

Laboratory

ALS Environmental Sydney

Page

1 of 5

Contact : MR GARRY COLLINS Contact : Greg Vogel Work Order : ES0613359

: 8/12 MARS ROAD LANE COVE WEST NSW Address : 277-289 Woodpark Road Smithfield NSW

AUSTRALIA 2066 Australia 2164

 Telephone
 : 02 9911 1000
 Telephone
 : +61 (02) 8784 8555

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 : +61 (02) 8784 8500

Project : LCOVLAB4329BH Quote number : EN/007/06 Date received : 25 Oct 2006

 Order number
 : 5350

 C-O-C number
 : 29854

 Secured
 : 27 Oct 2006

 No. of samples
 - Received

Site : - Not provided - Analysed : 8

#### ALSE - Excellence in Analytical Testing



Client

Address

NATA Accredited Laboratory 825

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

Accredited for compliance with ISO/IEC 17025.

This document has been electronically signed by those names that appear on this report and are the authorised signatories. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatory Position Department

Peter Dickenson Senior Spectroscopist Inorganics - NATA 825 (10911 - Sydney)

Page Number : 2 of 5

Client : COFFEY ENVIRONMENTS PTY LTD

Work Order : ES0613359

# ALS Environmental

#### **Comments**

This report for the ALSE reference ES0613359 supersedes any previous reports with this reference. Results apply to the samples as submitted. All pages of this report have been checked and approved for release.

This report contains the following information:

- 1 Analytical Results for Samples Submitted
- Surrogate Recovery Data

The analytical procedures used by ALS Environmental have been developed from established internationally-recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported herein. Reference methods from which ALSE methods are based are provided in parenthesis.

When moisture determination has been performed, results are reported on a dry weight basis. When a reported 'less than' result is higher than the LOR, this may be due to primary sample extracts/digestion dilution and/or insuffient sample amount for analysis. Surrogate Recovery Limits are static and based on USEPA SW846 or ALS-QWI/EN38 (in the absence of specified USEPA limits). Where LOR of reported result differ from standard LOR, this may be due to high moisture, reduced sample amount or matrix interference. When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for process purposes. Abbreviations: CAS number = Chemical Abstract Services number, LOR = Limit of Reporting. \* Indicates failed Surrogate Recoveries.

Page Number : 3 of 5

Client : COFFEY ENVIRONMENTS PTY LTD

Work Order : ES0613359



Analytical Results		Clie	nt Sample ID :	TP1/S1	TP3/S3	TP4/S5	TP6/S7	TP8/S9
Analytical Results	Samp	le Matrix Type	e / Description :	SOIL	SOIL	SOIL	SOIL	SOIL
		Samp	e Date / Time :	( 25 Oct 2006 )				
				( 15:00 )	( 15:00 )	( 15:00 )	( 15:00 )	( 15:00 )
		Laborate	ory Sample ID :					
Analyte	CAS number	LOR	Units	ES0613359-001	ES0613359-002	ES0613359-003	ES0613359-004	ES0613359-005
EA055: Moisture Content					•		•	
Moisture Content (dried @ 103°C)		1.0	%	<1.0	1.4	1.7	3.5	2.3
ED040T : Total Sulphate by ICPAES								
Sulphate as SO4 2-	14808-79-8	100	mg/kg	280	430	160	<100	200

Page Number : 4 of 5

Client : COFFEY ENVIRONMENTS PTY LTD

Work Order : ES0613359



Analytical Results		Clie	nt Sample ID :	TP10/S11	TP12/S12	TP14/S14		
Analytical Nesults	Sampl		e / Description : le Date / Time :	SOIL ( 25 Oct 2006 )	SOIL ( 25 Oct 2006 )	SOIL ( 25 Oct 2006 )		
		•		( 15:00 )	(15:00)	(15:00)		
		Laborat	ory Sample ID :					
Analyte	CAS number	LOR	Units	ES0613359-006	ES0613359-007	ES0613359-008		
EA055: Moisture Content								
Moisture Content (dried @ 103°C)		1.0	%	<1.0	3.5	1.1		
ED040T : Total Sulphate by ICPAES								
Sulphate as SO4 2-	14808-79-8	100	mg/kg	410	<100	<100		

Page Number : 5 of 5

Client : COFFEY ENVIRONMENTS PTY LTD

Work Order : ES0613359

# ALS Environmental

## **Surrogate Control Limits**

l No surrogates present on this report.

Report version : COANA 3.02 A Campbell Brothers Limited Company