Appendix E1 – Soils and Contaminated Land

Gladstone Area Water Board

Test Pit Log

CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 4923 0712 Facsimile 4923 0753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP40
Location: Yarwun to Ambrose Equipment type: Backhoe - 600mm Bucket				Easting: 291633 Northing: 7367870 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES
	ZL	Silty Loam (TOPSOIL) - ALLUVIUM low plasticity, grey, organic matter, dry to moist, no structure		
	CL	Clay Loam, gravelly - Possibly RESIDUAL low to medium plasticity, orange-brown & brown, fine to medium gravel, dry to moist, moderate-strength		
1.0		- very strong (tending to weathered substrate)		PP >600kPa
		MetaSiltstone - RESIDUAL extremely weathered, low to medium strength, grey, fractures at 20-60mm spacings		
2.0				
		Pit Refusal @ 2.6m		
3.0				

Groundwater: nil

Logged by: MRE

Date: 14/09/07

Transcribed by: HEP

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CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 4923 0712 Facsimile 4923 0753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP43
Location: Yarwun to Ambrose Equipment type: Backhoe - 600mm Bucket				Easting: 290407 Northing: 7368777 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES
	ZL	Silty Loam (TOPSOIL) - ALLUVIUM low plasticity, grey, organic matter, dry to moist, no structure		
1.0		MetaSiltstone - RESIDUAL extremely weathered, low to medium strength, grey, fractures at 20-100mm spacings		
2.0		- distinctly weathered, medium strength, grey with purple-black staining in defects,		
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: MRE

Date:14/09/07

Transcribed by: HEP

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CENTRAL QUEENSLAND
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216 Richardson Road North
Rockhampton
Phone 4923 0712 Facsimile 4923 0753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP48
Location: Ambrose to Epala Equipment type: Backhoe - 600mm Bucket				Easting: 288501 Northing: 7370402 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES
	MC	Medium Clay - ALLUVIUM medium plasticity, some sand, pale brown, just moist, very strong		PP >600kPa
1.0		MetaSiltstone extremely weathered, extremely low strength, interbedded with weathered, silty gravel bands (highly fractured)		
2.0		MetaSiltstone distinctly weathered, medium to high strength (massive)		
3.0		Refusal @ 2.0m		

Groundwater: nil

Logged by: JPT

Date: 12/09/07

Transcribed by: HEP

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216 Richardson Road North
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Phone 4923 0712 Facsimile 4923 0753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP49
Location: Ambrose to Epala Equipment type: Backhoe - 600mm Bucket				Easting: 288051 Northing: 7370669 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES
	MC	Medium Clay - ALLUVIUM medium plasticity, pale brown, just moist, strong		
		- very strong		PP >600kPa
1.0				PP >600kPa
		- very pale brown (bleached zone)		PP >600kPa
2.0				PP=550kPa
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: JPT

Date: 12/09/07

Transcribed by: HEP

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216 Richardson Road North
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Phone 4923 0712 Facsimile 4923 0753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP50
Location: Ambrose to Epala Equipment type: Backhoe - 600mm Bucket				Easting: 287524 Northing: 7370957 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES
	MHC	Medium Heavy Clay - ALLUVIUM medium to high plasticity, pale brown mottled grey, moist, strong		PP >600kPa
1.0		- grey mottled brown		PP >600kPa
2.0		pale brown mottled grey, dry		
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: JPT

Date: 12/09/07

Transcribed by: HEP

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Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP51
Location: Ambrose to Epala Equipment type: Backhoe - 600mm Bucket				Easting: 287159 Northing: 7371377 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES
	MC	Medium Clay - ALLUVIUM medium plasticity, pale brown, dry, strong		
		- traces of gravel, very strong		PP >600kPa
1.0				PP >600kPa
	MHC	Medium Heavy Clay high plasticity fines, pale brown mottled grey, some sand, moist, very strong		PP >600kPa
2.0				PP >600kPa
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: JPT

Date: 12/09/07

Transcribed by: HEP

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216 Richardson Road North
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Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP52
Location: Ambrose to Epala Equipment type: Backhoe - 600mm Bucket				Easting: 286802 Northing: 7371844 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES
	MC	Medium Clay - ALLUVIUM medium plasticity, pale brown, just moist, strong		
	MHC	Medium Heavy Clay medium to high plasticity, some sand, dark brown, moist, very strong		PP >600kPa
1.0		- brown mottled grey		PP >600kPa
	MC	Medium Clay - Possibly RESIDUAL medium plasticity, trace sand, orange-brown, just moist, strong		PP=550kPa
2.0		- trace of gravel		
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: JPT

Date: 12/09/07

Transcribed by: HEP

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216 Richardson Road North
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Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP53
Location: Ambrose to Epala Equipment type: Backhoe - 600mm Bucket				Easting: 286424 Northing: 7372206 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES
	MC	Medium Clay - ALLUVIUM medium plasticity, pale brown, just moist, strong		
		- pale brown, moist, moderate strength		PP=250kPa
1.0				
	MHC	Medium Heavy Clay high plasticity fines, pale brown mottled red-brown, some sand, moist, very strong		PP >600kPa
				PP >600kPa
2.0				
				PP >600kPa
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: JPT

Date: 12/09/07

Transcribed by: HEP

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216 Richardson Road North
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Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP54
Location: Epala to Raglan Equipment type: Backhoe - 600mm Bucket				Easting: 286089 Northing: 7372499 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES
	MC	Medium Clay - ALLUVIUM medium plasticity, pale brown, just moist, strong		PP=215kPa
	MHC	Medium Heavy Clay high plasticity fines, pale brown mottled grey, some sand, moist, moderate - strong		PP=315kPa
1.0		- very strong		PP >600kPa
				PP=565kPa
2.0				PP=540kPa
				PP=550kPa
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: JPT

Date: 12/09/07

Transcribed by: HEP

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Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP55
Location: Epala to Raglan Equipment type: Backhoe - 600mm Bucket				Easting: 285702 Northing: 7372900 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES
	MC	Medium Clay - ALLUVIUM medium plasticity, pale brown, just moist, strong		
	MHC	Medium Heavy Clay high plasticity fines, dark brown, some sand, just moist, very strong		PP >600kPa
1.0				PP >600kPa
	MC	Medium Clay - Possibly RESIDUAL medium plasticity, brown mottled grey, moist, trace of gravel		PP >600kPa
2.0		more gravel (>50%), pale brown mottled red & grey, dry		
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: JPT

Date: 12/09/07

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Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP56
Location: Epala to Raglan Equipment type: Backhoe - 600mm Bucket				Easting: 285453 Northing: 7373312 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES
	MC	Medium Clay - ALLUVIUM medium plasticity, pale brown, just moist, strong		
		- dark brown, very strong		PP >600kPa
1.0				
		- medium to high plasticity, pale brown mottled grey, moist		PP >600kPa
				PP >600kPa
2.0				
				PP >600kPa
				PP >600kPa
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: JPT

Date: 12/09/07

Transcribed by: HEP

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Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP57
Location: Epala to Raglan Equipment type: Backhoe - 600mm Bucket				Easting: 285195 Northing: 7373744 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES
	MC	Medium Clay - RESIDUAL medium plasticity, pale brown, just moist, strong		
1.0				
		- very strong		PP >600kPa
				PP=450kPa
2.0				
	MC	Medium Clay medium plasticity, pale brown mottled grey, trace of gravel, moist, strong		
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: JPT

Date: 12/09/07

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216 Richardson Road North
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Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP58
Location: Epala to Raglan Equipment type: Backhoe - 600mm Bucket				Easting: 284868 Northing: 7374184 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES
	MC	Medium Clay - RESIDUAL medium to high plasticity, some sand, pale brown, moist, very strong		PP >600kPa
		- medium plasticity, red-brown, strong		PP=450kPa
1.0				
		- medium to high plasticity fines, some gravel, brown mottled grey, dry		
2.0				
	LMC	Light Medium Clay low to medium plasticity fines, pale brown, dry, very strong		
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil	Logged by: JPT Date: 13/09/07
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216 Richardson Road North
Rockhampton
Phone 4923 0712 Facsimile 4923 0753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP59
Location: Epala to Raglan Equipment type: Backhoe - 600mm Bucket				Easting: 284621 Northing: 7374537 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES
	MC	Medium Clay - RESIDUAL medium to high plasticity, some sand, pale brown, moist, very strong		
		- medium plasticity, red-brown, strong		PP=450kPa
1.0				
	LMC	Light Medium Clay low to medium plasticity fines, pale brown, dry, very strong		
2.0				
		MetaSiltstone extremely weathered, low strength, grey.		
		Refusal @ 2.4m		
3.0				

Groundwater: nil

Logged by: JPT

Date: 13/09/07

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Test Pit Log

Golder Associates

Queensland Government
Department of Main Roads

CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 4923 0712 Facsimile 4923 0753

Project: Gladstone-Fitzroy Water Pipeline	Pit No: TP60
Location: Epala to Raglan Equipment type: Backhoe - 600mm Bucket	Easting: 284346 Northing: 7374894 Elevation:

DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES
	MC	Medium Clay - RESIDUAL medium plasticity, pale brown, some sand & gravel, just moist, strong		
1.0				
2.0	MC	Medium Clay medium plasticity, pale brown mottled grey, moist, trace of gravel		
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: JPT

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Test Pit Log

Golder Associates

Queensland Government
Department of Main Roads

CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 4923 0712 Facsimile 4923 0753

Project: Gladstone-Fitzroy Water Pipeline	Pit No: TP61
Location: Epala to Raglan Equipment type: Backhoe - 600mm Bucket	Easting: 283936 Northing: 7375088 Elevation:

DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES
	MC	Medium Clay - Possibly RESIDUAL medium plasticity, some sand, pale brown, just moist, strong		
1.0		Gravel (Band) - Possibly RESIDUAL medium to coarse, medium plasticity fines, dark brown, dry, minor clay (structure less)		
	LMC	Light Medium Clay - RESIDUAL medium plasticity fines, medium to coarse gravel, pale brown, just moist, strong		
2.0	MHC	Medium Heavy Clay high plasticity, some sand, red-brown, minor gravel, very strong		PP >600kPa
	LMC	Light Medium Clay medium plasticity fines, medium to coarse gravel (50%) with cobbles, pale brown, just moist		
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: JPT

Date: 13/09/07

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216 Richardson Road North
Rockhampton
Phone 4923 0712 Facsimile 4923 0753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP62
Location: Epala to Raglan Equipment type: Backhoe - 600mm Bucket				Easting: 283449 Northing: 7375147 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES
		Mudstone / Claystone - RESIDUAL extremely weathered, extremely low strength, brown		
1.0		- becoming distinctly weathered, massive		
		Refusal @ 1.5m		
2.0				
3.0				

Groundwater: nil

Logged by: JPT

Date: 13/09/07

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216 Richardson Road North
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Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP63
Location: Epala to Raglan Equipment type: Backhoe - 600mm Bucket				Easting: 282963 Northing: 7375227 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES
	ZL	Silty Loam - ALLUVIUM low plasticity, grey-brown, dry, friable, weak		
	ZCL	Silty Clay Loam - Possibly RESIDUAL low to medium plasticity, orange-brown, just moist, moderate strength		PP=280kPa
1.0		- mottled orange-brown & grey		PP=280kPa
2.0		- pale orange-brown		
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: MRE

Date: 14/09/07

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Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP64
Location: Epala to Raglan Equipment type: Backhoe - 600mm Bucket				Easting: 282456 Northing: 7375285 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES
	ZL	Silty Loam - ALLUVIUM low plasticity, grey, dry, friable, weak		
	MC	Medium Clay - Possibly RESIDUAL medium plasticity, orange-brown & grey, some fine to medium gravel, dry-moist, , very strong		PP >600kPa
1.0				
		MetaSiltstone - RESIDUAL extremely weathered, very low strength, interbedded with orange-brown clay seams.		
		- medium strength, grey, purple-black staining on defects, fracture spacings 20-60mm		
2.0				
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: MRE

Date: 14/09/07

Transcribed by: HEP

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216 Richardson Road North
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Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP65
Location: Epala to Raglan Equipment type: Backhoe - 600mm Bucket				Easting: 281918 Northing: 7375363 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES
	LC	Light Clay - RESIDUAL low plasticity, brown, dry, strong (completely weathered rock)		
1.0		MetaSiltstone - RESIDUAL extremely weathered, very low strength, interbedded with red-brown clay seams, fracture spacing 20-60mm.		
2.0		- medium strength, grey, purple-black staining on defects, fracture spacings 20-60mm		
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: MRE

Date: 14/09/07

Transcribed by: HEP

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216 Richardson Road North
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Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP66
Location: Epala to Raglan Equipment type: Backhoe - 600mm Bucket				Easting: 281485 Northing: 7375389 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES
	ZL	Silty Loam - ALLUVIUM low plasticity, grey, dry, friable, weak		
	ZCL	Silty Clay Loam low plasticity, brown, just moist, weak-moderate		
1.0	LC	Light Clay, gravelly - RESIDUAL medium plasticity, medium gravel, orange-brown & dark grey, dry		
		Claystone extremely weathered, very low strength, orange-brown & black		
2.0				
		MetaSiltstone extremely weathered, low strength		
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: MRE

Date: 14/09/07

Transcribed by: HEP

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Test Pit Log

Golder Associates

Queensland Government
Department of Main Roads

CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 4923 0712 Facsimile 4923 0753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP67
Location: Epala to Raglan Equipment type: Backhoe - 600mm Bucket				Easting: 280981 Northing: 7375459 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES
	LC	Light Clay - Possibly RESIDUAL low plasticity, orange-brown & grey, dry, friable		
1.0		MetaSiltstone Extremely weathered, low strength, grey with black & purple staining on fractures, and intermittent orange-brown & grey clay seams, fracture spacing 20-60mm		
2.0	LMC	Light Medium Clay mottled orange-brown & whitish [along western face of pit only], otherwise extremely weathered MetaSiltstone		
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: MRE

Date: 14/09/07

Transcribed by: HEP

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Phone 4923 0712 Facsimile 4923 0753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP68
Location: Epala to Raglan Equipment type: Backhoe - 600mm Bucket				Easting: 280471 Northing: 7375510 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES
	ZCL	Silty Clay Loam - Possibly RESIDUAL low to medium plasticity, orange-brown & grey, dry		
		MetaSiltstone Extremely weathered, low strength, grey, with intermittent orange-brown & grey clay seams (50% weathered gravel).		
1.0		- low to medium strength, fracture spacing 20-60mm		
		- distinctly weathered, high strength		
2.0				
		Refusal @ 2.5m		
3.0				

Groundwater: nil

Logged by: MRE

Date: 14/09/07

Transcribed by: HEP

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Phone 4923 0712 Facsimile 4923 0753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP69
Location: Epala to Raglan Equipment type: Backhoe - 600mm Bucket				Easting: 279991 Northing: 7375641 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES
	ZCL	Silty Clay Loam - ALLUVIAL low plasticity, brown, dry, friable, weak		
	MHC	Medium Heavy Clay medium to high plasticity, brown with some grey, moist, weak-moderate	D 0.4m	PP=260kPa
1.0				
			D 1.5m	PP=370kPa
2.0				
		brown & grey mottled orange-brown, strong		PP=400kPa
			D 2.5m	
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: MRE

Date: 14/09/07

Transcribed by: HEP

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Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP70
Location: Epala to Raglan Equipment type: Backhoe - 600mm Bucket				Easting: 279536 Northing: 7375796 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES
	MHC	Medium Heavy Clay - ALLUVIUM medium to high plasticity, dark brown, moist, weak - moderate	D 0.2m	
		- grey & brown	D 0.5m	PP=190kPa
1.0			D 1.5m	
		- dark grey/black organic inclusions, moderate strength		PP=235kPa
2.0				
		- strong		PP=385kPa
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: MRE

Date: 14/09/07

Transcribed by: HEP

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Test Pit Log

Queensland Government
Department of Main Roads

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Phone 4923 0712 Facsimile 4923 0753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP71
Location: Epala to Raglan Equipment type: Backhoe - 600mm Bucket				Easting: 279070 Northing: 7376011 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES
	LMC	Light Medium Clay - ALLUVIUM low to medium plasticity, mottled pale grey & brown, moist, strong	D 0.0-0.5m	
			D 0.5-1.0m	PP=565kPa
1.0				
		- trace of fine to medium gravel, very strong	D 1.0-1.5m	PP >600kPa
			D 1.5-2.0m	
2.0				
			D 2.0-2.5m	
		- strong		PP=400kPa
			D 2.5-3.0m	PP=370kPa
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: JPT & MRE

Date: 13/09/07

Transcribed by: HEP

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CENTRAL QUEENSLAND
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Phone 4923 0712 Facsimile 4923 0753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP72
Location: Epala to Raglan Equipment type: Backhoe - 600mm Bucket				Easting: 278599 Northing: 7376183 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES
	CL	Clay Loam - ALLUVIAL low plasticity, brown, some fine to medium gravel	D 0.0-0.2m	
	LC	Light Clay, gravelly low plasticity, fine to coarse gravel, pale brown	D 2 0.2-0.5m	
	LMC	Light Medium Clay - RESIDUAL low to medium plasticity, silt, mottled orange-brown & brown, some fine to medium gravel, traces of carbonaceous matter, friable	D 2 0.5-1.0m	
1.0		- pale orange-brown, medium to coarse gravel	D 1.0-1.5m	
			D 1.5-2.0m	
2.0		- layers of low strength, weathered MetaSiltstone (30%), orange-brown, brown & dark grey		
		MetaSiltstone extremely weathered, very low strength, some clay bands, orange-brown & grey	D 2.0-2.5m	
3.0			D 2.5-3.0m	
		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: JPT

Date: 12/09/07

Transcribed by: HEP

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Test Pit Log

CENTRAL QUEENSLAND
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216 Richardson Road North
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Phone 4923 0712 Facsimile 4923 0753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP73
Location: Epala to Raglan Equipment type: Backhoe - 600mm Bucket				Easting: 278220 Northing: 7376360 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES
	MC	Medium Clay - ALLUVIAL medium plasticity, dark grey/black, dry, trace fine sand, dry, strong	D 0.0-0.5m	PP >600kPa
	LMC	Light Medium Clay, gravelly - RESIDUAL low to medium plasticity, red-brown, dry-moist, fine to coarse gravel	D 2 0.5-1.0m	
1.0			D 1.0-1.5m	
		MetaSiltstone extremely weathered, very low strength, clay bands (50%), orange-brown & grey	D 1.5-2.0m	
2.0			D 2.0-2.5m	
			D 2.5-3.0m	
		- increased MetaSiltstone content		
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: JPT & MRE

Date: 13/09/07

Transcribed by: HEP

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Phone 4923 0712 Facsimile 4923 0753

Project: Gladstone-Fitzroy Water Pipeline	Pit No: TP74
Location: Raglan to Bajool Equipment type: Backhoe - 600mm Bucket	Easting: 277841 Northing: 7376377 Elevation:

DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES
	SCL	Sandy Clay Loam - ALLUVIUM low to medium plasticity, dark brown/black, root fibres, moist, weak	D 0.0-0.25m	
	LC	Light Clay, sandy low to medium plasticity fines, fine sand, dark brown, dry-moist, moderate strength	D 0.25-0.5m	PP=450kPa
			D 0.5-0.75m	
			D 0.75-1.0m	
	SCL	Sandy Clay Loam		
1.0		low plasticity fines, pale grey-brown, just moist, moderate-strong	D 1.0-1.25m	
				PP=420kPa
			D 1.25-1.5m	
	MC	Medium Clay medium plasticity, grey mottled orange-brown, moist, moderate strength	D 1.5-1.75m	
			D 1.75-2.0m	
2.0				
			D 2.0-2.25m	PP=360kPa
			D 2.25-2.5m	
	LMC	Light Medium Clay low to medium plasticity, grey, some red mottles, some organics, moist, friable, weak	D 2.5-2.75m	
				PP=145kPa
			D 2.75-3.0m	
3.0		Pit Terminated @ 3.0m		

Groundwater: nil	Logged by: JPT & MRE Date: 13/09/07
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Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP77
Location: Raglan to Bajool Equipment type: Backhoe - 600mm Bucket				Easting: 276548 Northing: 7376926 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES
	LMC	Light Medium Clay - ALLUVIAL low to medium plasticity, dark brown, some organics, trace fine gravel, moist, weak	D 0.0-0.6m	PP=190kPa
			D 0.6-0.8m	
		- mottled pale brown, strong		PP=500kPa
		- dry, very strong	D 0.8-1.8m	
1.0				PP >600kPa
		- just moist	D 1.8-3.0m	
2.0				PP >600kPa
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: JPT & MJW

Date: 18/09/07

Transcribed by: HEP

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Phone 4923 0712 Facsimile 4923 0753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP78
Location: Raglan to Bajool Equipment type: Backhoe - 600mm Bucket				Easting: 276033 Northing: 7377106 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES
	LMC	Light Medium Clay - ALLUVIAL low to medium plasticity, dark brown, trace fine gravel, moist, strong	D 0.0-0.2m D 0.2-0.8m	PP=430kPa PP=430kPa
1.0	MC	Medium Clay medium plasticity, mottled pale brown & yellow-brown, trace of fine gravel, moist, strong	D 0.8-1.0m D 1.0-3.0m	PP=495kPa PP=525kPa
2.0				
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: JPT & MJW

Date: 18/09/07

Transcribed by: HEP

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Project: Gladstone-Fitzroy Water Pipeline	Pit No: TP79
Location: Raglan to Bajool Equipment type: Backhoe - 600mm Bucket	Easting: 275470 Northing: 7377273 Elevation:

DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES
	SL	Sandy Loam - ALLUVIUM low plasticity, grey, dry, root fibres, weak structure	D 0.0-0.25m	
	SCL	Sandy Clay Loam medium plasticity, mottled pale brown & grey, fine gravel (3mm), moist, moderate strength	D 0.25-0.5m	PP=305kPa
	MC	Medium Clay medium plasticity, pale brown & grey, trace gravel, moist, moderate strength	D 0.5-0.75m D 0.75-1.0m	PP=300kPa
1.0			D 1.0-1.25m	
			D 1.25-1.5m	
		- very strong	D 1.5-1.75m	PP >600kPa
		- loamy organic layer, brown		
	HC	Heavy Clay heavy plasticity, pale brown & grey, trace gravel, moist, strong	D 1.75-2.0m	
2.0			D 2.0-2.25m	PP=540kPa
			D 2.25-2.5m	
			D 2.5-2.75m	
			D 2.75-3.0m	PP=510kPa
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: JPT & MJW

Date: 18/09/07

Transcribed by: HEP

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Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP80
Location: Raglan to Bajool Equipment type: Backhoe - 600mm Bucket				Easting: 274851 Northing:7377453 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES
	SCL	Sandy Clay Loam - ALLUVIUM medium plasticity, grey-brown, moist, strong	D 0.0-0.25m	PP >600kPa
	MC	Medium Clay medium plasticity, pale brown & grey, trace gravel, moist, moderate strength	D 0.25-0.5m D 0.5-0.75m	PP=295kPa
	LS	Loamy Sand fine grained, low plasticity fines, grey with black organic matter, moist	D 0.75-1.0m	PP=130kPa
1.0		weak structure	D 1.0-1.25m	PP=275kPa
	MC	Medium Clay medium plasticity, pale brown & grey, trace gravel, moist, moderate strength	D 1.25-1.5m D 1.5-1.75m D 1.75-2.0m	
2.0	HC	Heavy Clay medium to high plasticity, pale brown & grey, trace gravel, occasional organic inclusions, moist, moderate strength	D 2.0-2.25m D 2.25-2.5m D 2.5-2.75m	PP=345kPa
	LC	Light Clay	D 2.75-3.0m	PP=425kPa
3.0		low plasticity, pale brown & grey, black organic matter, moist, strong		
		Pit Terminated @ 3.0m		

Groundwater: nil	Logged by: JPT & MJW Date: 18/09/07
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Phone 4923 0712 Facsimile 4923 0753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP81
Location: Raglan to Bajool Equipment type: Backhoe - 600mm Bucket				Easting: 274340 Northing: 7377627 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES
	SCL	Sandy Clay Loam - ALLUVIUM low plasticity, fine sand, grey-brown, dry, root fibres, weak structure	D 0.0-0.25m	
		- traces of gravel	D 0.25-0.5m	PP=540kPa
	ZCL	Silty Clay Loam low to medium plasticity, trace fine gravel, brown, friable, just moist strong	D 0.5-0.75m	
			D 0.75-1.0m	
1.0				
			D 1.0-1.25m	PP=550kPa
			D 1.25-1.5m	
			D 1.5-1.75m	PP >600kPa
			D 1.75-2.0m	
2.0				
			D 2.0-2.25m	PP >600kPa
	MHC	Medium Heavy Clay medium to high plasticity, mottled pale brown & grey, moist, strong (occasional organic matter)	D 2.25-2.5m	
			D 2.5-2.75m	
			D 2.75-3.0m	PP=550kPa
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: JPT & MJW

Date: 18/09/07

Transcribed by: HEP

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Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP82
Location: Raglan to Bajool Equipment type: Backhoe - 600mm Bucket				Easting: 273824 Northing: 7377810 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES
	ZCL	Silty Clay Loam - ALLUVIUM low to medium plasticity, brown, dry, root fibres, weak structure	D 0.0-0.25m	
			D 0.25-0.5m	
	MC	Medium Clay medium plasticity, brown, moist, weak (massive)		PP=130kPa
			D 0.5-0.75m	
			D 0.75-1.0m	
1.0				
		- grey, silty, occasional orange-brown mottles	D 1.0-1.25m	
				PP=145kPa
			D 1.5-1.75m	
			D 1.75-2.0m	PP=135kPa
2.0				
			D 2.0-2.25m	
			D 2.25-2.5m	
			D 2.5-2.75m	
			D 2.75-3.0m	PP=130kPa
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: JPT & MJW

Date: 18/09/07

Transcribed by: HEP

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Phone 4923 0712 Facsimile 4923 0753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP83
Location: Raglan to Bajool Equipment type: Backhoe - 600mm Bucket				Easting: 273381 Northing: 7378012 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES
	CL	Clay Loam - ALLUVIUM low plasticity, whitish grey (leached), dry	D 0.0-0.2m	
	MC	Medium Clay medium plasticity, dark brown, moist, moderate-strong	D 0.2-2.2m	PP=320kPa
1.0				
2.0			D 2.2-3.0m	
		- brown, very strong		PP >600kPa
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: JPT & MJW

Date: 18/09/07

Transcribed by: HEP

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Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP84
Location: Raglan to Bajool Equipment type: Backhoe - 600mm Bucket				Easting: 272969 Northing: 7378284 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES
	MC	Medium Clay - ALLUVIUM medium plasticity, dark grey/black, dry, strong		
	MHC	Medium Heavy Clay medium to high plasticity, dark grey/black, dry, strong		PP >600kPa
	LMC	Light Medium Clay - RESIDUAL		
1.0		low to medium plasticity, pale brown, moist, strong		PP=550kPa
		mottled pale & orange-brown		PP=510kPa
2.0				
				PP=590kPa
		- with traces of MetaSiltstone, very strong		
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: JPT & MJW

Date: 18/09/07

Transcribed by: HEP

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Test Pit Log

CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 4923 0712 Facsimile 4923 0753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP85
Location: Raglan to Bajool Equipment type: Backhoe - 600mm Bucket				Easting: 272544 Northing: 7378546 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES
	LS	Loamy Sand - Possibly ALLUVIUM fine to medium, low plasticity fines, whitish grey (leached), dry, single grained		
	LMC	Light Medium Clay - RESIDUAL low to medium plasticity, pale brown, moist, strong		PP=480kPa
1.0		- trace of fine gravel		
2.0		- moderate strength		PP=220kPa
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: JPT & MJW

Date: 18/09/07

Transcribed by: HEP

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216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP86
Location: Raglan to Bajool Equipment type: Backhoe - 600mm Bucket				Easting: 272107 Northing: 7378790 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	LS	Loamy Sand - ALLUVIUM fine grained, low plasticity fines, pale brown, weak, moist, no structure		
	MHC	Medium Heavy Clay medium to high plasticity, dark brown, moist, strong		PP=300kPa
1.0		- mottled brown, traces of fine to medium gravel		PP=330kPa
2.0				PP=395kPa
3.0		Pit Terminated @ 3.0m		

Groundwater: nil	Originally Logged by: JPT & MJW Date: 04/09/07
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Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP87
Location: Raglan to Bajool Equipment type: Backhoe - 600mm Bucket				Easting: 271665 Northing: 7379031 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	LS	Loamy Sand - ALLUVIUM fine grained, low plasticity fines, pale brown, weak, moist, no structure	D 0.0-0.3m	
	SCL	Sandy Clay Loam low to medium plasticity fines, dark brown, moist, no structure	D 0.3-0.45m	
	CS	Clayey Sand fine to medium, low to medium plasticity fines, brown, moist, very strong	D 0.45-1.05m	PP=505kPa
1.0			D 1.0-1.25m	
			D 1.05-1.75m	
		- mottled grey, strong	D 1.25-1.50m	PP=400kPa
2.0				
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date: 04/09/07

Transcribed by: HEP

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Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP88
Location: Raglan to Bajool Equipment type: Backhoe - 600mm Bucket				Easting: 271181 Northing:7379168 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	LS	Loamy Sand - ALLUVIUM fine grained, low plasticity fines, pale brown, weak, moist, no structure	D 0.0-0.6m	
1.0	CS	Clayey Sand fine to medium, medium plasticity clay fines, dark brown, moist, moderate-strong	D 0.6-1.5m	
2.0	MHC	Medium Heavy Clay medium to high plasticity, mottled grey, moist, very strong	D 1.5-3.0m	PP >600kPa
3.0		Pit Terminated @ 3.0m		

Groundwater: nil	Originally Logged by: JPT & MJW Date: 04/08/07
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Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP90
Location: Raglan to Bajool Equipment type: Backhoe - 600mm Bucket				Easting: 270184 Northing: 7379299 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	MHC	Medium Heavy Clay - ALLUVIUM medium to high plasticity, dark grey/black, moist		
1.0				PP=190kPa
		- mottled orange-brown and Back, moist, moderate strength		PP=180kPa
2.0				
		- very moist, weak to moderate		PP=125kPa
		- wet		water inflow @ 2.4m
		- weak		PP=40kPa
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date: 22/08/07

Transcribed by: HEP

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Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP91	
Location: Raglan to Bajool				Easting: 269211 Northing: 7379536	
Equipment type: Backhoe - 600mm Bucket				Elevation:	
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES	
	HC	Heavy Clay - ALLUVIUM high plasticity, dark grey, very moist, moderate strength, massive	D 0.0-0.25m		
				PP=140kPa	
			D 0.25-0.5m		
			D 0.5-0.75m		
	HC	Heavy Clay high plasticity, grey, mottled pale brown, moist, moderate-strong	D 0.75-1.0m		
				PP=220kPa	
1.0			D 1.0-1.25m		
			D 1.25-1.5m		
		- mottled red-brown and grey, very moist			
			D 1.5-1.75m	PP=170kPa	
2.0			D 1.75-2.0m		
			D 2.0-2.25m		
			D 2.25-2.5m	PP=250kPa	
			D 2.5-2.75m		
			D 2.75-3.0m	PP=220kPa	
3.0		Pit Terminated @ 3.0m			

Groundwater: nil

Originally Logged by: JPT & MJW

Date: 22/08/07

Transcribed by: HEP

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Project: Gladstone-Fitzroy Water Pipeline	Pit No: TP92
Location: Raglan to Bajool Equipment type: Backhoe - 600mm Bucket	Easting: 269211 Northing: 7379536 Elevation:

DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	HC	Heavy Clay - ALLUVIUM high plasticity, dark grey & orange brown, very moist, weak-moderate, massive	D 0.0-0.25m	
	MHC	Medium Heavy Clay medium to high plasticity, grey & dark brown, organics, moist, weak-moderate	D 0.25-0.5m	PP=105kPa
			D 0.5-0.75m	PP=170kPa
		- moderate-strong	D 0.75-1.0m	
1.0			D 1.0-1.25m	
			D 1.25-1.5m	
			D 1.5-1.75m	
		- with dark grey / black organic matter	D 1.75-2.0m	PP=220kPa
2.0		- no longer with organic matter	D 2.0-2.25m	
			D 2.25-2.5m	PP=180kPa
			D 2.5-2.75m	PP=195kPa
			D 2.75-3.0m	water inflow @ 2.9m
3.0		Pit Terminated @ 3.0m		

Groundwater: 2.9m depth

Originally Logged by: JPT & MJW

Date: 22/08/07

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Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP93
Location: Raglan to Bajool Equipment type: Backhoe - 600mm Bucket				Easting: 268978 Northing: 7379953 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	CL	Clay Loam - ALLUVIAL low plasticity, dark brown, organic matter, dry, very weak, indistinct peds	D 0.0-0.25m	
	MHC	Heavy Clay medium to high plasticity, grey mottled orange-brown, moist, moderate-strong	D 0.25-0.5m	PP=170kPa
			D 0.5-0.75m	
			D 0.75-1.0m	
1.0			D 1.0-1.25m	
			D 1.25-1.5m	PP=180kPa
			D 1.5-1.75m	
			D 1.75-2.0m	
2.0			D 2.0-2.25m	PP=185kPa
			D 2.25-2.5m	
			D 2.5-2.75m	
3.0			D 2.75-3.0m	PP=190kPa
		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date: 22/08/07

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Project: Gladstone-Fitzroy Water Pipeline	Pit No: TP94
Location: Raglan to Bajool Equipment type: Backhoe - 600mm Bucket	Easting: 269859 Northing: 7880401 Elevation:

DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES
	SCL	Sandy Clay Loam - ALLUVIUM low plasticity, fine sand, brown, dry, organic matter, weak structure	D 0.0-0.25m	
			D 0.25-0.5m	
	LMC	Light Medium Clay, gravelly - Possibly RESIDUAL low to medium plasticity, grey-brown, fine to coarse gravel (30%), moist, very strong		PP >600kPa
			D 0.5-0.75m	
			D 0.75-1.0m	
		- occasional red-brown mottles		PP=590kPa
1.0				
			D 1.0-1.25m	
			D 1.25-1.5m	PP=460kPa
			D 1.5-1.75m	
			D 1.75-2.0m	
2.0				
		- fine gravel, moderate strength	D 2.0-2.25m	PP=320kPa
			D 2.25-2.5m	
			D 2.5-2.75m	
			D 2.75-3.0m	PP=340kPa
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: JPT & MJW

Date: 18/09/07

Transcribed by: HEP

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Project: Gladstone-Fitzroy Water Pipeline	Pit No: TP95
Location: Raglan to Bajool Equipment type: Backhoe - 600mm Bucket	Easting: 268539 Northing: 7380852 Elevation:

DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES
	SCL	Sandy Clay Loam - ALLUVIUM low plasticity, fine sand, brown, moist, organic matter, weak structure	D 0.0-0.25m	
			D 0.25-0.5m	
	LMC	Light Medium Clay, gravelly low to medium plasticity, grey-brown, fine to coarse gravel and sand, moist, very strong		PP >600kPa
			D 0.5-0.75m	
	LC	Light Clay low plasticity, grey, some fine to coarse gravel, moist, very strong		PP >600kPa
			D 0.75-1.0m	
1.0				PP >600kPa
			D 1.0-1.25m	
			D 1.25-1.5m	
		- occasional orange-brown mottles		
			D 1.5-1.75m	PP >600kPa
			D 1.75-2.0m	PP=470kPa
2.0				
	MC	Medium Clay - Possibly RESIDUAL medium plasticity, mottled red & orange brown, white and brown, moist, trace of fine gravel, moderate - strong	D 2.25-2.5m	PP=360kPa
			D 2.5-2.75m	
			D 2.75-3.0m	PP=330kPa
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil	Logged by: JPT & MJW Date: 18/09/07
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Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP96
Location: Raglan to Bajool Equipment type: Backhoe - 600mm Bucket				Easting: 268294 Northing: 7381287 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	L	Loam - ALLUVIAL low plasticity, grey, dry, weak, no structure	D 0.0-0.25m	
	LMC	Light Medium Clay low to medium plasticity, dark grey, moist, moderately strong	D 0.25-0.5m	PP=330kPa
	MC	Medium Clay medium plasticity, mottled orange, grey & yellow-brown, moist, very strong	D 0.5-0.75m	PP=600kPa
			D 0.75-1.0m	
1.0			D 1.0-1.25m	
			D 1.25-1.5m	
			D 1.5-1.75m	
		- mottled orange, whitish grey & yellow-brown	D 1.75-2.0m	PP >600kPa
2.0			D 2.0-2.25m	
			D 2.25-2.5m	
			D 2.5-2.75m	
			D 2.75-3.0m	PP >600kPa
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date: 22/08/07

Transcribed by: HEP

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Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP97	
Location: Raglan to Bajool Equipment type: Backhoe - 600mm Bucket				Easting: 267975 Northing: 7381666 Elevation:	
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES	
	LMC	Light Medium Clay - ALLUVIUM	D 0.0-0.25m		
		low plasticity, dark brown, dry, strong, no structure		PP >600kPa	
		- pale brown, moist	D 0.25-0.5m	PP >600kPa	
		- moderate-strong	D 0.5-0.75m	PP=330kPa	
	MC	Medium Clay	D 0.75-1.0m		
1.0		medium plasticity, pale brown, moist, strong	D 1.0-1.25m		
		- grey and brown, trace of fine gravel, moist, strong	D 1.25-1.5m	PP >600kPa	
			D 1.5-1.75m		
2.0			D 1.75-2.0m		
		- pale, brown, becoming wet, weak-moderate	D 2.0-2.25m		
			D 2.25-2.5m		
			D 2.5-2.75m		
3.0			D 2.75-3.0m		
		Pit Terminated @ 3.0m			

Groundwater: nil

Originally Logged by: JPT & MJW

Date: 22/08/07

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Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP98
Location: Raglan to Bajool Equipment type: Backhoe - 600mm Bucket				Easting: 267651 Northing: 7382053 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES
	HC	Heavy Clay - ALLUVIUM	D 0.0-0.25m	
		high plasticity, dark brown, trace of fine gravel, organics, dry, strong		PP >600kPa
			D 0.25-0.5m	
				PP=510kPa
			D 0.5-0.75m	
		- grey, no gravel	D 0.75-1.0m	
				PP >600kPa
1.0			D 1.0-1.25m	
			D 1.25-1.5m	
	HC	Heavy Clay - Possibly RESIDUAL		PP >600kPa
		- pale orange-brown mottles, trace of fine & medium gravel	D 1.5-1.75m	
			D 1.75-2.0m	
2.0				
		- moderate-strong	D 2.0-2.25m	PP=415kPa
			D 2.25-2.5m	
			D 2.5-2.75m	
			D 2.75-3.0m	PP=420kPa
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: JPT & MJW

Date: 04/09/07

Transcribed by: HEP

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Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP99
Location: Raglan to Bajool Equipment type: Backhoe - 600mm Bucket				Easting: 267268 Northing: 7382383 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES
	MC	Medium Clay - ALLUVIUM	D 0.0-0.25m	
		medium plasticity, brown, trace of organic matter, friable, just moist,		
		strong	D 0.25-0.5m	
		- mottled brown and dark grey/black, dry		PP=555kPa
			D 0.5-0.75m	
			D 0.75-1.0m	
	HC	Heavy Clay		PP >600kPa
1.0		high plasticity, pale brown, trace of fine to medium gravel, dry, very strong		
			D 1.0-1.25m	
				PP >600kPa
		- mottled pale brown & grey, trace of fine (rounded) gravel	D 1.25-1.5m	
			D 1.5-1.75m	
				PP >600kPa
			D 1.75-2.0m	
2.0				
			D 2.0-2.25m	
				PP >600kPa
			D 2.25-2.5m	
			D 2.5-2.75m	
			D 2.75-3.0m	PP=405kPa
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: JPT & MJW

Date: 04/09/07

Transcribed by: HEP

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Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP102
Location: Raglan to Bajool Equipment type: Backhoe - 600mm Bucket				Easting: 265456 Northing: 7383178 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	ZL	Silty Loam - ALLUVIUM low plasticity, light brown, dry, friable, weak structure	D 0.0-0.25m	
	LC	Light Clay, sandy low plasticity, pale brown, moist, moderate strength	D 0.25-0.5m	
			D 0.5-0.75m	
			D 0.75-1.0m	
	MC	Medium Clay, sandy		PP=460kPa
1.0		medium plasticity, fine sand, orange-brown, moist, strong	D 1.0-1.25m	
		- trace fine gravel, red-brown, just moist, very strong	D 1.25-1.5m	PP=540kPa
			D 1.5-1.75m	
2.0			D 1.75-2.0m	PP=550kPa
		- grey and yellow brown	D 2.0-2.25m	
			D 2.25-2.5m	
			D 2.5-2.75m	
3.0			D 2.75-3.0m	PP=600kPa
		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date: 22/08/07

Transcribed by: HEP

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Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP103
Location: Raglan to Bajool Equipment type: Backhoe - 600mm Bucket				Easting: 265026 Northing: 7383367 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	HC	Heavy Clay - ALLUVIUM high plasticity, pale brown, moist, strong, massive	D 0.0-0.25m	PP=595kPa
	MC	Medium Clay medium plasticity, pale brown, trace of fine gravel (2-3mm), trace organics, just moist, very strong	D 0.25-0.5m	PP=600kPa
			D 0.5-0.75m	
			D 0.75-1.0m	
1.0				
			D 1.0-1.25m	PP=600kPa
			D 1.25-1.5m	
				PP=490kPa
			D 1.5-1.75m	
2.0			D 1.75-2.0m	
			D 2.0-2.25m	PP=520kPa
		- with dark grey organic matter, moist	D 2.25-2.5m	
			D 2.5-2.75m	
			D 2.75-3.0m	
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date: 22/08/07

Transcribed by: HEP

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Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP104
Location: Raglan to Bajool Equipment type: Backhoe - 600mm Bucket				Easting: 264534 Northing: 7383580 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	MHC	Medium Heavy Clay - ALLUVIUM medium to high plasticity, yellow-brown, root fibres, moist, very strong	D 0.0-0.25m	PP=590kPa
	HC	Heavy Clay high plasticity, mottled grey & pale brown, moist, strong, massive	D 0.25-0.5m	
			D 0.5-0.75m	PP=465kPa
			D 0.75-1.0m	
1.0			D 1.0-1.25m	
		- very strong		PP=520kPa
			D 1.25-1.5m	
		- strong		PP=345kPa
			D 1.5-1.75m	
2.0			D 1.75-2.0m	
				PP=380kPa
			D 2.0-2.25m	
			D 2.25-2.5m	
			D 2.5-2.75m	
		- trace fine gravel (3mm)		
			D 2.75-3.0m	PP=420kPa
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date: 22/08/07

Transcribed by: HEP

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Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP105
Location: Raglan to Bajool Equipment type: Backhoe - 600mm Bucket				Easting: Northing: Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	HC	Heavy Clay - ALLUVIUM	D 0.0-0.25m	
		high plasticity, pale brown, just moist, very strong		PP >600kPa
			D 0.25-0.5m	
				PP >600kPa
			D 0.5-0.75m	
		- grey, black organic matter, moist, strong		PP=485kPa
			D 0.75-1.0m	
1.0				
			D 1.0-1.25m	
			D 1.25-1.5m	
				PP=355kPa
			D 1.5-1.75m	
		- very strong		PP >600kPa
2.0			D 1.75-2.0m	
			D 2.0-2.25m	
			D 2.25-2.5m	
	LC	Light Clay		
		low plasticity layer, trace fine gravel, moist	D 2.5-2.75m	
	HC	Heavy Clay		PP=590kPa
		high plasticity, grey, moist, very strong		
			D 2.75-3.0m	
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date:

Transcribed by: HEP

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Test Pit Log

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Project: Fitzroy - Gladstone Pipeline	Pit No: TP106
Location: Approximate chainage 55.0 km (Eight Mile Creek) Equipment type: Caterpillar 432E backhoe with 600mm bucket	Easting: 263763 Northing: 7383878 Elevation:

DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	ZCL	Silty Clay Loam - ALLUVIUM low to medium plasticity, dark grey, trace of fine gravel, dry, hard, friable	D 0.0-0.25m	
			D 0.25-0.5m	PP = 450 kPa
	MHC	Medium Heavy Clay medium to high plasticity, dark grey-brown, trace fine gravel, moist, stif	D 0.5-0.75m	PP = 200 kPa
			D 0.75-1.0m	
1.0				
	MC	Medium Clay medium plasticity, mottled pale brown, moist, firm	D 1.0-1.25m	PP = 150 kPa
				PP = 100 kPa
			D 1.25-1.5m	
		- becoming wet and soft		PP = 50 kPa
			D 1.5-1.75m	
	LC	Light Clay		
2.0		low to medium plasticity, light grey-brown, traces of 'jarosite', wet, very soft	D 1.75-2.0m	
			D 2.0-2.25m	
			D 2.25-2.5m	
			D 2.5-2.75m	
				WATER INFLOW
			D 2.75-3.0m	
3.0				
		Pit Terminated @ 3.0m		

Groundwater: 2.7m depth

Logged by: MJW

Date: 23/10/07

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Project: Fitzroy - Gladstone Pipeline	Pit No: TP107
Location: Approximate chainage 54.5 km	Easting: 263236 Northing: 7383969
Equipment type: Caterpillar 432E backhoe with 600mm bucket	Elevation:

DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	LC	Light Clay - ALLUVIUM low to medium plasticity, dark brown, trace of fine to medium gravel, dry, hard	D 0.0-0.25m	
			D 0.25-0.5m	PP = 450 kPa
		dark grey, stiff	D 0.5-0.75m	PP = 150 kPa
			D 0.75-1.0m	
1.0				
	HC	Heavy Clay medium to high plasticity, grey, moist	D 1.0-1.25m	PP = 100 kPa
			D 1.25-1.5m	
		- with orange brown mottle		PP = 150 kPa
			D 1.5-1.75m	
		- no mottling		
2.0			D 1.75-2.0m	PP = 100 kPa
			D 2.0-2.25m	
			D 2.25-2.5m	
				PP = 150 kPa
			D 2.5-2.75m	
				PP = 100 kPa
			D 2.75-3.0m	
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: MJW

Date: 23/10/07

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Project: Fitzroy - Gladstone Pipeline	Pit No: TP108
Location: Approximate chainage 53.9 km	Easting: 262752 Northing: 7384143
Equipment type: Caterpillar 432E backhoe with 600mm bucket	Elevation:

DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	MC	Medium Clay - ALLUVIUM medium to high plasticity, dark brown, organics, moist, very stiff	D 0.0-0.25m	
			D 0.25-0.5m	PP = 250 kPa
			D 0.5-0.75m	PP = 200 kPa
			D 0.75-1.0m	
1.0				PP = 250 kPa
			D 1.0-1.25m	
		- grey mottled pale brown, stiff		
			D 1.25-1.5m	
				PP = 150 kPa
			D 1.5-1.75m	
	HC	Heavy Clay		
2.0		high plasticity, grey with orange brown mottles, firm to stiff	D 1.75-2.0m	PP = 100 kPa
			D 2.0-2.25m	
			D 2.25-2.5m	
			D 2.5-2.75m	PP = 100 kPa
			D 2.75-3.0m	
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: MJW

Date: 23/10/07

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Project: Fitzroy - Gladstone Pipeline				Pit No: TP109
Location: Approximate chainage 53.5 km Equipment type: Caterpillar 432E backhoe with 600mm bucket				Easting: 262282 Northing: 7384313 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	LS	Loamy Sand - ALLUVIUM fine grained, some clay, dark brown, organic matter, dry, friable	D 0.0-0.25m	
	LC	Light Clay low to medium plasticity, dark brown, just moist, hard	D 0.25-0.5m	PP = 450 kPa
		- moist, stiff	D 0.5-0.75m	PP = 150 kPa
			D 0.75-1.0m	
1.0				
			D 1.0-1.25m	
	MHC	Medium Heavy Clay medium to high plasticity, dark grey, moist, soft to firm	D 1.25-1.5m	PP = 50 kPa
				PP = 50 kPa
			D 1.5-1.75m	
2.0		- some orange brown mottling, becoming wet and very soft.	D 1.75-2.0m	
			D 2.0-2.25m	
			D 2.25-2.5m	
			D 2.5-2.75m	
			D 2.75-3.0m	
3.0				
		Pit Terminated @ 3.0m		

Groundwater: not noted

Logged by: MJW

Date: 23/10/07

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Project: Fitzroy - Gladstone Pipeline				Pit No: TP110
Location: Approximate chainage 53.0 km Equipment type: Caterpillar 432E backhoe with 600mm bucket				Easting: 261811 Northing: 7384482 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	LC	Light Clay - ALLUVIUM low to medium plasticity, grey-brown, trace of organic matter, dry, hard, friable	D 0.0-0.25m	
		- less organic matter	D 0.25-0.5m	PP = 400 kPa
			D 0.5-0.75m	PP >450 kPa
			D 0.75-1.0m	
1.0				
	MC	Medium Clay medium to high plasticity, mottled pale brown & grey, moist	D 1.0-1.25m	PP = 350 kPa
	HC	Heavy Clay medium to high plasticity, mottled pale brown, grey and red-brown, moist, very sti	D 1.25-1.5m	
			D 1.5-1.75m	PP = 300 kPa
2.0			D 1.75-2.0m	
			D 2.0-2.25m	
			D 2.25-2.5m	
			D 2.5-2.75m	PP = 300 kPa
			D 2.75-3.0m	
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: MJW
Date: 23/10/07

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Project: Fitzroy - Gladstone Pipeline	Pit No: TP111
Location: Approximate chainage 52.5 km (Port Alma rail spur)	Easting: 261341 Northing: 7384652
Equipment type: Caterpillar 432E backhoe with 600mm bucket	Elevation:

DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	LC	Light Clay - ALLUVIUM low to medium plasticity, grey, trace of organic matter, dry, hard, friable	D 0.0-0.25m	
		- less organic matter	D 0.25-0.5m	PP = 350 kPa
			D 0.5-0.75m	PP >450 kPa
			D 0.75-1.0m	
1.0			D 1.0-1.25m	PP = 400 kPa
	MHC	Medium Heavy Clay medium plasticity, mottled dark brown and red-brown, moist, hard	D 1.25-1.5m	
			D 1.5-1.75m	PP = 400 kPa
		- becoming stiff		
2.0			D 1.75-2.0m	PP = 250 kPa
			D 2.0-2.25m	
			D 2.25-2.5m	
			D 2.5-2.75m	PP = 200 kPa
			D 2.75-3.0m	
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: MJW

Date: 23/10/07

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Project: Fitzroy - Gladstone Pipeline	Pit No: TP112
Location: Approximate chainage 52.0 km	Easting: 260868 Northing: 7384835
Equipment type: Caterpillar 432E backhoe with 600mm bucket	Elevation:

DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	ZCL	Silty Clay Loam - ALLUVIUM low to medium plasticity, dark grey, trace of fine gravel, just moist, very stiff	D 0.0-0.25m	
			D 0.25-0.5m	PP = 300 kPa
	LC	Light Clay low to medium plasticity, pale grey-brown, moist, hard	D 0.5-0.75m	
			D 0.75-1.0m	PP >450 kPa
1.0				
	MC	Medium Clay medium to high plasticity, grey mottled pale brown and orange, moist, very stiff	D 1.0-1.25m	
				PP = 250 kPa
			D 1.25-1.5m	
		- stiff		
			D 1.5-1.75m	
				PP = 200 kPa
2.0			D 1.75-2.0m	
			D 2.0-2.25m	
		- pale brown		
			D 2.25-2.5m	
			D 2.5-2.75m	PP = 200 kPa
			D 2.75-3.0m	
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: MJW

Date: 23/10/07

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Project: Fitzroy - Gladstone Pipeline	Pit No: TP114
Location: Approximate chainage 51.1 km	Easting: 259924 Northing: 7385216
Equipment type: Caterpillar 432E backhoe with 600mm bucket	Elevation:

DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	ZL	Silty Clay Loam - ALLUVIUM low plasticity, brown, organics, just moist, hard, friable	D 0.0-0.25m	
	HC	Heavy Clay medium to high plasticity, dark brown, moist, hard, friable	D 0.25-0.5m	PP >450 kPa
			D 0.5-0.75m	
			D 0.75-1.0m	PP = 400 kPa
1.0				
		- mottled pale brown, very stiff	D 1.0-1.25m	
				PP = 350 kPa
			D 1.25-1.5m	
			D 1.5-1.75m	
2.0			D 1.75-2.0m	PP = 300 kPa
			D 2.0-2.25m	
		- red-brown mottling	D 2.25-2.5m	
				PP = 250 kPa
			D 2.5-2.75m	
			D 2.75-3.0m	
3.0				PP = 250 kPa
		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: MJW

Date: 23/10/07

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Project: Fitzroy - Gladstone Pipeline				Pit No: TP115
Location: Approximate chainage 50.7 km Equipment type: Caterpillar 432E backhoe with 600mm bucket				Easting: 259486 Northing: 7385392 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	LMC	Light Medium Clay - ALLUVIUM medium plasticity, dark grey-brown, trace of fine gravel, moist, very stiff	D 0.0-0.25m	
			D 0.25-0.5m	PP = 350 kPa
	LC	Light Clay low to medium plasticity, pale brown, moist, stiff		
			D 0.5-0.75m	PP = 250 kPa
			D 0.75-1.0m	
1.0				
			D 1.0-1.25m	PP >450 kPa
			D 1.25-1.5m	
				PP >450 kPa
			D 1.5-1.75m	
	LMC	Light Medium Clay		
2.0		medium plasticity, mottled pale brown and grey, moist, hard	D 1.75-2.0m	
			D 2.0-2.25m	
			D 2.25-2.5m	
				PP >450 kPa
			D 2.5-2.75m	
		- mottled brown, grey and red-brown, stiff	D 2.75-3.0m	
3.0				PP = 200 kPa
		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: MJW
Date: 23/10/07

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Project: Fitzroy - Gladstone Pipeline				Pit No: TP116
Location: Approximate chainage 50.2 km Equipment type: Caterpillar 432E backhoe with 600mm bucket				Easting: 258995 Northing: 7385590 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	MC	Medium Clay - ALLUVIUM medium to high plasticity, dk grey-brown, trace fine gravel, moist, hard, friable		PP >450 kPa
	MHC	Medium Heavy Clay medium to high plasticity, mottled pale and orange brown, trace sand & gravel, moist		
1.0				
2.0				
		- mottled pale brown and grey (Possibly Residual)		
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: MJW
Date: 23/10/07

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Project: Fitzroy - Gladstone Pipeline				Pit No: TP117
Location: Approximate chainage 49.6 km Equipment type: Caterpillar 432E backhoe with 600mm bucket				Easting: 258552 Northing: 7385769 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	LMC	Light Medium Clay - ALLUVIUM low to medium plasticity, dark brown, moist, hard, friable		PP >450 kPa
	MHC	Medium Heavy Clay medium to high plasticity, mottled pale and orange brown, trace gravel, wet, stiff		PP = 100 kPa
1.0				
2.0				
	LC	Light Clay, sandy (Possibly Residual) low plasticity, orange-brown, moist, stiff		
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: MJW

Date: 23/10/07

Transcribed by: HEP

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Project: Fitzroy - Gladstone Pipeline				Pit No: TP118
Location: Approximate chainage 49.0 km Equipment type: Caterpillar 432E backhoe with 600mm bucket				Easting: 258071 Northing: 7385963 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	MC	Medium Clay - ALLUVIUM medium to high plasticity, dark brown, trace fine gravel, moist, hard, friable		PP >450 kPa
1.0				
	MHC	Medium Heavy Clay (Possibly Residual) medium to high plasticity, mottled pale and orange brown, trace gravel, moist, hard		PP >450 kPa
2.0				PP >450 kPa
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: MJW

Date: 23/10/07

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Transcribed by: HEP

Test Pit Log

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Queensland Government
Department of Main Roads

CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Fitzroy - Gladstone Pipeline	Pit No: TP119
Location: Approximate chainage 48.5 km	Easting: 257595 Northing: 7386154
Equipment type: Caterpillar 432E backhoe with 600mm bucket	Elevation:

DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	ZL	Silty Loam - ALLUVIUM low plasticity, brown, organic matter (roots), dry, hard, friable	D 0.0-0.25m	
	MHC	Medium Heavy Clay medium to high plasticity, brown, moist, trace fine gravel, dry, hard	D 0.25-0.5m	PP >450 kPa
	ZCL	Silty Clay Loam low plasticity, brown, organic matter (roots), dry, hard, friable	D 0.5-0.75m	PP = 400 kPa
			D 0.75-1.0m	
1.0		- varying clay content tending to light clay		
			D 1.0-1.25m	PP = 400 kPa
			D 1.25-1.5m	
			D 1.5-1.75m	
				PP >450 kPa
2.0			D 1.75-2.0m	
	HC	Heavy Clay medium to high plasticity, mottled brown, moist, very stiff	D 2.0-2.25m	
				PP = 300 kPa
			D 2.25-2.5m	
			D 2.5-2.75m	
				PP = 300 kPa
			D 2.75-3.0m	
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: MJW

Date: 23/10/07

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Project: Fitzroy - Gladstone Pipeline				Pit No: TP120
Location: Approximate chainage 48.0 km Equipment type: Caterpillar 432E backhoe with 600mm bucket				Easting: 257144 Northing: 7386336 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	HC	Heavy Clay medium to high plasticity, dark grey-brown, trace fine gravel, moist, hard	D 0.0-0.25m	
			D 0.25-0.5m	PP >450 kPa
		- grey-brown	D 0.5-0.75m	
			D 0.75-1.0m	PP >450 kPa
1.0			D 1.0-1.25m	
			D 1.25-1.5m	
		- mottled pale brown, trace gravel (Possibly Residual)		PP = 400 kPa
			D 1.5-1.75m	
2.0			D 1.75-2.0m	
		- very stiff		PP = 350 kPa
			D 2.0-2.25m	
			D 2.25-2.5m	PP = 300 kPa
			D 2.5-2.75m	
			D 2.75-3.0m	
3.0				PP = 300 kPa
		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: MJW

Date: 23/10/07

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Project: Fitzroy - Gladstone Pipeline				Pit No: TP121
Location: Approximate chainage 47.5 km Equipment type: Caterpillar 432E backhoe with 600mm bucket				Easting: 256785 Northing: 7386752 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	LS	Loamy Sand - ALLUVIAL fine grained, low plasticity fines, pale brown, dry, loose		
	LMC	Light Medium Clay (Possibly Residual) low to medium plasticity, pale brown, dry, hard		PP >450 kPa
1.0		- trace fine gravel		PP >450 kPa
2.0	MHC	Medium Heavy Clay - Residual medium to high plasticity, mottled pale brown and grey, moist, very stiff		PP = 350 kPa
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: MJW

Date: 23/10/07

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Project: Fitzroy - Gladstone Pipeline				Pit No: TP122
Location: Approximate chainage 46.9 km Equipment type: Caterpillar 432E backhoe with 600mm bucket				Easting: 256464 Northing: 7387180 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	LC	Light Clay - ALLUVIUM low to medium plasticity, dk brown, moist, hard, friable		PP >450 kPa
	MHC	Medium Heavy Clay medium to high plasticity, dark grey, trace fine gravel, moist, hard		PP >450 kPa
1.0		- dark brown		
				PP >450 kPa
	MHC	Medium Heavy Clay - (Possibly Residual) medium to high plasticity, mottled brown and orange brown, moist		
2.0				PP >450 kPa
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: MJW

Date: 23/10/07

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Project: Fitzroy - Gladstone Pipeline	Pit No: TP123
Location: Approximate chainage 46.4 km	Easting: 256190 Northing: 7387546
Equipment type: Caterpillar 432E backhoe with 600mm bucket	Elevation:

DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	MC	Medium Clay - ALLUVIUM medium to high plasticity, dark grey, some fine gravel, moist, hard	D 0.0-0.25m	
			D 0.25-0.5m	PP >450 kPa
			D 0.5-0.75m	PP = 400 kPa
			D 0.75-1.0m	
1.0		- dark grey-brown, stiff		PP = 250 kPa
			D 1.0-1.25m	
			D 1.25-1.5m	
		- dark brown, trace of fine gravel, hard		PP >450 kPa
			D 1.5-1.75m	
		- mottled pale and orange brown		
2.0			D 1.75-2.0m	PP >450 kPa
			D 2.0-2.25m	
			D 2.25-2.5m	
			D 2.5-2.75m	PP = 400 kPa
			D 2.75-3.0m	
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: MJW

Date: 23/10/07

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Project: Fitzroy - Gladstone Pipeline	Pit No: TP124
Location: Approximate chainage 46.1 km	Easting: 255871 Northing: 7387970
Equipment type: Caterpillar 432E backhoe with 600mm bucket	Elevation:

DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	MC	Medium Clay - ALLUVIUM medium to high plasticity, dark grey, some fine gravel, moist, hard		PP >450 kPa
1.0		- brown, very stiff		PP = 300 kPa
2.0		- medium to high plasticity, mottled dark brown and grey, moist		PP = 300 kPa
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: MJW

Date: 22/10/07

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Project: Fitzroy - Gladstone Pipeline				Pit No: TP125
Location: Approximate chainage 45.7 km Equipment type: Caterpillar 432E backhoe with 600mm bucket				Easting: 255584 Northing: 7388354 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	MHC	Medium Heavy Clay (Possibly Residual) medium to high plasticity, orange-brown, moist, very stiff, friable		PP = 300 kPa
1.0		- pale brown		PP = 300 kPa
2.0		- mottled brown and grey		PP = 350 kPa
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: MJW
Date: 22/10/07

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Project: Fitzroy - Gladstone Pipeline				Pit No: TP126
Location: Approximate chainage 45.2 km (Station Ck) Equipment type: Caterpillar 432E backhoe with 600mm bucket				Easting: 255282 Northing: 7388757 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	MC	Medium Clay - ALLUVIUM medium plasticity, dark grey, trace of fine gravel, dry, hard		PP >450 kPa
		- mottled dark grey & dark brown, moist, stiff		PP = 200 kPa
1.0		- mottled pale brown and grey, moist, very stifft		
				PP = 300 kPa
2.0				
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: MJW

Date: 22/10/07

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Project: Fitzroy - Gladstone Pipeline				Pit No: TP127
Location: Approximate chainage 44.6 km Equipment type: Caterpillar 432E backhoe with 600mm bucket				Easting: 254984 Northing: 7389154 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	MHC	Medium Heavy Clay - ALLUVIUM medium to high plasticity, dark grey, dry, hard		PP >450 kPa
1.0		- pale brown		PP >450 kPa
		- dark grey-brown		PP >450 kPa
2.0				
				PP >450 kPa
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: MJW

Date: 22/10/07

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Project: Fitzroy - Gladstone Pipeline				Pit No: TP128
Location: Approximate chainage 44.1 km Equipment type: Caterpillar 432E backhoe with 600mm bucket				Easting: 254681 Northing: 7389558 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	MHC	Medium Heavy Clay - ALLUVIUM medium to high plasticity, dark grey, dry, hard		PP >450 kPa
	HC	Heavy Clay high plasticity, dark grey/black, moist, very stiff		PP = 350 kPa
1.0				
	MHC	Medium Heavy Clay medium to high plasticity, mottled brown and grey, moist, very stiff		PP = 350 kPa
2.0				
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: MJW

Date: 22/10/07

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Project: Fitzroy - Gladstone Pipeline				Pit No: TP129
Location: Approximate chainage 43.6 km Equipment type: Caterpillar 432E backhoe with 600mm bucket				Easting: 254390 Northing: 7389947 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	MHC	Medium Heavy Clay - ALLUVIUM medium to high plasticity, dark grey, dry, hard		PP >450 kPa
	MHC	Medium Heavy Clay (Possibly Residual) medium to high plasticity, brown, trace of fine gravel, dry, hard		PP >450 kPa
1.0		- pale brown		
2.0		- mottled brown and grey		PP >450 kPa
3.0				PP >450 kPa
		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: MJW

Date: 22/10/07

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Project: Fitzroy - Gladstone Pipeline				Pit No: TP130
Location: Approximate chainage 43.1 km Equipment type: Caterpillar 432E backhoe with 600mm bucket				Easting: 254187 Northing: 7390392 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	ZL	Silty Loam - ALLUVIUM non-plastic, dark brown, trace of fine gravel, dry, hard	D 0.0-0.25m D 0.25-0.5m	PP >450 kPa
	LMC	Light Clay medium plasticity, dark brown, just moist, hard	D 0.5-0.75m D 0.75-1.0m	PP >450 kPa
1.0		- mottled pale/yellow bown, trace fine gravel, moist, very stiff	D 1.0-1.25m D 1.25-1.5m D 1.5-1.75m	PP 250-300 kPa PP >450 kPa
2.0	MC	Medium Clay (Possibly Residual) medium to high plasticity, mottled pale brown and grey, moist, hard	D 1.75-2.0m D 2.0-2.25m D 2.25-2.5m D 2.5-2.75m D 2.75-3.0m	PP = 400 kPa PP = 400 kPa
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: MJW
Date: 22/10/07

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Project: Fitzroy - Gladstone Pipeline				Pit No: TP131
Location: Approximate chainage 42.7 km Equipment type: Caterpillar 432E backhoe with 600mm bucket				Easting: 254053 Northing: 7390879 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	MHC	Medium Heavy Clay - ALLUVIUM medium plasticity, dark brown, moist, hard	D 0.0-0.25m	PP >450 kPa
			D 0.25-0.5m	
	MC	Medium Clay, sandy (Possibly Residual) low to medium plasticity, mottled pale / yellow brown, moist, stiff trace of fine gravel		PP = 200 kPa
			D 0.5-0.75m	
			D 0.75-1.0m	PP = 250 kPa
1.0		- very stiff to hard		
			D 1.0-1.25m	PP = 400 kPa
			D 1.25-1.5m	
				PP = 300 kPa
			D 1.5-1.75m	
2.0			D 1.75-2.0m	
				PP = 350 kPa
			D 2.0-2.25m	
			D 2.25-2.5m	
			D 2.5-2.75m	PP = 300 kPa
			D 2.75-3.0m	
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: MJW
Date: 22/10/07

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Project: Fitzroy - Gladstone Pipeline	Pit No: TP132
Location: Approximate chainage 42.1 km	Easting: 253925 Northing: 7391366
Equipment type: Caterpillar 432E backhoe with 600mm bucket	Elevation:

DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	ZL	Silty Loam - ALLUVIUM low plasticity, pale brown (leahced), dry, hard	D 0.0-0.25m	PP >450 kPa
			D 0.25-0.5m	PP = 200 kPa
	MHC	Medium Heavy Clay medium to high plasticity, dark brown, occasional fine gravel, moist, stiff		
			D 0.5-0.75m	PP = 100 kPa
			D 0.75-1.0m	
1.0				PP = 350 kPa
		- brown mottled, very stiff to hard	D 1.0-1.25m	
			D 1.25-1.5m	
				PP = 300 kPa
			D 1.5-1.75m	
2.0			D 1.75-2.0m	PP = 300 kPa
			D 2.0-2.25m	
			D 2.25-2.5m	
				PP = 350 kPa
			D 2.5-2.75m	
			D 2.75-3.0m	
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: MJW

Date: 22/10/07

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Project: Fitzroy - Gladstone Pipeline	Pit No: TP133
Location: Approximate chainage 41.7 km	Easting: 253798 Northing: 7391847
Equipment type: Caterpillar 432E backhoe with 600mm bucket	Elevation:

DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	MHC	Medium Heavy Clay - ALLUVIUM medium to high plasticity, dark grey-brown, just moist, hard	D 0.0-0.25m	PP >450 kPa
			D 0.25-0.5m	
		- moist, stiff to very stiff		PP = 150 kPa
			D 0.5-0.75m	
			D 0.75-1.0m	PP = 250 kPa
1.0				
	MHC	Medium Heavy Clay (Possibly Residual) medium to high plasticity, mottled pale / yellow brown, moist, hard	D 1.0-1.25m	PP >450 kPa
			D 1.25-1.5m	
				PP >450 kPa
			D 1.5-1.75m	
2.0			D 1.75-2.0m	
				PP >450 kPa
			D 2.0-2.25m	
			D 2.25-2.5m	
			D 2.5-2.75m	PP >450 kPa
			D 2.75-3.0m	
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: MJW

Date: 22/10/07

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Project: Fitzroy - Gladstone Pipeline				Pit No: TP134
Location: Approximate chainage 41.2 km Equipment type: Caterpillar 432E backhoe with 600mm bucket				Easting: 253671 Northing: 7392332 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	MHC	Medium Heavy Clay - ALLUVIUM medium to high plasticity, dark brown, dry, hard		PP >450 kPa
		brown, trace of fine gravel, very stiff		
1.0	MHC	Medium Heavy Clay - RESIDUAL Pale brown, fine to medium gravel, hard		PP = 350 kPa PP >450 kPa
2.0				
		mottled pale brown and grey		PP >450 kPa
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: MJW

Date: 22/10/07

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Transcribed by: HEP

Test Pit Log

Golder Associates

Queensland Government
Department of Main Roads

CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Fitzroy - Gladstone Pipeline	Pit No: TP135
Location: Approximate chainage 40.8 km	Easting: 253537 Northing: 7392841
Equipment type: Caterpillar 432E backhoe with 600mm bucket	Elevation:

DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	HC	Heavy Clay - ALLUVIUM high plasticity, dark grey / black, trace gravel, just moist, hard		PP >450 kPa
1.0		- dark brown, moist, friable		PP = 350 kPa
2.0		- dry, hard		PP >450 kPa
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: MJW

Date: 22/10/07

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Transcribed by: HEP

Test Pit Log

CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Fitzroy - Gladstone Pipeline				Pit No: TP136
Location: Approximate chainage 40.2 km Equipment type: Caterpillar 432E backhoe with 600mm bucket				Easting: 253413 Northing: 7393310 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	SCL	Sandy Clay Loam low plasticity, pale brown, just moist (desiccated), very stiff, friable		PP = 300 kPa
	HC	Heavy Clay high plasticity, yellowish and orange-brown, moist, stiff		PP = 150 kPa
1.0		- dark brown, trace of fine gravel, dry, hard		PP >450 kPa
2.0				
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: MJW
Date: 22/10/07

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Transcribed by: HEP

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CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Fitzroy - Gladstone Pipeline				Pit No: TP137
Location: Approximate chainage 39.7 km Equipment type: Caterpillar 432E backhoe with 600mm bucket				Easting: 253293 Northing: 7393769 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	LC	Light Clay - ALLUVIUM low to medium plasticity, dark grey / black, trace of fine gravel, dry, hard		PP >450 kPa
	ZCL	Silty Clay Loam low plasticity, dark brown, trace of fine gravel, dry, very stiff		PP = 350 kPa
1.0				
	LC	Light Clay low to medium plasticity, dark brown, dry, hard		PP >450 kPa
		low plasticity fines, with fine sand and fine to medium gravel (50%), dry		
2.0				
	HC	Heavy Clay high plasticity, dark grey, dry, hard		PP >450 kPa
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: MJW
Date: 22/10/07

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Transcribed by: HEP

Test Pit Log

CENTRAL QUEENSLAND
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216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Fitzroy - Gladstone Pipeline	Pit No: TP138
Location: Approximate chainage 39.2 km (Bob Ck)	Easting: 253164 Northing: 7394259
Equipment type: Caterpillar 432E backhoe with 600mm bucket	Elevation:

DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	LS	Loamy Sand - ALLUVIUM fine grained, low to medium plasticity, brown, dry, loose	D 0.0-0.25m	
	MC	Medium Clay low to medium plasticity, brown, trace of fine gravel, moist, stiff	D 0.25-0.5m	PP = 100 kPa
			D 0.5-0.75m	
			D 0.75-1.0m	PP = 100 kPa
	MHC	Medium Heavy Clay		
1.0		medium to high plasticity, mottled dark brown and brown, moist, very stiff trace of fine to medium gravel	D 1.0-1.25m	PP = 200 kPa
			D 1.25-1.5m	
			D 1.5-1.75m	PP = 400 kPa
	MC	Medium Clay - RESIDUAL		
2.0		low to medium plasticity, pale brown, fine and medium gravel, moist, hard	D 1.75-2.0m	PP >450 kPa
			D 2.0-2.25m	
			D 2.25-2.5m	
			D 2.5-2.75m	
			D 2.75-3.0m	PP >450 kPa
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: MJW

Date: 22/10/07

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Test Pit Log

CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP151
Location: Midgee to Gavial Equipment type: Backhoe - 600mm Bucket				Coordinates: E N Elevation: m AHD
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	HC	Heavy Clay - ALLUVIUM	D 0.0-0.25m	
		high plasticity, grey-brown, trace sand, organics, moist, strong, poor pedology		
		- predominantly grey	D 0.25-0.5m	
			D 0.5-0.75m	
			D 0.75-1.0m	
1.0				PP=350-450kPa
			D 1.0-1.25m	
			D 1.25-1.5m	
			D 1.5-1.75m	
	LC	Light Clay, sandy		Seepage Layer
2.0		low plasticity, red-brown mottled grey, fine sand, very moist, weak	D 1.75-2.0m	
	MC	Medium Clay		
		medium plasticity, grey, some fine sand, root fibres, just moist, strong	D 2.0-2.25m	PP=310-350kPa
			D 2.25-2.5m	
			D 2.5-2.75m	
		- becoming red-brown mottled	D 2.75-3.0m	
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date:

Transcribed by: HEP

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CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP152
Location: Midgee to Gavial Equipment type: Backhoe - 600mm Bucket				Easting: 249948 Northing: 7400854 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	HC	Heavy Clay - ALLUVIUM high plasticity, dark brown, moist, strong, indistinct pedology		
	HC	Heavy Clay high plasticity, grey-brown, moist, strong, massive		
1.0				PP=320-440kPa
	S	Sand Fine to medium grained, pale brown, wet, weak, single grained		
	MHC	Medium Heavy CLAY medium to high plasticity, orange-brown mottled grey, some fine sand, moist, strong, massive		
2.0				
3.0				PP=320-400kPa
		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date:

Transcribed by: HEP

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Test Pit Log

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Queensland Government
Department of Main Roads

CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline	Pit No: TP153
Location: Midgee to Gavial Equipment type: Backhoe - 600mm Bucket	Easting: 249745 Northing: 7401307 Elevation:

DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	HC	Heavy Clay - ALLUVIUM high plasticity, dark grey-brown, moist, moderately strong, indistinct pedology		
		grey-brown, strong, massive		PP=250-420kPa
1.0				
	S	SAND Fine to medium grained, pale brown, wet, weak, single grained		
	MC	Medium Heavy CLAY medium to high plasticity, red & orange-brown mottled grey, some fine sand, moist, strong, massive		
2.0				
		- moderate-strong		PP=140-180kPa
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date:

Transcribed by: HEP

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CENTRAL QUEENSLAND
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216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP154
Location: Midgee to Gavial Equipment type: Backhoe - 600mm Bucket				Easting: 249565 Northing: 7401770 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	HC	Heavy Clay - ALLUVIUM high plasticity, dark brown, just moist, strong		
		- brown		PP=200-300kPa
1.0				
		- pale grey, moist, structure evident (slicken sided fissuring)		
2.0				PP=250-350kPa
				PP=200-250kPa
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date:

Transcribed by: HEP

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Department of Main Roads

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216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline	Pit No: TP155
Location: Gavial to Rocklands Equipment type: Backhoe - 600mm Bucket	Easting: 249413 Northing:7402261 Elevation:

DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	ZCL	Silty Clay Loam - ALLUVIUM medium plasticity, grey-brown, root fibres, dry, strong, peds to 10mm	D 0.0-0.25m	
	LC	Light Clay low plasticity, grey-brown, fine gravel (5mm), just moist, very strong	D 0.25-0.5m	
	MC	Medium Clay medium plasticity, grey & red-brown, just moist, very strong, some structure		PP >600kPa
			D 0.75-1.0m	
1.0				
			D 1.25-1.5m	
	MHC	Medium Heavy Clay high plasticity, grey mottled brown, moist, strong, structured, slicken sided		
2.0			D 1.75-2.0m	
				PP=350-500kPa
			D 2.25-2.5m	
			D 2.75-3.0m	
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date:

Transcribed by: HEP

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CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP159
Location: Gavial to Rocklands Equipment type: Backhoe - 600mm Bucket				Easting: 248352 Northing: 7403859 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	LMC	Light Medium Clay - ALLUVIUM		
		low to medium plasticity, dark grey, traces of fine gravel, dry, moderate-strong	D 0.0-0.6m	PP=335kPa
			D 0.6-0.9m	
		- dark brown, very strong	D 0.9-2.1m	PP >600kPa
1.0		- pale brown, moist, strong		
				PP=440kPa
2.0				
		- mottled grey, very strong	D 2.1-3.0m	
				PP=560kPa
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date: 03/09/07

Transcribed by: HEP

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Test Pit Log

CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP160
Location: Gavial to Rocklands Equipment type: Backhoe - 600mm Bucket				Easting: 247989 Northing: 7404338 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	LMC	Light Medium Clay - ALLUVIUM low to medium plasticity, dark grey, traces of fine gravel, dry, moderate-strong	D 0.0-0.5m	PP=405kPa
			D 0.5-1.1m	
		- dark brown, very strong		PP >600kPa
1.0			D 1.1-1.4m	
				PP >600kPa
		- mottled brown, moist, strong		PP=425kPa
2.0				
			D 1.4-3.0m	
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date: 03/09/07

Transcribed by: HEP

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CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP161
Location: Gavial to Rocklands Equipment type: Backhoe - 600mm Bucket				Easting: 247736 Northing: 7404773 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	LMC	Light Medium Clay - ALLUVIUM low to medium plasticity, dark grey, traces of fine gravel, dry, very strong		PP >600kPa
		-dark grey, moist		PP=465kPa
1.0		- mottled grey		PP=550kPa
2.0		- mottled brown		PP=490kPa
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date: 03/09/07

Transcribed by: HEP

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GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
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Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP162
Location: Gavial to Rocklands Equipment type: Backhoe - 600mm Bucket				Easting: 247710 Northing: 7405326 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	LMC	Light Medium Clay - ALLUVIUM low to medium plasticity, brown, traces of fine gravel, dry, very strong	D 0.0-0.5m D 0.5-0.8m	
1.0			D 0.8-2.4m	
2.0				
3.0			D 2.4-3.0m	
		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date:

Transcribed by: HEP

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GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
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Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP163
Location: Gavial to Rocklands Equipment type: Backhoe - 600mm Bucket				Easting: 247473 Northing: 7405690 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	MHC	Medium Heavy Clay - ALLUVIUM high plasticity, dark grey-brown, moist, very strong, indistinct pedology	D 0.0-0.9m	PP=575kPa
			D 0.9-1.1m	
1.0		- mottled grey		PP >600kPa
2.0				
	LMC	Light Medium Clay low to medium plasticity, grey mottled orange-brown, trace fine gravel, moist, very strong	D 2.0-2.3m	PP >600kPa
			D 2.25-2.5m	
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date: 03/09/07

Transcribed by: HEP

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CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP165
Location: Rocklands to Archer Park Equipment type: Backhoe - 600mm Bucket				Easting: 246779 Northing: 7406343 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	ZCL	Silty Clay Loam - ALLUVIUM low to medium plasticity, dark grey, root fibres, trace of fine gravel, just moist, very strong, poor ped development	D 0.0-0.25m	
				PP >600kPa
			D 0.25-0.5m	
			D 0.5-0.75m	
			D 0.75-1.0m	PP >600kPa
1.0				
			D 1.0-1.25m	
				PP=600kPa
	LC	Light Clay low plasticity, grey mottled pale brown & orange, just moist, very strong	D 1.25-1.5m	PP=505kPa
	MC	Medium Clay - RESIDUAL medium plasticity, grey & red-brown, just moist, very strong, structured	D 1.5-1.75m	
		- trace fine gravel (2-3mm)		
2.0			D 1.75-2.0m	
				PP=530kPa
			D 2.25-2.5m	
			D 2.5-2.75m	
	MHC	Medium Heavy Clay medium to high plasticity, grey, trace organic matter, moist, very strong		PP >600kPa
3.0			D 2.75-3.0m	
		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date: 30/08/07

Transcribed by: HEP

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216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP166
Location: Rocklands to Archer Park Equipment type: Backhoe - 600mm Bucket				Easting: 246376 Northing: 7406640 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	MC	Medium Clay - ALLUVIUM medium plasticity, dark grey, root fibres, moist, moderately weak	D 0.0-0.25m	
			D 0.25-0.5m	PP=475kPa
	MHC	Medium Heavy Clay medium to high plasticity, grey, moist, moderately strong		PP=370kPa
			D 0.5-0.75m	
			D 0.75-1.0m	
1.0				
		- dark grey, trace of fine gravel, very strong	D 1.0-1.25m	
				PP=535kPa
			D 1.25-1.5m	
			D 1.5-1.75m	
				PP=540kPa
2.0			D 1.75-2.0m	
		- with black organic matter, strong	D 2.0-2.25m	
			D 2.25-2.5m	PP=410kPa
			D 2.5-2.75m	
			D 2.75-3.0m	
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date: 30/08/07

Transcribed by: HEP

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CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 4923 0712 Facsimile 4923 0753

Project: Gladstone-Fitzroy Water Pipeline	Pit No: TP167
Location: Rocklands to Archer Park Equipment type: Backhoe - 600mm Bucket	Easting: 245957 Northing: 7406971 Elevation:

DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES
	MC	Medium Clay - ALLUVIUM medium plasticity, dark grey/grey-brown, trace fine gravel, dry, friable	D 0.0-0.25m	
			D 0.25-0.5m	PP >600kPa
	HC	Heavy Clay high plasticity, dark grey, traces of fine gravel, moist	D 0.5-0.75m	PP=515kPa
			D 0.75-1.0m	
1.0			D 1.0-1.25m	
		- moderate-strong		PP=395kPa
			D 1.25-1.5m	
			D 1.5-1.75m	
			D 1.75-2.0m	
2.0				PP=285kPa
		- mottled orange & grey, very moist, moderate strength	D 2.0-2.25m	
			D 2.25-2.5m	
			D 2.5-2.75m	
			D 2.75-3.0m	PP=275kPa
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Logged by: JPT & MJW

Date: 03/09/07

Transcribed by: HEP

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Test Pit Log

CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP168
Location: Rocklands to Archer Park Equipment type: Backhoe - 600mm Bucket				Easting: 245524 Northing: 7407225 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	ZCL	Silty Clay Loam - ALLUVIUM low to medium plasticity, dark grey-brown, root fibres, moist, moderate - strong, peds to 10mm	D 0.0-0.25m D 0.25-0.5m	
		- predominantly dark grey, trace root fibres & organics	D 0.5-0.75m D 0.75-1.0m	
1.0			D 1.0-1.25m	
	MC	Medium Clay - RESIDUAL medium plasticity, with silt, grey and red-brown, trace of fine gravel, moist, strong	D 1.25-1.5m D 1.5-1.75m	
2.0			D 1.75-2.0m	
			D 2.25-2.5m D 2.5-2.75m	
3.0			D 2.75-3.0m	
		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date: 30/08/07

Transcribed by: HEP

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Test Pit Log

CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP169
Location: Rocklands to Archer Park Equipment type: Backhoe - 600mm Bucket				Easting: 245114 Northing: 7407507 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	MC	Medium Clay - ALLUVIUM medium plasticity, with silt, grey-brown, root fibres, moist, weak	D 0.0-0.25m	
	LC	Light Clay low plasticity, with silt, dark brown, organic matter, moist, weak - moderate	D 0.25-0.5m D 0.5-0.75m D 0.75-1.0m	
1.0			D 1.0-1.25m	
		- with more dark grey/black organic matter	D 1.25-1.5m	
	MC	Medium Clay medium plasticity, with fine gravel (3-5mm), grey, very moist, weak	D 1.5-1.75m	
2.0			D 1.75-2.0m	
	LC	Light Clay low plasticity, grey and pale brown, moist, weak-moderate	D 2.0-2.25m D 2.25-2.5m	
		- some red-brown	D 2.5-2.75m	
3.0			D 2.75-3.0m	
		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date: 30/08/07

Transcribed by: HEP

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Test Pit Log

CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP171
Location: Rocklands to Archer Park Equipment type: Backhoe - 600mm Bucket				Easting: 254460 Northing: 7470880 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	MHC	Medium Heavy Clay - ALLUVIUM	D 0.0-0.25m	
		medium to high plasticity, dark grey, trace of fine gravel, trace organics,		PP >600kPa
		dry, very strong, structured	D 0.25-0.5m	
			D 0.5-0.75m	
			D 0.75-1.0m	
		- no organics		
1.0				
			D 1.0-1.25m	
			D 1.25-1.5m	
				PP=530kPa
			D 1.5-1.75m	
			D 1.75-2.0m	
	HC	Heavy Clay		
2.0		high plasticity, mottled grey & orange-brown, moist, very strong		
			D 2.0-2.25m	
				PP=575kPa
			D 2.25-2.5m	
			D 2.5-2.75m	
3.0			D 2.75-3.0m	
		Pit Terminated @ 3.0m		

Groundwater: nil	Originally Logged by: JPT & MJW Date: 31/08/07
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Test Pit Log

CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP172
Location: Rocklands to Archer Park Equipment type: Backhoe - 600mm Bucket				Easting: 244153 Northing: 7407981 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	CL	Clay Loam - ALLUVIAL	D 0.0-0.25m	
		low to medium plasticity, dark grey, root fibres, traces of fine gravel, dry, strong		PP >600kPa
			D 0.25-0.5m	
	LC	Light Clay		
		low plasticity, grey, trace sand & gravel, moist, very strong		
			D 0.5-0.75m	
				PP >600kPa
			D 0.75-1.0m	
		- Pale brown & grey		
1.0				PP=520kPa
			D 1.0-1.25m	
	MC	Medium Clay - Possibly RESIDUAL	D 1.25-1.5m	
		medium plasticity, mottled grey & orange-brown, moist, very strong		PP=600kPa
			D 1.5-1.75m	
2.0			D 1.75-2.0m	
		- trace of organic matter, moderate-strong		PP=365kPa
			D 2.0-2.25m	
			D 2.5-2.75m	
			D 2.75-3.0m	PP=395kPa
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date: 31/08/07

Transcribed by: HEP

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Test Pit Log

Golder Associates

Queensland Government
Department of Main Roads

CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP173
Location: Rocklands to Archer Park Equipment type: Backhoe - 600mm Bucket				Easting: 243758 Northing: 7408126 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	CL	Clay Loam - ALLUVIAL low to medium plasticity, dark grey, root fibres, traces of fine gravel, dry, strong		PP >600kPa PP=410kPa
1.0				
	LMC	Light Medium Clay - Possibly RESIDUAL low to medium plasticity, grey & orange-brown, moist, very strong		PP=500kPa
2.0				PP=425kPa
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date: 31/08/07

Transcribed by: HEP

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Test Pit Log

CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP180
Location: Archer Park North Equipment type: Backhoe - 600mm Bucket				Easting: 241128 Northing: 7409351 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	MHC	Medium Heavy Clay - ALLUVIUM medium to high plasticity, dark brown, just moist, strong		
		- pale brown		PP=470kPa
1.0				PP >600kPa
		- grey mottled orange-brown, moist		PP=360kPa
2.0				
	CS	Clayey Sand, gravelly - Possibly RESIDUAL medium grained, low plasticity fines, fine - medium gravel, grey mottled orange-brown, moist, moderate-strong		
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date: 30/08/07

Transcribed by: HEP

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Test Pit Log

CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP181
Location: Archer Park North Equipment type: Backhoe - 600mm Bucket				Easting: 240622 Northing: 7409321 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	MHC	Medium Heavy Clay - ALLUVIUM medium to high plasticity, dark brown, moist, strong		
	MC	Medium Clay, sandy medium plasticity, fine to medium sand, dark brown, just moist, very strong		PP >600kPa
1.0				
				PP=475kPa
		- pale grey mottled orange-brown, strong		PP=465kPa
2.0				
		- dry		
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil	Originally Logged by: JPT & MJW Date: 30/08/07
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CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP182
Location: Archer Park North Equipment type: Backhoe - 600mm Bucket				Easting: 240125 Northing: 7409423 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	MHC	Medium Heavy Clay - ALLUVIUM medium to high plasticity, dark brown, moist, strong		
	MC	Medium Clay, sandy medium plasticity, fine to medium sand, dark brown, just moist, very strong		PP >600kPa
1.0		- pale grey mottled orange-brown		PP >600kPa
2.0				
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date: 30/08/07

Transcribed by: HEP

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CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP184
Location: Archer Park North Equipment type: Backhoe - 600mm Bucket				Easting: 239216 Northing: 7409784 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	MHC	Medium Heavy Clay - ALLUVIUM medium to high plasticity, dark brown, moist, strong		PP >600kPa
	MC	Medium Clay, sandy medium plasticity, fine to medium sand, dark brown, just moist, very strong		PP >600kPa
1.0		- pale grey		PP=505kPa
2.0		- pale grey mottled orange-brown, moist, strong		PP=335kPa
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date: 30/08/07

Transcribed by: HEP

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Test Pit Log

CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP185
Location: Archer Park North Equipment type: Backhoe - 600mm Bucket				Easting: 238704 Northing: 7409838 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	MHC	Medium Heavy Clay - ALLUVIUM medium to high plasticity, dark brown, moist, strong		
	MC	Medium Clay, sandy medium plasticity, fine to medium sand, dark brown, moist, moderate-strong		PP=315kPa
1.0		- pale grey		PP=470kPa
2.0		- pale grey mottled orange-brown		PP=385kPa
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date: 30/08/07

Transcribed by: HEP

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Test Pit Log

Queensland Government
Department of Main Roads

CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP186
Location: Archer Park North Equipment type: Backhoe - 600mm Bucket				Easting: 238198 Northing: 7409907 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	MHC	Medium Heavy Clay - ALLUVIUM medium to high plasticity, dark brown, moist, strong		
	MC	Medium Clay, sandy medium plasticity, fine to medium sand, dark brown, just moist, very strong		PP >600kPa
1.0				
2.0				
		- pale grey mottled orange-brown		PP >600kPa
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date: 30/08/07

Transcribed by: HEP

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CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP191
Location: Archer Park North Equipment type: Backhoe - 600mm Bucket				Easting: 235982 Northing: 7410192 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	MHC	Medium Heavy Clay - ALLUVIUM medium to high plasticity, dark grey, just moist, very strong		PP >600kPa
		- moist, moderate strength		PP=200kPa
1.0				
2.0				
		- pale brown mottled grey, strong		PP=400kPa
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date: 27/08/07

Transcribed by: HEP

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Test Pit Log

CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP192
Location: Archer Park North Equipment type: Backhoe - 600mm Bucket				Easting: 235618 Northing: 7410237 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	MHC	Medium Heavy Clay - ALLUVIUM medium to high plasticity, dark grey, moist, moderate strength		PP=145kPa
		- very strong		PP >600kPa
1.0				
2.0				
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date:

Transcribed by: HEP

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Test Pit Log

CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP193
Location: Archer Park North Equipment type: Backhoe - 600mm Bucket				Easting: 235200 Northing: 7410287 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	HC	Heavy Clay - ALLUVIUM plasticity, dark grey, very moist, moderate strength		PP=155kPa
1.0		- moist, strong		PP=465kPa
2.0				
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date: 27/08/07

Transcribed by: HEP

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Test Pit Log

CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP194
Location: Archer Park North Equipment type: Backhoe - 600mm Bucket				Easting: 234853 Northing: 7410330 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	LMC	Light Medium Clay - ALLUVIUM low to medium plasticity, dark grey, moist, strong		PP=320kPa
	MC	Medium Clay medium plasticity, pale brown, traces of fine gravel, moist, moderate strength		PP=170kPa
1.0				
	MHC	Medium Heavy Clay medium to high plasticity, mottled light brown & grey, very moist, strong		PP >600kPa
		- moist		
2.0				
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date: 27/08/07

Transcribed by: HEP

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Test Pit Log

CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP195
Location: Archer Park North Equipment type: Backhoe - 600mm Bucket				Easting: 234451 Northing: 7410537 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	LMC	Light Medium Clay - ALLUVIUM low to medium plasticity, dark grey, moist, strong		PP=440kPa
1.0		- pale brown, with dark grey (black) inclusions		PP=515kPa
	LMC	Light Medium Clay - RESIDUAL pale brown, traces of fine gravel, very strong		PP >600kPa
2.0	LC	Light Clay, gravelly low plasticity, fine to medium gravel, pale brown, dry		
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date: 27/08/07

Transcribed by: HEP

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Test Pit Log

CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP196
Location: Archer Park North Equipment type: Backhoe - 600mm Bucket				Easting: 234322 Northing: 7410880 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	CL	Clay Loam - ALLUVIAL low to medium plasticity, dark grey, moist		
	MHC	Medium Heavy Clay medium to high plasticity, darl grey, moist, strong		PP=535kPa
1.0	LC	Light Clay, gravelly low to medium plasticity fines; poorly graded fine to medium gravel, dark grey, moist, very strong		PP >600kPa
		- pale brown - RESIDUAL		PP=590kPa
2.0				
		Weathered Rock - GRANITE Extremely Weathered		
3.0		Pit Terminated @ 3.0m		

Groundwater: nil	Originally Logged by: JPT & MJW Date: 27/08/07
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CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP197
Location: Archer Park North Equipment type: Backhoe - 600mm Bucket				Easting: 234182 Northing: 7411239 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	CL	Clay Loam - ALLUVIAL low to medium plasticity, dark grey, moist		
	LMC	Light Medium Clay light to medium plasticity, dark grey, moist, moderate - strong		PP=350kPa
1.0	LC	Light Clay, gravelly low to medium plasticity fines; poorly graded fine to medium gravel, dark grey, moist, very strong		PP=550kPa
		- pale yellow-brown (possibly RESIDUAL)		PP=570kPa
2.0				
	LMC	Light Medium Clay (possibly RESIDUAL) low to medium plasticity, mottled yellow-brown & grey, moist, strong		PP >600kPa
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date:27/08/07

Transcribed by: HEP

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Test Pit Log

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Queensland Government
Department of Main Roads

CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP198
Location: Archer Park North Equipment type: Backhoe - 600mm Bucket				Easting: 234204 Northing: 7411781 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	CL	Clay Loam - ALLUVIAL low to medium plasticity, dark grey, moist		
	MC	Medium Clay (possibly RESIDUAL) medium plasticity, silt, pale brown, just moist, very strong		PP >600kPa
1.0		- pale grey		
	LMC	Light Medium Clay, gravelly - RESIDUAL low to medium plasticity fines; poorly graded fine to medium gravel, pale brown, moist, very strong		PP >600kPa
2.0				
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date: 27/08/07

Transcribed by: HEP

This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with *The Australian Soil and Land Survey 2nd Edition* (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some instances by inspection of relevant soil samples.

Test Pit Log

CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP199
Location: Archer Park North Equipment type: Backhoe - 600mm Bucket				Easting: 234221 Northing: 7412149 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	CL	Clay Loam - ALLUVIAL low to medium plasticity, dark grey, moist		
1.0	LC	Light Clay, gravelly low to medium plasticity fines; poorly graded fine to medium gravel, dark grey, moist, very strong		
2.0	LMC	Light Medium Clay low to medium plasticity, dark grey, moist, very strong		PP >600kPa
3.0	LMC	Light Medium Clay, gravelly - RESIDUAL low to medium plasticity fines; poorly graded fine to medium gravel, pale brown, moist, very strong		
		Pit Terminated @ 3.0m		

Groundwater: nil	Originally Logged by: JPT & MJW Date: 27/08/07
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Test Pit Log

CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP200
Location: Archer Park North Equipment type: Backhoe - 600mm Bucket				Easting: 234349 Northing: 7412579 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	CL	Clay Loam - ALLUVIAL low to medium plasticity, dark grey, moist		
	MHC	Medium Heavy Clay medium to high plasticity, dark grey/black, moist		
1.0		- pale brown		
	LMC	Light Medium Clay, gravelly low to medium plasticity fines; poorly graded fine to medium gravel, pale brown, moist, very strong		
2.0				
	MHC	Medium Heavy Clay medium to high plasticity, dark grey/black, moist, strong		PP=410kPa
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date: 27/08/07

Transcribed by: HEP

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Test Pit Log

CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP201
Location: Archer Park North Equipment type: Backhoe - 600mm Bucket				Easting: ? Northing: ? Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	MHC	Medium Heavy Clay - ALLUVIUM medium to high plasticity, dark grey/black, moist, moderate strength		PP=330kPa
		- grey		PP=410kPa
1.0				
	MC	Medium Clay medium plasticity, pale brown mottled orange, traces of fine gravel, strong		PP=535kPa
2.0				
	LC	Light Clay, sandy (possibly RESIDUAL) low plasticity, brown, just moist, very strong, massive		PP >600kPa
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date: 28/08/07

Transcribed by: HEP

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Test Pit Log

CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP202
Location: Archer Park North Equipment type: Backhoe - 600mm Bucket				Easting: ? Northing: ? Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	MHC	Medium Heavy Clay - ALLUVIUM medium to high plasticity, dark grey/black, moist, moderate strength		PP=405kPa
		- grey, strong		PP=505kPa
1.0		- grey, very strong		PP >600kPa
2.0				
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date: 28/08/07

Transcribed by: HEP

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Test Pit Log

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Queensland Government
Department of Main Roads

CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP203
Location: Archer Park North Equipment type: Backhoe - 600mm Bucket				Easting: ? Northing: ? Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	MHC	Medium Heavy Clay - ALLUVIUM medium to high plasticity, dark grey/black, moist, moderate strength		PP=320kPa
		- grey, very strong		PP >600kPa
1.0				
	MC	Medium Clay medium plasticity, pale grey, traces of fine gravel, moist, very strong		PP=580kPa
2.0				
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date: 28/08/07

Transcribed by: HEP

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CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP205
Location: Archer Park North Equipment type: Backhoe - 600mm Bucket				Easting: Northing: Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	LMC	Light Medium Clay - ALLUVIUM low to medium plasticity, dark grey, dry, very strong		PP >600kPa
		- just moist		PP >600kPa
	LC	Light Clay, gravelly - Possibly RESIDUAL low to medium plasticity fines, poorly graded gravel (up to 50%), mottled purple-grey & orange-brown, dry, strong		
1.0				
2.0				
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date: 28/08/07

Transcribed by: HEP

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Test Pit Log

CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP207
Location: Archer Park North Equipment type: Backhoe - 600mm Bucket				Easting: Northing: Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	CL	Clay Loam - ALLUVIAL low plasticity, pale brown, just moist, very strong		PP >600kPa
	LMC	Light Medium Clay low to medium plasticity, grey, moist		PP >600kPa
		- mottled grey & red-brown		PP >600kPa
1.0				
2.0				
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date: 28/08/07

Transcribed by: HEP

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Test Pit Log

CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP208
Location: Archer Park North Equipment type: Backhoe - 600mm Bucket				Easting: Northing: Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	CL	Clay Loam - ALLUVIAL low plasticity, pale brown, just moist, strong		
	MC	Medium Clay - Possibly RESIDUAL medium plasticity, grey, trace of fine gravel, moist, strong		
1.0		- mottled grey & red-brown		
2.0				
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date: 28/08/07

Transcribed by: HEP

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Test Pit Log

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Queensland Government
Department of Main Roads

CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP209
Location: Archer Park North Equipment type: Backhoe - 600mm Bucket				Easting: Northing: Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	CL	Clay Loam - ALLUVIAL low plasticity, pale brown, just moist, very strong		PP >600kPa
	MC	Medium Clay - Possibly RESIDUAL medium plasticity, grey, trace of fine gravel, moist, very strong		PP=590kPa
1.0		- mottled pale orange brown & grey		PP >600kPa
2.0				
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date: 28/08/07

Transcribed by: HEP

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Test Pit Log

CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP212
Location: Archer Park North Equipment type: Backhoe - 600mm Bucket				Easting: Northing: Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	CL	Clay Loam - ALLUVIAL low to medium plasticity, dark grey, just moist, very strong		PP >600kPa
	MC	Medium Clay medium plasticity, pale grey, trace of fine gravel, just moist, very strong		PP >600kPa
1.0				
	LMC	Light Medium Clay - Possibly RESIDUAL low to medium plasticity, mottled pale grey & orange-brown, moist, very strong		PP >600kPa
2.0				
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date: 28/08/07

Transcribed by: HEP

This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with *The Australian Soil and Land Survey 2nd Edition* (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some instances by inspection of relevant soil samples.

Test Pit Log

Queensland Government
Department of Main Roads

CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP213
Location: Archer Park North Equipment type: Backhoe - 600mm Bucket				Easting: Northing: Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	LMC	Light Medium Clay - ALLUVIUM low to medium plasticity, pale brown, trace of fine gravel, moist, strong.		PP=510kPa
		- very strong		PP >600kPa
1.0				
		- mottled brown & orange-brown		PP >600kPa
		- mottled red-brown & grey		PP >600kPa
2.0				
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date: 29/08/07

Transcribed by: HEP

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Test Pit Log

CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP214
Location: Archer Park North Equipment type: Backhoe - 600mm Bucket				Easting: Northing: Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	LMC	Light Medium Clay - ALLUVIUM low to medium plasticity, pale brown, trace of fine gravel, moist, strong.		
1.0		- mottled brown & orange-brown		
		- mottled red-brown & grey		
2.0				
3.0		Pit Terminated @ 3.0m		
Groundwater: nil				Originally Logged by: JPT & MJW Date: 29/08/07
This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with *The Australian Soil and Land Survey 2nd Edition* (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some instances by inspection of relevant soil samples.				Transcribed by: HEP

Test Pit Log

Golder Associates

Queensland Government
Department of Main Roads

CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP215
Location: Archer Park North Equipment type: Backhoe - 600mm Bucket				Easting: Northing: Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	LMC	Light Medium Clay - ALLUVIUM low to medium plasticity, pale brown, trace of fine gravel, moist, strong.		PP=570kPa
	MC	Medium Clay - Possibly RESIDUAL medium plasticity, pale brown, trace of fine gravel, moist, moderate strength		PP=285kPa
1.0				
	LMC	Light medium Clay low to medium plasticity, pale grey, trace of fine gravel, moist, very strong		PP=590kPa
		- mottled pale grey & orange-brown, strong		PP=445kPa
2.0				
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date: 29/08/07

Transcribed by: HEP

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Test Pit Log

CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP216
Location: Archer Park North Equipment type: Backhoe - 600mm Bucket				Easting: Northing: Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	LMC	Light Medium Clay - ALLUVIUM low to medium plasticity, pale brown, trace of fine gravel, moist, moderate-strong.		PP=335kPa
		- very strong		PP >600kPa
1.0				
		- mottled orange-brown & grey, strong		PP=390kPa
	LC	Light Clay, gravelly - RESIDUAL low to medium plasticity fines, poorly graded gravel (up to 50%), pale brown, dry, moderate-strong		
2.0				
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date: 29/08/07

Transcribed by: HEP

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Test Pit Log

Queensland Government
Department of Main Roads

CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP217
Location: Archer Park North Equipment type: Backhoe - 600mm Bucket				Easting: Northing: Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	MHC	Medium Heavy Clay - ALLUVIUM medium to high plasticity, dark grey/black, trace of sand and fine gravel, moist, moderate strength		PP=205kPa
		- very moist, moderate-weak		PP=165kPa
1.0				
	LC	Light Clay, gravelly - Possibly RESIDUAL dry strong		
2.0				
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date: 29/08/07

Transcribed by: HEP

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Test Pit Log

Queensland Government
Department of Main Roads

CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP218a
Location: Archer Park North Equipment type: Backhoe - 600mm Bucket				Easting: Northing: Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	CL	Clay Loam - ALLUVIAL low to medium plasticity, dark grey/black, dry		
		Gravel predominantly coarse with cobbles and boulders (blue stone), low to medium plasticity fines, grey, dry		
1.0		Backhoe Refusal @ 0.9m		
2.0				
3.0				

Groundwater: nil

Originally Logged by: JPT & MJW

Date: 29/08/07

Transcribed by: HEP

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Test Pit Log

CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP218b
Location: Archer Park North Equipment type: Backhoe - 600mm Bucket				Easting: 236888 Northing: 7421017 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	LMC	Light Medium Clay - ALLUVIUM low to medium plasticity, dark grey/black, trace of fine gravel, dry, very strong		PP >600kPa
		- dark brown, moist, strong		PP=415kPa
	LMC	Light Medium Clay low to medium plasticity fines, pale brown, some sand, trace of fine gravel, moist, strong		
1.0				PP=430kPa
2.0				
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date: 29/08/07

Transcribed by: HEP

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Test Pit Log

CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP219
Location: Archer Park North Equipment type: Backhoe - 600mm Bucket				Easting: Northing: Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	LMC	Light Medium Clay - ALLUVIUM low to medium plasticity, some fine sand, pale brown, trace of fine gravel, moist		PP=405kPa
1.0	LC	Light Clay, sandy low to medium plasticity, fine to medium sand, very pale brown, moist, traces of fine gravel		PP >600kPa
		- mottled pale brown, orange-brown and grey		PP >600kPa
2.0	SCL	Sandy Clay Loam (Possibly Colluvium) low to medium plasticity fines, dark brown, with coarse gravel including cobbles & boulders		
3.0		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date: 29/08/07

Transcribed by: HEP

This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with *The Australian Soil and Land Survey 2nd Edition* (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some instances by inspection of relevant soil samples.

Test Pit Log

CENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North
Rockhampton
Phone 49230712 Facsimile 49230753

Project: Gladstone-Fitzroy Water Pipeline				Pit No: TP220
Location: Archer Park North Equipment type: Backhoe - 600mm Bucket				Easting: 237672 Northing: 7421199 Elevation:
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES
	LS	Loamy Sand - ALLUVIUM low to medium plasticity fines, dark brown, moist	D 0.0-0.4m	
			D 0.4-0.9m	
	SCL	Sandy Clay Loam low to medium plasticity fines, red-brown, moist, strong		PP=415kPa
			D 0.9-1.2m	
1.0	LMC	Light Medium Clay, sandy low to medium plasticity, mottled red-brown, pale brown & grey, moist, strong		PP=460kPa
			D 1.2-2.0m	
		- mottled grey, very strong		PP >600kPa
2.0				
		- pale grey	D 2.0-3.0m	PP >600kPa
3.0				
		Pit Terminated @ 3.0m		

Groundwater: nil

Originally Logged by: JPT & MJW

Date: 29/08/07

Transcribed by: HEP

This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with *The Australian Soil and Land Survey 2nd Edition* (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some instances by inspection of relevant soil samples.

Appendix E1 - Soil Test Results

FITZROY - GLADSTONE PIPELINE: LABORATORY TEST SUMMARY. **Page 1 of 2**

R'ton Laboratory No.	R07/2360	R07/2361	R07/2362	R07/2363	R07/2364	R07/2365	R07/2366	R07/2367	R07/2368	R07/2369	R07/2370	R07/2371	R07/2372	R07/2373	R07/2374	R07/2375	R07/2376
Distance (ex intake)	1.1	2.7	6.2	9.2	10.2	11.6	12.9	16.8	18.8	22.7	24.8	27.3	31.0	32.5	41.0	43.0	45.5
Test Pit No.	219	215	208	202	200	197	194	185	181	172	167	162	155	152	136	132	127
Sample depth	1.4-1.8	1.3-3.0	0.9-3.0	1.0-3.0	0.2-2.8	1.3-2.5	0.4-1.0	0.5-1.5	2.3-3.0	2.0-2.25	1.5-1.75	0.8-2.4	2.0-2.5	2.5-2.75	1.0-3.0	1.5-1.75	2.0-3.0
Description	C with S	C	C	C	S C	C	C	C	S C	C	C	C	C	S C	C	C	C
USCS	CI	CH	CH	CH	CI	CH	CH	CH	CL	CI	CH	CI	CH	CI	CH	CI	CH
Colour (Munsell)	L OL BN	GY BN	BN	BK	D GY BN	L YL BN	OL GY	BK	OL BN	OL BN	BK	BN	GY BN	L OL BN	D GY BN	D GY BN	D GY BN
Origin	Residual	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial
Particle Size																	
26.5mm																	
19.0mm					100												
9.50mm					99		100										100
4.75mm					94		98										98
2.36mm	100		100	100	89	100	98	100	100	100				100	100	100	97
0.425mm	97	100	99	99	67	99	95	97	99	99		100	100	99	99	98	96
0.075mm	73	93	97	99	61	94	90	95	70	93	100	86	97	65	97	94	94
0.0135mm						49							53			36	
0.002mm						11							48			32	
LL	43.2	67.2	63.8	77.2	47.6	64.0	72.2	64.2	32.2	42.0	76.4	36.0	62.6	41.8	61.2	45.4	57.4
PI	28.4	50.8	47.0	52.0	29.4	46.6	51.8	43.2	15.4	26.8	54.6	20.6	43.6	26.0	44.0	31.8	35.8
LS	11.0	20.2	19.0	19.8	15.0	19.4	20.2	19.0	5.0	13.8	20.4	9.0	17.6	12.4	19.6	15.2	17.8
Emerson Class	1	1	1	1	1	1	1	2	2	1	1	1	1	2	1	1	2
Percent dispersion													43				
pH (Q121)	6.4	7.3	7.6	5.9	7.6	7.5	8.1	6.7	7.7	7.2	6.6	7.7	7.0	3.1	8.1	7.0	8.4
pH (Q121) [1:5 Ratio]	9.0	7.9	7.9	6.3	8.3	8.9	8.7	6.9	8.4	7.6	7.5	8.8	6.7	4.0	8.6	7.4	9.0
Conductivity (Q122A)	2.7	2.5	2.7	3.4	1.7	4.2	2.3	5.6	2.5	3.9	5.8	2.7	2.5	4.0	1.5	3.6	2.9
Salinity (Q122D)	0.4	0.4	1.0	0.8	0.2	0.6	0.3	1.0	0.5	1.0	2.5	0.8	1.4	1.4	0.4	0.7	0.9

Munsell codes:	Black, very dark grey	BK	5Y 2.5/1, 5Y 3/1	Light yellowish brown	L YL BN	2.5Y 6/4
	Dark greyish brown	D GY BN	2.5Y 3/2, 2.5Y 4/2, 10YR 3/2	Light olive brown	L OL BN	2.5Y 5/3, 2.5Y 5/4
	Greyish brown	GY BN	2.5Y 5/2	Olive brown	OL BN	2.5Y 4/3, 2.5Y 4/4
	Brown	BN	10YR 4/3, 10YR 5/3	Olive	OL	5Y 4/3
	Dark yellowish brown	D YL BN	10YR 4/4	Olive grey	OL GY	5Y 4/2
	Yellowish brown	YL BN	10YR 5/4, 10YR 5/6			

Descriptors: C = clay, S = sand/sandy, G = gravelly

FITZROY - GLADSTONE PIPELINE: LABORATORY TEST SUMMARY. **Page 2 of 2**

R'ton Laboratory No.	R07/2377	R07/2378	R07/2379	R07/2380	R07/2381	R07/2382	R07/2383	R07/2384	R07/2385	R07/2386	R07/2387	R07/2388	R07/2389	R07/2390	R07/2391	R07/2392	R07/2393
Distance (ex intake)	48.0	50.1	53.6	55.1	57.5	60.5	62.0	64.5	67.0	69.6	70.2	75.1	78.1	80.0	82.0	83.6	85.3
Test Pit No.	122	118	111	108	103	98	95	90	85	80	79	69	63	59	55	52	49
Sample depth	0.9-1.8	2.0-3.0	1.0-1.25	2.0-2.5	2.5-2.75	1.25-1.5	1.25-1.5	1.25-1.5	1.0-1.25	1.0-1.25	2.0-2.5	0.4-2.0	0.4-1.3	1.5-2.0	2.0-2.5	1.5-2.0	1.0-1.50
Description	C	C	C	C	C	C	C with S	C	C	C	C	C	C	G S C	C with S	C	C
USCS	CH	CH	CI	CH	CH	CH	CI	CH	CI	CH	CI	CH	CI	CH	CI	CI	CI
Colour (Munsell)	D GY BN	OL	D GY BN	D GY BN	L YL BN	OL	OL BN	BK	YL BN	OL GY	BN	BN	L OL BN	D YL BN	D YL BN	YL BN	L OL BN
Origin	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Residual	Residual	Residual	Alluvial?
Particle Size																	
26.5mm														100			
19.0mm	100													90			
9.50mm	97													81			
4.75mm	96				100	100	100							75	100		
2.36mm	94	100	100		99	99	99				100		100	71	96	100	100
0.425mm	91	99	98	100	97	97	87			100	99	100	97	58	91	99	98
0.075mm	87	96	96	99	96	94	78	100	100	99	95	99	92	52	81	89	96
0.0135mm					77			98			54		37			15	
0.002mm					64			81			48		35			11	
LL	59.4	60.2	45.2	67.4	60.4	57.4	42.4	81.8	38.0	63.0	40.2	51.4	36.6	51.8	40.2	40.2	44.4
PI	37.2	38.0	27.6	43.8	43.8	41.8	28.2	55.8	22.8	43.2	24.0	35.0	20.2	31.0	16.8	22.2	28.8
LS	19.2	18.4	13.8	19.2	18.4	15.8	19.0	20.0	13.0	19.0	12.0	15.8	12.2	16.2	9.8	12.2	14.6
Emerson Class	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1
Percent dispersion					5								2			85	
pH (Q121)	8.1	7.1	7.7	6.6	6.7	7.3	8.3	6.8	7.2	7.1	6.2	4.1	8.1	7.5	4.1	4.4	8.2
pH (Q121) [1:5 Ratio]	8.7	9.6	8.0	7.6	8.6	7.9	8.5	7.7	8.6	7.8	7.1	5.0	8.9	8.5	5.3	5.5	8.8
Conductivity (Q122A)	3.0	3.2	3.6	2.8	4.0	2.8	3.6	2.7	3.3	4.8	3.1	3.2	2.7	3.9	3.1	2.1	3.2
Salinity (Q122D)	0.4	0.6	1.6	1.2	1.5	1.0	1.2	2.2	1.2	0.9	0.9	0.6	0.4	1.0	0.5	0.6	0.1

Munsell codes:						
	Black, very dark grey	BK	5Y 2.5/1, 5Y 3/1	Light yellowish brown	L YL BN	2.5Y 6/4
	Dark greyish brown	D GY BN	2.5Y 3/2, 2.5Y 4/2, 10YR 3/2	Light olive brown	L OL BN	2.5Y 5/3, 2.5Y 5/4
	Greyish brown	GY BN	2.5Y 5/2	Olive brown	OL BN	2.5Y 4/3, 2.5Y 4/4
	Brown	BN	10YR 4/3, 10YR 5/3	Olive	OL	5Y 4/3
	Dark yellowish brown	D YL BN	10YR 4/4	Olive grey	OL GY	5Y 4/2
	Yellowish brown	YL BN	10YR 5/4, 10YR 5/6			

Descriptors: C = clay, S = sand/sandy, G = gravelly

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Client:	ARUP	Sampled By: Golder
Project:	Gladstone Fitzroy Pipeline	Job No: 077633062
Location:	Epala to Raglan	

pHfox Screening Test Results

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Location	pH_F	pH_{FOX}	Indication	Location	pH_F	pH_{FOX}	Indication
Drilled:	14/09/07						
TP69 0.4m	6.2	4.8	Nil ASS/PASS	TP70 0.2m	5.5	3.8	Possible PASS
TP69 1.5m	4.5	3.9	Possible PASS	TP70 0.5m	4.7	3.6	Possible PASS
TP69 2.5m	4.7	4.0	Improbable PASS	TP70 1.5m	5.8	6.5	Nil ASS/PASS
Drilled:	13/09/07			Drilled:	12/09/07		
TP71 0.0-0.5m	5.3	4.5	Nil ASS/PASS	TP72 0.0-0.2m	6.6	4.2	Improbable PASS
TP71 0.5-1.0m	6.9	6.8	Nil ASS/PASS	TP72 0.2-0.5m	7.1	4.8	Nil ASS/PASS
TP71 1.0-1.5m	7.5	8.0	Nil ASS/PASS	TP72 0.5-1.0m	6.9	6.3	Nil ASS/PASS
TP71 1.5-2.0m	7.3	8.2	Nil ASS/PASS	TP72 1.0-1.5m	8.7	8.5	Nil ASS/PASS
TP71 2.0-2.5m	7.5	8.3	Nil ASS/PASS	TP72 1.5-2.0m	8.8	9.0	Nil ASS/PASS
TP71 2.5-3.0m	7.5	8.2	Nil ASS/PASS	TP72 2.0-2.5m	8.6	8.6	Nil ASS/PASS
				TP72 2.5-3.0m	8.6	8.7	Nil ASS/PASS

Quantitative Test Results

4

Location	Action Criteria (mole H^+/t)	TAA (mole H^+/t)	a-ANC (mole H^+/t)	Texture Description	S_{POS} (%)	'Net Acidity' (mole H^+/t)	pH_{OX}	Lime Rate (kg/m^3)
TP69 1.5m	36	26	--	LC, grey-brown	<0.02	26	4.7	3
TP70 0.5m	62	37	--	MC, brown, mottled	<0.02	37	4.4	4
TP71 0.0-0.5m	36	31	--	LC, grey-brown	<0.02	31	4.6	3
TP72 0.0-0.2m	36	20	--	SL, brown, organics	<0.02	20	--*	3

Remarks: TAA - Total Actual Acidity. ANC - Acid Neutralising Capacity. S_{POS} - Peroxide Oxidisable Sulfur
Liming rates are based on a FOS of 1.5, assumed density of 1.4 tonne/m^3
for sands and clay and 'net potential acidity' as determined by analysis.
ANC is only determined when pH is >= 6.5
* All samples have undergone the Chromium Reducible Sulfur test, where pHox is not determined.

Test Procedures: pH_{FOX} "ASS Screening Test" (rapid oxidation with Hydrogen Peroxide) – Golder Associates
SPOCAS method – ALS Brisbane

Prepared By: BM | Checked By: HP 19/11/07

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Client:	ARUP	Sampled By: Golder
Project:	Gladstone Fitzroy Pipeline	Job No: 077633062
Location:	Raglan to Bajool	

pHfox Screening Test Results

25

Location	pH_F	pH_{FOX}	Indication	Location	pH_F	pH_{FOX}	Indication
Drilled:	13/09/07			Drilled:	18/09/07		
TP73 0.0-0.5m	6.5	4.8	Nil ASS/PASS	TP77 0.0-0.6m	5.6	3.3	Possible PASS
TP73 0.5-1.0m	5.5	6.0	Nil ASS/PASS	TP77 0.6-0.8m	6.4	4.9	Nil ASS/PASS
TP73 1.0-1.5m	6.2	6.5	Nil ASS/PASS	TP77 0.8-1.8m	6.6	6.1	Nil ASS/PASS
TP73 1.5-2.0m	6.5	6.1	Nil ASS/PASS	TP77 1.8-3.0m	7.7	7.8	Nil ASS/PASS
TP73 2.0-2.5m	6.7	7.7	Nil ASS/PASS	TP78 0.0-0.2m	5.4	4.1	Improbable PASS
TP73 2.5-3.0m	6.6	7.1	Nil ASS/PASS	TP78 0.2-0.8m	5.7	4.6	Nil ASS/PASS
				TP78 0.8-1.0m	7.7	7.9	Nil ASS/PASS
				TP78 1.0-3.0m	7.6	8.0	Nil ASS/PASS
Drilled:	13/09/07						
TP74 0.00-0.25m	5.5	4.1	Improbable PASS	TP74 1.25-1.50m			No Sample
TP74 0.25-0.50m	6.7	4.6	Nil ASS/PASS	TP74 1.50-1.75m	6.7	7.7	Nil ASS/PASS
TP74 0.50-0.75m	7.1	6.0	Nil ASS/PASS	TP74 1.75-2.0m	6.5	7.5	Nil ASS/PASS
TP74 0.75-1.0m	7.3	6.3	Nil ASS/PASS	TP74 2.00-2.25m	6.1	6.3	Nil ASS/PASS
TP74 1.00-1.25m	7.4	7.7	Nil ASS/PASS	TP74 2.50-2.75m	4.2	3.0	Possible PASS
TP74 1.25-1.50m	7.1	7.9	Nil ASS/PASS	TP74 2.75-3.0m	4.4	3.2	Possible PASS

Quantitative Test Results

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Location	Action Criteria (mole H^+/t)	TAA (mole H^+/t)	a-ANC (mole H^+/t)	Texture Description	S_{POS} (%)	'Net Acidity' (mole H^+/t)	pH_{OX}	Lime Rate (kg/m^3)
TP73 0.0-0.5m	36	12	--	SCL, brown - pale brown	<0.02	12	--*	nil
TP74 0.00-0.25m	36	11	--	SCL, dark brown, organics	<0.02	11	--*	nil
TP74 0.50-0.75m	36	<2	--	LC, dark brown	<0.02	<10	--*	nil
TP74 1.00-1.25m	36	<2	62	SCL, brown	<0.02	<10	7.1	nil
TP74 1.50-1.75m	62	<2	60	MC, brown-grey	<0.02	<10	7.0	nil
TP74 2.5-2.75m	62	34	--	MC, grey-black, organics	<0.02	44	5.5	5
TP74 2.75-3.00m	36	92	--	LC, grey, reddish brown	<0.02	111	4.4	12
TP77 0.0-0.6m	18	13	--	LS, dk brown, trace organics	0.02	26	3.5	3
TP78 0.0-0.2m	36	44	--	CL, brown	<0.02	44	--*	5

Remarks: TAA - Total Actual Acidity. ANC - Acid Neutralising Capacity. S_{POS} - Peroxide Oxidisable Sulfur
Liming rates are based on a FOS of 1.5, assumed density of 1.4 tonne/m^3
for sands and clay and 'net potential acidity' as determined by analysis.
ANC is only determined when pH is >= 6.5
* All samples have undergone the Chromium Reducible Sulfur test, where pHox is not determined.

Test Procedures: pH_{FOX} "ASS Screening Test" (rapid oxidation with Hydrogen Peroxide) – Golder Associates SPOCAS method – ALS Brisbane

Prepared By: TN/SLS | Checked By: HP 19/11/07

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Client:	ARUP	Sampled By: Golder
Project:	Gladstone Fitzroy Pipeline	Job No: 077633062
Location:	Raglan to Bajool	

pHfox Screening Test Results

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Location	pH_F	pH_{FOX}	Indication	Location	pH_F	pH_{FOX}	Indication
Drilled:	18/09/07						
TP79 0.00-0.25m	6.3	3.5	Possible PASS	TP79 1.50-1.75m	8.3	8.6	Nil ASS/PASS
TP79 0.25-0.50m	8.8	8.5	Nil ASS/PASS	TP79 1.75-2.0m	8.1	8.7	Nil ASS/PASS
TP79 0.50-0.75m	8.9	8.7	Nil ASS/PASS	TP79 2.00-2.25m	8.1	8.7	Nil ASS/PASS
TP79 0.75-1.0m	8.9	8.6	Nil ASS/PASS	TP79 2.25-2.50m	7.8	8.4	Nil ASS/PASS
TP79 1.00-1.25m	9.0	8.8	Nil ASS/PASS	TP79 2.50-2.75m	8.7	8.7	Nil ASS/PASS
TP79 1.25-1.50m	8.6	8.8	Nil ASS/PASS	TP79 2.75-3.0m	7.8	8.4	Nil ASS/PASS
Drilled:	18/09/07						
TP80 0.00-0.25m	5.4	3.5	Possible PASS	TP80 1.50-1.75m	7.6	7.9	Nil ASS/PASS
TP80 0.25-0.50m	6.3	4.8	Nil ASS/PASS	TP80 1.75-2.0m	7.6	8.0	Nil ASS/PASS
TP80 0.50-0.75m	7.0	5.9	Nil ASS/PASS	TP80 2.00-2.25m	7.8	8.3	Nil ASS/PASS
TP80 0.75-1.0m	7.3	6.8	Nil ASS/PASS	TP80 2.25-2.50m	7.6	8.2	Nil ASS/PASS
TP80 1.00-1.25m	7.2	7.4	Nil ASS/PASS	TP80 2.00-2.25m	7.8	8.3	Nil ASS/PASS
TP80 1.25-1.50m	7.6	7.7	Nil ASS/PASS	TP80 2.75-3.0m	7.7	8.5	Nil ASS/PASS
Drilled:	18/09/07						
TP81 0.00-0.25m	6.5	6.2	Nil ASS/PASS	TP81 1.50-1.75m	8.0	8.6	Nil ASS/PASS
TP81 0.25-0.50m	8.4	7.5	Nil ASS/PASS	TP81 1.75-2.0m	7.8	8.7	Nil ASS/PASS
TP81 0.50-0.75m	8.1	8.3	Nil ASS/PASS	TP81 2.00-2.25m	7.7	8.4	Nil ASS/PASS
TP81 0.75-1.0m	8.3	8.7	Nil ASS/PASS	TP81 2.25-2.50m	7.8	8.5	Nil ASS/PASS
TP81 1.00-1.25m	8.3	8.7	Nil ASS/PASS	TP81 2.50-2.75m	7.6	8.3	Nil ASS/PASS
TP81 1.25-1.50m	8.2	8.7	Nil ASS/PASS	TP81 2.75-3.0m	7.6	8.2	Nil ASS/PASS

Quantitative Test Results

6

Location	Action Criteria (mole H^+/t)	TAA (mole H^+/t)	a-ANC (mole H^+/t)	Texture Description	S_{POS} (%)	'Net Acidity' (mole H^+/t)	pH_{OX}	Lime Rate (kg/m^3)
TP79 0.00-0.25m	36	10	--	SL, grey, organics	<0.02*	<10	--*	nil
TP79 2.00-2.25m	62	<2	53	HC, yellow-grey	<0.02	<10	8.2	nil
TP80 0.00-0.25m	36	18	--	SCL, grey-brown, organics	<0.02*	18	--*	nil
TP80 1.00-1.25m	18	<2	--	LS, grey, black organics	<0.02*	<10	--*	nil
TP81 0.00-0.25m	36	8	--	SCL, grey-brown, organics	<0.02*	<10	--*	nil
TP81 0.50-0.75m	36	<2	184	ZCL, brown-grey, organics	<0.02*	<10	--*	nil

Remarks: TAA - Total Actual Acidity. ANC - Acid Neutralising Capacity. S_{POS} - Peroxide Oxidisable Sulfur
Liming rates are based on a FOS of 1.5, assumed density of 1.4 tonne/m^3
for sands and clay and 'net potential acidity' as determined by analysis.
ANC is only determined when pH is >= 6.5
* All samples have undergone the Chromium Reducible Sulfur test, where pHox is not determined.

Test Procedures: pH_{FOX} "ASS Screening Test" (rapid oxidation with Hydrogen Peroxide) – Golder Associates
SPOCAS method – ALS Brisbane

Prepared By: TN/SLS | Checked By: HP 19/11/07

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Golder Associates

Client:	ARUP	Sampled By: Golder
Project:	Gladstone Fitzroy Pipeline	Job No: 077633062
Location:	Raglan to Bajool	

pHfox Screening Test Results

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Location	pH_F	pH_{FOX}	Indication	Location	pH_F	pH_{FOX}	Indication
Drilled:	18/09/07			Drilled:	04/09/07		
TP83 0.0-0.2m	5.6	3.2	Possible PASS	TP87 0.0-0.3m	6.8	7.2	Nil ASS/PASS
TP83 0.2-2.2m	7.0	5.9	Nil ASS/PASS	TP87 0.3-0.45m	6.7	5.1	Nil ASS/PASS
TP83 2.2-3.0m	6.8	7.2	Nil ASS/PASS	TP87 0.45-1.05m	5.3	4.5	Nil ASS/PASS
				TP87 1.05-1.75m	7.4	7.4	Nil ASS/PASS
				TP87 1.25-1.50m	6.1	5.1	Nil ASS/PASS
Drilled:	04/09/07						
TP88 0.0-0.6m	6.8	6.2	Nil ASS/PASS				
TP88 0.6-1.50m	7.0	7.1	Nil ASS/PASS				
TP88 1.50-3.0m	7.6	7.9	Nil ASS/PASS				

Quantitative Test Results

Location	Action Criteria (mole H^+/t)	TAA (mole H^+/t)	a-ANC (mole H^+/t)	Texture Description	S_{POS} (%)	'Net Acidity' (mole H^+/t)	pH_{OX}	Lime Rate (kg/m^3)
TP83 0.0-0.2m	36	23	--	CL, pale brown	<0.02	23	--*	3
TP87 0.3-0.45m	36	29	--	ZL, brown	<0.02	29	4	3
TP88 0.0-0.6m	36	4	64	SL, grey-brown	<0.02	2	6.7	nil

Remarks: TAA - Total Actual Acidity. ANC - Acid Neutralising Capacity. S_{POS} - Peroxide Oxidisable Sulfur
Liming rates are based on a FOS of 1.5, assumed density of 1.4 tonne/m^3
for sands and clay and 'net potential acidity' as determined by analysis.
ANC is only determined when pH is >= 6.5
* All samples have undergone the Chromium Reducible Sulfur test, where pHox is not determined.

Test Procedures: pH_{FOX} "ASS Screening Test" (rapid oxidation with Hydrogen Peroxide) – Golder Associates SPOCAS method – ALS Brisbane

Prepared By: TN/SLS | Checked By: HP 19/10/07

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Client:	ARUP	Sampled By: Golder
Project:	Gladstone Fitzroy Pipeline	Job No: 077633062
Location:	Raglan to Bajool	

pHfox Screening Test Results

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Location	pH_F	pH_{FOX}	Indication	Location	pH_F	pH_{FOX}	Indication
Drilled:	18/09/07						
TP82 0.00-0.25m	5.4	3.4	Possible PASS	TP82 1.75-2.0m	6.2	5.4	Nil ASS/PASS
TP82 0.25-0.50m	7.4	4.8	Nil ASS/PASS	TP82 2.00-2.25m	5.8	4.9	Nil ASS/PASS
TP82 0.50-0.75m	4.9	4.1	Improbable PASS	TP82 2.25-2.50m	6.4	5.5	Nil ASS/PASS
TP82 0.75-1.0m	5.4	4.2	Improbable PASS	TP82 2.50-2.75m	6.4	5.8	Nil ASS/PASS
TP82 1.00-1.25m	5.7	4.9	Nil ASS/PASS	TP82 2.75-3.0m	6.4	7.4	Nil ASS/PASS
TP82 1.50-1.75m	6.1	5.2	Nil ASS/PASS				
Drilled:	18/09/07						
TP94 0.00-0.25m	6.3	4.8	Nil ASS/PASS	TP94 1.50-1.75m	4.8	4.7	Nil ASS/PASS
TP94 0.25-0.50m	8.3	8.5	Nil ASS/PASS	TP94 1.75-2.0m	4.8	4.8	Nil ASS/PASS
TP94 0.50-0.75m	8.3	8.8	Nil ASS/PASS	TP94 2.00-2.25m	4.7	4.7	Nil ASS/PASS
TP94 0.75-1.0m	7.0	8.3	Nil ASS/PASS	TP94 2.25-2.50m	4.8	4.7	Nil ASS/PASS
TP94 1.00-1.25m	5.3	5.0	Nil ASS/PASS	TP94 2.50-2.75m	4.8	5.1	Nil ASS/PASS
TP94 1.25-1.50m	4.9	4.6	Nil ASS/PASS	TP94 2.75-3.0m	4.8	4.6	Nil ASS/PASS
Drilled:	18/09/07						
TP95 0.00-0.25m	5.2	3.7	Possible PASS	TP95 1.50-1.75m	8.4	8.9	Nil ASS/PASS
TP95 0.25-0.50m	6.1	6.7	Nil ASS/PASS	TP95 1.75-2.0m	8.5	8.9	Nil ASS/PASS
TP95 0.50-0.75m	7.8	8.0	Nil ASS/PASS	TP95 2.00-2.25m			No Sample
TP95 0.75-1.0m	8.0	7.1	Nil ASS/PASS	TP95 2.25-2.50m	8.4	7.8	Nil ASS/PASS
TP95 1.00-1.25m	9.2	9.0	Nil ASS/PASS	TP95 2.50-2.75m	9.1	9.1	Nil ASS/PASS
TP95 1.25-1.50m	9.2	9.3	Nil ASS/PASS	TP95 2.75-3.0m	8.6	7.6	Nil ASS/PASS

Quantitative Test Results

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Location	Action Criteria (mole H^+/t)	TAA (mole H^+/t)	a-ANC (mole H^+/t)	Texture Description	S_{POS} (%)	'Net Acidity' (mole H^+/t)	pH_{OX}	Lime Rate (kg/m^3)
TP82 0.00-0.25m	36	5	50	ZCL, brown	<0.02	<10	6.8	nil
TP82 0.50-0.75m	36	22	--	LC, brown	<0.02	29	4.7	3
TP82 2.00-2.25m	62	11	--	HC, grey	<0.02	17	6.3	nil
TP94 1.25-1.50m	62	18	--	LMC, pale grey, brown	<0.02	18	5.3	nil
TP95 0.00-0.25m	36	6	--	SCL, brown	<0.02	<10	4.1	nil
TP95 2.25-2.50m	36	<2	29	LC, grey	<0.02	<10	8.2	nil

Remarks: TAA - Total Actual Acidity. ANC - Acid Neutralising Capacity. S_{POS} - Peroxide Oxidisable Sulfur
Liming rates are based on a FOS of 1.5, assumed density of 1.4 tonne/m^3
for sands and clay and 'net potential acidity' as determined by analysis.
ANC is only determined when pH is >= 6.5

Test Procedures: pH_{FOX} "ASS Screening Test" (rapid oxidation with Hydrogen Peroxide) – Golder Associates
SPOCAS method – ALS Brisbane

Prepared By: SLS/LMG | Checked By: MP 19/11/07

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Client:	ARUP	Sampled By: Golder
Project:	Gladstone Fitzroy Pipeline	Job No: 077633062
Location:	Raglan to Bajool	

pHfox Screening Test Results

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Location	pH_F	pH_{FOX}	Indication	Location	pH_F	pH_{FOX}	Indication
Drilled:	22/08/07						
TP91 0.00-0.25m	6.5	5.2	Nil ASS/PASS	TP91 1.50-1.75m	7.1	6.2	Nil ASS/PASS
TP91 0.25-0.50m	6.4	5.6	Nil ASS/PASS	TP91 1.75-2.0m	7.3	6.7	Nil ASS/PASS
TP91 0.50-0.75m	6.2	4.4	Improbable PASS	TP91 2.25-2.50m	7.3	6.3	Nil ASS/PASS
TP91 0.75-1.0m	6.9	6.6	Nil ASS/PASS	TP91 2.50-2.75m	7.3	6.9	Nil ASS/PASS
TP91 1.00-1.25m	6.9	5.8	Nil ASS/PASS	TP91 2.75-3.0m	7.3	7.1	Nil ASS/PASS
TP91 1.25-1.50m	6.9	6.3	Nil ASS/PASS				
Drilled:	22/08/07						
TP92 0.00-0.25m	6.3	3.2	Possible PASS	TP92 1.50-1.75m	6.4	6.4	Nil ASS/PASS
TP92 0.25-0.50m	5.7	3.6	Possible PASS	TP92 1.75-2.0m	6.6	7.1	Nil ASS/PASS
TP92 0.50-0.75m	5.9	3.7	Possible PASS	TP92 2.00-2.25m	6.8	7.6	Nil ASS/PASS
TP92 0.75-1.0m	5.8	3.9	Possible PASS	TP92 2.25-2.50m	6.9	6.8	Nil ASS/PASS
TP92 1.00-1.25m	5.7	4.0	Improbable PASS	TP92 2.50-2.75m	7.1	7.1	Nil ASS/PASS
TP92 1.25-1.50m	6.2	6.7	Nil ASS/PASS	TP92 2.75-3.0m	7.2	6.9	Nil ASS/PASS
Drilled:	22/08/07						
TP93 0.00-0.25m	7.3	5.8	Nil ASS/PASS	TP93 1.50-1.75m	7.0	5.2	Nil ASS/PASS
TP93 0.25-0.50m	7.2	5.8	Nil ASS/PASS	TP93 1.75-2.0m	6.4	5.3	Nil ASS/PASS
TP93 0.50-0.75m	6.9	5.2	Nil ASS/PASS	TP93 2.00-2.25m	6.4	5.3	Nil ASS/PASS
TP93 0.75-1.0m	6.3	5.0	Nil ASS/PASS	TP93 2.25-2.50m	6.4	5.2	Nil ASS/PASS
TP93 1.00-1.25m	6.4	4.7	Nil ASS/PASS	TP93 2.50-2.75m	6.4	5.0	Nil ASS/PASS
TP93 1.25-1.50m	6.3	4.5	Nil ASS/PASS	TP93 2.75-3.0m	6.7	5.8	Nil ASS/PASS

Quantitative Test Results

5

Location	Action Criteria (mole H^+/t)	TAA (mole H^+/t)	a-ANC (mole H^+/t)	Texture Description	S_{POS} (%)	'Net Acidity' (mole H^+/t)	pH_{OX}	Lime Rate (kg/m^3)
TP91 0.50-0.75m	62	25	33	HC, grey	<0.02	28	7.2	3
TP92 0.00-0.25m	62	46	–	HC, grey, organic matter	<0.02*	46	*–	5
TP92 0.75-1.0m	62	26	--	HC, grey	<0.02	26	5.5	3
TP92 1.50-1.75m	62	6	18	HC, grey	<0.02	<10	7.0	nil
TP93 1.25-1.50m	62	21	--	HC, grey	<0.02	21	5.7	3

Remarks: TAA - Total Actual Acidity. ANC - Acid Neutralising Capacity. S_{POS} - Peroxide Oxidisable Sulfur
Liming rates are based on a FOS of 1.5, assumed density of 1.4 tonne/m^3
for sands and clay and 'net potential acidity' as determined by analysis.
ANC is only determined when pH is >= 6.5
* All samples have undergone the Chromium Reducible Sulfur test, where pHox is not determined.

Test Procedures: pH_{FOX} "ASS Screening Test" (rapid oxidation with Hydrogen Peroxide) – Golder Associates
SPOCAS method – ALS Brisbane

Prepared By: TN/SLS | Checked By: HA 19/11/07

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Client:	ARUP	Sampled By: Golder
Project:	Gladstone Fitzroy Pipeline	Job No: 077633062
Location:	Raglan to Bajool	

pHfox Screening Test Results

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Location	pH_F	pH_{FOX}	Indication	Location	pH_F	pH_{FOX}	Indication
Drilled:	22/08/07						
TP96 0.00-0.25m	9.0	8.8	Nil ASS/PASS	TP96 1.50-1.75m	6.7	5.9	Nil ASS/PASS
TP96 0.25-0.50m	9.3	7.5	Nil ASS/PASS	TP96 1.75-2.0m	6.1	7.1	Nil ASS/PASS
TP96 0.50-0.75m	8.7	8.6	Nil ASS/PASS	TP96 2.00-2.25m	5.8	5.7	Nil ASS/PASS
TP96 0.75-1.0m	8.1	8.1	Nil ASS/PASS	TP96 2.25-2.50m	5.5	5.0	Nil ASS/PASS
TP96 1.00-1.25m	7.6	8.2	Nil ASS/PASS	TP96 2.50-2.75m	5.6	5.3	Nil ASS/PASS
TP96 1.25-1.50m	7.4	8.1	Nil ASS/PASS	TP96 2.75-3.0m	4.8	5.7	Nil ASS/PASS
Drilled:	22/08/07						
TP97 0.00-0.25m	8.7	8.4	Nil ASS/PASS	TP97 1.50-1.75m	8.6	8.7	Nil ASS/PASS
TP97 0.25-0.50m	8.6	8.2	Nil ASS/PASS	TP97 1.75-2.0m	8.2	8.5	Nil ASS/PASS
TP97 0.50-0.75m	8.4	8.4	Nil ASS/PASS	TP97 2.00-2.25m	8.1	8.6	Nil ASS/PASS
TP97 0.75-1.0m	7.9	8.3	Nil ASS/PASS	TP97 2.25-2.50m	8.3	8.7	Nil ASS/PASS
TP97 1.00-1.25m	8.3	8.3	Nil ASS/PASS	TP97 2.50-2.75m	7.7	7.5	Nil ASS/PASS
TP97 1.25-1.50m	8.4	8.2	Nil ASS/PASS	TP97 2.75-3.0m	7.6	7.8	Nil ASS/PASS

Quantitative Test Results

2

Location	Action Criteria (mole H^+/t)	TAA (mole H^+/t)	a-ANC (mole H^+/t)	Texture Description	S_{POS} (%)	'Net Acidity' (mole H^+/t)	pH_{OX}	Lime Rate (kg/m^3)
TP96 2.25-2.50m	36	6	--	LC, sandy, organics, grey & red	<0.02	<10	5.9	nil
TP97 2.75-3.0m	36	<2	33	LC, pale brown	0.22	24	8.4	3

Remarks: TAA - Total Actual Acidity. ANC - Acid Neutralising Capacity. S_{POS} - Peroxide Oxidisable Sulfur
Liming rates are based on a FOS of 1.5, assumed density of 1.4 tonne/m^3
for sands and clay and 'net potential acidity' as determined by analysis.
ANC is only determined when pH is >= 6.5

Test Procedures: pH_{FOX} "ASS Screening Test" (rapid oxidation with Hydrogen Peroxide) – Golder Associates
SPOCAS method – ALS Brisbane

Prepared By: TN/SLS | Checked By: HP 19/11/07

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Client:	ARUP	Sampled By: Golder
Project:	Gladstone Fitzroy Pipeline	Job No: 077633062
Location:	Raglan to Bajool	

pHfox Screening Test Results

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Location	pH_F	pH_{FOX}	Indication	Location	pH_F	pH_{FOX}	Indication
Drilled:	04/09/07						
TP98 0.00-0.25m	6.8	6.4	Nil ASS/PASS	TP98 1.50-1.75m	7.7	7.7	Nil ASS/PASS
TP98 0.25-0.50m	8.3	7.0	Nil ASS/PASS	TP98 1.75-2.0m	7.4	7.8	Nil ASS/PASS
TP98 0.50-0.75m	8.4	7.5	Nil ASS/PASS	TP98 2.00-2.25m	7.7	7.1	Nil ASS/PASS
TP98 0.75-1.0m	8.1	7.6	Nil ASS/PASS	TP98 2.25-2.50m	7.5	7.6	Nil ASS/PASS
TP98 1.00-1.25m	8.2	7.4	Nil ASS/PASS	TP98 2.50-2.75m	7.6	7.0	Nil ASS/PASS
TP98 1.25-1.50m	7.8	7.1	Nil ASS/PASS	TP98 2.75-3.0m	7.5	6.9	Nil ASS/PASS
Drilled:	04/09/07						
TP99 0.00-0.25m	8.2	7.6	Nil ASS/PASS	TP99 1.50-1.75m	8.6	9.0	Nil ASS/PASS
TP99 0.25-0.50m	8.8	8.0	Nil ASS/PASS	TP99 1.75-2.0m	8.7	9.0	Nil ASS/PASS
TP99 0.50-0.75m	8.4	7.9	Nil ASS/PASS	TP99 2.00-2.25m	8.5	8.7	Nil ASS/PASS
TP99 0.75-1.0m	8.3	8.4	Nil ASS/PASS	TP99 2.25-2.50m	8.6	8.8	Nil ASS/PASS
TP99 1.00-1.25m	8.3	8.6	Nil ASS/PASS	TP99 2.50-2.75m	8.6	8.9	Nil ASS/PASS
TP99 1.25-1.50m	8.6	8.6	Nil ASS/PASS	TP99 2.75-3.0m	8.4	9.0	Nil ASS/PASS

Quantitative Test Results

3

Location	Action Criteria (mole H^+/t)	TAA (mole H^+/t)	a-ANC (mole H^+/t)	Texture Description	S_{POS} (%)	'Net Acidity' (mole H^+/t)	pH_{OX}	Lime Rate (kg/m^3)
TP98 0.00-0.25m	62	6	--	HC, brown, organics	<0.02*	<10	--*	nil
TP98 2.75-3.0m	62	<2	23	HC, pale orange-brown & grey	<0.02	<10	7.2	nil
TP99 0.00-0.25m	62	<2	304	MC, brown, organics	<0.02*	<10	--*	nil

Remarks: TAA - Total Actual Acidity. ANC - Acid Neutralising Capacity. S_{POS} - Peroxide Oxidisable Sulfur
Liming rates are based on a FOS of 1.5, assumed density of 1.4 tonne/m^3
for sands and clay and 'net potential acidity' as determined by analysis.
ANC is only determined when pH is >= 6.5
* All samples have undergone the Chromium Reducible Sulfur test, where pHox is not determined.

Test Procedures: pH_{FOX} "ASS Screening Test" (rapid oxidation with Hydrogen Peroxide) – Golder Associates
SPOCAS method – ALS Brisbane

Prepared By: SLS/LMG | Checked By: HP 16/11/07

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Client:	ARUP	Sampled By: Golder
Project:	Gladstone Fitzroy Pipeline	Job No: 077633062
Location:	Raglan to Bajool	

pHfox Screening Test Results

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Location	pH_F	pH_{FOX}	Indication	Location	pH_F	pH_{FOX}	Indication
Drilled:	22/08/07						
TP102 0.00-0.25m	7.5	4.8	Nil ASS/PASS	TP102 1.50-1.75m	8.6	8.6	Nil ASS/PASS
TP102 0.25-0.50m	8.1	6.4	Nil ASS/PASS	TP102 1.75-2.0m	8.7	8.5	Nil ASS/PASS
TP102 0.50-0.75m	8.4	8.0	Nil ASS/PASS	TP102 2.00-2.25m	8.8	8.9	Nil ASS/PASS
TP102 0.75-1.0m	7.8	8.1	Nil ASS/PASS	TP102 2.25-2.50m	8.9	9.0	Nil ASS/PASS
TP102 1.00-1.25m	8.3	8.7	Nil ASS/PASS	TP102 2.50-2.75m	8.7	8.7	Nil ASS/PASS
TP102 1.25-1.50m	8.7	8.7	Nil ASS/PASS	TP102 2.75-3.0m	9.1	8.8	Nil ASS/PASS

Quantitative Test Results

3

Location	Action Criteria (mole H^+/t)	TAA (mole H^+/t)	a-ANC (mole H^+/t)	Texture Description	S_{POS} (%)	'Net Acidity' (mole H^+/t)	pH_{OX}	Lime Rate (kg/m^3)
TP102 0.00-0.25m	36	<2	--	LC, red-brown	<0.02	<10	6.4	nil
TP102 2.25-2.50m	62	<2	149	HC, pale brown, grey	<0.02	<10	9.0	nil
TP102 0.75-1.0m	62	<2	53	MC, red-brown	<0.02	<10	7.7	nil

Remarks: TAA - Total Actual Acidity. ANC - Acid Neutralising Capacity. S_{POS} - Peroxide Oxidisable Sulfur
Liming rates are based on a FOS of 1.5, assumed density of 1.4 tonne/m^3
for sands and clay and 'net potential acidity' as determined by analysis.
ANC is only determined when pH is >= 6.5

Test Procedures: pH_{FOX} "ASS Screening Test" (rapid oxidation with Hydrogen Peroxide) – Golder Associates SPOCAS method – ALS Brisbane

Prepared By: SLS/LMG | Checked By: HB 19/11/07

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Client:	ARUP	Sampled By: Golder
Project:	Gladstone Fitzroy Pipeline	Job No: 077633062
Location:	Raglan to Bajool	

pHfox Screening Test Results

36

Location	pH_F	pH_{FOX}	Indication	Location	pH_F	pH_{FOX}	Indication
Drilled:	22/08/07						
TP103 0.00-0.25m	8.4	8.5	Nil ASS/PASS	TP103 1.50-1.75m	7.9	8.4	Nil ASS/PASS
TP103 0.25-0.50m	8.5	8.4	Nil ASS/PASS	TP103 1.75-2.0m	7.9	8.5	Nil ASS/PASS
TP103 0.50-0.75m	8.2	8.5	Nil ASS/PASS	TP103 2.00-2.25m	7.8	8.5	Nil ASS/PASS
TP103 0.75-1.0m	8.0	8.3	Nil ASS/PASS	TP103 2.25-2.50m	7.4	8.2	Nil ASS/PASS
TP103 1.00-1.25m	8.0	8.1	Nil ASS/PASS	TP103 2.50-2.75m	7.9	7.5	Nil ASS/PASS
TP103 1.25-1.50m	7.9	7.9	Nil ASS/PASS	TP103 2.75-3.0m	7.6	8.5	Nil ASS/PASS
Drilled:	22/08/07						
TP104 0.00-0.25m	8.9	7.8	Nil ASS/PASS	TP104 1.50-1.75m	7.4	6.9	Nil ASS/PASS
TP104 0.25-0.50m	8.7	8.6	Nil ASS/PASS	TP104 1.75-2.0m	7.4	7.8	Nil ASS/PASS
TP104 0.50-0.75m	8.3	8.0	Nil ASS/PASS	TP104 2.00-2.25m	7.8	8.0	Nil ASS/PASS
TP104 0.75-1.0m	8.0	7.8	Nil ASS/PASS	TP104 2.25-2.50m	7.7	8.2	Nil ASS/PASS
TP104 1.00-1.25m	8.2	7.4	Nil ASS/PASS	TP104 2.50-2.75m	7.2	7.8	Nil ASS/PASS
TP104 1.25-1.50m	8.2	7.6	Nil ASS/PASS	TP104 2.75-3.0m	7.8	8.0	Nil ASS/PASS
Drilled:	22/08/07						
TP105 0.00-0.25m	5.9	4.2	Improbable PASS	TP105 1.50-1.75m	8.1	8.1	Nil ASS/PASS
TP105 0.25-0.50m	7.5	8.0	Nil ASS/PASS	TP105 1.75-2.0m	7.2	7.4	Nil ASS/PASS
TP105 0.50-0.75m	5.5	5.0	Nil ASS/PASS	TP105 2.00-2.25m	7.9	8.0	Nil ASS/PASS
TP105 0.75-1.0m	8.2	8.4	Nil ASS/PASS	TP105 2.25-2.50m	7.6	7.8	Nil ASS/PASS
TP105 1.00-1.25m	6.7	6.5	Nil ASS/PASS	TP105 2.50-2.75m	7.7	7.9	Nil ASS/PASS
TP105 1.25-1.50m	7.8	8.2	Nil ASS/PASS	TP105 2.75-3.0m	7.5	7.0	Nil ASS/PASS

Quantitative Test Results

6

Location	Action Criteria (mole H^+/t)	TAA (mole H^+/t)	a-ANC (mole H^+/t)	Texture Description	S_{POS} (%)	'Net Acidity' (mole H^+/t)	pH_{OX}	Lime Rate (kg/m^3)
TP103 2.50-2.75m	62	<2	209	MC, grey&pale brown, gravel	0.03	<10	9.2	nil
TP104 1.00-1.25m	62	<2	29	HC, pale brown	<0.02	<10	7.3	nil
TP104 1.50-1.75m	62	<2	66	HC, grey & pale brown	0.03	<10	7.7	nil
TP105 0.00-0.25m	36	13	--	LC, brown, organics	0.03	31	4.3	3
TP105 0.50-0.75m	62	20	32	HC, yellow brown & grey	<0.02	20	6.6	3
TP105 2.25-2.50m	36	<2	199	LC, grey & pale brown	0.02	<10	8.6	nil

Remarks: TAA - Total Actual Acidity. ANC - Acid Neutralising Capacity. S_{POS} - Peroxide Oxidisable Sulfur
Liming rates are based on a FOS of 1.5, assumed density of 1.4 tonne/m^3
for sands and clay and 'net potential acidity' as determined by analysis.
ANC is only determined when pH is >= 6.5

Test Procedures: pH_{FOX} "ASS Screening Test" (rapid oxidation with Hydrogen Peroxide) – Golder Associates
SPOCAS method – ALS Brisbane

Prepared By: TN/SLS | Checked By: HA 19/11/07

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http://WWW.golder.com

Client:	ARUP	Sampled By: Golder
Project:	Gladstone Fitzroy Pipeline	Job No: 077633062
Location:	Raglan to Bajool	

pHfox Screening Test Results

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Location	pH_F	pH_{FOX}	Indication	Location	pH_F	pH_{FOX}	Indication
Drilled:	23/10/07						
TP106 0.00-0.25m	6.0	4.6	Nil ASS/PASS	TP106 1.50-1.75m	4.9	4.0	Improbable PASS
TP106 0.25-0.50m	6.4	5.5	Nil ASS/PASS	TP106 1.75-2.0m	5.8	1.9	PASS
TP106 0.50-0.75m	6.5	5.6	Nil ASS/PASS	TP106 2.00-2.25m	4.3	2.7	Probable PASS
TP106 0.75-1.0m	6.7	5.8	Nil ASS/PASS	TP106 2.25-2.50m	4.2	3.0	Possible PASS
TP106 1.00-1.25m	6.2	5.6	Nil ASS/PASS	TP106 2.50-2.75m	4.2	3.3	Possible PASS
TP106 1.25-1.50m	6.5	5.7	Nil ASS/PASS	TP106 2.75-3.0m	4.1	3.0	Possible PASS
Drilled:	23/10/07						
TP107 0.00-0.25m	7.1	7.5	Nil ASS/PASS	TP107 1.50-1.75m	7.4	7.3	Nil ASS/PASS
TP107 0.25-0.50m	7.3	6.5	Nil ASS/PASS	TP107 1.75-2.0m	7.5	8.3	Nil ASS/PASS
TP107 0.50-0.75m	8.3	8.4	Nil ASS/PASS	TP107 2.00-2.25m	7.5	8.2	Nil ASS/PASS
TP107 0.75-1.0m	8.3	8.5	Nil ASS/PASS	TP107 2.25-2.50m	7.4	7.2	Nil ASS/PASS
TP107 1.00-1.25m	8.0	8.3	Nil ASS/PASS	TP107 2.50-2.75m	7.5	7.0	Nil ASS/PASS
TP107 1.25-1.50m	7.7	7.7	Nil ASS/PASS	TP107 2.75-3.0m	7.4	7.8	Nil ASS/PASS
Drilled:	23/10/07						
TP108 0.00-0.25m	7.4	6.4	Nil ASS/PASS	TP108 1.50-1.75m	7.6	8.0	Nil ASS/PASS
TP108 0.25-0.50m	7.3	7.3	Nil ASS/PASS	TP108 1.75-2.0m	7.6	7.9	Nil ASS/PASS
TP108 0.50-0.75m	7.1	7.3	Nil ASS/PASS	TP108 2.00-2.25m	7.4	7.7	Nil ASS/PASS
TP108 0.75-1.0m	7.4	7.3	Nil ASS/PASS	TP108 2.25-2.50m	7.1	7.5	Nil ASS/PASS
TP108 1.00-1.25m	7.7	7.4	Nil ASS/PASS	TP108 2.50-2.75m	5.6	4.4	Improbable PASS
TP108 1.25-1.50m	7.6	7.3	Nil ASS/PASS	TP108 2.75-3.0m	5.3	4.0	Improbable PASS

Quantitative Test Results

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Location	Action Criteria (mole H^+/t)	TAA (mole H^+/t)	a-ANC (mole H^+/t)	Texture Description	S_{POS} (%)	'Net Acidity' (mole H^+/t)	pH_{OX}	Lime Rate (kg/m^3)
TP106 1.75-2.0m	36	13	--	LC, dk grey-brown	0.97	616	2.2	64
TP106 2.25-2.5m	36	29	--	LC, grey-brown	<0.02	49	3.6	6
TP107 0.25-0.5m	36	<2	90	LC, dk brown, trace sand	0.04	<10	6.6	nil
TP108 0.0-0.25m	62	5	--	MC, dk brown, organics	<0.02	<10	<10	nil
TP108 2.75-3.0m	62	24	--	HC, grey, some orange-brown	<0.02	25	4.8	3

Remarks: TAA - Total Actual Acidity. ANC - Acid Neutralising Capacity. S_{POS} - Peroxide Oxidisable Sulfur
Liming rates are based on a FOS of 1.5, assumed density of 1.4 tonne/m^3
for sands and clay and 'net potential acidity' as determined by analysis.
ANC is only determined when pH is >= 6.5

Test Procedures: pH_{FOX} "ASS Screening Test" (rapid oxidation with Hydrogen Peroxide) – Golder Associates
SPOCAS method – ALS Brisbane

Prepared By: HP | Checked By: HM 19/11/07

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http://WWW.golder.com

Client:	ARUP	Sampled By: Golder
Project:	Gladstone Fitzroy Pipeline	Job No: 077633062
Location:	Raglan to Bajool	

pHfox Screening Test Results

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Location	pH_F	pH_{FOX}	Indication	Location	pH_F	pH_{FOX}	Indication
Drilled:	23/10/07						
TP109 0.00-0.25m	6.5	4.6	Nil ASS/PASS	TP109 1.50-1.75m	7.4	6.8	Nil ASS/PASS
TP109 0.25-0.50m	6.7	6.1	Nil ASS/PASS	TP109 1.75-2.0m	7.3	6.8	Nil ASS/PASS
TP109 0.50-0.75m	7.0	7.1	Nil ASS/PASS	TP109 2.00-2.25m	7.3	6.4	Nil ASS/PASS
TP109 0.75-1.0m	7.4	7.8	Nil ASS/PASS	TP109 2.25-2.50m	7.1	6.2	Nil ASS/PASS
TP109 1.00-1.25m	7.3	7.3	Nil ASS/PASS	TP109 2.50-2.75m	7.2	6.0	Nil ASS/PASS
TP109 1.25-1.50m	7.4	6.8	Nil ASS/PASS	TP109 2.75-3.0m	6.6	5.5	Nil ASS/PASS
Drilled:	23/10/07						
TP110 0.00-0.25m	6.6	5.5	Nil ASS/PASS	TP110 1.50-1.75m	7.3	8.1	Nil ASS/PASS
TP110 0.25-0.50m	7.4	6.6	Nil ASS/PASS	TP110 1.75-2.0m	7.6	7.3	Nil ASS/PASS
TP110 0.50-0.75m	7.0	6.0	Nil ASS/PASS	TP110 2.00-2.25m	7.5	7.8	Nil ASS/PASS
TP110 0.75-1.0m	7.4	7.6	Nil ASS/PASS	TP110 2.25-2.50m	7.6	7.8	Nil ASS/PASS
TP110 1.00-1.25m	7.6	8.1	Nil ASS/PASS	TP110 2.50-2.75m	7.5	7.0	Nil ASS/PASS
TP110 1.25-1.50m	7.7	8.1	Nil ASS/PASS	TP110 2.75-3.0m	7.3	7.0	Nil ASS/PASS
Drilled:	23/10/07						
TP111 0.00-0.25m	7.4	6.7	Nil ASS/PASS	TP111 1.50-1.75m	7.5	8.0	Nil ASS/PASS
TP111 0.25-0.50m	7.5	7.8	Nil ASS/PASS	TP111 1.75-2.0m	7.4	7.7	Nil ASS/PASS
TP111 0.50-0.75m	7.7	8.1	Nil ASS/PASS	TP111 2.00-2.25m	7.4	7.2	Nil ASS/PASS
TP111 0.75-1.0m	7.9	7.8	Nil ASS/PASS	TP111 2.25-2.50m	7.5	7.6	Nil ASS/PASS
TP111 1.00-1.25m	7.8	7.7	Nil ASS/PASS	TP111 2.50-2.75m	7.2	7.8	Nil ASS/PASS
TP111 1.25-1.50m	7.8	8.2	Nil ASS/PASS	TP111 2.75-3.0m	7.3	8.0	Nil ASS/PASS
Drilled:	23/10/07						
TP112 0.00-0.25m	7.1	6.3	Nil ASS/PASS	TP112 1.50-1.75m	7.7	7.0	Nil ASS/PASS
TP112 0.25-0.50m	7.8	7.5	Nil ASS/PASS	TP112 1.75-2.0m	7.6	7.2	Nil ASS/PASS
TP112 0.50-0.75m	8.1	8.1	Nil ASS/PASS	TP112 2.00-2.25m	6.8	6.1	Nil ASS/PASS
TP112 0.75-1.0m	8.2	7.7	Nil ASS/PASS	TP112 2.25-2.50m	5.9	5.5	Nil ASS/PASS
TP112 1.00-1.25m	7.8	8.2	Nil ASS/PASS	TP112 2.50-2.75m	5.7	5.4	Nil ASS/PASS
TP112 1.25-1.50m	7.7	8.0	Nil ASS/PASS	TP112 2.75-3.0m	5.5	5.6	Nil ASS/PASS

Quantitative Test Results

3

Location	Action Criteria (mole H^+/t)	TAA (mole H^+/t)	a-ANC (mole H^+/t)	Texture Description	S_{POS} (%)	'Net Acidity' (mole H^+/t)	pH_{OX}	Lime Rate (kg/m^3)
TP109 0.0-0.25m	36	13	--	LS, dk brown, trace organics	<0.02	13	*--	nil
TP110 0.0-0.25m	36	12	--	LC, grey brown, organics	<0.02	12	*--	nil
TP112 2.25-2.5m	62	9	--	MC, pale grey-brown	0.02	22	6.0	3

Remarks: TAA - Total Actual Acidity. ANC - Acid Neutralising Capacity. S_{POS} - Peroxide Oxidisable Sulfur
Liming rates are based on a FOS of 1.5, assumed density of 1.4 tonne/m^3
for sands and clay and 'net potential acidity' as determined by analysis.
ANC is only determined when pH is >= 6.5
* All samples have undergone the Chromium Reducible Sulfur test, where pHox is not determined.

Test Procedures: pH_{FOX} "ASS Screening Test" (rapid oxidation with Hydrogen Peroxide) – Golder Associates
SPOCAS method – ALS Brisbane

Prepared By: HP | Checked By: HP 19/11/07

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Client:	ARUP	Sampled By: Golder
Project:	Gladstone Fitzroy Pipeline	Job No: 077633062
Location:	Bajool to Archer	

pHfox Screening Test Results

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Location	pH_F	pH_{FOX}	Indication	Location	pH_F	pH_{FOX}	Indication
Drilled:	23/10/07						
TP114 0.00-0.25m	6.0	3.5	Possible PASS	TP114 1.50-1.75m	8.0	7.8	Nil ASS/PASS
TP114 0.25-0.50m	7.3	6.1	Nil ASS/PASS	TP114 1.75-2.0m	7.9	8.2	Nil ASS/PASS
TP114 0.50-0.75m	7.7	7.0	Nil ASS/PASS	TP114 2.00-2.25m	7.8	8.1	Nil ASS/PASS
TP114 0.75-1.0m	7.8	7.3	Nil ASS/PASS	TP114 2.25-2.50m	7.8	8.1	Nil ASS/PASS
TP114 1.00-1.25m	8.2	7.9	Nil ASS/PASS	TP114 2.50-2.75m	7.7	7.9	Nil ASS/PASS
TP114 1.25-1.50m	8.0	8.3	Nil ASS/PASS	TP114 2.75-3.0m	7.7	8.0	Nil ASS/PASS
Drilled:	23/10/07						
TP115 0.00-0.25m	8.1	7.6	Nil ASS/PASS	TP115 1.50-1.75m	7.8	8.3	Nil ASS/PASS
TP115 0.25-0.50m	8.2	8.3	Nil ASS/PASS	TP115 1.75-2.0m	7.7	8.2	Nil ASS/PASS
TP115 0.50-0.75m	8.2	8.4	Nil ASS/PASS	TP115 2.00-2.25m	7.9	8.2	Nil ASS/PASS
TP115 0.75-1.0m	8.1	8.6	Nil ASS/PASS	TP115 2.25-2.50m	7.9	8.3	Nil ASS/PASS
TP115 1.00-1.25m	8.3	8.6	Nil ASS/PASS	TP115 2.50-2.75m	8.0	8.5	Nil ASS/PASS
TP115 1.25-1.50m	7.9	8.4	Nil ASS/PASS	TP115 2.75-3.0m	7.9	8.3	Nil ASS/PASS
Drilled:	23/10/07						
TP119 0.00-0.25m	6.2	4.6	Nil ASS/PASS	TP119 1.50-1.75m	8.0	7.6	Nil ASS/PASS
TP119 0.25-0.50m	7.0	5.6	Nil ASS/PASS	TP119 1.75-2.0m	7.8	8.1	Nil ASS/PASS
TP119 0.50-0.75m	6.6	5.4	Nil ASS/PASS	TP119 2.00-2.25m	7.9	8.2	Nil ASS/PASS
TP119 0.75-1.0m	7.1	6.0	Nil ASS/PASS	TP119 2.25-2.50m	8.1	7.9	Nil ASS/PASS
TP119 1.00-1.25m	7.7	7.2	Nil ASS/PASS	TP119 2.50-2.75m	8.0	8.2	Nil ASS/PASS
TP119 1.25-1.50m	7.9	7.3	Nil ASS/PASS	TP119 2.75-3.0m	7.9	8.2	Nil ASS/PASS

Quantitative Test Results

3

Location	Action Criteria (mole H^+/t)	TAA (mole H^+/t)	a-ANC (mole H^+/t)	Texture Description	S_{POS} (%)	'Net Acidity' (mole H^+/t)	pH_{OX}	Lime Rate (kg/m^3)
TP114 0.0-0.25m	36	14	--	ZL, brown, organics	<0.02	14	*--	nil
TP119 0.0-0.25m	36	10	--	ZL, brown, organics	<0.02	10	*--	nil
TP119 0.5-0.75m	36	9	67	ZCL, brown, organics	<0.02	<10	6.7	nil

Remarks: TAA - Total Actual Acidity. ANC - Acid Neutralising Capacity. S_{POS} - Peroxide Oxidisable Sulfur
Liming rates are based on a FOS of 1.5, assumed density of 1.4 tonne/m^3
for sands and clay and 'net potential acidity' as determined by analysis.
ANC is only determined when pH is >= 6.5
* All samples have undergone the Chromium Reducible Sulfur test, where pHox is not determined.

Test Procedures: pH_{FOX} "ASS Screening Test" (rapid oxidation with Hydrogen Peroxide) – Golder Associates
SPOCAS method – ALS Brisbane

Prepared By: HP | Checked By: HP 19 Nov 07

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Client:	ARUP	Sampled By: Golder
Project:	Gladstone Fitzroy Pipeline	Job No: 077633062
Location:	Bajool to Archer	

pHfox Screening Test Results

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Location	pH_F	pH_{FOX}	Indication	Location	pH_F	pH_{FOX}	Indication
Drilled:	23/10/07						
TP120 0.00-0.25m	7.7	7.8	Nil ASS/PASS	TP120 1.50-1.75m	8.1	8.5	Nil ASS/PASS
TP120 0.25-0.50m	8.1	8.5	Nil ASS/PASS	TP120 1.75-2.0m	8.2	8.5	Nil ASS/PASS
TP120 0.50-0.75m	8.1	8.4	Nil ASS/PASS	TP120 2.00-2.25m	8.0	8.4	Nil ASS/PASS
TP120 0.75-1.0m	8.1	8.4	Nil ASS/PASS	TP120 2.25-2.50m	8.0	8.4	Nil ASS/PASS
TP120 1.00-1.25m	8.2	8.5	Nil ASS/PASS	TP120 2.50-2.75m	8.1	8.0	Nil ASS/PASS
TP120 1.25-1.50m	8.3	8.8	Nil ASS/PASS	TP120 2.75-3.0m	8.1	8.5	Nil ASS/PASS
Drilled:	23/10/07						
TP123 0.00-0.25m	6.7	4.5	Nil ASS/PASS	TP123 1.50-1.75m	8.4	8.6	Nil ASS/PASS
TP123 0.25-0.50m	6.0	3.6	Possible PASS	TP123 1.75-2.0m	8.2	8.5	Nil ASS/PASS
TP123 0.50-0.75m	6.9	5.8	Nil ASS/PASS	TP123 2.00-2.25m	8.2	8.4	Nil ASS/PASS
TP123 0.75-1.0m	8.2	8.2	Nil ASS/PASS	TP123 2.25-2.50m	8.1	8.4	Nil ASS/PASS
TP123 1.00-1.25m	7.7	7.4	Nil ASS/PASS	TP123 2.50-2.75m	8.0	8.4	Nil ASS/PASS
TP123 1.25-1.50m	8.0	8.2	Nil ASS/PASS	TP123 2.75-3.0m	8.3	8.7	Nil ASS/PASS

Quantitative Test Results

1

Location	Action Criteria (mole H^+/t)	TAA (mole H^+/t)	a-ANC (mole H^+/t)	Texture Description	S_{POS} (%)	'Net Acidity' (mole H^+/t)	pH_{OX}	Lime Rate (kg/m^3)
TP123 0.25-0.5m	62	23	90	MC, dk brown, trace sand	<0.02	23	6.9	3

Remarks: TAA - Total Actual Acidity. ANC - Acid Neutralising Capacity. S_{POS} - Peroxide Oxidisable Sulfur
Liming rates are based on a FOS of 1.5, assumed density of 1.4 tonne/m^3
for sands and clay and 'net potential acidity' as determined by analysis.
ANC is only determined when pH is >= 6.5

Test Procedures: pH_{FOX} "ASS Screening Test" (rapid oxidation with Hydrogen Peroxide) – Golder Associates SPOCAS method – ALS Brisbane

Prepared By: HP | Checked By: HP 19/11/07

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Client:	ARUP	Sampled By: Golder
Project:	Gladstone Fitzroy Pipeline	Job No: 077633062
Location:	Archer to Midgee	

pHfox Screening Test Results

36

Location	pH_F	pH_{FOX}	Indication	Location	pH_F	pH_{FOX}	Indication
Drilled:	22/10/07						
TP130 0.00-0.25m	5.3	3.3	Possible PASS	TP130 1.50-1.75m	7.5	8.1	Nil ASS/PASS
TP130 0.25-0.50m	5.8	4.3	Improbable PASS	TP130 1.75-2.0m	7.7	8.1	Nil ASS/PASS
TP130 0.50-0.75m	5.9	5.2	Nil ASS/PASS	TP130 2.00-2.25m	7.7	8.0	Nil ASS/PASS
TP130 0.75-1.0m	7.3	6.8	Nil ASS/PASS	TP130 2.25-2.50m	7.7	7.1	Nil ASS/PASS
TP130 1.00-1.25m	7.6	7.6	Nil ASS/PASS	TP130 2.50-2.75m	7.7	7.5	Nil ASS/PASS
TP130 1.25-1.50m	7.8	8.1	Nil ASS/PASS	TP130 2.75-3.0m	7.8	8.0	Nil ASS/PASS
Drilled:	22/10/07						
TP131 0.00-0.25m	6.4	5.0	Nil ASS/PASS	TP131 1.50-1.75m	6.3	6.0	Nil ASS/PASS
TP131 0.25-0.50m	6.1	5.2	Nil ASS/PASS	TP131 1.75-2.0m	6.7	6.6	Nil ASS/PASS
TP131 0.50-0.75m	5.9	5.2	Nil ASS/PASS	TP131 2.00-2.25m	6.7	6.7	Nil ASS/PASS
TP131 0.75-1.0m	6.2	6.5	Nil ASS/PASS	TP131 2.25-2.50m	6.9	6.6	Nil ASS/PASS
TP131 1.00-1.25m	5.9	5.6	Nil ASS/PASS	TP131 2.50-2.75m	6.9	6.3	Nil ASS/PASS
TP131 1.25-1.50m	6.0	6.0	Nil ASS/PASS	TP131 2.75-3.0m	7.0	6.6	Nil ASS/PASS
Drilled:	22/10/07						
TP132 0.00-0.25m	5.9	3.7	Possible PASS	TP132 1.50-1.75m	7.6	8.1	Nil ASS/PASS
TP132 0.25-0.50m	7.6	7.0	Nil ASS/PASS	TP132 1.75-2.0m	7.4	7.8	Nil ASS/PASS
TP132 0.50-0.75m	7.9	8.0	Nil ASS/PASS	TP132 2.00-2.25m	7.1	7.7	Nil ASS/PASS
TP132 0.75-1.0m	8.1	8.5	Nil ASS/PASS	TP132 2.25-2.50m	6.6	6.0	Nil ASS/PASS
TP132 1.00-1.25m	8.0	8.4	Nil ASS/PASS	TP132 2.50-2.75m	6.1	5.7	Nil ASS/PASS
TP132 1.25-1.50m	7.8	8.4	Nil ASS/PASS	TP132 2.75-3.0m	5.9	5.8	Nil ASS/PASS

Quantitative Test Results

4

Location	Action Criteria (mole H^+/t)	TAA (mole H^+/t)	a-ANC (mole H^+/t)	Texture Description	S_{POS} (%)	'Net Acidity' (mole H^+/t)	pH_{OX}	Lime Rate (kg/m^3)
TP130 0.0-0.25m	36	35	--	ZL, dk brown	<0.02	35	*--	4
TP130 0.5-0.75m	36	13	--	ZL, dk brown	<0.02	13	4.8	nil
TP131 0.0-0.25m	62	13	--	MHC, brown	<0.02	13	*--	nil
TP132 0.0-0.25m	36	24	--	ZL, grey-brown	<0.02	24	*--	3

Remarks: TAA - Total Actual Acidity. ANC - Acid Neutralising Capacity. S_{POS} - Peroxide Oxidisable Sulfur
Liming rates are based on a FOS of 1.5, assumed density of 1.4 tonne/m^3
for sands and clay and 'net potential acidity' as determined by analysis.
ANC is only determined when pH is >= 6.5
* All samples have undergone the Chromium Reducible Sulfur test, where pHox is not determined.

Test Procedures: pH_{FOX} "ASS Screening Test" (rapid oxidation with Hydrogen Peroxide) -- Golder Associates SPOCAS method – ALS Brisbane

Prepared By: HP | Checked By: HP 19/1/07

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Client:	ARUP	Sampled By: Golder
Project:	Gladstone Fitzroy Pipeline	Job No: 077633062
Location:	Bajool to Archer	

pHfox Screening Test Results

24

Location	pH_F	pH_{FOX}	Indication	Location	pH_F	pH_{FOX}	Indication
Drilled:	22/10/07						
TP133 0.00-0.25m	7.5	8.0	Nil ASS/PASS	TP133 1.50-1.75m	7.6	7.9	Nil ASS/PASS
TP133 0.25-0.50m	7.7	7.8	Nil ASS/PASS	TP133 1.75-2.0m	7.5	8.1	Nil ASS/PASS
TP133 0.50-0.75m	7.7	8.2	Nil ASS/PASS	TP133 2.00-2.25m	7.5	8.1	Nil ASS/PASS
TP133 0.75-1.0m	7.7	8.3	Nil ASS/PASS	TP133 2.25-2.50m	7.7	8.3	Nil ASS/PASS
TP133 1.00-1.25m	7.8	8.2	Nil ASS/PASS	TP133 2.50-2.75m	7.5	8.2	Nil ASS/PASS
TP133 1.25-1.50m	7.8	8.3	Nil ASS/PASS	TP133 2.75-3.0m	7.5	8.2	Nil ASS/PASS
Drilled:	22/10/07						
TP138 0.00-0.25m	6.6	4.5	Nil ASS/PASS	TP138 1.50-1.75m	8.6	8.4	Nil ASS/PASS
TP138 0.25-0.50m	7.2	6.8	Nil ASS/PASS	TP138 1.75-2.0m	8.6	8.5	Nil ASS/PASS
TP138 0.50-0.75m	7.4	6.5	Nil ASS/PASS	TP138 2.00-2.25m	8.7	8.6	Nil ASS/PASS
TP138 0.75-1.0m	7.8	6.5	Nil ASS/PASS	TP138 2.25-2.50m	8.8	8.8	Nil ASS/PASS
TP138 1.00-1.25m	8.2	7.8	Nil ASS/PASS	TP138 2.50-2.75m	8.6	8.5	Nil ASS/PASS
TP138 1.25-1.50m	8.3	8.2	Nil ASS/PASS	TP138 2.75-3.0m	8.7	8.7	Nil ASS/PASS

Quantitative Test Results

1

Location	Action Criteria (mole H^+/t)	TAA (mole H^+/t)	a-ANC (mole H^+/t)	Texture Description	S_{POS} (%)	'Net Acidity' (mole H^+/t)	pH_{OX}	Lime Rate (kg/m^3)
TP138 0.0-0.25	18	9	--	LS, brown	<0.02	<10	*--	nil

Remarks: TAA - Total Actual Acidity. ANC - Acid Neutralising Capacity. S_{POS} - Peroxide Oxidisable Sulfur
Liming rates are based on a FOS of 1.5, assumed density of 1.4 tonne/m^3
for sands and clay and 'net potential acidity' as determined by analysis.
ANC is only determined when pH is >= 6.5
* All samples have undergone the Chromium Reducible Sulfur test, where pHox is not determined.

Test Procedures: pH_{FOX} "ASS Screening Test" (rapid oxidation with Hydrogen Peroxide) – Golder Associates
SPOCAS method – ALS Brisbane

Prepared By: HP | Checked By: [signature] 19/11/07

Golder Associates Pty Ltd
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Client:	ARUP	Sampled By: Golder
Project:	Gladstone Fitzroy Pipeline	Job No: 077633062
Location:	Midgee to Gavial	

pHfox Screening Test Results

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Location	pH_F	pH_{FOX}	Indication	Location	pH_F	pH_{FOX}	Indication
Drilled:	not listed						
TP151 0.00-0.25m	6.9	6.2	Nil ASS/PASS	TP151 1.50-1.75m	7.3	7.4	Nil ASS/PASS
TP151 0.25-0.50m	7.6	7.4	Nil ASS/PASS	TP151 1.75-2.0m	6.7	6.2	Nil ASS/PASS
TP151 0.50-0.75m	7.3	6.4	Nil ASS/PASS	TP151 2.00-2.25m	6.2	6.6	Nil ASS/PASS
TP151 0.75-1.0m	7.3	7.3	Nil ASS/PASS	TP151 2.25-2.50m	7.3	6.9	Nil ASS/PASS
TP151 1.00-1.25m	7.3	7.0	Nil ASS/PASS	TP151 2.50-2.75m	7.7	7.6	Nil ASS/PASS
TP151 1.25-1.50m	7.3	7.1	Nil ASS/PASS	TP151 2.75-3.0m	7.9	8.5	Nil ASS/PASS

Quantitative Test Results

1

Location	Action Criteria (mole H^+/t)	TAA (mole H^+/t)	a-ANC (mole H^+/t)	Texture Description	S_{POS} (%)	'Net Acidity' (mole H^+/t)	pH_{OX}	Lime Rate (kg/m^3)
TP151 1.75-2.0m	36	25	--	LC, sandy, grey & red-brown	<0.02	31	5.0	3

Remarks: TAA - Total Actual Acidity. ANC - Acid Neutralising Capacity. S_{POS} - Peroxide Oxidisable Sulfur
Liming rates are based on a FOS of 1.5, assumed density of 1.4 tonne/m^3
for sands and clay and 'net potential acidity' as determined by analysis.
ANC is only determined when pH is >= 6.5

Test Procedures: pH_{FOX} "ASS Screening Test" (rapid oxidation with Hydrogen Peroxide) – Golder Associates
SPOCAS method – ALS Brisbane

Prepared By: TN/SLS | Checked By: HP 19/11/07

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Client:	ARUP	Sampled By: Golder
Project:	Gladstone Fitzroy Pipeline	Job No: 077633062
Location:	Gavial to Rocklands	

pHfox Screening Test Results

11

Location	pH_F	pH_{FOX}	Indication	Location	pH_F	pH_{FOX}	Indication
Drilled:	not listed						
TP155 0.0-0.25m	6.4	4.7	Nil ASS/PASS	TP155 1.75-2.0m	5.8	4.3	Improbable PASS
TP155 0.25-0.50m	5.6	4.9	Nil ASS/PASS	TP155 2.25-2.50m	5.7	5.6	Nil ASS/PASS
TP155 0.75-1.0m	5.5	5.0	Nil ASS/PASS	TP155 2.75-3.0m	6.4	6.4	Nil ASS/PASS
TP155 1.25-1.50m	5.3	4.5	Nil ASS/PASS				
Drilled:	03/09/07						
TP163 0.0-0.9m	6.6	4.6	Nil ASS/PASS				
TP163 0.9-1.1m	6.6	5.6	Nil ASS/PASS				
TP163 2.0-3.0m	7.9	6.7	Nil ASS/PASS				
TP163 2.25-2.50m	6.9	7.7	Nil ASS/PASS				

Quantitative Test Results

3

Location	Action Criteria (mole H^+/t)	TAA (mole H^+/t)	a-ANC (mole H^+/t)	Texture Description	S_{POS} (%)	'Net Acidity' (mole H^+/t)	pH_{OX}	Lime Rate (kg/m^3)
TP155 1.75-2.0m	62	<2	16	MC, grey & brown, organics	<0.02	<10	7.0	nil
TP163 0.0-0.9m	36	12	--	LC, dark brown	<0.02	12	4.9	nil
TP163 2.25-2.50m	36	<2	136	LMC, sandy, grey & red-brown	<0.02	<10	9.0	nil

Remarks: TAA - Total Actual Acidity. ANC - Acid Neutralising Capacity. S_{POS} - Peroxide Oxidisable Sulfur
Liming rates are based on a FOS of 1.5, assumed density of 1.4 tonne/m^3
for sands and clay and 'net potential acidity' as determined by analysis.
ANC is only determined when pH is >= 6.5

Test Procedures: pH_{FOX} "ASS Screening Test" (rapid oxidation with Hydrogen Peroxide) – Golder Associates
SPOCAS method – ALS Brisbane

Prepared By: TN/SLS | Checked By: HA 19/11/07

Golder Associates Pty Ltd
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Client:	ARUP	Sampled By: Golder
Project:	Gladstone Fitzroy Pipeline	Job No: 077633062
Location:	Gavial to Rocklands	

pHfox Screening Test Results

24

Location	pH_F	pH_{FOX}	Indication	Location	pH_F	pH_{FOX}	Indication
Drilled:	03/09/07			Drilled:	03/09/07		
TP159 0.0-0.6	7.5	5.4	Nil ASS/PASS	TP162 0.0-0.5	8.4	8.2	Nil ASS/PASS
TP159 0.6-0.9	7.9	7.4	Nil ASS/PASS	TP162 0.5-0.8	8.1	8.3	Nil ASS/PASS
TP159 0.9-2.1	8.2	8.2	Nil ASS/PASS	TP162 0.8-2.4	8.0	8.4	Nil ASS/PASS
TP159 2.1-3.0	7.9	8.4	Nil ASS/PASS	TP162 2.4-3.0	8.5	8.7	Nil ASS/PASS
Drilled:	03/09/07						
TP160 0.0-0.5	7.5	4.7	Nil ASS/PASS				
TP160 0.5-1.1	7.4	7.0	Nil ASS/PASS				
TP160 1.1-1.4	7.8	6.8	Nil ASS/PASS				
TP160 1.4-3.0	8.3	8.6	Nil ASS/PASS				
Drilled:	30/08/07						
TP165 0.00-0.25m	6.1	4.6	Nil ASS/PASS	TP165 1.50-1.75m	7.5	7.8	Nil ASS/PASS
TP165 0.25-0.50m	6.1	5.5	Nil ASS/PASS	TP165 1.75-2.0m	7.6	7.7	Nil ASS/PASS
TP165 0.50-0.75m	6.4	5.8	Nil ASS/PASS	TP165 2.00-2.25m	7.5	7.8	Nil ASS/PASS
TP165 0.75-1.0m	7.3	6.7	Nil ASS/PASS	TP165 2.25-2.50m	7.4	7.8	Nil ASS/PASS
TP165 1.00-1.25m	7.4	6.9	Nil ASS/PASS	TP165 2.50-2.75m	7.4	7.6	Nil ASS/PASS
TP165 1.25-1.50m	7.3	7.8	Nil ASS/PASS	TP165 2.75-3.0m	7.4	7.6	Nil ASS/PASS

Quantitative Test Results

3

Location	Action Criteria (mole H^+/t)	TAA (mole H^+/t)	a-ANC (mole H^+/t)	Texture Description	S_{POS} (%)	'Net Acidity' (mole H^+/t)	pH_{OX}	Lime Rate (kg/m^3)
TP159 0.0-0.6m	36	2	--	LC, sandy, dark brown	<0.02	<10	7.2	nil
TP160 0.0-0.5m	36	4	--	ZL, dark brown	<0.02	<10	7.2	nil
TP165 0.00-0.25m	36	25	25	SCL, dark grey, gravel	<0.02*	25	*--	3
TP165 1.00-1.25m	36	<2	260	LC, grey	<0.02	<10	8.9	nil

Remarks: TAA - Total Actual Acidity. ANC - Acid Neutralising Capacity. S_{POS} - Peroxide Oxidisable Sulfur
Liming rates are based on a FOS of 1.5, assumed density of 1.4 tonne/m^3
for sands and clay and 'net potential acidity' as determined by analysis.
ANC is only determined when pH is >= 6.5
* All samples have undergone the Chromium Reducible Sulfur test, where pHox is not determined.

Test Procedures: pH_{FOX} "ASS Screening Test" (rapid oxidation with Hydrogen Peroxide) – Golder Associates
SPOCAS method – ALS Brisbane

Prepared By: BM | Checked By: HA 19/11/07

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Client:	ARUP	Sampled By: Golder
Project:	Gladstone Fitzroy Pipeline	Job No: 077633062
Location:	Rocklands to Archer park	

pHfox Screening Test Results

24

Location	pH_F	pH_{FOX}	Indication	Location	pH_F	pH_{FOX}	Indication
Drilled:	03/09/07			Drilled:			
TP167 0.00-0.25m	8.1	7.4	Nil ASS/PASS	TP167 1.50-1.75m	7.7	7.1	Nil ASS/PASS
TP167 0.25-0.50m	7.6	6.4	Nil ASS/PASS	TP167 1.75-2.0m	7.7	8.2	Nil ASS/PASS
TP167 0.50-0.75m	7.5	7.1	Nil ASS/PASS	TP167 2.00-2.25m	7.6	8.3	Nil ASS/PASS
TP167 0.75-1.0m	7.7	7.3	Nil ASS/PASS	TP167 2.25-2.50m	7.7	8.2	Nil ASS/PASS
TP167 1.00-1.25m	8.0	7.5	Nil ASS/PASS	TP167 2.50-2.75m	7.7	7.6	Nil ASS/PASS
TP167 1.25-1.50m	7.7	7.1	Nil ASS/PASS	TP167 2.75-3.0m	7.7	8.1	Nil ASS/PASS
Drilled:	30/08/07						
TP166 0.00-0.25m	7.6	5.0	Nil ASS/PASS	TP166 1.50-1.75m	7.5	8.2	Nil ASS/PASS
TP166 0.25-0.50m	7.5	7.1	Nil ASS/PASS	TP166 1.75-2.0m	7.6	8.3	Nil ASS/PASS
TP166 0.50-0.75m	7.6	7.2	Nil ASS/PASS	TP166 2.00-2.25m	7.3	8.5	Nil ASS/PASS
TP166 0.75-1.0m	7.7	8.0	Nil ASS/PASS	TP166 2.25-2.50m	7.4	8.3	Nil ASS/PASS
TP166 1.00-1.25m	7.6	8.2	Nil ASS/PASS	TP166 2.50-2.75m	7.4	8.1	Nil ASS/PASS
TP166 1.25-1.50m	7.2	8.3	Nil ASS/PASS	TP166 2.75-3.0m	7.4	8.1	Nil ASS/PASS

Quantitative Test Results

3

Location	Action Criteria (mole H^+/t)	TAA (mole H^+/t)	a-ANC (mole H^+/t)	Texture Description	S_{POS} (%)	'Net Acidity' (mole H^+/t)	pH_{OX}	Lime Rate (kg/m^3)
TP166 0.00-0.25m	62	16	--	MC, dark grey, organics	<0.02*	16	*--	nil
TP167 0.00-0.25m	62	<2	75	MC, grey & brown, organics	<0.02	<10	6.9	nil
TP167 2.50-2.75m	62	<2	55	HC, grey	<0.02	<19	7.0	nil

Remarks: TAA - Total Actual Acidity. ANC - Acid Neutralising Capacity. S_{POS} - Peroxide Oxidisable Sulfur
Liming rates are based on a FOS of 1.5, assumed density of 1.4 tonne/m^3
for sands and clay and 'net potential acidity' as determined by analysis.
ANC is only determined when pH is >= 6.5
* All samples have undergone the Chromium Reducible Sulfur test, where pHox is not determined.

Test Procedures: pH_{FOX} "ASS Screening Test" (rapid oxidation with Hydrogen Peroxide) – Golder Associates SPOCAS method – ALS Brisbane

Prepared By: SLS/LMG | Checked By: HA 14/11/07

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Client:	ARUP	Sampled By: Golder
Project:	Gladstone Fitzroy Pipeline	Job No: 077633062
Location:	Rocklands to Archer park	

pHfox Screening Test Results

35

Location	pH_F	pH_{FOX}	Indication	Location	pH_F	pH_{FOX}	Indication
Drilled:	30/08/07			Drilled:			
TP168 0.00-0.25m	6.2	4.5	Nil ASS/PASS	TP168 1.50-1.75m	7.8	7.3	Nil ASS/PASS
TP168 0.25-0.50m	6.6	5.4	Nil ASS/PASS	TP168 1.75-2.0m	8.0	7.3	Nil ASS/PASS
TP168 0.50-0.75m	7.0	6.1	Nil ASS/PASS	TP168 2.00-2.25m	7.9	7.7	Nil ASS/PASS
TP168 0.75-1.0m	7.7	6.8	Nil ASS/PASS	TP168 2.25-2.50m	7.9	8.1	Nil ASS/PASS
TP168 1.00-1.25m	8.0	8.0	Nil ASS/PASS	TP168 2.50-2.75m	7.9	7.5	Nil ASS/PASS
TP168 1.25-1.50m	7.7	7.6	Nil ASS/PASS	TP168 2.75-3.0m	8.0	7.8	Nil ASS/PASS
Drilled:	30/08/07			Drilled:			
TP169 0.00-0.25m	5.4	3.5	Possible PASS	TP169 1.50-1.75m	8.0	7.6	Nil ASS/PASS
TP169 0.25-0.50m	6.8	5.3	Nil ASS/PASS	TP169 1.75-2.0m	7.9	8.1	Nil ASS/PASS
TP169 0.50-0.75m	7.0	6.1	Nil ASS/PASS	TP169 2.00-2.25m	7.9	8.1	Nil ASS/PASS
TP169 0.75-1.0m	7.6	6.8	Nil ASS/PASS	TP169 2.25-2.50m	7.5	7.8	Nil ASS/PASS
TP169 1.00-1.25m	7.8	7.0	Nil ASS/PASS	TP169 2.50-2.75m	7.8	6.9	Nil ASS/PASS
TP169 1.25-1.50m	7.9	7.0	Nil ASS/PASS	TP169 2.75-3.0m	7.8	7.0	Nil ASS/PASS
Drilled:	31/08/07			Drilled:			
TP172 0.00-0.25m	5.5	3.1	Possible PASS	TP172 1.50-1.75m	7.5	7.6	Nil ASS/PASS
TP172 0.25-0.50m	6.3	5.6	Nil ASS/PASS	TP172 1.75-2.0m	7.5	6.9	Nil ASS/PASS
TP172 0.50-0.75m	6.5	5.7	Nil ASS/PASS	TP172 2.00-2.25m	7.6	7.9	Nil ASS/PASS
TP172 0.75-1.0m	6.9	6.8	Nil ASS/PASS	TP172 2.50-2.75m	7.5	7.7	Nil ASS/PASS
TP172 1.00-1.25m	7.1	6.7	Nil ASS/PASS	TP172 2.75-3.0m	7.5	7.4	Nil ASS/PASS
TP172 1.25-1.50m	7.2	6.8	Nil ASS/PASS				

Quantitative Test Results

4

Location	Action Criteria (mole H^+/t)	TAA (mole H^+/t)	a-ANC (mole H^+/t)	Texture Description	S_{POS} (%)	'Net Acidity' (mole H^+/t)	pH_{OX}	Lime Rate (kg/m^3)
TP168 0.00-0.25m	36	25	--	ZCL, dark grey, organics	<0.02*	25	*--	3
TP169 0.00-0.25m	62	27	80	LMC, dark brown-grey, organics	<0.02	27	6.9	3
TP172 0.00-0.25m	36	26	60	CL, grey, organics	<0.02	26	6.9	3
TP172 0.75-1.0m	36	<2	173	LC, sandy, grey	<0.02	<10	8.4	nil

Remarks: TAA - Total Actual Acidity. ANC - Acid Neutralising Capacity. S_{POS} - Peroxide Oxidisable Sulfur
Liming rates are based on a FOS of 1.5, assumed density of 1.4 tonne/m^3
for sands and clay and 'net potential acidity' as determined by analysis.
ANC is only determined when pH is >= 6.5
* All samples have undergone the Chromium Reducible Sulfur test, where pHox is not determined.

Test Procedures: pH_{FOX} "ASS Screening Test" (rapid oxidation with Hydrogen Peroxide) – Golder Associates
SPOCAS method – ALS Brisbane

Prepared By: TN/SLS | Checked By: HP 19/11/07

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Client:	ARUP	Sampled By: Golder
Project:	Gladstone Fitzroy Pipeline	Job No: 077633062
Location:	Connection to Fitzroy River	

pHfox Screening Test Results

Location	pH_F	pH_{FOX}	Indication	Location	pH_F	pH_{FOX}	Indication
Drilled:							
TP220 0.0-0.4	6.4	5.1	Nil ASS/PASS				
TP220 0.4-0.9	8.3	8.2	Nil ASS/PASS				
TP220 0.9-1.2	8.1	8.4	Nil ASS/PASS				
TP220 1.2-2.0	7.6	8.0	Nil ASS/PASS				
TP220 2.0-3.0	7.0	7.4	Nil ASS/PASS				

Quantitative Test Results

Location	Action Criteria (mole H^+/t)	TAA (mole H^+/t)	a-ANC (mole H^+/t)	Texture Description	S_{POS} (%)	'Net Acidity' (mole H^+/t)	pH_{OX}	Lime Rate (kg/m^3)
TP220 0.0-0.4m	36	<2	--	LC, Sandy, dk brown	<0.02	<10	*--	nil
TP220 2.0-3.0m	36	2	28	LC, pale grey-brown mottled	<0.02	<10	6.9	nil

Remarks: TAA - Total Actual Acidity. ANC - Acid Neutralising Capacity. S_{POS} - Peroxide Oxidisable Sulfur
Liming rates are based on a FOS of 1.5, assumed density of 1.4 tonne/m^3
for sands and clay and 'net potential acidity' as determined by analysis.
ANC is only determined when pH is >= 6.5
* All samples have undergone the Chromium Reducible Sulfur test, where pHox is not determined.

Test Procedures: pH_{FOX} "ASS Screening Test" (rapid oxidation with Hydrogen Peroxide) – Golder Associates SPOCAS method – ALS Brisbane

Prepared By: BM | Checked By: HP 19/11/07

Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: **EB0710275**	Page	: 1 of 12
Client	: **GOLDER ASSOCIATES**	Laboratory	: Environmental Division Brisbane
Contact	: MS SILVANA SANTOMARTINO	Contact	: Tim Kilmister
Address	: P O BOX 1734 MILTON QLD AUSTRALIA 4064	Address	: 32 Shand Street Stafford QLD Australia 4053
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Telephone	: +61 07 3721 5400	Telephone	: +61-7-3243 7222
Facsimile	: +61 07 3721 5401	Facsimile	: +61-7-3243 7218
Project	: 077633062 GLADSTONE-FITZROY PIPELINE	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----		
C-O-C number	: ----	Date Samples Received	: 11-SEP-2007
Sampler	: SILVANA SANTOMARTINO	Issue Date	: 18-SEP-2007
Site	: GLADSTONE-FITZROY PIPELINE		
		No. of samples received	: 21
Quote number	: BN/240/07	No. of samples analysed	: 21

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Cass Sealby	Senior Chemist - Acid Sulphate Soils	Inorganics

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been preformed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insuffient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for process purposes.

Key : CAS Number = Chemistry Abstract Services number
LOR = Limit of reporting
^ = Result(s) reported is calculated using analyte detections at or above the LOR. (eg. <5 + 5 + 7 = 12).

- **ANC not required because pH KCl less than 6.5**
- **Liming rate is calculated and reported on a dry weight basis assuming use of fine agricultural lime (CaCO3) and using a safety factor of 1.5 to allow for non-homogeneous mixing and poor reactivity of lime. For conversion of Liming Rate from □kg/t dry weight□ to □kg/m3 in-situ soil□, multiply □reported results□ x □wet bulk density of soil in t/m3□.**

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: TP91 0.50-0.75m	TP92 0.00-0.25m	TP92 0.75-1.0m	TP92 1.50-1.75m	TP93 1.25-1.50m
				Client sampling date / time: 22-AUG-2007 15:00	22-AUG-2007 15:00	22-AUG-2007 15:00	22-AUG-2007 15:00	22-AUG-2007 15:00
				EB0710275-001	EB0710275-002	EB0710275-003	EB0710275-004	EB0710275-005
EA029-A: pH Measurements								
pH KCl (23A)	----	0.1	pH Unit	**5.2**	----	**4.8**	**5.8**	**4.8**
pH OX (23B)	----	0.1	pH Unit	**7.2**	----	**5.5**	**7.0**	**5.7**
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)	----	2	mole H+ / t	**25**	----	**26**	**6**	**21**
Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	----	**6**	<2	**6**
Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	----	<2	<2	<2
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	**0.04**	----	**0.04**	<0.02	**0.03**
sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	----	<0.02	<0.02	<0.02
sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	----	<0.02	<0.02	<0.02
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)	----	0.02	% S	**0.03**	----	<0.02	<0.02	<0.02
Peroxide Sulfur (23De)	----	0.02	% S	**0.04**	----	<0.02	<0.02	<0.02
Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	----	<0.02	<0.02	<0.02
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	----	<10	<10	<10
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)	----	0.02	% Ca	**0.16**	----	**0.08**	**0.07**	**0.10**
Peroxide Calcium (23Wh)	----	0.02	% Ca	**0.22**	----	**0.10**	**0.09**	**0.12**
Acid Reacted Calcium (23X)	----	0.02	% Ca	**0.06**	----	<0.02	<0.02	**0.02**
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	**28**	----	<10	<10	**11**
sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	**0.04**	----	<0.02	<0.02	<0.02
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	**0.16**	----	**0.18**	**0.18**	**0.15**
Peroxide Magnesium (23Tm)	----	0.02	% Mg	**0.20**	----	**0.20**	**0.21**	**0.18**
Acid Reacted Magnesium (23U)	----	0.02	% Mg	**0.04**	----	**0.02**	**0.03**	**0.03**
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	**31**	----	**17**	**28**	**24**
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	**0.05**	----	**0.03**	**0.04**	**0.04**
EA029-F: Excess Acid Neutralising Capacity								
Excess Acid Neutralising Capacity (23Q)	----	0.02	% CaCO3	**0.17**	----	----	**0.09**	----
acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	**33**	----	----	**18**	----
sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.02	% S	**0.05**	----	----	**0.03**	----

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: TP91 0.50-0.75m	TP92 0.00-0.25m	TP92 0.75-1.0m	TP92 1.50-1.75m	TP93 1.25-1.50m
				Client sampling date / time: 22-AUG-2007 15:00	22-AUG-2007 15:00	22-AUG-2007 15:00	22-AUG-2007 15:00	22-AUG-2007 15:00
				EB0710275-001	EB0710275-002	EB0710275-003	EB0710275-004	EB0710275-005
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	**1.5**	----	**1.5**	**1.5**	**1.5**
Net Acidity (sulfur units)	----	0.02	% S	**0.04**	----	**0.04**	<0.02	**0.03**
Net Acidity (acidity units)	----	10	mole H+ / t	**28**	----	**26**	<10	**21**
Liming Rate	----	1	kg CaCO3/t	**2**	----	**2**	<1	**2**
EA033-A: Actual Acidity								
pH KCl (23A)	----	0.1	pH Unit	----	**4.4**	----	----	----
Titratable Actual Acidity (23F)	----	2	mole H+ / t	----	**46**	----	----	----
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	----	**0.07**	----	----	----
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)	----	0.02	% S	----	<0.02	----	----	----
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	----	<10	----	----	----
EA033-D: Retained Acidity								
Net Acid Soluble Sulfur (20Je)	----	0.02	% S	----	<0.02	----	----	----
acidity - Net Acid Soluble Sulfur (a-20J)	----	10	mole H+ / t	----	<10	----	----	----
sulfidic - Net Acid Soluble Sulfur (s-20J)	----	0.02	% pyrite S	----	<0.02	----	----	----
KCl Extractable Sulfur (23Ce)	----	0.02	% S	----	<0.02	----	----	----
HCl Extractable Sulfur (20Be)	----	0.02	% S	----	<0.02	----	----	----
EA033-E: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	----	**1.5**	----	----	----
Net Acidity (sulfur units)	----	0.02	% S	----	**0.07**	----	----	----
Net Acidity (acidity units)	----	10	mole H+ / t	----	**46**	----	----	----
Liming Rate	----	1	kg CaCO3/t	----	**3**	----	----	----

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: TP96 2.25-2.50m	TP97 2.75-3.0m	TP102 0.75-1.0m	TP103 2.50-2.75m	TP104 1.50-1.75m
				Client sampling date / time: 22-AUG-2007 15:00	22-AUG-2007 15:00	22-AUG-2007 15:00	22-AUG-2007 15:00	22-AUG-2007 15:00
				EB0710275-006	EB0710275-007	EB0710275-008	EB0710275-009	EB0710275-010
EA029-A: pH Measurements								
pH KCl (23A)	----	0.1	pH Unit	5.0	6.7	5.9	8.4	7.5
pH OX (23B)	----	0.1	pH Unit	5.9	8.4	7.7	9.2	7.7
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)	----	2	mole H+ / t	6	<2	<2	<2	<2
Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	<2	<2	<2	<2
Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	<2	<2	<2	<2
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02
sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02
sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	<0.02	<0.02	0.02	0.02
Peroxide Sulfur (23De)	----	0.02	% S	<0.02	0.22	<0.02	0.03	0.03
Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	0.22	<0.02	<0.02	<0.02
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	137	<10	<10	<10
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)	----	0.02	% Ca	0.06	0.15	0.14	0.35	0.21
Peroxide Calcium (23Wh)	----	0.02	% Ca	0.08	0.81	0.18	0.66	0.24
Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.02	0.66	0.04	0.31	0.02
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	329	17	153	13
sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.02	0.53	0.03	0.24	0.02
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	0.09	0.12	0.10	0.16	0.19
Peroxide Magnesium (23Tm)	----	0.02	% Mg	0.11	0.76	0.13	0.21	0.22
Acid Reacted Magnesium (23U)	----	0.02	% Mg	0.02	0.64	0.03	0.05	0.03
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	18	526	22	38	27
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	0.03	0.84	0.04	0.06	0.04
EA029-F: Excess Acid Neutralising Capacity								
Excess Acid Neutralising Capacity (23Q)	----	0.02	% CaCO3	----	0.16	0.27	1.05	0.33
acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	----	33	53	209	66
sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.02	% S	----	0.05	0.08	0.34	0.10

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID	TP96 2.25-2.50m	TP97 2.75-3.0m	TP102 0.75-1.0m	TP103 2.50-2.75m	TP104 1.50-1.75m
				Client sampling date / time	22-AUG-2007 15:00	22-AUG-2007 15:00	22-AUG-2007 15:00	22-AUG-2007 15:00	22-AUG-2007 15:00
					EB0710275-006	EB0710275-007	EB0710275-008	EB0710275-009	EB0710275-010
EA029-H: Acid Base Accounting									
ANC Fineness Factor	----	0.5	-		**1.5**	**1.5**	**1.5**	**1.5**	**1.5**
Net Acidity (sulfur units)	----	0.02	% S		<0.02	**0.04**	<0.02	<0.02	<0.02
Net Acidity (acidity units)	----	10	mole H+ / t		<10	**24**	<10	<10	<10
Liming Rate	----	1	kg CaCO3/t		<1	**2**	<1	<1	<1

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: TP105 2.25-2.50m	TP151 1.75-2.0m	TP155 1.75-2.0m	TP163 2.25-2.50m	TP165 0.00-0.25m
				Client sampling date / time: 22-AUG-2007 15:00	22-AUG-2007 15:00	22-AUG-2007 15:00	22-AUG-2007 15:00	22-AUG-2007 15:00
				EB0710275-011	EB0710275-012	EB0710275-013	EB0710275-014	EB0710275-015
EA029-A: pH Measurements								
pH KCl (23A)	----	0.1	pH Unit	**7.5**	**4.7**	**6.4**	**8.2**	----
pH OX (23B)	----	0.1	pH Unit	**8.6**	**5.0**	**7.0**	**9.0**	----
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	**25**	<2	<2	----
Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	**24**	<2	<2	----
Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	<2	<2	<2	----
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	**0.04**	<0.02	<0.02	----
sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	**0.04**	<0.02	<0.02	----
sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	----
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	**0.04**	<0.02	<0.02	----
Peroxide Sulfur (23De)	----	0.02	% S	**0.02**	**0.05**	<0.02	<0.02	----
Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	**0.02**	<0.02	<0.02	<0.02	----
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	**13**	<10	<10	<10	----
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)	----	0.02	% Ca	**0.17**	**0.17**	**0.04**	**0.32**	----
Peroxide Calcium (23Wh)	----	0.02	% Ca	**0.21**	**0.20**	**0.05**	**0.39**	----
Acid Reacted Calcium (23X)	----	0.02	% Ca	**0.04**	**0.03**	<0.02	**0.07**	----
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	**19**	**14**	<10	**34**	----
sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	**0.03**	**0.02**	<0.02	**0.05**	----
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	**0.20**	**0.17**	**0.06**	**0.16**	----
Peroxide Magnesium (23Tm)	----	0.02	% Mg	**0.25**	**0.19**	**0.07**	**0.19**	----
Acid Reacted Magnesium (23U)	----	0.02	% Mg	**0.05**	**0.02**	<0.02	**0.03**	----
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	**43**	**19**	<10	**27**	----
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	**0.07**	**0.03**	<0.02	**0.04**	----
EA029-F: Excess Acid Neutralising Capacity								
Excess Acid Neutralising Capacity (23Q)	----	0.02	% CaCO3	**1.00**	----	**0.08**	**0.68**	----
acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	**199**	----	**16**	**136**	----
sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.02	% S	**0.32**	----	**0.02**	**0.22**	----

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID :	TP105 2.25-2.50m	TP151 1.75-2.0m	TP155 1.75-2.0m	TP163 2.25-2.50m	TP165 0.00-0.25m
				Client sampling date / time :	22-AUG-2007 15:00	22-AUG-2007 15:00	22-AUG-2007 15:00	22-AUG-2007 15:00	22-AUG-2007 15:00
					EB0710275-011	EB0710275-012	EB0710275-013	EB0710275-014	EB0710275-015
EA029-H: Acid Base Accounting									
ANC Fineness Factor	----	0.5	-		**1.5**	**1.5**	**1.5**	**1.5**	----
Net Acidity (sulfur units)	----	0.02	% S		<0.02	**0.05**	<0.02	<0.02	----
Net Acidity (acidity units)	----	10	mole H+ / t		<10	**31**	<10	<10	----
Liming Rate	----	1	kg CaCO3/t		<1	**2**	<1	<1	----
EA033-A: Actual Acidity									
pH KCl (23A)	----	0.1	pH Unit		----	----	----	----	**5.0**
Titratable Actual Acidity (23F)	----	2	mole H+ / t		----	----	----	----	**25**
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S		----	----	----	----	**0.04**
EA033-B: Potential Acidity									
Chromium Reducible Sulfur (22B)	----	0.02	% S		----	----	----	----	<0.02
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t		----	----	----	----	<10
EA033-E: Acid Base Accounting									
ANC Fineness Factor	----	0.5	-		----	----	----	----	**1.5**
Net Acidity (sulfur units)	----	0.02	% S		----	----	----	----	**0.04**
Net Acidity (acidity units)	----	10	mole H+ / t		----	----	----	----	**25**
Liming Rate	----	1	kg CaCO3/t		----	----	----	----	**2**

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: TP165 1.00-1.25m	TP166 0.00-0.25m	TP168 0.00-0.25m	TP169 0.00-0.25m	TP172 0.00-0.25m
				Client sampling date / time: 22-AUG-2007 15:00	22-AUG-2007 15:00	22-AUG-2007 15:00	22-AUG-2007 15:00	22-AUG-2007 15:00
				EB0710275-016	EB0710275-017	EB0710275-018	EB0710275-019	EB0710275-020
EA029-A: pH Measurements								
pH KCl (23A)	----	0.1	pH Unit	**8.1**	----	----	**4.9**	**4.8**
pH OX (23B)	----	0.1	pH Unit	**8.9**	----	----	**6.9**	**6.9**
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	----	----	**27**	**26**
Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	----	----	<2	<2
Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	----	----	<2	<2
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	----	----	**0.04**	**0.04**
sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	----	----	<0.02	<0.02
sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	----	----	<0.02	<0.02
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	----	----	<0.02	<0.02
Peroxide Sulfur (23De)	----	0.02	% S	<0.02	----	----	<0.02	<0.02
Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	----	----	<0.02	<0.02
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	----	----	<10	<10
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)	----	0.02	% Ca	**0.47**	----	----	**0.10**	**0.36**
Peroxide Calcium (23Wh)	----	0.02	% Ca	**0.83**	----	----	**0.48**	**0.42**
Acid Reacted Calcium (23X)	----	0.02	% Ca	**0.35**	----	----	**0.39**	**0.06**
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	**176**	----	----	**193**	**30**
sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	**0.28**	----	----	**0.31**	**0.05**
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	**0.27**	----	----	**0.15**	**0.19**
Peroxide Magnesium (23Tm)	----	0.02	% Mg	**0.34**	----	----	**0.19**	**0.21**
Acid Reacted Magnesium (23U)	----	0.02	% Mg	**0.08**	----	----	**0.04**	**0.02**
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	**64**	----	----	**35**	**20**
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	**0.10**	----	----	**0.06**	**0.03**
EA029-F: Excess Acid Neutralising Capacity								
Excess Acid Neutralising Capacity (23Q)	----	0.02	% CaCO3	**1.30**	----	----	**0.40**	**0.30**
acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	**260**	----	----	**80**	**60**
sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.02	% S	**0.42**	----	----	**0.13**	**0.10**

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID	TP165 1.00-1.25m	TP166 0.00-0.25m	TP168 0.00-0.25m	TP169 0.00-0.25m	TP172 0.00-0.25m
				Client sampling date / time	22-AUG-2007 15:00	22-AUG-2007 15:00	22-AUG-2007 15:00	22-AUG-2007 15:00	22-AUG-2007 15:00
					EB0710275-016	EB0710275-017	EB0710275-018	EB0710275-019	EB0710275-020
EA029-H: Acid Base Accounting									
ANC Fineness Factor	----	0.5	-		**1.5**	----	----	**1.5**	**1.5**
Net Acidity (sulfur units)	----	0.02	% S		<0.02	----	----	**0.04**	**0.04**
Net Acidity (acidity units)	----	10	mole H+ / t		<10	----	----	**27**	**26**
Liming Rate	----	1	kg CaCO3/t		<1	----	----	**2**	**2**
EA033-A: Actual Acidity									
pH KCl (23A)	----	0.1	pH Unit		----	**5.1**	**5.3**	----	----
Titratable Actual Acidity (23F)	----	2	mole H+ / t		----	**16**	**25**	----	----
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S		----	**0.02**	**0.04**	----	----
EA033-B: Potential Acidity									
Chromium Reducible Sulfur (22B)	----	0.02	% S		----	<0.02	<0.02	----	----
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t		----	<10	<10	----	----
EA033-E: Acid Base Accounting									
ANC Fineness Factor	----	0.5	-		----	**1.5**	**1.5**	----	----
Net Acidity (sulfur units)	----	0.02	% S		----	**0.02**	**0.04**	----	----
Net Acidity (acidity units)	----	10	mole H+ / t		----	**16**	**25**	----	----
Liming Rate	----	1	kg CaCO3/t		----	**1**	**2**	----	----

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: TP172 0.75-1.0m				
				Client sampling date / time: 22-AUG-2007 15:00				
				EB0710275-021				
EA029-A: pH Measurements								
pH KCl (23A)	----	0.1	pH Unit	**7.8**				
pH OX (23B)	----	0.1	pH Unit	**8.4**				
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2				
Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2				
Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2				
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02				
sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02				
sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02				
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)	----	0.02	% S	**0.11**				
Peroxide Sulfur (23De)	----	0.02	% S	**0.11**				
Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02				
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10				
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)	----	0.02	% Ca	**0.54**				
Peroxide Calcium (23Wh)	----	0.02	% Ca	**0.78**				
Acid Reacted Calcium (23X)	----	0.02	% Ca	**0.24**				
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	**120**				
sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	**0.19**				
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	**0.23**				
Peroxide Magnesium (23Tm)	----	0.02	% Mg	**0.30**				
Acid Reacted Magnesium (23U)	----	0.02	% Mg	**0.07**				
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	**57**				
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	**0.09**				
EA029-F: Excess Acid Neutralising Capacity								
Excess Acid Neutralising Capacity (23Q)	----	0.02	% CaCO3	**0.87**				
acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	**173**				
sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.02	% S	**0.28**				
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	**1.5**				

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: TP172 0.75-1.0m				
				Client sampling date / time: 22-AUG-2007 15:00				
				EB0710275-021				
EA029-H: Acid Base Accounting								
Net Acidity (sulfur units)	----	0.02	% S	<0.02				
Net Acidity (acidity units)	----	10	mole H+ / t	<10				
Liming Rate	----	1	kg CaCO3/t	<1				

Environmental Division

QUALITY CONTROL REPORT

Work Order	: **EB0710275**	Page	: 1 of 8
Client	: **GOLDER ASSOCIATES**	Laboratory	: Environmental Division Brisbane
Contact	: MS SILVANA SANTOMARTINO	Contact	: Tim Kilmister
Address	: P O BOX 1734 MILTON QLD AUSTRALIA 4064	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: ssantomartino@golder.com.au	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: +61 07 3721 5400	Telephone	: +61-7-3243 7222
Facsimile	: +61 07 3721 5401	Facsimile	: +61-7-3243 7218
Project	: 077633062 GLADSTONE-FITZROY PIPELINE	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: GLADSTONE-FITZROY PIPELINE		
C-O-C number	: ----	Date Samples Received	: 11-SEP-2007
Sampler	: SILVANA SANTOMARTINO	Issue Date	: 18-SEP-2007
Order number	: ----		
		No. of samples received	: 21
Quote number	: BN/240/07	No. of samples analysed	: 21

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Cass Sealby	Senior Chemist - Acid Sulphate Soils	Inorganics

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been preformed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insuffient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = Chemistry Abstract Services number
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA029-A: pH Measurements (QC Lot: 491999)									
EB0710275-001	TP91 0.50-0.75m	EA029: pH KCl (23A)	----	0.1	pH Unit	5.2	5.3	1.9	0% - 20%
		EA029: pH OX (23B)	----	0.1	pH Unit	7.2	7.2	0.0	0% - 20%
EB0710275-012	TP151 1.75-2.0m	EA029: pH KCl (23A)	----	0.1	pH Unit	4.7	4.8	2.1	0% - 20%
		EA029: pH OX (23B)	----	0.1	pH Unit	5.0	5.0	0.0	0% - 20%
EA029-B: Acidity Trail (QC Lot: 491999)									
EB0710275-001	TP91 0.50-0.75m	EA029: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	0.04	0.04	0.0	No Limit
		EA029: sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	<0.02	0.0	----
		EA029: sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	<0.02	0.0	----
		EA029: Titratable Actual Acidity (23F)	----	2	mole H+ / t	25	24	5.7	0% - 50%
		EA029: Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	<2	0.0	----
		EA029: Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	<2	0.0	----
EB0710275-012	TP151 1.75-2.0m	EA029: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	0.04	0.04	0.0	No Limit
		EA029: sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	0.04	0.04	0.0	No Limit
		EA029: sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	<0.02	0.0	----
		EA029: Titratable Actual Acidity (23F)	----	2	mole H+ / t	25	24	5.4	0% - 50%
		EA029: Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	24	22	5.2	0% - 50%
		EA029: Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	<2	0.0	----
EA029-C: Sulfur Trail (QC Lot: 491999)									
EB0710275-001	TP91 0.50-0.75m	EA029: KCl Extractable Sulfur (23Ce)	----	0.02	% S	0.03	0.03	0.0	No Limit
		EA029: Peroxide Sulfur (23De)	----	0.02	% S	0.04	0.04	0.0	No Limit
		EA029: Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	<0.02	0.0	----
		EA029: acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	<10	0.0	----
EB0710275-012	TP151 1.75-2.0m	EA029: KCl Extractable Sulfur (23Ce)	----	0.02	% S	0.04	0.05	0.0	No Limit
		EA029: Peroxide Sulfur (23De)	----	0.02	% S	0.05	0.05	0.0	No Limit
		EA029: Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	<0.02	0.0	----
		EA029: acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	<10	0.0	----
EA029-D: Calcium Values (QC Lot: 491999)									
EB0710275-001	TP91 0.50-0.75m	EA029: KCl Extractable Calcium (23Vh)	----	0.02	% Ca	0.16	0.17	0.0	No Limit
		EA029: Peroxide Calcium (23Wh)	----	0.02	% Ca	0.22	0.23	0.0	0% - 50%
		EA029: Acid Reacted Calcium (23X)	----	0.02	% Ca	0.06	0.06	0.0	No Limit

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA029-D: Calcium Values (QC Lot: 491999) - continued									
EB0710275-001	TP91 0.50-0.75m	EA029: sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	0.04	0.05	0.0	No Limit
		EA029: acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	28	29	0.0	No Limit
EB0710275-012	TP151 1.75-2.0m	EA029: KCl Extractable Calcium (23Vh)	----	0.02	% Ca	0.17	0.19	10.6	No Limit
		EA029: Peroxide Calcium (23Wh)	----	0.02	% Ca	0.20	0.20	0.0	0% - 50%
		EA029: Acid Reacted Calcium (23X)	----	0.02	% Ca	0.03	<0.02	0.0	----
		EA029: sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	0.02	<0.02	0.0	----
		EA029: acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	14	<10	33.9	----
EA029-E: Magnesium Values (QC Lot: 491999)									
EB0710275-001	TP91 0.50-0.75m	EA029: KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	0.16	0.16	0.0	No Limit
		EA029: Peroxide Magnesium (23Tm)	----	0.02	% Mg	0.20	0.20	0.0	0% - 50%
		EA029: Acid Reacted Magnesium (23U)	----	0.02	% Mg	0.04	0.04	0.0	No Limit
		EA029: sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	0.05	0.05	0.0	No Limit
		EA029: Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	31	30	0.0	No Limit
EB0710275-012	TP151 1.75-2.0m	EA029: KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	0.17	0.18	9.9	No Limit
		EA029: Peroxide Magnesium (23Tm)	----	0.02	% Mg	0.19	0.19	0.0	No Limit
		EA029: Acid Reacted Magnesium (23U)	----	0.02	% Mg	0.02	<0.02	0.0	----
		EA029: sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	0.03	<0.02	0.0	----
		EA029: Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	19	<10	60.4	----
EA029-F: Excess Acid Neutralising Capacity (QC Lot: 491999)									
EB0710275-001	TP91 0.50-0.75m	EA029: Excess Acid Neutralising Capacity (23Q)	----	0.02	% CaCO3	0.17	0.18	7.0	No Limit
		EA029: sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.02	% S	0.05	0.06	0.0	No Limit
		EA029: acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	33	36	7.0	No Limit
EA033-A: Actual Acidity (QC Lot: 492000)									
EB0710275-002	TP92 0.00-0.25m	EA033: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	0.07	0.08	0.0	No Limit
		EA033: Titratable Actual Acidity (23F)	----	2	mole H+ / t	46	48	6.1	0% - 20%
		EA033: pH KCl (23A)	----	0.1	pH Unit	4.4	4.4	0.0	0% - 20%
EA033-B: Potential Acidity (QC Lot: 492000)									
EB0710275-002	TP92 0.00-0.25m	EA033: Chromium Reducible Sulfur (22B)	----	0.02	% S	<0.02	<0.02	0.0	----
		EA033: acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	<10	0.0	----
EA033-D: Retained Acidity (QC Lot: 492000)									
EB0710275-002	TP92 0.00-0.25m	EA033: sulfidic - Net Acid Soluble Sulfur (s-20J)	----	0.02	% pyrite S	<0.02	<0.02	0.0	----
		EA033: Net Acid Soluble Sulfur (20Je)	----	0.02	% S	<0.02	<0.02	0.0	----
		EA033: KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	<0.02	0.0	----

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA033-D: Retained Acidity (QC Lot: 492000) - continued									
EB0710275-002	TP92 0.00-0.25m	EA033: HCl Extractable Sulfur (20Be)	----	0.02	% S	<0.02	<0.02	0.0	----
		EA033: acidity - Net Acid Soluble Sulfur (a-20J)	----	10	mole H+ / t	<10	<10	0.0	----

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

		Method Blank (MB) Report			Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA029-B: Acidity Trail (QCLot: 491999)								
EA029: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	----	----	----	----
EA029: Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	----	----	----	----
EA029: Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	----	----	----	----
EA029: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	----	----	----	----
EA029: sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	----	----	----	----
EA029: sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	----	----	----	----
EA029-C: Sulfur Trail (QCLot: 491999)								
EA029: KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	----	----	----	----
EA029: Peroxide Sulfur (23De)	----	0.02	% S	<0.02	----	----	----	----
EA029: Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	----	----	----	----
EA029: acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	----	----	----	----
EA029-D: Calcium Values (QCLot: 491999)								
EA029: KCl Extractable Calcium (23Vh)	----	0.02	% Ca	<0.02	----	----	----	----
EA029: Peroxide Calcium (23Wh)	----	0.02	% Ca	<0.02	----	----	----	----
EA029: Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.02	----	----	----	----
EA029: acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	----	----	----	----
EA029: sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.02	----	----	----	----
EA029-E: Magnesium Values (QCLot: 491999)								
EA029: KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	<0.02	----	----	----	----
EA029: Peroxide Magnesium (23Tm)	----	0.02	% Mg	<0.02	----	----	----	----
EA029: Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.02	----	----	----	----
EA029: Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	<10	----	----	----	----
EA029: sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	<0.02	----	----	----	----
EA029-F: Excess Acid Neutralising Capacity (QCLot: 491999)								
EA029: Excess Acid Neutralising Capacity (23Q)	----	0.02	% CaCO3	<0.02	----	----	----	----
EA029: acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	<10	----	----	----	----
EA029: sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.02	% S	<0.02	----	----	----	----
EA033-A: Actual Acidity (QCLot: 492000)								
EA033: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	----	----	----	----
EA033: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	----	----	----	----
EA033-B: Potential Acidity (QCLot: 492000)								
EA033: Chromium Reducible Sulfur (22B)	----	0.02	% S	<0.02	----	----	----	----
EA033: acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	----	----	----	----

Sub-Matrix: **SOIL**

		Method Blank (MB) Report			Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	*CAS Number*	*LOR*	*Unit*	*Result*	*Concentration*	*LCS*	*Low*	*High*
EA033-D: Retained Acidity (QCLot: 492000)								
EA033: Net Acid Soluble Sulfur (20Je)	----	0.02	% S	<0.02	----	----	----	----
EA033: acidity - Net Acid Soluble Sulfur (a-20J)	----	10	mole H+ / t	<10	----	----	----	----
EA033: sulfidic - Net Acid Soluble Sulfur (s-20J)	----	0.02	% pyrite S	<0.02	----	----	----	----
EA033: KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	----	----	----	----
EA033: HCl Extractable Sulfur (20Be)	----	0.02	% S	<0.02	----	----	----	----

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) Results are required to be reported.**

SAMPLE CHAIN OF CUSTODY DOCUMENTATION - SOIL

Project ID:	077633062	Quote/Order No.:	
Site Location:	Gladstone-Fitzroy Pipeline	Lab Name:	ALS
Sampled By:	Silvana Santomartino		
Turnaround (Days)	7	BY:	
Report Format:	HARD ☐ FAX ☐ DISK ☐	EMAIL ☑ BULLETIN BOARD ☐	
Email Format:	PDF ☑ Excel ☑ Other ☐	Email Addre: ssantomartino@golder.com.au	

GOLDER ASSOCIATES PTY LTD
611 Coronation Drive, Toowong, Qld 4066
Phone: (07) 3721 5400
Fax: (07) 3721 5401
Invoice to be sent to PO Box 1734 Milton BC, Qld 4064
Project Manager: Henry Parsons
Contact Phone: 07 37215400
Email: hparsons@golder.com.au

Comments/Special Instructions:
Please e-mail results etc. to Silvana Santomartino

Samples from a declared Fire Ant Area: N
Samples taken from a known Weed and or Pest Area: N

	SAMPLE ID	SAMPLE MATRIX	SAMPLE DATE	SAMPLE TIME	CONTAINER/ PRESERVATIVE		No CONTAINERS	POSSIBLE HIGH CONCENTRATION	ANALYSIS REQUIRED: EA-033 (Chromium Suite)	EA - 029 (SPOCAS)
1	TP91 0.50-0.75m	Soil	Aug-07		Bag	Frozen	1	N		X
2	TP92 0.00-0.25m	Soil	Aug-07		Bag	Frozen	1	N	X	
3	TP92 0.75-1.0m	Soil	Aug-07		Bag	Frozen	1	N		X
4	TP92 1.50-1.75m	Soil	Aug-07		Bag	Frozen	1	N		X
5	TP93 1.25-1.50m	Soil	22/08/07		Bag	Frozen	1	N		X
6	TP96 2.25-2.50m	Soil	22/08/07		Bag	Frozen	1	N		X
7	TP97 2.75-3.0m	Soil	22/08/07		Bag	Frozen	1	N		X
8	TP102 0.75-1.0m	Soil	22/08/07		Bag	Frozen	1	N		X
9	TP103 2.50-2.75m	Soil	22/08/07		Bag	Frozen	1	N		X
10	TP104 1.50-1.75m	Soil	22/08/07		Bag	Frozen	1	N		X
11	TP105 2.25-2.50m	Soil	Aug-07		Bag	Frozen	1	N		X
12	TP151 1.75-2.0m	Soil	Aug-07		Bag	Frozen	1	N		X
13	TP155 1.75-2.0m	Soil	Aug-07		Bag	Frozen	1	N		X
14	TP163 2.25-2.50m	Soil	Aug-07		Bag	Frozen	1	N		X
15	TP165 0.00-0.25m	Soil	Aug-07		Bag	Frozen	1	N	X	
16	TP165 1.00-1.25m	Soil	Aug-07		Bag	Frozen	1	N		X
17	TP166 0.00-0.25m	Soil	Aug-07		Bag	Frozen	1	N	X	
18	TP168 0.00-0.25m	Soil	Aug-07		Bag	Frozen	1	N	X	
19	TP169 0.00-0.25m	Soil	Aug-07		Bag	Frozen	1	N		X
20	TP172 0.00-0.25m	Soil	Aug-07		Bag	Frozen	1	N		X
21	TP172 0.75-1.0m	Soil	Aug-07		Bag	Frozen	1	N		X

Environmental Division
Brisbane
Work Order
EB0710275
Telephone : +61-7-3243 7222

SAMPLE MATRIX = Soil/Sediment/Fill/Other **SAMPLE TYPE** = Core(CR) **HIGH CONCENTRATION:** Tick box and circle expected parameters in analysis list

Container Type and Preservative Codes: P = Natural Plastic; N = Nitric Acid Preserved; C = Sodium Hydroxide Preserved; J = Solvent Washed Acid Rinsed Jar; S = Solvent Washed Acid Rinsed Glass Bottle; VC = Hydrochloric Preserved Vial; VS = Sulphuric Acid

	SIGNATURE	COMPANY	DATE	TIME
RELEASED BY		GOLDER	11/9/2007	10:30
RECEIVED BY		ALS	11/9/07	1340
RELEASED BY				
RECEIVED BY				
RELEASED BY				
RECEIVED BY				

	SIGNATURE	COMPANY	DATE	TIME	Shipment Method
RELEASED BY					Shipping Ref:
RECEIVED BY					

To Be Filled Out By Analysing Laboratory

LAB. BATCH NUMBER

Security Seal	✓	Chilled	✓	Bill to:	
Suitable Containers	✓	Frozen		Address	
Cool Box	✓	Ambient			

THIS FORM IS TO BE SIGNED BY GOLDER STAFF; COURIER/S; LABORATORY ON RECEIPT OF SAMPLES.

ALS Environmental

CERTIFICATE OF ANALYSIS

Client	: **GOLDER ASSOCIATES**	*Laboratory*	: **Environmental Division Brisbane**	*Page*	: **1 of 15**
Contact	: **MS SILVANA SANTOMARTINO**	*Contact*	: **TIM.KILMISTER Kilmister**	*Work Order*	: **EB0711439**
Address	: **P O BOX 1734 MILTON QLD AUSTRALIA 4064**	*Address*	: **32 Shand Street Stafford QLD Australia 4053**		
E-mail	: **ssantomartino@golder.com.au**	*E-mail*	: **Services.Brisbane@alsenviro.com**		
Telephone	: **3721 5400**	*Telephone*	: **+61-7-3243 7222**		
Facsimile	: **3721 5401**	*Facsimile*	: **+61-7-3243 7218**		
Project	: **077633062**	*Quote number*	: **BN/240/07**	*Date received*	: **4 Oct 2007**
Order number	: **- Not provided -**			*Date issued*	: **16 Oct 2007**
C-O-C number	: **- Not provided -**			*No. of samples*	- *Received* : **28**
Site	: **GLADSTONE-FITZROY PIPELINE**				*Analysed* : **28**

ALSE - Excellence in Analytical Testing

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Signatory	*Position*	*Department*
Jessica Garwood	**Supervisor - Acid Sulphate Soils**	**Inorganics - NATA 825 (818 - Brisbane)**

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Comments

This report for the ALSE reference EB0711439 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:

- **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.

Specific comments for Work Order **EB0711439**

Liming rate is calculated and reported on a dry weight basis assuming use of fine agricultural lime (CaCO3) and using a safety factor of 1.5 to allow for non-homogeneous mixing and poor reactivity of lime. For conversion of Liming Rate from ‘kg/t dry weight’ to ‘kg/m3 in-situ soil’, multiply ‘reported results’ x ‘wet bulk density of soil in t/m3’.

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Analytical Results

Analyte	CAS number	LOR	Units	Client Sample ID: TP74_0.00-0.25m	TP74_0.50-0.75m	TP74_1.00-1.25m	TP74_1.50-1.70m	TP74_2.25-2.50m
Sample Matrix Type / Description:				SOIL	SOIL	SOIL	SOIL	SOIL
Sample Date / Time:				(30 Sep 2007) (15:00)	(30 Sep 2007) (15:00)	(30 Sep 2007) (15:00)	(30 Sep 2007) (15:00)	(30 Sep 2007) (15:00)
Laboratory Sample ID:				EB0711439-001	EB0711439-002	EB0711439-003	EB0711439-004	EB0711439-005
EA029-A: pH Measurements								
pH KCl (23A)		0.1	pH Unit	----	----	6.8	6.0	4.8
pH OX (23B)		0.1	pH Unit	----	----	7.1	7.0	5.5
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)		2	mole H+ / t	----	----	<2	<2	34
Titratable Peroxide Acidity (23G)		2	mole H+ / t	----	----	<2	<2	12
Titratable Sulfidic Acidity (23H)		2	mole H+ / t	----	----	<2	<2	<2
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	----	----	<0.02	<0.02	0.05
sulfidic - Titratable Peroxide Acidity (s-23G)		0.02	% pyrite S	----	----	<0.02	<0.02	<0.02
sulfidic - Titratable Sulfidic Acidity (s-23H)		0.02	% pyrite S	----	----	<0.02	<0.02	<0.02
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)		0.02	% S	----	----	0.03	0.06	0.08
Peroxide Sulfur (23De)		0.02	% S	----	----	0.03	0.08	0.09
Peroxide Oxidisable Sulfur (23E)		0.02	% S	----	----	<0.02	<0.02	<0.02
acidity - Peroxide Oxidisable Sulfur (a-23E)		10	mole H+ / t	----	----	<10	<10	11
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)		0.02	% Ca	----	----	0.14	0.17	0.12
Peroxide Calcium (23Wh)		0.02	% Ca	----	----	0.15	0.20	0.14
Acid Reacted Calcium (23X)		0.02	% Ca	----	----	<0.02	0.03	<0.02
acidity - Acid Reacted Calcium (a-23X)		10	mole H+ / t	----	----	<10	15	<10
sulfidic - Acid Reacted Calcium (s-23X)		0.02	% S	----	----	<0.02	0.02	<0.02
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)		0.02	% Mg	----	----	0.12	0.22	0.18
Peroxide Magnesium (23Tm)		0.02	% Mg	----	----	0.14	0.27	0.21
Acid Reacted Magnesium (23U)		0.02	% Mg	----	----	0.02	0.05	0.04
acidity - Acid Reacted Magnesium (a-23U)		10	mole H+ / t	----	----	17	40	29
sulfidic - Acid Reacted Magnesium (s-23U)		0.02	% S	----	----	0.03	0.06	0.05
EA029-F: Excess Acid Neutralising Capacity								
Excess Acid Neutralising Capacity (23Q)		0.02	% CaCO3	----	----	0.31	0.30	----
acidity - Excess Acid Neutralising Capacity (a-23Q)		10	mole H+ / t	----	----	62	60	----
sulfidic - Excess Acid Neutralising Capacity (s-23Q)		0.02	% S	----	----	0.10	0.10	----

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Analytical Results

Analyte	CAS number	LOR	Units	Client Sample ID : TP74_0.00-0.25m Sample Matrix Type / Description : SOIL Sample Date / Time : (30 Sep 2007) (15:00) Laboratory Sample ID : EB0711439-001	Client Sample ID : TP74_0.50-0.75m Sample Matrix Type / Description : SOIL Sample Date / Time : (30 Sep 2007) (15:00) Laboratory Sample ID : EB0711439-002	Client Sample ID : TP74_1.00-1.25m Sample Matrix Type / Description : SOIL Sample Date / Time : (30 Sep 2007) (15:00) Laboratory Sample ID : EB0711439-003	Client Sample ID : TP74_1.50-1.70m Sample Matrix Type / Description : SOIL Sample Date / Time : (30 Sep 2007) (15:00) Laboratory Sample ID : EB0711439-004	Client Sample ID : TP74_2.25-2.50m Sample Matrix Type / Description : SOIL Sample Date / Time : (30 Sep 2007) (15:00) Laboratory Sample ID : EB0711439-005
EA029-H: Acid Base Accounting								
ANC Fineness Factor		0.5		----	----	1.5	1.5	1.5
Net Acidity (sulfur units)		0.02	% S	----	----	<0.02	<0.02	0.07
Net Acidity (acidity units)		10	mole H+ / t	----	----	<10	<10	44
Liming Rate		1	kg CaCO3/t	----	----	<1	<1	3
EA033-A: Actual Acidity								
pH KCl (23A)		0.1	pH Unit	5.7	6.4	----	----	----
Titratable Actual Acidity (23F)		2	mole H+ / t	11	<2	----	----	----
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	<0.02	<0.02	----	----	----
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)		0.02	% S	<0.02	<0.02	----	----	----
acidity - Chromium Reducible Sulfur (a-22B)		10	mole H+ / t	<10	<10	----	----	----
EA033-E: Acid Base Accounting								
ANC Fineness Factor		0.5		1.5	1.5	----	----	----
Net Acidity (sulfur units)		0.02	% S	<0.02	<0.02	----	----	----
Net Acidity (acidity units)		10	mole H+ / t	11	<10	----	----	----
Liming Rate		1	kg CaCO3/t	<1	<1	----	----	----

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Analytical Results

Analyte	CAS number	LOR	Units	Client Sample ID: TP74_2.50-2.75m Sample Matrix Type / Description: SOIL Sample Date / Time: (30 Sep 2007) (15:00) Laboratory Sample ID: EB0711439-006	Client Sample ID: TP79_0.00-0.25m Sample Matrix Type / Description: SOIL Sample Date / Time: (30 Sep 2007) (15:00) Laboratory Sample ID: EB0711439-007	Client Sample ID: TP79_2.00-2.25m Sample Matrix Type / Description: SOIL Sample Date / Time: (30 Sep 2007) (15:00) Laboratory Sample ID: EB0711439-008	Client Sample ID: TP80_0.00-0.25m Sample Matrix Type / Description: SOIL Sample Date / Time: (30 Sep 2007) (15:00) Laboratory Sample ID: EB0711439-009	Client Sample ID: TP80_1.00-1.25m Sample Matrix Type / Description: SOIL Sample Date / Time: (30 Sep 2007) (15:00) Laboratory Sample ID: EB0711439-010
EA029-A: pH Measurements								
pH KCl (23A)		0.1	pH Unit	4.3	----	6.5	----	----
pH OX (23B)		0.1	pH Unit	4.4	----	8.2	----	----
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)		2	mole H+ / t	92	----	<2	----	----
Titratable Peroxide Acidity (23G)		2	mole H+ / t	55	----	<2	----	----
Titratable Sulfidic Acidity (23H)		2	mole H+ / t	<2	----	<2	----	----
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	0.15	----	<0.02	----	----
sulfidic - Titratable Peroxide Acidity (s-23G)		0.02	% pyrite S	0.09	----	<0.02	----	----
sulfidic - Titratable Sulfidic Acidity (s-23H)		0.02	% pyrite S	<0.02	----	<0.02	----	----
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)		0.02	% S	0.07	----	<0.02	----	----
Peroxide Sulfur (23De)		0.02	% S	0.08	----	<0.02	----	----
Peroxide Oxidisable Sulfur (23E)		0.02	% S	<0.02	----	<0.02	----	----
acidity - Peroxide Oxidisable Sulfur (a-23E)		10	mole H+ / t	<10	----	<10	----	----
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)		0.02	% Ca	0.13	----	0.12	----	----
Peroxide Calcium (23Wh)		0.02	% Ca	0.14	----	0.14	----	----
Acid Reacted Calcium (23X)		0.02	% Ca	<0.02	----	<0.02	----	----
acidity - Acid Reacted Calcium (a-23X)		10	mole H+ / t	<10	----	<10	----	----
sulfidic - Acid Reacted Calcium (s-23X)		0.02	% S	<0.02	----	<0.02	----	----
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)		0.02	% Mg	0.14	----	0.20	----	----
Peroxide Magnesium (23Tm)		0.02	% Mg	0.16	----	0.25	----	----
Acid Reacted Magnesium (23U)		0.02	% Mg	0.03	----	0.04	----	----
acidity - Acid Reacted Magnesium (a-23U)		10	mole H+ / t	24	----	35	----	----
sulfidic - Acid Reacted Magnesium (s-23U)		0.02	% S	0.04	----	0.06	----	----
EA029-F: Excess Acid Neutralising Capacity								
Excess Acid Neutralising Capacity (23Q)		0.02	% CaCO3	----	----	0.26	----	----
acidity - Excess Acid Neutralising Capacity (a-23Q)		10	mole H+ / t	----	----	53	----	----
sulfidic - Excess Acid Neutralising Capacity (s-23Q)		0.02	% S	----	----	0.08	----	----

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Analytical Results

Analyte	CAS number	LOR	Units	Client Sample ID : TP74_2.50-2.75m Sample Matrix Type / Description : SOIL Sample Date / Time : (30 Sep 2007) (15:00) Laboratory Sample ID : EB0711439-006	Client Sample ID : TP79_0.00-0.25m Sample Matrix Type / Description : SOIL Sample Date / Time : (30 Sep 2007) (15:00) Laboratory Sample ID : EB0711439-007	Client Sample ID : TP79_2.00-2.25m Sample Matrix Type / Description : SOIL Sample Date / Time : (30 Sep 2007) (15:00) Laboratory Sample ID : EB0711439-008	Client Sample ID : TP80_0.00-0.25m Sample Matrix Type / Description : SOIL Sample Date / Time : (30 Sep 2007) (15:00) Laboratory Sample ID : EB0711439-009	Client Sample ID : TP80_1.00-1.25m Sample Matrix Type / Description : SOIL Sample Date / Time : (30 Sep 2007) (15:00) Laboratory Sample ID : EB0711439-010
EA029-G: Retained Acidity								
Net Acid Soluble Sulfur (20Je)		0.02	% S	0.02	----	----	----	----
acidity - Net Acid Soluble Sulfur (a-20J)		10	mole H+ / t	<10	----	----	----	----
sulfidic - Net Acid Soluble Sulfur (s-20J)		0.02	% pyrite S	<0.02	----	----	----	----
HCl Extractable Sulfur (20Be)		0.02	% S	0.09	----	----	----	----
EA029-H: Acid Base Accounting								
ANC Fineness Factor		0.5		1.5	----	1.5	----	----
Net Acidity (sulfur units)		0.02	% S	0.18	----	<0.02	----	----
Net Acidity (acidity units)		10	mole H+ / t	111	----	<10	----	----
Liming Rate		1	kg CaCO3/t	8	----	<1	----	----
EA033-A: Actual Acidity								
pH KCl (23A)		0.1	pH Unit	----	5.6	----	5.1	6.4
Titratable Actual Acidity (23F)		2	mole H+ / t	----	10	----	18	<2
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	----	<0.02	----	0.03	<0.02
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)		0.02	% S	----	<0.02	----	<0.02	<0.02
acidity - Chromium Reducible Sulfur (a-22B)		10	mole H+ / t	----	<10	----	<10	<10
EA033-E: Acid Base Accounting								
ANC Fineness Factor		0.5		----	1.5	----	1.5	1.5
Net Acidity (sulfur units)		0.02	% S	----	<0.02	----	0.03	<0.02
Net Acidity (acidity units)		10	mole H+ / t	----	<10	----	18	<10
Liming Rate		1	kg CaCO3/t	----	<1	----	1	<1

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Analytical Results

Analyte	CAS number	LOR	Units	Client Sample ID: TP81_0.00-0.25m Sample Matrix Type / Description: SOIL Sample Date / Time: (30 Sep 2007) (15:00) Laboratory Sample ID: EB0711439-011	Client Sample ID: TP81_0.50-0.75m Sample Matrix Type / Description: SOIL Sample Date / Time: (30 Sep 2007) (15:00) Laboratory Sample ID: EB0711439-012	Client Sample ID: TP82_0.00-0.25m Sample Matrix Type / Description: SOIL Sample Date / Time: (30 Sep 2007) (15:00) Laboratory Sample ID: EB0711439-013	Client Sample ID: TP82_0.50-0.75m Sample Matrix Type / Description: SOIL Sample Date / Time: (30 Sep 2007) (15:00) Laboratory Sample ID: EB0711439-014	Client Sample ID: TP82_2.00-2.25m Sample Matrix Type / Description: SOIL Sample Date / Time: (30 Sep 2007) (15:00) Laboratory Sample ID: EB0711439-015
EA029-A: pH Measurements								
pH KCl (23A)		0.1	pH Unit	----	----	5.5	4.9	5.4
pH OX (23B)		0.1	pH Unit	----	----	6.8	4.7	6.3
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)		2	mole H+ / t	----	----	5	22	11
Titratable Peroxide Acidity (23G)		2	mole H+ / t	----	----	<2	<2	<2
Titratable Sulfidic Acidity (23H)		2	mole H+ / t	----	----	<2	<2	<2
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	----	----	<0.02	0.03	<0.02
sulfidic - Titratable Peroxide Acidity (s-23G)		0.02	% pyrite S	----	----	<0.02	<0.02	<0.02
sulfidic - Titratable Sulfidic Acidity (s-23H)		0.02	% pyrite S	----	----	<0.02	<0.02	<0.02
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)		0.02	% S	----	----	<0.02	0.02	0.04
Peroxide Sulfur (23De)		0.02	% S	----	----	<0.02	0.03	0.06
Peroxide Oxidisable Sulfur (23E)		0.02	% S	----	----	<0.02	<0.02	<0.02
acidity - Peroxide Oxidisable Sulfur (a-23E)		10	mole H+ / t	----	----	<10	<10	<10
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)		0.02	% Ca	----	----	0.16	0.06	0.12
Peroxide Calcium (23Wh)		0.02	% Ca	----	----	0.18	0.06	0.12
Acid Reacted Calcium (23X)		0.02	% Ca	----	----	0.02	<0.02	<0.02
acidity - Acid Reacted Calcium (a-23X)		10	mole H+ / t	----	----	12	<10	<10
sulfidic - Acid Reacted Calcium (s-23X)		0.02	% S	----	----	<0.02	<0.02	<0.02
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)		0.02	% Mg	----	----	0.06	0.08	0.21
Peroxide Magnesium (23Tm)		0.02	% Mg	----	----	0.07	0.10	0.23
Acid Reacted Magnesium (23U)		0.02	% Mg	----	----	<0.02	<0.02	0.02
acidity - Acid Reacted Magnesium (a-23U)		10	mole H+ / t	----	----	10	13	18
sulfidic - Acid Reacted Magnesium (s-23U)		0.02	% S	----	----	<0.02	0.02	0.03
EA029-F: Excess Acid Neutralising Capacity								
Excess Acid Neutralising Capacity (23Q)		0.02	% CaCO3	----	----	0.25	----	----
acidity - Excess Acid Neutralising Capacity (a-23Q)		10	mole H+ / t	----	----	50	----	----
sulfidic - Excess Acid Neutralising Capacity (s-23Q)		0.02	% S	----	----	0.08	----	----

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Analytical Results

Analyte	CAS number	LOR	Units	Client Sample ID : TP81_0.00-0.25m Sample Matrix Type / Description : SOIL Sample Date / Time : (30 Sep 2007) (15:00) Laboratory Sample ID : EB0711439-011	Client Sample ID : TP81_0.50-0.75m Sample Matrix Type / Description : SOIL Sample Date / Time : (30 Sep 2007) (15:00) Laboratory Sample ID : EB0711439-012	Client Sample ID : TP82_0.00-0.25m Sample Matrix Type / Description : SOIL Sample Date / Time : (30 Sep 2007) (15:00) Laboratory Sample ID : EB0711439-013	Client Sample ID : TP82_0.50-0.75m Sample Matrix Type / Description : SOIL Sample Date / Time : (30 Sep 2007) (15:00) Laboratory Sample ID : EB0711439-014	Client Sample ID : TP82_2.00-2.25m Sample Matrix Type / Description : SOIL Sample Date / Time : (30 Sep 2007) (15:00) Laboratory Sample ID : EB0711439-015
EA029-H: Acid Base Accounting								
ANC Fineness Factor		0.5		----	----	1.5	1.5	1.5
Net Acidity (sulfur units)		0.02	% S	----	----	<0.02	0.05	0.03
Net Acidity (acidity units)		10	mole H+ / t	----	----	<10	29	17
Liming Rate		1	kg CaCO3/t	----	----	<1	2	1
EA033-A: Actual Acidity								
pH KCl (23A)		0.1	pH Unit	5.5	8.1	----	----	----
Titratable Actual Acidity (23F)		2	mole H+ / t	8	<2	----	----	----
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	<0.02	<0.02	----	----	----
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)		0.02	% S	<0.02	<0.02	----	----	----
acidity - Chromium Reducible Sulfur (a-22B)		10	mole H+ / t	<10	<10	----	----	----
EA033-C: Acid Neutralising Capacity								
Acid Neutralising Capacity (19A1)		0.01	% CaCO3	----	0.92	----	----	----
acidity - Acid Neutralising Capacity (a-19A1)		10	mole H+ / t	----	184	----	----	----
sulfidic - Acid Neutralising Capacity (s-19A1)		0.01	% pyrite S	----	0.29	----	----	----
EA033-E: Acid Base Accounting								
ANC Fineness Factor		0.5		1.5	1.5	----	----	----
Net Acidity (sulfur units)		0.02	% S	<0.02	<0.02	----	----	----
Net Acidity (acidity units)		10	mole H+ / t	<10	<10	----	----	----
Liming Rate		1	kg CaCO3/t	<1	<1	----	----	----

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Analytical Results

Analyte	CAS number	LOR	Units	Client Sample ID : TP94_1.25-1.50m Sample Matrix Type / Description : SOIL Sample Date / Time : (30 Sep 2007) (15:00) Laboratory Sample ID : EB0711439-016	Client Sample ID : TP95_0.00-0.25m Sample Matrix Type / Description : SOIL Sample Date / Time : (30 Sep 2007) (15:00) Laboratory Sample ID : EB0711439-017	Client Sample ID : TP95_2.25-2.50m Sample Matrix Type / Description : SOIL Sample Date / Time : (30 Sep 2007) (15:00) Laboratory Sample ID : EB0711439-018	Client Sample ID : TP98_0.00-0.25m Sample Matrix Type / Description : SOIL Sample Date / Time : (30 Sep 2007) (15:00) Laboratory Sample ID : EB0711439-019	Client Sample ID : TP98_2.75-3.0m Sample Matrix Type / Description : SOIL Sample Date / Time : (30 Sep 2007) (15:00) Laboratory Sample ID : EB0711439-020
EA029-A: pH Measurements								
pH KCl (23A)		0.1	pH Unit	4.6	5.4	6.6	----	6.8
pH OX (23B)		0.1	pH Unit	5.3	4.1	8.2	----	7.2
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)		2	mole H+ / t	18	6	<2	----	<2
Titratable Peroxide Acidity (23G)		2	mole H+ / t	12	<2	<2	----	<2
Titratable Sulfidic Acidity (23H)		2	mole H+ / t	<2	<2	<2	----	<2
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	0.03	<0.02	<0.02	----	<0.02
sulfidic - Titratable Peroxide Acidity (s-23G)		0.02	% pyrite S	<0.02	<0.02	<0.02	----	<0.02
sulfidic - Titratable Sulfidic Acidity (s-23H)		0.02	% pyrite S	<0.02	<0.02	<0.02	----	<0.02
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)		0.02	% S	<0.02	<0.02	<0.02	----	0.03
Peroxide Sulfur (23De)		0.02	% S	<0.02	<0.02	<0.02	----	0.03
Peroxide Oxidisable Sulfur (23E)		0.02	% S	<0.02	<0.02	<0.02	----	<0.02
acidity - Peroxide Oxidisable Sulfur (a-23E)		10	mole H+ / t	<10	<10	<10	----	<10
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)		0.02	% Ca	0.05	0.07	0.05	----	0.33
Peroxide Calcium (23Wh)		0.02	% Ca	0.04	0.07	0.06	----	0.35
Acid Reacted Calcium (23X)		0.02	% Ca	<0.02	<0.02	<0.02	----	0.02
acidity - Acid Reacted Calcium (a-23X)		10	mole H+ / t	<10	<10	<10	----	12
sulfidic - Acid Reacted Calcium (s-23X)		0.02	% S	<0.02	<0.02	<0.02	----	<0.02
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)		0.02	% Mg	0.08	0.02	0.09	----	0.19
Peroxide Magnesium (23Tm)		0.02	% Mg	0.10	0.03	0.12	----	0.21
Acid Reacted Magnesium (23U)		0.02	% Mg	<0.02	<0.02	0.04	----	0.02
acidity - Acid Reacted Magnesium (a-23U)		10	mole H+ / t	12	<10	31	----	21
sulfidic - Acid Reacted Magnesium (s-23U)		0.02	% S	<0.02	<0.02	0.05	----	0.03
EA029-F: Excess Acid Neutralising Capacity								
Excess Acid Neutralising Capacity (23Q)		0.02	% CaCO3	----	----	0.14	----	0.12
acidity - Excess Acid Neutralising Capacity (a-23Q)		10	mole H+ / t	----	----	29	----	23
sulfidic - Excess Acid Neutralising Capacity (s-23Q)		0.02	% S	----	----	0.05	----	0.04

ALS Environmental

Analytical Results

Analyte	CAS number	LOR	Units	Client Sample ID : TP94_1.25-1.50m Sample Matrix Type / Description : SOIL Sample Date / Time : (30 Sep 2007) (15:00) Laboratory Sample ID : EB0711439-016	Client Sample ID : TP95_0.00-0.25m Sample Matrix Type / Description : SOIL Sample Date / Time : (30 Sep 2007) (15:00) Laboratory Sample ID : EB0711439-017	Client Sample ID : TP95_2.25-2.50m Sample Matrix Type / Description : SOIL Sample Date / Time : (30 Sep 2007) (15:00) Laboratory Sample ID : EB0711439-018	Client Sample ID : TP98_0.00-0.25m Sample Matrix Type / Description : SOIL Sample Date / Time : (30 Sep 2007) (15:00) Laboratory Sample ID : EB0711439-019	Client Sample ID : TP98_2.75-3.0m Sample Matrix Type / Description : SOIL Sample Date / Time : (30 Sep 2007) (15:00) Laboratory Sample ID : EB0711439-020
EA029-H: Acid Base Accounting								
ANC Fineness Factor		0.5		1.5	1.5	1.5	----	1.5
Net Acidity (sulfur units)		0.02	% S	0.03	<0.02	<0.02	----	<0.02
Net Acidity (acidity units)		10	mole H+ / t	18	<10	<10	----	<10
Liming Rate		1	kg CaCO3/t	1	<1	<1	----	<1
EA033-A: Actual Acidity								
pH KCl (23A)		0.1	pH Unit	----	----	----	6.1	----
Titratable Actual Acidity (23F)		2	mole H+ / t	----	----	----	6	----
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	----	----	----	<0.02	----
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)		0.02	% S	----	----	----	<0.02	----
acidity - Chromium Reducible Sulfur (a-22B)		10	mole H+ / t	----	----	----	<10	----
EA033-E: Acid Base Accounting								
ANC Fineness Factor		0.5		----	----	----	1.5	----
Net Acidity (sulfur units)		0.02	% S	----	----	----	<0.02	----
Net Acidity (acidity units)		10	mole H+ / t	----	----	----	<10	----
Liming Rate		1	kg CaCO3/t	----	----	----	<1	----

ALS Environmental

Analytical Results

Analyte	CAS number	LOR	Units	TP99_0.00-0.25m	TP102_0.00-0.25m	TP102_2.25-2.50m	TP104_1.00-1.25m	TP105_0.00-0.25m
Client Sample ID :				TP99_0.00-0.25m	TP102_0.00-0.25m	TP102_2.25-2.50m	TP104_1.00-1.25m	TP105_0.00-0.25m
Sample Matrix Type / Description :				SOIL	SOIL	SOIL	SOIL	SOIL
Sample Date / Time :				(30 Sep 2007) (15:00)	(30 Sep 2007) (15:00)	(30 Sep 2007) (15:00)	(30 Sep 2007) (15:00)	(30 Sep 2007) (15:00)
Laboratory Sample ID :				EB0711439-021	EB0711439-022	EB0711439-023	EB0711439-024	EB0711439-025
EA029-A: pH Measurements								
pH KCl (23A)		0.1	pH Unit	----	6.6	8.3	7.4	5.6
pH OX (23B)		0.1	pH Unit	----	6.4	9.0	7.3	4.3
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)		2	mole H+ / t	----	<2	<2	<2	13
Titratable Peroxide Acidity (23G)		2	mole H+ / t	----	<2	<2	<2	<2
Titratable Sulfidic Acidity (23H)		2	mole H+ / t	----	<2	<2	<2	<2
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	----	<0.02	<0.02	<0.02	0.02
sulfidic - Titratable Peroxide Acidity (s-23G)		0.02	% pyrite S	----	<0.02	<0.02	<0.02	<0.02
sulfidic - Titratable Sulfidic Acidity (s-23H)		0.02	% pyrite S	----	<0.02	<0.02	<0.02	<0.02
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)		0.02	% S	----	<0.02	0.03	<0.02	<0.02
Peroxide Sulfur (23De)		0.02	% S	----	<0.02	0.03	<0.02	0.03
Peroxide Oxidisable Sulfur (23E)		0.02	% S	----	<0.02	<0.02	<0.02	0.03
acidity - Peroxide Oxidisable Sulfur (a-23E)		10	mole H+ / t	----	<10	<10	<10	18
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)		0.02	% Ca	----	0.35	0.35	0.25	0.32
Peroxide Calcium (23Wh)		0.02	% Ca	----	0.34	0.74	0.25	0.34
Acid Reacted Calcium (23X)		0.02	% Ca	----	<0.02	0.39	<0.02	<0.02
acidity - Acid Reacted Calcium (a-23X)		10	mole H+ / t	----	<10	194	<10	<10
sulfidic - Acid Reacted Calcium (s-23X)		0.02	% S	----	<0.02	0.31	<0.02	<0.02
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)		0.02	% Mg	----	0.06	0.15	0.22	0.22
Peroxide Magnesium (23Tm)		0.02	% Mg	----	0.07	0.12	0.23	0.23
Acid Reacted Magnesium (23U)		0.02	% Mg	----	<0.02	<0.02	<0.02	<0.02
acidity - Acid Reacted Magnesium (a-23U)		10	mole H+ / t	----	<10	<10	<10	<10
sulfidic - Acid Reacted Magnesium (s-23U)		0.02	% S	----	<0.02	<0.02	<0.02	<0.02
EA029-F: Excess Acid Neutralising Capacity								
Excess Acid Neutralising Capacity (23Q)		0.02	% CaCO3	----	----	0.74	0.14	----
acidity - Excess Acid Neutralising Capacity (a-23Q)		10	mole H+ / t	----	----	149	29	----
sulfidic - Excess Acid Neutralising Capacity (s-23Q)		0.02	% S	----	----	0.24	0.05	----

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Analytical Results

Analyte	CAS number	LOR	Units	Client Sample ID : TP99_0.00-0.25m Sample Matrix Type / Description : SOIL Sample Date / Time : (30 Sep 2007) (15:00) Laboratory Sample ID : EB0711439-021	TP102_0.00-0.25m SOIL (30 Sep 2007) (15:00) EB0711439-022	TP102_2.25-2.50m SOIL (30 Sep 2007) (15:00) EB0711439-023	TP104_1.00-1.25m SOIL (30 Sep 2007) (15:00) EB0711439-024	TP105_0.00-0.25m SOIL (30 Sep 2007) (15:00) EB0711439-025
EA029-H: Acid Base Accounting								
ANC Fineness Factor		0.5		----	1.5	1.5	1.5	1.5
Net Acidity (sulfur units)		0.02	% S	----	<0.02	<0.02	<0.02	0.05
Net Acidity (acidity units)		10	mole H+ / t	----	<10	<10	<10	31
Liming Rate		1	kg CaCO3/t	----	<1	<1	<1	2
EA033-A: Actual Acidity								
pH KCl (23A)		0.1	pH Unit	8.1	----	----	----	----
Titratable Actual Acidity (23F)		2	mole H+ / t	<2	----	----	----	----
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	<0.02	----	----	----	----
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)		0.02	% S	<0.02	----	----	----	----
acidity - Chromium Reducible Sulfur (a-22B)		10	mole H+ / t	<10	----	----	----	----
EA033-C: Acid Neutralising Capacity								
Acid Neutralising Capacity (19A1)		0.01	% CaCO3	1.52	----	----	----	----
acidity - Acid Neutralising Capacity (a-19A1)		10	mole H+ / t	304	----	----	----	----
sulfidic - Acid Neutralising Capacity (s-19A1)		0.01	% pyrite S	0.49	----	----	----	----
EA033-E: Acid Base Accounting								
ANC Fineness Factor		0.5		1.5	----	----	----	----
Net Acidity (sulfur units)		0.02	% S	<0.02	----	----	----	----
Net Acidity (acidity units)		10	mole H+ / t	<10	----	----	----	----
Liming Rate		1	kg CaCO3/t	<1	----	----	----	----

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Analytical Results

Analyte	CAS number	LOR	Units	Client Sample ID: TP105_0.50-0.75m Sample Matrix Type / Description: SOIL Sample Date / Time: (30 Sep 2007) (15:00) Laboratory Sample ID: EB0711439-026	Client Sample ID: TP167_0.00-0.25m Sample Matrix Type / Description: SOIL Sample Date / Time: (30 Sep 2007) (15:00) Laboratory Sample ID: EB0711439-027	Client Sample ID: TP167_2.50-2.75m Sample Matrix Type / Description: SOIL Sample Date / Time: (30 Sep 2007) (15:00) Laboratory Sample ID: EB0711439-028		
EA029-A: pH Measurements								
pH KCl (23A)		0.1	pH Unit	5.1	6.4	6.9		
pH OX (23B)		0.1	pH Unit	6.6	6.9	7.0		
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)		2	mole H+ / t	20	<2	<2		
Titratable Peroxide Acidity (23G)		2	mole H+ / t	<2	<2	<2		
Titratable Sulfidic Acidity (23H)		2	mole H+ / t	<2	<2	<2		
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	0.03	<0.02	<0.02		
sulfidic - Titratable Peroxide Acidity (s-23G)		0.02	% pyrite S	<0.02	<0.02	<0.02		
sulfidic - Titratable Sulfidic Acidity (s-23H)		0.02	% pyrite S	<0.02	<0.02	<0.02		
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)		0.02	% S	<0.02	<0.02	0.05		
Peroxide Sulfur (23De)		0.02	% S	<0.02	<0.02	0.05		
Peroxide Oxidisable Sulfur (23E)		0.02	% S	<0.02	<0.02	<0.02		
acidity - Peroxide Oxidisable Sulfur (a-23E)		10	mole H+ / t	<10	<10	<10		
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)		0.02	% Ca	0.16	0.64	0.33		
Peroxide Calcium (23Wh)		0.02	% Ca	0.17	0.75	0.38		
Acid Reacted Calcium (23X)		0.02	% Ca	<0.02	0.11	0.05		
acidity - Acid Reacted Calcium (a-23X)		10	mole H+ / t	<10	55	23		
sulfidic - Acid Reacted Calcium (s-23X)		0.02	% S	<0.02	0.09	0.04		
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)		0.02	% Mg	0.25	0.32	0.28		
Peroxide Magnesium (23Tm)		0.02	% Mg	0.28	0.37	0.32		
Acid Reacted Magnesium (23U)		0.02	% Mg	0.02	0.05	0.03		
acidity - Acid Reacted Magnesium (a-23U)		10	mole H+ / t	20	39	29		
sulfidic - Acid Reacted Magnesium (s-23U)		0.02	% S	0.03	0.06	0.05		
EA029-F: Excess Acid Neutralising Capacity								
Excess Acid Neutralising Capacity (23Q)		0.02	% CaCO3	0.16	0.37	0.28		
acidity - Excess Acid Neutralising Capacity (a-23Q)		10	mole H+ / t	32	75	55		
sulfidic - Excess Acid Neutralising Capacity (s-23Q)		0.02	% S	0.05	0.12	0.09		

ALS Environmental

Analytical Results

				Client Sample ID :	TP105_0.50-0.75m	TP167_0.00-0.25m	TP167_2.50-2.75m		
				Sample Matrix Type / Description :	SOIL	SOIL	SOIL		
				Sample Date / Time :	(30 Sep 2007) (15:00)	(30 Sep 2007) (15:00)	(30 Sep 2007) (15:00)		
				Laboratory Sample ID :					
Analyte	***CAS number***	***LOR***	***Units***		**EB0711439-026**	**EB0711439-027**	**EB0711439-028**		
EA029-H: Acid Base Accounting									
ANC Fineness Factor		0.5			1.5	1.5	1.5		
Net Acidity (sulfur units)		0.02	% S		0.03	<0.02	<0.02		
Net Acidity (acidity units)		10	mole H+ / t		20	<10	<10		
Liming Rate		1	kg CaCO3/t		2	<1	<1		

ALS Environmental

Surrogate Control Limits

- **No surrogates present on this report.**

Environmental Division

QUALITY CONTROL REPORT

Work Order	: **EB0711439**	Page	: 1 of 8
Client	: **GOLDER ASSOCIATES**	Laboratory	: Environmental Division Brisbane
Contact	: MS SILVANA SANTOMARTINO	Contact	: Tim Kilmister
Address	: P O BOX 1734 MILTON QLD AUSTRALIA 4064	Address	: 32 Shand Street Stafford QLD Australia 4053
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Telephone	: +61 07 3721 5400	Telephone	: +61-7-3243 7222
Facsimile	: +61 07 3721 5401	Facsimile	: +61-7-3243 7218
Project	: 077633062	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: GLADSTONE-FITZROY PIPELINE		
C-O-C number	: ----	Date Samples Received	: 04-OCT-2007
Sampler	: ----	Issue Date	: 16-OCT-2007
Order number	: ----		
		No. of samples received	: 28
Quote number	: BN/240/07	No. of samples analysed	: 28

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Jessica Garwood	Supervisor - Acid Sulphate Soils	Inorganics

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been preformed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insuffient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = Chemistry Abstract Services number
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA029-A: pH Measurements (QC Lot: 509221)									
EB0711439-003	TP74_1.00-1.25m	EA029: pH KCl (23A)	----	0.1	pH Unit	6.8	6.8	0.0	0% - 20%
		EA029: pH OX (23B)	----	0.1	pH Unit	7.1	7.0	1.4	0% - 20%
EB0711439-018	TP95_2.25-2.50m	EA029: pH KCl (23A)	----	0.1	pH Unit	6.6	6.6	0.0	0% - 20%
		EA029: pH OX (23B)	----	0.1	pH Unit	8.2	8.2	0.0	0% - 20%
EA029-B: Acidity Trail (QC Lot: 509221)									
EB0711439-003	TP74_1.00-1.25m	EA029: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	0.0	----
		EA029: sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	<0.02	0.0	----
		EA029: sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	<0.02	0.0	----
		EA029: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	0.0	----
		EA029: Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	<2	0.0	----
		EA029: Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	<2	0.0	----
EB0711439-018	TP95_2.25-2.50m	EA029: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	0.0	----
		EA029: sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	<0.02	0.0	----
		EA029: sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	<0.02	0.0	----
		EA029: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	0.0	----
		EA029: Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	<2	0.0	----
		EA029: Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	<2	0.0	----
EA029-C: Sulfur Trail (QC Lot: 509221)									
EB0711439-003	TP74_1.00-1.25m	EA029: KCl Extractable Sulfur (23Ce)	----	0.02	% S	0.03	0.03	0.0	No Limit
		EA029: Peroxide Sulfur (23De)	----	0.02	% S	0.03	0.03	0.0	No Limit
		EA029: Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	<0.02	0.0	----
		EA029: acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	<10	0.0	----
EB0711439-018	TP95_2.25-2.50m	EA029: KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	<0.02	0.0	----
		EA029: Peroxide Sulfur (23De)	----	0.02	% S	<0.02	<0.02	0.0	----
		EA029: Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	<0.02	0.0	----
		EA029: acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	<10	0.0	----
EA029-D: Calcium Values (QC Lot: 509221)									
EB0711439-003	TP74_1.00-1.25m	EA029: KCl Extractable Calcium (23Vh)	----	0.02	% Ca	0.14	0.12	12.8	No Limit
		EA029: Peroxide Calcium (23Wh)	----	0.02	% Ca	0.15	0.14	10.4	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA029-D: Calcium Values (QC Lot: 509221) - continued									
EB0711439-003	TP74_1.00-1.25m	EA029: Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.02	<0.02	0.0	----
		EA029: sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.02	<0.02	0.0	----
		EA029: acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	<10	0.0	----
EB0711439-018	TP95_2.25-2.50m	EA029: KCl Extractable Calcium (23Vh)	----	0.02	% Ca	0.05	0.06	0.0	No Limit
		EA029: Peroxide Calcium (23Wh)	----	0.02	% Ca	0.06	0.06	0.0	No Limit
		EA029: Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.02	<0.02	0.0	----
		EA029: sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.02	<0.02	0.0	----
		EA029: acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	<10	0.0	----
EA029-E: Magnesium Values (QC Lot: 509221)									
EB0711439-003	TP74_1.00-1.25m	EA029: KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	0.12	0.11	0.0	No Limit
		EA029: Peroxide Magnesium (23Tm)	----	0.02	% Mg	0.14	0.13	0.0	No Limit
		EA029: Acid Reacted Magnesium (23U)	----	0.02	% Mg	0.02	0.02	0.0	No Limit
		EA029: sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	0.03	0.03	0.0	No Limit
		EA029: Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	17	21	19.4	No Limit
EB0711439-018	TP95_2.25-2.50m	EA029: KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	0.09	0.10	12.3	No Limit
		EA029: Peroxide Magnesium (23Tm)	----	0.02	% Mg	0.12	0.13	0.0	No Limit
		EA029: Acid Reacted Magnesium (23U)	----	0.02	% Mg	0.04	0.03	0.0	No Limit
		EA029: sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	0.05	0.04	23.3	No Limit
		EA029: Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	31	24	23.3	No Limit
EA029-F: Excess Acid Neutralising Capacity (QC Lot: 509221)									
EB0711439-003	TP74_1.00-1.25m	EA029: Excess Acid Neutralising Capacity (23Q)	----	0.02	% CaCO3	0.31	0.25	22.5	0% - 50%
		EA029: sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.02	% S	0.10	0.08	22.5	No Limit
		EA029: acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	62	50	22.5	No Limit
EB0711439-018	TP95_2.25-2.50m	EA029: Excess Acid Neutralising Capacity (23Q)	----	0.02	% CaCO3	0.14	0.19	28.4	No Limit
		EA029: sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.02	% S	0.05	0.06	28.4	No Limit
		EA029: acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	29	38	28.4	No Limit
EA033-A: Actual Acidity (QC Lot: 509220)									
EB0711439-001	TP74_0.00-0.25m	EA033: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	0.0	----
		EA033: Titratable Actual Acidity (23F)	----	2	mole H+ / t	11	11	0.0	No Limit
		EA033: pH KCl (23A)	----	0.1	pH Unit	5.7	5.6	1.8	0% - 20%
EA033-B: Potential Acidity (QC Lot: 509220)									
EB0711439-001	TP74_0.00-0.25m	EA033: Chromium Reducible Sulfur (22B)	----	0.02	% S	<0.02	<0.02	0.0	----

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA033-B: Potential Acidity (QC Lot: 509220) - continued									
EB0711439-001	TP74_0.00-0.25m	EA033: acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	<10	0.0	----

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

		Method Blank (MB) Report			Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA029-B: Acidity Trail (QCLot: 509221)								
EA029: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	----	----	----	----
EA029: Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	----	----	----	----
EA029: Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	----	----	----	----
EA029: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	----	----	----	----
EA029: sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	----	----	----	----
EA029: sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	----	----	----	----
EA029-C: Sulfur Trail (QCLot: 509221)								
EA029: KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	----	----	----	----
EA029: Peroxide Sulfur (23De)	----	0.02	% S	<0.02	----	----	----	----
EA029: Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	----	----	----	----
EA029: acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	----	----	----	----
EA029-D: Calcium Values (QCLot: 509221)								
EA029: KCl Extractable Calcium (23Vh)	----	0.02	% Ca	<0.02	----	----	----	----
EA029: Peroxide Calcium (23Wh)	----	0.02	% Ca	<0.02	----	----	----	----
EA029: Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.02	----	----	----	----
EA029: acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	----	----	----	----
EA029: sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.02	----	----	----	----
EA029-E: Magnesium Values (QCLot: 509221)								
EA029: KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	<0.02	----	----	----	----
EA029: Peroxide Magnesium (23Tm)	----	0.02	% Mg	<0.02	----	----	----	----
EA029: Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.02	----	----	----	----
EA029: Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	<10	----	----	----	----
EA029: sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	<0.02	----	----	----	----
EA029-F: Excess Acid Neutralising Capacity (QCLot: 509221)								
EA029: Excess Acid Neutralising Capacity (23Q)	----	0.02	% CaCO3	<0.02	----	----	----	----
EA029: acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	<10	----	----	----	----
EA029: sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.02	% S	<0.02	----	----	----	----
EA029-G: Retained Acidity (QCLot: 509221)								
EA029: Net Acid Soluble Sulfur (20Je)	----	0.02	% S	<0.02	----	----	----	----
EA029: acidity - Net Acid Soluble Sulfur (a-20J)	----	10	mole H+ / t	<10	----	----	----	----
EA029: sulfidic - Net Acid Soluble Sulfur (s-20J)	----	0.02	% pyrite S	<0.02	----	----	----	----
EA029: HCl Extractable Sulfur (20Be)	----	0.02	% S	<0.02	----	----	----	----
EA033-A: Actual Acidity (QCLot: 509220)								

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
		LOR	Unit	Result	Concentration	LCS	Low	High
EA033-A: Actual Acidity (QCLot: 509220) - continued								
EA033: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	----	----	----	----
EA033: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	----	----	----	----
EA033-B: Potential Acidity (QCLot: 509220)								
EA033: Chromium Reducible Sulfur (22B)	----	0.02	% S	<0.02	----	----	----	----
EA033: acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	----	----	----	----
EA033-C: Acid Neutralising Capacity (QCLot: 509220)								
EA033: Acid Neutralising Capacity (19A1)	----	0.01	% CaCO3	<0.01	----	----	----	----
EA033: acidity - Acid Neutralising Capacity (a-19A1)	----	10	mole H+ / t	<10	----	----	----	----
EA033: sulfidic - Acid Neutralising Capacity (s-19A1)	----	0.01	% pyrite S	<0.01	----	----	----	----

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) Results are required to be reported.**

SAMPLE CHAIN OF CUSTODY DOCUMENTATION - SOIL

Project ID:	077633062	Quote/Order No.:	
Site Location:	Gladstone-Fitzroy Pipeline	Lab Name:	ALS
Sampled By:	Dept Main Roads		
Turnaround (Days)	7	BY:	
Report Format:	HARD ☐ FAX ☐ DISK ☐	EMAIL ☑ BULLETIN BOARD ☐	
Email Format:	PDF ☑ Excel ☑ Other ☐	Email Addre: ssantomartino@golder.com.au	

GOLDER ASSOCIATES PTY LTD
611 Coronation Drive, Toowong, Qld 4066
Phone: (07) 3721 5400
Fax: (07) 3721 5401
Invoice to be sent to PO Box 1734 Milton BC, Qld 4064
Project Manager: Henry Parsons
Contact Phone: 07 37215400
Email: hparsons@golder.com.au

Comments/Special Instructions:
Please e-mail results etc. to Silvana Santomartino

Samples from a declared Fire Ant Area: N
Samples taken from a known Weed and or Pest Area: N

ANALYSIS REQUIRED

SAMPLE ID	SAMPLE MATRIX	SAMPLE DATE	SAMPLE TIME	CONTAINER/ PRESERVATIVE		No CONTAINERS	POSSIBLE HIGH CONCENTRATION	EA-033 (Chromium Suite)	EA - 029 (SPOCAS)
1 TP74 0.00-0.25m	Soil	Sep-07		Bag	Frozen	1	N	X	
2 TP74 0.50-0.75m	Soil	Sep-07		Bag	Frozen	1	N	X	
3 TP74 1.00-1.25m	Soil	Sep-07		Bag	Frozen	1	N		X
4 TP74 1.50-1.75m	Soil	Sep-07		Bag	Frozen	1	N		X
5 TP74 2.25-2.50m	Soil	Sep-07		Bag	Frozen	1	N		X
6 TP74 2.50-2.75m	Soil	Sep-07		Bag	Frozen	1	N		X
7 TP79 0.00-0.25m	Soil	Sep-07		Bag	Frozen	1	N	X	
8 TP79 2.00-2.25m	Soil	Sep-07		Bag	Frozen	1	N		X
9 TP80 0.00-0.25m	Soil	Sep-07		Bag	Frozen	1	N	X	
10 TP80 1.00-1.25m	Soil	Sep-07		Bag	Frozen	1	N	X	
11 TP81 0.00-0.25m	Soil	Sep-07		Bag	Frozen	1	N	X	
12 TP81 0.50-0.75m	Soil	Sep-07		Bag	Frozen	1	N	X	
13 TP82 0.00-0.25m	Soil	Sep-07		Bag	Frozen	1	N		X
14 TP82 0.50-0.75m	Soil	Sep-07		Bag	Frozen	1	N		X
15 TP82 2.00-2.25m	Soil	Sep-07		Bag	Frozen	1	N		X
16 TP94 1.25-1.50m	Soil	Sep-07		Bag	Frozen	1	N		X
17 TP95 0.00-0.25m	Soil	Sep-07		Bag	Frozen	1	N		X
18 TP95 2.25-2.50m	Soil	Sep-07		Bag	Frozen	1	N		X
19 TP98 0.00-0.25m	Soil	Sep-07		Bag	Frozen	1	N	X	
20 TP98 2.75-3.0m	Soil	Sep-07		Bag	Frozen	1	N		X
21 TP99 0.00-0.25m	Soil	Sep-07		Bag	Frozen	1	N	X	
22 TP102 0.00-0.25m	Soil	Sep-07		Bag	Frozen	1	N		X
23 TP102 2.25-2.50m	Soil	Sep-07		Bag	Frozen	1	N		X
24 TP104 1.00-1.25m	Soil	Sep-07		Bag	Frozen	1	N		X
25 TP105 0.00-0.25m	Soil	Sep-07		Bag	Frozen	1	N		X
26 TP105 0.50-0.75m	Soil	Sep-07		Bag	Frozen	1	N		X
27 TP167 0.00-0.25m	Soil	Sep-07		Bag	Frozen	1	N		X
28 TP167 2.50-2.75m	Soil	Sep-07		Bag	Frozen	1	N		X

Environmental Division
Brisbane
Work Order
EB0711439

Telephone : +61-7-3243 7222

SAMPLE MATRIX = Soil/Sediment/Fill/Other

SAMPLE TYPE = Core(CR)

HIGH CONCENTRATION: Tick box and circle expected parameters in analysis list

Container Type and Preservative Codes: P = Natural Plastic; N = Nitric Acid Preserved; C = Sodium Hydroxide Preserved; J = Solvent Washed Acid Rinsed Jar; S = Solvent Washed Acid Rinsed Glass Bottle; VC = Hydrochloric Preserved Vial; VS = Sulphuric Acid

	SIGNATURE	COMPANY	DATE	TIME
RELEASED BY		GOLDER	4/10/07	3:00 pm
RECEIVED BY	N.King	AGS	4/10/07	16:0
RELEASED BY				
RECEIVED BY				
RELEASED BY				
RECEIVED BY				

	SIGNATURE	COMPANY	DATE	TIME	Shipment Method
RELEASED BY					Shipping Ref:
RECEIVED BY					

To Be Filled Out By Analysing Laboratory

LAB. BATCH NUMBER

Security Seal	✓	Chilled		Bill to:	
Suitable Containers	✓	Frozen		Address	
Cool Box	✓	Ambient			

THIS FORM IS TO BE SIGNED BY GOLDER STAFF; COURIER/S; LABORATORY ON RECEIPT OF SAMPLES.

Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: **EB0713257**	Page	: 1 of 16
Client	: **GOLDER ASSOCIATES**	Laboratory	: Environmental Division Brisbane
Contact	: MS SILVANA SANTOMARTINO	Contact	: Tim Kilmister
Address	: P O BOX 1734 MILTON QLD AUSTRALIA 4064	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: ssantomartino@golder.com.au	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: +61 07 3721 5400	Telephone	: +61-7-3243 7222
Facsimile	: +61 07 3721 5401	Facsimile	: +61-7-3243 7218
Project	: 077633062 GLADSTONE-FITZROY PIPELINE	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----		
C-O-C number	: ----	Date Samples Received	: 13-NOV-2007
Sampler	: DEPT MAIN ROADS	Issue Date	: 15-NOV-2007
Site	: GLADSTONE-FITZROY PIPELINE		
		No. of samples received	: 32
Quote number	: EN/002/05	No. of samples analysed	: 32

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Cass Sealby	Senior Chemist - Acid Sulphate Soils	Inorganics

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been preformed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insuffient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for process purposes.

Key : CAS Number = Chemistry Abstract Services number
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting

- **ANC not required because pH KCl less than 6.5**
- **Liming rate is calculated and reported on a dry weight basis assuming use of fine agricultural lime (CaCO3) and using a safety factor of 1.5 to allow for non-homogeneous mixing and poor reactivity of lime. For conversion of Liming Rate from □kg/t dry weight□ to □kg/m3 in-situ soil□, multiply □reported results□ x □wet bulk density of soil in t/m3□.**

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: TP69 1.5m	TP70 0.5m	TP71 0.0-0.5m	TP72 0.0-0.2m	TP73 0.0-0.50m
				Client sampling date / time: [13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]
				EB0713257-001	EB0713257-002	EB0713257-003	EB0713257-004	EB0713257-005
EA029-A: pH Measurements								
pH KCl (23A)	----	0.1	pH Unit	**4.6**	**4.5**	**4.8**	----	----
pH OX (23B)	----	0.1	pH Unit	**4.7**	**4.4**	**4.6**	----	----
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)	----	2	mole H+ / t	**26**	**37**	**31**	----	----
Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	**31**	**35**	**31**	----	----
Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	**5**	<2	<2	----	----
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	**0.04**	**0.06**	**0.05**	----	----
sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	**0.05**	**0.06**	**0.05**	----	----
sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	----	----
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	<0.02	<0.02	----	----
Peroxide Sulfur (23De)	----	0.02	% S	<0.02	<0.02	<0.02	----	----
Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	<0.02	<0.02	----	----
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	<10	<10	----	----
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)	----	0.02	% Ca	**0.07**	**0.13**	**0.14**	----	----
Peroxide Calcium (23Wh)	----	0.02	% Ca	**0.07**	**0.14**	**0.15**	----	----
Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.02	<0.02	<0.02	----	----
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	<10	<10	----	----
sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.02	<0.02	<0.02	----	----
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	**0.16**	**0.17**	**0.16**	----	----
Peroxide Magnesium (23Tm)	----	0.02	% Mg	**0.16**	**0.19**	**0.16**	----	----
Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.02	**0.02**	<0.02	----	----
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	<10	**16**	<10	----	----
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	<0.02	**0.03**	<0.02	----	----
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	**1.5**	**1.5**	**1.5**	----	----
Net Acidity (sulfur units)	----	0.02	% S	**0.04**	**0.06**	**0.05**	----	----
Net Acidity (acidity units)	----	10	mole H+ / t	**26**	**37**	**31**	----	----
Liming Rate	----	1	kg CaCO3/t	**2**	**3**	**2**	----	----
EA033-A: Actual Acidity								
pH KCl (23A)	----	0.1	pH Unit	----	----	----	**5.3**	**5.7**
Titratable Actual Acidity (23F)	----	2	mole H+ / t	----	----	----	**20**	**12**

Analytical Results

Sub-Matrix: SOIL				Client sample ID	TP69 1.5m	TP70 0.5m	TP71 0.0-0.5m	TP72 0.0-0.2m	TP73 0.0-0.50m
				Client sampling date / time	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]
Compound	CAS Number	LOR	Unit		EB0713257-001	EB0713257-002	EB0713257-003	EB0713257-004	EB0713257-005
EA033-A: Actual Acidity - Continued									
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S		----	----	----	**0.03**	<0.02
EA033-B: Potential Acidity									
Chromium Reducible Sulfur (22B)	----	0.02	% S		----	----	----	<0.02	<0.02
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t		----	----	----	<10	<10
EA033-E: Acid Base Accounting									
ANC Fineness Factor	----	0.5	-		----	----	----	**1.5**	**1.5**
Net Acidity (sulfur units)	----	0.02	% S		----	----	----	**0.03**	<0.02
Net Acidity (acidity units)	----	10	mole H+ / t		----	----	----	**20**	**12**
Liming Rate	----	1	kg CaCO3/t		----	----	----	**2**	<1

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: TP77 0.0-0.6m	TP78 0.0-0.2m	TP83 0.0-0.2m	TP87 0.3-0.45m	TP88 0.0-0.6m
Client sampling date / time				[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]
				EB0713257-006	EB0713257-007	EB0713257-008	EB0713257-009	EB0713257-010
EA029-A: pH Measurements								
pH KCl (23A)	----	0.1	pH Unit	5.6	----	----	4.9	6.2
pH OX (23B)	----	0.1	pH Unit	3.5	----	----	4.0	6.7
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)	----	2	mole H+ / t	13	----	----	29	4
Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	----	----	24	<2
Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	----	----	<2	<2
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	0.02	----	----	0.05	<0.02
sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	----	----	0.04	<0.02
sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	----	----	<0.02	<0.02
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	----	----	<0.02	<0.02
Peroxide Sulfur (23De)	----	0.02	% S	0.02	----	----	<0.02	<0.02
Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	0.02	----	----	<0.02	<0.02
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	13	----	----	<10	<10
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)	----	0.02	% Ca	0.18	----	----	0.22	0.21
Peroxide Calcium (23Wh)	----	0.02	% Ca	0.21	----	----	0.25	0.24
Acid Reacted Calcium (23X)	----	0.02	% Ca	0.03	----	----	0.02	0.03
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	15	----	----	12	14
sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	0.02	----	----	<0.02	0.02
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	0.06	----	----	0.10	0.04
Peroxide Magnesium (23Tm)	----	0.02	% Mg	0.07	----	----	0.11	0.04
Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.02	----	----	<0.02	<0.02
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	<10	----	----	12	<10
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	<0.02	----	----	<0.02	<0.02
EA029-F: Excess Acid Neutralising Capacity								
Excess Acid Neutralising Capacity (23Q)	----	0.02	% CaCO3	----	----	----	----	0.32
acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	----	----	----	----	64
sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.02	% S	----	----	----	----	0.10
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	1.5	----	----	1.5	1.5

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: TP77 0.0-0.6m	TP78 0.0-0.2m	TP83 0.0-0.2m	TP87 0.3-0.45m	TP88 0.0-0.6m
				Client sampling date / time: [13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]
				EB0713257-006	EB0713257-007	EB0713257-008	EB0713257-009	EB0713257-010
EA029-H: Acid Base Accounting - Continued								
Net Acidity (sulfur units)	----	0.02	% S	**0.04**	----	----	**0.05**	<0.02
Net Acidity (acidity units)	----	10	mole H+ / t	**26**	----	----	**29**	<10
Liming Rate	----	1	kg CaCO3/t	**2**	----	----	**2**	<1
EA033-A: Actual Acidity								
pH KCl (23A)	----	0.1	pH Unit	----	**4.9**	**5.1**	----	----
Titratable Actual Acidity (23F)	----	2	mole H+ / t	----	**44**	**23**	----	----
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	----	**0.07**	**0.04**	----	----
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)	----	0.02	% S	----	<0.02	<0.02	----	----
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	----	<10	<10	----	----
EA033-E: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	----	**1.5**	**1.5**	----	----
Net Acidity (sulfur units)	----	0.02	% S	----	**0.07**	**0.04**	----	----
Net Acidity (acidity units)	----	10	mole H+ / t	----	**44**	**23**	----	----
Liming Rate	----	1	kg CaCO3/t	----	**3**	**2**	----	----

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: TP106 1.75-2.0m Client sampling date / time: [13-NOV-2007] EB0713257-011	TP106 2.25-2.5m [13-NOV-2007] EB0713257-012	TP107 0.25-0.5m [13-NOV-2007] EB0713257-013	TP108 0.0-0.25m [13-NOV-2007] EB0713257-014	TP108 2.75-3.0m [13-NOV-2007] EB0713257-015
EA029-A: pH Measurements								
pH KCl (23A)	----	0.1	pH Unit	**5.6**	**4.2**	**6.9**	----	**4.9**
pH OX (23B)	----	0.1	pH Unit	**2.2**	**3.6**	**6.6**	----	**4.8**
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)	----	2	mole H+ / t	**13**	**29**	<2	----	**24**
Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	**557**	**52**	<2	----	**15**
Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	**544**	**23**	<2	----	<2
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	**0.02**	**0.05**	<0.02	----	**0.04**
sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	**0.89**	**0.08**	<0.02	----	**0.02**
sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	**0.87**	**0.04**	<0.02	----	<0.02
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)	----	0.02	% S	**0.09**	**0.07**	**0.02**	----	**0.04**
Peroxide Sulfur (23De)	----	0.02	% S	**1.06**	**0.08**	**0.06**	----	**0.04**
Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	**0.97**	<0.02	**0.04**	----	<0.02
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	**603**	<10	**23**	----	<10
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)	----	0.02	% Ca	**0.12**	**0.09**	**0.20**	----	**0.10**
Peroxide Calcium (23Wh)	----	0.02	% Ca	**0.12**	**0.09**	**0.26**	----	**0.10**
Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.02	<0.02	**0.06**	----	<0.02
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	<10	**30**	----	<10
sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.02	<0.02	**0.05**	----	<0.02
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	**0.18**	**0.15**	**0.18**	----	**0.11**
Peroxide Magnesium (23Tm)	----	0.02	% Mg	**0.20**	**0.16**	**0.23**	----	**0.12**
Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.02	<0.02	**0.05**	----	<0.02
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	**12**	<10	**39**	----	<10
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	**0.02**	<0.02	**0.06**	----	<0.02
EA029-F: Excess Acid Neutralising Capacity								
Excess Acid Neutralising Capacity (23Q)	----	0.02	% CaCO3	----	----	**0.45**	----	----
acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	----	----	**90**	----	----
sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.02	% S	----	----	**0.14**	----	----
EA029-G: Retained Acidity								
Net Acid Soluble Sulfur (20Je)	----	0.02	% S	----	**0.03**	----	----	----

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: TP106 1.75-2.0m Client sampling date / time: [13-NOV-2007] EB0713257-011	TP106 2.25-2.5m [13-NOV-2007] EB0713257-012	TP107 0.25-0.5m [13-NOV-2007] EB0713257-013	TP108 0.0-0.25m [13-NOV-2007] EB0713257-014	TP108 2.75-3.0m [13-NOV-2007] EB0713257-015
EA029-G: Retained Acidity - Continued								
acidity - Net Acid Soluble Sulfur (a-20J)	----	10	mole H+ / t	----	**14**	----	----	----
sulfidic - Net Acid Soluble Sulfur (s-20J)	----	0.02	% pyrite S	----	**0.02**	----	----	----
HCl Extractable Sulfur (20Be)	----	0.02	% S	----	**0.10**	----	----	----
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	**1.5**	**1.5**	**1.5**	----	**1.5**
Net Acidity (sulfur units)	----	0.02	% S	**0.99**	**0.08**	<0.02	----	**0.04**
Net Acidity (acidity units)	----	10	mole H+ / t	**616**	**49**	<10	----	**25**
Liming Rate	----	1	kg CaCO3/t	**46**	**4**	<1	----	**2**
EA033-A: Actual Acidity								
pH KCl (23A)	----	0.1	pH Unit	----	----	----	**6.0**	----
Titratable Actual Acidity (23F)	----	2	mole H+ / t	----	----	----	**5**	----
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	----	----	----	<0.02	----
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)	----	0.02	% S	----	----	----	<0.02	----
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	----	----	----	<10	----
EA033-E: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	----	----	----	**1.5**	----
Net Acidity (sulfur units)	----	0.02	% S	----	----	----	<0.02	----
Net Acidity (acidity units)	----	10	mole H+ / t	----	----	----	<10	----
Liming Rate	----	1	kg CaCO3/t	----	----	----	<1	----

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: TP109 0.0-0.25m	TP110 0.0-0.25m	TP112 2.25-2.5m	TP114 0.0-0.25m	TP119 0.0-0.25m
Client sampling date / time				[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]
				EB0713257-016	EB0713257-017	EB0713257-018	EB0713257-019	EB0713257-020
EA029-A: pH Measurements								
pH KCl (23A)	----	0.1	pH Unit	----	----	**5.6**	----	----
pH OX (23B)	----	0.1	pH Unit	----	----	**6.0**	----	----
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)	----	2	mole H+ / t	----	----	**9**	----	----
Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	----	----	**5**	----	----
Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	----	----	<2	----	----
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	----	----	<0.02	----	----
sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	----	----	<0.02	----	----
sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	----	----	<0.02	----	----
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)	----	0.02	% S	----	----	<0.02	----	----
Peroxide Sulfur (23De)	----	0.02	% S	----	----	**0.02**	----	----
Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	----	----	**0.02**	----	----
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	----	----	**13**	----	----
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)	----	0.02	% Ca	----	----	**0.11**	----	----
Peroxide Calcium (23Wh)	----	0.02	% Ca	----	----	**0.11**	----	----
Acid Reacted Calcium (23X)	----	0.02	% Ca	----	----	<0.02	----	----
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	----	----	<10	----	----
sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	----	----	<0.02	----	----
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	----	----	**0.26**	----	----
Peroxide Magnesium (23Tm)	----	0.02	% Mg	----	----	**0.29**	----	----
Acid Reacted Magnesium (23U)	----	0.02	% Mg	----	----	**0.02**	----	----
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	----	----	**20**	----	----
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	----	----	**0.03**	----	----
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	----	----	**1.5**	----	----
Net Acidity (sulfur units)	----	0.02	% S	----	----	**0.03**	----	----
Net Acidity (acidity units)	----	10	mole H+ / t	----	----	**22**	----	----
Liming Rate	----	1	kg CaCO3/t	----	----	**2**	----	----
EA033-A: Actual Acidity								
pH KCl (23A)	----	0.1	pH Unit	**5.6**	**5.6**	----	**5.4**	**5.3**
Titratable Actual Acidity (23F)	----	2	mole H+ / t	**13**	**12**	----	**14**	**10**

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: TP109 0.0-0.25m	TP110 0.0-0.25m	TP112 2.25-2.5m	TP114 0.0-0.25m	TP119 0.0-0.25m
				Client sampling date / time: [13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]
				EB0713257-016	EB0713257-017	EB0713257-018	EB0713257-019	EB0713257-020
EA033-A: Actual Acidity - Continued								
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	**0.02**	<0.02	----	**0.02**	<0.02
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)	----	0.02	% S	<0.02	<0.02	----	<0.02	<0.02
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	<10	----	<10	<10
EA033-E: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	**1.5**	**1.5**	----	**1.5**	**1.5**
Net Acidity (sulfur units)	----	0.02	% S	**0.02**	<0.02	----	**0.02**	<0.02
Net Acidity (acidity units)	----	10	mole H+ / t	**13**	**12**	----	**14**	**10**
Liming Rate	----	1	kg CaCO3/t	<1	<1	----	**1**	<1

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: TP119 0.5-0.75m	TP123 0.25-0.5m	TP130 0.0-0.25m	TP130 0.5-0.75m	TP131 0.0-0.25m
				Client sampling date / time: [13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]
				EB0713257-021	EB0713257-022	EB0713257-023	EB0713257-024	EB0713257-025
EA029-A: pH Measurements								
pH KCl (23A)	----	0.1	pH Unit	**5.5**	**5.2**	----	**5.3**	----
pH OX (23B)	----	0.1	pH Unit	**6.7**	**6.9**	----	**4.8**	----
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)	----	2	mole H+ / t	**9**	**23**	----	**13**	----
Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	<2	----	<2	----
Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	<2	----	<2	----
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	**0.04**	----	**0.02**	----
sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	<0.02	----	<0.02	----
sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	<0.02	----	<0.02	----
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	<0.02	----	<0.02	----
Peroxide Sulfur (23De)	----	0.02	% S	<0.02	<0.02	----	<0.02	----
Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	<0.02	----	<0.02	----
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	<10	----	<10	----
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)	----	0.02	% Ca	**0.24**	**0.17**	----	**0.15**	----
Peroxide Calcium (23Wh)	----	0.02	% Ca	**0.27**	**0.21**	----	**0.18**	----
Acid Reacted Calcium (23X)	----	0.02	% Ca	**0.04**	**0.04**	----	**0.04**	----
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	**18**	**18**	----	**18**	----
sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	**0.03**	**0.03**	----	**0.03**	----
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	**0.27**	**0.23**	----	**0.14**	----
Peroxide Magnesium (23Tm)	----	0.02	% Mg	**0.30**	**0.26**	----	**0.17**	----
Acid Reacted Magnesium (23U)	----	0.02	% Mg	**0.02**	**0.03**	----	**0.03**	----
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	**20**	**21**	----	**22**	----
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	**0.03**	**0.03**	----	**0.04**	----
EA029-F: Excess Acid Neutralising Capacity								
Excess Acid Neutralising Capacity (23Q)	----	0.02	% CaCO3	**0.34**	**0.45**	----	----	----
acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	**67**	**90**	----	----	----
sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.02	% S	**0.11**	**0.14**	----	----	----
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	**1.5**	**1.5**	----	**1.5**	----

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: TP119 0.5-0.75m	TP123 0.25-0.5m	TP130 0.0-0.25m	TP130 0.5-0.75m	TP131 0.0-0.25m
			Client sampling date / time:	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]
				EB0713257-021	EB0713257-022	EB0713257-023	EB0713257-024	EB0713257-025
EA029-H: Acid Base Accounting - Continued								
Net Acidity (sulfur units)	----	0.02	% S	<0.02	**0.04**	----	**0.02**	----
Net Acidity (acidity units)	----	10	mole H+ / t	<10	**23**	----	**13**	----
Liming Rate	----	1	kg CaCO3/t	<1	**2**	----	<1	----
EA033-A: Actual Acidity								
pH KCl (23A)	----	0.1	pH Unit	----	----	**4.7**	----	**5.6**
Titratable Actual Acidity (23F)	----	2	mole H+ / t	----	----	**35**	----	**13**
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	----	----	**0.06**	----	**0.02**
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)	----	0.02	% S	----	----	<0.02	----	<0.02
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	----	----	<10	----	<10
EA033-E: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	----	----	**1.5**	----	**1.5**
Net Acidity (sulfur units)	----	0.02	% S	----	----	**0.06**	----	**0.02**
Net Acidity (acidity units)	----	10	mole H+ / t	----	----	**35**	----	**13**
Liming Rate	----	1	kg CaCO3/t	----	----	**2**	----	<1

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: TP132 0.0-0.25m Client sampling date / time: [13-NOV-2007] EB0713257-026	Client sample ID: TP138 0.0-0.25m Client sampling date / time: [13-NOV-2007] EB0713257-027	Client sample ID: TP159 0.0-0.6m Client sampling date / time: [13-NOV-2007] EB0713257-028	Client sample ID: TP160 0.0-0.5m Client sampling date / time: [13-NOV-2007] EB0713257-029	Client sample ID: TP163 0.0-0.9m Client sampling date / time: [13-NOV-2007] EB0713257-030
EA029-A: pH Measurements								
pH KCl (23A)	----	0.1	pH Unit	----	----	6.2	6.1	5.5
pH OX (23B)	----	0.1	pH Unit	----	----	7.2	7.2	4.9
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)	----	2	mole H+ / t	----	----	2	4	12
Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	----	----	<2	<2	<2
Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	----	----	<2	<2	<2
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	----	----	<0.02	<0.02	<0.02
sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	----	----	<0.02	<0.02	<0.02
sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	----	----	<0.02	<0.02	<0.02
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)	----	0.02	% S	----	----	<0.02	<0.02	<0.02
Peroxide Sulfur (23De)	----	0.02	% S	----	----	<0.02	<0.02	<0.02
Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	----	----	<0.02	<0.02	<0.02
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	----	----	<10	<10	<10
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)	----	0.02	% Ca	----	----	0.19	0.24	0.64
Peroxide Calcium (23Wh)	----	0.02	% Ca	----	----	0.24	0.31	0.70
Acid Reacted Calcium (23X)	----	0.02	% Ca	----	----	0.05	0.06	0.06
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	----	----	24	33	32
sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	----	----	0.04	0.05	0.05
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	----	----	0.12	0.10	0.24
Peroxide Magnesium (23Tm)	----	0.02	% Mg	----	----	0.14	0.12	0.26
Acid Reacted Magnesium (23U)	----	0.02	% Mg	----	----	<0.02	0.02	0.02
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	----	----	15	17	17
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	----	----	0.02	0.03	0.03
EA029-F: Excess Acid Neutralising Capacity								
Excess Acid Neutralising Capacity (23Q)	----	0.02	% CaCO3	----	----	0.39	0.35	----
acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	----	----	77	70	----
sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.02	% S	----	----	0.12	0.11	----
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	----	----	1.5	1.5	1.5

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: TP132 0.0-0.25m	TP138 0.0-0.25m	TP159 0.0-0.6m	TP160 0.0-0.5m	TP163 0.0-0.9m
				Client sampling date / time: [13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]
				EB0713257-026	EB0713257-027	EB0713257-028	EB0713257-029	EB0713257-030
EA029-H: Acid Base Accounting - Continued								
Net Acidity (sulfur units)	----	0.02	% S	----	----	<0.02	<0.02	<0.02
Net Acidity (acidity units)	----	10	mole H+ / t	----	----	<10	<10	**12**
Liming Rate	----	1	kg CaCO3/t	----	----	<1	<1	<1
EA033-A: Actual Acidity								
pH KCl (23A)	----	0.1	pH Unit	**4.7**	**5.8**	----	----	----
Titratable Actual Acidity (23F)	----	2	mole H+ / t	**24**	**9**	----	----	----
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	**0.04**	<0.02	----	----	----
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)	----	0.02	% S	<0.02	<0.02	----	----	----
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	<10	----	----	----
EA033-E: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	**1.5**	**1.5**	----	----	----
Net Acidity (sulfur units)	----	0.02	% S	**0.04**	<0.02	----	----	----
Net Acidity (acidity units)	----	10	mole H+ / t	**24**	<10	----	----	----
Liming Rate	----	1	kg CaCO3/t	**2**	<1	----	----	----

Analytical Results

Sub-Matrix: SOIL			Client sample ID	TP220 0.0-0.4m	TP220 2.0-3.0m	----	----	----
			Client sampling date / time	[13-NOV-2007]	[13-NOV-2007]	----	----	----
Compound	CAS Number	LOR	Unit	EB0713257-031	EB0713257-032	----	----	----
EA029-A: pH Measurements								
pH KCl (23A)	----	0.1	pH Unit	----	**6.1**	----	----	----
pH OX (23B)	----	0.1	pH Unit	----	**6.9**	----	----	----
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)	----	2	mole H+ / t	----	**2**	----	----	----
Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	----	<2	----	----	----
Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	----	<2	----	----	----
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	----	<0.02	----	----	----
sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	----	<0.02	----	----	----
sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	----	<0.02	----	----	----
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)	----	0.02	% S	----	<0.02	----	----	----
Peroxide Sulfur (23De)	----	0.02	% S	----	<0.02	----	----	----
Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	----	<0.02	----	----	----
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	----	<10	----	----	----
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)	----	0.02	% Ca	----	**0.16**	----	----	----
Peroxide Calcium (23Wh)	----	0.02	% Ca	----	**0.16**	----	----	----
Acid Reacted Calcium (23X)	----	0.02	% Ca	----	<0.02	----	----	----
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	----	<10	----	----	----
sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	----	<0.02	----	----	----
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	----	**0.26**	----	----	----
Peroxide Magnesium (23Tm)	----	0.02	% Mg	----	**0.29**	----	----	----
Acid Reacted Magnesium (23U)	----	0.02	% Mg	----	**0.03**	----	----	----
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	----	**22**	----	----	----
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	----	**0.04**	----	----	----
EA029-F: Excess Acid Neutralising Capacity								
Excess Acid Neutralising Capacity (23Q)	----	0.02	% CaCO3	----	**0.14**	----	----	----
acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	----	**28**	----	----	----
sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.02	% S	----	**0.04**	----	----	----
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	----	**1.5**	----	----	----

Analytical Results

Sub-Matrix: SOIL			Client sample ID	TP220 0.0-0.4m	TP220 2.0-3.0m	----	----	----
			Client sampling date / time	[13-NOV-2007]	[13-NOV-2007]	----	----	----
Compound	CAS Number	LOR	Unit	EB0713257-031	EB0713257-032	----	----	----
EA029-H: Acid Base Accounting - Continued								
Net Acidity (sulfur units)	----	0.02	% S	----	<0.02	----	----	----
Net Acidity (acidity units)	----	10	mole H+ / t	----	<10	----	----	----
Liming Rate	----	1	kg CaCO3/t	----	<1	----	----	----
EA033-A: Actual Acidity								
pH KCl (23A)	----	0.1	pH Unit	**6.4**	----	----	----	----
Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	----	----	----	----
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	----	----	----	----
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)	----	0.02	% S	<0.02	----	----	----	----
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	----	----	----	----
EA033-E: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	**1.5**	----	----	----	----
Net Acidity (sulfur units)	----	0.02	% S	<0.02	----	----	----	----
Net Acidity (acidity units)	----	10	mole H+ / t	<10	----	----	----	----
Liming Rate	----	1	kg CaCO3/t	<1	----	----	----	----

Environmental Division

QUALITY CONTROL REPORT

Work Order	: **EB0713257**	Page	: 1 of 8
Client	: **GOLDER ASSOCIATES**	Laboratory	: Environmental Division Brisbane
Contact	: MS SILVANA SANTOMARTINO	Contact	: Tim Kilmister
Address	: P O BOX 1734 MILTON QLD AUSTRALIA 4064	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: ssantomartino@golder.com.au	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: +61 07 3721 5400	Telephone	: +61-7-3243 7222
Facsimile	: +61 07 3721 5401	Facsimile	: +61-7-3243 7218
Project	: 077633062 GLADSTONE-FITZROY PIPELINE	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: GLADSTONE-FITZROY PIPELINE		
C-O-C number	: ----	Date Samples Received	: 13-NOV-2007
Sampler	: DEPT MAIN ROADS	Issue Date	: 15-NOV-2007
Order number	: ----		
		No. of samples received	: 32
Quote number	: EN/002/05	No. of samples analysed	: 32

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Cass Sealby	Senior Chemist - Acid Sulphate Soils	Inorganics

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been preformed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insuffient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = Chemistry Abstract Services number
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA029-A: pH Measurements (QC Lot: 533654)									
EB0713257-001	TP69 1.5m	EA029: pH KCl (23A)	----	0.1	pH Unit	4.6	4.6	0.0	0% - 20%
		EA029: pH OX (23B)	----	0.1	pH Unit	4.7	4.6	2.2	0% - 20%
EB0713257-018	TP112 2.25-2.5m	EA029: pH KCl (23A)	----	0.1	pH Unit	5.6	5.6	0.0	0% - 20%
		EA029: pH OX (23B)	----	0.1	pH Unit	6.0	6.0	0.0	0% - 20%
EA029-B: Acidity Trail (QC Lot: 533654)									
EB0713257-001	TP69 1.5m	EA029: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	0.04	0.04	0.0	No Limit
		EA029: sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	0.05	0.05	0.0	No Limit
		EA029: sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	<0.02	0.0	No Limit
		EA029: Titratable Actual Acidity (23F)	----	2	mole H+ / t	26	27	4.9	0% - 50%
		EA029: Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	31	31	0.0	0% - 50%
		EA029: Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	5	4	28.6	No Limit
EB0713257-018	TP112 2.25-2.5m	EA029: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	0.0	No Limit
		EA029: sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	<0.02	0.0	No Limit
		EA029: sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	<0.02	0.0	No Limit
		EA029: Titratable Actual Acidity (23F)	----	2	mole H+ / t	9	8	15.4	No Limit
		EA029: Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	5	2	66.7	No Limit
		EA029: Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	<2	0.0	No Limit
EA029-C: Sulfur Trail (QC Lot: 533654)									
EB0713257-001	TP69 1.5m	EA029: KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA029: Peroxide Sulfur (23De)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA029: Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA029: acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	<10	0.0	No Limit
EB0713257-018	TP112 2.25-2.5m	EA029: KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA029: Peroxide Sulfur (23De)	----	0.02	% S	0.02	0.02	0.0	No Limit
		EA029: Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	0.02	0.02	0.0	No Limit
		EA029: acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	13	14	0.0	No Limit

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA029-D: Calcium Values (QC Lot: 533654)									
EB0713257-001	TP69 1.5m	EA029: KCl Extractable Calcium (23Vh)	----	0.02	% Ca	0.07	0.07	0.0	No Limit
		EA029: Peroxide Calcium (23Wh)	----	0.02	% Ca	0.07	0.07	0.0	No Limit
		EA029: Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.02	<0.02	0.0	No Limit
		EA029: sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA029: acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	<10	0.0	No Limit
EB0713257-018	TP112 2.25-2.5m	EA029: KCl Extractable Calcium (23Vh)	----	0.02	% Ca	0.11	0.11	0.0	No Limit
		EA029: Peroxide Calcium (23Wh)	----	0.02	% Ca	0.11	0.12	0.0	No Limit
		EA029: Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.02	<0.02	0.0	No Limit
		EA029: sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA029: acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	<10	0.0	No Limit
EA029-E: Magnesium Values (QC Lot: 533654)									
EB0713257-001	TP69 1.5m	EA029: KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	0.16	0.16	0.0	No Limit
		EA029: Peroxide Magnesium (23Tm)	----	0.02	% Mg	0.16	0.18	7.1	No Limit
		EA029: Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.02	<0.02	0.0	No Limit
		EA029: sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA029: Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	<10	11	10.7	No Limit
EB0713257-018	TP112 2.25-2.5m	EA029: KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	0.26	0.26	0.0	0% - 50%
		EA029: Peroxide Magnesium (23Tm)	----	0.02	% Mg	0.29	0.30	4.1	0% - 50%
		EA029: Acid Reacted Magnesium (23U)	----	0.02	% Mg	0.02	0.04	42.9	No Limit
		EA029: sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	0.03	0.05	42.9	No Limit
		EA029: Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	20	31	42.9	No Limit
EA033-A: Actual Acidity (QC Lot: 533655)									
EB0713257-004	TP72 0.0-0.2m	EA033: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	0.03	0.03	0.0	No Limit
		EA033: Titratable Actual Acidity (23F)	----	2	mole H+ / t	20	18	13.3	No Limit
		EA033: pH KCl (23A)	----	0.1	pH Unit	5.3	5.4	1.9	0% - 20%
EB0713257-025	TP131 0.0-0.25m	EA033: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	0.02	0.02	0.0	No Limit
		EA033: Titratable Actual Acidity (23F)	----	2	mole H+ / t	13	14	9.5	No Limit
		EA033: pH KCl (23A)	----	0.1	pH Unit	5.6	5.5	1.8	0% - 20%
EA033-B: Potential Acidity (QC Lot: 533655)									
EB0713257-004	TP72 0.0-0.2m	EA033: Chromium Reducible Sulfur (22B)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA033: acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	<10	0.0	No Limit
EB0713257-025	TP131 0.0-0.25m	EA033: Chromium Reducible Sulfur (22B)	----	0.02	% S	<0.02	<0.02	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA033-B: Potential Acidity (QC Lot: 533655) - continued									
EB0713257-025	TP131 0.0-0.25m	EA033: acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	<10	0.0	No Limit

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

		Method Blank (MB) Report			Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA029-B: Acidity Trail (QCLot: 533654)								
EA029: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	----	----	----	----
EA029: Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	----	----	----	----
EA029: Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	----	----	----	----
EA029: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	----	----	----	----
EA029: sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	----	----	----	----
EA029: sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	----	----	----	----
EA029-C: Sulfur Trail (QCLot: 533654)								
EA029: KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	----	----	----	----
EA029: Peroxide Sulfur (23De)	----	0.02	% S	<0.02	----	----	----	----
EA029: Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	----	----	----	----
EA029: acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	----	----	----	----
EA029-D: Calcium Values (QCLot: 533654)								
EA029: KCl Extractable Calcium (23Vh)	----	0.02	% Ca	<0.02	----	----	----	----
EA029: Peroxide Calcium (23Wh)	----	0.02	% Ca	<0.02	----	----	----	----
EA029: Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.02	----	----	----	----
EA029: acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	----	----	----	----
EA029: sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.02	----	----	----	----
EA029-E: Magnesium Values (QCLot: 533654)								
EA029: KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	<0.02	----	----	----	----
EA029: Peroxide Magnesium (23Tm)	----	0.02	% Mg	<0.02	----	----	----	----
EA029: Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.02	----	----	----	----
EA029: Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	<10	----	----	----	----
EA029: sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	<0.02	----	----	----	----
EA029-F: Excess Acid Neutralising Capacity (QCLot: 533654)								
EA029: Excess Acid Neutralising Capacity (23Q)	----	0.02	% CaCO3	<0.02	----	----	----	----
EA029: acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	<10	----	----	----	----
EA029: sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.02	% S	<0.02	----	----	----	----
EA029-G: Retained Acidity (QCLot: 533654)								
EA029: Net Acid Soluble Sulfur (20Je)	----	0.02	% S	<0.02	----	----	----	----
EA029: acidity - Net Acid Soluble Sulfur (a-20J)	----	10	mole H+ / t	<10	----	----	----	----
EA029: sulfidic - Net Acid Soluble Sulfur (s-20J)	----	0.02	% pyrite S	<0.02	----	----	----	----
EA029: HCl Extractable Sulfur (20Be)	----	0.02	% S	<0.02	----	----	----	----
EA033-A: Actual Acidity (QCLot: 533655)								

Sub-Matrix: **SOIL**

		Method Blank (MB) Report			Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	*CAS Number*	*LOR*	*Unit*	*Result*	*Concentration*	*LCS*	*Low*	*High*
EA033-A: Actual Acidity (QCLot: 533655) - continued								
EA033: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	----	----	----	----
EA033: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	----	----	----	----
EA033-B: Potential Acidity (QCLot: 533655)								
EA033: Chromium Reducible Sulfur (22B)	----	0.02	% S	<0.02	----	----	----	----
EA033: acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	----	----	----	----

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) Results are required to be reported.**

SAMPLE CHAIN OF CUSTODY DOCUMENTATION - SOIL

Project ID:	077633062	Quote/Order No.:	
Site Location:	Gladstone-Fitzroy Pipeline	Lab Name:	ALS
Sampled By:	Dept Main Roads		
Turnaround (Days)	4	BY: 19/11/2007	
Report Format:	HARD ☐ FAX ☐ DISK ☐ EMAIL ☑ BULLETIN BOARD ☐		
Email Format:	PDF ☑ Excel ☑ Other ☐ Email Address ssantomartino@golder.com.au		

GOLDER ASSOCIATES PTY LTD
611 Coronation Drive, Toowong, Qld 4066
Invoice to be sent to PO Box 1734 Milton BC, Qld 4064
Phone: (07) 3721 5400
Fax: (07) 3721 5401
Project Manager: Henry Parsons
Contact Phone: 07 37215400
Email: hparsons@golder.com.au

Comments/Special Instructions:
Please e-mail results etc. to Henry Parsons (Urgent)

Samples from a declared Fire Ant Area: N

Samples taken from a known Weed and or Pest Area: N

SAMPLE ID	SAMPLE MATRIX	SAMPLE DATE	SAMPLE TIME	CONTAINER/ PRESERVATIVE		No CONTAINERS	POSSIBLE HIGH CONCENTRATION	ANALYSIS REQUIRED: Chromium Suite	SPOCAS
1 TP69 1.5m	Soil	Nov-07		Bag	chilled	1	N		X
2 TP70 0.5m	Soil	Nov-07		Bag	chilled	1	N		X
3 TP71 0.0-0.5m	Soil	Nov-07		Bag	chilled	1	N		X
4 TP72 0.0-0.2m	Soil	Nov-07		Bag	chilled	1	N	X	
5 TP73 0.0-0.50m	Soil	Nov-07		Bag	chilled	1	N	X	
6 TP77 0.0-0.6m	Soil	Nov-07		Bag	chilled	1	N		X
7 TP78 0.0-0.2m	Soil	Nov-07		Bag	chilled	1	N	X	
8 TP83 0.0-0.2m	Soil	Nov-07		Bag	chilled	1	N	X	
9 TP87 0.3-0.45m	Soil	Nov-07		Bag	chilled	1	N		X
10 TP88 0.0-0.6m	Soil	Nov-07		Bag	chilled	1	N		X
11 TP106 1.75-2.0m	Soil	Nov-07		Bag	chilled	1	N		X
12 TP106 2.25-2.5m	Soil	Nov-07		Bag	chilled	1	N		X
13 TP107 0.25-0.5m	Soil	Nov-07		Bag	chilled	1	N		X
14 TP108 0.0-0.25m	Soil	Nov-07		Bag	chilled	1	N	X	
15 TP108 2.75-3.0m	Soil	Nov-07		Bag	chilled	1	N		X
16 TP109 0.0-0.25m	Soil	Nov-07		Bag	chilled	1	N	X	
17 TP110 0.0-0.25m	Soil	Nov-07		Bag	chilled	1	N	X	
18 TP112 2.25-2.5m	Soil	Nov-07		Bag	chilled	1	N		X
19 TP114 0.0-0.25m	Soil	Nov-07		Bag	chilled	1	N	X	
20 TP119 0.0-0.25m	Soil	Nov-07		Bag	chilled	1	N	X	
21 TP119 0.5-0.75m	Soil	Nov-07		Bag	chilled	1	N		X
22 TP123 0.25-0.5m	Soil	Nov-07		Bag	chilled	1	N		X
23 TP130 0.0-0.25m	Soil	Nov-07		Bag	chilled	1	N	X	
24 TP130 0.5-0.75m	Soil	Nov-07		Bag	chilled	1	N		X
25 TP131 0.0-0.25m	Soil	Nov-07		Bag	chilled	1	N	X	
26 TP132 0.0-0.25m	Soil	Nov-07		Bag	chilled	1	N	X	
27 TP138 0-0.0-25m	Soil	Nov-07		Bag	chilled	1	N	X	
28 TP159 0.0-0.6m	Soil	Nov-07		Bag	chilled	1	N		X
29 TP160 0.0-0.5m	Soil	Nov-07		Bag	chilled	1	N		X
30 TP163 0.0-0.9m	Soil	Nov-07		Bag	chilled	1	N		X
31 TP220 0.0-0.4m	Soil	Nov-07		Bag	chilled	1	N	X	
32 TP220 2.0-3.0m	Soil	Nov-07		Bag	chilled	1	N		X

Environmental Division
Brisbane
Work Order
EB0713257

Telephone : +61-7-3243 7222

SAMPLE MATRIX = Soil/Sediment/Fill/Other

SAMPLE TYPE = Core(CR)

HIGH CONCENTRATION: Tick box and circle expected parameters in analysis list

Container Type and Preservative Codes: P = Natural Plastic; N = Nitric Acid Preserved; C = Sodium Hydroxide Preserved; J = Solvent Washed Acid Rinsed Jar; S = Solvent Washed Acid Rinsed Glass Bottle; VC = Hydrochloric Preserved Vial; VS = Sulphuric Acid

	SIGNATURE	COMPANY	DATE	TIME
RELEASED BY	B. [signature]	GOLDER	13/11/07	15:00
RECEIVED BY				
RELEASED BY	Christian	ALS	13/11/07	16:45
RECEIVED BY				
RELEASED BY				
RECEIVED BY				

	SIGNATURE	COMPANY	DATE	TIME	Shipment Method
RELEASED BY					Shipping Ref:
RECEIVED BY					

To Be Filled Out By Analysing Laboratory				LAB. BATCH NUMBER	
Security Seal		Chilled		Bill to:	
Suitable Containers		Frozen		Address	
Cool Box		Ambient			

THIS FORM IS TO BE SIGNED BY GOLDER STAFF; COURIER/S; LABORATORY ON RECEIPT OF SAMPLES.