Test Type:

EC (1:5)

Order No:

Job No: G23085/1

Reference

Naval College Rd & Wool Rd, Vincentia

Sample Name: TPF6 0.1-0.4m 30/7/03

Sample No:

75692

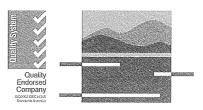
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Sydney Environmental and Soil Laboratory

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TEST

RESULT

COMMENTS

pH in water 1:2 pH in CaCl₂ 1:2

EC mS/cm 1:2

.05

Chlorides mg/kg

CATION ANALYSIS

TEST	so	SOLUBLE		EXCHANGEABLE		
Unit	meq%	Comment	meq%	% of ECEC	Comment	
Sodium	4					
Potassium						
Calcium						
Magnesium						
Aluminium						
		ECEC				
		Ca/Mg				
	ma/ka]		

mg/kg

Phosphate as P

Ammonium as N

Nitrate as N

Sulphate as S

Iron

Zinc

Copper

Manganese

Boron

Recommendations

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Explanation of the Melhods:	: : : : : : : : :
EXCHARATION OF THE METHODS:	*******

pH, EC, Soluble Cations, Nitrate: Bradley et al (1983), Exchangeable Cations, ECEC: Method 15A1 Rayment & Higginson (1992) Chloride: Vogel (1961). Aluminium: Method 3500 APHA (1992). Phosphate: Method 9E1 Rayment & Higginson (1992). Ammonium, Sulphate, Iron, Copper, Manganese + Zinc: Method 83-1 to 83-5 Block (1983). Boron: Method 12C2 Rayment & Higginson (1992).

Simon Leake Date of Report 11/08/2003 Consultant. N.Burrows

Test Type:

EC (1:5)

Order No:

Job No: G23085/1

Reference

Naval College Rd & Wool Rd, Vincentia

Sample Name: TPF6 0.7-1.0m 30/7/03

Sample No:

75693

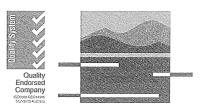
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TEST RESULT COMMENTS

pH in water 1:2 pH in CaCl₂ 1:2

EC mS/cm 1:2

.09

Chlorides mg/kg

CATION ANALYSIS

TEST	so	SOLUBLE		EXCHANGEABLE		
Unit	meq%	Comment	meq%	% of ECEC	Comment	
Sodium						
Potassium						
Calcium						
Magnesium						
Aluminium						
L		ECEC				
		Ca/Mg				
	ma/ka					

mg/kg

Phosphate as P Ammonium as N Nitrate as N

Sulphate as S

Iron

Zinc

Copper

Manganese

Boron

Recommendations

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Explaination: of the Methods:	

pH, EC, Soluble Cations, Nitrate: Bradley et al (1983). Exchangeable Cations, ECEC: Method 15A1 Rayment & Higginson (1992) Chloride: Vogel (1961). Aluminium: Method 3500 APH (1992). Phosphate: Method 9E1 Rayment & Higginson (1992). Ammonium, Sulphate, Iron, Copper, Manganese + Zinc: Method 83-1 to 83-5 Black (1983). Boron: Method 12C2 Rayment & Higginson (1992).

Simon Leake Date of Report 11/08/2003

Consultant N.Burrows

Test Type:

EC (1:5), eCEC + sol SO4

Order No:

Job No: G23085/1

Reference

Naval College Rd & Wool Rd, Vincentia

Sample Name: TPF6 1.5-2.0m 30/7/03

Sample No:

75694

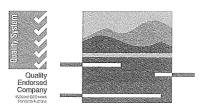
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TEST

RESULT

COMMENTS

pH in water 1:2 pH in CaCl, 1:2

EC mS/cm 1:2

.13

Chlorides mg/kg

CATION ANALYSIS

TEST	SOLUBLE		EXCHANGEABLE		
Unit	meq%	Comment	meq%	% of ECEC	Comment
Sodium Potassium Calcium Magnesium Aluminium	.45 .01 < 0.08 .13		1.12 .08 1.61 9.27 .09	9.20 0.70 13.20 76.20 0.70	elevated - sodic very low low high slightly available
	m a /l· a	ECEC Ca/Mg	12.17 0.20		unbalanced ratio

mg/kg

Phosphate as P Ammonium as N

Nitrate as N

Sulphate as S

147

Iron Zinc

Copper

Manganese

Boron

Recommendations

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DH, EC, Soluble Cations, Nitrate: Bradley et al (1983). Exchangeable Cations, ECEC: Method 15A1 Rayment & Higginson (1992). Phosphate: Method 9E1 Rayment & Higginson (1992). Ammonium, Sulphate, Iron, Copper, Manganese + Zinc: Method 83-1 to 83-5 Black (1983). Boron: Method 12C2 Rayment & Higginson (1992).

Checked by Principal.....

Simon Leake Date of Report 11/08/2003 Consultant. N.Burrows

Test Type:

EC (1:5), eCEC + sol SO4

Order No:

Job No: G23085/1

Reference

Naval College Rd & Wool Rd, Vincentia

Sample Name: TPF8 0.5-1.0m 30/7/03

Sample No: 75695

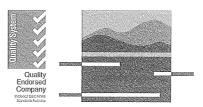
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TEST RESULT COMMENTS

pH in water 1:2 pH in CaCl₂ 1:2

EC mS/cm 1:2

.39

Chlorides mg/kg

CATION ANALYSIS

TEST	SOLUBLE			EXCHANGEABLE	
Unit	meq%	Comment	meq%	% of ECEC	Comment
Sodium Potassium Calcium Magnesium Aluminium	1.32 < 0.006 < 0.08 .11		.44 .05 .45 3.19 1.28	8.10 0.90 8.30 59.00 23.70	high - sodic very low low high available
		ECEC Ca/Mg	5.41 0.10		unbalanced ratio

mg/kg

Phosphate as P Ammonium as N

Nitrate as N Sulphate as S

21

Iron Zinc Copper

Manganese

Boron

Recommendations

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pH, EC, Soluble Cations, Nitrate: Bradley et al (1983). Exchangeable Cations, ECEC: Method 15A1 Rayment & Higginson (1992). Chloride: Vogel (1961). Aluminium: Method 3500 APHA (1992). Phosphate: Method 9E1 Rayment & Higginson (1992). Ammonium, Sulphate, Iron, Copper, Manganese + Zinc: Method 83-1 to 83-5 Blacky (1983). Boron: Method 12C2 Rayment & Higginson (1992).

Checked by Principal...... Simon Leake Date of Report 11/08/2003 Consultant N.Burrows

Test Type:

EC (1:5)

Order No:

Job No: G23085/1

Reference

Naval College Rd & Wool Rd, Vincentia

Sample Name: TPF8 1.4-1.7m 30/7/03

Sample No:

75696

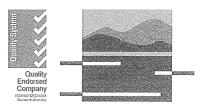
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TEST RESULT COMMENTS

pH in water 1:2

pH in CaCl₂ 1:2

EC mS/cm 1:2

.32

Chlorides mg/kg

CATION ANALYSIS

TEST	SOLUBLE		EXCHANGEABLE		
Unit	meq% .	Comment	meq%	% of ECEC	Comment
Sodium Potassium Calcium Magnesium Aluminium					,
	•	ECEC			
		Ca/Mg			
	ma/ka	l			

mg/kg

Phosphate as P Ammonium as N

Nitrate as N

Sulphate as S

Iron

Zinc

Copper

Manganese

Boron

Recommendations

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Explanation of the Mannids:	<u> </u>

pH, EC, Soluble Cations, Nitrate: Bradley et al (1983) Exchangeable Cations, ECEC: Method 15A1 Rayment & Higginson (1992)
Chloride: Vogel (1961). Aluminium: Method 3500 API/A (1992). Phosphate: Method 9E1 Rayment & Higginson (1992). Ammonium, Sulphate, Iron, Copper, Manganese + Zinc: Method 83-1 to 83-5 Black (1983). Boron: Method 12C2 Rayment & Higginson (1992).

Consultant N.Burrows

Test Type:

EC (1:5)

Order No:

Job No: G23085/1

Reference

Naval College Rd & Wool Rd, Vincentia

Sample Name: TPF8 2.0-2.5m 30/7/03

Sample No:

75697

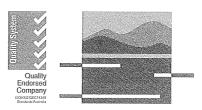
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pH in water 1:2

pH in CaCl₂ 1:2

EC mS/cm 1:2

.19

Chlorides mg/kg

CATION ANALYSIS

TEST	SO	SOLUBLE		EXCHANGEABLE		
Unit	meq%	Comment	meq%	% of ECEC	Comment	
Sodium Potassium Calcium Magnesium Aluminium						
		ECEC				
	Ca/Mg					
ma/ka					L	

mg/kg

Phosphate as P

Ammonium as N

Nitrate as N

Sulphate as S

Iron

Zinc

Copper

Manganese

Boron

Recommendations

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pH, EC, Soluble Cations, Nitrate: Bradley et al (1983). Exchangeable Cations, ECEC: Method 15A1 Rayment & Higginson (1992) Chloride: Vogel (1961). Aluminium: Method 3500 APHA (1992). Phosphate: Method 9E1 Rayment & Higginson (1992). Ammonium, Sulphate, Iron, Copper, Manganese + Zinc: Method 83-1 to 83-5 Black (1983). Boron: Method 12C2 Rayment & Higginson (1992).

Checked by Principal...... Simon Leake Date of Report 11/08/2003

Consultant. N.Burkows

Test Type:

EC (1:5)

Order No:

Job No: G23085/1

Reference

Naval College Rd & Wool Rd, Vincentia

Sample Name: TPG2 0.3-0.7m 29/7/03

Sample No: 75698

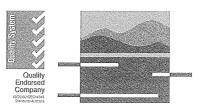
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TEST RESULT COMMENTS

pH in water 1:2 pH in CaCl, 1:2

EC mS/cm 1:2

.04

Chlorides mg/kg

CATION ANALYSIS

TEST	SOL	UBLE	EXCHANGEABLE		
Unit	meq%	Comment	meq%	% of ECEC	Comment
Sodium Potassium Calcium Magnesium Aluminium					
		ECEC Ca/Mg			
	ma/ka	L	i		

mg/kg

Phosphate as P Ammonium as N

Nitrate as N

Sulphate as S

Iron

Zinc

Copper

Manganese

Boron

Recommendations

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Explanation of the Methods:	••••••
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Chloride: Vogel (1961). Aluminium: Method 3500 APHA (1992). Phosphate: Method 951 Rayment & Higginson (1992). Ammonium, Sulphate, Iron, Copper, Manganese + Zinc: Method 83-1 to 83-5 Black (1983). Boron: Method 12C2 Rayment & Higginson (1992).

Checked by Principal..... Simon Leake Date of Report 11/08/2003

Consultant N.Burrows

Test Type:

EC (1:5)

Order No:

Job No: G23085/1

Reference

Naval College Rd & Wool Rd, Vincentia

Sample Name: TPG2 0.7-1.1m 29/7/03

Sample No: 75699

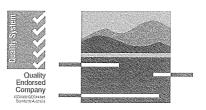
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TEST RESULT COMMENTS

pH in water 1:2 pH in CaCl₂ 1:2

EC mS/cm 1:2

.05

Chlorides mg/kg

CATION ANALYSIS

TEST	SO	SOLUBLE		EXCHANGEABL	-
Unit	meq%	Comment	meq%	% of ECEC	Comment
Sodium Potassium Calcium Magnesium Aluminium					
	ma/ka	ECEC Ca/Mg			

mg/kg

Phosphate as P

Ammonium as N

Nitrate as N

Sulphate as S

Iron

Zinc

Copper

Manganese

Boron

Recommendations

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Explanation of the Methods:	*
Explanation for the Richard Street, and the Control of the Control	***********

Checked by Principal..... Simon Leake Date of Report 11/08/2003 Consultant N.Burrows

Test Type:

EC (1:5), eCEC + sol SO4

Order No:

Job No: G23085/1

Reference

Naval College Rd & Wool Rd, Vincentia

Sample Name: TPG2 1.9-2.4m 29/7/03

Sample No:

Date Received 31/07/2003 Total No Pages:

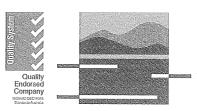
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Results & Conclusions assume that sampling is representative. This document shall not be reproduced except in full

TEST

RESULT

COMMENTS

pH in water 1:2 pH in CaCl₂ 1:2

EC mS/cm 1:2

.06

Chlorides mg/kg

CATION ANALYSIS

TEST	SOL	_UBLE		EXCHANGEABL	E
Unit	meq%	Comment	meq%	% of ECEC	Comment
Sodium Potassium Calcium Magnesium Aluminium	.21 .01 < 0.08 .02		.3 .12 < 0.20 2.62 18.15	1.40 0.60 0.00 12.40 85.60	low - not sodic very low very low slightly low high - available
	ma/ka	ECEC Ca/Mg	21.20 0.00		unbalanced ratio

mg/kg

Phosphate as P Ammonium as N

Nitrate as N

Sulphate as S

<5

Iron Zinc Copper Manganese

Boron

Recommendations

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pH, EC, Soluble Cations, Nitrate: Bradley et al (1983). Exchangeable Cations, ECEC: Method 15A1 Rayment & Higginson (1992) Chloride: Vogel (1961). Aluminium: Method 3500 APHA/(1992). Phosphate: Method 9E1 Rayment & Higginson (1992). Ammonium, Sulphate, Iron, Copper, Manganese + Zinc: Method 83-1 to 83-5 Black/(1983). Boron: Method 12C2 Rayment & Higginson (1992).

 Consultant N.Burrows

Test Type:

EC (1:5)

Order No:

Job No: G23085/1

Reference

Naval College Rd & Wool Rd, Vincentia

Sample Name: TPG7 0.2-0.4m 29/7/03

Sample No:

75701

Date Received 31/07/2003 Total No Pages: 45

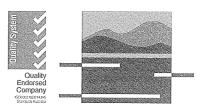
CLIENT:

Network Geotechnics Pty Ltd

Richard King 6/6 Morton Close TUGGERAH NSW

2259

COMMENTS



Sydney Environmental and Soil Laboratory

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TEST

pH in water 1:2 pH in CaCl, 1:2

EC mS/cm 1:2

.04

RESULT

Chlorides mg/kg

CATION ANALYSIS

TEST	so	SOLUBLE		EXCHANGEABLI	
Unit	meq%	Comment	meq%	% of ECEC	Comment
Sodium					
Potassium					
Calcium					
Magnesium					
Aluminium					
<u> </u>		ECEC			
		Ca/Mg			
	ma/ka				

mg/kg

Phosphate as P

Ammonium as N

Nitrate as N

Sulphate as S

Iron

Zinc

Copper

Manganese

Boron

Recommendations

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pH, EC, Soluble Cations, Nitrate: Bradley et al (1983). Exchangeable Cations, ECEC: Method 15A1 Rayment & Higginson (1992) Chloride: Vogel (1961). Aluminium: Method 3500 APHA (1992). Phosphate: Method 9E1 Rayment & Higginson (1992). Ammonium, Sulphate, Iron, Copper, Manganese + Zinc: Method 83-1 to 83-5 Black (1983). Boron: Method 12C2 Rayment & Higginson (1992).

Checked by Principal...... Simon Leake Date of Report 11/08/2003 Consultant. N.Burrows

Test Type:

EC (1:5), eCEC + sol SO4

Order No:

Job No: G23085/1

Reference

Naval College Rd & Wool Rd, Vincentia

Sample Name: TPG7 0.5-1.0m 29/7/03

Sample No:

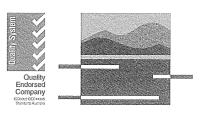
75702

Date Received 31/07/2003 Total No Pages:

CLIENT: Network Geotechnics Pty Ltd

> Richard King 6/6 Morton Close TUGGERAH NSW

2259



Sydney Environmental and Soil Laboratory

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TEST

RESULT

COMMENTS

pH in water 1:2 pH in CaCl₂ 1:2

EC mS/cm 1:2

.29

Chlorides mg/kg

CATION ANALYSIS

TEST	so	LUBLE		EXCHANGEABL	
Unit	meq%	Comment	meq%	% of ECEC	Comment
Sodium Potassium Calcium Magnesium Aluminium	1.09 .01 < 0.08 .54		2.16 .13 .6 8.46 1.08	17.40 1.00 4.80 68.10 8.70	high - sodic very low very low high available
	m a /k a	ECEC Ca/Mg	12.43 0.10		unbalanced ratio

mg/kg

Phosphate as P Ammonium as N

Nitrate as N Sulphate as S

928

Iron Zinc Copper

Manganese

Boron

Recommendations

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Checked by Principal...... Simon Leake Date of Report 11/08/2003

Consultant N.Burrows

Test Type:

EC (1:5)

Order No:

Job No: G23085/1

Reference

Naval College Rd & Wool Rd, Vincentia

Sample Name: TPG7 2.5-3.0m 29/7/03

Sample No:

75703

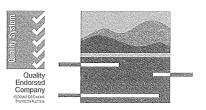
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TEST

RESULT

COMMENTS

pH in water 1:2 pH in CaCl₂ 1:2

EC mS/cm 1:2

.37

Chlorides mg/kg

CATION ANALYSIS

TEST	SOLUBLE EXCHANGEABLE		E		
Unit	meq%	Comment	meq%	% of ECEC	Comment
Sodium Potassium Calcium Magnesium Aluminium					
		ECEC			
		Ca/Mg			
	ma/ka	ı			

mg/kg

Phosphate as P

Ammonium as N

Nitrate as N

Sulphate as S

Iron

Zinc

Copper

Manganese

Boron

Recommendations

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Consultant. N.Burrows

Test Type:

EC (1:5), eCEC + sol SO4

Order No:

Job No: G23085/1

Reference

Naval College Rd & Wool Rd, Vincentia

Sample Name: TPH4 0.15-0.9m 30/7/03

Sample No:

75704

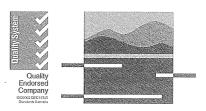
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TEST

RESULT

COMMENTS

pH in water 1:2

pH in CaCl, 1:2 EC mS/cm 1:2

.04

Chlorides mg/kg

CATION ANALYSIS

TEST	SOLUBLE			EXCHANGEABLE		
Unit	meq%	Comment	meq%	% of ECEC	Comment	
Sodium Potassium Calcium Magnesium Aluminium	.15 .03 < 0.08 .14		.21 .13 .21 2.13 11.1	1.50 0.90 1.50 15.50 80.60	low - not sodic very low very low OK high - available	
	ma/ka	ECEC Ca/Mg	13.78 0.10	· · · · · · · · · · · · · · · · · · ·	unbalanced ratio	

mg/kg

Phosphate as P

Ammonium as N

Nitrate as N

Sulphate as S

1286

Iron

Zinc

Copper

Manganese

Boron

Recommendations

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	Britation of the Methods:	
nH.	EU. SOUDIR USTONS Nitrate: Bradley of al (1993)/Evobangooble Cations, ECCO, Maihad (CA) Danmard (1995)	

pH, EC, Soluble Cations, Nitrate: Bradley et al (1983)/Exchangeable Cations, ECEC: Method 15A1 Rayment & Higginson (1992) Chloride: Vogel (1981). Aluminium: Method 3500 AP#A (1992). Phosphate: Method 9E1 Rayment & Higginson (1992). Ammonium, Sulphate, Iron, Copper, Manganese + Zinc: Method 83-1 to 83-5 Bjack (1983). Boron: Method 12C2 Rayment & Higginson (1992).

Checked by Principal............ Simon Leake Date of Report 11/08/2003

Consultant

N.Burrows

Test Type:

EC (1:5)

Order No:

Job No: G23085/1

Reference

Naval College Rd & Wool Rd, Vincentia

Sample Name: TPH4 0.9-1.1m 30/7/03

Sample No:

75705

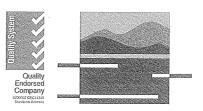
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TEST RESULT COMMENTS

pH in water 1:2

pH in CaCl₂ 1:2

EC mS/cm 1:2

.04

Chlorides mg/kg

CATION ANALYSIS

TEST	SO	SOLUBLE		EXCHANGEABLE	
Unit	meq%	Comment	meq%	% of ECEC	Comment
Sodium Potassium Calcium Magnesium Aluminium					
		ECEC Ca/Mg			
	ma/ka	Į.			·

mg/kg

Phosphate as P

Ammonium as N

Nitrate as N

Sulphate as S

Iron

Zinc

Copper

Manganese

Boron

Recommendations

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pH, EC, Soluble Cations, Nitrate: Bradley et al (1983). Exchangeable Cations, ECEC: Method 15A1 Rayment & Higginson (1992) Chloride: Vogel (1961). Aluminium: Method 3500 APHA (1992). Phosphate: Method 9E1 Rayment & Higginson (1992). Ammonium, Sulphate, Iron, Copper, Manganese + Zinc: Method 83-1 to 83-5 Black (1983). Boron: Method 12C2 Rayment & Higginson (1992).

Checked by Principal...... Simon Leake Date of Report 11/08/2003

Consultant N.Burrows

Test Type:

EC (1:5)

Order No:

Job No: G23085/1

Reference

Naval College Rd & Wool Rd, Vincentia

Sample Name: TPH4 1.1-1.3m 30/7/03

75706

Sample No:

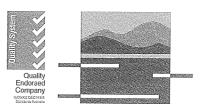
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TEST

RESULT

COMMENTS

pH in water 1:2 pH in CaCl₂ 1:2

EC mS/cm 1:2

.04

Chlorides mg/kg

CATION ANALYSIS

TEST	SOLUBLE			EXCHANGEABLE		
Unit	meq%	Comment	meq%	% of ECEC	Comment	
Sodium Potassium Calcium Magnesium Aluminium						
	•	ECEC Ca/Mg				
	mg/kg	L				

mg/kg

Phosphate as P

Ammonium as N

Nitrate as N

Sulphate as S

Iron

Zinc

Copper

Manganese

Boron

Recommendations

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Chloride: Vogel (1961). Aluminium: Method 3500 APHA (1992). Phosphate: Method 15A1 Hayment & Higginson (1992). Ammonium, Sulphate, Iron, Copper, Manganese + Zinc: Method 83-1 to 83-5 Black (1992). Boron: Method 12C2 Rayment & Higginson (1992).

Checked by Principal.....

Simon Leake Date of Report 11/08/2003 Consultant N.Burrows



ACN 069 211 561 6/6 Morton Close TUGGERAH NSW 2259 Telephone 4351 6200 Facsimile 4351 6300

Email: gosnetgeo@bigpond.com

ATTERBERG LIMITS & LINEAR SHRINKAGE **TEST REPORT SHEET**

(Document No R12.1)

Client: Forbes Rigby Pty Ltd

Project: Feasibility for Development

Location: Naval College Road & The Wool Road, Vincentia

Date Tested: 8/8/03

Job No: G23085/1

SAMPLE DATA				
Sample Number:	TPA1 (0.45 – 0.55m)	TPC4 (1.0 – 1.1m)	TPD5 (0.75 – 0.8m)	
Sample Location:	Approximate sample locations are shown on Drawing No G23085/1-1			
	(Slope)	(Slope)	(Ridge)	
Date Sampled:	30/7/03	29/7/03	29/7/03	
Sample Description:	(SC/CL) Clayey SAND/Sandy CLAY, low plasticity, fine grained, brown mottled orange	(CH) CLAY, high plasticity, pale grey mottled orange- brown	(CH) CLAY, high plasticity, orange- brown mottled pale grey	
	(Residual)	(Slopewash)	(Residual)	
Sample History:	Oven Dried	Oven Dried	Oven Dried	
Preparation Method:	Dry Sieved	Dry Sieved	Dry Sieved	

TEST PROCEDURE			TEST RESULTS	
AS1289 3.1.2 - 1995 Liquid Limit (W _L)	%	20	62	67
AS1289 3.2.1-1995 Plastic Limit (Wp)	%	20	22	23
AS1289 3.3.1-1995 Plasticity Index (I _P)	%	Borderline Non Plastic	40	44





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. 1318

Approved Signatory: Ś Waugh 26 / 11 / 63



ACN 069 211 561 6/6 Morton Close TUGGERAH NSW 2259 Telephone 4351 6200 Facsimile 4351 6300

Email: gosnetgeo@bigpond.com

ATTERBERG LIMITS & LINEAR SHRINKAGE **TEST REPORT SHEET**

(Document No R12.1)

Client: Forbes Rigby Pty Ltd

Project: Feasibility for Development

Location: Naval College Road & The Wool Road, Vincentia

Job No: G23085/1

Date Tested: 8/8/03

SAMPLE DATA
Sample Number

Sample Number:	TPE1 (0.55 – 0.7m)	TPE4 (0.4 – 0.55m)	TPG2 (0.7 – 1.1m)	
Sample Location:		imate sample locations are shown on Drawing No G23085/1-1		
	(Slope)	(Slope)	(Slope)	
Date Sampled:	29/7/03	29/7/03	29/7/03	
Sample Description:	(CH) CLAY, high plasticity, orange- brown mottled red/pale grey	(CL) Sandy CLAY, medium plasticity, orange-brown mottled grey, fine to medium sand	(CL-CH) Sandy CLAY, medium to high plasticity, red- brown/orange- brown/pale grey, fine to medium sand	
	(Residual)	(Residual)	(Residual)	
Sample History:	Oven Dried	Oven Dried	Oven Dried	
Preparation Method:	Dry Sieved	Dry Sieved	Dry Sieved	

TEST PROCEDURE		TEST RESULTS		
AS1289 3.1.2 - 1995 Liquid Limit (W _L)	%	70	45	57
AS1289 3.2.1-1995 Plastic Limit (W _P)	%	22	17	18
AS1289 3.3.1-1995 Plasticity Index (I _P)	%	48	28	39

Comments:



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Approved Signatory: S Waugh 24 / 11 / 63



ATTERBERG LIMITS & LINEAR SHRINKAGE TEST REPORT SHEET

(Document No R12.1)

Client: Forbes Rigby Pty Ltd

Project: Feasibility for Development

Location: Naval College Road & The Wool Road, Vincentia

Job No: G23085/1

Date Tested: 8/8/03

SAMPLE	DATA

Sample Number:	TPG5 (0.3 – 0.7m)	TPG8 (0.5 – 1.0m)	TPH2 (0.5 – 0.8m)
Sample Location:	Approxima E	te sample locations a Prawing No G23085/1	re shown on
	(Slope)	(Slope)	(Ridge)
Date Sampled:	29/7/03	29/7/03	30/7/03
Sample Description:	(SM-SC) Silty Clayey SAND, fine to medium grained, pale grey mottled yellow-brown	(CL/CH) Sandy Silty CLAY, medium to high plasticity, orange-brown mottled pale grey	(CH) Silty CLAY, high plasticity, yellow-brown mottled pale grey
Comple History	(Probable Slopewash)	(Residual)	(Residual)
Sample History:	Oven Dried	Oven Dried	Oven Dried
Preparation Method:	Dry Sieved	Dry Sieved	Dry Sieved

TEST PROCEDURE			TEST RESULTS			
AS1289 3.1.2 - 1995 Liquid Limit (W _L)	%	28	59	74		
AS1289 3.2.1-1995 Plastic Limit (W _P)	%	12	14	22		
AS1289 3.3.1-1995 Plasticity Index (I _P)	%	16	45	49		

Comments:



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Approved Signatory: S Waugh 26/11/03

Stow Want



(Document No R11.5)

CALIFORNIA BEARING RATIO REPORT SHEET

Client: Forbes Rigby Pty Ltd
Project: Feasibility for Development
Location: Naval College Road & The Wool Road, Vincentia

Job No: G23085/1
Tested by: MK/SW
Checked by: SW

CAI		31 F		A
SAL	٧ı	"	: 137	ATA

Sample Number:	TPA1 (0.45 – 0.55m)	TPC4 (1.0 – 1.1m)	TPD5 (0.75 – 0.8m)
Sample Location:	Refe	r to Drawing No G2308	5/1-1
	Slope	Slope	Ridge
Date Sampled:	30/7/03	29/7/03	29/7/03
Sample Description;	(SC/CL) Clayey SAND/Sandy CLAY, low plasticity, fine grained, brown mottled orange	(CH) CLAY, high plasticity, pale grey mottled orange- brown	(CH) CLAY, high plasticity, orange-brown mottled pale grey, trace fine to medium gravel
	(Residual)	(Slopewash)	(Residual)
Field Moisture Content:	18.5	23.5	25.0

LABORATORY COMPACTION DATA [AS1289 5.1.1-2003]

Maximum Dry Density	t/m³	1.95	1.67	1,63
Optimum Moisture Content	%	11.0	19.0	22.0

CALIFORNIA BEARING RATIO TEST RESULTS [AS1289 6.1.1-1998] (AS1289 2.1.1-1992)

Date	Tested		9/8/03	9/8/03	9/8/03
	Dry Density	t/m³	1.93	1.68	1.64
Before Soaking	Density Ratio	%	99.0	100.5	100.5
0,	Moisture Content	%	11.0	19.0	21.5
Numk	oer of days soaked	W	4	4	4
Surch	narge	kg	9.0	9.0	9.0
Swell	after soaking	%	0.0	2.5	2.0
7 U	Dry Density	t/m³	1.93	1.63	1.60
After Soakina	Density Ratio	%	99.0	97.5	98.5
	Moisture Content	%	12.0	23.5	25.5
After Test	Moisture Content Top	30mm %	12.0	27.0	26.5
∢ F	Moisture Content Who	le sample %	11.5	23.5	25.5
CBR v	value @ 2.5/5.0mm pene	etration %	60/70	41/2/5	6/6

Comments: Material Retained on AS 19.0mm sieve

excluded



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Approved Signatory: S Waugh 2 4 / II / O 3



(Document No R11.5)

CALIFORNIA BEARING RATIO REPORT SHEET

Client: Project ocatio		Developmen ^a	t Wool Road, Vincentia	Job No: G2308 Tested by: LB Checked by: SV	
AMPL	E DATA				
Sam	ple Number:		TPE4 (0.4 to 0.55m)		
	ple Location:		Refer to Drawing No. G23085/1-1		
			Slope		
Date	Sampled:		29/7/03		
Sam	ple Description:		(CL) Sandy CLAY, low to medium plasticity, orangebrown mottled grey (with 3% Lime)		
			(Residual)		
Field	Moisture Content:		20.5		
ABOR	ATORY COMPACTION	DATA [AS12	89 5.1.1-1993]		
Maxir	mum Dry Density	t/m³	1.73		
Optin	num Moisture Content	%	18.5		
ALIFO	RNIA BEARING RATIO	TEST RESU	LTS [AS1289 6.1.1-1998	3] (AS1289 2.1.1-1992)	
	Tested		26/8/03		
_	Dry Density	t/m³	1.71		
Before Soaking	Density Ratio	%	99.0		
шŒ	Moisture Content	%	19.0		
Numb	per of days soaked		4		
Surch		kg	9.0		
	after soaking	%	0.5		
	Dry Density	t/m³	1.70		
After Snaking	Density Ratio	%	98.5		
0,	Moisture Content	%	21.0		
h #	Moisture Content Top 30		24.0		
After Test	Moisture Content Whole		20.5		
CBB	value @ 2.5/5.0mm penetr		35/30		

Comments: Material Retained on AS 19.0mm sieve

excluded



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(Document No R11.5)

CALIFORNIA BEARING RATIO REPORT SHEET

Client: Forbes Rigby Pty Ltd

Project: Feasibility for Development

Job No: G23085/1

Tested by: MK/SW

Location: Naval College Road & The Wool Road, Vincentia

Checked by: SW

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Sample Number: Sample Location:		TPE4 (0.4 – 0.55m) or to Drawing No G2308	
	Slope	Slope	Slope
Date Sampled:	29/7/03	29/7/03	29/7/03
Sample Description:	(CH) CLAY, high plasticity, orange-brown	(CL) Sandy CLAY, low to medium plasticity, orange- brown mottled grey	(CL/CH) Sandy CLAY, medium to high plasticity, red- brown/orange- brown/pale grey, fine to medium sand
	(Residual)	(Residual)	(Residual)
Field Moisture Content:	25.0	20.5	23.5

LABORATORY COMPACTION DATA [AS1289 5.1.1-2003]

Maximum Dry Density	t/m³	1.60	1.72	1.65
Optimum Moisture Content	%	22.5	18,5	20.5

CALIFORNIA BEARING RATIO TEST RESULTS [AS1289 6.1.1-1998] (AS1289 2.1.1-1992)

				-1 ()	
Date	Tested		9/8/03	11/8/03	9/8/03
⊕ <u>⊑</u>	Dry Density	t/m³	1.56	1.72	1.66
Before	Density Ratio	%	98.0	100.5	100.5
	Moisture Content	%	23.0	20.5	21.0
Numb	per of days soaked		4	4	4
Surch	narge	kg	9	9	9
Swell	after soaking	%	3.5	1.0	0.5
er ina	Dry Density	t/m³	1.51	1.71	1.65
After Soaking	Density Ratio	%	94.5	99.5	100.0
	Moisture Content	%	28.5	21.0	22.5
After Test	Moisture Content Top 30mm	%	29.5	21.5	23.5
4 F	Moisture Content Whole samp	ole %	28.0	20.5	22.5
CBR v	value @ 2.5/5.0mm penetration	%	31/2/3	7/7	9/8

Comments: Material Retained on AS 19.0mm sieve

excluded



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CALIFORNIA BEARING RATIO REPORT SHEET

Client: Forbes Rigby Pty Ltd
Project: Feasibility for Development
Location: Naval College Road & The Wool Road, Vincentia

Job No: G23085/1
Tested by: MK/SW
Checked by: SW

SAMPLE DATA	S	A١	ЛP	LE	D	AT.	Α
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Sample Number:	TPG2 (0.7 – 1.0m)	TPG2 (0.7 – 1.0m) TPG5 (0.3 – 0.7m)	
Sample Location:	TPG2 (0.7 – 1.0m) TPG5 (0.3 – 0.7m) TPG5 (
	Slope	Slope	Slope
Date Sampled:	29/7/03	29/7/03	29/7/03
Sample Description:	(CL/CH) Sandy CLAY, medium to high plasticity, red- brown/orange- brown/pale grey, fine to medium sand	(SM-SC) Silty Clayey SAND, fine to medium grained, pale grey mottled yellow-brown	(SM-SC) Silty Clayey SAND, fine to medium grained, pale grey mottled yellow-brown
	(Residual +3% Lime)	(Probable Slopewash)	(Probable Slopewash +3% Lime)
Field Moisture Content:	23.5	14.5	14.5

LABORATORY COMPACTION DATA [AS1289 5.1.1-2003]

Maximum Dry Density	t/m³	1.62	1.88	1,83
Optimum Moisture Content	%	22.0	12.0	15.0

CALIFORNIA BEARING RATIO TEST RESULTS [AS1289 6.1.1-1998] (AS1289 2.1.1-1992)

Date	Date Tested		11/8/03	9/8/03	11/8/03
Date			11/0/03	3/0/03	11/0/03
0.0	Dry Density	t/m ³	1.64	1.93	1.83
Before Soaking	Density Ratio	%	101.5	102.5	100.0
	Moisture Content	%	20.5	12.0	14.0
Numb	per of days soaked		4	4	4
Surch	narge	kg	9	9	9
Swell	after soaking	%	0	0.5	0.5
_ B	Dry Density	t/m³	1.64	1.92	1.82
After Soaking	Density Ratio	%	101.5	102.5	99.5
	Moisture Content	%	23.5	13.0	18.5
After Test	Moisture Content Top 30m	m %	23.5	14.0	15.5
₩	Moisture Content Whole sa	mple %	23.0	13.0	18.5
CBR value @ 2.5/5.0mm penetration %		40/35	6/7	60/60	

Comments: Material Retained on AS 19.0mm sieve

excluded



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(Document No R11.5)

CALIFORNIA BEARING RATIO REPORT SHEET

Client: Forbes Rigby Pty Ltd

Project: Feasibility for Development

Location: Naval College Road & The Wool Road, Vincentia

Job No: G23085/1

Tested by: MK/SW

Checked by: SW

SAMPLE DATA

Sample Number: Sample Location:		TPG8 (0.5 – 1.0m) TPH2 (0.5 – 0.8m) Refer to Drawing No G23085/1-1	
	Slope	Ridge	
Date Sampled:	29/7/03	30/7/03	
Sample Description:	(CL/CH) Sandy Silty CLAY, medium to high plasticity, orange-brown mottled pale grey	(CL) Silty CLAY, low to medium plasticity, yellow-brown mottled pale grey	
	(Residual)	(Residual)	
Field Moisture Content:	26.5	25.5	

LABORATORY COMPACTION DATA [AS1289 5.1.1-2003]

Maximum Dry Density	t/m³	1.72	1.62	
Optimum Moisture Content	%	19.0	20.0	

CALIFORNIA BEARING RATIO TEST RESULTS [AS1289 6.1.1-1998] (AS1289 2.1.1-1992)

Date Tested		11/8/03	11/8/03	
0.2	Dry Density t/m ³	1.66	1.55	
Before	Density Ratio %	96.5	96.0	
	Moisture Content %	18.5	20.0	
Numb	per of days soaked	4	4	
Surch	arge kg	9	9	
Swell	after soaking %	4.5	5.0	
ing .	Dry Density t/m ³	1.59	1.48	
After Soaking	Density Ratio %	92.5	91.0	
	Moisture Content %	23.5	29.0	
After Test	Moisture Content Top 30mm %	26.0	29.5	
₹ F	Moisture Content Whole sample %	23.5	28.5	
CBR v	alue @ 2.5/5.0mm penetration %	21/2/21/2	21/21/2	

Comments: Material Retained on AS 19.0mm sieve

excluded



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Approved Signatory: S Waugh 26 ////03



ACN 069 211 561 6/6 Morton Close TUGGERAH NSW 2259 Telephone 4351 6200

Facsimile 4351 6300 Email: gosnetgeo@bigpond.com

SHRINK/SWELL INDEX TEST REPORT SHEET

(Document No R19.1)

Client: Forbes Rigby Pty Ltd Job No: G23085/1 **Project:** Feasibility for Development Location: Naval College Road & The Wool Road, Vincentia **Date:** 13/8/03 SAMPLE DATA Sample Number: TPC2 (0.7 - 0.88m) TPC4 (0.9 - 1.3m) TPD5 (0.75 - 0.8m)*Sample Location: Refer to Drawing No G23085/1-1 Slope Slope Ridge Date Sampled: 30/7/03 30/7/03 29/7/03 Sample Description: (CL) Sandy CLAY. (CH) CLAY, high (CH) CLAY, high low plasticity, pale plasticity, pale grey plasticity, orangegrey mottled mottled orangebrown, trace of fine orange-brown brown, some silt to medium gravel fines (Residual) (Slopewash) (Residual) **TEST PROCEDURE TEST RESULTS** AS1289 2.1.1-1992 Moisture Content (Field) % 24.5 23.8 25.6 AS1289 2.1.1-1992 26.7 24.9 28.5 Moisture Content (After Test)% AS1289 7.1.1-1998 Swelling Strain (Esw) 0.5 % 0.0 0,0 4.6 2.4 5.5 Shrinkage Strain (Esh) %

Comment: *Specimens remoulded at 100% Standard compactive effort at field moisture content

2.7



Shrink/Swell Index (Iss)

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Approved Signatory: S Waugh 26/11/03

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SHRINK/SWELL INDEX **TEST REPORT SHEET**

(Document No R19.1)

Client: Forbes Rigby Pty Ltd

Job No: G23085/1

Project: Feasibility for Development

Location: Naval College Road & The Wool Road, Vincentia

Date: 13/8/03

SAMPLE DATA

OAMI LE DATA					
Sample Number:	TPE1 (0.55 – 0.7m)*	TPE4 (0.6 – 0.9m)	TPG2 (0.7 – 1.1m)*		
Sample Location:	Refer to Drawing No G23085/1-1				
	Slope	Slope	Slope		
Date Sampled:	29/7/03	29/7/03	29/7/03		
Sample Description:	(CH) CLAY, high plasticity, orange-brown mottled red/pale grey	(CL) Sandy CLAY, low to medium plasticity, orange- brown mottled pale grey	(CL/CH) Sandy CLAY, medium to high plasticity, red- brown/orange- brown/pale grey, fine to medium sand		
	(Residual)	(Residual)	(Residual)		

TEST PROCEDURE		TEST RESULTS		
AS1289 2.1.1-1992 Moisture Content (Field) %	24.7	21.2	22.8	
AS1289 2.1.1-1992 Moisture Content (After Test)%	29.5	25.7	25.3	
AS1289 7.1.1-1998 Swelling Strain (Esw) %	0.0	0.0	0.0	
Shrinkage Strain (Esh) %	1.6	0.9	4.4	
Shrink/Swell Index (Iss) %	0.9	0.5	2.4	

Comment: *Specimens remoulded at 100% Standard compactive effort at field moisture content



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Approved Signatory: S Waugh 26/11/03



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Email: gosnetgeo@bigpond.com

SHRINK/SWELL INDEX TEST REPORT SHEET

(Document No R19.1)

Client: Forbes Rigby Pty Ltd Job No: G23085/1

Project: Feasibility for Development

Location: Naval College Road & The Wool Road, Vincentia Date: 13/8/03

SAMPLE DATA

Sample Number:	TPG3 (0.5 – 0.8m) TPG7 (0.5 – 0.8m) TPH2 (0.5 – 0.8m)			
Sample Location:	Refer to Drawing No G23085/1-1			
	Slope	Slope	Ridge	
Date Sampled:	29/7/03	29/7/03	30/7/03	
Sample Description:	(CL) Sandy CLAY, low to medium plasticity, red- brown/orange- brown/pale grey	(CL)Sandy CLAY, medium plasticity, orange-brown/pale grey, fine to medium sand	(CL) Silty CLAY, low to medium plasticity, yellow- brown mottled pale grey	
	(Residual)	(Residual)	(Residual)	

TEST PROCEDUF	RE	TEST RESULTS		
AS1289 2.1.1-1992 Moisture Content (Field)	%	19.4	19.5	28.7
AS1289 2.1.1-1992 Moisture Content (After Te	est)%	20.7	21.2	31.1
AS1289 7.1.1-1998 Swelling Strain (Esw)	%	0.0	0.1	0.1
Shrinkage Strain (Esh)	%	1.7	2.7	3.1
Shrink/Swell Index (Iss)	%	1.0	1.5	1.7
1		ł .		

Comment:



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Approved Signatory: S Waugh 26 /// / 03



PARTICLE SIZE DISTRIBUTION REPORT SHEET

(Document No R16.2)

Client: Forbes Rigby Pty Ltd Project: Feasibility for Development Location: Naval College Road & The Wool Road, Vincentia

Date Tested: 13/8/03

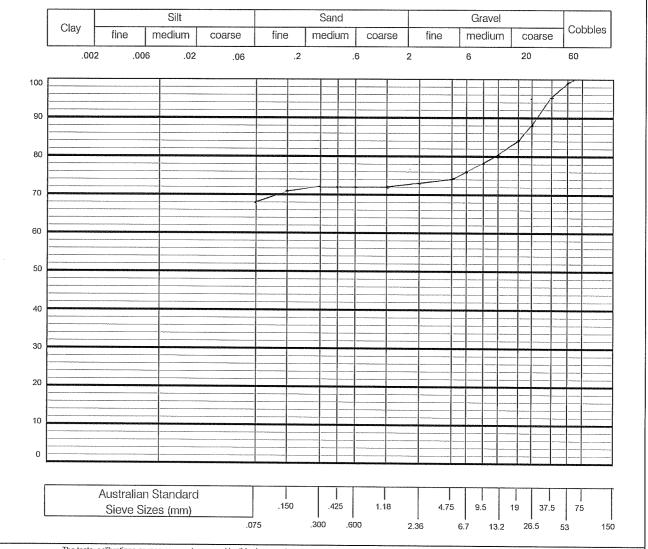
Job No:G23085/1

Sample Identification TP D5 (0.75-0.8m)
Test Procedure
AS 1289 3.6.1 (washed)

Material Description

(CH) CLAY, high plasticity, orange-brown, some fine to medium gravel (Residual)

Grading Results						
AS Sieve	% Passing	AS Sieve	% Passing			
63mm	100	4.75mm	74			
53mm	99	2.36mm	73			
37.5mm	95	1.18mm	72			
26.5mm	88	600um	72			
19mm	84	425um	72			
13.2mm	80	300um	72			
9.5mm	78	150um	71			
6.7mm	76	75um	68			





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Authorised Signature: S Waugh 26 / 11 / 03



Client: Forbes Rigby Pty Ltd

ACN 069 211 561 6/6 Morton Close TUGGERAH NSW 2259 Telephone 4351 6200 Facsimilie 4351 6300 gosnetgeo@bigpond.com

PARTICLE SIZE DISTRIBUTION REPORT SHEET

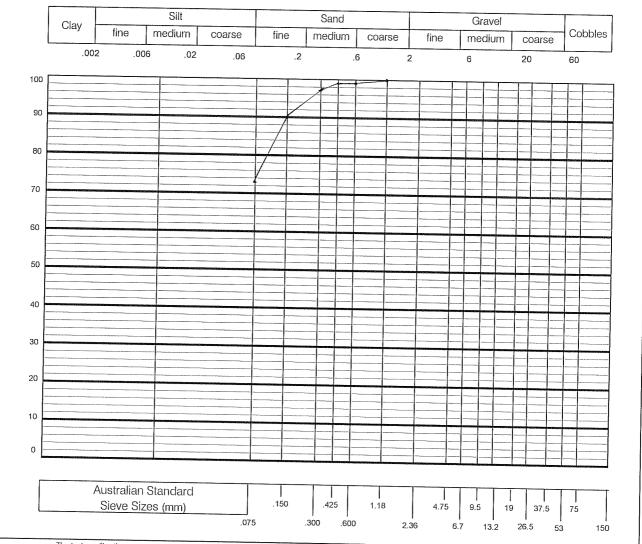
(Document No R16.2)

Project: Feasibility fo	r Development
	ege Road & The Wool Road, Vincentia
Sample Identification	ation
TPE4 (0.4-0.55m)	
Test Procedure	
AS 1289 3.6.1 (wa	shed)
Material Descript	ion
	low to medium plasticity,
orange-brown mot	tled grev
(Residual)	

Grading Results									
AS Sieve	% Passing	AS Sieve	% Passing						
150mm		4.75mm							
53mm		2.36mm							
37.5mm		1.18mm	100						
26.5mm		600um	99						
19mm		425um	99						
13.2mm		300um	97						
9.5mm		150um	90						
6.7mm		75um	73						

Job No:G23085/1

Date Tested:13/8/03





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Authorised Signature: S Waugh 26 / 11 /6 >



PARTICLE SIZE DISTRIBUTION REPORT SHEET

(Document No R16.2)

Client: Forbes Rigby Pty Ltd
Project: Feasibility for Development

Location: Naval College Road & The Wool Road, Vincentia

Job No: G23085/1

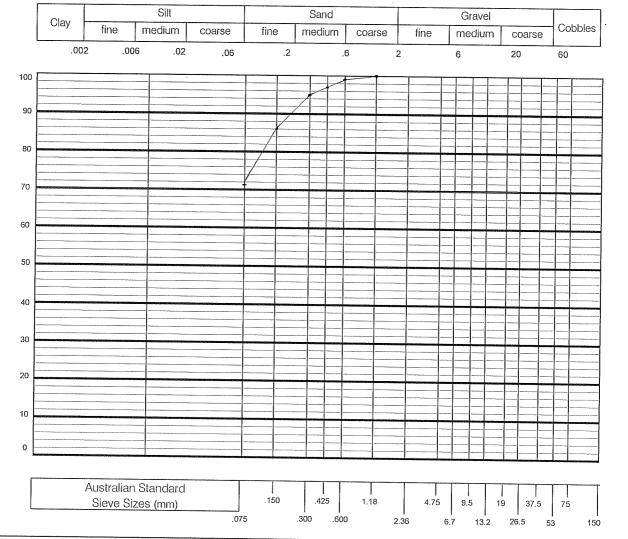
Date Tested: 13/8/03

Sample Identification TP G2 (0.7-1.1m)
Test Procedure
AS 1289 3.6.1 (washed)

Material Description

(CL/CH) Sandy CLAY, medium to high plasticity, red-brown/orange-brown/pale grey, fine to medium sand (Residual)

Grading Results							
AS Sieve	% Passing	AS Sieve	% Passing				
150mm		4.75mm					
53mm		2.36mm					
37.5mm		1.18mm	100				
26.5mm		600um	99				
19mm		425um	97				
13.2mm		300um	95				
9.5mm		150um	86				
6.7mm		75um	71				





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Authorised Signature: S Waugh

26/11/03



PARTICLE SIZE DISTRIBUTION REPORT SHEET

(Document No R16.2)

Client: Forbes Rigby Pty Ltd Project:Feasibility for Development Location:Naval College Road & The Wool Road, Vincentia

Date Tested: 13/8/03

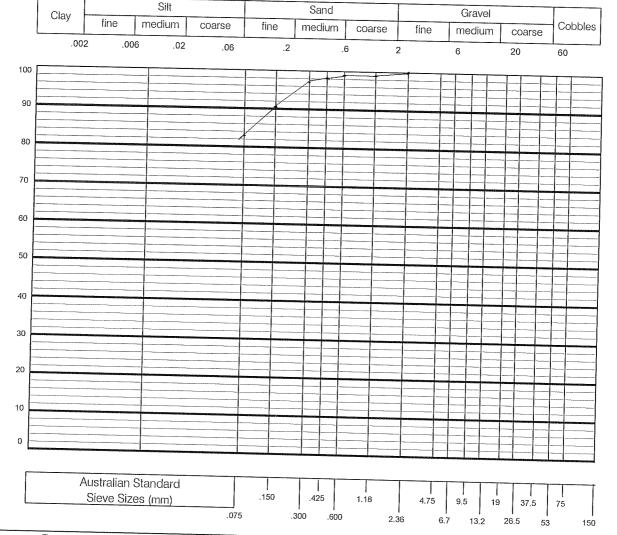
Job No:G23085/1

Sample Identification TP H2 (0.5-0.8m)

Test Procedure AS 1289 3.6.1 (washed)

Material Description
(CL) Silty CLAY, low to medium plasticity, yellow-brown mottled pale grey
(Residual)

Grading Results								
AS Sieve	% Passing	AS Sieve	% Passing					
63mm		4.75mm	<u> </u>					
53mm		2.36mm	100					
37.5mm		1.18mm	99					
26.5mm	-	600um	99					
19mm		425um	98					
13.2mm		300um	97					
9.5mm		150um	90					
6.7mm		75um	83					





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Steen Want

Authorised Signature: S Waugh 26/1//03



Our Job:

23026

Batch No:

4

Your Ref: G23085/1

Page: 1 of 1

Laboratory Report

CLIENT:

Network Geotechnics Pty. Ltd.

Address:

6/6 Morton Close, Tuggerah NSW 2259

PROJECT:

Material Analysis - Forbes Rigby P/L Vincentia

particle size distribution sieving in combination with hydrometer

Sample submitted by Client/ Analysed as received

TEST METHOD (S)

AS1289.3.6.2

PRETREATMENT:

Nil - Standard Oven Drying

particle density assumed - 2.65 g/cm3 (ASTM g/l hydrometer)

SAMPL	E No.	TP D5 0.75 - 0.80m	TP E4 0.40 - 0.55m	TP G2 0.70 - 1.10m	TP H2 0.50 - 0.80m	
% Passing	% Passing AS Sieve					
	75.0 mm					
	37.5 mm					
	26.5 mm	100				
	19.0 mm	100				
	13.2 mm	95				
	9.5 mm	91			100	
	6.7 mm	88			100	
	4.75 mm		100	100	99	
	2.36 mm	84	100	100	99	
	1.18 mm	82	99	99	98	
	600 um	81	99	98	97	
	425 um	81	98	97	97	
	300 um	80	96	95	95	
	150 um	75	72	74	88	
% finer than	75 um	75	72	74	82	
	60 um	55	46	43	57	
	30 um	52	43	30	54	
	20 um	50	41	28	53	
	13.5 um	48	41	24	51	
	6 um	40	37	20	45	
	2 um	27	29	17	31	

Approved Signatory .

M.A--S

....(Marten Sweeney

Date: 21k August 2003

TERRATEST Pty. Ltd.

(ABN 52 082 867 945)

117 Magowar Road, Girraween NSW 2145 Ph: (02) 9636 7377 Fax: (02) 9688 4757



NATA Accredited Laboratory No 541

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 Australian national standards of measurement. This document shall not be reproduced except in full.

RTR-PSDHYD32-02



Job No:

23026

Batch No:

Your Ref: G23085/1 Page:

1 of 2

Laboratory Report

CLIENT:

Network Geotechnics Pty. Ltd.

Address:

6/6 Morton Close, Tuggerah NSW 2259

PROJECT:

Material Analysis - Forbes Rigby P/L Vincentia

emerson class number

TEST METHOD(S) AS1289 3.8.1

SAMPLE No.	CLASS No.	Classification
TP A1 0.45 - 0.55m	4	The remoulded soil shall not disperse in water and calcium carbonate nor shall calcium sulfate be present
TP C4 1.00 - 1.10m	4	The remoulded soil shall not disperse in water and calcium carbonate nor shall calcium sulfate be present
TP D5 0.75 - 0.80m	4	The remoulded soil shall not disperse in water and calcium carbonate nor shall calcium sulfate be present
TP E1 0.55 - 0.70m	4	The remoulded soil shall not disperse in water and calcium carbonate nor shall calcium sulfate be present
TP E4 0.40 - 0.55m	4	The remoulded soil shall not disperse in water and calcium carbonate nor shall calcium sulfate be present

Sample supplied by Client/ Analysed as Received

TERRATEST Pty. Ltd. (ABN 52 082 867 945)

117 Magowar Road, Girraween NSW 2145 Ph (02) 9636 7377 Fax: (02) 9688 4757



NATA Accredited Laboratory No 541

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Job No: Batch No: 23026

Your Ref: G23085/1 Page:

2 of 2

Laboratory Report

CLIENT:

Network Geotechnics Pty. Ltd.

Address:

6/6 Morton Close, Tuggerah NSW 2259

PROJECT:

Material Analysis - Forbes Rigby P/L Vincentia

emerson class number

TEST METHOD(S) AS1289 3.8.1

SAMPLE No.	CLASS No.	Classification
TP G2 0.70 - 1.10m	4	The remoulded soil shall not disperse in water and calcium carbonate nor shall calcium sulfate be present
TP G5 0.30 - 0.70m	2	Air Dried crumbs of soil shall show a moderate to slight reaction. A moderate reaction consists of an easily recognised cloud of colloids in suspension. A slight reaction consists of a bare hint of cloud at the surface of the crumbs.
TP G8 0.50 - 1.00m	3	The soil remoulded at the plastic limit shall disperse in water.
TP H2 0.50 - 0.80m	4	The remoulded soil shall not disperse in water and calcium carbonate nor shall calcium sulfate be present

Sample supplied by Client/ Analysed as Received

General Manager

Date: 29th Avoust, 2003

TERRATEST Pty. Ltd. (ABN 52 082 867 945)

117 Magowar Road, Girraween NSW 2145 Ph (02) 9636 7377 Fax: (02) 9688 4757



NATA Accredited Laboratory No 541

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Environmental Analysis Laboratory Norsearch Ltd

ABN: 57 003 082 406

PO Box 5125 East Lismore 2480 NSW Australia Telephone (02) 6620 3678 Facsimile (02) 6620 3957

Job Number	E0832
Sample Accession No.	Samples 1 - 8
Sample Type	SOIL
No. of samples	8
Date supplied	6 th August, 2003

3rd September, 2003

Att/ Gary Peake Network Geotechnics 6/6 Moreton Close TUGGERAH NSW 2259

Dear Gary,

Herewith are the analysis results of 8 soil samples supplied on the 6th August, 2003.

Results were supplied by fax on the 7th August, 2003.

Please contact the laboratory if you have any queries.

Yours faithfully,

Graham Lancaster, Laboratory Manager

Results refer to samples as received at the laboratory. This report is not to be reproduced except in full.

Analysis performed according to Rayment and Higgins, 1992. Australian Laboratory Handbook of Soil and Water Chemical Methods, except where stated otherwise.

RESULTS OF ACID SULPHATE SOIL ANALYSIS (Page 1 of 1)

8 samples supplied by Network Geotechnics on 6th August, 2003 - Lab. Job No. E0832 Analysis requested by Gary Peake - Your Job No. G23085/1

Sample Site	Depth (m)	Texture (note 9)	Reduced Inorganic Sulphur (% chromium reducible S) (%Scr) (note 2)	Lab. Bulk Density tonne DW/m³	Potential Acidity Neutralising Calculation Kg Lime/m³ (based on %Scr)	COMMENTS RE: Classification as potential acid suiphate soil (ASS) (based on %Scr results)
BHF9	0.75-1.0	Fine	0.022	0.92	0.6	NOT Potential ASS
BHF9	1.7-2.0	Fine	0.037	1.15	1.3	NOT Potential ASS
BHI1	0.2-0.5	Fine	0.018	1.27	0.7	NOT Potential ASS
BHI1	0.7-1.0	Fine	0.018	1.51	0.9	NOT Potential ASS
BHI2	0.2-0.5	Fine	0.009	1.71	0.5	NOT Potential ASS
BHI2	1.2-1.5	Fine	0.008	1.43	0.4	NOT Potential ASS
BHJ1	0.75-1.0	Fine	0.006	1.60	0.3	NOT Potential ASS
BHJ1	1.7-2.0	Fine	0.011	1.35	0.5 Refer Note 6 & 7	NOT Potential ASS

NOTE:

- 1 All analysis is Dry Weight (DW) samples dried and ground immediately upon arrival (unless supplied dried and ground)
- 2 Samples analysed by 'Chromium Reducible Sulphur' technique (Scr Method 22B)
- 3 Methods from Stone, Y. Ahern CR, and Blunden B (1998). Acid Sulphate Soil Manual 1998. ASSMAC, Wollongbar, NSW.
- 4 Total carbon and total sulphur determined using a LECO CNS 2000 analyser
- 5 Bulk density was determined immediately on arrival to laboratory (insitu bulk density is preferred)
- 6 Neutralising Requirement (based on NAGP, chromium reducible sulphur or total sulphur) = Kg H₂SO₄/tonne x bulk density
- 7 The neutralising requirement does not include a safety margin for complete neutralisation (a factor of 1.5 is often recommended)
- 8 Conductivity 1 dS/m = 1 mS/cm = 1000 μ S/cm
- 9 For Texture: coarse = sands to loamy sands; medium = sandy loams to light clays; fine = medium to heavy clays and silty clays
- 10 Neutralisation Calculation for neutralisation of actual and potential acidity (ie. sum of calculation based on Crs and TAA)
- 11 ANC= Acid Neutralising Capacity of the Soil (Detection limit of 0.05% CaCO3 Equivalent)
- 12 NAGP= Net Acid Generating Potential= (31.3*%S_{ox})-(10*%ANC) (From Mulvey, 1993)

(Classification of potential acid sulphate material if: coarse Scr≥0.03%S; medium Scr≥0.06%S; fine Scr≥0.1%S) (equivalent conversions - 0.03%S = 0.019 mole/ Kg; 0.06%S = 0.037 mole/ Kg; 0.1%S = 0.062 mole/ Kg)

* Projects that disturb >1000 tonnes of ASS soils with ≥0.03% S, a detailed management plan may be required.

checked:

ALS Environmental





CERTIFICATE OF ANALYSIS

CONTACT:

MR G PEAKE

CLIENT:

NETWORK GEOTECHNICS PTY LTD

ADDRESS:

6/6 MORTON CLOSE TUGGERAH NSW 2259

ORDER No.:

G23085/1

PROJECT:

BATCH:

SUB BATCH:

LABORATORY: DATE RECEIVED:

DATE COMPLETED:

SAMPLE TYPE:

No. of SAMPLES:

ES41419

SYDNEY

01/08/2003

08/08/2003

WATER

3

COMMENTS

Samples digested by USEPA method 3005 prior to the determination of total metals. True colour determined at pH EA-005. Ionic balance out of acceptable limits due to analytes not quantified in this report.

NOTES

This is the Final Report and supersedes any preliminary reports with this batch number. All pages of this report have been checked and approved for release.

ISSUING LABORATORY: SYDNEY

Address

277-289 Woodpark Road SMITHFIELD NSW 2164

Phone: 61-2-8784 8555

Fax:

61-2-8784 8500

Email:

cindy.suen@alsenviro.com

Signatory

Breg Vogel

LABORATORIES

AUSTRALASIA

Brishane Melbourne Sydney Newcastle Auckland

Hong Kong Singapore Kuala Lumpur Bogor

AMERICAS

Vancouver Santiago Antofagasta NATA Accredited Laboratory Number 825

Site: SYDNEY

This Laboratory is accredited by the National Association of Testing Authorities, Australia. The testis) reported herein have been performed in accordance with its terms of accreditation. This document shall not be reproduced except in full.

ES41419

Sub Batch:

0

Date of Issue:

08/08/2003

Client:

NETWORK GEOTECHNICS PTY LTD

Client Reference:





							SAMPLE	DENTIFICATI	ON		The state of the s	
		Laborat	ory I.D.	1	2	3						
		Date Sa	mpled	31/07/2003	31/07/2003	31/07/2003						
		The state of the s	and the second second second second	SW1	SW2	SW3	V 1 100 (100 11) 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			The second secon	2 FA STATE OF STREET AS A SAME OF STREET	* - Martin - Martin - Adams - Adams
METHOD	ANALYSIS DESCRIPTION	UNIT	LOR									
A-005	pH Value		0.01	6.07	5.62	4.47						
A-005-P	pH Value		0.01	7.20	5.93	5.26						
A-015	Total Dissolved Solids (TDS)	mg/L	1	358	630	478						
A-041	Colour (True)	PCU	1	150	70	5						
A-045	Turbidity	NTU	0.1	70.0	2400	65.0						
A-065	Total Hardness as CaCO3	mg/L	1	71	39	116						
D-005F	Calcium - Filtered	mg/L	1	11	5	11						
D-010F	Magnesium - Filtered	mg/L	1	11	7	21						
D-015F	Sodium - Filtered	mg/L	1	54	45	102						
D-020F	Potassium - Filtered	mg/L	1	3	1	2						
D-035-P	Bicarbonate as CaCO3	mg/L	1	10	12	<1						
D-040F	Sulphate - Filtered	mg/L	1	24	5	53			Valuation and the second			
D-045-P	Chloride	mg/L	1	125	99	241						
G-005T	Iron - Total	mg/L	0.01	4.42	29.2	7.08						
G-020T	Silver - Total	mg/L	0.001	<0.001	<0.001	<0.001						
G-020T	Aluminium - Total	mg/L	0.01	0.75	29.2	1.69						
G-020T	Arsenic - Total	mg/L	0.001	<0.001	0.008	<0.001						
G-020T	Boron - Total	mg/L	0.01	0.01	0.03	0.01						
G-020T	Barium - Total	mg/L	0.001	0.020	0.161	0.059					ALLA ALLA ALLA ALLA ALLA ALLA ALLA ALL	
G-020T	Cadmium - Total	mg/L	0.001	<0.001	0.001	<0.001						
G-020T	Chromium - Total	mg/L	0.001	0.004	0.024	0.003						
G-020T	Copper - Total	mg/L	0.001	0.002	0.030	0.003						
G-020T	Manganese - Total	mg/L	0.001	0.004	0.162	0.020						
G-020T	Molybdenum - Total	mg/L	0.001	<0.001	<0.001	<0.001						
G-020T	Nickel - Total	mg/L	0.001	0.001	0.011	0.001						
G-020T	Lead - Total	mg/L	0.001	<0.001	0.072	0.006						
G-020T	Antimony - Total	mg/L	0.001	<0.001	<0.001	<0.001						
G-020T	Selenium - Total	mg/L	0.01	<0.01	<0.01	<0.01						
G-020T	Zinc - Total	mg/L	0.005	0.007	0.051	0.042		and the second s			-	***************************************
G-0201 G-035T	Mercury - Total	mg/L	0.0001	<0.0001	<0.0001	<0.0001						
K-026MA	Total Cyanide	mg/L	0.005	<0.005	<0.005	<0.005						
K-040-P	Fluoride	mg/L	0.1	<0.1	<0.1	<0.1					****	
K-040-F K-055A	Ammonia as N	mg/L	0.01	0.02	0.18	<0.01					enterpression of the control of the	
K-055A K-057A	Nitrite as N	mg/L	0.01	<0.02	<0.01	<0.01						

ES41419

Sub Batch:

0

Date of Issue:

08/08/2003

Client:

NETWORK GEOTECHNICS PTY LTD

Client Reference:

						SAMPLE IDENTIFICATION											
		Laboratory I.D. Date Sampled		1	2	3											
				Date Sampled		Date Sampled		Date Sampled		Date Sampled		Date Sampled		Date Sampled		31/07/2003	31/07/2003
	1			SW1	SW2	SW3											
METHOD	ANALYSIS DESCRIPTION	UNIT	LOR														
EK-058A	Nitrate as N	mg/L	0.01	<0.01	<0.01	<0.01											
EK-085	Sulphide	mg/L	0.1	<0.1	<0.1	<0.1											
EZ-005	Total Cations	me/L	0.01	3.86	2.79	6.84											
EZ-010	Total Anions	me/L	0.01	4.23	3.14	7.92											
EZ-015	Actual (Anion / Cation) Difference Allowed (Anion / Cation) Difference	me/L	0.01	0.37	0.35	1.09											
EZ-020	Allowed (Anion / Cation) Difference	me/L	0.01	0.17	0.16	0.23											

CERTIFICATE OF ANALYSIS



ES41419

Sub Batch:

0

Date of Issue:

08/08/2003

Client:

NETWORK GEOTECHNICS PTY LTD

Client Reference:



							SAN	IPLE IDENTIF	ICATION			
		Laborat	ory I.D.	200	201	202						
		Date Sa	ampled	01/08/2003	01/08/2003	01/08/2003						
METHOD	ANALYSIS DESCRIPTION	UNIT	LOR	METHOD BLANK	LCS	MS						
							CHEC	CKS AND SPIKE	S			
EA-005	pH Value		0.01									
EA-005-P	pH Value		0.01									
EA-015	Total Dissolved Solids (TDS)	mg/L	1	<1					An and an			
EA-041	Colour (True)	PCU	1						-			
EA-045	Turbidity	NTU	0.1	<0.1	101%				The second secon			
EA-065	Total Hardness as CaCO3	mg/L	1									
ED-005F	Calcium - Filtered	mg/L	1	<1								
ED-010F	Magnesium - Filtered	mg/L	1	<1								
ED-015F	Sodium - Filtered	mg/L	1	<1								
ED-020F	Potassium - Filtered	mg/L	1	<1								
ED-035-P	Bicarbonate as CaCO3	mg/L	1								PETALANA	
ED-040F	Sulphate - Filtered	mg/L	1	<1								
ED-045-P	Chloride	mg/L	1	<1	105%	112%						
EG-005T	Iron - Total	mg/L	0.01	<0.01		115%					***************************************	
EG-020T	Silver - Total	mg/L	0.001	<0.001	85.0%		Page and the second					
EG-020T	Aluminium - Total	mg/L	0.01	<0.01	109%	82.0%	- Anna Anna Anna Anna Anna Anna Anna Ann					
EG-020T	Arsenic - Total	mg/L	0.001	<0.001	91.0%	97.0%	and the second					
EG-020T	Boron - Total	mg/L	0.01	<0.01	104%	92.0%						
EG-020T	Barium - Total	mg/L	0.001	<0.001	103%	103%						
EG-020T	Cadmium - Total	mg/L	0.001	<0.001	98.0%	96.0%						
EG-020T	Chromium - Total	mg/L	0.001	<0.001	90.0%	89.0%						
EG-020T	Copper - Total	mg/L	0.001	<0.001	98.0%	101%						
EG-020T	Manganese - Total	mg/L	0.001	<0.001	99.0%	96.0%						
EG-020T	Molybdenum - Total	mg/L	0.001	<0.001	99.0%							
EG-020T	Nickel - Total	mg/L	0.001	<0.001	93.0%	92.0%			and a constant			
EG-020T	Lead - Total	mg/L	0.001	<0.001	99.0%	94.0%						
EG-020T	Antimony - Total	mg/L	0.001	<0.001	100%							
EG-020T	Selenium - Total	mg/L	0.01	<0.01	107%	100%			phinamia			
EG-020T	Zinc - Total	mg/L	0.005	<0.005	98.0%	98.0%			and a second		* contract of the contract of	
EG-035T	Mercury - Total	mg/L	0.0001	<0.0001	103%	98.0%		Page 1				
EK-026MA	Total Cyanide	mg/L	0.005	<0.005	109%	101%			ALIANA AND AND AND AND AND AND AND AND AND	***		
EK-040-P	Fluoride	mg/L	0.1	<0.1	93.0%	97.0%				III.		

QUALITY CONTROL REPORT

ES41419

Sub Batch:

0

Date of Issue:

08/08/2003

Client:

NETWORK GEOTECHNICS PTY LTD

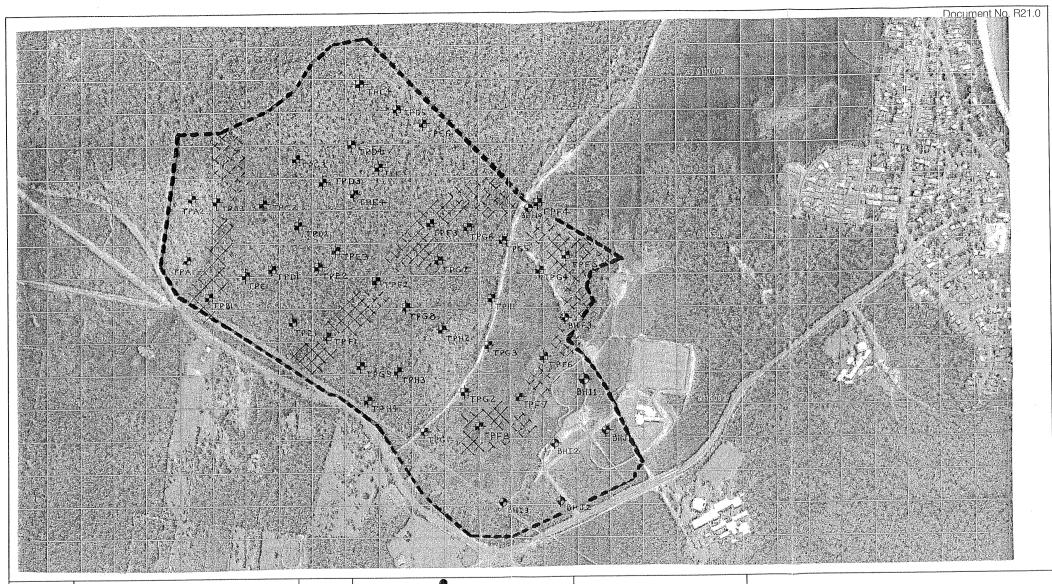
Client Reference:



							S	AMPLE IDENT	IFICATION		
		Laborat	ory I.D.	200	201	202					
		Date Sa	impled	01/08/2003	01/08/2003	01/08/2003					
		The second secon	The ref or model and recommended and reference for the second and referenc	METHOD	LCS	MS				THE COMMISSION OF THE PARTY OF	
METHOD	ANALYSIS DESCRIPTION	UNIT	LOR	BLANK							
							СН	ECKS AND SPIR	KES		
EK-055A	Ammonia as N	mg/L	0.01	<0.01	100%	100%				Adama	
EK-057A	Nitrite as N	mg/L	0.01	<0.01	100%	99.0%				A. A. B. BOOM AND	
EK-058A	Nitrate as N	mg/L	0.01	<0.01	98.0%	95.0%					
EK-085	Sulphide	mg/L	0.1	<0.1	105%						
EZ-005	Total Cations	me/L	0.01								
EZ-010	Total Anions	me/L	0.01		****						
EZ-015	Actual (Anion / Cation) Difference	me/L	0.01								
EZ-020	Allowed (Anion / Cation) Difference	me/L	0.01								

QUALITY CONTROL REPORT

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	WONK	1 7 6	SOTE	CHNICS PTY				RATORY B							STAF	FORD Q	LD 4053	
POSTAL ADDRESS: UNIT 6. 6 MORTON CLOSE TUGGETAH SAMPLERS: GP. SEND REPORT TO: 45 ABOVE SEND INVOICE TO: RHONE FAX: 45 21 63 OVE-MAIL.									TEL:	(07) 324	3 7222							
						Campinenterspie		PHONE S FAX: 43 >16300E-MAIL:								(07) 324	-3 7218	
DATA NEEDED BY: 6/8/03				DED BY:		1	V HT PARTONNE CONTROL OF THE PARTON NAMED IN CONTROL OF THE PA	RT FORM				DISK: □	BUL	LETIN B	JOARD	: 🗆 E	E-MAIL: 🗌	
PROJECT ID: 6230 85/1	QUOTE			Y/405/02 ANDLING/STORAGE OR DISI		Parameter	QC LE	VEL: Q	CS+. 🗆	QCS2:	QCS3:	: 🗆 (QCS4: 🗆					
P.O. NO.:	ANALYSIS REQUIRED																	
FOR LAB USE ONLY							_		' / /			·	/ /	/ /	7	7/		
COOLER SEAL	-						_		//,	3/0n/	/ / .		//		/ /	′ /		
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COOLER TEMP: deg. C] /	/ / 4	V &/ &	j [*] / / /	/ / /	/ /			/ /			
SAMPLE DA				*CONTAINER D	ATA	,] / /	ANALYSIS REQUIRED							/ / / <u>-</u>			
SAMPLE ID	MATRIX	DATE	TIME	TYPE & PRESERVATIVE	NO.	рН	/ /	/3/.	3/4/		/ /	/ /		, <u> </u>	/ /		NOTES	
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NAME: GARY PER	TKE				DATE: <i>(/</i>	8/07	NAME:	attraction of the same	OIU)		DAT	ΓΕ: <i>l /</i>	8/9	CONS	SIGNMEN	T NOTE NO.	
OF: NETWORK	GEOF	ECHN	1105	P/C T	IME:) } }	OF:	name*	NUS			TIM	IE: 6	.JOK	Ļ			
NAME:					DATE:		NAME:					DAT	TE:	100	TRAN		CO. NAME.	
OF: Klenett	A S			V & Commonder	IME: //		OF:					TIM	E:					
*Container Type and Preservative Cov VC = Hydrochloric Acid Preserved Via O = Other.	des: P = N al; VS = Su	latural Pla ulphuric A	ıstic; N = .cid Prese	Nitric Acid Preserved; C = Soderved Vial; BS = Sulphuric Acid	lium Hydr Preserve	oxide Pred Glass	reserved; Bottle; Z	J = Solvent = Zinc Acet	Washed Adate Preserv	cid Rinsed Jar red Bottle; E =	r; S = Solve = EDTA Pre	ent Washe served Bo	ed Acid Ri ottle; ST =	nsed Gla Sterile E	ss Bottl 3ottle;	e;		





LEGEND

Approximate location of test pits

Approximate location of boreholes

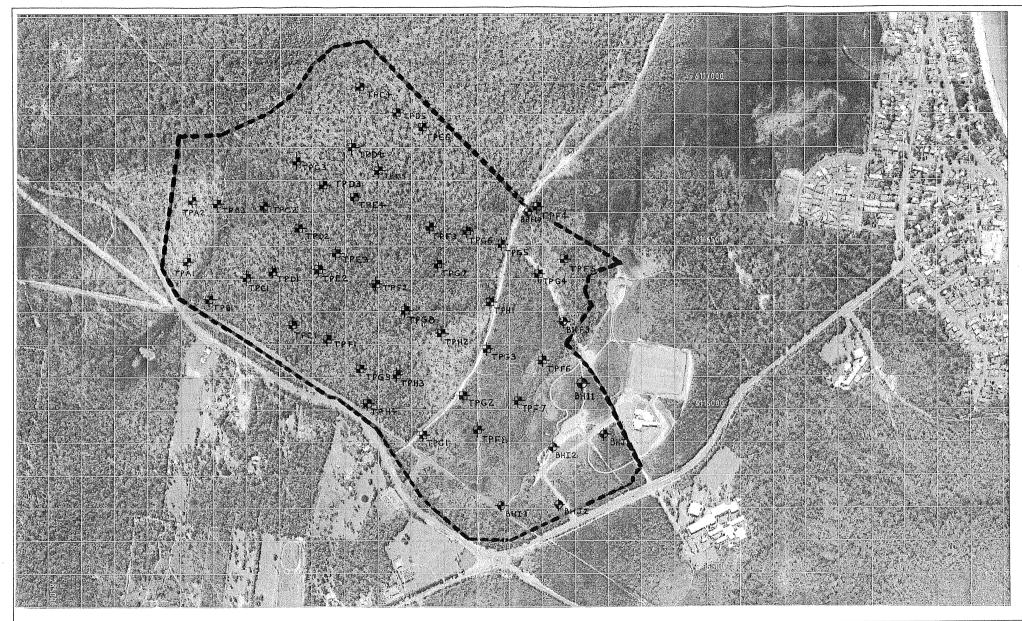
Typically 0.5 to 1m depth of non saline soil \sim elsewhere the thickness is generally >1.5m . Interpreted 0.5 to 1m depth of non saline soil \sim elsewhere the

thickness is generally >1.5m



6/6 Morton Close TUGGERAH NSW 2259 Tel: (02) 4351 6200 Fax: (02) 4351 6300 Email: gosnetgeo@bigpond.com

Scale: 1:4000 A1 sheet	Client:	FORBES RIGBY PTY LTD
AMG Zone 56 Co-ordinates 100m grid Plot size: A3	Project:	FEASIBILITY FOR DEVELOPMENT, NAVAL COLLEGE & THE WOOL ROAD, VINCENTIA
Drawn: GP	Location:	TEST PIT & BOREHOLE LOCATIONS
Drawing No: G23085/1-2		





LEGEND

APPROXIMATE LOCATION OF TEST PITS



APPROXIMATE LOCATION OF BOREHOLES



etwork Geotechnics Pty Ltd

6/6 Morton Close TUGGERAH NSW 2259 Tel: (02) 4351 6200 Fax: (02) 4351 6300 Email: gosnetgeo@bigpond.com Scale: 1:4000 A1 sheet

AMG Zone 56 Co-ordinates 100m grid

Plot size: A3

Drawn: GV

Drawing No: G23085/1-1

FORBES RIGBY PTY LTD

FEASIBILITY FOR DEVELOPMENT NAVAL COLLEGE & THE WOOL ROAD, VINCENTIA

TEST PIT LOCATIONS