









Land Systems, Land Resource Areas and Landforms Intercepted by the Study Area

Land System ¹	Description ¹	Land Resource Area ²	Landform ²	Description ²	Landform observation and test pit locations
Mountains					
Carborough (Ca)	Rocky mountains and hills formed on flat-lying or gently dipping Mesozoic sandstone; outcrop and very shallow undifferentiated soils; sandstone forest; forest grass	Nathan (16)	Hills	Steep hills and dissected tablelands on quartzose sandstone and minor basalt; rock outcrop; lithosols, shallow earthy sands, solodics, soloths; narrow-leaved ironbark, spotted gum, cypress pine forest	LF27, LF47
Deeply dissected tablelands					
Nathan (N)	Dissected tablelands of flat-lying Mesozoic sandstone; outcrop, very shallow undifferentiated and texture- contrast soils; sandstone forest and high forest; forest grass	Nathan (16)	Hills	Steep hills and dissected tablelands on quartzose sandstone and minor basalt; rock outcrop; lithosols, shallow earthy sands, solodics, soloths; narrow-leaved ironbark, spotted gum, cypress pine forest	
Doonkuna (Do)	Dissected tablelands of flat-lying Mesozoic sandstone; outcrop very shallow undifferentiated and texture- contrast soils; sandstone forest and high forest; forest grass				





Land System ¹	Description ¹	Land Resource Area ²	Landform ²	Description ²	Landform observation and test pit locations
Hills					
Woodlands – eastern mid- height grass					
Irving (I)	Hills on granitic and volcanic rocks; texture-contrast soils and outcrop and very shallow undifferentiated soils; grassy woodlands; eastern mid-height grass				
Softwood scrub					
Malakoff (Mf)	Hills on dipping Upper Palaeozoic sedimentary or volcanic rocks; very shallow undifferentiated and shallow to deep texture-contrast soils; softwood scrub and rosewood forests	Mundell (13)	Low hills	Rolling to steep low hills on labile sandstone; shallow grey clays, brown clays, black earths; softwood scrub and brigalow, bauhinia forest	LF37, LF38, LF41, LF42, LF43, TP49, TP50
Narran (Na)	Hills and dissected tablelands on flat- lying Jurassic rocks; shallow texture- contrast soils and cracking clays; high forests and softwood and brigalow scrubs; scrub grass	Narran (14)	Low hills	Rolling low hills on mixed sediments; rock shelf; shallow solodics, grey clays, brown clays, earthy sands, lithosols; silver-leaved ironbark, poplar box woodland; brigalow forest; cypress pine, spotted gum forest	LF7, LF8, TP18, LF32, LF39





Land System ¹	Description ¹	Land Resource Area ²	Landform ²	Description ²	Landform observation and test pit locations
Undulating plains					
Woodland – texture-contrast soils					
Torsdale (Te)	Strongly undulating plains with low hills, and moderately extensive lower slopes; shallow texture-contrast soils and cracking clays; grassy woodland; eastern mid-height grass				LF26, TP35, TP38, TP39, LF36, LF44, LF45, LF46
Bouldercombe (BI)	Strongly undulating plains with low hills, on granitic and volcanic rocks; texture-contrast and uniform coarsetextured soils; grassy woodland; eastern mid-height grass				LF33, LF34, TP54
Montana (Mo)	Tributary fluvial plains with extensive erosional slopes on flat-bedded Mesozoic shale and sandstone; shallow to deep texture-contrast soils; grassy woodlands; eastern mid-height grass	Montana (5)	Valley floors	Broad valley floors developed on fine to coarse alluvium; rises; solodics, solodized-solonetz, grey clays; poplar box, silver-leaved ironbark, roughbarked apple woodlands	TP19, TP20, LF29, LF30, LF31





Land System ¹	Description ¹	Land Resource Area ²	Landform ²	Description ²	Landform observation and test pit locations
Cracking clays					
Orana (Or)	Undulating plains on dipping Upper Palaeozoic volcanic rocks; shallow cracking clay, shallow undifferentiated soils, and texture- contrast soils; grassy woodland; eastern mid-height grass	Mundell (13)	Low hills	Rolling to steep low hills on labile sandstone; shallow grey clays, brown clays, black earths; softwood scrub and brigalow, bauhinia forest	LF14, LF22, TP67
Barfield (Bf)	Undulating plains on Upper Palaeozoic volcanic rocks, with moderately extensive depositional lower slopes; shallow to deep cracking clays; grassy woodland; eastern mid-height grass				LF15, LF16, LF19, LF18, LF20, LF21, LF35, TP56, TP58, TP59, TP61, TP62, TP65, TP66
Brigalow scrub					
Wandoan (W)	Undulating plains with erosional upper slopes and depositional lower slope; cracking clays and dark brown and grey-brown clays; brigalow and softwood scrub	Wandoan (8)	Plains and rises	Undulating plains and rises on labile sandstone; black earths, grey clays, brown clays; brigalow, belah, bauhinia forest, softwood and grassland	LF2, TP2, LF3, LF4, LF5, LF6, LF28, TP6, TP7, TP9, TP10, TP12, TP13,
Kiddell (K)	Undulating plains with extensive depositional lower slopes; cracking clays and dark brown and greybrown clays; brigalow scrub with scrub grass and blue grass grasslands	Wandoan (8)	Plains and rises	Undulating plains and rises on labile sandstone; black earths, grey clays, brown clays; brigalow, belah, bauhinia forest, softwood and grassland	LF9, LF13, LF17, TP23, TP26, TP27, TP63, TP68





Land System ¹	Description ¹	Land Resource Area ²	Landform ²	Description ²	Landform observation and test pit locations
Highworth (H)	Undulating to nearly flat plains with extensive depositional slopes; cracking clays, commonly gilgaied, and texture-contrast soils; brigalow scrub; scrub grass				LF12, TP69
Hinchley (HI)	Undulating to nearly flat, mainly depositional plains; very deep and deep cracking clays; brigalow scrub and scrub grass	Wandoan (8)	Plains and rises	Undulating plains and rises on labile sandstone; black earths, grey clays, brown clays; brigalow, belah, bauhinia forest, softwood and grassland	
Softwood scrub					
Eurombah (E)	Undulating plains mainly on Mesozoic shale, locally capped with Tertiary basalt; moderately deep to deep cracking clays and dark brown and grey-brown clays; softwood and brigalow scrub	Wandoan (8) / Mundell (13)	Plains and rises/Low hills	Undulating plains and rises on labile sandstone; black earths, grey clays, brown clays; brigalow, belah, bauhinia forest, softwood and grassland / Rolling to steep low hills on labile sandstone; shallow grey clays, brown clays, black earths; softwood scrub and brigalow, bauhinia forest	LF10, LF11, LF24, LF25, LF40, TP28, TP45, TP46
Banana (B)	Undulating plains mainly on Upper Palaeozoic argillaceous rocks; cracking clays; softwood and brigalow scrubs and grassy woodland; scrub grass and eastern mid-height grass				





Land System ¹	Description ¹	Land Resource Area ²	Landform ²	Description ²	Landform observation and test pit locations
Alluvial plains					
Juandah (J)	Mainly stable plains of deposits derived from less-weathered rocks; deep texture-contrast soils; grassy woodland; eastern mid-height grass	Juandah (3) / Montana (5)	Alluvial plains / Valley floors	Narrow flat plains developed on fine to coarse alluvium; solodics, solodized-solonetz, grey clays, brown clays; poplar box, sandalwood woodland / Broad valley floors developed on fine to coarse alluvium; rises; solodics, solodized-solonetz, grey clays; poplar box, silver-leaved ironbark, roughbarked apple woodlands	LF1, LF23, TP48
Kroombit (Km)	Mainly stable plains with relatively broad levees; deep texture-contrast and alluvial soils; tall grassy woodland and grassy woodlands; frontage grass				

Notes:

- 1. Speck, et al., 1968
- 2. Forster, B.A. 1983









Landform Survey Observations

Landform Survey Location	Survey Photo	Landform Elements and Topographical Relief	Observations and Descriptions
Landform survey site 1 (LF1)		Very gently inclined hill crest within a very gently inclined gently undulating plain (GP)	Located within the Juandah Land System¹ Extremely low relief within the landform pattern Approximately 3% slope Acacia spp. dominant in the tallest and mid strata Mixed grasses dominant within groundcover layer
Landform survey site 2 (LF2)		Gently inclined hill crest within a gently inclined undulating plain (UP)	Located within the Wandoan Land System¹ Extremely low relief within the landform pattern Approximately 5% slope Acacia spp. dominant within the mid stratum Mixed grasses dominant within the groundcover layer
Landform survey site 3 (LF3)		Very gently inclined hill slope within a very gently inclined gently undulating plain (GP)	Located within the Wandoan Land System¹ Extremely low relief within the landform pattern Approximately 3% slope Sparse cover of Acacia spp. dominant within the tallest stratum Isolated clumps of Acacia spp. dominant within the mid stratum Mixed grasses dominant within the groundcover layer
Landform survey site 4 (LF4)		Gently inclined hill crest within a gently inclined undulating plain (UP)	Located within the Wandoan Land System¹ Extremely low relief within the landform pattern Approximately 3% – 4% slope Dominated by cleared pastures Roadside vegetation dominated by mix of Acacia spp. within the tallest and mid strata





Landform Survey Location	Survey Photo	Landform Elements and Topographical Relief	Observations and Descriptions
Landform survey site 5 (LF5)		Gently inclined hill slope within a gently inclined undulating plain (UP)	Located within the Wandoan Land System¹ Extremely low relief within the landform pattern Approximately 6% – 7% slope Eucalypt spp. and Acacia spp. dominant within the tallest stratum Isolated clumps of Acacia spp. dominant within the mid stratum Cleared areas dominated by pasture grasses within the groundcover layer
Landform survey site 6 (LF6)		Gently inclined open depression surrounded by gently inclined undulating rises (UR)	Located within the Wandoan Land System¹ Very low relief within the landform pattern Surrounding area within the transition between a plain and drainage depression network
Landform survey site 7 (LF7)		Broad, level hill crest surrounded by moderately inclined rolling rises (RR)	Located within the Narran Land System¹ Very low relief within the landform pattern Eucalypt spp. and Acacia spp. dominant within the tallest stratum Acacia spp. dominant with in the mid stratum Cleared areas dominated by pasture grasses within the groundcover layer
Landform survey site 8 (LF8)		Moderately inclined open depression surrounded by moderately inclined rolling rises (RR)	Located within the Narran Land System¹ Very low relief within the landform pattern Surrounding are within the transition between a plain and drainage depression network





Landform Survey Location	Survey Photo	Landform Elements and Topographical Relief	Observations and Descriptions
Landform survey site 9 (LF9)		Gently inclined mid- slope surrounded by moderately inclined rolling rises (RR)	Located within the Kiddell Land System ¹ Very low relief within the landform pattern
Landform survey site 10 (LF10)		Flat within a level plain (LP)	Located within the Eurombah Land System¹ Extremely low relief within the landform pattern Acacia spp. dominant within the tallest and mid strata Mixed grasses dominant within the groundcover layer
Landform survey site 11 (LF11)		Gently inclined mid- slope surrounded by gently inclined undulating rises (UR)	Located within the Eurombah Land System ¹ Low relief within the landform pattern
Landform survey site 12 (LF12)		Very gently inclined hill crest within a very gently inclined gently undulating plain (GP)	Located within the Highworth Land System¹ Extremely low relief within the landform pattern Very sparse Casuarina spp. and Acacia spp. dominant within the tallest stratum Isolated clumps of Acacia spp. dominant within the mid stratum Mixed grasses and herbaceous weed spp dominant within the groundcover layer Tumulus landform elements within the surrounding landscape





Landform Survey Location	Survey Photo	Landform Elements and Topographical Relief	Observations and Descriptions
Landform survey site 13 (LF13)		Gently inclined lower hill slope within a gently inclined undulating plain (UP)	Located within the Kiddell Land System¹ Extremely low relief within the landform pattern Isolated individuals of Casuarina spp. and Acacia spp. dominant within the tallest stratum Isolated clumps of mixed Casuarina spp. and Acacia spp. dominant within the mid stratum Mixed grasses and herbaceous weed spp. dominant within the groundcover layer
Landform survey site 14 (LF14)		Very gently inclined hill crest within a very gently inclined gently undulating plain (GP)	Located within the Orana Land System¹ Extremely low relief within the landform pattern Tumulus landform elements within the surrounding landscape
Landform survey site 15 (LF15)		Flat within a level plain (LP)	Located within the Barfield Land System¹ Extremely low relief within the landform pattern Isolated individuals of Acacia spp. and isolated clumps of Casuarina spp. dominant within the tallest stratum Mix of Acacia spp. dominant within the mid stratum Dense cover of mixed grasses and herbaceous weed spp dominant within the groundcover layer





Landform Survey Location	Survey Photo	Landform Elements and Topographical Relief	Observations and Descriptions
Landform survey site 16 (LF16)		Gently inclined hill slope within a gently inclined undulating plain (UP)	Located within the Barfield Land System¹ Extremely low relief within the landform pattern Isolated individuals of Acacia spp. and Casuarina spp. dominant within the tallest stratum Isolated clumps of woody weeds dominant within the mid stratum Mixed grasses and herbaceous weed spp. dominant within the groundcover layer
Landform survey site 17 (LF17)		Very gently inclined hill slope within a very gently inclined gently undulating plain (GP)	Located within the Kiddell Land System ¹ Extremely low relief within the landform pattern
Landform survey site 18 (LF18)		Flat within a level plain (LP)	Located within the Barfield Land System ¹ Extremely low relief within the landform pattern
Landform survey site 19 (LF19)		Flat within a level plain (LP)	Located within the Barfield Land System ¹ Extremely low relief within the landform pattern
Landform survey site 20 (LF20)		Very gently inclined hill slope within a very gently inclined gently undulating plain (GP)	Located within the Barfield LandSystem ¹ Extremely low relief within the landform pattern





Landform Survey Location	Survey Photo	Landform Elements and Topographical Relief	Observations and Descriptions
Landform survey site 21 (LF21)		Very gently inclined hill slope within a very gently inclined gently undulating plain (GP)	Located within the Barfield Land System ¹ Extremely low relief within the landform pattern Tumulus landform elements within the surrounding landscape Active deposition/aggradation
Landform survey site 22 (LF22)	No photo available	Very gently inclined hill crest within a very gently inclined gently undulating plain (GP)	Located within the Orana Land System¹ Extremely low relief within the landform pattern
Landform survey site 23 (LF23)		Flat within a level plain (LP)	Located within the Juandah Land System¹ Extremely low relief within the landform pattern Isolated clumps and individuals of mixed Eucalypt spp. And Acacia spp. Dominant within the tallest and mid strata Cleared areas dominated by pasture grasses
Landform survey site 24 (LF24)		Very gently inclined hill slope within a very gently inclined gently undulating plain (GP)	Located within the Eurombah Land System ¹ Extremely low relief within the landform pattern Tumulus landform elements within the surrounding landscape
Landform survey site 25 (LF25)		Flat within a level plain (LP)	Located within the Eurombah Land System ¹ Extremely low relief within the landform pattern





Landform Survey Location	Survey Photo	Landform Elements and Topographical Relief	Observations and Descriptions
Landform survey site 26 (LF26)		Very gently inclined hill slope surrounded by very gently inclined gently undulating rises (GR)	Located within the Torsdale Land System ¹ Very low relief within the landform pattern
Landform survey site 27 (LF27)		Moderately inclined hill slope surrounded by moderately inclined rolling rises (RR)	Located within the Carborough Land System¹ Very low relief within the landform pattern Acacia spp and Eucalypt spp dominant within the tallest stratum Mix of Acacia spp., Casuarina spp. and Eucalypt spp regrowth dominant within the mid stratum Sparse clumps of grasses dominant within the groundcover layer Exposed rocks and boulders present at the land surface
Landform survey site 28 (LF28)		Gently inclined hill slope surrounded by gently inclined gently undulating rises (GR)	Located within the Wandoan Land System¹ Very low relief within the landform pattern Cleared area for the cultivation of forage crops
Landform survey site 29 (LF29)		Moderately inclined slope of an open depression surrounded by moderately inclined rolling rises (RR)	Located within the Montana Land System ¹ Very low relief within the landform pattern





Landform Survey Location	Survey Photo	Landform Elements and Topographical Relief	Observations and Descriptions
Landform survey site 30 (LF30)		Gently to moderately inclined hill slope surrounded by moderately inclined rolling rises (RR)	Located within the Montana Land System ¹ Very low relief within the landform pattern
Landform survey site 31 (LF31)		Gently inclined upper hill slope to hill crest surrounded by gently inclined gently undulating to rolling rises (RR)	Located within the Montana Land System ¹ Very low relief within the landform pattern
Landform survey site 32 (LF32)		Very gently inclined hill crest within a very gently inclined gently undulating plain (GP)	Located within the Narran Land System ¹ Very low relief within the landform pattern
Landform survey site 33 (LF33)		Very gently inclined hill crest surrounded by gently inclined undulating rises (UR)	Located within the Bouldercombe Land System ¹ Very low relief within the landform pattern
Landform survey site 34 (LF34)		Very gently inclined plain surrounded by gently to moderately inclined undulating rises (UR)	Located within the Bouldercombe Land System ¹ Very low relief within the landform pattern





Landform Survey Location	Survey Photo	Landform Elements and Topographical Relief	Observations and Descriptions
Landform survey site 35 (LF35)		Very gently inclined hill slope surrounded by very gently to moderately inclined undulating rises (UR)	Located within the Barfield Land System ¹ Very low relief within the landform pattern
Landform survey site 36 (LF36)		Very gently inclined slope of an open depression surrounded by gently to moderately inclined undulating to rolling rises (RR)	Located within the Torsdale Land System ¹ Very low relief within the landform pattern
Landform survey site 37 (LF37)		Moderately inclined hill slope surrounded by moderately inclined undulating low hills (UL)	Located within the Malakoff Land System ¹ Low relief within the landform pattern
Landform survey site 38 (LF38)		Moderately inclined hill slope surrounded by moderately inclined undulating low hills (UL)	Located within the Malakoff Land System ¹ Low relief within the landform pattern
Landform survey site 39 (LF39)		Gently inclined hill slope surrounded by moderately inclined undulating low hills (UL)	Located within the Narran Land System ¹ Low relief within the landform pattern
Landform survey site 40 (LF40)	No photo available	Moderately to steeply inclined hill slope surrounded by steep low hills (SL)	Located within the Eurombah Land System ¹ Low relief within the landform pattern





Landform Survey Location	Survey Photo	Landform Elements and Topographical Relief	Observations and Descriptions
Landform survey site 41 (LF41)		Level to very gently inclined flat within a gently inclined undulating plain (UP)	Located within the Malakoff Land System ¹ Extremely low relief within the landform pattern
Landform survey site 42 (LF42)		Moderately inclined hill slope surrounded by moderately inclined undulating low hills (UL)	Located within the Malakoff Land System ¹ Low relief within the landform pattern
Landform survey site 43 (LF43)		Very gently inclined hill crest surrounded by gently inclined undulating rises (UR)	Located within the Malakoff Land System ¹ Very low relief within the landform pattern
Landform survey site 44 (LF44)	A CONTRACTOR OF THE CONTRACTOR	Very gently inclined flat within an open depression surrounded by gently inclined undulating low hills (UL)	Located within the Torsdale Land System ¹ Low relief within the landform pattern
Landform survey site 45 (LF45)		Moderately inclined hill slope surrounded by moderately inclined to steep rolling low hills (RL)	Located within the Torsdale Land System ¹ Low relief within the landform pattern





Landform Survey Location	Survey Photo	Landform Elements and Topographical Relief	Observations and Descriptions
Landform survey site 46 (LF46)		Gently to moderately inclined hill slope surrounded by moderately inclined rolling low hills (RL)	Located within the Torsdale Land System ¹ Low relief within the landform pattern
Landform survey site 47 (LF47)		Moderately inclined slope within an open depression surrounded by moderately inclined to steep rolling low hills (RL)	Located within the Carborough Land System ¹ Low relief within the landform pattern

Note:

1. Speck et al., 1968 (Perry (compiled) 1968)









Dominant Geology in the Study Area

Symbol ¹	Geological province ¹	Description ¹	Test pit locations			
Quarterna	Quarternary alluvial soils					
Qa	Alluvium	Alluvial soils typically comprise variable depths and strengths of clay, silt, sand and gravel and are generally stratified in order of grain size (e.g. gravels below clays).	TP9, TP18, TP23, TP54, TP39, TP26			
Qpa	Alluvium	Alluvial zones may also include deep deposits of reactive clays (black soils).	No test pits excavated within this geological unit			
Tertiary-Q	uarternary colluvial	soils	_			
TQr?	Colluvium	Colluvial soils typically comprise of clay, silt, sand and gravel that have been deposited at the base of slopes. Colluvial deposits within the study area are expected to have originated from the adjacent Camboon Volcanics and may include high strength cobbles and boulders of igneous rock.	No test pits excavated within this geological unit			
Tertiary se	edimentary rock					
Та	Poorly consolidated sediments	The poorly consolidated sediments are commonly formed when old alluvial and colluvial deposits consolidate and become cemented and the rock mass typically comprises extremely weathered, low strength clayey sandstone and sandy claystone.	TP68, TP59, TP63, TP65			
Jurassic se	dimentary #1					
Ji	Injune Creek group	These rock groups display similar characteristics and typically comprise extremely to distinctly weathered, low	TP2, TP6, TP7, TP12, TP13			
Je0	Evergreen formation #0	to medium strength lithic sandstone, siltstone and mudstone. The weathering profile is generally deep and	TP27			
Je1	Evergreen formation #1	the associated residual soils are typically clays and sandy clays which can be highly plastic and reactive.	TP28			
Je2	Evergreen formation #2		No test pits excavated within this geological unit			





Symbol ¹	Geological province ¹	Description ¹	Test pit locations		
Jurassic se	Jurassic sedimentary #2				
Jh Jp	Hutton sandstone Precipice sandstone	These rock groups display similar characteristics and typically comprise distinctly to slightly weathered, medium to high strength quartzose sandstone with minor interbedded extremely to distinctly weathered, low to medium strength siltstone and mudstone layers. In general the Jh province appears finer grained and slightly lower strength than the Jp province. The weathering profile of the sandstone is generally shallow and the associated residual soils are typically sands and sandy clays. The presence of quartz within the sandstone matrix of these groups dominates the rock characteristics and results in rock strength significantly higher than the deeply weathered sedimentary rocks.	TP19, TP20 No test pits excavated within this geological unit		
Permian s	edimentary rock				
Pbf	Flat Top formation	These rock groups display similar characteristics and typically comprise extremely weathered, low to medium strength siltstone, mudstone, lithic sandstone and minor limestone. The weathering profile is generally deep and	No test pits excavated within this geological unit		
Pbr	Barfield formation	the associated residual soils are typically highly plastic reactive clays and sandy/gravely clays.	TP61, TP62, TP45, TP46		
Pbo	Oxtrack formation		No test pits excavated within this geological unit		
Pwyb	Banana formation		TP67, TP69, TP66		
Pbu	Buffel formation		TP38		
Permo-car	boniferous igneous i	rock			
CPvc	Camboon Volcanics (includes Qa < 500 mm)	This rock group typically comprise andesite, conglomerate, basalt, dolerite and tuff. The weathering profile is generally shallow to moderate and the associated residual soils are typically clays and sandy clays.	TP58, TP35, TP56, TP50, TP49		

Note:

1. Connell Hatch (2008)









Soil Map Unit Descriptions¹

Soil Map Unit ¹	Description	Study area	Test pit and soil sample locations
SI4	Strongly dissected steep valley side slopes with strongly undulating to low hilly lower areas: dominant soils are gravelly loamy duplex soils (Dy2.33), (Dy2.13), and (Dy2.12) with some areas of (Dr2.32), (Dr2.31), and (Db1.33 and Db1.32). On steeper and higher slopes some (Um4.31) soils occur. Small flood-plains on flatter valley floors have loamy or sandy duplex soils (Dy2.33), (Dy2.43), and similar (Dy3) soils with small areas of clays (Ug5.24) and (Ug5.15).	Associated with surface drainage lines: • Juandah Creek • Roche Creek • Bullock Creek • Bungaban Creek • Cockatoo Creek	TP6, TP7, TP12, TP23
CB3	Gentle to moderately undulating or rolling lands: dominant soils are of moderate to shallow depth, chiefly grey clays (Ug5.22 and Ug5.23) but with important areas of dark clays (Ug5.13 and Ug5.14) or brown clays (Ug5.32). A slight (6 12 in.) gilgai micro relief may occasionally be present and local surface accumulations of silcrete (billy) gravel may occur. Associated soils are mainly loamy duplex soils (Dy2.33 and Dy2.13), (Dd1.33 and Dd1.13), and (Db1.33 and Db1.13). On higher ridges and their slopes friable earths (Gn3.43 and Gn3.46) and uniform friable clays (Uf6.31, Uf6.32, and Uf6.33) occur together with (Gn3.93) in low sites. The soils of associated stream flood-plains are loamy duplex types (unit S14). There are a few small inclusions of unit Fz6 ² .	Wandoan to Cabbage Tree Creek	TP2, TP9, TP10, TP13, TP28





Soil Map Unit ¹	Description	Study area	Test pit and soil sample locations
Va30	Undulating or moderately undulating lands with occasional low hilly areas: a complex range of soils is present but on moderate slopes loamy-surfaced duplex soils are dominant, chiefly (Dy3.43 and Dy3.42), with smaller areas of (Dr2.12), (Dr2.43), and (Dy2.43). Small areas of deeper-surfaced (Dy5.42 and Dy5.43) soils also occur. On more gentle slopes there may be areas of cracking clays (Ug5.22) and (Ug5.32) with associated duplex soils (Dd1.33) and (Db1.33) and small areas of friable earths (Gn3.93) and (Gn3.23). Aggraded valley floors have loamy duplex soils (Dy2.43) and (Dd1.43). The occasional low hills have shallow stony sands (Uc1.21 and Uc1.23) or loams (Um1.43).	Associated with the upper catchment areas of: Bullock Creek Bungaban Creek Cockatoo Creek	TP18, TP19, TP20
Mm13	Generally low rounded hilly country on lithic sandstones with concave slopes to broad depressions; some outcrops of mottled rock, some low scarps: chief soils are alkaline dark friable earths (Gn3.43). Associated are: (Ug5.14 and Ug5.15) soils from upper slopes to depressions; (Dr4.13), (Dr2.41), and (Dr2.23) on some rises; (Gn3.13) on rises; and (Um5.51) with (Gn2.11) on crests of mottled rock areas. Minor soil occurrences include (Gn3.71) and (Gn3.11).	Associated with surface drainage line of Pidgeon Creek	TP26, TP27
Bz1	High hilly to mountainous, strongly dissected, sandstone ranges and plateaux with strong scarps and often deep narrow ravines: dominant soils are shallow stony sands (Uc1.21) but other shallow sands also occur— (Uc1.23), (Uc5.11), (Uc4.1), (Uc4.2), and (Uc2.12). Shallow stony loams (Um1.43), (Um1.41), (Um4.1), (Um4.2), and (Um3.12) occur in many localities. On some slopes shallow stony duplex soils occur, chiefly (Dr2.41) and (Dy3.41). In valley floors sandy or loamy-surfaced duplex soils occur, chiefly (Dy3.42), (Dy3.32), (Dy2.42), (Dy2.32), and (Dd1.13). There are also areas of deep outwash sands (Uc1.21) and (Uc5.11).	Associated with the mountainous area in the vicinity of Downfall Creek and Ross Creek south of the township of Cracow	TP35





Soil Map Unit ¹	Description	Study area	Test pit and soil sample locations
Qa6	Low hilly to gently rolling country with very narrow valley plains: hard neutral red soils (Dr2.12) occur in association with cracking clays (Ug5.13 and Ug5.14) showing linear gilgai formation, or with (Ug5.3) on most slopes. Other soil occurrences include: (Um4) and (Uf6) including (Uf6.31) soils on crests; (Dy2.43) and (Dd1.33) on slopes; and (Dd1.43) in valley plains. Small areas of unit Fz9 are included in places.	Associated with Cracow Creek	TP38, TP39
Kb17	Low to moderately high hills with small alluvial plains: generally dark cracking clays (Ug5.12, Ug5.13, and Ug5.14) are associated with various (Dr2), (Db1), and (Dy2) soils on slopes. The soils of units LK13 and If 3 may be associated on steeper ridges and slopes. Other soils are likely. Data are limited.	Associated with the northern boundary of Ross Creek, the areas between Delusion Creek and Spring Creek, and Boam Creek and Castle Creek	TP49, TP50
LK13	Hilly to mountainous terrain: chief soils seem to be shallow loams (Um4.1) and (Um4.2), probably with other loamy soils (Um6.21), (Um2.12), and (Um1.43). Other soil occurrences include (Gn2.1), (Dr2.22), (Db1.4), (Dy3.12), (Dy2.12), (Dy3.4), (Dy2.4), and (Ug5) soils as for unit Kb17 in areas of gentler relief. Data are inadequate.	Extending north from Ross Creek to Delusion Creek and from Oxtrack Creek to Lonesome Creek	No test pit locations recorded within this Soil Map Unit
MM7	Moderate to gently undulating lowlands and plains: dominant soils are moderately deep to deep clays, which in some areas have a moderate gilgai micro relief (1-2 ft). In some areas the soil surface may be strewn with silcrete (billy) gravel to 4 in. diameter. Brown clays (Ug5.34, Ug5.38, Ug5.32, and Ug5.37) are dominant but grey forms (Ug5.25, Ug5.24, and Ug5.22) are also common; dark clays (Ug5.13, Ug5.15, and Ug5.16) also occur. Closely associated are thin-surfaced loamy duplex soils, chiefly (Dr2.13 and Dr2.33), (Db1.13 and Db1.33), and (Dy2.33 and Dy2.43), which occur particularly on flood-plains of small streams. Small areas of friable earths (Gn3.13 and Gn3.12) also occur, particularly where the unit borders the high mountains of unit Bz1.	Extends north from Cracow Creek to Gyranda Road, Nipan Road to Kianga Road and Norths Road to Banana Creek	TP45, TP61, TP62, TP68, TP69





Soil Map Unit ¹	Description	Study area	Test pit and soil sample locations
MM10	Moderate to gently undulating lowlands and plains broken by high strike ridges and hills: chief soils are brown clays (Ug5.34, Ug5.38, Ug5.32, and Ug5.37), with grey clays (Ug5.25, Ug5.24, and Ug5.22) and dark clays (Ug5.13, Ug5.15, and Ug5.16). Associated are loamy duplex soils (Dr2.13), (Dr2.33), (Db1.13), (Db1.33), (Dy2.33), and (Dy2.43) on flood-plains along small streams, and the soils of unit If3 ³ on the narrow strike ridges and hills.	Extends northwards from the area around Mt Steel to north of Delusion Creek	TP46, TP48
Kb20	Low rounded hills with moderate alluvial plains, broken by long narrow strike ridges and scarps of unit If3 ³ : chief soils are dark clays (Ug5.12 and Ug5.13) but with important areas of grey clays (Ug5.22) and brown clays (Ug5.3) on the slopes. Associated are (Ug5.15) and possibly other (Ug5) clays on the alluvial plains. The soils of unit If 3 ³ occur on the strike ridges and scarps that run almost north-south across this unit in places.	Extends north from Spring Creek to Boam Creek, One Mile Creek to Lonesome Creek, an area south of Kianga Creek and an area extending north between Kianga Road and Norths Road	TP54, TP56, TP58, TP59, TP63, TP65, TP66, TP67
Kb18	Generally low rounded hills but with some steeper slopes in places: dominant soils are dark clays (Ug5.12) on erosional slopes, and (Ug5.13) and (Ug5.15) on lower slopes. There is some weak to moderate gilgai micro relief. Associated soils include (Ug5.3), (Ug5.1), and possibly (Uf6) soils on some crests. Small areas of other soils are likely.	Extends north from the vicinity of Mt Wiseman to the township of Banana	No test pit locations recorded within this Soil Map Unit

Notes:

- 1. CSIRO 1991 Digital Atlas of Australian Soils.
- Fz6 High hills, strongly dissected low ranges with some mesas: dominant soils are shallow stony loams (Um1.43 and Um1.41) with lesser (Um4.2). Associated are areas of shallow sandy soils (Uc1.21), (Uc3.12), and (Uc5.11). On many slopes duplex soils occur, chiefly (Dr2.41), (Dr3.43), and similar (Db) soils; on flatter valley floors sandy-surfaced duplex soils are common, chiefly (Dy3.42) and (Dy2.42).
- 3. If3 Steep high ridges of dissected plateaux, with steep scarps and some small plains: chief soils seem to be shallow dark pedal clays (Uf6.22) and (Uf6.11) with shallow loams (Um6.21), (Um4), and (Um1.43). Other soils include (Ug5.12), (Uf6.31), (Gn3.12), (Dr2.12), and (Dy2.43).









Soil Types and Test Pit Locations

Soil order ¹	Description ¹	Soil map unit ²	Test pit location
Tenosol	 Soils that do not fit the requirements of any of the other soil orders and generally with one or more of the following: A peaty horizon; A humose, melacic, or melanic horizon, or conspicuously bleached A2 horizon, which overlies a calcrete pan, hard unweathered rock or other hard materials; or partially weathered or decomposed rock or saprolite; or unconsolidated mineral materials; A horizons which meet all the conditions for a peaty, humose, melacic or melanic horizon except the depth requirement, and directly overlie a calcrete pan, hard unweathered rock or other hard materials; or partially weathered or decomposed rock or saprolite; or unconsolidated mineral materials; A1 horizons which have more than a weak development of structure and directly overlie a calcretepan, hard unweathered rock or other hard materials; or partially weathered or decomposed rock or saprolite; or unconsolidated mineral materials; An A2 horizon which directly overlies a calcrete pan, hard unweathered rock or other hard materials; or partially weathered or decomposed rock or saprolite or unconsolidated mineral materials; Either a tenic B horizon, or a B2 horizon with 15% clay (SL) or less or a transitional horizon (C/B) occurring in fissures in the parent rock or saprolite which contains between 10 and 50% of B horizon material (including pedogenic carbonate); A ferric or bauxitic horizon >0.2 m thick; A calcareous horizon >0.2 m thick. 	Bz1, MM10, Qa6, Va30	TP35, TP48, TP39, TP19
Kandosol	 Soils other than Hydrosols which have all of the following: B2 horizons in which the major part is massive or has only a weak grade of structure; A maximum clay content in some part of the B2 horizon which exceeds 15% (i.e. heavy sandy loam, SL+); Do not have a tenic B horizon; Do not have clear or abrupt textural B horizons; Are not calcareous throughout the solum or below the A1 or Ap horizon or a depth of 0.2 m if the A1 horizon is only weakly developed. 	CB3, MM7	TP2, TP13, TP68





Soil order ¹	Description ¹	Soil map unit ²	Test pit location	
Chromosol	Soils other than Hydrosols with a clear or abrupt textural B horizon and in which the major part of the upper 0.2 m of the B2 horizon (or the major part of the entire B2 horizon if it is less than 0.2 m thick) is not sodic and not strongly acid. Soils with strongly subplastic upper B2 horizons are also included even if they are sodic.	CB3, MM7, SI4	TP28, TP69, TP6	
Dermosol	 Soils other than Vertosols, Hydrosols, Calcarosols and Ferrosols which: Have B2 horizons with structure more developed than 'weak' throughout the major part of the horizon; and Do not have clear or abrupt textural B horizons. 	Kb17, MM7	TP49, TP62	
Vertosol	 Soils with the following: A clay field texture of 35% or more clay throughout the solum except for thin, surface crusty horizons 0.03 m or less thick; When dry open cracks occur at some time in most years. These are at least 5 mm wide and extend upward to the surface or to the base of any plough layer, self-mulching horizon, or thin, surface crusty horizon; and Slickensides and or lenticular ped occur at some depth in the solum. 	Kb20	TP58	
Sodosol	Soils with a clear or abrupt textural B horizon and in which the major part of the upper 0.2 m of the B2 horizon (or the major part of the entire B2 horizon if it is less than 0.2 m this) is sodic and not strongly acid. Hydrosols and soils with strongly subplastic upper B2 horizons are excluded.	Kb20, MM10	TP67, TP46	
Calcarosol	Soils that are calcareous throughout the solum or calcareous at least directly below the A1 or Ap horizon, or within a depth of 0.2 m (whichever is shallower. Carbonate accumulations must be judged to be pedogenic (a result of the soil forming process), which are either current or relict and the soils do not have clear or abrupt textural B horizons.	MM7	TP45	

Notes:

- 1. Isbell 1996
- 2. CSIRO 1991 Digital Atlas of Australian Soils









Emerson Aggregate Test Results

Soil map unit ¹	Soil order ²	Horizon	Emerson classification number ³	Dispersibility risk ³	Slope of landform element	Test pit location	
Bz1	Tenosol	A	6	Non-dispersible	Very gently inclined (1% – 3%)	TP35	
		В	6	Non-dispersible			
CB3	Kandosol	A	6	Non-dispersible	Very gently inclined (1% – 3%)	TP2	
			5	Slightly dispersible	Gently inclined (3% – 10%)	TP13	
	Chromosol	A	4	Slightly dispersible	Gently inclined (3% – 10%)	TP28	
Kb17	Dermosol	A	6	Non-dispersible	Moderately inclined (10% – 32%)	TP49	
		В	6	Non-dispersible			
		C/B	4	Slightly dispersible			
Kb20	Vertosol	A	6	Non-dispersible	Very gently inclined (1% – 3%)	TP58	
		В	6	Non-dispersible			
	Sodosol	A	4	Slightly dispersible	Very gently inclined (1% – 3%)	TP67	
		В	4	Slightly dispersible			
MM7	Calcarosol	disturbed surface	4	Slightly dispersible	Level (<1%)	TP45	
		В	4	Slightly dispersible			
	Dermosol	A	6/24	Non-dispersible/ Moderately dispersible	Level (<1%)	TP62	
		В	2	Moderately dispersible			
	Kandosol	A	4	Slightly dispersible	Gently inclined (3% – 10%)	TP68	





Soil map unit ¹	Soil order ²	Horizon	Emerson classification number ³	Dispersibility risk ³	Slope of landform element	Test pit location	
	Chromosol A 4		Slightly dispersible	Very gently inclined (1% – 3%)	TP69		
		В	2	Moderately dispersible			
MM10	Sodosol	A	4/64	Slightly dispersible/ Non- dispersible	Very gently inclined (1% – 3%)	TP46	
		В	4	Slightly dispersible			
	Tenosol	A	6	Non-dispersible	Level (<1%)	TP48	
		В	3	Slightly dispersible			
Qa6	Tenosol	A	6	Non-dispersible	Very gently inclined (1% – 3%)	TP39	
		В	6	Non-dispersible			
SI4	Chromosol	A	4	Slightly dispersible	Very gently inclined (1% – 3%)	TP6	
Va30	Tenosol	A	6	Non-dispersible	Gently to moderately inclined (6% – 20%)	TP19	

Notes:

- 1. CSIRO 1991 Digital Atlas of Australian Soils;
- 2. Isbell 1996;
- 3. Modal value;
- 4. Multiple samples collected and analysed from same soil order and horizon at different test pit locations.









Soil Profile Salinity Conditions

Soil Map S Unit ¹	Soil order ²	Horizon (description ⁴)	pH³	EC (dS/m)	Soluble ions (mg/kg) ³					Exchangeable cations (meq/100g) ³				CEC · (meq/100g) ³	EC _e (dS/m)	Salinity risk ⁴	Test pit	
					Ca	Mg	Na	K	Cl	SO4	Ca	Mg	Na	K	(ineq/ roug)*	4	risk	location
Bz1	Tenosol	A (Clayey SAND)	7.2	0.04	20	<10	<10	20	<10	<10	8.6	1.4	< 0.1	0.6	10.6	0.943	Non-saline	TP35
		B (Clayey SAND)	7.4	0.03	10	<10	10	10	<10	<10	2.3	1.2	< 0.1	0.3	3.8	0.621	Non-saline	
	Kandosol	A (Sandy CLAY)	8.2	0.22	<10	<10	<10	<10	<10	<10	21.1	5.5	0.7	1.0	28.2	1.9006	Non-saline	TP2/ TP13
		B (Light CLAY)	8.8	0.49	<10	<10	30	<10	210	<10	30.0	6.8	3.9	0.5	41.2	4.214	Slightly saline	
		C/B (Light CLAY matrix)	9.6	0.69	<10	<10	<10	<10	660	<10	18.3	5.2	7.1	0.4	31.0	5.934	Moderately saline	
	Chromosol	A (Sandy CLAY)	8.9	0.84	<10	<10	50	<10	470	30	48.5	8.0	5.0	1.3	62.8	7.224	Moderately saline	TP28
		C/B (Sandy CLAY matrix)	8.4	1.34	210	40	1320	<10	670	2150	25.1	9.8	6.5	0.4	41.7	11.524	Highly saline	
Kb17	Dermosol	A (Sandy CLAY)	6.8	0.04	20	10	<10	30	<10	<10	13.2	5.6	0.1	1.5	20.5	0.3096	Non-saline	TP49
		B (Silty CLAY)	7.4	0.10	20	10	30	10	<10	<10	18.4	7.2	0.4	0.7	26.7	0.8686	Non-saline	
		C/B (Sandy CLAY matrix)	8.3	0.10	30	<10	40	<10	<10	<10	43.0	8.4	0.7	1.0	53.0	0.8256	Non-saline	
Kb20	Vertosol	A (Silty CLAY)	7.2	0.04	<10	<10	<10	<10	<10	< 10	21.7	20.4	0.7	1.8	44.6	0.3354	Non-saline	TP58
		B (Silty CLAY)	7.4	0.52	20	20	140	<10	560	10	33.0	26.5	3.1	1.3	63.8	4.429	Moderately saline	





Soil Map	Soil order ²	Horizon (description4)	pH³	EC (dS/m)		So	luble io	ns (mg/k	g) ³		Exc	_	ble cation 100g) 3	ons	CEC (meq/100g) ³	EC _e (dS/m)	Salinity risk ⁴	Test pit
Unit ¹		(40000)		4	Ca	Mg	Na	K	Cl	SO4	Ca	Mg	Na	K	(4		
	Sodosol	A (Silty CLAY)	8.5	0.14	90	20	30	40	<10	10	22.2	4.8	0.5	1.0	28.6	1.1954	Non-saline	TP67
		B (Silty CLAY)	8.7	0.85	40	20	490	<10	250	130	36.1	20.4	5.8	0.7	63.0	7.267	Moderately saline	
MM7	Calcarosol	disturbed surface (Silty CLAY)	8.7	0.13	70	10	40	30	<10	20	41.6	6.1	0.4	3.0	51.2	1.118	Non-saline	TP45
		B (Silty CLAY)	8.8	0.46	80	30	160	50	220	380	42.1	10.7	1.2	2.6	56.5	3.9216	Slightly saline	
	Dermosol	A (Silty CLAY)	7.5	1.98	610	190	610	<10	<10	2540	43.4	11.8	3.9	1.2	61.2	17.028	Extremely saline	TP62
		B (Silty CLAY)	6.9	3.35	1740	350	1200	<10	900	6800	8.5	9.8	5.0	0.6	23.8	28.81	Extremely saline	
	Kandosol	A (Silty CLAY)	8.4	0.69	50	30	420	<10	510	30	37.8	18.9	4.2	1.3	62.3	5.7104	Moderately saline	TP68
	Chromosol	A (Silty CLAY)	8.9	0.34	20	<10	110	<10	< 10	20	45.6	13.1	3.9	2.2	64.6	2.924	Slightly saline	TP69
		B (Silty CLAY)	9.0	0.81	20	<10	960	<10	930	290	35.7	7.7	6.0	0.7	50.1	6.9918	Moderately saline	
MM10	Sodosol	A (Silty CLAY)	8.8	0.11	80	10	40	<10	<10	<10	40.3	3.7	0.3	0.7	45.0	0.9718	Non-saline	TP46
		B (Silty CLAY)	9.0	0.36	20	<10	320	<10	160	<10	55.8	13.8	4.1	2.3	75.8	3.1304	Slightly saline	
	Tenosol	A (Clayey SAND)	7.8	0.07	10	<10	<10	60	<10	<10	6.9	2.5	0.7	1.7	11.7	1.518	Non-saline	TP48





Soil Map	Soil order ²	Horizon (description4)	pH³	EC (dS/m)		So	luble io	ns (mg/k	g) ³		Exc	_	ble catio	ons	CEC - (meq/100g) ³	EC _e (dS/m)	Salinity risk ⁴	Test pit
Unit ¹		(description)		4	Ca	Mg	Na	K	Cl	SO4	Ca	Mg	Na	K	(meq/100g)	4	Hisk	location
		B (Sandy CLAY)	7.6	0.05	< 10	<10	30	10	< 10	< 10	10.0	6.2	0.9	1.1	18.2	0.4214	Non-saline	
Qa6	Tenosol	A (Sandy CLAY)	6.6	0.06	20	10	10	20	< 10	10	16.7	6.8	0.2	1.6	25.3	0.5418	Non-saline	TP39
		B (Sandy CLAY)	7.1	0.04	10	<10	20	10	<10	10	11.9	3.6	0.3	0.8	16.6	0.621	Non-saline	
SI4	Chromosol	A (Sandy CLAY)	8.5	0.12	< 10	<10	<10	<10		<10	44.8	8.2	1.8	0.7	55.4	1.0578	Non-saline	TP6
		B (Light CLAY)	8.9	1.05	<10	<10	90	<10	1010	30	28.5	7.6	6.9	0.5	43.6	9.03	Highly saline	
Va30	Tenosol	A (Clayey SAND)	5.6	0.03	50	50	50	50	<10	40	2.0	0.5	0.3	0.8	3.5	0.667	Non-saline	TP19
		B (SAND)	7.0	0.02	<10	<10	<10	<10	<10	<10	2.0	0.4	0.4	1.0		0.46	Non-saline	
		C (EW SANDSTONE)	6.6	0.34	< 10	<10	<10	<10	260	70	5.8	7.5	3.1	1.1	17.4	7.82	Moderately saline	

Notes:

ECe Electrical Conductivity of saturated extracts calculated by conversion of EC1:5 x multiplier factor (Slavich and Petterson 1993) in Hazelton and Murphy 2007

- 1. CSIRO 1991 Digital Atlas of Australian Soils;
- 2. Isbell 1996;
- 3. Calculated mean value;
- 4. Salinity rating, Hazelton and Murphy 2007.





Appendix G.8





Soil Profile Sodicity Conditions

Soil Map Unit ¹	Soil order ²	Horizon (description ⁴)	ESP(%) ³	E	_	able catio	ons	CEC (meq/100g)	Sodicity risk ⁴	Test pit location
				Ca	Mg	Na	K	3		
Bz1	Tenosol	A (Clayey SAND)	< 0.1	8.6	1.4	< 0.1	0.6	10.6	Non-sodic	TP35
		B (Clayey SAND)	< 0.1	2.3	1.2	< 0.1	0.3	3.8	Non-sodic	
CB3	Kandosol	A (Sandy CLAY)	2.5	42.2	5.5	0.7	1.0	49.4	Non-sodic	TP2/TP13
		B (Light CLAY)	9.5	30.0	6.8	3.9	0.5	41.2	Marginally sodic – sodic	
		C/B (Light CLAY matrix)	22.9	18.3	5.2	7.1	0.4	31.0	Strongly sodic	
	Chromosol	A (Sandy CLAY)	8.0	48.5	8.0	5.0	1.3	62.8	Marginally sodic – sodic	TP28
		C/B (Sandy CLAY matrix)	15.6	25.1	9.8	6.5	0.4	41.8	Strongly sodic	
Kb1 <i>7</i>	Dermosol	A (Sandy CLAY)	0.5	13.2	5.6	0.1	1.5	20.4	Non-sodic	TP49
		B (Silty CLAY)	1.5	18.4	7.2	0.4	0.7	26.7	Non-sodic	
		C/B (Sandy CLAY matrix)	1.3	43.0	8.4	0.7	1.0	53.1	Non-sodic	
Kb20	Vertosol	A (Silty CLAY)	1.6	21.7	20.4	0.7	1.8	44.6	Non-sodic	TP58
		B (Silty CLAY)	4.9	33.0	26.5	3.1	1.3	63.9	Non-sodic	
	Sodosol	A (Silty CLAY)	1.7	22.2	4.8	0.5	1.0	28.5	Non-sodic	TP67
		B (Silty CLAY)	9.2	36.1	20.4	5.8	0.7	63.0	Marginally sodic – sodic	
MM7	Calcarosol	disturbed surface (Silty CLAY)	0.8	41.6	6.1	0.4	3.0	51.1	Non-sodic	TP45
		B (Silty CLAY)	2.1	42.1	10.7	1.2	2.6	56.6	Non-sodic	
	Dermosol	A (Silty CLAY)	6.4	43.4	12.8	3.9	1.2	61.3	Marginally sodic – sodic	TP62
		B (Silty CLAY)	21.0	8.5	9.8	5.0	0.6	23.9	Strongly sodic	
	Kandosol	A (Silty CLAY)	6.7	37.8	18.9	4.2	1.3	62.2	Marginally sodic – sodic	TP68
	Chromosol	A (Silty CLAY)	6.0	45.6	13.1	3.9	2.2	64.8	Marginally sodic – sodic	TP69
		B (Silty CLAY)	12.0	35.7	7.7	6.0	0.7	50.1	Marginally sodic – sodic	





Soil Map Unit ¹	Soil order ²	Horizon (description ⁴)	ESP (%) ³	Ex	changea (meq/	ble catio	ons	CEC (meq/100g)	Sodicity risk ⁴	Test pit location
				Ca	Mg	Na	K	3		
MM10	Sodosol	A (Silty CLAY)	0.7	40.3	3.7	0.3	0.7	45.0	Non-sodic	TP46
		B (Silty CLAY)	5.4	55.8	13.8	4.1	2.3	76.0	Non-sodic	
	Tenosol	A (Clayey SAND)	6.0	6.9	2.5	0.7	1.7	11.8	Marginally sodic – sodic	TP48
		B (Sandy CLAY)	4.9	10.0	6.2	0.9	1.1	18.2	Non-sodic	
Qa6	Tenosol	A (Sandy CLAY)	0.8	16.7	6.8	0.2	1.6	25.3	Non-sodic	TP39
		B (Sandy CLAY)	1.8	11.8	3.6	0.3	0.8	16.5	Non-sodic	
SI4	Chromosol	A (Sandy CLAY)	3.2	44.8	8.2	1.8	0.7	55.5	Non-sodic	TP6
		B (Light CLAY)	15.8	28.5	7.6	6.9	0.5	43.5	Strongly sodic	
Va30	Tenosol	A (Clayey SAND)	8.6	2.0	0.5	0.3	0.8	3.6	Marginally sodic – sodic	TP19
		B (SAND)		2.0	0.4	0.4	1.0	3.8		
		C (EW SANDSTONE)	17.8	5.8	7.5	3.1	1.1	17.5	Strongly sodic	

Notes:

- 1. CSIRO 1991 Digital Atlas of Australian Soils;
- 2. Isbell 1996;
- 3. Calculated mean value;
- 4. Sodicity rating (Northcote and Skene 1972) in Hazelton and Murphy 2007.





Appendix G.9





Soil Profile Nutrient Conditions

Soil Map	Soil order ²	Horizon (desc. ⁴)	pH³	Soluble SO4	Exc		ble catior 100g) ³	ıs	CEC (meg/	Ca/Mg	Base sat.	Nitrite	Nitrate	Nitrite + Nitrate as	Reactive P (mg/kg)	Nutrient conditions ⁴	Test pit
Unit ¹			-	(mg/kg) ³	Ca	Mg	Na	K	100g) ³	ratio ³	(%) ³	as N ³	as N ³	N (NO _x) (mg/kg) ³	3		loc'ns
Bz1	Tenosol	A (Clayey SAND)	7.4	<10	8.6	1.4	<0.1	0.6	10.6	6.1	100	0.3	20.4	20.6	2.96	pH may influence nutrient availability for Fe, N and P are deficient, Ca/Mg ratio balanced with the horizon very weekly leached	TP35
		B (Clayey SAND)	7.4	<10	2.3	1.2	< 0.1	0.3	3.8	1.9	100	0.1	1.6	1.7	0.2	pH may influence nutrient availability for Fe, N and P are deficient, Ca is low with the horizon very weekly leached	
CB3	Kandosol	A (Sandy CLAY)	8.2	<10	21.1	5.5	0.7	1.0	28.3	3.8	100	0.2	6.3	6.5	0.24	N and P are deficient, Ca/Mg ratio balanced with the horizon very weekly leached and may have some buffering capacity	TP2/ TP13





Soil Map	Soil order ²	Horizon (desc. ⁴)	pH ³	Soluble SO4	Exc		ble catior	ıs	CEC (meg/	Ca/Mg	Base sat.	Nitrite	Nitrate	Nitrite + Nitrate as	Reactive P (mg/kg)	Nutrient conditions ⁴	Test pit
Unit ¹			-	(mg/kg) ³	Ca	Mg	Na	K	100g) ³	ratio ³	(%)3	as N ³	as N ³	N (NO _x) (mg/kg) ³	3		loc'ns
		B (Light CLAY)	8.8	<10	30.0	6.8	3.9	0.5	41.2	4.4	100	0.4	5.9	6.2	0.3	pH may influence nutrient availability for P, N and P are deficient, Ca/Mg ratio balanced with the horizon very weekly leached and may have some buffering capacity	
		C/B (Light CLAY matrix)	9.6	<10	18.3	5.2	7.1	0.4	31.0	3.5		<0.2	1.3	1.3	<0.25	pH may influence nutrient availability, N and P are deficient, Ca is low with the horizon very weekly leached and may have some buffering capacity	
	Chromosol	A (Sandy CLAY)	8.9	30	48.5	8.0	5.0	1.3	62.8	6.1	100	<0.1	3.5	3.5	0.2	pH may influence nutrient availability for P, N and P are deficient, Mg is low with the horizon very weekly leached and may have some buffering capacity	TP28





Soil Map	Soil order ²	Horizon (desc. ⁴)	pH ³	Soluble SO4	Ex		ble catio	ıs	CEC (meg/	Ca/Mg	Base sat.	Nitrite	Nitrate	Nitrite + Nitrate as	Reactive P (mg/kg)	Nutrient conditions ⁴	Test pit
Unit ¹			•	(mg/kg) ³	Ca	Mg	Na	K	100g) ³	ratio ³	(%)3	as N ³	as N ³	N (NO _x) (mg/kg) ³	3		loc'ns
		C/B (Sandy CLAY matrix)	8.4	2150	25.1	9.8	6.5	0.4	41.8	2.6	100	<0.1	3.8	3.8	<0.1	N and P are deficient, Ca is low with the horizon very weekly leached and may have some buffering capacity	
Kb1 <i>7</i>	Dermosol	A (Sandy CLAY)	6.8	<10	13.2	5.6	0.1	1.5	20.4	2.4	100	0.4	11.9	12.3	3.52	pH may influence nutrient availability for Fe, N and P are deficient, Ca is low with the horizon very weekly leached	TP49
		B (Silty CLAY)	7.4	<10	18.4	7.2	0.4	0.7	26.7	2.6	100	<0.1	0.1	0.1	0.11	pH may influence nutrient availability for Fe, N and P are deficient, Ca is low with the horizon very weekly leached and may have some buffering capacity	
		C/B (Sandy CLAY matrix)	8.3	<10	43.0	8.4	0.7	1.0	53.1	5.1	100					Ca/Mg ratio balanced with the horizon very weekly leached and may have some buffering capacity	





Soil Map	Soil order ²	Horizon (desc. ⁴)	pH ³	Soluble SO4	Ex		ble cation	ıs	CEC (meq/	Ca/Mg	Base sat.	Nitrite	Nitrate	Nitrite + Nitrate as	Reactive P (mg/kg)	Nutrient conditions ⁴	Test pit
Unit ¹		, ,	•	(mg/kg) ³	Ca	Mg	Na	K	100g) ³	ratio ³	(%) ³	as N ³	as N ³	N (NO _x) (mg/kg) ³	3		loc'ns
Kb20	Vertosol	A (Silty CLAY)	7.2	<10	21.7	20.4	0.7	1.8	44.6	1.1	100	0.1	7.6	7.7	1.75	pH may influence nutrient availability for Fe, N and P are deficient, Ca is low with the horizon very weekly leached and may have some buffering capacity	TP58
		B (Silty CLAY)	7.4	10	33.0	36.5	3.1	1.3	73.9	0.9	100	0.2	0.9	1	0.23	pH may influence nutrient availability for Fe, N and P are deficient, Ca is low with the horizon very weekly leached and may have some buffering capacity	
	Sodosol	A (Silty CLAY)	8.5	10	22.2	4.8	0.5	1.0	28.5	4.6	100	<0.1	20.3	20.3	0.28	pH may influence nutrient availability for P, N and P are deficient, Ca/Mg ratio balanced with the horizon very weekly leached and may have some buffering capacity	TP67





Soil Map	Soil order ²	Horizon (desc. ⁴)	pH ³	Soluble SO4	Exc		ble cation	ns	CEC (meg/	Ca/Mg	Base sat.	Nitrite	Nitrate	Nitrite + Nitrate as	Reactive P (mg/kg)	Nutrient conditions ⁴	Test pit
Unit ¹		, ,	•	(mg/kg) ³	Ca	Mg	Na	K	100g) ³	ratio ³	(%) ³	as N ³	as N ³	N (NO _x) (mg/kg) ³	3		loc'ns
		B (Silty CLAY)	8.7	130	36.1	20.4	5.8	0.7	63.0	1.8	100	0.2	3.0	1.7	< 0.25	pH may influence nutrient availability for P, N and P are deficient, Ca is low with the horizon very weekly leached and may have some buffering capacity	
ММ7	Calcarosol	disturbed surface (Silty CLAY)	8.7	20	41.6	6.1	0.4	3.0	51.1	6.8	100	<0.1	2.1	2.1	1.74	pH may influence nutrient availability for P, N and P are deficient, Mg is low with the horizon very weekly leached and may have some buffering capacity	TP45
		B (Silty CLAY)	8.8	100	42.1	10.7	1.2	2.6	56.6	3.9	100	<0.2	0.4	0.4	0.3	pH may influence nutrient availability for P, N and P are deficient, Ca/Mg ratio balanced with the horizon very weekly leached and may have some buffering capacity	

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Soil Map	Soil order ²	Horizon (desc. ⁴)	pH ³	Soluble SO4	Exc	changea (meq/	ble catior	ıs	CEC (meg/	Ca/Mg	Base sat.	Nitrite	Nitrate	Nitrite + Nitrate as	Reactive P (mg/kg)	Nutrient conditions ⁴	Test pit
Unit ¹			•	(mg/kg) ³	Ca	Mg	Na	K	100g) ³	ratio ³	(%) ³	as N ³	as N ³	N (NO _x) (mg/kg) ³	3		loc'ns
	Dermosol	A (Silty CLAY)	7.5	2540	43.4	12.8	3.9	1.2	61.3	3.4	100					pH may influence nutrient availability for Fe, Ca is low with the horizon very weekly leached and may have some buffering capacity	TP62
		B (Silty CLAY)	6.9	6800	8.5	9.8	5.0	0.6	23.9	0.9	100	<0.1	0.3	0.3	<0.1	pH may influence nutrient availability for Fe, N and P are deficient, Ca is deficient with the horizon very weekly leached	
	Kandosol	A (Silty CLAY)	8.4	30	37.8	18.9	4.2	1.3	62.2	2.0	100	0.7	9.9	10.6	<0.25	N and P are deficient, Ca is low with the horizon very weekly leached and may have some buffering capacity	TP68





Soil Map	Soil order ²	Horizon (desc. ⁴)	pH ³	Soluble SO4	Ex		ble catior	ns	CEC (meq/	Ca/Mg	Base sat.	Nitrite	Nitrate	Nitrite + Nitrate as	Reactive P (mg/kg)	Nutrient conditions ⁴	Test pit
Unit ¹		,	P	(mg/kg) ³	Ca	Mg	Na	K	100g) ³	ratio ³	(%) ³	as N ³	as N ³	N (NO _x) (mg/kg) ³	3		loc'ns
	Chromosol	A (Silty CLAY)	8.9	20	45.6	13.1	3.9	2.2	64.8	3.5	100	0.1	2.3	2.3	<0.25	pH may influence nutrient availability for P, N and P are deficient, Ca is low with the horizon very weekly leached and may have some buffering capacity	TP69
		B (Silty CLAY)	9.0	285	35.7	7.7	6.0	0.7	50.1	4.6	100	<0.1	1	1	<0.1	N and P are deficient, Ca/Mg ratio balanced with the horizon very weekly leached and may have some buffering capacity	
MM10	Sodosol	A (Silty CLAY)	8.8	<10	40.3	3.7	0.3	0.7	45.0	10.9	100	<0.1	3.5	3.5	0.49	N and P are deficient, Mg is deficient with the horizon very weakly leached and may have some buffering capacity	TP46
		B (Silty CLAY)	9.0	<10	55.8	13.8	4.1	2.3	76.0	4.0	100	0.3	1.5	1.7	0.2	N and P are deficient, Ca/Mg ratio balanced with the horizon very weekly leached and may have some buffering capacity	





Soil Map	Soil order ²	Horizon (desc. ⁴)	pH ³	Soluble SO4	Exc		ble cation	ıs	CEC (meg/	Ca/Mg	Base sat.	Nitrite	Nitrate	Nitrite + Nitrate as	Reactive P (mg/kg)	Nutrient conditions ⁴	Test pit
Unit ¹			-	(mg/kg) ³	Ca	Mg	Na	K	100g) ³	ratio ³	(%)3	as N ³	as N ³	N (NO _x) (mg/kg) ³	3		loc'ns
	Tenosol	A (Clayey SAND)	7.8	<10	6.9	2.5	0.7	1.7	11.8	2.8	100					Ca is low with the horizon very weekly leached	TP48
		B (Sandy CLAY)	7.6	<10	10.0	6.2	0.9	1.1	18.2	1.6	100	<0.1	0.8	0.8	9.17	N is deficient, P is within the range satisfactory for vegetative growth, Ca is low with the horizon very weekly leached	
Qa6	Tenosol	A (Sandy CLAY)	6.6	10	16.7	6.8	0.2	1.6	25.3	2.5	100				2.06	P is deficient, Ca is low with the horizon very weekly leached and may have some buffering capacity	TP39
		B (Sandy CLAY)	7.1	10	11.9	3.6	0.3	0.8	16.6	3.3	100	<0.1	0.7	0.7	1.2	N and P are deficient, Ca is low with the horizon very weekly leached	
SI4	Chromosol	A (Sandy CLAY)	8.5	<10	44.8	8.2	1.8	0.7	55.5	5.5	100					Ca/Mg ratio balanced with the horizon very weekly leached and may have some buffering capacity	TP6

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Soil Map	Soil order ²	Horizon (desc. ⁴)	pH³	Soluble SO4	Exc		ble catior 100g) ³	ns	CEC (meg/	Ca/Mg	Base sat.	Nitrite	Nitrate	Nitrite + Nitrate as	Reactive P (mg/kg)	Nutrient conditions ⁴	Test pit
Unit ¹		,	,	(mg/kg) ³	Ca	Mg	Na	K	100g) ³	ratio ³	(%) ³	as N ³	as N ³	N (NO _x) (mg/kg) ³	3		loc'ns
		B (Light CLAY)	8.9	30	28.5	7.6	6.9	0.5	43.5	3.8	100	<0.1	0.9	0.9	<0.1	N and P are deficient, Ca is low with the horizon very weekly leached and may have some buffering capacity	
Va30	Tenosol	A (Clayey SAND)	5.6	40	2.0	0.5	0.3	0.8	3.6	4.0	100	<0.1	12.2	12.2	0.23	N and P are deficient, Ca is low with the horizon very weekly leached	TP19
		B (SAND)	7.0	<10	2.0	0.4	0.4	1.0	3.8	5.0	97	<0.1	12	12	<0.1	N and P are deficient, Ca/Mg ratio balanced with the horizon very weekly leached	
		C (EW SANDSTONE)	6.6	70	5.8	7.5	3.1	1.1	17.5	0.8	100	<0.1	0.2	0.2	< 0.1	N and P are deficient, Ca is deficient with the horizon very weekly leached	

Notes:

- 1. CSIRO 1991 Digital Atlas of Australian Soils;
- 2. Isbell 1996;
- 3. Calculated mean value;
- 4. Summary description.





Appendix G.10





Landform and Soil Types

Landform Survey Location	Landform Element and Slope Range ¹	Soil type ² and Characteristics	Project Activity and Stage	Soil Degradation Risk
LF1	Very gently inclined hill crest (1% – 3%)	N/A	Vegetation clearing Earthworks associated with provision of site access tracks, installation of trackside services, drainage and pavements Scraping and ground improvement beneath fill Fill – embankment south of bridge site Construction of bridge foundations and abutment piers	Moderate risk
LF2	Gently inclined hillcrest (3% – 10%)	N/A	Vegetation clearing Earthworks associated with provision of site access tracks, installation of trackside services, drainage and pavements Scraping and ripping Cut – 10 m	Moderate risk
(TP2)	Very gently inclined flat (1% – 3%)	Kandosol – non-dispersible, non-saline, non-sodic A horizon with N and P deficient, Ca/Mg balanced, weakly leached with some buffering capacity. B horizon is slightly saline, marginally sodic to sodic and pH may influence nutrient availability for P. N and P are deficient, Ca/Mg are balanced, horizon is very weakly leached and may have some buffering capacity. C/B horizon is moderately saline, strongly sodic and pH may influence nutrient availability. N and P are deficient, Ca is low, horizon is very weakly leached and may have some buffering capacity.	Vegetation clearing Earthworks associated with provision of site access tracks, installation of trackside services, drainage and pavements Scraping and ripping Cut – 8 m	High risk





Landform Survey Location	Landform Element and Slope Range ¹	Soil type ² and Characteristics	Project Activity and Stage	Soil Degradation Risk
LF3 (TP6)	Very gently inclined hill slope (1% – 3%)	Chromosol – slightly dispersible, non-saline, non-sodic A horizon with Cg/Mg balanced, horizon very weakly leached and may have some buffering capacity. B horizon is highly saline, strongly sodic with N and P deficient, Ca low, horizon is very weakly leached and may have some buffering capacity.	Vegetation clearing Earthworks associated with provision of site access tracks, installation of trackside services, drainage and pavements Scraping and ground improvement beneath fill Fill – 10 m embankment for bridge site Construction of bridge foundations and abutment piers	High risk
LF4	Gently inclined hill crest (3% – 10%)	N/A	Vegetation clearing Earthworks associated with provision of site access tracks, installation of trackside services, drainage and pavements Scraping and ripping Cut – 13 m	Moderate risk
LF5 (TP12)	Gently inclined hill slope (3% – 10%)	N/A	Vegetation clearing Earthworks associated with provision of site access tracks, installation of trackside services, drainage and pavements Scraping and ripping Cut – 8 m	Moderate risk





Landform Survey Location	Landform Element and Slope Range ¹	Soil type ² and Characteristics	Project Activity and Stage	Soil Degradation Risk
LF6 (TP13)	Gently inclined open depression (3% – 10%)	Kandosol – A horizon is slightly dispersible, non-saline, non-sodic with N and P deficient, Ca/Mg balanced, weakly leached with some buffering capacity. B horizon is slightly saline, marginally sodic to sodic and pH may influence nutrient availability for P. N and P are deficient, Ca/Mg are balanced, horizon is very weakly leached and may have some buffering capacity. C/B horizon is moderately saline, strongly sodic and pH may influence nutrient availability. N and P are deficient, Ca is low, horizon is very weakly leached and may have some buffering capacity.	Vegetation clearing Earthworks associated with provision of site access tracks, installation of trackside services, drainage and pavements Scraping and ground improvement beneath fill Fill – 5 m	High risk
LF7	Level crest of a hill (≤1%)	N/A	Vegetation clearing Earthworks associated with provision of site access tracks, installation of trackside services, drainage and pavements Scraping and ripping Cut – 18 m	Moderate risk
LF8 (TP18)	Moderately inclined open depression (10% – 32%)	N/A	Vegetation clearing Earthworks associated with provision of site access tracks, installation of trackside services, drainage and pavements Scraping and ground improvement beneath fill Fill – 10 m	High risk





Landform Survey Location	Landform Element and Slope Range ¹	Soil type ² and Characteristics	Project Activity and Stage	Soil Degradation Risk
LF9	Gently inclined hill slope (3% – 10%)	N/A	Vegetation clearing Earthworks associated with provision of site access tracks, installation of trackside services, drainage and pavements Scraping, ripping and possibly blasting Cut – 12 m	High risk
LF10	Level flat (≤1%)	N/A	No works – outside study area	N/A
LF11 (TP28)	Gently inclined hill slope (3% – 10%)	Chromosol – A horizon is slightly dispersible, moderately saline, marginally sodic to sodic and pH may influence nutrient availability for P. N and P are deficient, Mg is low, horizon is very weakly leached and may have some buffering capacity. C/B horizon is highly saline, strongly sodic and N and P are deficient, Ca is low, horizon is very weakly leached and may have some buffering capacity.	Vegetation clearing Earthworks associated with provision of site access tracks, installation of trackside services, drainage and pavements Scraping, ripping and possibly blasting Cut – 3 m	High risk
LF12 (TP69)	Very gently inclined hill crest (1% – 3%)	Chromosol – A horizon is slightly dispersible, slightly saline, marginally sodic to sodic and pH may influence nutrient availability for P. N and P are deficient, Ca is low, horizon is very weakly leached and may have some buffering capacity. B horizon is moderately dispersible, moderately saline and marginally sodic to sodic. N and P are deficient, Ca/Mg is balanced, horizon is very weakly leached and may have some buffering capacity.	Vegetation clearing Earthworks associated with provision of site access tracks, installation of trackside services, drainage and pavements Scraping and ground improvement beneath fill Fill – 1 m	Moderate risk





Landform Survey Location	Landform Element and Slope Range ¹	Soil type ² and Characteristics	Project Activity and Stage	Soil Degradation Risk
LF13 (TP68)	Gently inclined hill slope (3% – 10%)	Kandosol – A horizon is slightly dispersible, moderately saline, marginally sodic to sodic and N and P are deficient, Ca is low, horizon is very weakly leached and may have some buffering capacity	Vegetation clearing Earthworks associated with provision of site access tracks, installation of trackside services, drainage and pavements Scraping and ground improvement beneath fill Fill – 1 m	High risk
LF14 (TP67)	Very gently inclined hill crest (1% – 3%)	Sodosol – A horizon is slightly dispersible, non-saline, non-sodic and pH may influence nutrient availability for P. N and P are deficient, Ca/Mg is balanced, horizon is very weakly leached and may have some buffering capacity.	Vegetation clearing Earthworks associated with provision of site access tracks, installation of trackside services, drainage and pavements Scraping and ripping Cut – 3 m	High risk
LF15 (TP66)	Level flat (≤1%)	N/A	Vegetation clearing Earthworks associated with provision of site access tracks, installation of trackside services, drainage and pavements Scraping and ground improvement beneath fill Fill – 2 m	Low risk
LF16 (TP65)	Gently inclined hill slope (3% – 10%)	N/A	Vegetation clearing Earthworks associated with provision of site access tracks, installation of trackside services, drainage and pavements Scraping and ground improvement beneath fill Fill – 4 m	Moderate risk





Landform Survey Location	Landform Element and Slope Range ¹	Soil type ² and Characteristics	Project Activity and Stage	Soil Degradation Risk
LF17 (TP63)	Very gently inclined hill slope (1% – 3%)	N/A	Vegetation clearing Earthworks associated with provision of site access tracks, installation of trackside services, drainage and pavements Scraping and ground improvement beneath fill Fill – 6 m	Moderate risk
LF18 (TP62)	Level flat (≤1%)	Dermosol – A horizon is non-dispersible to moderately dispersible, extremely saline, marginally sodic to sodic and pH may influence nutrient availability for Fe. Ca is low, horizon is very weakly leached and may have some buffering capacity. B horizon is moderately dispersible, extremely saline, strongly sodic and pH may influence nutrient availability for Fe. N and P are deficient, Ca is deficient, horizon very weakly leached.	Vegetation clearing Earthworks associated with provision of site access tracks, installation of trackside services, drainage and pavements Scraping and ripping Cut – 2 m	High risk
LF19 (TP61)	Level flat (≤1%)	N/A	Vegetation clearing Earthworks associated with provision of site access tracks, installation of trackside services, drainage and pavements Scraping and ripping Cut – 4 m	High risk
LF20 (TP59)	Very gently inclined hill slope (1% – 3%)	N/A	Vegetation clearing Earthworks associated with provision of site access tracks, installation of trackside services, drainage and pavements Scraping and ground improvement beneath fill Fill – 6 m	Moderate risk





Landform Survey Location	Landform Element and Slope Range ¹	Soil type ² and Characteristics	Project Activity and Stage	Soil Degradation Risk
LF21 (TP58)	Very gently inclined hill slope (1% – 3%)	Vertosol – A horizon is non-dispersible, non-saline, non-sodic and pH may influence nutrient availability for Fe. N and P are deficient, Ca is low, horizon is very weakly leached and may have some buffering capacity. B horizon is non-dispersible, moderately saline, non-sodic and pH may influence nutrient availability for Fe. N and P are deficient, Ca is low, horizon is very weakly leached and may have some buffering capacity.	Vegetation clearing Earthworks associated with provision of site access tracks, installation of trackside services, drainage and pavements Scraping and ground improvement beneath fill Fill – 5 m	Moderate risk
LF22	Very gently inclined hill crest (1% – 3%)	N/A	No works – outside study area	N/A
LF23 (TP48)	Level flat (≤1%)	Tenosol – A horizon is non-dispersible, non-saline, non-sodic and Ca is low, horizon is very weakly leached. B horizon is slightly dispersible, non-saline, non-sodic and N is deficient, P is within the range satisfactory for vegetative growth, Ca is low and horizon is very weakly leached.	Vegetation clearing Earthworks associated with provision of site access tracks, installation of trackside services, drainage and pavements Scraping and ground improvement beneath fill Fill – 18 m embankment at bridge site Construction of bridge foundations and abutment piers	Moderate risk
LF24 (TP46)	Very gently inclined hill slope (1% – 3%)	Sodosol – A horizon is slightly dispersible to non-dispersible, non-saline, non-sodic and N and P are deficient, Mg is deficient, horizon is very weakly leached and may have some buffering capacity. B horizon is slightly dispersible, slightly saline, marginally sodic to sodic and N and P are deficient, Ca/Mg is balanced, horizon is very weakly leached and may have some buffering capacity.	Vegetation clearing Earthworks associated with provision of site access tracks, installation of trackside services, drainage and pavements Scraping and ground improvement beneath fill Fill – 15 m	High risk





Landform Survey Location	Landform Element and Slope Range ¹	Soil type ² and Characteristics	Project Activity and Stage	Soil Degradation Risk
LF25 (TP45)	Level flat (≤1%)	Calcarosol – A horizon is slightly dispersible, non-saline, non-sodic and pH may influence nutrient availability for P. N and P are deficient, Mg is low, horizon is very weakly leached and may have some buffering capacity. B horizon is slightly dispersible, slightly saline, non-sodic and pH may influence nutrient availability for P. N and P are deficient, Ca/Mg is balanced, horizon is very weakly leached and may have some buffering capacity.	Vegetation clearing Earthworks associated with provision of site access tracks, installation of trackside services, drainage and pavements Scraping and ripping Cut – 1 m	High risk
LF26 (TP35)	Very gently inclined hill slope (1% – 3%)	Tenosol – A horizon is non-dispersible, non-saline, non-sodic and pH may influence nutrient availability for Fe. N and P are deficient, Ca/Mg is balanced and horizon is very weakly leached. B horizon is non-dispersible, non-saline, non-sodic and pH may influence nutrient availability for Fe. N and P are deficient, Ca is low and horizon is very weakly leached.	Vegetation clearing Earthworks associated with provision of site access tracks, installation of trackside services, drainage and pavements Scraping, ripping and possibly blasting Cut – 1 m	Moderate risk
LF27	Moderately inclined hill slope (10% – 32%)	N/A	Vegetation clearing Earthworks associated with provision of site access tracks, installation of trackside services, drainage and pavements Scraping, ripping and possibly blasting Cut – 7 m	High risk
LF28 (TP10)	Gently inclined slope of an open depression (3% – 10%)	N/A	Vegetation clearing Earthworks associated with provision of site access tracks, installation of trackside services, drainage and pavements Scraping and ripping Cut – 6 m	High risk





Landform Survey Location	Landform Element and Slope Range ¹	Soil type ² and Characteristics	Project Activity and Stage	Soil Degradation Risk
LF29 (near TP19)	Moderately inclined slope of an open depression (10% – 32%)	N/A	Vegetation clearing Earthworks associated with provision of site access tracks, installation of trackside services, drainage and pavements Scraping, ripping and ground improvement Transition between fill embankment (<10 m) and cut (3 m)	High risk
LF30 (TP19)	Gently to moderately inclined hill slope (6% – 20%)	Tenosol – A horizon is non-dispersible, non-saline, marginally sodic to sodic and N and P are deficient, Ca is low and horizon is very weakly leached. B horizon is non-saline and N and P are deficient, Ca/Mg is balanced, horizon is very weakly bleached. C horizon is moderately saline, strongly sodic and N and P are deficient, Ca is deficient, horizon weakly bleached	Vegetation clearing Earthworks associated with provision of site access tracks, installation of trackside services, drainage and pavements Scraping and ripping Cut – 3 m	High risk
LF31 (TP20)	Gently inclined hill crest (3% – 10%)	N/A	Vegetation clearing Earthworks associated with provision of site access tracks, installation of trackside services, drainage and pavements Scraping and ground improvement beneath fill Fill – 3 m	Moderate risk
LF32	Very gently inclined hill crest (1% – 3%)	N/A	Vegetation clearing Earthworks associated with provision of site access tracks, installation of trackside services, drainage and pavements Scraping, ripping and possibly blasting Cut – 18 m	High risk





Landform Survey Location	Landform Element and Slope Range ¹	Soil type ² and Characteristics	Project Activity and Stage	Soil Degradation Risk
LF33 (near TP53)	Very gently inclined hill crest (1% – 3%)	N/A	Vegetation clearing Earthworks associated with provision of site access tracks, installation of trackside services, drainage and pavements Scraping, ripping and possibly blasting in this area where excavation of material is required Ground improvement beneath fill Transition between fill embankment (7 m) at bridge	High risk
			site to the north and cut (17 m) to the south	
LF34 (TP54)	Very gently inclined flat (1% – 3%)	N/A	Vegetation clearing Earthworks associated with provision of site access tracks, installation of trackside services, drainage and pavements Scraping and ground improvement beneath fill Fill – 7 m embankment at bridge site Construction of bridge foundations and abutment piers	Moderate risk
LF35 (TP56)	Very gently inclined hill slope (1% – 3%)	N/A	Vegetation clearing Earthworks associated with provision of site access tracks, installation of trackside services, drainage and pavements Scraping, ripping and possibly blasting Cut – 3 m	High risk





Landform Survey Location	Landform Element and Slope Range ¹	Soil type ² and Characteristics	Project Activity and Stage	Soil Degradation Risk
LF36	Very gently inclined open depression (1% – 3%)	N/A	Scraping, ripping and possibly blasting in this area where excavation of material is required Ground improvement beneath fill	High risk
LF37	Moderately inclined hill slope (10% – 32%)	N/A	Scraping, ripping and possibly blasting in this area where excavation of material is required Ground improvement beneath fill	High risk
LF38	Moderately inclined hill slope (10% – 32%)	N/A	Scraping, ripping and possibly blasting in this area where excavation of material is required Ground improvement beneath fill	High risk
LF39	Gently inclined hill slope (3% – 10%)	N/A	Scraping, ripping and possibly blasting in this area where excavation of material is required Ground improvement beneath fill	High risk
LF40	Moderately to steeply inclined hill slope (20% – 40%)	N/A	Scraping, ripping and possibly blasting in this area where excavation of material is required Ground improvement beneath fill	High risk
LF41	Level to very gently inclined flat (0.6% – 1%)	N/A	Vegetation clearing Earthworks associated with provision of site access tracks, installation of trackside services, drainage and pavements Scraping and ground improvement beneath fill Fill – near the 18 m embankment at bridge site Construction of bridge foundations and abutment piers	Moderate risk





Landform Survey Location	ey and Slope Range ¹ Soil type ² and Characteristics		Project Activity and Stage	Soil Degradation Risk		
hill slope (10% – 32%) pH may influence nutrient availability for Fe. N and P are is low and horizon is very weakly leached. B horizon is n dispersible, non-saline, non-sodic and pH may influence availability for Fe. N and P are deficient, Ca is low, horizon weakly leached and may have some buffering capacity. Ca slightly dispersible, non-sodic and Ca/Mg is but the saline in t		Dermosol – A horizon is non-dispersible, non-saline, non-sodic and pH may influence nutrient availability for Fe. N and P are deficient, Ca is low and horizon is very weakly leached. B horizon is non-dispersible, non-saline, non-sodic and pH may influence nutrient availability for Fe. N and P are deficient, Ca is low, horizon is very weakly leached and may have some buffering capacity. C/B horizon is slightly dispersible, non-saline, non-sodic and Ca/Mg is balance, horizon is very weakly leached and may have some buffering capacity.	Earthworks associated with provision of site access tracks, installation of trackside services, drainage and pavements Scraping, ripping and possibly blasting Cut – 16 m Cut – 16 m			
LF43 (TP50)	Very gently inclined hill crest (1% – 3%)	N/A	Vegetation clearing Earthworks associated with provision of site access tracks, installation of trackside services, drainage and pavements Scraping and ground improvement beneath fill Fill – 3 m embankment at bridge site Construction of bridge foundations and abutment piers	Moderate risk		
LF44 (TP39)	Very gently inclined flat within an open depression (1% – 3%)	Tenosol – A horizon is non-dispersible, non-saline, non-sodic and P is deficient, Ca is low, horizon is very weakly leached and may have some buffering capacity. B horizon is non-dispersible, non-saline, non-sodic and N and P are deficient, Ca is low, horizon is very weakly leached.	Vegetation clearing Earthworks associated with provision of site access tracks, installation of trackside services, drainage and pavements Scraping and ground improvement beneath fill Fill – 1 m	Moderate risk		





Landform Survey Location	Landform Element and Slope Range ¹	Soil type ² and Characteristics	Project Activity and Stage	Soil Degradation Risk
LF45 (near TP38)			Vegetation clearing Earthworks associated with provision of site access tracks, installation of trackside services, drainage and pavements Scraping and ground improvement beneath fill Fill – near 8 m embankment at bridge site Construction of bridge foundations and abutment piers	High risk
LF46	Gently to moderately inclined hill slope (6% – 20%)	N/A	Vegetation clearing Earthworks associated with provision of site access tracks, installation of trackside services, drainage and pavements Scraping, ripping and possibly blasting Cut – 8 m	High risk
LF47	Moderately inclined open depression (10% – 32%)	N/A	Vegetation clearing Earthworks associated with provision of site access tracks, installation of trackside services, drainage and pavements Scraping, ripping and possibly blasting Cut – 15 m	High risk

Notes:

- 1. McDonald et al., 1990;
- 2. Isbell 1996.

N/A – Not Available





Appendix G.11

Telephone: +61 7 3135 8000 Facsimile: +61 7 3135 8001 Email: cwbne@conwag.com www.conwag.com



Client	Connell Wagner	Phone	3135 8540	Date & Time:	14/04/08
Postal Address	Locked Bag 1800 Spring Hill Q 4004	Fax	3135 8001	Project Number:	H328128
Project Name:	SBRJV	Sampling Location:	Surat Basin	Sampled By:	M Harrison
Sample Device:	Backhoe	Report Format	PDF	Send Report To:	harrisonm@conwag.com
QC Level	NATA	Send Invoice To (care of Connell Wagner)	Monique Harrison	Data Needed By	30/04/08

	\wedge	Laborator	y Use Only		Christian-ALS
Chilled:	Ye		Laboratory Batch Number:	13.6	
Cooler Seal:	Broken	(fitact)	Temperature:	130	<u> </u>

MOG 188	Production Majority		12 H	Samp	le A	naly	sis		Section 1		10 miles		
		Sai	mple		Aurania Aurania	1949		An	alysis	Require	ď		
Sample ID	Lab ID	Date	Matrix (soil/ water)	Sample Container	pH (1:5)	EC (1:5)	Major Cations (Ca, Na, K, Mg)	Anions (Cl, SO4, Alkalinity)	ESP	CEC	Minor Anions (NO ₂ – N, NO ₃ – N, F, Reactive P)	Emerson Aggregate Testing	Hold
TP38 0-0.1	1	25/01/08	Soil	Glass jar									√
TP38 0.2-0.3	2	25/01/08	Soil	Glass jar									✓
TP38 0.5-0.6	3	25/01/08	Soil	Glass jar									✓
TP38 0.8-0.9	4	25/01/08	Soil	Glass jar									✓
TP39 0-0.1	5	25/01/08	Soil	Glass jar	1	1	✓	✓	✓	1	✓	✓	
TP39 0.2-0.3	6	25/01/08	Soil	Glass jar	✓	1	✓	✓				4	***************************************

0.2-0.3		•	
Split Samples	Analysis	Environmental Division Brisbane	
Split Sample One:		Work Order	-
Split Sample Two:		EB0804854	***************************************
Split Sample Three:			
Split Sample Four:			
Split Sample Five:			
Split Sample Six:			
	H	Telephone: +61-7-3243 7222	

			Qual	ity Assurance	
Relinquished by:			34.4 T.	CONTRACTOR	
Name (and initial):	M Harrison	Date:	14/04/08	Name (and initial):	Date:
Company:	Connell Wagner	Time:	16.00	Company:	Time:
Name (and initial):		Date:		Name (and initial):	Date:
Company:		Time:		Company:	Time;

Telephone: +61 7 3135 8000 Facsimile: +61 7 3135 8001 Email: cwbne@conwag.com www.conwag.com



Client	Connell Wagner	Phone	3135 8540	Date & Time:	14/04//08
Postal Address	Locked Bag 1800 Spring Hill Q 4004	Fax	3135 8001	Project Number:	H328128
Project Name:	SBRJV	Sampling Location:	Surat Basin	Sampled By:	M Harrison
Sample Device:	Backhoe	Report Format	PDF	Send Report To:	harrisonm@conwag.com
QC Level	NATA	Send Invoice To (care of Connell Wagner)	Monique Harrison	Data Needed By	30/04/08

	Complete served as	Laborator	y Use Only		Christian-ALS
Chilled:	/es	No	Laboratory Batch Number:	12.1	10.10
Cooler Seal: E	Broken	Intact)	Temperature:	12.0	0 14.4.00 - 18:10

			- House and a second	Samp	le A	naly	sis					1316	
		Sar	nple					1	Analysi	s Requi	red		
Sample ID	Lab ID	Date	Matrix (soil/ water)	Sample Container	pH (1:5)	EC (1:5)	Major Cations (Ca, Na, K, Mg)	Anions (Cl, SO4, Alkalinity)	ESP	CEC	Minor Anions (NO ₂ – N, NO ₃ – N, F, Reactive P)	Emerson Aggregate Testing	PloH
TP39 0.5-0.6	7	25/01/08	Soil	Glass jar	1	1	-	√	1	1	1	1	
TP39 0.8-0.9	8.	25/01/08	Soil	Glass jar	1	✓	√	✓				1	
TP39 1.1-1.2	9	25/01/08	Soil	Glass jar	1	✓	✓	✓	✓	✓	1	✓	
TP49 0-0.1	10	24/01/08	Soil	Glass jar	1	✓	1	✓	✓	✓	✓	1	
TP49 0.2-0.3	1(24/01/08	Soil	Glass jar	1	1	✓	✓				/	
TP49 0.5-0.6	12	24/01/08	Soil	Glass jar	1	1	/	· ✓	✓	✓	1	/	

Split Samples	Analysis
Split Sample One:	
Split Sample Two	
Split Sample Three	
Split Sample Four	
Split Sample Five	

Quality Assurance								
Relinquished by:								
Name (and initial):	M Harrison	Date:	14/04/08	Name (and initial):	Date:			
Company:	Connell Wagner	Time:	16.00	Company:	Time:			
Name (and initial):		Date:		Name (and initial):	Date:			
Company:		Time:		Company:	Time:			

Telephone: +61 7 3135 8000 Facsimile: +61 7 3135 8001 Email: cwbne@conwag.com www.conwag.com



Client	Connell Wagner	Phone	3135 8540	Date & Time:	14/04/08
Postal Address	Locked Bag 1800 Spring Hill Q 4004	Fax	3135 8001	Project Number:	H328128
Project Name:	SBRJV	Sampling Location:	Surat Basin	Sampled By:	M Harrison
Sample Device:	Backhoe	Report Format	PDF	Send Report To:	harrisonm@conwag.com
QC Level	NATA	Send Invoice To (care of Connell Wagner)	Monique Harrison	Data Needed By	30/04/08

	\sim		Laboratory Use Only		Christic	an-ALS
Chilled:	(es)	No.	Laboratory Batch Number:	12.6	1111108	18:10
Cooler Seal:	Broken	totact)	Temperature:	12.0	0 14,4.0 a	(2)

es a constitue				Samp	le A	naly	sis		4.7	er Pired es			100
	Sample							Α	nalysi	s Requi	red		
Sample ID	Lab ID	Date	Matrix (soil/ water)	Sample Container	(6:1) Hd	EC (1:5)	Major Cations (Ca, Na, K, Mg)	Anions (Cl, SO4, Alkalinity)	dS3	OEC	Minor Anions (NO ₂ – N, NO ₃ – N, F, Reactive P)	Emerson Aggregate Testing	Hold
TP49 0.8-0.9	17	24/01/08	Soil	Glass jar	1	1	✓	√				/	
TP49 1.1-1.2	ΪΥ	24/01/08	Soil	Glass jar	1	1	✓ .	1	✓	1	✓	/	
TP50 0-0.1	15	24/01/08	Soil	Glass jar		<u> </u>			••••••				✓
TP50 0.2-0.3	16	24/01/08	Soil	Glass jar		<u>I</u>							✓
TP50 0.5-0.6	17	24/01/08	Soil	Glass jar									✓
TP50 0.8-0.9	100	24/01/08	Soil	Glass jar									✓

Split Samples	Analysis
Split Sample One:	
Split Sample Two	
Split Sample Three	
Split Sample Four	
Split Sample Five	

			Quali	ty Assurance	
Relinquished by:					
Name (and initial):	M Harrison	Date:	14/04/08	Name (and initial):	Date:
Company:	Connell Wagner	Time:	16.00	Company:	Time:
Name (and initial):	Y)	Date:		Name (and initial):	Date:
Company:		Time:		Company:	Time:

Telephone: +61 7 3135 8000 Facsimile: +61 7 3135 8001 Email: cwbne@conwag.com www.conwag.com



Client	Connell Wagner	Phone	3135 8540	Date & Time:	14/04/08
Postal Address	Locked Bag 1800 Spring Hill Q 4004	Fax	3135 8001	Project Number:	H328128
Project Name:	SBRJV	Sampling Location:	Surat Basin	Sampled By:	M Harrison
Sample Device:	Backhoe	Report Format	PDF	Send Report To:	harrisonm@conwag.com
QC Level	NATA	Send Invoice To (care of Connell Wagner)	Monique Harrison	Data Needed By	30/04/08

			Laboratory Use Only		Christian-ALS
Chilled:	(Yes)	No	Laboratory Batch Number:	12.6	100
Cooler Seal:	Broken	(ntact)	Temperature:	12,0	0 14,4.0 8 18-10

	th a		ting and the same	Samp	le Aı	naly	sis	V 15 N P				1.4	Description (
	Sample					and the second		1	Analys	is Req	uired		in the second
Sample ID	Lab ID	Date	Matrix (soil/ water)	Sample Container	pH (1:5)	EC (1:5)	Major Cations (Ca, Na, K, Mg)	Anions (CI, SO4, Alkalinity)	ESP	CEC	Minor Anions (NO ₂ – N, NO ₃ – N, F, Reactive P)	Emerson Aggregate Testing	Hold
TP50 1.1-1.2	14	24/01/08	Soil	Glass jar									1
TDE /	20	23/01/08	Soil	Glass jar									✓
TP54 0.2-0.3	21	23/01/08	Soil	Glass jar									✓
TP54 0.5-0.6	12	23/01/08	Soil	Glass jar									✓
TP54 0.8-0.9	23	23/01/08	Soil	Glass jar									✓
TP54 1.1-1.2	24	23/01/08	Soil	Glass jar									✓

Split Samples	Analysis
Split Sample One:	
Split Sample Two	
Split Sample Three	
Split Sample Four	
Split Sample Five	

Campany Campa			Quali	ity Assurance	
Relinquished by:		San Marian	Contractor (Contractor)	Mes. 18 h - 12 h	
Name (and initial):	M Harrison	Date:	14/04/08	Name (and initial):	Date:
Company:	Connell Wagner	Time:	16.00	Company:	Time;
Name (and initial):		Date:		Name (and initial):	Date:
Company:		Time:		Company:	Time:

Telephone: +61 7 3135 8000 Facsimile: +61 7 3135 8001 Email: cwbne@conwag.com www.conwag.com



Client	Connell Wagner	Phone	3135 8540	Date & Time:	14/04/08
Postal Address	Locked Bag 1800 Spring Hill Q 4004	Fax	3135 8001	Project Number:	H328128
Project Name:	SBRJV	Sampling Location:	Surat Basin	Sampled By:	M Harrison
Sample Device:	Backhoe	Report Format	PDF	Send Report To:	harrisonm@conwag.com
QC Level	NATA	Send Invoice To (care of Connell Wagner)	Monique Harrison	Data Needed By	30/04/08

			Laboratory Use Only		Christian-A	22
Chilled:	∠ Yes y	No	Laboratory Batch Number:	12 L		60
Cooler Seal:	Broken	Intact	Temperature:	1-2.0	0 14,4,08 18:	C

Sample Analysis													
Sample				Analysis Required									
Sample ID	Lab ID	Date	Matrix (soil/ water)	Sample Container	pH (1:5)	EC (1:5)	Major Cations (Ca, Na, K, Mg)	Anions (Cl, SO4, Alkalinity)	ESP	CEC	Minor Anions (NO ₂ – N, NO ₃ – N, F, Reactive P)	Emerson Aggregate Testing	Hold
TP56 0-0.1	25	23/01/08	Soil	Glass jar									1
TP56 0.2-0.3	26	23/01/08	Soil	Glass jar									✓
TP56 0.5-0.6	27	23/01/08	Soil	Glass jar									✓
TP56 0.8-0.9	58	23/01/08	Soil	Glass jar									✓

Split Samples	Analysis
Split Sample One:	
Split Sample Two	
Split Sample Three	
Split Sample Four	
Split Sample Five	

Quality Assurance									
Relinguished by:			energia. Paga esta esta esta esta esta esta esta est						
Name (and initial):	M Harrison	Date:	14/04/08	Name (and initial):	Date:				
Company:	Connell Wagner	Time:	16.00	Company:	Time:				
Name (and initial):		Date:		Name (and initial):	Date:				
Company:		Time:		Company:	Time:				

ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES



Environmental Division

SAMPLE RECEIPT NOTIFICATION (SRN)

Comprehensive Report

- EB0804854 Work Order

Client : CONNELL WAGNER PTY LTD Laboratory · Environmental Division Brisbane

Contact : MS MONIQUE HARRISON Contact · Tim Kilmister

Address : LOCKED BAG 1800 Address : 32 Shand Street Stafford QLD Australia

SPRING HILL QLD, AUSTRALIA 4004

E-mail : harrisonm@conwag.com E-mail : Services.Brisbane@alsenviro.com

Telephone Telephone : +61 07 32461000 : +61-7-3243 7222 Facsimile : +61 07 32461001 Facsimile : +61-7-3243 7218

Project : H328128 SBRJV Page : 1 of 3

Order number

C-O-C number Quote number : ES2008CONWAG0109

: Surat Basin

Sampler QC Level : M.Harrison : NEPM 1999 Schedule B(3) and ALS

QCS3 requirement

Dates

Date Samples Received : 14-APR-2008 Issue Date : 15-APR-2008 16:16 Client Requested Due Date : 30-APR-2008 Scheduled Reporting Date 30-APR-2008

Delivery Details

Mode of Delivery Temperature : 13.6 C - Ice present : Carrier

No. of coolers/boxes : 1 LARGE No. of samples received : 28 Sercurity Seal No. of samples analysed · Intact : 10

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Requested Deliverables
- Samples received in appropriately pretreated and preserved containers.
- Breaches in recommended extraction / analysis holding times may occur.
- Emerson Aggregate analysis will be subcontracted to Golder Associates.
- The recommended holding time for pH analysis is 7 days from the time of sampling.
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Please direct any queries related to sample condition / numbering / breakages to Maggie Kahi.
- Analytical work for this work order will be conducted at ALS Brisbane.
- Sample Disposal Aqueous (14 days), Solid (90 days) from date of completion of work order.

Page : 2 of 3 Work Order : EB0804854

Client : CONNELL WAGNER PTY LTD



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

• No sample container / preservation non-compliance exist.

Summary of Sample(s) and Requested Analysis

process neccessary tasks. Packages of the determination tasks, that are includ When date(s) and	y for the execution may contain addition of moisture con	tent and preparation own bracketed, these	(On Hold) SOIL No analysis requested	EA002 1:5)	SOIL - EA010 (solids): Electrical Conductivity (1:5) Flectrical Conductivity (1:5)	SOIL - ED007 CEC / Exchangeable Cations (ED007)	SOIL - ED037 Alkalinity in Soil	SOIL - ED093S Cations - Soluble	SOIL - Major Anions CI, SO4 only	SOIL - Minor Anions NO2-N, NO3-N, F, Reactive P
ID	date / time		O No a	SOIL - E pH (1:5)	SOIL	SOIL -	SOIL	SOII	SOII CI, S	SOII
EB0804854-001	25-JAN-2008 15:00	TP38 0-0.1	✓							
EB0804854-002	25-JAN-2008 15:00	TP38 0.2-0.3	✓							
EB0804854-003	25-JAN-2008 15:00	TP38 0.5-0.6	✓							
EB0804854-004	25-JAN-2008 15:00	TP38 0.8-0.9	✓							
EB0804854-005	25-JAN-2008 15:00	TP39 0-0.1		✓	✓	✓	✓	✓	✓	✓
EB0804854-006	25-JAN-2008 15:00	TP39 0.2-0.3		✓	✓		✓	✓	✓	
EB0804854-007	25-JAN-2008 15:00	TP39 0.5-0.6		✓	✓	✓	✓	✓	✓	✓
EB0804854-008	25-JAN-2008 15:00	TP39 0.8-0.9		✓	✓		✓	✓	✓	
EB0804854-009	25-JAN-2008 15:00	TP39 1.1-1.2		✓	✓	✓	✓	✓	✓	✓
EB0804854-010	24-JAN-2008 15:00	TP49 0-0.1		✓	✓	✓	✓	1	✓	✓
EB0804854-011	24-JAN-2008 15:00	TP49 0.2-0.3		✓	✓		✓	✓	✓	
EB0804854-012	24-JAN-2008 15:00	TP49 0.5-0.6		✓	✓	✓	✓	1	✓	✓
EB0804854-013	24-JAN-2008 15:00	TP49 0.8-0.9		✓	✓		✓	✓	✓	
EB0804854-014	24-JAN-2008 15:00	TP49 1.1-1.2		✓	✓	✓	✓	✓	✓	✓
EB0804854-015	24-JAN-2008 15:00	TP50 0-0.1	✓							
EB0804854-016	24-JAN-2008 15:00	TP50 0.2-0.3	✓							
EB0804854-017	24-JAN-2008 15:00	TP50 0.5-0.6	✓							
EB0804854-018	24-JAN-2008 15:00	TP50 0.8-0.9	✓							
EB0804854-019	24-JAN-2008 15:00	TP50 1.1-1.2	✓							
EB0804854-020	23-JAN-2008 15:00	TP54 0-0.1	✓							
EB0804854-021	23-JAN-2008 15:00	TP54 0.2-0.3	✓							
EB0804854-022	23-JAN-2008 15:00	TP54 0.5-0.6	✓							
EB0804854-023	23-JAN-2008 15:00	TP54 0.8-0.9	✓							
EB0804854-024	23-JAN-2008 15:00	TP54 1.1-1.2	✓							
EB0804854-025	23-JAN-2008 15:00	TP56 0-0.1	✓							
EB0804854-026	23-JAN-2008 15:00	TP56 0.2-0.3	✓							
EB0804854-027	23-JAN-2008 15:00	TP56 0.5-0.6	✓							
EB0804854-028	23-JAN-2008 15:00	TP56 0.8-0.9	✓							

Page : 3 of 3 Work Order : EB0804854

Client : CONNELL WAGNER PTY LTD



Requested Deliverables

MS MONIQUE HARRISON

- *AU Certificate of Analysis - NATA	Email	harrisonm@conwag.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep)	Email	harrisonm@conwag.com
- *AU QC Report ¿ DEFAULT (Anon QC Rep) - NATA	Email	harrisonm@conwag.com
- A4 - AU Sample Receipt Notification - Environmental	Email	harrisonm@conwag.com
- A4 - AU Tax Invoice	Email	harrisonm@conwag.com
- Default - Chain of Custody	Email	harrisonm@conwag.com
- EDI Format - ENMRG	Email	harrisonm@conwag.com
- EDI Format - XTab	Email	harrisonm@conwag.com
- Trigger - Subcontract Report	Email	harrisonm@conwag.com





Environmental Division

CERTIFICATE OF ANALYSIS

Work Order : **EB0804854** Page : 1 of 4

Client : CONNELL WAGNER PTY LTD Laboratory : Environmental Division Brisbane

Contact : MS MONIQUE HARRISON Contact : Tim Kilmister

Address : LOCKED BAG 1800 Address : 32 Shand Street Stafford QLD Australia 4053

SPRING HILL QLD, AUSTRALIA 4004

 Telephone
 : +61 07 32461000
 Telephone
 : +61-7-3243 7222

 Facsimile
 : +61 07 32461001
 Facsimile
 : +61-7-3243 7218

Project : H328128 SBRJV QC Level : NEPM 1999 Schedule B(3) and ALS QCS3 requirement

Order number : ----

C-O-C number : ---- Date Samples Received : 14-APR-2008
Sampler : M.Harrison Issue Date : 02-MAY-2008

Site : Surat Basin

No. of samples received : 28

Quote number : BN/189/08 No. of samples analysed : 10

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

Kim McCabeSenior Inorganic ChemistInorganicsStephen HislopSenior Inorganic ChemistInorganics

Environmental Division Brisbane
Part of the ALS Laboratory Group

32 Shand Street Stafford QLD Australia 4053

Tel. +61-7-3243 7222 Fax. +61-7-3243 7218 www.alsglobal.com

A Campbell Brothers Limited Company

Page : 2 of 4

Work Order : EB0804854

Client : CONNELL WAGNER PTY LTD

Project : H328128 SBRJV



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 processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

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

- EA037 Alkalinity, EK057 (Nitrite), EK058 (Nitrate), EK059 (NOx) & EK071 (React. P); batch EB0804584-014; results could not be obtained due to insufficient sample volume
- Sample TP39 0 0.1 and TP39 0.5 0.6 contained insufficient volume for Fluoride analysis.

Page : 3 of 4
Work Order : EB0804854

Client : CONNELL WAGNER PTY LTD

Project : H328128 SBRJV



Sub-Matrix: SOIL		Cli	ent sample ID	TP39 0-0.1	TP39 0.2-0.3	TP39 0.5-0.6	TP39 0.8-0.9	TP39 1.1-1.2
	Clie	ent sampli	ng date / time	25-JAN-2008 15:00				
Compound	CAS Number	LOR	Unit	EB0804854-005	EB0804854-006	EB0804854-007	EB0804854-008	EB0804854-009
EA002 : pH (Soils)								
pH Value		0.1	pH Unit	6.6	6.9	7.1	7.2	7.3
EA010: Conductivity								
Electrical Conductivity @ 25°C		1	μS/cm	63	37	23	27	26
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)		1.0	%		11.8	10.8	5.1	6.1
ED007: Exchangeable Cations								
^ Exchangeable Calcium		0.1	meq/100g	16.7		11.0		12.8
^ Exchangeable Magnesium		0.1	meq/100g	6.8		2.8		4.3
^ Exchangeable Potassium		0.1	meq/100g	1.6		0.7		0.8
^ Exchangeable Sodium		0.1	meq/100g	0.2		0.2		0.3
^ Cation Exchange Capacity		0.1	meq/100g	25.3		14.8		18.3
^ Exchangeable Sodium Percent		0.1	%	0.9		1.6		1.6
ED037: Alkalinity								
Alkalinity		1	meq/kg		2	2	2	4
Bicarbonate Alkalinity as CaCO3	71-52-3	1	meq/kg		2	2	2	4
Carbonate Alkalinity as CaCO3	3812-32-6	1	meq/kg		<1	<1	<1	<1
ED040S: Soluble Major Anions								
Sulphate as SO4 2-	14808-79-8	10	mg/kg	10	10	10	10	10
ED045: Chloride								
Chloride	16887-00-6	10	mg/kg	<10	<10	<10	<10	<10
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	20	10	<10	<10	10
Magnesium	7439-95-4	10	mg/kg	10	<10	<10	<10	<10
Sodium	7440-23-5	10	mg/kg	10	20	10	20	20
Potassium	7440-09-7	10	mg/kg	20	10	<10	<10	<10
EK040S: Fluoride Soluble								
Fluoride	16984-48-8	1	mg/kg					<1
EK057: Nitrite as N								
Nitrite as N (Sol.)		0.1	mg/kg			<0.1		<0.1
EK058: Nitrate as N								
^ Nitrate as N (Sol.)		0.1	mg/kg			0.7		0.7
EK059: Nitrite plus Nitrate as N (NOx)								
Nitrite + Nitrate as N (Sol.)		0.1	mg/kg			0.7		0.7
EK071: Reactive Phosphorus as P (Disso	olved)							
Reactive Phosphorus as P		0.10	mg/kg	2.06		1.01		1.39

Page : 4 of 4 Work Order : EB0804854

Client : CONNELL WAGNER PTY LTD

Project : H328128 SBRJV

ALS

Sub-Matrix: SOIL		Cli	ent sample ID	TP49 0-0.1	TP49 0.2-0.3	TP49 0.5-0.6	TP49 0.8-0.9	TP49 1.1-1.2
	Cli	ent sampli	ng date / time	24-JAN-2008 15:00				
Compound	CAS Number	LOR	Unit	EB0804854-010	EB0804854-011	EB0804854-012	EB0804854-013	EB0804854-014
EA002 : pH (Soils)								
pH Value		0.1	pH Unit	6.8	7.0	7.2	8.0	8.3
EA010: Conductivity								
Electrical Conductivity @ 25°C		1	μS/cm	36	21	20	101	96
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)		1.0	%	14.6	15.7	7.6	6.9	
ED007: Exchangeable Cations								
^ Exchangeable Calcium		0.1	meq/100g	13.2		18.4		43.0
^ Exchangeable Magnesium		0.1	meq/100g	5.6		7.2		8.4
^ Exchangeable Potassium		0.1	meq/100g	1.5		0.7		1.0
^ Exchangeable Sodium		0.1	meq/100g	0.1		0.4		0.7
^ Cation Exchange Capacity		0.1	meq/100g	20.5		26.7		53.0
^ Exchangeable Sodium Percent		0.1	%	0.7		1.6		1.3
ED037: Alkalinity								
Alkalinity		1	meq/kg	2	2	2	8	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	meq/kg	2	2	2	7	
Carbonate Alkalinity as CaCO3	3812-32-6	1	meq/kg	<1	<1	<1	4	
ED040S: Soluble Major Anions								
Sulphate as SO4 2-	14808-79-8	10	mg/kg	<10	10	<10	<10	<10
ED045: Chloride								
Chloride	16887-00-6	10	mg/kg	<10	<10	<10	<10	<10
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	20	10	<10	40	30
Magnesium	7439-95-4	10	mg/kg	10	10	<10	10	<10
Sodium	7440-23-5	10	mg/kg	<10	20	20	50	40
Potassium	7440-09-7	10	mg/kg	30	20	<10	<10	<10
EK040S: Fluoride Soluble								
Fluoride	16984-48-8	1	mg/kg	<1		<1		
EK057: Nitrite as N								
Nitrite as N (Sol.)		0.1	mg/kg	0.4		<0.1		
EK058: Nitrate as N								
^ Nitrate as N (Sol.)		0.1	mg/kg	11.9		0.1		
EK059: Nitrite plus Nitrate as N (NOx)								
Nitrite + Nitrate as N (Sol.)		0.1	mg/kg	12.3		0.1		
EK071: Reactive Phosphorus as P (Disso	olved)							
Reactive Phosphorus as P		0.10	mg/kg	3.52		0.11		



MANSFIELD LABORATORY

1/51 Secam Street, Mansfield QLD 4122 PO Box 2034 Mansfield DC QLD 4122 Phone:(07) 3343 3166 Fax:(07) 3849 4705 www.golder.com.au

TEST RESULTS

Client:

ALS Environmental Brisbane

Address:

32 Shand Street, Stafford

Project:

Delivered Samples

Batch No.:

EB0804854

Report No.:

R6957

Job No.:

087634002/8 Date Received: 17/04/2008

Sampled by:

Client

EMERSON CLASSIFICATION

		<u></u>		
				Emerson
	Sample			Classification
Reg'n No.	No.	Sample ID	Description	Number
0832647	5	TP39 0-0.1	(CI) Sandy CLAY, dark brown	6
0832648	6	TP39 0.2-0.3	(CI) Sandy CLAY, brown	6
0832649	7	TP39 0.5-0.6	(SC) Clayey SAND, dark grey	6
0832650	8	TP39 0.8-0.9	(SC) Clayey SAND, brown	6
0832651	9	TP39 1.1-1.2	(SC) Clayey SAND, dark brown	6
0832652	10	TP49 0-0.1	(CH) Sandy CLAY, dark brown	6
0832653	11	TP49 0.2-0.3	(CH) Silty CLAY, dark brown	6
0832654	12	TP49 0.5-0.6	(CH) Sandy CLAY, dark brown, some gravel	6
0832655	13	TP49 0.8-0.9	(CI) Sandy CLAY, brown, some gravel	4
0832656	14	TP49 1.1-1.2	(CH) Sandy CLAY, dark brown, some gravel	4

Remarks: Deionised water at 23 °C used in Emerson Class test.

Test Procedure: AS 1289 3.8.1

Prepared by NF

AC Checked by

This Laboratory is accredited by the National Association of Testing Authorities, Australia. The test(s) reported herein have been performed in accordance with its scope of registration.

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1446

N Jun 25/4/8

Authorised Signatory





Environmental Division

QUALITY CONTROL REPORT

Work Order : **EB0804854** Page : 1 of 6

Client : CONNELL WAGNER PTY LTD Laboratory : Environmental Division Brisbane

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Project : H328128 SBRJV QC Level : NEPM 1999 Schedule B(3) and ALS QCS3 requirement

Site : Surat Basin

C-O-C number : ---- Date Samples Received : 14-APR-2008

Sampler : M.Harrison | Issue Date : 02-MAY-2008

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



Order number

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
Kim McCabe	Senior Inorganic Chemist	Inorganics
Stephen Hislop	Senior Inorganic Chemist	Inorganics

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Page : 2 of 6
Work Order : EB0804854

Client : CONNELL WAGNER PTY LTD

Project : H328128 SBRJV



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

Page : 3 of 6 Work Order : EB0804854

Client : CONNELL WAGNER PTY LTD

Project : H328128 SBRJV



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 I	Duplicate (DUP) Report		
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%
EA002 : pH (Soils)	(QC Lot: 640694)								
EB0804854-006	TP39 0.2-0.3	EA002: pH Value		0.1	pH Unit	6.9	6.6	4.9	0% - 20%
EB0804991-028	Anonymous	EA002: pH Value		0.1	pH Unit	8.1	8.0	0.0	0% - 20%
EA010: Conductivit	y (QC Lot: 640699)								
EB0804854-006	TP39 0.2-0.3	EA010: Electrical Conductivity @ 25°C		1	μS/cm	37	39	4.0	0% - 20%
EA055: Moisture Co	ontent (QC Lot: 635592								
EB0804854-005	TP39 0-0.1	EA055-103: Moisture Content (dried @ 103°C)		1.0	%	18.3	17.1	7.0	0% - 50%
EB0804854-012	TP49 0.5-0.6	EA055-103: Moisture Content (dried @ 103°C)		1.0	%	7.6	8.4	9.4	No Limit
ED007: Exchangeal	ble Cations (QC Lot: 64	40385)							
EB0804848-001	Anonymous	ED007: Exchangeable Calcium		0.1	meg/100g	3.9	3.7	6.1	0% - 20%
		ED007: Exchangeable Magnesium		0.1	meg/100g	<0.1	<0.1	0.0	No Limit
		ED007: Exchangeable Potassium		0.1	meg/100g	0.7	0.7	0.0	No Limit
		ED007: Exchangeable Sodium		0.1	meq/100g	8.2	7.7	6.6	0% - 20%
EB0804848-009	Anonymous	ED007: Exchangeable Calcium		0.1	meq/100g	7.8	7.7	1.6	0% - 20%
	-	ED007: Exchangeable Magnesium		0.1	meq/100g	0.4	0.4	0.0	No Limit
		ED007: Exchangeable Potassium		0.1	meq/100g	1.0	1.0	0.0	0% - 50%
		ED007: Exchangeable Sodium		0.1	meq/100g	8.8	8.8	0.0	0% - 20%
ED037: Alkalinity (QC Lot: 640703)								
EB0804991-028	Anonymous	ED037: Alkalinity		1	meq/kg	975	975	0.0	0% - 20%
ED040S: Soluble Ma	ajor Anions (QC Lot: 6	40698)							
EB0804854-006	TP39 0.2-0.3	ED040S: Sulphate as SO4 2-	14808-79-8	10	mg/kg	10	10	0.0	No Limit
EB0804991-028	Anonymous	ED040S: Sulphate as SO4 2-	14808-79-8	10	mg/kg	26600	25600	4.0	0% - 20%
ED045: Chloride (C	QC Lot: 640695)								
EB0804854-006	TP39 0.2-0.3	EDO45S: Chloride	16887-00-6	10	mg/kg	<10	<10	0.0	No Limit
EB0804991-028	Anonymous	EDO45S: Chloride	16887-00-6	10	mg/kg	<20	<20	0.0	No Limit
ED093S: Soluble Ma	ajor Cations (QC Lot: 6	640702)							
EB0804854-006	TP39 0.2-0.3	ED093S: Calcium	7440-70-2	10	mg/kg	10	10	0.0	No Limit
		ED093S: Magnesium	7439-95-4	10	mg/kg	<10	<10	0.0	No Limit
		ED093S: Sodium	7440-23-5	10	mg/kg	20	20	0.0	No Limit
		ED093S: Potassium	7440-09-7	10	mg/kg	10	10	0.0	No Limit
EB0804991-028	Anonymous	ED093S: Calcium	7440-70-2	10	mg/kg	2750	2700	1.9	0% - 20%
		ED093S: Magnesium	7439-95-4	10	mg/kg	5020	4910	2.3	0% - 20%
		ED093S: Sodium	7440-23-5	10	mg/kg	4010	3910	2.4	0% - 20%
		ED093S: Potassium	7440-09-7	10	mg/kg	100	100	0.0	0% - 50%
EK057: Nitrite as N	(QC Lot: 640696)								
EB0804854-010	TP49 0-0.1	EK057: Nitrite as N (Sol.)		0.1	mg/kg	0.4	0.4	0.0	No Limit
EK059: Nitrite plus	Nitrate as N (NOx) (QC	Lot: 640700)							
EB0804854-010	TP49 0-0.1	EK059: Nitrite + Nitrate as N (Sol.)		0.1	mg/kg	12.3	12.2	0.0	0% - 20%

Page : 4 of 6 Work Order : EB0804854

Client : CONNELL WAGNER PTY LTD

Project : H328128 SBRJV



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 (%)		
EK071: Reactive Pho	osphorus as P (Dissolved) (QC Lot: 640697)									
EB0804854-010	TP49 0-0.1	EK071: Reactive Phosphorus as P		0.10	mg/kg	3.52	3.48	1.2	0% - 20%		

Page : 5 of 6 Work Order : EB0804854

Client : CONNELL WAGNER PTY LTD

Project : H328128 SBRJV



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)		Laboratory Control Spike (LC	S) Report	
			_	Report	Spike	Spike Recovery (%)	Recovery	Limits (%)
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA010: Conductivity (QCLot: 640699)								
EA010: Electrical Conductivity @ 25°C		1	μS/cm	<1	1413 μS/cm	100	98.2	102
ED007: Exchangeable Cations (QCLot: 640385)								
ED007: Exchangeable Calcium		0.1	meq/100g	<0.1	0.294 meq/100g	98.2	70.2	105
ED007: Exchangeable Magnesium		0.1	meq/100g	<0.1	0.154 meq/100g	90.6	76.4	110
ED007: Exchangeable Potassium		0.1	meq/100g	<0.1	0.04 meq/100g	70.9	70	95.3
ED007: Exchangeable Sodium		0.1	meq/100g	<0.1	0.102 meq/100g	72.5	70	104
ED007: Cation Exchange Capacity		0.1	meq/100g		0.59 meq/100g	89.8	70.1	104
ED037: Alkalinity (QCLot: 640703)								
ED037: Alkalinity		1	meq/kg	<1	500 meq/kg	93.8	85	105
ED040S: Soluble Major Anions (QCLot: 640698)								
ED040S: Sulphate as SO4 2-	14808-79-8	10	mg/kg	<10				
ED045: Chloride (QCLot: 640695)								
EDO45S: Chloride	16887-00-6	10	mg/kg	<10	5000 mg/kg	96.8	74	121
ED093S: Soluble Major Cations (QCLot: 640702)								
ED093S: Calcium	7440-70-2	10	mg/kg	<10				
ED093S: Magnesium	7439-95-4	10	mg/kg	<10				
ED093S: Sodium	7440-23-5	10	mg/kg	<10				
ED093S: Potassium	7440-09-7	10	mg/kg	<10				
EK040S: Fluoride Soluble (QCLot: 640701)								
EK040S: Fluoride	16984-48-8	1	mg/kg	<1				
		1.0	mg/kg		50 mg/kg	89.3	73.5	107
EK057: Nitrite as N (QCLot: 640696)								
EK057: Nitrite as N (Sol.)		0.1	mg/kg	<0.1				
		0.10	mg/kg		2.5 mg/kg	110	95.5	119
EK059: Nitrite plus Nitrate as N (NOx) (QCLot: 640700)								
EK059: Nitrite + Nitrate as N (Sol.)		0.1	mg/kg	<0.1				
		0.10	mg/kg		2.5 mg/kg	109	84.6	127
EK071: Reactive Phosphorus as P (Dissolved) (QCLot: 64069	97)							
EK071: Reactive Phosphorus as P		0.1	mg/kg		2.5 mg/kg	98.5	92.8	109
		0.10	mg/kg	<0.10				

Page : 6 of 6 Work Order : EB0804854

Client : CONNELL WAGNER PTY LTD

Project : H328128 SBRJV



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.

Sub-Matrix: SOIL					Matrix Spike (MS) Repo	ort	
				Spike	Spike Recovery (%)	Recovery	Limits (%)
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED045: Chloride (Q	CLot: 640695)						
EB0804854-005	TP39 0-0.1	EDO45S: Chloride	16887-00-6	2000 mg/kg	87.8	70	130
EK057: Nitrite as N	(QCLot: 640696)						
EB0804854-005	TP39 0-0.1	EK057: Nitrite as N (Sol.)		20 mg/kg	107	70	130
EK059: Nitrite plus I	litrate as N (NOx) (QCLot: 640700)						
EB0804854-005	TP39 0-0.1	EK059: Nitrite + Nitrate as N (Sol.)		20 mg/kg	105	70	130
EK071: Reactive Ph	osphorus as P (Dissolved) (QCLot: 640697)						
EB0804854-005	TP39 0-0.1	EK071: Reactive Phosphorus as P		20 mg/kg	93.6	70	130

ALS Laboratory Group ANALYTICAL CHEMISTRY & TESTING SERVICES



Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order : **EB0804854** Page : 1 of 7

Client : CONNELL WAGNER PTY LTD Laboratory : Environmental Division Brisbane

Contact : MS MONIQUE HARRISON Contact : Tim Kilmister

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 : +61-7-3243 7218

Project : H328128 SBRJV : NEPM 1999 Schedule B(3) and ALS QCS3 requirement

Site : Surat Basin

C-O-C number : ---- Date Samples Received : 14-APR-2008
Sampler : M.Harrison Issue Date : 02-MAY-2008

Sampler : M. Harrison Issue Date : U2-MAY-200
Order number : ----

No. of samples received : 28

Quote number : BN/189/08

No. of samples analysed : 10

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 Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Page : 2 of 7

Work Order : EB0804854

Client : CONNELL WAGNER PTY LTD

Project : H328128 SBRJV



Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non-volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

Matrix: SOIL

Evaluation: **x** = Holding time breach ; ✓ = Within holding time.

Method		Sample Date		traction / Preparation			Analysis	
Container / Client Sample ID(s)		Sample Date		•				
Container / Cirent Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA002 : pH (Soils)								
Soil Glass Jar - Unpreserved								
TP49 0-0.1,	TP49 0.2-0.3,	24-JAN-2008	22-APR-2008	22-JUL-2008	✓	28-APR-2008	22-APR-2008	×
TP49 0.5-0.6,	TP49 0.8-0.9,							
TP49 1.1-1.2								
Soil Glass Jar - Unpreserved								
TP39 0-0.1,	TP39 0.2-0.3,	25-JAN-2008	22-APR-2008	23-JUL-2008	✓	28-APR-2008	22-APR-2008	×
TP39 0.5-0.6,	TP39 0.8-0.9,							
TP39 1.1-1.2								
A010: Conductivity								
Soil Glass Jar - Unpreserved								
TP49 0-0.1,	TP49 0.2-0.3,	24-JAN-2008	22-APR-2008	22-JUL-2008	✓	28-APR-2008	20-MAY-2008	✓
TP49 0.5-0.6,	TP49 0.8-0.9,				·			
TP49 1.1-1.2								
Soil Glass Jar - Unpreserved								
TP39 0-0.1,	TP39 0.2-0.3,	25-JAN-2008	22-APR-2008	23-JUL-2008	✓	28-APR-2008	20-MAY-2008	✓
TP39 0.5-0.6,	TP39 0.8-0.9,				Ť			
TP39 1.1-1.2								
A055: Moisture Content								
Soil Glass Jar - Unpreserved								
TP49 0-0.1,	TP49 0.2-0.3,	24-JAN-2008				15-APR-2008	31-JAN-2008	x
TP49 0.5-0.6,	TP49 0.8-0.9							
Soil Glass Jar - Unpreserved								
TP39 0.2-0.3,	TP39 0.5-0.6,	25-JAN-2008				15-APR-2008	01-FEB-2008	×
TP39 0.8-0.9,	TP39 1.1-1.2							
D007: Exchangeable Cations								
Pulp Bag								
TP49 0-0.1,	TP49 0.5-0.6,	24-JAN-2008	22-APR-2008	22-JUL-2008	✓	23-APR-2008	22-JUL-2008	✓
TP49 1.1-1.2					_ •			,
Pulp Bag								
TP39 0-0.1,	TP39 0.5-0.6,	25-JAN-2008	22-APR-2008	23-JUL-2008	✓	23-APR-2008	23-JUL-2008	1
TP39 1.1-1.2					· •			

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Client : CONNELL WAGNER PTY LTD

Project : H328128 SBRJV



Matrix: SOIL					Evaluation	x = Holding time	breach ; ✓ = Withir	n holding time
Method		Sample Date	Ex	traction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED037: Alkalinity								
Soil Glass Jar - Unpreserved								
TP49 0-0.1,	TP49 0.2-0.3,	24-JAN-2008	22-APR-2008	22-JUL-2008	✓	28-APR-2008	22-JUL-2008	✓
TP49 0.5-0.6,	TP49 0.8-0.9							
Soil Glass Jar - Unpreserved								
TP39 0.2-0.3,	TP39 0.5-0.6,	25-JAN-2008	22-APR-2008	23-JUL-2008	✓	28-APR-2008	23-JUL-2008	✓
TP39 0.8-0.9,	TP39 1.1-1.2							
ED040S: Soluble Major Anions								
Soil Glass Jar - Unpreserved								
TP49 0-0.1,	TP49 0.2-0.3,	24-JAN-2008	22-APR-2008	22-JUL-2008	✓	28-APR-2008	20-MAY-2008	✓
TP49 0.5-0.6,	TP49 0.8-0.9,							
TP49 1.1-1.2								
Soil Glass Jar - Unpreserved								
TP39 0-0.1,	TP39 0.2-0.3,	25-JAN-2008	22-APR-2008	23-JUL-2008	✓	28-APR-2008	20-MAY-2008	✓
TP39 0.5-0.6,	TP39 0.8-0.9,							
TP39 1.1-1.2								
ED045: Chloride								
Soil Glass Jar - Unpreserved								
TP49 0-0.1,	TP49 0.2-0.3,	24-JAN-2008	22-APR-2008	22-JUL-2008	✓	28-APR-2008	20-MAY-2008	✓
TP49 0.5-0.6,	TP49 0.8-0.9,							
TP49 1.1-1.2								
Soil Glass Jar - Unpreserved	TD20 0 2 0 2			00 1111 0000			00 1441/ 0000	
TP39 0-0.1, TP39 0.5-0.6,	TP39 0.2-0.3, TP39 0.8-0.9,	25-JAN-2008	22-APR-2008	23-JUL-2008	✓	28-APR-2008	20-MAY-2008	✓
TP39 0.5-0.6, TP39 1.1-1.2	1F39 0.6-0.9,							
ED093S: Soluble Major Cations							I	
Soil Glass Jar - Unpreserved TP49 0-0.1,	TP49 0.2-0.3,	04 141 0000	00 ADD 0000	22-JUL-2008		00 ADD 0000	22-JUL-2008	
TP49 0-0.1, TP49 0.5-0.6,	TP49 0.8-0.9,	24-JAN-2008	22-APR-2008	22-JUL-2006	✓	28-APR-2008	22-JUL-2006	✓
TP49 1.1-1.2	11 43 0.0-0.3,							
Soil Glass Jar - Unpreserved								
TP39 0-0.1,	TP39 0.2-0.3,	25-JAN-2008	22-APR-2008	23-JUL-2008	✓	28-APR-2008	23-JUL-2008	1
TP39 0.5-0.6.	TP39 0.8-0.9,	20-0A(4-2000	22-71 10-2000	20 002 2000	Y	20-74114-2000	20 002 2000	Y
TP39 1.1-1.2								
EK040S: Fluoride Soluble								
Soil Glass Jar - Unpreserved								
TP49 0-0.1,	TP49 0.5-0.6	24-JAN-2008	22-APR-2008	22-JUL-2008	✓	30-APR-2008	20-MAY-2008	1
Soil Glass Jar - Unpreserved					<u> </u>			· ·
TP39 1.1-1.2		25-JAN-2008	22-APR-2008	23-JUL-2008	✓	30-APR-2008	20-MAY-2008	1
EK057: Nitrite as N		25 5741-2000				207 10 2000		-
Soil Glass Jar - Unpreserved								
TP49 0-0.1,	TP49 0.5-0.6	24-JAN-2008	22-APR-2008	22-JUL-2008		30-APR-2008	22-JUL-2008	
	11 40 0.0-0.0	24-JAN-2006	22-AFR-2000	22-JUL-2000	✓	JU-AFR-2000	22-JUL-2000	✓
Soil Glass Jar - Unpreserved	TD20 4 4 4 0			00 1111 0000			00 1111 0000	
TP39 0.5-0.6,	TP39 1.1-1.2	25-JAN-2008	22-APR-2008	23-JUL-2008	✓	30-APR-2008	23-JUL-2008	✓

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Matrix: SOIL					Evaluation:	: × = Holding time	breach; ✓ = Withir	n holding time.
Method		Sample Date	Ex	traction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK059: Nitrite plus Nitrate as N (NOx)								
Soil Glass Jar - Unpreserved TP49 0-0.1,	TP49 0.5-0.6	24-JAN-2008	22-APR-2008	22-JUL-2008	√	30-APR-2008	22-JUL-2008	√
Soil Glass Jar - Unpreserved TP39 0.5-0.6,	TP39 1.1-1.2	25-JAN-2008	22-APR-2008	23-JUL-2008	√	30-APR-2008	23-JUL-2008	✓
EK071: Reactive Phosphorus as P (Dissolved								
Soil Glass Jar - Unpreserved TP49 0-0.1, TP49 1.1-1.2	TP49 0.5-0.6,	24-JAN-2008	22-APR-2008	22-JUL-2008	✓	30-APR-2008	22-JUL-2008	✓
Soil Glass Jar - Unpreserved TP39 0-0.1, TP39 1.1-1.2	TP39 0.5-0.6,	25-JAN-2008	22-APR-2008	23-JUL-2008	✓	30-APR-2008	23-JUL-2008	✓

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Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: SOIL Evaluation: × = Quality Control frequency not within specification; ✓ = Quality Control frequency within specification.

Quality Control Sample Type			Count	Evaluation		in or iroquorioy i	Quality Control Specification
	Method	QC C	Count	Actual	Rate (%)	Evaluation	Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Alkalinity in Soil	ED037	1	9	11.1	10.0	<u> </u>	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Cations - soluble by ICP-AES	ED093S	2	11	18.2	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride - Soluble	EDO45S	2	11	18.2	10.0	√	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Electrical Conductivity (1:5)	EA010	1	10	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Exchangeable Cations	ED007	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Anions - Soluble	ED040S	2	11	18.2	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Moisture Content	EA055-103	2	18	11.1	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) - Soluble	EK059	1	4	25.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite as N - Soluble	EK057	1	4	25.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
pH (1:5)	EA002	2	11	18.2	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P - Soluble	EK071	1	5	20.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Alkalinity in Soil	ED037	1	9	11.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride - Soluble	EDO45S	1	11	9.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Electrical Conductivity (1:5)	EA010	1	10	10.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Exchangeable Cations	ED007	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Fluoride - Soluble	EK040S	1	3	33.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) - Soluble	EK059	1	4	25.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite as N - Soluble	EK057	1	4	25.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P - Soluble	EK071	1	5	20.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Alkalinity in Soil	ED037	1	9	11.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Cations - soluble by ICP-AES	ED093S	1	11	9.1	5.0	√	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride - Soluble	EDO45S	1	11	9.1	5.0	√	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Electrical Conductivity (1:5)	EA010	1	10	10.0	5.0	1	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Exchangeable Cations	ED007	1	20	5.0	5.0	√	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Fluoride - Soluble	EK040S	1	3	33.3	5.0	√	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Anions - Soluble	ED040S	1	11	9.1	5.0	√	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) - Soluble	EK059	1	4	25.0	5.0	√	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite as N - Soluble	EK057	1	4	25.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P - Soluble	EK071	1	5	20.0	5.0	√	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Chloride - Soluble	EDO45S	1	11	9.1	5.0	√	ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) - Soluble	EK059	1	4	25.0	5.0	√	ALS QCS3 requirement
Nitrite as N - Soluble	EK057	1	4	25.0	5.0	√	ALS QCS3 requirement
Reactive Phosphorus as P - Soluble	EK071	1	5	20.0	5.0	1	ALS QCS3 requirement

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Brief Method Summaries

The analytical procedures used by the Environmental Division 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 in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH (1:5)	EA002	SOIL	(APHA 21st ed., 4500H+) pH is determined on soil samples after a 1:5 soil/water leach. This method is compliant with NEPM (1999) Schedule B(3) (Method 103)
Electrical Conductivity (1:5)	EA010	SOIL	(APHA 21st ed., 2510) Conductivity is determined on soil samples using a 1:5 soil/water leach. This method is compliant with NEPM (1999) Schedule B(3) (Method 104)
Moisture Content	EA055-103	SOIL	A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (1999) Schedule B(3) (Method 102)
Exchangeable Cations	ED007	SOIL	Rayment & Higginson (1992) Method 15A1. Cations are exchanged from the sample by contact with Ammonium Chloride. They are then quantitated in the final solution by ICPAES and reported as meq/100g of original soil. This method is compliant with NEPM (1999) Schedule B(3) (Method 301)
Alkalinity in Soil	ED037	SOIL	APHA 21st ed., 2320 B Alkalinity is determined and reported on a 1:5 soil/water leach.
Major Anions - Soluble	ED040S	SOIL	In-house. Soluble Anions are determined off a 1:5 soil / water extract by ICPAES.
Cations - soluble by ICP-AES	ED093S	SOIL	APHA 21st ed., 3120; USEPA SW 846 - 6010 (ICPAES) Water extracts of the soil are analyzed for major cations by ICPAES. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (1999) Schedule B(3)
Chloride - Soluble	EDO45S	SOIL	APHA 21st ed., 4500Cl- Soluble Chloride is determined titremetrically on soil samples following a 1:5 soil/water leach. This method is compliant with NEPM (1999) Schedule B(3) (Method 401)
Fluoride - Soluble	EK040S	SOIL	APHA 21st ed., 4500 FC Soluble Fluoride is determined after a 1:5 soil/water extract using an ion selective electrode.
Nitrite as N - Soluble	EK057	SOIL	APHA 21st ed., 4500 NO3- I. Nitrite in a water extract is determined by direct colourimetry by FIA.
Nitrate as N - Soluble	EK058	SOIL	APHA 21st ed., 4500 NO3I Nitrate in the 1:5 soil:water extract is reduced to nitrite by way of a cadmium reduction column followed by quantification by FIA. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results.
Nitrite and Nitrate as N (NOx) - Soluble	EK059	SOIL	APHA 21st ed., 4500 NO3- I. Combined oxidised Nitrogen (NO2+NO3) in a water extract is determined by Cadmium Reduction, and direct colourimetry by FIA.
Reactive Phosphorus as P - Soluble	EK071	SOIL	APHA 21st ed., 4500-P G Reactive phosphorus in the soil is determined on a water extract by direct colourimetry by FIA.
Emerson Aggregate Testing	EME-SOL	SOIL	Emerson Aggregate Testing per AS1289.3.8.1 performed by Subcontrator Laboratory.
Preparation Methods	Method	Matrix	Method Descriptions
Exchangeable Cations Preparation Method	ED007PR	SOIL	Rayment & Higginson (1992) method 15A1. A 1M NH4Cl extraction by end over end tumbling at a ratio of 1:20. There is no pretreatment for soluble salts. Extracts can be run by ICP for cations.
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of distilled water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.

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Summary of Outliers

Outliers: Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Duplicate outliers occur.
- For all matrices, no Laboratory Control outliers occur.
- For all matrices, no Matrix Spike outliers occur.

Regular Sample Surrogates

• For all regular sample matrices, no surrogate recovery outliers occur.

Outliers: Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

Matrix: SOIL

Method		E	ktraction / Preparation			Analysis	
Container / Client Sample ID(s)		Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA002 : pH (Soils)							
Soil Glass Jar - Unpreserved							
TP49 0-0.1,	TP49 0.2-0.3,				28-APR-2008	22-APR-2008	6
TP49 0.5-0.6,	TP49 0.8-0.9,						
TP49 1.1-1.2							
Soil Glass Jar - Unpreserved							
TP39 0-0.1,	TP39 0.2-0.3,				28-APR-2008	22-APR-2008	6
TP39 0.5-0.6,	TP39 0.8-0.9,						
TP39 1.1-1.2							
EA055: Moisture Content							
Soil Glass Jar - Unpreserved							
TP49 0-0.1,	TP49 0.2-0.3,				15-APR-2008	31-JAN-2008	75
TP49 0.5-0.6,	TP49 0.8-0.9						
Soil Glass Jar - Unpreserved							
TP39 0.2-0.3,	TP39 0.5-0.6,				15-APR-2008	01-FEB-2008	74
TP39 0.8-0.9,	TP39 1.1-1.2						

Outliers: Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

No Quality Control Sample Frequency Outliers exist.

ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES



Environmental Division

SAMPLE RECEIPT NOTIFICATION (SRN)

Comprehensive Report

Work Order : EB0800746

Client : CONNELL WAGNER PTY LTD Laboratory : Environmental Division Brisbane

Contact : MS MONIQUE HARRISON Contact : Tim Kilmister

Address : LOCKED BAG 1800 Address : 32 Shand Street Stafford QLD Australia

SPRING HILL QLD, AUSTRALIA 4004 40

Telephone : +61 07 32461000 Telephone : +61-7-3243 7222
Facsimile : +61 07 32461001 Facsimile : +61-7-3243 7218

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Order number : ----

Site : Surat Basin

Sampler : M.Harrison QC Level : NEPM 1999 Schedule B(3) and ALS

QCS3 requirement

Dates

Date Samples Received : 21-JAN-2008 Issue Date : 14-APR-2008 16:04
Client Requested Due Date : 28-APR-2008 Scheduled Reporting Date : 28-APR-2008

Delivery Details

Mode of Delivery : Client Drop off Temperature : 0.6 C - Ice bricks present

No. of coolers/boxes: 4 MEDIUMNo. of samples received: 119Sercurity Seal: Intact.No. of samples analysed: 59

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Requested Deliverables
- Samples received in appropriately pretreated and preserved containers.
- Breaches in recommended extraction / analysis holding times may occur.
- Emerson Aggregate Testing will be subcontracted to Golder Associates.
- Please be advised that sample TP6 2 0.2-0.3 was not received.
- The recommended extraction time for Moisture, pH, Sulfate, EC and Chloride on soil samples is 7 days from the date of sampling.
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Please direct any queries related to sample condition / numbering / breakages to Maggie Kahi.
- Analytical work for this work order will be conducted at ALS Brisbane.
- Sample Disposal Aqueous (14 days), Solid (90 days) from date of completion of work order.

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Client : CONNELL WAGNER PTY LTD



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

• No sample container / preservation non-compliance exist.

Summary of Sample(s) and Requested Analysis

process neccessary tasks. Packages m the determination tasks, that are include When date(s) and	for the execution for the execution and contain addition of moisture contains	al analyses, such as tent and preparation own bracketed, these	ssted		SOIL - EA010 (solids): Electrical Conductivity (1:5) Electrical Conductivity (1:5)		SOIL - ED007 CEC / Exchangeable Cations (ED007)		ons	
Matrix: SOIL Laboratory sample	Client sampling	Client sample ID	(On Hold) SOIL No analysis requested	SOIL - EA002 pH (1:5)	SOIL - EA010 (sol Conductivity (1:5) Electrical Conduct	SOIL - EA055-103 Moisture Content	L - ED007) / Exchangea	SOIL - ED037 Alkalinity in Soil	SOIL - ED040S Soluble Major Anions	SOIL - ED045S Chloride Soluble
ID	date / time		o Š	SO Hd	SOI Con Di	SOI	SOIL CEC	SOI	Solu	SOIL
EB0800746-001	16-JAN-2008 15:00	TP19 0-0.1		✓	✓		✓	✓	✓	✓
EB0800746-002	16-JAN-2008 15:00	TP19 0.2-0.3		✓	✓		✓	✓	✓	✓
EB0800746-003	16-JAN-2008 15:00	TP19 0.5-0.6	✓							
EB0800746-004	16-JAN-2008 15:00	TP19 0.8-0.9		✓	✓		✓	✓	✓	✓
EB0800746-005	16-JAN-2008 15:00	TP10 0-0.1	✓							
EB0800746-006	16-JAN-2008 15:00	TP10 0.2-0.3	✓							
EB0800746-007	16-JAN-2008 15:00	TP10 0.5-0.6	✓							
EB0800746-008	16-JAN-2008 15:00	TP10 0.8-0.9	✓							
EB0800746-009	16-JAN-2008 15:00	TP10 1.1-1.2	✓							
EB0800746-010	16-JAN-2008 15:00	TP20 0-0.1	✓							
EB0800746-011	16-JAN-2008 15:00	TP20 0.2-0.3	✓							
EB0800746-012	16-JAN-2008 15:00	TP20 0.5-0.6	✓							
EB0800746-013	16-JAN-2008 15:00	TP20 0.8-0.9	✓							
EB0800746-014	16-JAN-2008 15:00	TP20 1.1-1.2	✓							
EB0800746-015	13-JAN-2008 15:00	TP68 0-0.1		✓	✓		✓	✓	✓	✓
EB0800746-016	13-JAN-2008 15:00	TP68 0.2-0.3		✓	✓	✓		✓	✓	✓
EB0800746-017	13-JAN-2008 15:00	TP68 0.5-0.6		✓	✓		✓	✓	✓	✓
EB0800746-018	13-JAN-2008 15:00	TP68 0.8-0.9		✓	✓	✓		✓	✓	✓
EB0800746-019	13-JAN-2008 15:00	TP68 1.1-1.2		✓	✓		✓	✓	✓	✓
EB0800746-020	13-JAN-2008 15:00	TP67 0-0.1		✓	1		✓	1	1	1
EB0800746-021	13-JAN-2008 15:00	TP67 0.2-0.3		✓	✓	✓		1	✓	1
EB0800746-022	13-JAN-2008 15:00	TP67 0.5-0.6		✓	1		✓	1	1	1
EB0800746-023	13-JAN-2008 15:00	TP67 0.8-0.9		✓	✓	✓		✓	✓	1
EB0800746-024	13-JAN-2008 15:00	TP67 1.1-1.2		✓	✓		✓	✓	✓	✓
EB0800746-025	13-JAN-2008 15:00	TP69 0-0.1		✓	✓		✓	✓	✓	✓
EB0800746-026	13-JAN-2008 15:00	TP69 0.2-0.3		✓	✓	✓		✓	✓	✓
EB0800746-027	13-JAN-2008 15:00	TP69 0.5-0.6		✓	✓		✓	✓	✓	✓
EB0800746-028	13-JAN-2008 15:00	TP69 0.8-0.9		✓	✓	✓		✓	✓	✓
EB0800746-029	13-JAN-2008 15:00	TP69 1.1-1.2		✓	✓		✓	✓	✓	✓
EB0800746-030	15-JAN-2008 15:00	TP45 0-0.1		✓	✓		✓	✓	✓	✓
EB0800746-031	15-JAN-2008 15:00	TP45 0.2-0.3		✓	✓	✓		✓	✓	✓
EB0800746-032	15-JAN-2008 15:00	TP45 0.5-0.6		✓	✓		✓	✓	✓	✓
EB0800746-033	15-JAN-2008 15:00	TP45 0.8-0.9		✓	✓	✓		✓	✓	✓
EB0800746-034	15-JAN-2008 15:00	TP45 1.1-1.2		✓	1		1	1	✓	✓
EB0800746-035	15-JAN-2008 15:00	TP46 0-0.1		✓	✓		1	1	✓	✓

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			(On Hold) SOIL No analysis requested	SOIL - EA002 pH (1:5)	SOIL - EA010 (solids): Electrical Conductivity (1:5) Electrical Conductivity (1:5)	SOIL - EA055-103 Moisture Content	SOIL - ED007 CEC / Exchangeable Cations (ED007)	SOIL - ED037 Alkalinity in Soil	SOIL - ED040S Soluble Major Anions	SOIL - ED045S Chloride Soluble
EB0800746-036	15-JAN-2008 15:00	TP46 0.2-0.3	S Z	<u>ν</u> <u>ν</u>	<u>№ 0 ш</u>	ω ≥	<u> 0 0 </u>	\(\sqrt{\sqrt{\sqrt{\colored}}}\)	<u>₩</u>	<u>₩</u>
EB0800746-037	15-JAN-2008 15:00	TP46 0.5-0.6		1	✓		✓	1	1	√
EB0800746-038	15-JAN-2008 15:00	TP46 0.8-0.9		1	1	1		1	1	1
EB0800746-039	15-JAN-2008 15:00	TP46 1.1-1.2		1	✓		✓	1	✓	√
EB0800746-040	15-JAN-2008 15:00	TP48 0-0.1		√	✓		1	√	1	√
EB0800746-041	15-JAN-2008 15:00	TP48 0.2-0.3		1	1	✓		√	1	√
EB0800746-042	15-JAN-2008 15:00	TP48 0.5-0.6		√	· ✓	· ·	1	· /	√	· /
EB0800746-043	15-JAN-2008 15:00	TP48 0.8-0.9		√	√	✓		· ✓	✓	√
EB0800746-044	15-JAN-2008 15:00	TP48 1.1-1.2		1	√		1	1	1	√
EB0800746-045	15-JAN-2008 15:00	TP35 0-0.1		√	✓		1	√	√	√
EB0800746-046	15-JAN-2008 15:00	TP35 0.2-0.3		1	✓	✓		√	1	√
EB0800746-047	15-JAN-2008 15:00	TP35 0.5-0.6		✓	1		1	1	1	1
EB0800746-048	15-JAN-2008 15:00	TP35 0.8-0.9		1	✓	✓		√	√	√
EB0800746-049	15-JAN-2008 15:00	TP35 1.1-1.2		√	✓	<u> </u>	1	1	1	1
EB0800746-050	14-JAN-2008 15:00	TP66 0-0.1	1					<u> </u>	<u> </u>	+ -
EB0800746-051	14-JAN-2008 15:00	TP66 0.2-0.3	√							+
EB0800746-052	14-JAN-2008 15:00	TP66 0.5-0.6	1							
EB0800746-053	14-JAN-2008 15:00	TP66 0.8-0.9	1							
EB0800746-054	14-JAN-2008 15:00	TP66 1.1-1.2	✓							
EB0800746-055	14-JAN-2008 15:00	TP65 0-0.1	1							
EB0800746-056	14-JAN-2008 15:00	TP65 0.2-0.3	1							
EB0800746-057	14-JAN-2008 15:00	TP65 0.5-0.6	1							
EB0800746-058	14-JAN-2008 15:00	TP65 0.8-0.9	1							+
EB0800746-059	14-JAN-2008 15:00	TP65 1.1-1.2	1							
EB0800746-060	14-JAN-2008 15:00	TP61 0-0.1	✓							
EB0800746-061	14-JAN-2008 15:00	TP61 0.2-0.3	1							
EB0800746-062	14-JAN-2008 15:00	TP61 0.5-0.6	1							
EB0800746-063	14-JAN-2008 15:00	TP61 0.8-0.9	1							
EB0800746-064	14-JAN-2008 15:00	TP61 1.1-1.2	✓							
EB0800746-065	14-JAN-2008 15:00	TP62 0-0.1		✓	✓		✓	✓	✓	✓
EB0800746-066	14-JAN-2008 15:00	TP62 0.5-0.6		✓	✓		✓	✓	✓	✓
EB0800746-067	14-JAN-2008 15:00	TP62 0.8-0.9		✓	✓	✓		✓	✓	✓
EB0800746-068	14-JAN-2008 15:00	TP62 1.1-1.2		✓	✓		1	✓	✓	✓
EB0800746-069	14-JAN-2008 15:00	TP63 0-0.1	✓							
EB0800746-070	14-JAN-2008 15:00	TP63 0.2-0.3	✓							
EB0800746-071	14-JAN-2008 15:00	TP63 0.5-0.6	✓							
EB0800746-072	14-JAN-2008 15:00	TP63 0.8-0.9	✓						1	1
EB0800746-073	14-JAN-2008 15:00	TP63 1.1-1.2	✓							
EB0800746-074	14-JAN-2008 15:00	TP59 0-0.1	√							
			1						1	
EB0800746-075	14-JAN-2008 15:00	TP59 0.2-0.3	₩							

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Client : CONNELL WAGNER PTY LTD



			(On Hold) SOIL No analysis requested	- EA002	SOIL - EA010 (solids): Electrical Conductivity (1:5) Electrical Conductivity (1:5)	SOIL - EA055-103 Moisture Content	SOIL - ED007 CEC / Exchangeable Cations (ED007)	SOIL - ED037 Alkalinity in Soil	SOIL - ED040S Soluble Major Anions	SOIL - ED045S Chloride Soluble
			On F	SOIL - E pH (1:5)	SOIL Cond	SOIL	SOIL	SOIL	Solut	SOIL
EB0800746-077	14-JAN-2008 15:00	TP59 0.8-0.9	✓	0, 11	0, 0 ==	0,	0, 0	0,	0, 0,	,
EB0800746-078	14-JAN-2008 15:00	TP59 1.1-1.2	✓							
EB0800746-079	14-JAN-2008 15:00	TP58 0-0.1		✓	✓		✓	✓	✓	✓
EB0800746-080	14-JAN-2008 15:00	TP58 0.2-0.3		✓	✓	✓		✓	✓	✓
EB0800746-081	14-JAN-2008 15:00	TP58 0.5-0.6		✓	✓		✓	✓	✓	✓
EB0800746-082	14-JAN-2008 15:00	TP58 0.8-0.9		✓	✓	✓		✓	✓	✓
EB0800746-083	14-JAN-2008 15:00	TP58 1.1-1.2		✓	✓		✓	✓	✓	✓
EB0800746-084	10-JAN-2008 15:00	TP18 0-0.1	✓							
EB0800746-085	10-JAN-2008 15:00	TP18 0.2-0.3	✓							
EB0800746-086	10-JAN-2008 15:00	TP18 0.5-0.6	✓							
EB0800746-087	10-JAN-2008 15:00	TP18 0.8-0.9	✓							
EB0800746-088	10-JAN-2008 15:00	TP18 1.1-1.2	✓							
EB0800746-089	10-JAN-2008 15:00	TP13 0-0.1		✓	✓		✓	✓	✓	✓
EB0800746-090	10-JAN-2008 15:00	TP13 0.2-0.3	✓							
EB0800746-091	10-JAN-2008 15:00	TP13 0.5-0.6		✓	✓		✓	✓	✓	✓
EB0800746-092	10-JAN-2008 15:00	TP13 0.8-0.9	1							
EB0800746-093	10-JAN-2008 15:00	TP13 1.1-1.2		✓	✓		✓	✓	✓	✓
EB0800746-094	09-JAN-2008 15:00	TP7 0-0.1	✓							
EB0800746-095	09-JAN-2008 15:00	TP7 0.2-0.3	✓							
EB0800746-096	09-JAN-2008 15:00	TP7 0.5-0.6	1							
EB0800746-097	09-JAN-2008 15:00	TP7 0.8-0.9	✓							
EB0800746-098	09-JAN-2008 15:00	TP7 1.1-1.2	✓							
EB0800746-099	09-JAN-2008 15:00	TP6 0-0.1		✓	✓		✓	✓	✓	✓
EB0800746-100	09-JAN-2008 15:00	TP6 0.2-0.3	1							
EB0800746-101	09-JAN-2008 15:00	TP6 0.5-0.6		✓	✓		✓	✓	✓	✓
EB0800746-102	09-JAN-2008 15:00	TP6 0.8-0.9	✓							
EB0800746-103	09-JAN-2008 15:00	TP6 1.1-1.2		✓	✓		1	✓	✓	✓
EB0800746-104	10-JAN-2008 15:00	TP28 0-0.1		1	✓		✓	✓	✓	✓
EB0800746-105	10-JAN-2008 15:00	TP28 0.2-0.3	✓							\Box
EB0800746-106	10-JAN-2008 15:00	TP28 0.5-0.6		✓	✓		✓	✓	✓	✓
EB0800746-107	10-JAN-2008 15:00	TP28 0.8-0.9	✓							
EB0800746-108	10-JAN-2008 15:00	TP28 1.1-1.2		✓	✓		✓	✓	✓	✓
EB0800746-109	10-JAN-2008 15:00	TP23 0-0.1	✓							
EB0800746-110	10-JAN-2008 15:00	TP23 0.2-0.3	✓							
EB0800746-111	10-JAN-2008 15:00	TP23 0.5-0.6	✓							
EB0800746-112	10-JAN-2008 15:00	TP23 0.8-0.9	✓							
EB0800746-113	10-JAN-2008 15:00	TP23 1.1-1.2	✓							
EB0800746-114	09-JAN-2008 15:00	TP2 0.1	✓							
EB0800746-115	09-JAN-2008 15:00	TP2 0.2		✓	✓		✓	✓	✓	✓
EB0800746-116	09-JAN-2008 15:00	TP2 0.3	✓							
EB0800746-117	09-JAN-2008 15:00	TP2 0.5		✓	✓		✓	✓	✓	✓
	1	1	1				1	-		

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			(On Hold) SOIL No analysis requested	SOIL - EA002 pH (1:5)	SOIL - EA010 (solids): Electrical Conductivity (1:5) Electrical Conductivity (1:5)	SOIL - ED007 CEC / Exchangeable Cations (ED007)	SOIL - ED037 Alkalinity in Soil	SOIL - ED040S Soluble Major Anions	SOIL - ED045S Chloride Soluble
EB0800746-118	09-JAN-2008 15:00	TP2 0.8	✓						
EB0800746-119	09-JAN-2008 15:00	TP2 1.1		✓	✓	✓	✓	✓	✓

Matrix: SOIL Laboratory sample ID	Client sampling date / time	Client sample ID	SOIL - ED093S Cations - Soluble	SOIL - Minor Anions NO2-N, NO3-N, F, Reactive P
EB0800746-001	16-JAN-2008 15:00	TP19 0-0.1	✓	√
EB0800746-002	16-JAN-2008 15:00	TP19 0.2-0.3	✓	1
EB0800746-004	16-JAN-2008 15:00	TP19 0.8-0.9	✓	✓
EB0800746-015	13-JAN-2008 15:00	TP68 0-0.1	✓	✓
EB0800746-016	13-JAN-2008 15:00	TP68 0.2-0.3	✓	
EB0800746-017	13-JAN-2008 15:00	TP68 0.5-0.6	✓	✓
EB0800746-018	13-JAN-2008 15:00	TP68 0.8-0.9	✓	
EB0800746-019	13-JAN-2008 15:00	TP68 1.1-1.2	✓	✓
EB0800746-020	13-JAN-2008 15:00	TP67 0-0.1	✓	✓
EB0800746-021	13-JAN-2008 15:00	TP67 0.2-0.3	✓	
EB0800746-022	13-JAN-2008 15:00	TP67 0.5-0.6	✓	✓
EB0800746-023	13-JAN-2008 15:00	TP67 0.8-0.9	✓	
EB0800746-024	13-JAN-2008 15:00	TP67 1.1-1.2	✓	✓
EB0800746-025	13-JAN-2008 15:00	TP69 0-0.1	✓	✓
EB0800746-026	13-JAN-2008 15:00	TP69 0.2-0.3	✓	
EB0800746-027	13-JAN-2008 15:00	TP69 0.5-0.6	✓	✓
EB0800746-028	13-JAN-2008 15:00	TP69 0.8-0.9	✓	
EB0800746-029	13-JAN-2008 15:00	TP69 1.1-1.2	✓	✓
EB0800746-030	15-JAN-2008 15:00	TP45 0-0.1	✓	✓
EB0800746-031	15-JAN-2008 15:00	TP45 0.2-0.3	✓	
EB0800746-032	15-JAN-2008 15:00	TP45 0.5-0.6	✓	✓
EB0800746-033	15-JAN-2008 15:00	TP45 0.8-0.9	✓	
EB0800746-034	15-JAN-2008 15:00	TP45 1.1-1.2	✓	✓
EB0800746-035	15-JAN-2008 15:00	TP46 0-0.1	✓	✓
EB0800746-036	15-JAN-2008 15:00	TP46 0.2-0.3	✓	
EB0800746-037	15-JAN-2008 15:00	TP46 0.5-0.6	✓	✓
EB0800746-038	15-JAN-2008 15:00	TP46 0.8-0.9	✓	
EB0800746-039	15-JAN-2008 15:00	TP46 1.1-1.2	✓	✓

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Client : CONNELL WAGNER PTY LTD



			SOIL - ED093S Cations - Soluble	SOIL - Minor Anions NO2-N, NO3-N, F, Reactive P
EB0800746-040	15-JAN-2008 15:00	TP48 0-0.1	✓	✓
EB0800746-041	15-JAN-2008 15:00	TP48 0.2-0.3	✓	
EB0800746-042	15-JAN-2008 15:00	TP48 0.5-0.6	✓	✓
EB0800746-043	15-JAN-2008 15:00	TP48 0.8-0.9	✓	
EB0800746-044	15-JAN-2008 15:00	TP48 1.1-1.2	✓	✓
EB0800746-045	15-JAN-2008 15:00	TP35 0-0.1	✓	✓
EB0800746-046	15-JAN-2008 15:00	TP35 0.2-0.3	✓	
EB0800746-047	15-JAN-2008 15:00	TP35 0.5-0.6	✓	✓
EB0800746-048	15-JAN-2008 15:00	TP35 0.8-0.9	✓	
EB0800746-049	15-JAN-2008 15:00	TP35 1.1-1.2	✓	✓
EB0800746-065	14-JAN-2008 15:00	TP62 0-0.1	✓	✓
EB0800746-066	14-JAN-2008 15:00	TP62 0.5-0.6	✓	✓
EB0800746-067	14-JAN-2008 15:00	TP62 0.8-0.9	✓	
EB0800746-068	14-JAN-2008 15:00	TP62 1.1-1.2	✓	✓
EB0800746-079	14-JAN-2008 15:00	TP58 0-0.1	✓	✓
EB0800746-080	14-JAN-2008 15:00	TP58 0.2-0.3	✓	
EB0800746-081	14-JAN-2008 15:00	TP58 0.5-0.6	✓	✓
EB0800746-082	14-JAN-2008 15:00	TP58 0.8-0.9	✓	
EB0800746-083	14-JAN-2008 15:00	TP58 1.1-1.2	✓	✓
EB0800746-089	10-JAN-2008 15:00	TP13 0-0.1	✓	✓
EB0800746-091	10-JAN-2008 15:00	TP13 0.5-0.6	✓	✓
EB0800746-093	10-JAN-2008 15:00	TP13 1.1-1.2	✓	✓
EB0800746-099	09-JAN-2008 15:00	TP6 0-0.1	✓	✓
EB0800746-101	09-JAN-2008 15:00	TP6 0.5-0.6	✓	✓
EB0800746-103	09-JAN-2008 15:00	TP6 1.1-1.2	✓	✓
EB0800746-104	10-JAN-2008 15:00	TP28 0-0.1	✓	✓
EB0800746-106	10-JAN-2008 15:00	TP28 0.5-0.6	✓	✓
EB0800746-108	10-JAN-2008 15:00	TP28 1.1-1.2	✓	✓
EB0800746-115	09-JAN-2008 15:00	TP2 0.2	✓	✓
EB0800746-117	09-JAN-2008 15:00	TP2 0.5	✓	✓
EB0800746-119	09-JAN-2008 15:00	TP2 1.1	✓	✓

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Client : CONNELL WAGNER PTY LTD



Requested Deliverables

MS MONIQUE HARRISON

- *AU Certificate of Analysis - NATA	Email	harrisonm@conwag.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep)	Email	harrisonm@conwag.com
- *AU QC Report ¿ DEFAULT (Anon QC Rep) - NATA	Email	harrisonm@conwag.com
- A4 - AU Sample Receipt Notification - Environmental	Email	harrisonm@conwag.com
- A4 - AU Tax Invoice	Email	harrisonm@conwag.com
- Default - Chain of Custody	Email	harrisonm@conwag.com
- EDI Format - ENMRG	Email	harrisonm@conwag.com
- EDI Format - XTab	Email	harrisonm@conwag.com
- Trigger - Subcontract Report	Email	harrisonm@conwag.com

ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order : **EB0800746** Page : 1 of 22

Client : CONNELL WAGNER PTY LTD Laboratory : Environmental Division Brisbane

Contact : MS MONIQUE HARRISON Contact : Tim Kilmister

Address : LOCKED BAG 1800 Address : 32 Shand Street Stafford QLD Australia 4053

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Project : H328128 SBRJV QC Level : NEPM 1999 Schedule B(3) and ALS QCS3 requirement

Order number : ----

 C-O-C number
 : -- Date Samples Received
 : 12-APR-2008

 Sampler
 : M.Harrison
 Issue Date
 : 02-MAY-2008

Site : Surat Basin

No. of samples received : 119

Quote number : BN/189/08 No. of samples analysed : 59

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

Stephen Hislop Senior Inorganic Chemist Inorganics

Environmental Division Brisbane
Part of the ALS Laboratoru Group

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A Campbell Brothers Limited Company

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Client : CONNELL WAGNER PTY LTD

Project : H328128 SBRJV



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 processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

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

- ED007 (exchanbeable cations): EB0800746-101 has insufficient sample to analyse for ED007
- ED045S (chloride Soluble) for batch EB0800746 #089 & #099 Insufficient sample has been provided for standard analysis.
- Nitrite as N (EK057), Nitrate and Nitrite as N (EK059) and Reactive Phosphorus as P (EK071): For several samples insufficient volume has been provided for standard analysis. LOR's have been raised accordingly.
- Nitrite as N (EK057), Nitrate and Nitrite as N (EK059), Nitrate as N (EK058) and Reactive Phosphorus as P (EK071): Insufficient volume has been provided for samples 40 (TP48 0-0.1), 42 (TP48 0.5-0.6), 65 (TP62 0-0.1), 66 (TP62 0.5-0.6), 83 (TP58 1.1-1.2), 89 (TP13 0-0.1) and 99 (TP6 0-0.1). Unable to perform requested analyses.

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Project : H328128 SBRJV



Sub-Matrix: PULP		Clie	ent sample ID	TP19 0-0.1	TP19 0.8-0.9	TP68 0-0.1	TP68 0.5-0.6	TP68 1.1-1.2
	Clie	ent samplii	ng date / time	16-APR-2008 15:00	16-JAN-2008 15:00	13-JAN-2008 15:00	13-JAN-2008 15:00	13-JAN-2008 15:00
Compound	CAS Number	LOR	Unit	EB0800746-001	EB0800746-004	EB0800746-015	EB0800746-017	EB0800746-019
ED007: Exchangeable Cations								
^ Exchangeable Calcium		0.1	meq/100g	2.0	5.8	44.0	35.1	34.4
^ Exchangeable Magnesium		0.1	meq/100g	0.5	7.5	13.8	21.0	22.0
^ Exchangeable Potassium		0.1	meq/100g	0.8	1.1	1.9	0.9	1.0
^ Exchangeable Sodium		0.1	meq/100g	0.3	3.1	1.1	5.1	6.5
^ Cation Exchange Capacity		0.1	meq/100g	3.5	17.4	60.8	62.2	64.0
^ Exchangeable Sodium Percent		0.1	%	7.4	17.7	1.8	8.3	10.2

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Client : CONNELL WAGNER PTY LTD

Project : H328128 SBRJV



Sub-Matrix: PULP		Clie	nt sample ID	TP67 0-0.1	TP67 0.5-0.6	TP67 1.1-1.2	TP69 0-0.1	TP69 0.5-0.6
	Clien	nt samplin	g date / time	13-JAN-2008 15:00				
Compound	CAS Number	LOR	Unit	EB0800746-020	EB0800746-022	EB0800746-024	EB0800746-025	EB0800746-027
ED007: Exchangeable Cations								
^ Exchangeable Calcium		0.1	meq/100g	22.2	36.2	36.0	48.0	43.1
^ Exchangeable Magnesium		0.1	meq/100g	4.8	20.5	20.3	11.2	15.0
^ Exchangeable Potassium		0.1	meq/100g	1.0	0.8	0.5	2.4	1.9
^ Exchangeable Sodium		0.1	meq/100g	0.5	5.2	6.3	1.1	6.6
^ Cation Exchange Capacity		0.1	meq/100g	28.6	62.7	63.1	62.7	66.5
^ Exchangeable Sodium Percent		0.1	%	1.7	8.3	10.0	1.8	9.9

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Client : CONNELL WAGNER PTY LTD

Project : H328128 SBRJV



Sub-Matrix: PULP		Client sample ID			TP45 0-0.1	TP45 0.5-0.6	TP45 1.1-1.2	TP46 0-0.1
	CI	ient sampli	ng date / time	13-JAN-2008 15:00	15-JAN-2008 15:00	15-JAN-2008 15:00	15-JAN-2008 15:00	15-JAN-2008 15:00
Compound	CAS Number	LOR	Unit	EB0800746-029	EB0800746-030	EB0800746-032	EB0800746-034	EB0800746-035
ED007: Exchangeable Cations								
^ Exchangeable Calcium		0.1	meq/100g	35.7	41.6	40.6	43.6	40.3
^ Exchangeable Magnesium		0.1	meq/100g	7.7	6.1	6.9	14.4	3.7
^ Exchangeable Potassium		0.1	meq/100g	0.7	3.0	2.2	3.0	0.7
^ Exchangeable Sodium		0.1	meq/100g	6.0	0.4	0.7	1.7	0.3
^ Cation Exchange Capacity		0.1	meq/100g	50.1	51.2	50.4	62.6	45.0
^ Exchangeable Sodium Percent		0.1	%	12.1	0.9	1.3	2.7	0.7

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Client : CONNELL WAGNER PTY LTD

Project : H328128 SBRJV



Sub-Matrix: PULP		Client sample ID			TP46 1.1-1.2	TP48 0-0.1	TP48 0.5-0.6	TP48 1.1-1.2
	CI	ient sampli	ng date / time	15-JAN-2008 15:00				
Compound	CAS Number	LOR	Unit	EB0800746-037	EB0800746-039	EB0800746-040	EB0800746-042	EB0800746-044
ED007: Exchangeable Cations								
^ Exchangeable Calcium		0.1	meq/100g	58.0	53.5	6.9	10.3	9.6
^ Exchangeable Magnesium		0.1	meq/100g	14.2	13.3	2.5	6.2	6.1
^ Exchangeable Potassium		0.1	meq/100g	2.7	1.9	1.7	0.8	1.3
^ Exchangeable Sodium		0.1	meq/100g	2.8	5.3	0.7	0.8	1.0
^ Cation Exchange Capacity		0.1	meq/100g	77.7	73.9	11.7	18.2	18.1
^ Exchangeable Sodium Percent		0.1	%	3.6	7.2	5.8	4.5	5.6

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Sub-Matrix: PULP		Clie	ent sample ID	TP35 0-0.1	TP35 0.5-0.6	TP35 1.1-1.2	TP62 0-0.1	TP62 0.5-0.6
	Clie	ent samplii	ng date / time	15-JAN-2008 15:00	15-JAN-2008 15:00	15-JAN-2008 15:00	14-JAN-2008 15:00	14-JAN-2008 15:00
Compound	CAS Number	LOR	Unit	EB0800746-045	EB0800746-047	EB0800746-049	EB0800746-065	EB0800746-066
ED007: Exchangeable Cations								
^ Exchangeable Calcium		0.1	meq/100g	8.6	3.0	1.6	18.4	68.3
^ Exchangeable Magnesium		0.1	meq/100g	1.4	1.1	1.3	9.6	16.0
^ Exchangeable Potassium		0.1	meq/100g	0.6	0.4	0.2	1.4	0.9
^ Exchangeable Sodium		0.1	meq/100g	<0.1	<0.1	<0.1	0.9	6.8
^ Cation Exchange Capacity		0.1	meq/100g	10.6	4.5	3.1	30.3	92.0
^ Exchangeable Sodium Percent		0.1	%	<0.1	<0.1	<0.1	3.1	7.3

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Client : CONNELL WAGNER PTY LTD

Project : H328128 SBRJV



Sub-Matrix: PULP		Clie	ent sample ID	TP62 1.1-1.2	TP58 0-0.1	TP58 0.5-0.6	TP58 1.1-1.2	TP13 0-0.1
	Clie	ent samplii	ng date / time	14-JAN-2008 15:00	14-JAN-2008 15:00	14-JAN-2008 15:00	14-JAN-2008 15:00	10-JAN-2008 15:00
Compound	CAS Number	LOR	Unit	EB0800746-068	EB0800746-079	EB0800746-081	EB0800746-083	EB0800746-089
ED007: Exchangeable Cations								
^ Exchangeable Calcium		0.1	meq/100g	8.5	21.7	25.5	40.4	23.6
^ Exchangeable Magnesium		0.1	meq/100g	9.8	20.4	23.5	29.5	6.9
^ Exchangeable Potassium		0.1	meq/100g	0.6	1.8	1.0	1.6	1.4
^ Exchangeable Sodium		0.1	meq/100g	5.0	0.7	2.4	3.7	0.9
^ Cation Exchange Capacity		0.1	meq/100g	23.8	44.6	52.4	75.2	32.7
^ Exchangeable Sodium Percent		0.1	%	20.9	1.6	4.6	4.9	2.7

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Sub-Matrix: PULP		Client sample ID			TP13 1.1-1.2	TP6 0-0.1	TP6 1.1-1.2	TP28 0-0.1
	C	lient sampli	ng date / time	10-JAN-2008 15:00	10-JAN-2008 15:00	09-JAN-2008 15:00	09-JAN-2008 15:00	10-JAN-2008 15:00
Compound	CAS Number	LOR	Unit	EB0800746-091	EB0800746-093	EB0800746-099	EB0800746-103	EB0800746-104
ED007: Exchangeable Cations								
^ Exchangeable Calcium		0.1	meq/100g	18.1	18.3	44.8	28.5	52.3
^ Exchangeable Magnesium		0.1	meq/100g	9.1	5.2	8.2	7.6	6.4
^ Exchangeable Potassium		0.1	meq/100g	0.6	0.4	0.7	0.5	1.2
^ Exchangeable Sodium		0.1	meq/100g	3.3	7.1	1.8	6.9	1.4
^ Cation Exchange Capacity		0.1	meq/100g	31.1	31.0	55.4	43.6	61.3
^ Exchangeable Sodium Percent		0.1	%	10.5	22.8	3.3	15.9	2.4

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Sub-Matrix: PULP		Clie	ent sample ID	TP28 0.5-0.6	TP28 1.1-1.2	TP2 0.2	TP2 0.5	TP2 1.1
	Cli	ient sampli	ng date / time	10-JAN-2008 15:00	10-JAN-2008 15:00	09-JAN-2008 15:00	09-JAN-2008 15:00	09-JAN-2008 15:00
Compound	CAS Number	LOR	Unit	EB0800746-106	EB0800746-108	EB0800746-115	EB0800746-117	EB0800746-119
ED007: Exchangeable Cations								
^ Exchangeable Calcium		0.1	meq/100g	44.7	25.1	18.6	33.1	38.9
^ Exchangeable Magnesium		0.1	meq/100g	9.6	9.8	4.0	6.1	5.2
^ Exchangeable Potassium		0.1	meq/100g	1.4	0.4	0.6	0.5	0.4
^ Exchangeable Sodium		0.1	meq/100g	8.6	6.5	0.5	2.2	6.1
^ Cation Exchange Capacity		0.1	meq/100g	64.2	41.7	23.6	41.9	50.7
^ Exchangeable Sodium Percent		0.1	%	13.4	15.6	2.0	5.3	12.1

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Sub-Matrix: SOIL		Cli	ent sample ID	TP19 0-0.1	TP19 0.2-0.3	TP19 0.8-0.9	TP68 0-0.1	TP68 0.2-0.3
	Cli	ent sampli	ing date / time	16-APR-2008 15:00	16-JAN-2008 15:00	16-JAN-2008 15:00	13-JAN-2008 15:00	13-JAN-2008 15:00
Compound	CAS Number	LOR	Unit	EB0800746-001	EB0800746-002	EB0800746-004	EB0800746-015	EB0800746-016
EA002 : pH (Soils)								
pH Value		0.1	pH Unit	5.6	7.0	6.6	7.6	8.2
EA010: Conductivity								
Electrical Conductivity @ 25°C		1	μS/cm	29	23	336	144	384
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)		1.0	%	6.6	8.4	14.0	18.0	14.8
ED007: Exchangeable Cations								
^ Exchangeable Calcium		0.1	meq/100g		2.0			
^ Exchangeable Magnesium		0.1	meq/100g		0.4			
^ Exchangeable Potassium		0.1	meq/100g		1.0			
^ Exchangeable Sodium		0.1	meq/100g		0.4			
^ Cation Exchange Capacity		0.1	meq/100g		3.9			
^ Exchangeable Sodium Percent		0.1	%		10.3			
ED037: Alkalinity								
Alkalinity		1	meq/kg	3	1	4	32	58
Bicarbonate Alkalinity as CaCO3	71-52-3	1	meq/kg	3	1	4	32	56
Carbonate Alkalinity as CaCO3	3812-32-6	1	meq/kg	<1	<1	<1	<1	2
ED040S: Soluble Major Anions								
Sulphate as SO4 2-	14808-79-8	10	mg/kg	40	<10	70	40	50
ED045: Chloride								
Chloride	16887-00-6	10	mg/kg	<10	<10	260	<10	460
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	50	<10	<10	100	60
Magnesium	7439-95-4	10	mg/kg	20	<10	<10	20	30
Sodium	7440-23-5	10	mg/kg	30	<10	170	80	360
Potassium	7440-09-7	10	mg/kg	400	20	<10	<10	<10
EK040S: Fluoride Soluble								
Fluoride	16984-48-8	1	mg/kg	<1	2	<1	1	
EK057: Nitrite as N								
Nitrite as N (Sol.)		0.1	mg/kg	<0.1	<0.1	<0.1	1.0	
EK058: Nitrate as N								
^ Nitrate as N (Sol.)		0.1	mg/kg	12.2	12.0	0.2	26.9	
EK059: Nitrite plus Nitrate as N (NOx)								
Nitrite + Nitrate as N (Sol.)		0.1	mg/kg	12.2	12.0	0.2	27.9	
EK071: Reactive Phosphorus as P (Disso	olved)							
Reactive Phosphorus as P		0.10	mg/kg	0.23	<0.10	<0.10	0.13	

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Sub-Matrix: SOIL		Clie	ent sample ID	TP68 0.5-0.6	TP68 0.8-0.9	TP68 1.1-1.2	TP67 0-0.1	TP67 0.2-0.3
	Cl	ient sampli	ng date / time	13-JAN-2008 15:00				
Compound	CAS Number	LOR	Unit	EB0800746-017	EB0800746-018	EB0800746-019	EB0800746-020	EB0800746-021
EA002 : pH (Soils)								
pH Value		0.1	pH Unit	8.5	8.7	8.9	8.5	8.6
EA010: Conductivity								
Electrical Conductivity @ 25°C		1	μS/cm	693	651	664	139	65
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)		1.0	%	16.3	18.9	16.3	15.9	18.1
ED037: Alkalinity								
Alkalinity		1	meq/kg	126	97		19	9
Bicarbonate Alkalinity as CaCO3	71-52-3	1	meq/kg	117	87		19	9
Carbonate Alkalinity as CaCO3	3812-32-6	1	meq/kg	9	10		<1	<1
ED040S: Soluble Major Anions								
Sulphate as SO4 2-	14808-79-8	10	mg/kg	<10	20	10	10	<10
ED045: Chloride								
Chloride	16887-00-6	10	mg/kg	1090	960	<10	<10	<10
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	60	40	10	90	<10
Magnesium	7439-95-4	10	mg/kg	40	30	<10	20	<10
Sodium	7440-23-5	10	mg/kg	700	760	200	30	60
Potassium	7440-09-7	10	mg/kg	<10	<10	<10	40	<10
EK040S: Fluoride Soluble								
Fluoride	16984-48-8	1	mg/kg	46		34	1	
EK057: Nitrite as N								
Nitrite as N (Sol.)		0.1	mg/kg	0.9		0.3	<0.1	
EK058: Nitrate as N								
^ Nitrate as N (Sol.)		0.1	mg/kg	1.3		1.5	20.3	
EK059: Nitrite plus Nitrate as N (NOx)								
Nitrite + Nitrate as N (Sol.)		0.1	mg/kg	2.2		1.8	20.3	
EK071: Reactive Phosphorus as P (Disse	olved)							
Reactive Phosphorus as P		0.10	mg/kg	<0.10		<0.25	0.28	

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Sub-Matrix: SOIL		Clie	ent sample ID	TP67 0.5-0.6	TP67 0.8-0.9	TP67 1.1-1.2	TP69 0-0.1	TP69 0.2-0.3
	Cli	ent sampli	ng date / time	13-JAN-2008 15:00				
Compound	CAS Number	LOR	Unit	EB0800746-022	EB0800746-023	EB0800746-024	EB0800746-025	EB0800746-026
EA002 : pH (Soils)								
pH Value		0.1	pH Unit	8.7	8.8	8.8	8.6	9.0
EA010: Conductivity								
Electrical Conductivity @ 25°C		1	μS/cm	609	772	845	83	139
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)		1.0	%	17.5	16.8	16.0	22.0	19.6
ED037: Alkalinity								
Alkalinity		1	meq/kg		4	63	26	13
Bicarbonate Alkalinity as CaCO3	71-52-3	1	meq/kg		4	62	26	12
Carbonate Alkalinity as CaCO3	3812-32-6	1	meq/kg		<1	2	<1	1
ED040S: Soluble Major Anions								
Sulphate as SO4 2-	14808-79-8	10	mg/kg	90	200	200	<10	20
ED045: Chloride								
Chloride	16887-00-6	10	mg/kg	<10	980	<10	<10	<10
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	20	60	50	50	10
Magnesium	7439-95-4	10	mg/kg	10	40	30	<10	<10
Sodium	7440-23-5	10	mg/kg	340	790	750	50	140
Potassium	7440-09-7	10	mg/kg	<10	<10	<10	<10	<10
EK040S: Fluoride Soluble								
Fluoride	16984-48-8	1	mg/kg	14		33	<1	
EK057: Nitrite as N								
Nitrite as N (Sol.)		0.1	mg/kg	<0.2		0.3	<0.1	
EK058: Nitrate as N								
^ Nitrate as N (Sol.)		0.1	mg/kg	4.8		1.1	2.8	
EK059: Nitrite plus Nitrate as N (NOx)								
Nitrite + Nitrate as N (Sol.)		0.1	mg/kg	4.8		1.5	2.8	
EK071: Reactive Phosphorus as P (Disso	olved)							
Reactive Phosphorus as P		0.10	mg/kg	<0.25		<0.10	<0.10	

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Sub-Matrix: SOIL		Clie	ent sample ID	TP69 0.5-0.6	TP69 0.8-0.9	TP69 1.1-1.2	TP45 0-0.1	TP45 0.2-0.3
	Cli	ent sampli	ng date / time	13-JAN-2008 15:00	13-JAN-2008 15:00	13-JAN-2008 15:00	15-JAN-2008 15:00	15-JAN-2008 15:00
Compound	CAS Number	LOR	Unit	EB0800746-027	EB0800746-028	EB0800746-029	EB0800746-030	EB0800746-031
EA002 : pH (Soils)								
pH Value		0.1	pH Unit	9.1	9.0	9.0	8.7	8.7
EA010: Conductivity								
Electrical Conductivity @ 25°C		1	μS/cm	340	794	813	130	106
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)		1.0	%	15.5	16.9	12.3	16.7	17.8
ED037: Alkalinity								
Alkalinity		1	meq/kg		42	112	175	255
Bicarbonate Alkalinity as CaCO3	71-52-3	1	meq/kg		36	103	174	254
Carbonate Alkalinity as CaCO3	3812-32-6	1	meq/kg		6	9	1	1
ED040S: Soluble Major Anions								
Sulphate as SO4 2-	14808-79-8	10	mg/kg	20	270	300	20	20
ED045: Chloride								
Chloride	16887-00-6	10	mg/kg	<10	1050	880	<10	<10
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	<10	20	20	70	100
Magnesium	7439-95-4	10	mg/kg	<10	<10	<10	10	<10
Sodium	7440-23-5	10	mg/kg	140	980	940	40	20
Potassium	7440-09-7	10	mg/kg	<10	<10	<10	30	20
EK040S: Fluoride Soluble								
Fluoride	16984-48-8	1	mg/kg	22		48	<1	
EK057: Nitrite as N								
Nitrite as N (Sol.)		0.1	mg/kg	<0.2		<0.1	<0.1	
EK058: Nitrate as N								
^ Nitrate as N (Sol.)		0.1	mg/kg	1.8		1.0	2.1	
EK059: Nitrite plus Nitrate as N (NOx)								
Nitrite + Nitrate as N (Sol.)		0.1	mg/kg	1.8		1.0	2.1	
EK071: Reactive Phosphorus as P (Disso	olved)							
Reactive Phosphorus as P		0.10	mg/kg	<0.25		<0.10	1.74	

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Sub-Matrix: SOIL		Clie	ent sample ID	TP45 0.5-0.6	TP45 0.8-0.9	TP45 1.1-1.2	TP46 0-0.1	TP46 0.2-0.3
	Cli	ent sampli	ng date / time	15-JAN-2008 15:00				
Compound	CAS Number	LOR	Unit	EB0800746-032	EB0800746-033	EB0800746-034	EB0800746-035	EB0800746-036
EA002 : pH (Soils)								
pH Value		0.1	pH Unit	8.9	8.7	8.7	8.9	8.7
EA010: Conductivity								
Electrical Conductivity @ 25°C		1	μS/cm	124	370	456	65	113
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)		1.0	%	12.7	13.2	12.0	10.5	20.4
ED037: Alkalinity								
Alkalinity		1	meq/kg		1020	1020	12	125
Bicarbonate Alkalinity as CaCO3	71-52-3	1	meq/kg		1010	1020	12	125
Carbonate Alkalinity as CaCO3	3812-32-6	1	meq/kg		7	4	<1	<1
ED040S: Soluble Major Anions								
Sulphate as SO4 2-	14808-79-8	10	mg/kg	20	140	200	<10	<10
ED045: Chloride								
Chloride	16887-00-6	10	mg/kg	<10	330	510	<10	<10
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	50	80	100	60	90
Magnesium	7439-95-4	10	mg/kg	20	40	50	<10	10
Sodium	7440-23-5	10	mg/kg	80	230	300	20	60
Potassium	7440-09-7	10	mg/kg	40	70	70	<10	<10
EK040S: Fluoride Soluble								
Fluoride	16984-48-8	1	mg/kg	2		3	2	
EK057: Nitrite as N								
Nitrite as N (Sol.)		0.1	mg/kg	<0.2		<0.1	<0.1	
EK058: Nitrate as N								
^ Nitrate as N (Sol.)		0.1	mg/kg	0.4		0.4	3.5	
EK059: Nitrite plus Nitrate as N (NOx)								
Nitrite + Nitrate as N (Sol.)		0.1	mg/kg	0.4		0.4	3.5	
EK071: Reactive Phosphorus as P (Disso	lved)							
Reactive Phosphorus as P		0.10	mg/kg	0.34		0.17	0.49	

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Sub-Matrix: SOIL		Clie	ent sample ID	TP46 0.5-0.6	TP46 0.8-0.9	TP46 1.1-1.2	TP48 0-0.1	TP48 0.2-0.3
	Cli	ent samplii	ng date / time	15-JAN-2008 15:00				
Compound	CAS Number	LOR	Unit	EB0800746-037	EB0800746-038	EB0800746-039	EB0800746-040	EB0800746-041
EA002 : pH (Soils)								
pH Value		0.1	pH Unit	8.8	9.0	9.1	7.8	7.7
EA010: Conductivity								
Electrical Conductivity @ 25°C		1	μS/cm	150	334	364	66	13
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)		1.0	%	18.0	18.6	12.5	13.4	8.6
ED037: Alkalinity								
Alkalinity		1	meq/kg	128	74	510		2
Bicarbonate Alkalinity as CaCO3	71-52-3	1	meq/kg	124	70	499		2
Carbonate Alkalinity as CaCO3	3812-32-6	1	meq/kg	3	4	11		<1
ED040S: Soluble Major Anions								
Sulphate as SO4 2-	14808-79-8	10	mg/kg	<10	<10	<10	<10	<10
ED045: Chloride								
Chloride	16887-00-6	10	mg/kg	<10	270	280	<10	<10
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	30	20	20	10	<10
Magnesium	7439-95-4	10	mg/kg	<10	<10	<10	<10	<10
Sodium	7440-23-5	10	mg/kg	180	420	360	<10	<10
Potassium	7440-09-7	10	mg/kg	<10	<10	<10	60	10
EK040S: Fluoride Soluble								
Fluoride	16984-48-8	1	mg/kg	3		8	<1	
EK057: Nitrite as N								
Nitrite as N (Sol.)		0.1	mg/kg	0.4		<0.2		
EK058: Nitrate as N								
^ Nitrate as N (Sol.)		0.1	mg/kg	1.2		1.7		
EK059: Nitrite plus Nitrate as N (NOx)								
Nitrite + Nitrate as N (Sol.)		0.1	mg/kg	1.6		1.7		
EK071: Reactive Phosphorus as P (Dissol	ved)							
Reactive Phosphorus as P		0.10	mg/kg	<0.10		0.26		

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Sub-Matrix: SOIL		Clie	ent sample ID	TP48 0.5-0.6	TP48 0.8-0.9	TP48 1.1-1.2	TP35 0-0.1	TP35 0.2-0.3
	Cli	ent samplii	ng date / time	15-JAN-2008 15:00				
Compound	CAS Number	LOR	Unit	EB0800746-042	EB0800746-043	EB0800746-044	EB0800746-045	EB0800746-046
EA002 : pH (Soils)								
pH Value		0.1	pH Unit	7.4	7.6	7.5	7.0	7.4
EA010: Conductivity								
Electrical Conductivity @ 25°C		1	μS/cm	28	32	49	41	14
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)		1.0	%	9.1	5.7	7.0	9.3	7.7
ED037: Alkalinity								
Alkalinity		1	meq/kg	2	3	5	2	2
Bicarbonate Alkalinity as CaCO3	71-52-3	1	meq/kg	2	3	5	2	2
Carbonate Alkalinity as CaCO3	3812-32-6	1	meq/kg	<1	<1	<1	<1	<1
ED040S: Soluble Major Anions								
Sulphate as SO4 2-	14808-79-8	10	mg/kg	<10	<10	<10	<10	<10
ED045: Chloride								
Chloride	16887-00-6	10	mg/kg	<10	<10	<10	<10	<10
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	<10	<10	<10	20	<10
Magnesium	7439-95-4	10	mg/kg	<10	<10	<10	<10	<10
Sodium	7440-23-5	10	mg/kg	20	30	40	<10	<10
Potassium	7440-09-7	10	mg/kg	<10	<10	<10	30	<10
EK040S: Fluoride Soluble								
Fluoride	16984-48-8	1	mg/kg	<1		<1	<1	
EK057: Nitrite as N								
Nitrite as N (Sol.)		0.1	mg/kg			<0.1	0.3	
EK058: Nitrate as N								
^ Nitrate as N (Sol.)		0.1	mg/kg			0.8	20.4	
EK059: Nitrite plus Nitrate as N (NOx)								
Nitrite + Nitrate as N (Sol.)		0.1	mg/kg			0.8	20.6	
EK071: Reactive Phosphorus as P (Dissol	ved)							
Reactive Phosphorus as P		0.10	mg/kg			9.17	2.96	

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Client : CONNELL WAGNER PTY LTD

Project : H328128 SBRJV



Sub-Matrix: SOIL		Clie	ent sample ID	TP35 0.5-0.6	TP35 0.8-0.9	TP35 1.1-1.2	TP62 0-0.1	TP62 0.5-0.6
	Cli	ent samplii	ng date / time	15-JAN-2008 15:00	15-JAN-2008 15:00	15-JAN-2008 15:00	14-JAN-2008 15:00	14-JAN-2008 15:00
Compound	CAS Number	LOR	Unit	EB0800746-047	EB0800746-048	EB0800746-049	EB0800746-065	EB0800746-066
EA002 : pH (Soils)								
pH Value		0.1	pH Unit	7.4	7.4	7.4	7.5	7.4
EA010: Conductivity								
Electrical Conductivity @ 25°C		1	μS/cm	27	26	22	87	1980
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)		1.0	%	7.0	7.2	6.0	18.0	16.9
ED037: Alkalinity								
Alkalinity		1	meq/kg	3	2	2		
Bicarbonate Alkalinity as CaCO3	71-52-3	1	meq/kg	3	2	2		
Carbonate Alkalinity as CaCO3	3812-32-6	1	meq/kg	<1	<1	<1		
ED040S: Soluble Major Anions								
Sulphate as SO4 2-	14808-79-8	10	mg/kg	<10	<10	<10	10	5070
ED045: Chloride								
Chloride	16887-00-6	10	mg/kg	<10	<10	<10	<10	<10
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	10	10	<10	<10	1220
Magnesium	7439-95-4	10	mg/kg	<10	<10	<10	<10	370
Sodium	7440-23-5	10	mg/kg	<10	10	20	50	1170
Potassium	7440-09-7	10	mg/kg	10	<10	<10	<10	<10
EK040S: Fluoride Soluble								
Fluoride	16984-48-8	1	mg/kg	<1		<1	1	11
EK057: Nitrite as N								
Nitrite as N (Sol.)		0.1	mg/kg	0.2		<0.1		
EK058: Nitrate as N								
^ Nitrate as N (Sol.)		0.1	mg/kg	2.1		1.1		
EK059: Nitrite plus Nitrate as N (NOx)								
Nitrite + Nitrate as N (Sol.)		0.1	mg/kg	2.3		1.1		
EK071: Reactive Phosphorus as P (Disso	lved)							
Reactive Phosphorus as P		0.10	mg/kg	0.28		<0.10		

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Client : CONNELL WAGNER PTY LTD

Project : H328128 SBRJV

ALS

Sub-Matrix: SOIL		Clie	ent sample ID	TP62 0.8-0.9	TP62 1.1-1.2	TP58 0-0.1	TP58 0.2-0.3	TP58 0.5-0.6
	Cli	ent sampli	ng date / time	14-JAN-2008 15:00				
Compound	CAS Number	LOR	Unit	EB0800746-067	EB0800746-068	EB0800746-079	EB0800746-080	EB0800746-081
EA002 : pH (Soils)								
pH Value		0.1	pH Unit	7.2	6.5	7.2	7.5	7.6
EA010: Conductivity								
Electrical Conductivity @ 25°C		1	μS/cm	3350	1070	39	36	234
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)		1.0	%	15.6	13.1	25.0	23.1	19.6
ED037: Alkalinity								
Alkalinity		1	meq/kg		1	<1	<1	2
Bicarbonate Alkalinity as CaCO3	71-52-3	1	meq/kg		1	<1	<1	2
Carbonate Alkalinity as CaCO3	3812-32-6	1	meq/kg		<1	<1	<1	<1
ED040S: Soluble Major Anions								
Sulphate as SO4 2-	14808-79-8	10	mg/kg	11900	1700	<10	<10	<10
ED045: Chloride								
Chloride	16887-00-6	10	mg/kg	770	1040	<10	<10	90
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	3390	90	<10	<10	<10
Magnesium	7439-95-4	10	mg/kg	640	60	<10	<10	<10
Sodium	7440-23-5	10	mg/kg	1280	1120	<10	<10	20
Potassium	7440-09-7	10	mg/kg	<10	<10	<10	<10	<10
EK040S: Fluoride Soluble								
Fluoride	16984-48-8	1	mg/kg		4	<1		2
EK057: Nitrite as N								
Nitrite as N (Sol.)		0.1	mg/kg		<0.1	0.1		0.2
EK058: Nitrate as N								
^ Nitrate as N (Sol.)		0.1	mg/kg		0.3	7.6		0.9
EK059: Nitrite plus Nitrate as N (NOx)								
Nitrite + Nitrate as N (Sol.)		0.1	mg/kg		0.3	7.7		1.0
EK071: Reactive Phosphorus as P (Disso	olved)							
Reactive Phosphorus as P		0.10	mg/kg		<0.10	1.75		0.23

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Client : CONNELL WAGNER PTY LTD

Project : H328128 SBRJV

ALS

Sub-Matrix: SOIL		Clie	ent sample ID	TP58 0.8-0.9	TP58 1.1-1.2	TP13 0-0.1	TP13 0.5-0.6	TP13 1.1-1.2
	Cli	ent sampli	ng date / time	14-JAN-2008 15:00	14-JAN-2008 15:00	10-JAN-2008 15:00	10-JAN-2008 15:00	10-JAN-2008 15:00
Compound	CAS Number	LOR	Unit	EB0800746-082	EB0800746-083	EB0800746-089	EB0800746-091	EB0800746-093
EA002 : pH (Soils)								
pH Value		0.1	pH Unit	6.8	7.8	7.6	8.8	9.6
EA010: Conductivity								
Electrical Conductivity @ 25°C		1	μS/cm	512	515	221	295	691
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)		1.0	%	18.9	18.1	9.7	11.5	8.6
ED037: Alkalinity								
Alkalinity		1	meq/kg	<1			1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	meq/kg	<1			1	
Carbonate Alkalinity as CaCO3	3812-32-6	1	meq/kg	<1			<1	
ED040S: Soluble Major Anions								
Sulphate as SO4 2-	14808-79-8	10	mg/kg	20	<10	<10	<10	<10
ED045: Chloride								
Chloride	16887-00-6	10	mg/kg	1340	790		180	660
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	60	<10	<10	<10	<10
Magnesium	7439-95-4	10	mg/kg	60	<10	<10	<10	<10
Sodium	7440-23-5	10	mg/kg	470	50	<10	30	70
Potassium	7440-09-7	10	mg/kg	<10	<10	<10	<10	<10
EK040S: Fluoride Soluble								
Fluoride	16984-48-8	1	mg/kg		3	<1	6	6
EK057: Nitrite as N								
Nitrite as N (Sol.)		0.1	mg/kg				<0.1	<0.2
EK058: Nitrate as N								
^ Nitrate as N (Sol.)		0.1	mg/kg				2.6	1.3
EK059: Nitrite plus Nitrate as N (NOx)								
Nitrite + Nitrate as N (Sol.)		0.1	mg/kg				2.6	1.3
EK071: Reactive Phosphorus as P (Disse	olved)							
Reactive Phosphorus as P		0.10	mg/kg				<0.10	<0.25

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Client : CONNELL WAGNER PTY LTD

Project : H328128 SBRJV



Sub-Matrix: SOIL		Clie	ent sample ID	TP6 0-0.1	TP6 0.5-0.6	TP6 1.1-1.2	TP28 0-0.1	TP28 0.5-0.6
	Cli	ient sampli	ng date / time	09-JAN-2008 15:00	09-JAN-2008 15:00	09-JAN-2008 15:00	10-JAN-2008 15:00	10-JAN-2008 15:00
Compound	CAS Number	LOR	Unit	EB0800746-099	EB0800746-101	EB0800746-103	EB0800746-104	EB0800746-106
EA002 : pH (Soils)								
pH Value		0.1	pH Unit	8.5	8.7	9.1	8.9	8.8
EA010: Conductivity								
Electrical Conductivity @ 25°C		1	μS/cm	123	1050	926	107	841
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)		1.0	%	9.1	12.2	10.0	14.8	13.9
ED037: Alkalinity								
Alkalinity		1	meq/kg		9	11	1	58
Bicarbonate Alkalinity as CaCO3	71-52-3	1	meq/kg		9	9	1	57
Carbonate Alkalinity as CaCO3	3812-32-6	1	meq/kg		<1	1	<1	<1
ED040S: Soluble Major Anions								
Sulphate as SO4 2-	14808-79-8	10	mg/kg	<10	40	20	<10	50
ED045: Chloride								
Chloride	16887-00-6	10	mg/kg		720	1300	<10	920
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	<10	<10	<10	<10	<10
Magnesium	7439-95-4	10	mg/kg	<10	<10	<10	<10	<10
Sodium	7440-23-5	10	mg/kg	<10	120	50	<10	90
Potassium	7440-09-7	10	mg/kg	<10	<10	<10	<10	<10
EK040S: Fluoride Soluble								
Fluoride	16984-48-8	1	mg/kg		39	18	1	61
EK057: Nitrite as N								
Nitrite as N (Sol.)		0.1	mg/kg		<0.1	<0.1	<0.1	<0.1
EK058: Nitrate as N								
^ Nitrate as N (Sol.)		0.1	mg/kg		1.5	0.3	2.8	4.2
EK059: Nitrite plus Nitrate as N (NOx)								
Nitrite + Nitrate as N (Sol.)		0.1	mg/kg		1.5	0.3	2.8	4.2
EK071: Reactive Phosphorus as P (Disso	olved)							
Reactive Phosphorus as P		0.10	mg/kg		<0.10	<0.10	0.28	0.15

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Client : CONNELL WAGNER PTY LTD

Project : H328128 SBRJV



	Clie	ent sample ID	TP28 1.1-1.2	TP2 0.2	TP2 0.5	TP2 1.1	
Cli	ent samplii	ng date / time	10-JAN-2008 15:00	09-JAN-2008 15:00	09-JAN-2008 15:00	09-JAN-2008 15:00	
CAS Number	LOR	Unit	EB0800746-108	EB0800746-115	EB0800746-117	EB0800746-119	
	0.1	pH Unit	8.4	8.8	8.8	8.8	
	1	μS/cm	1340	93	171	491	
	1.0	%	8.0	8.1	13.3	13.3	
	1	meq/kg	1	<1	1	1	
71-52-3	1	meq/kg	<1	<1	1	1	
3812-32-6	1	meq/kg	<1	<1	<1	<1	
14808-79-8	10	mg/kg	2150	<10	<10	<10	
16887-00-6	10	mg/kg	670	<10	<10	500	
7440-70-2	10	mg/kg	210	<10	<10	<10	
7439-95-4	10	mg/kg	40	<10	<10	<10	
7440-23-5	10	mg/kg	1320	<10	20	50	
7440-09-7	10	mg/kg	<10	<10	<10	<10	
16984-48-8	1	mg/kg	3	3	18	3	
	0.1	mg/kg	<0.1	0.2	0.6	0.4	
	0.1	mg/kg	3.8	6.3	7.6	7.5	
	0.1	mg/kg	3.8	6.5	8.2	7.8	
ved)							
	0.10	mg/kg	<0.10	0.24	0.74	0.20	
	CAS Number 71-52-3 3812-32-6 14808-79-8 16887-00-6 7440-70-2 7439-95-4 7440-23-5 7440-09-7 16984-48-8	Client samplin CAS Number LOR 0.1 1 1.0 1 71-52-3 1 3812-32-6 1 14808-79-8 10 16887-00-6 10 7440-70-2 10 7440-70-2 10 7440-23-5 10 7440-09-7 10 16984-48-8 1 0.1 0.1 ved)	0.1 pH Unit 1 μS/cm 1 meq/kg 71-52-3 1 meq/kg 3812-32-6 1 meq/kg 14808-79-8 10 mg/kg 16887-00-6 10 mg/kg 7440-70-2 10 mg/kg 7440-23-5 10 mg/kg 7440-09-7 10 mg/kg 16984-48-8 1 mg/kg 0.1 mg/kg 0.1 mg/kg ved)	Client sampling date / time 10-JAN-2008 15:00 CAS Number LOR Unit EB0800746-108 0.1 pH Unit 8.4 1 μS/cm 1340 1.0 % 8.0 1 meq/kg 1 71-52-3 1 meq/kg <1	Client sampling date / time 10-JAN-2008 15:00 09-JAN-2008 15:00 CAS Number LOR Unit EB0800746-108 EB0800746-115 0.1 pH Unit 8.4 8.8 1 μS/cm 1340 93 1.0 % 8.0 8.1 1 meq/kg 1 <1	Client sampling date / time 10-JAN-2008 15:00 09-JAN-2008 15:00 09-JAN-2008 15:00 O9-JAN-2008 15:00	Cilent sampling date / time 10-JAN-2008 15:00 09-JAN-2008 15:00 D9-JAN-2008 15:00 EB0800746-119 10 13 13 13 13 13 13 13 13 13 13 13 13 13 13 13 13 13 <



MANSFIELD LABORATORY

1/51 Secam Street, Mansfield QLD 4122 PO Box 2034 Mansfield DC QLD 4122 Phone:(07) 3343 3166 Fax:(07) 3849 4705 www.golder.com.au

TEST RESULTS

Client:

ALS Environmental Brisbane

Address:

32 Shand Street, Stafford

Project: Batch No.: **Delivered Samples** EB0800746

Report No.:

R6959

Job No.:

087634002/8

Date Received: 17/04/2008

Sampled by: Client

EMERSON CLASSIFICATION

	Sample			Emerson
Reg'n No.	No.	Sample ID	Description	Classification Number
0832597	1	TP19 0-0.1	(SC) Clayey SAND, brown	Number 6
0832598	15	TP68 0-0.1	(CH) Silty CLAY, dark brown	6
0832599	16	TP68 0.2-0.3	(CH) Silty CLAY, dark grey	4
0832600	17	TP68 0.5-0.6	(CH) Silty CLAY, dark grey	4
0832601	18	TP68 0.8-0.9	(CH) Silty CLAY, dark grey	4
0832602	19	TP68 1.1-1.2	(CH) Silty CLAY, dark grey	4
0832603	20	TP67 0.0-0.1	(CH) Silty CLAY, dark grey & brown	4
0832604	21	TP67 0.2-0.3	(CH) Silty CLAY, dark grey	6
0832605	22	TP67 0.5-0.6	(CH) Silty CLAY, dark grey	4
0832606	23	TP67 0.8-0.9	(CH) Silty CLAY, dark grey	4
0832607	24	TP67 1.1-1.2	(CH) Silty CLAY, dark grey	4
0832608	25	TP69 0.0-0.1	(CH) Sandy CLAY, dark grey	4
0832609	26	TP69 0.2-0.3	(CH) Silty CLAY, dark grey	4
0832610	27	TP69 0.5-0.6	(CH) Silty CLAY, dark grey	4
0832611	28	TP69 0.8-0.9	(CH) Silty CLAY, dark grey	2
0832612	29	TP69 1.1-1.2	(CH) Silty CLAY, browm	2
0832613	30	TP45 0.0-0.1	(CH) Silty CLAY, dark brown	4
0832614	31	TP45 0.2-0.3	(CH) Silty CLAY, dark brown	6
0832615	32	TP45 0.5-0.6	(CH) Silty CLAY, dark brown	4
0832616	33	TP45 0.8-0.9	(CH) Silty CLAY, dark brown	4
0832617	34	TP45 1.1-1.2	(CH) Silty CLAY, brown	4
0832618	35	TP46 0.0-0.1	(CI) Sandy CLAY, brown	4
0832619	36	TP46 0.2-0.3	(CH) Silty CLAY, dark grey	6
0832620	37	TP46 0.5-0.6	(CH) Silty CLAY, dark grey	4
0832621	38	TP46 0.8-0.9	(CH) Silty CLAY, dark grey	4
0832622	39	TP46 1.1-1.2	(CH) Silty CLAY, dark grey	4
0832623	40	TP48 0.0-0.1	(SC) Clayey SAND, brown	6
0832624	41	TP48 0.2-0.3	(SC) Clayey SAND, brown	6
0832625	42	TP48 0.5-0.6	(CH) Sandy CLAY, brown	3
0832626	43	TP48 0.8-0.9	(CI) Sandy CLAY, brown	3
0832627	44	TP48 1.1-1.2	(CI) Sandy CLAY, brown	3

Remarks: Deionised water at 23 °C used in Emerson Class test.

Test Procedure : AS 1289 3.8.1

Prepared by NF

Checked by 瓜

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N Jam 30/4/8 **Authorised Signatory**



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TEST RESULTS

Client : Address: ALS Environmental Brisbane

Project:

32 Shand Street, Stafford **Delivered Samples**

Batch No.:

EB0800746

Report No.: R6959

Job No.:

087634002/8

Date Received: 17/04/2008

Sampled by: Client

EMERSON CLASSIFICATION

			Emerson
· ·			Classification
No.	Sample ID	Description	Number
45	TP35 0.0-0.1	(SC) Clayey SAND, dark brown	6
46	TP35 0.2-0.3	(SC) Clayey SAND, brown	6
47	TP35 0.5-0.6	(SC) Clayey SAND, red brown	6
48	TP35 0.8-0.9	(SC) Clayey SAND, red brown	6
49	TP35 1.1-1.2	(CI) Sandy CLAY, red brown	6
65	TP62 0.0-0.1	(CH) Silty CLAY, dark grey	6
66	TP62 0.5-0.6		2
67	TP62 0.8-0.9	(CH) Silty CLAY, brown	2
68	TP62 1.1-1.2	(CH) Silty CLAY, brown	2
79	TP58 0.0-0.1	(CH) Silty CLAY, red brown	6
80	TP58 0.2-0.3	(CH) Silty CLAY, brown	6
81	TP58 0.5-0.6	(CH) Silty CLAY, dark brown	5
82	TP58 0.8-0.9	(CH) Silty CLAY, dark brown	6
83	TP58 1.1-1.2	(CH) Sandy CLAY, brown	4
89	TP13 0.0-0.1	(CI) Sandy CLAY, brown	5
99	TP6 0.0-0.1	(CH) Sandy CLAY, dark grey	4
104	TP28 0.0-0.1	(CH) Sandy CLAY, dark brown	4
105	TP2 0.2	(CI) Sandy CLAY, brown	6
	46 47 48 49 65 66 67 68 79 80 81 82 83 89 99	No. Sample ID 45 TP35 0.0-0.1 46 TP35 0.2-0.3 47 TP35 0.5-0.6 48 TP35 0.8-0.9 49 TP35 1.1-1.2 65 TP62 0.0-0.1 66 TP62 0.8-0.9 68 TP62 1.1-1.2 79 TP58 0.0-0.1 80 TP58 0.2-0.3 81 TP58 0.5-0.6 82 TP58 0.8-0.9 83 TP58 1.1-1.2 89 TP13 0.0-0.1 99 TP6 0.0-0.1 104 TP28 0.0-0.1	No. Sample ID Description 45 TP35 0.0-0.1 (SC) Clayey SAND, dark brown 46 TP35 0.2-0.3 (SC) Clayey SAND, brown 47 TP35 0.5-0.6 (SC) Clayey SAND, red brown 48 TP35 0.8-0.9 (SC) Clayey SAND, red brown 49 TP35 1.1-1.2 (CI) Sandy CLAY, red brown 65 TP62 0.0-0.1 (CH) Silty CLAY, dark grey 66 TP62 0.5-0.6 (CH) Silty CLAY, brown 68 TP62 1.1-1.2 (CH) Silty CLAY, brown 79 TP58 0.0-0.1 (CH) Silty CLAY, red brown 80 TP58 0.2-0.3 (CH) Silty CLAY, brown 81 TP58 0.5-0.6 (CH) Silty CLAY, dark brown 82 TP58 0.8-0.9 (CH) Silty CLAY, dark brown 83 TP58 1.1-1.2 (CH) Sandy CLAY, brown 89 TP13 0.0-0.1 (CH) Sandy CLAY, dark grey 104 TP28 0.0-0.1 (CH) Sandy CLAY, dark brown

Remarks: Deionised water at 23 °C used in Emerson Class test.

Test Procedure: AS 1289 3.8.1

Prepared by NA

Checked by JA

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Authorised Signatory

ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES



Environmental Division

QUALITY CONTROL REPORT

Work Order : **EB0800746** Page : 1 of 10

Client : CONNELL WAGNER PTY LTD Laboratory : Environmental Division Brisbane

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Project : H328128 SBRJV QC Level : NEPM 1999 Schedule B(3) and ALS QCS3 requirement

Site : Surat Basin

C-O-C number : ---- Date Samples Received : 12-APR-2008

Sampler : M.Harrison Issue Date : 02-MAY-2008
Order number : ----

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

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A Campbell Brothers Limited Company

Page : 2 of 10 Work Order : EB0800746

Client : CONNELL WAGNER PTY LTD

Project : H328128 SBRJV



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

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Client : CONNELL WAGNER PTY LTD

Project : H328128 SBRJV



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	t	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA002 : pH (Soils)	(QC Lot: 638412)								
EB0800746-020	TP67 0-0.1	EA002: pH Value		0.1	pH Unit	8.5	8.4	0.0	0% - 20%
EB0800746-030	TP45 0-0.1	EA002: pH Value		0.1	pH Unit	8.7	8.6	0.0	0% - 20%
EA002 : pH (Soils)	(QC Lot: 638422)								
EB0800746-040	TP48 0-0.1	EA002: pH Value		0.1	pH Unit	7.8	7.8	0.0	0% - 20%
EB0800746-049	TP35 1.1-1.2	EA002: pH Value		0.1	pH Unit	7.4	7.4	0.0	0% - 20%
EA002 : pH (Soils)	(QC Lot: 638432)								
EB0800746-099	TP6 0-0.1	EA002: pH Value		0.1	pH Unit	8.5	8.5	0.0	0% - 20%
EB0800746-119	TP2 1.1	EA002: pH Value		0.1	pH Unit	8.8	9.1	2.7	0% - 20%
EA010: Conductivity	v (QC Lot: 638417)								
EB0800746-020	TP67 0-0.1	EA010: Electrical Conductivity @ 25°C		1	μS/cm	139	127	9.0	0% - 20%
EB0800746-030	TP45 0-0.1	EA010: Electrical Conductivity @ 25°C		1	μS/cm	130	126	3.1	0% - 20%
EA010: Conductivity									
EB0800746-040	TP48 0-0.1	EA010: Electrical Conductivity @ 25°C		1	µS/cm	66	65	1.5	0% - 20%
EB0800746-049	TP35 1.1-1.2	EA010: Electrical Conductivity @ 25°C		1	μS/cm	22	23	4.4	0% - 20%
EA010: Conductivity		Enterto: Electrical Conductivity & 20 C			μονοιιι				0,0 20,0
EB0800746-099	TP6 0-0.1	EA010: Electrical Conductivity @ 25°C		1	μS/cm	123	122	0.8	0% - 20%
EB0800746-119	TP2 1.1	EA010: Electrical Conductivity @ 25°C		1	μS/cm	491	491	0.0	0% - 20%
	ontent (QC Lot: 636072)	Enterto: Electrical Conductivity & 20 C		·	μονοιιι			0.0	0,0 20,0
EB0800746-016	TP68 0.2-0.3	EA055-103: Moisture Content (dried @ 103°C)		1.0	%	14.8	15.4	3.4	0% - 50%
EB0800746-023	TP67 0.8-0.9	EA055-103: Moisture Content (dried @ 103°C)		1.0	%	16.8	16.8	0.0	0% - 50%
	ontent (QC Lot: 636073)					10.0			2,1
EB0800746-036	TP46 0.2-0.3	EA055-103: Moisture Content (dried @ 103°C)		1.0	%	20.4	17.8	14.1	0% - 50%
EB0800746-043	TP48 0.8-0.9	EA055-103: Moisture Content (dried @ 103°C)		1.0	%	5.7	5.8	3.0	No Limit
EA055: Moisture Co	ontent (QC Lot: 636074)								
EB0800746-081	TP58 0.5-0.6	EA055-103: Moisture Content (dried @ 103°C)		1.0	%	19.6	19.6	0.0	0% - 50%
EB0800746-101	TP6 0.5-0.6	EA055-103: Moisture Content (dried @ 103°C)		1.0	%	12.2	12.2	0.0	0% - 50%
EA055: Moisture Co	ontent (QC Lot: 639186)								
EB0804964-005	Anonymous	EA055-103: Moisture Content (dried @ 103°C)		1.0	%	8.2	7.8	5.0	No Limit
EB0804964-012	Anonymous	EA055-103: Moisture Content (dried @ 103°C)		1.0	%	8.0	8.7	8.1	No Limit
ED007: Exchangeat	ole Cations (QC Lot: 6390								
EB0800746-001	TP19 0-0.1	ED007: Exchangeable Calcium		0.1	meg/100g	2.0	2.0	0.0	0% - 20%
		ED007: Exchangeable Magnesium		0.1	meg/100g	0.5	0.5	0.0	No Limit
		ED007: Exchangeable Potassium		0.1	meq/100g	0.8	0.8	0.0	No Limit
		ED007: Exchangeable Sodium		0.1	meq/100g	0.3	0.3	0.0	No Limit
EB0800746-024	TP67 1.1-1.2	ED007: Exchangeable Calcium		0.1	meq/100g	36.0	34.8	3.3	0% - 20%
		ED007: Exchangeable Magnesium		0.1	meq/100g	20.3	19.8	2.1	0% - 20%
		ED007: Exchangeable Potassium		0.1	meq/100g	0.5	0.6	0.0	No Limit

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Client : CONNELL WAGNER PTY LTD



Sub-Matrix: SOIL						Laboratory I	Duplicate (DUP) Repor	t	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
ED007: Exchangeab	ole Cations (QC Lot: 6	39086) - continued							
EB0800746-024	TP67 1.1-1.2	ED007: Exchangeable Sodium		0.1	meq/100g	6.3	6.2	2.3	0% - 20%
ED007: Exchangeab	ole Cations (QC Lot: 6	39087)							
EB0800746-044	TP48 1.1-1.2	ED007: Exchangeable Calcium		0.1	meq/100g	9.6	10.0	3.7	0% - 20%
		ED007: Exchangeable Magnesium		0.1	meq/100g	6.1	6.1	0.0	0% - 20%
		ED007: Exchangeable Potassium		0.1	meq/100g	1.3	1.3	0.0	0% - 50%
		ED007: Exchangeable Sodium		0.1	meq/100g	1.0	0.9	12.9	No Limit
EB0800746-081	TP58 0.5-0.6	ED007: Exchangeable Calcium		0.1	meq/100g	25.5	23.5	8.3	0% - 20%
		ED007: Exchangeable Magnesium		0.1	meq/100g	23.5	21.8	7.5	0% - 20%
		ED007: Exchangeable Potassium		0.1	meq/100g	1.0	0.9	0.0	No Limit
		ED007: Exchangeable Sodium		0.1	meq/100g	2.4	2.4	0.0	0% - 20%
ED007: Exchangeab	ole Cations (QC Lot: 6	39088)							
EB0800746-117	TP2 0.5	ED007: Exchangeable Calcium		0.1	meq/100g	33.1	39.4	17.3	0% - 20%
		ED007: Exchangeable Magnesium		0.1	meq/100g	6.1	7.3	17.5	0% - 20%
		ED007: Exchangeable Potassium		0.1	meq/100g	0.5	0.6	0.0	No Limit
		ED007: Exchangeable Sodium		0.1	meq/100g	2.2	2.6	16.9	0% - 20%
ED037: Alkalinity (C	QC Lot: 638421)								
EB0800746-020	TP67 0-0.1	ED037: Alkalinity		1	meq/kg	19	19	0.0	0% - 50%
ED037: Alkalinity (C	QC Lot: 638431)								
EB0800746-049	TP35 1.1-1.2	ED037: Alkalinity		1	meq/kg	2	2	0.0	No Limit
ED040S: Soluble Ma	ajor Anions (QC Lot: 6	38416)							
EB0800746-020	TP67 0-0.1	ED040S: Sulphate as SO4 2-	14808-79-8	10	mg/kg	10	20	0.0	No Limit
EB0800746-030	TP45 0-0.1	ED040S: Sulphate as SO4 2-	14808-79-8	10	mg/kg	20	20	0.0	No Limit
FD040S: Soluble Ma	ajor Anions (QC Lot: 6				3 3				
EB0800746-040	TP48 0-0.1	ED040S: Sulphate as SO4 2-	14808-79-8	10	mg/kg		10	# Not	No Limit
LB00007 40 040	11 40 0 0.1	EB0400. Galphate as 004 2	14000 70 0	10	mg/kg		10	Determined	NO Ellint
EB0800746-049	TP35 1.1-1.2	ED040S: Sulphate as SO4 2-	14808-79-8	10	mg/kg	<10	<10	0.0	No Limit
FD040S: Soluble Ma	ajor Anions (QC Lot: 6				3 3				
EB0800746-119	TP2 1.1	ED040S: Sulphate as SO4 2-	14808-79-8	10	mg/kg	<10	<10	0.0	No Limit
		ED0400. Outpriate as 004 2-	14000 70 0	10	mg/kg	-10	110	0.0	NO Ellille
ED045: Chloride (Q EB0800746-020	TP67 0-0.1	EDO45S: Chloride	16887-00-6	10	ma/ka	<10	<10	0.0	No Limit
EB0800746-020	TP45 0-0.1	EDO45S: Chloride EDO45S: Chloride	16887-00-6	10	mg/kg mg/kg	<10	<10	0.0	No Limit
		ED0455: Chloride	10007-00-0	10	mg/kg	<10	<10	0.0	NO LIMIT
ED045: Chloride (Q		EDO 450: Oblacida	40007.00.0	40		-40	.40	0.0	No. 1 See 16
EB0800746-049	TP35 1.1-1.2	EDO45S: Chloride	16887-00-6	10	mg/kg	<10	<10	0.0	No Limit
ED045: Chloride (Q	•								
EB0800746-119	TP2 1.1	EDO45S: Chloride	16887-00-6	10	mg/kg	500	430	15.0	0% - 20%
	ajor Cations (QC Lot: (<u> </u>							I
EB0800746-020	TP67 0-0.1	ED093S: Calcium	7440-70-2	10	mg/kg	90	80	11.7	No Limit
		ED093S: Magnesium	7439-95-4	10	mg/kg	20	20	0.0	No Limit
		ED093S: Sodium	7440-23-5	10	mg/kg	30	20	0.0	No Limit
		ED093S: Potassium	7440-09-7	10	mg/kg	40	40	0.0	No Limit
EB0800746-030	TP45 0-0.1	ED093S: Calcium	7440-70-2	10	mg/kg	70	70	0.0	No Limit
		ED093S: Magnesium	7439-95-4	10	mg/kg	10	10	0.0	No Limit

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Client : CONNELL WAGNER PTY LTD



					1		Duplicate (DUP) Repor		1
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%
D093S: Soluble Ma	ajor Cations (QC Lot: 6	38420) - continued							
EB0800746-030	TP45 0-0.1	ED093S: Sodium	7440-23-5	10	mg/kg	40	40	0.0	No Limit
		ED093S: Potassium	7440-09-7	10	mg/kg	30	30	0.0	No Limit
D093S: Soluble Ma	ajor Cations (QC Lot: 6	38430)							
EB0800746-040	TP48 0-0.1	ED093S: Calcium	7440-70-2	10	mg/kg		20	# Not	No Limit
								Determined	
		ED093S: Magnesium	7439-95-4	10	mg/kg		10	# Not	No Limit
			7440.00.5	40	,,		40	Determined	N. 1
		ED093S: Sodium	7440-23-5	10	mg/kg		<10	# Not Determined	No Limit
		ED093S: Potassium	7440-09-7	10	mg/kg		80	# Not	No Limit
		ED0933. Foldsslulli	7440-03-7	10	mg/kg		80	Determined	NO LITTIL
EB0800746-049	TP35 1.1-1.2	ED093S: Calcium	7440-70-2	10	mg/kg	<10	<10	0.0	No Limit
		ED093S: Magnesium	7439-95-4	10	mg/kg	<10	<10	0.0	No Limit
		ED093S: Sodium	7440-23-5	10	mg/kg	20	10	0.0	No Limit
		ED093S: Potassium	7440-09-7	10	mg/kg	<10	<10	0.0	No Limit
D093S: Soluble Ma	ajor Cations (QC Lot: 6	38436)							
EB0800746-119	TP2 1.1	ED093S: Calcium	7440-70-2	10	mg/kg	<10	<10	0.0	No Limit
		ED093S: Magnesium	7439-95-4	10	mg/kg	<10	<10	0.0	No Limit
		ED093S: Sodium	7440-23-5	10	mg/kg	50	40	22.6	No Limit
		ED093S: Potassium	7440-09-7	10	mg/kg	<10	<10	0.0	No Limit
K040S: Fluoride So	oluble (QC Lot: 638419								
EB0800746-020	TP67 0-0.1	EK040S: Fluoride	16984-48-8	1	mg/kg	1	<1	0.0	No Limit
K040S: Fluoride So	oluble (QC Lot: 638429								
EB0800746-040	TP48 0-0.1	EK040S: Fluoride	16984-48-8	1	mg/kg	<1	2	81.2	No Limit
EB0800746-049	TP35 1.1-1.2	EK040S: Fluoride	16984-48-8	1	mg/kg	<1	<1	0.0	No Limit
K040S: Fluoride So	oluble (QC Lot: 638441								
EB0800746-119	TP2 1.1	EK040S: Fluoride	16984-48-8	1	mg/kg	3	6	77.7	No Limit
EK057: Nitrite as N	(QC Lot: 638414)								
EB0800746-020	TP67 0-0.1	EK057: Nitrite as N (Sol.)		0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EB0800746-030	TP45 0-0.1	EK057: Nitrite as N (Sol.)		0.1	mg/kg	<0.1	<0.1	0.0	No Limit
K057: Nitrite as N	(QC Lot: 638424)								
EB0800746-049	TP35 1.1-1.2	EK057: Nitrite as N (Sol.)		0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EK057: Nitrite as N	(QC Lot: 638438)								
EB0800746-119	TP2 1.1	EK057: Nitrite as N (Sol.)		0.1	mg/kg	0.4	0.3	0.0	No Limit
K059: Nitrite plus I	Nitrate as N (NOx) (QC								
EB0800746-020	TP67 0-0.1	EK059: Nitrite + Nitrate as N (Sol.)		0.1	mg/kg	20.3	20.3	0.0	0% - 20%
EB0800746-030	TP45 0-0.1	EK059: Nitrite + Nitrate as N (Sol.)		0.1	mg/kg	2.1	2.1	0.0	0% - 20%
	Nitrate as N (NOx) (QC				3 3				1
EB0800746-049	TP35 1.1-1.2	EK059: Nitrite + Nitrate as N (Sol.)		0.1	mg/kg	1.1	1.1	0.0	0% - 50%
	Nitrate as N (NOx) (QC			U. 1	9/1/9	1.1	1.1	0.0	3,3 00,0
EB0800746-119	TP2 1.1	EK059: Nitrite + Nitrate as N (Sol.)		0.1	mg/kg	7.8	7.5	4.1	0% - 20%

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Client : CONNELL WAGNER PTY LTD



Sub-Matrix: SOIL						Laboratory D	Ouplicate (DUP) Report		
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EK071: Reactive Pho	osphorus as P (Dissolved) (QC Lot: 638415)							
EB0800746-020	TP67 0-0.1	EK071: Reactive Phosphorus as P		0.10	mg/kg	0.28	0.31	7.4	No Limit
EB0800746-030	TP45 0-0.1	EK071: Reactive Phosphorus as P		0.10	mg/kg	1.74	1.82	4.8	0% - 50%
EK071: Reactive Pho	osphorus as P (Dissolved) (QC Lot: 638425)							
EB0800746-049	TP35 1.1-1.2	EK071: Reactive Phosphorus as P		0.10	mg/kg	<0.10	<0.10	0.0	No Limit
EK071: Reactive Pho	osphorus as P (Dissolved) (QC Lot: 638439)							
EB0800746-119	TP2 1.1	EK071: Reactive Phosphorus as P		0.10	mg/kg	0.20	0.16	18.5	No Limit

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Client : CONNELL WAGNER PTY LTD

Project : H328128 SBRJV



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)		Laboratory Control Spike (LC	S) Report	
				Report	Spike	Spike Recovery (%)	Recovery	Limits (%)
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA010: Conductivity (QCLot: 638417)								
EA010: Electrical Conductivity @ 25°C		1	μS/cm	<1	1413 μS/cm	100	98.2	102
EA010: Conductivity (QCLot: 638427)								
EA010: Electrical Conductivity @ 25°C		1	μS/cm	<1	1413 μS/cm	100	98.2	102
EA010: Conductivity (QCLot: 638435)								
EA010: Electrical Conductivity @ 25°C		1	μS/cm	<1	1413 μS/cm	99.9	98.2	102
ED007: Exchangeable Cations (QCLot: 639086)								
ED007: Exchangeable Calcium		0.1	meg/100g	<0.1	0.294 meg/100g	86.7	70.2	105
ED007: Exchangeable Magnesium		0.1	meq/100g	<0.1	0.154 meq/100g	89.5	76.4	110
ED007: Exchangeable Potassium		0.1	meq/100g	<0.1	0.04 meq/100g	73.0	70	95.3
ED007: Exchangeable Sodium		0.1	meq/100g	<0.1	0.102 meq/100g	96.2	70	104
ED007: Cation Exchange Capacity		0.1	meq/100g		0.59 meq/100g	88.0	70.1	104
ED007: Exchangeable Cations (QCLot: 639087)								
ED007: Exchangeable Calcium		0.1	meq/100g	<0.1	0.294 meq/100g	87.0	70.2	105
ED007: Exchangeable Magnesium		0.1	meq/100g	<0.1	0.154 meq/100g	83.5	76.4	110
ED007: Exchangeable Potassium		0.1	meq/100g	<0.1	.04 meq/100g	92.0	70	95.3
ED007: Exchangeable Sodium		0.1	meq/100g	<0.1	0.102 meq/100g	88.8	70	104
ED007: Cation Exchange Capacity		0.1	meq/100g		0.59 meq/100g	73.0	70.1	104
ED007: Exchangeable Cations (QCLot: 639088)								
ED007: Exchangeable Calcium		0.1	meq/100g	<0.1	0.294 meq/100g	88.4	70.2	105
ED007: Exchangeable Magnesium		0.1	meq/100g	<0.1	0.154 meq/100g	94.6	76.4	110
ED007: Exchangeable Potassium		0.1	meq/100g	<0.1	0.04 meq/100g	92.3	70	95.3
ED007: Exchangeable Sodium		0.1	meq/100g	<0.1	0.102 meq/100g	88.8	70	104
ED007: Cation Exchange Capacity		0.1	meq/100g		0.59 meq/100g	90.2	70.1	104
ED037: Alkalinity (QCLot: 638421)								
ED037: Alkalinity		1	meq/kg	<1	500 meq/kg	93.8	85	105
ED037: Alkalinity (QCLot: 638431)								
ED037: Alkalinity		1	meq/kg	<1	500 meq/kg	93.8	85	105
ED037: Alkalinity (QCLot: 638437)								
ED037: Alkalinity		1	meq/kg	<1	500 meg/kg	92.6	85	105
ED040S: Soluble Major Anions (QCLot: 638416)								
ED040S: Sulphate as SO4 2-	14808-79-8	10	mg/kg	<10				
ED040S: Soluble Major Anions (QCLot: 638426)								
ED040S: Sulphate as SO4 2-	14808-79-8	10	mg/kg	<10				
ED040S: Soluble Major Anions (QCLot: 638434)	. 1000 70 0		1119/119	-10				
ED040S: Soluble Wajor Anions (QCLot: 638434) ED040S: Sulphate as SO4 2-	14808-79-8	10	ma/ka	<10				
EDU403. Suipridle as SU4 2-	14000-19-0	10	mg/kg	\10				

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Client : CONNELL WAGNER PTY LTD



Sub-Matrix: SOIL				Method Blank (MB)		Laboratory Control Spike (LC	S) Report	
				Report	Spike	Spike Recovery (%)	Recovery	Limits (%)
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
ED045: Chloride (QCLot: 638413)								
EDO45S: Chloride	16887-00-6	10	mg/kg	<10	5000 mg/kg	91.2	74	121
ED045: Chloride (QCLot: 638423)								
EDO45S: Chloride	16887-00-6	10	mg/kg	<10	5000 mg/kg	104	74	121
ED045: Chloride (QCLot: 638433)			gg		5555			
EDO45S: Chloride	16887-00-6	10	mg/kg	<10	5000 mg/kg	99.2	74	121
	10007 00 0	10	mg/kg	110	oooo mgaxg	00.2		121
ED093S: Soluble Major Cations (QCLot: 638420) ED093S: Calcium	7440-70-2	10	ma/ka	<10				
ED093S: Magnesium	7439-95-4	10	mg/kg mg/kg	<10				
ED093S: Sodium	7440-23-5	10	mg/kg	<10				
ED093S: Potassium	7440-09-7	10	mg/kg	<10				
	7440 00 7	10	mg/kg	110				
ED093S: Soluble Major Cations (QCLot: 638430) ED093S: Calcium	7440-70-2	40		-10				
1111	7440-70-2	10 10	mg/kg	<10 <10				
ED093S: Magnesium ED093S: Sodium	7439-95-4	10	mg/kg mg/kg	<10				
ED093S: Potassium	7440-23-3	10	mg/kg	<10				
	7440-09-7	10	ilig/kg	<10				
ED093S: Soluble Major Cations (QCLot: 638436)	7440 70 0	4.0		.40				
ED093S: Calcium	7440-70-2	10	mg/kg	<10				
ED093S: Magnesium	7439-95-4	10	mg/kg	<10				
ED093S: Sodium	7440-23-5	10	mg/kg	<10				
ED093S: Potassium	7440-09-7	10	mg/kg	<10				
EK040S: Fluoride Soluble (QCLot: 638419)								
EK040S: Fluoride	16984-48-8	1	mg/kg	<1				
		1.0	mg/kg		50.0 mg/kg	90.0	73.5	107
EK040S: Fluoride Soluble (QCLot: 638429)								
EK040S: Fluoride	16984-48-8	1	mg/kg	<1				
		1.0	mg/kg		50.0 mg/kg	81.0	73.5	107
EK040S: Fluoride Soluble (QCLot: 638441)								
EK040S: Fluoride	16984-48-8	1	mg/kg	<1				
		1.0	mg/kg		50.0 mg/kg	83.6	73.5	107
EK057: Nitrite as N (QCLot: 638414)								
EK057: Nitrite as N (Sol.)		0.1	mg/kg	<0.1				
		0.10	mg/kg		2.5 mg/kg	104	95.5	119
EK057: Nitrite as N (QCLot: 638424)								
EK057: Nitrite as N (Sol.)		0.1	mg/kg	<0.1				
		0.10	mg/kg		2.5 mg/kg	103	95.5	119
EK057: Nitrite as N (QCLot: 638438)								
EK057: Nitrite as N (Sol.)		0.1	mg/kg	<0.1				
		0.10	mg/kg		2.5 mg/kg	103	95.5	119
EK059: Nitrite plus Nitrate as N (NOx) (QCLot: 638418)								
The place initiate as it (its) (4.525t. 555416)								

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Client : CONNELL WAGNER PTY LTD



Sub-Matrix: SOIL				Method Blank (MB)		Laboratory Control Spike (LC	S) Report	
				Report	Spike	Spike Recovery (%)	Recovery	Limits (%)
Method: Compound CAS I	Number	LOR	Unit	Result	Concentration	LCS	Low	High
EK059: Nitrite plus Nitrate as N (NOx) (QCLot: 638418) - continue	d							
EK059: Nitrite + Nitrate as N (Sol.)		0.1	mg/kg	<0.1				
		0.10	mg/kg		2.5 mg/kg	100	84.6	127
EK059: Nitrite plus Nitrate as N (NOx) (QCLot: 638428)								
EK059: Nitrite + Nitrate as N (Sol.)		0.1	mg/kg	<0.1				
		0.10	mg/kg		2.5 mg/kg	102	84.6	127
EK059: Nitrite plus Nitrate as N (NOx) (QCLot: 638440)								
EK059: Nitrite + Nitrate as N (Sol.)		0.1	mg/kg	<0.1				
		0.10	mg/kg		2.5 mg/kg	101	84.6	127
EK071: Reactive Phosphorus as P (Dissolved) (QCLot: 638415)								
EK071: Reactive Phosphorus as P		0.1	mg/kg		5.0 mg/kg	100	92.8	109
		0.10	mg/kg	<0.10				
EK071: Reactive Phosphorus as P (Dissolved) (QCLot: 638425)								
EK071: Reactive Phosphorus as P		0.1	mg/kg		5.0 mg/kg	103	92.8	109
		0.10	mg/kg	<0.10				
EK071: Reactive Phosphorus as P (Dissolved) (QCLot: 638439)								
EK071: Reactive Phosphorus as P		0.1	mg/kg		5.0 mg/kg	103	92.8	109
		0.10	mg/kg	<0.10				

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Client : CONNELL WAGNER PTY LTD

Project : H328128 SBRJV



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.

Sub-Matrix: SOIL					Matrix Spike (MS) Repo	rt	
				Spike	Spike Recovery (%)	Recovery Li	mits (%)
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED045: Chloride (Q0	CLot: 638413)						
EB0800746-001	TP19 0-0.1	EDO45S: Chloride	16887-00-6	2000 mg/kg	101	70	130
EK057: Nitrite as N	QCLot: 638414)						
EB0800746-001	TP19 0-0.1	EK057: Nitrite as N (Sol.)		2.0 mg/kg	112	70	130
EK057: Nitrite as N	QCLot: 638424)						
EB0800746-034	TP45 1.1-1.2	EK057: Nitrite as N (Sol.)		2.0 mg/kg	102	70	130
EK057: Nitrite as N	QCLot: 638438)						
EB0800746-101	TP6 0.5-0.6	EK057: Nitrite as N (Sol.)		2.0 mg/kg	95.3	70	130
EK059: Nitrite plus N	litrate as N (NOx) (QCLot: 638418)						
EB0800746-001	TP19 0-0.1	EK059: Nitrite + Nitrate as N (Sol.)		2.0 mg/kg	# Not Determined	70	130
EK059: Nitrite plus N	litrate as N (NOx) (QCLot: 638428)						
EB0800746-034	TP45 1.1-1.2	EK059: Nitrite + Nitrate as N (Sol.)		2.0 mg/kg	92.7	70	130
EK059: Nitrite plus N	litrate as N (NOx) (QCLot: 638440)						
EB0800746-068	TP62 1.1-1.2	EK059: Nitrite + Nitrate as N (Sol.)		2.0 mg/kg	89.0	70	130
EK071: Reactive Pho	sphorus as P (Dissolved) (QCLot: 638415)						
EB0800746-001	TP19 0-0.1	EK071: Reactive Phosphorus as P		2.0 mg/kg	103	70	130
EK071: Reactive Pho	esphorus as P (Dissolved) (QCLot: 638425)						
EB0800746-034	TP45 1.1-1.2	EK071: Reactive Phosphorus as P		2.0 mg/kg	93.2	70	130
EK071: Reactive Pho	osphorus as P (Dissolved) (QCLot: 638439)						
EB0800746-101	TP6 0.5-0.6	EK071: Reactive Phosphorus as P		2.0 mg/kg	75.3	70	130

ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES



Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order : **EB0800746** Page : 1 of 18

Client : CONNELL WAGNER PTY LTD Laboratory : Environmental Division Brisbane

Contact : MS MONIQUE HARRISON Contact : Tim Kilmister

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Project : H328128 SBRJV QC Level : NEPM 1999 Schedule B(3) and ALS QCS3 requirement

Site : Surat Basin

C-O-C number : ---- Date Samples Received : 12-APR-2008

Sampler : M.Harrison Issue Date : 02-MAY-2008
Order number :----

No. of samples received : 119

Quote number : BN/189/08 No. of samples analysed : 59

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 Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Page : 2 of 18
Work Order : EB0800746

Client : CONNELL WAGNER PTY LTD

Project : H328128 SBRJV



Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non-volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

Matrix: SOIL

Method		Sample Date	Ex	traction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA002 : pH (Soils)								
Soil Glass Jar - Unpreserved								
TP6 0-0.1,	TP6 0.5-0.6,	09-JAN-2008	18-APR-2008	07-JUL-2008	✓	21-APR-2008	18-APR-2008	3c
TP6 1.1-1.2,	TP2 0.2,							
TP2 0.5,	TP2 1.1							
Soil Glass Jar - Unpreserved								
TP13 0-0.1,	TP13 0.5-0.6,	10-JAN-2008	18-APR-2008	08-JUL-2008	✓	21-APR-2008	18-APR-2008	x
TP13 1.1-1.2,	TP28 0-0.1,							
TP28 0.5-0.6,	TP28 1.1-1.2							
Soil Glass Jar - Unpreserved								
TP68 0-0.1,	TP68 0.2-0.3,	13-JAN-2008	18-APR-2008	11-JUL-2008	✓	21-APR-2008	18-APR-2008	×
TP68 0.5-0.6,	TP68 0.8-0.9,				· •			
TP68 1.1-1.2,	TP67 0-0.1,							
TP67 0.2-0.3,	TP67 0.5-0.6,							
TP67 0.8-0.9,	TP67 1.1-1.2,							
TP69 0-0.1,	TP69 0.2-0.3,							
TP69 0.5-0.6,	TP69 0.8-0.9,							
TP69 1.1-1.2								
Soil Glass Jar - Unpreserved								
TP62 0-0.1,	TP62 0.5-0.6,	14-JAN-2008	18-APR-2008	12-JUL-2008	1	21-APR-2008	18-APR-2008	×
TP62 0.8-0.9,	TP62 1.1-1.2,				ľ			
TP58 0-0.1,	TP58 0.2-0.3,							
TP58 0.5-0.6,	TP58 0.8-0.9,							
TP58 1.1-1.2								
Soil Glass Jar - Unpreserved								
TP45 0-0.1,	TP45 0.2-0.3,	15-JAN-2008	18-APR-2008	13-JUL-2008	✓	21-APR-2008	18-APR-2008	×
TP45 0.5-0.6,	TP45 0.8-0.9,				,			
TP45 1.1-1.2,	TP46 0-0.1,							
TP46 0.2-0.3,	TP46 0.5-0.6,							
TP46 0.8-0.9,	TP46 1.1-1.2,							
TP48 0-0.1,	TP48 0.2-0.3,							
TP48 0.5-0.6,	TP48 0.8-0.9,							
TP48 1.1-1.2,	TP35 0-0.1,							
TP35 0.2-0.3,	TP35 0.5-0.6,							
TP35 0.8-0.9,	TP35 1.1-1.2							

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Client : CONNELL WAGNER PTY LTD



Matrix: SOIL	Evaluation:	x = Holding time breach ; ✓ = Within holding time.

Method		Sample Date	Ex	traction / Preparation			Analysis	
Container / Client Sample ID(s)		·	Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA002 : pH (Soils) - Continued								
Soil Glass Jar - Unpreserved								
TP19 0-0.1		16-APR-2008	18-APR-2008	13-OCT-2008	✓	21-APR-2008	18-APR-2008	x
Soil Glass Jar - Unpreserved								
TP19 0.2-0.3,	TP19 0.8-0.9	16-JAN-2008	18-APR-2008	14-JUL-2008	✓	21-APR-2008	18-APR-2008	×
EA010: Conductivity								
Soil Glass Jar - Unpreserved								
TP6 0-0.1,	TP6 0.5-0.6,	09-JAN-2008	18-APR-2008	07-JUL-2008	✓	21-APR-2008	16-MAY-2008	✓
TP6 1.1-1.2,	TP2 0.2,							
TP2 0.5,	TP2 1.1							
Soil Glass Jar - Unpreserved								
TP13 0-0.1,	TP13 0.5-0.6,	10-JAN-2008	18-APR-2008	08-JUL-2008	✓	21-APR-2008	16-MAY-2008	✓
TP13 1.1-1.2,	TP28 0-0.1,				,			
TP28 0.5-0.6,	TP28 1.1-1.2							
Soil Glass Jar - Unpreserved								
TP68 0-0.1,	TP68 0.2-0.3,	13-JAN-2008	18-APR-2008	11-JUL-2008	✓	21-APR-2008	16-MAY-2008	1
TP68 0.5-0.6,	TP68 0.8-0.9.	10 07 111 2000	10711112000		•			,
TP68 1.1-1.2.	TP67 0-0.1.							
TP67 0.2-0.3,	TP67 0.5-0.6,							
TP67 0.8-0.9,	TP67 1.1-1.2,							
TP69 0-0.1,	TP69 0.2-0.3,							
TP69 0.5-0.6,	TP69 0.8-0.9,							
TP69 1.1-1.2	11-09-0.0-0.9,							
Soil Glass Jar - Unpreserved								
TP62 0-0.1.	TP62 0.5-0.6.	14-JAN-2008	18-APR-2008	12-JUL-2008		21-APR-2008	16-MAY-2008	1
TP62 0.8-0.9,	TP62 1.1-1.2,	14-JAN-2006	10-APR-2000	12-JUL-2006	\checkmark	21-APR-2006	10-IVIA 1-2006	✓
TP58 0-0.1,	TP58 0.2-0.3.							
TP58 0.5-0.6.	TP58 0.8-0.9.							
	1750 0.0-0.9,							
TP58 1.1-1.2								
Soil Glass Jar - Unpreserved	TD45 0 0 0 0				_			
TP45 0-0.1,	TP45 0.2-0.3,	15-JAN-2008	18-APR-2008	13-JUL-2008	\checkmark	21-APR-2008	16-MAY-2008	✓
TP45 0.5-0.6,	TP45 0.8-0.9,							
TP45 1.1-1.2,	TP46 0-0.1,							
TP46 0.2-0.3,	TP46 0.5-0.6,							
TP46 0.8-0.9,	TP46 1.1-1.2,							
TP48 0-0.1,	TP48 0.2-0.3,							
TP48 0.5-0.6,	TP48 0.8-0.9,							
TP48 1.1-1.2,	TP35 0-0.1,							
TP35 0.2-0.3,	TP35 0.5-0.6,							
TP35 0.8-0.9,	TP35 1.1-1.2							
Soil Glass Jar - Unpreserved								
TP19 0-0.1		16-APR-2008	18-APR-2008	13-OCT-2008	✓	21-APR-2008	16-MAY-2008	1
Soil Glass Jar - Unpreserved								
TP19 0.2-0.3,	TP19 0.8-0.9	16-JAN-2008	18-APR-2008	14-JUL-2008	✓	21-APR-2008	16-MAY-2008	1

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: CONNELL WAGNER PTY LTD Client

: H328128 SBRJV Project



Matrix: SOIL Method		0	_	tua etia e / December (Co.)		3 7 3 11111	breach ; ✓ = Within	3 3 3 40
Container / Client Sample ID(s)		Sample Date		traction / Preparation			Analysis	1
, , ,			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content								
Soil Glass Jar - Unpreserved								
TP6 0-0.1,	TP6 0.5-0.6,	09-JAN-2008				16-APR-2008	16-JAN-2008	*
TP6 1.1-1.2,	TP2 0.2,							
TP2 0.5,	TP2 1.1							
Soil Glass Jar - Unpreserved								
TP13 0-0.1,	TP13 0.5-0.6,	10-JAN-2008				16-APR-2008	17-JAN-2008	×
TP13 1.1-1.2,	TP28 0-0.1,							
TP28 0.5-0.6,	TP28 1.1-1.2							
Soil Glass Jar - Unpreserved								
TP68 0-0.1,	TP68 0.2-0.3,	13-JAN-2008				16-APR-2008	20-JAN-2008	×
TP68 0.5-0.6,	TP68 0.8-0.9,							
TP68 1.1-1.2,	TP67 0-0.1,							
TP67 0.2-0.3,	TP67 0.5-0.6,							
TP67 0.8-0.9,	TP67 1.1-1.2,							
TP69 0-0.1,	TP69 0.2-0.3,							
TP69 0.5-0.6,	TP69 0.8-0.9,							
TP69 1.1-1.2								
Soil Glass Jar - Unpreserved								
TP62 0-0.1,	TP62 0.5-0.6,	14-JAN-2008				16-APR-2008	21-JAN-2008	×
TP62 0.8-0.9,	TP62 1.1-1.2,							
TP58 0-0.1,	TP58 0.2-0.3,							
TP58 0.5-0.6,	TP58 0.8-0.9,							
TP58 1.1-1.2								
Soil Glass Jar - Unpreserved								
TP45 0-0.1,	TP45 0.2-0.3,	15-JAN-2008				16-APR-2008	22-JAN-2008	x
TP45 0.5-0.6,	TP45 0.8-0.9,							
TP45 1.1-1.2,	TP46 0-0.1,							
TP46 0.2-0.3,	TP46 0.5-0.6,							
TP46 0.8-0.9,	TP46 1.1-1.2,							
TP48 0-0.1,	TP48 0.2-0.3,							
TP48 0.5-0.6,	TP48 0.8-0.9,							
TP48 1.1-1.2,	TP35 0-0.1,							
TP35 0.2-0.3,	TP35 0.5-0.6,							
TP35 0.8-0.9,	TP35 1.1-1.2							
Soil Glass Jar - Unpreserved								
TP19 0-0.1		16-APR-2008				21-APR-2008	23-APR-2008	✓
Soil Glass Jar - Unpreserved								<u> </u>
TP19 0.2-0.3,	TP19 0.8-0.9	16-JAN-2008				16-APR-2008	23-JAN-2008	44
11 10 0.2 0.0,	11 10 0.0 0.0	10-JAN-2006				10-AFR-2000	20-0/NIN-2000	×

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Client : CONNELL WAGNER PTY LTD

Project : H328128 SBRJV



Matrix: **SOIL** Evaluation: **x** = Holding time breach; **√** = Within holding time.

Method		Sample Date	Ex	traction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED007: Exchangeable Cations								
Pulp Bag								
TP6 0-0.1,	TP6 0.5-0.6,	09-JAN-2008	22-APR-2008	07-JUL-2008	✓	22-APR-2008	07-JUL-2008	✓
TP6 1.1-1.2,	TP2 0.2,							
TP2 0.5,	TP2 1.1							
Pulp Bag								
TP13 0-0.1,	TP13 0.5-0.6,	10-JAN-2008	22-APR-2008	08-JUL-2008	✓	22-APR-2008	08-JUL-2008	✓
TP13 1.1-1.2,	TP28 0-0.1,							
TP28 0.5-0.6,	TP28 1.1-1.2							
Pulp Bag								
TP68 0-0.1,	TP68 0.5-0.6,	13-JAN-2008	22-APR-2008	11-JUL-2008	✓	22-APR-2008	11-JUL-2008	✓
TP68 1.1-1.2,	TP67 0-0.1,							
TP67 0.5-0.6,	TP67 1.1-1.2,							
TP69 0-0.1,	TP69 0.5-0.6,							
TP69 1.1-1.2								
Pulp Bag								
TP62 0-0.1,	TP62 0.5-0.6,	14-JAN-2008	22-APR-2008	12-JUL-2008	✓	22-APR-2008	12-JUL-2008	✓
TP62 1.1-1.2,	TP58 0-0.1,							
TP58 0.5-0.6,	TP58 1.1-1.2							
Pulp Bag								
TP45 0-0.1,	TP45 0.5-0.6,	15-JAN-2008	22-APR-2008	13-JUL-2008	✓	22-APR-2008	13-JUL-2008	✓
TP45 1.1-1.2,	TP46 0-0.1,							
TP46 0.5-0.6,	TP46 1.1-1.2,							
TP48 0-0.1,	TP48 0.5-0.6,							
TP48 1.1-1.2,	TP35 0-0.1,							
TP35 0.5-0.6,	TP35 1.1-1.2							
Pulp Bag								
TP19 0-0.1		16-APR-2008	22-APR-2008	13-OCT-2008	✓	22-APR-2008	13-OCT-2008	✓
Pulp Bag								
TP19 0.2-0.3,	TP19 0.8-0.9	16-JAN-2008	22-APR-2008	14-JUL-2008	1	22-APR-2008	14-JUL-2008	✓

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: CONNELL WAGNER PTY LTD Client

Project : H328128 SBRJV



Matrix: SOIL					Evaluation	: x = Holding time	breach ; ✓ = Within	n holding tim
Method		Sample Date	E)	traction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED037: Alkalinity								
Soil Glass Jar - Unpreserved								
TP6 0.5-0.6,	TP6 1.1-1.2,	09-JAN-2008	18-APR-2008	07-JUL-2008	✓	21-APR-2008	07-JUL-2008	✓
TP2 0.2,	TP2 0.5,							
TP2 1.1								
Soil Glass Jar - Unpreserved								
TP13 0.5-0.6,	TP28 0-0.1,	10-JAN-2008	18-APR-2008	08-JUL-2008	✓	21-APR-2008	08-JUL-2008	✓
TP28 0.5-0.6,	TP28 1.1-1.2				·			
Soil Glass Jar - Unpreserved								
TP68 0-0.1,	TP68 0.2-0.3,	13-JAN-2008	18-APR-2008	11-JUL-2008	✓	21-APR-2008	11-JUL-2008	✓
TP68 0.5-0.6,	TP68 0.8-0.9,							
TP67 0-0.1,	TP67 0.2-0.3,							
TP67 0.8-0.9,	TP67 1.1-1.2,							
TP69 0-0.1,	TP69 0.2-0.3,							
TP69 0.8-0.9,	TP69 1.1-1.2							
Soil Glass Jar - Unpreserved								
TP62 1.1-1.2,	TP58 0-0.1,	14-JAN-2008	18-APR-2008	12-JUL-2008	✓	21-APR-2008	12-JUL-2008	1
TP58 0.2-0.3,	TP58 0.5-0.6,				,			
TP58 0.8-0.9								
Soil Glass Jar - Unpreserved								
TP45 0-0.1,	TP45 0.2-0.3,	15-JAN-2008	18-APR-2008	13-JUL-2008	✓	21-APR-2008	13-JUL-2008	✓
TP45 0.8-0.9,	TP45 1.1-1.2,				,			_
TP46 0-0.1,	TP46 0.2-0.3,							
TP46 0.5-0.6,	TP46 0.8-0.9,							
TP46 1.1-1.2,	TP48 0.2-0.3,							
TP48 0.5-0.6,	TP48 0.8-0.9,							
TP48 1.1-1.2,	TP35 0-0.1,							
TP35 0.2-0.3,	TP35 0.5-0.6,							
TP35 0.8-0.9,	TP35 1.1-1.2							
Soil Glass Jar - Unpreserved								
TP19 0-0.1		16-APR-2008	18-APR-2008	13-OCT-2008	✓	21-APR-2008	13-OCT-2008	1
Soil Glass Jar - Unpreserved								
TP19 0.2-0.3,	TP19 0.8-0.9	16-JAN-2008	18-APR-2008	14-JUL-2008	✓	21-APR-2008	14-JUL-2008	✓

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Matrix: SOIL

Client : CONNELL WAGNER PTY LTD

Project : H328128 SBRJV



Evaluation: \times = Holding time breach; \checkmark = Within holding time.

							,	
Method		Sample Date	Ex	traction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED040S: Soluble Major Anions								
Soil Glass Jar - Unpreserved								
TP6 0-0.1,	TP6 0.5-0.6,	09-JAN-2008	18-APR-2008	07-JUL-2008	✓	21-APR-2008	16-MAY-2008	✓
TP6 1.1-1.2,	TP2 0.2,				•			
TP2 0.5,	TP2 1.1							
Soil Glass Jar - Unpreserved								
TP13 0-0.1,	TP13 0.5-0.6,	10-JAN-2008	18-APR-2008	08-JUL-2008	✓	21-APR-2008	16-MAY-2008	✓
TP13 1.1-1.2.	TP28 0-0.1.	10 07 111 2000	1074112000		Y			ļ ,
TP28 0.5-0.6,	TP28 1.1-1.2							
Soil Glass Jar - Unpreserved								
TP68 0-0.1,	TP68 0.2-0.3,	13-JAN-2008	18-APR-2008	11-JUL-2008	✓	21-APR-2008	16-MAY-2008	✓
TP68 0.5-0.6,	TP68 0.8-0.9.	10 07 111 2000	1074112000		Y			, , , , , , , , , , , , , , , , , , ,
TP68 1.1-1.2,	TP67 0-0.1.							
TP67 0.2-0.3,	TP67 0.5-0.6,							
TP67 0.8-0.9,	TP67 1.1-1.2,							
TP69 0-0.1,	TP69 0.2-0.3,							
TP69 0.5-0.6.	TP69 0.8-0.9,							
TP69 1.1-1.2	,							
Soil Glass Jar - Unpreserved								
TP62 0-0.1,	TP62 0.5-0.6,	14-JAN-2008	18-APR-2008	12-JUL-2008	1	21-APR-2008	16-MAY-2008	✓
TP62 0.8-0.9,	TP62 1.1-1.2.	14-0/11-2000	10-A1 K-2000	12 001 2000	Y	21-A1 IX-2000	10 10711 2000	Y
TP58 0-0.1,	TP58 0.2-0.3,							
TP58 0.5-0.6,	TP58 0.8-0.9,							
TP58 1.1-1.2	55 5.5 5.5,							
Soil Glass Jar - Unpreserved								
TP45 0-0.1.	TP45 0.2-0.3,	15-JAN-2008	18-APR-2008	13-JUL-2008	1	21-APR-2008	16-MAY-2008	✓
TP45 0.5-0.6,	TP45 0.8-0.9.	10-07(1-2000	10-A1 K-2000	10 001 2000	•	21-A1 K-2000	10 10711 2000	Y
TP45 1.1-1.2.	TP46 0-0.1.							
TP46 0.2-0.3.	TP46 0.5-0.6.							
TP46 0.8-0.9.	TP46 1.1-1.2.							
TP48 0-0.1.	TP48 0.2-0.3.							
TP48 0.5-0.6.	TP48 0.8-0.9.							
TP48 1.1-1.2.	TP35 0-0.1,							
TP35 0.2-0.3,	TP35 0.5-0.6,							
TP35 0.8-0.9,	TP35 1.1-1.2							
Soil Glass Jar - Unpreserved	11 00 1.1 1.2							
TP19 0-0.1		16-APR-2008	18-APR-2008	13-OCT-2008	✓	21-APR-2008	16-MAY-2008	✓
Soil Glass Jar - Unpreserved					•			
TP19 0.2-0.3,	TP19 0.8-0.9	16-JAN-2008	18-APR-2008	14-JUL-2008	✓	21-APR-2008	16-MAY-2008	1
		10-3AN-2000	13-A1 11-2000	14 00L 2000	Y	21-A111-2000	13 107 (1 2000	Y

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Matrix: SOIL					Evaluation	: x = Holding time	breach ; ✓ = Within	n holding tim
Method		Sample Date	E	traction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED045: Chloride								
Soil Glass Jar - Unpreserved								
TP6 0.5-0.6,	TP6 1.1-1.2,	09-JAN-2008	18-APR-2008	07-JUL-2008	✓	21-APR-2008	16-MAY-2008	/
TP2 0.2,	TP2 0.5,				·			
TP2 1.1								
Soil Glass Jar - Unpreserved								
TP13 0.5-0.6,	TP13 1.1-1.2,	10-JAN-2008	18-APR-2008	08-JUL-2008	✓	21-APR-2008	16-MAY-2008	✓
TP28 0-0.1,	TP28 0.5-0.6,				·			
TP28 1.1-1.2								
Soil Glass Jar - Unpreserved								
TP68 0-0.1,	TP68 0.2-0.3,	13-JAN-2008	18-APR-2008	11-JUL-2008	✓	21-APR-2008	16-MAY-2008	✓
TP68 0.5-0.6,	TP68 0.8-0.9,				·			
TP68 1.1-1.2,	TP67 0-0.1,							
TP67 0.2-0.3,	TP67 0.5-0.6,							
TP67 0.8-0.9,	TP67 1.1-1.2,							
TP69 0-0.1,	TP69 0.2-0.3,							
TP69 0.5-0.6,	TP69 0.8-0.9,							
TP69 1.1-1.2								
Soil Glass Jar - Unpreserved								
TP62 0-0.1,	TP62 0.5-0.6,	14-JAN-2008	18-APR-2008	12-JUL-2008	✓	21-APR-2008	16-MAY-2008	/
TP62 0.8-0.9,	TP62 1.1-1.2,				·			
TP58 0-0.1,	TP58 0.2-0.3,							
TP58 0.5-0.6,	TP58 0.8-0.9,							
TP58 1.1-1.2								
Soil Glass Jar - Unpreserved								
TP45 0-0.1,	TP45 0.2-0.3,	15-JAN-2008	18-APR-2008	13-JUL-2008	✓	21-APR-2008	16-MAY-2008	✓
TP45 0.5-0.6,	TP45 0.8-0.9,				·			
TP45 1.1-1.2,	TP46 0-0.1,							
TP46 0.2-0.3,	TP46 0.5-0.6,							
TP46 0.8-0.9,	TP46 1.1-1.2,							
TP48 0-0.1,	TP48 0.2-0.3,							
TP48 0.5-0.6,	TP48 0.8-0.9,							
TP48 1.1-1.2,	TP35 0-0.1,							
TP35 0.2-0.3,	TP35 0.5-0.6,							
TP35 0.8-0.9,	TP35 1.1-1.2							
Soil Glass Jar - Unpreserved								
TP19 0-0.1		16-APR-2008	18-APR-2008	13-OCT-2008	✓	21-APR-2008	16-MAY-2008	✓
Soil Glass Jar - Unpreserved								
TP19 0.2-0.3,	TP19 0.8-0.9	16-JAN-2008	18-APR-2008	14-JUL-2008	✓	21-APR-2008	16-MAY-2008	✓
/		10 07(1-2000	.0 741 14 2300	1.002 2000	7	7. IX 2000	13 1. 2000	

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Matrix: SOIL

Client : CONNELL WAGNER PTY LTD

Project : H328128 SBRJV



						3 - 3		5 5
Method		Sample Date	Ex	traction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED093S: Soluble Major Cations								
Soil Glass Jar - Unpreserved								
TP6 0-0.1,	TP6 0.5-0.6,	09-JAN-2008	18-APR-2008	07-JUL-2008	1	21-APR-2008	07-JUL-2008	✓
TP6 1.1-1.2,	TP2 0.2,				,			•
TP2 0.5,	TP2 1.1							
Soil Glass Jar - Unpreserved								
TP13 0-0.1,	TP13 0.5-0.6.	10-JAN-2008	18-APR-2008	08-JUL-2008	✓	21-APR-2008	08-JUL-2008	✓
TP13 1.1-1.2.	TP28 0-0.1.	10 0741 2000	10 74 11 2000	00 002 2000	Y	2174114 2000	00 002 2000	Y
TP28 0.5-0.6.	TP28 1.1-1.2							
Soil Glass Jar - Unpreserved								
TP68 0-0.1,	TP68 0.2-0.3.	13-JAN-2008	18-APR-2008	11-JUL-2008	✓	21-APR-2008	11-JUL-2008	✓
TP68 0.5-0.6,	TP68 0.8-0.9,	10-07(1-2000	10-71 10-2000	11 002 2000	Y	21-A1 K-2000	11 002 2000	Y
TP68 1.1-1.2,	TP67 0-0.1,							
TP67 0.2-0.3,	TP67 0.5-0.6,							
TP67 0.8-0.9,	TP67 1.1-1.2,							
TP69 0-0.1,	TP69 0.2-0.3,							
TP69 0.5-0.6.	TP69 0.2-0.3, TP69 0.8-0.9.							
TP69 1.1-1.2	11 09 0.0-0.9,							
Soil Glass Jar - Unpreserved								
TP62 0-0.1,	TP62 0.5-0.6.	14-JAN-2008	40 ADD 0000	12-JUL-2008		21-APR-2008	12-JUL-2008	
TP62 0.8-0.9,	TP62 0.3-0.0,	14-JAN-2006	18-APR-2008	12-JUL-2006	✓	21-APR-2006	12-JUL-2006	✓
TP58 0-0.1,	TP58 0.2-0.3,							
TP58 0.5-0.6,	TP58 0.8-0.9,							
TP58 0.5-0.6, TP58 1.1-1.2	1230 0.0-0.9,							
Soil Glass Jar - Unpreserved								
TP45 0-0.1,	TP45 0.2-0.3,	45 1411 0000	40 400 0000	40 1111 0000		04 4 5 5 6 6 6 6	40 1111 0000	
TP45 0-0.1, TP45 0.5-0.6,	TP45 0.2-0.3, TP45 0.8-0.9.	15-JAN-2008	18-APR-2008	13-JUL-2008	✓	21-APR-2008	13-JUL-2008	✓
TP45 0.5-0.6, TP45 1.1-1.2.	TP45 0.8-0.9, TP46 0-0.1.							
	,							
TP46 0.2-0.3,	TP46 0.5-0.6,							
TP46 0.8-0.9,	TP46 1.1-1.2,							
TP48 0-0.1,	TP48 0.2-0.3,							
TP48 0.5-0.6,	TP48 0.8-0.9,							
TP48 1.1-1.2,	TP35 0-0.1,							
TP35 0.2-0.3,	TP35 0.5-0.6,							
TP35 0.8-0.9,	TP35 1.1-1.2							
Soil Glass Jar - Unpreserved								
TP19 0-0.1		16-APR-2008	18-APR-2008	13-OCT-2008	✓	21-APR-2008	13-OCT-2008	✓
Soil Glass Jar - Unpreserved								
TP19 0.2-0.3,	TP19 0.8-0.9	16-JAN-2008	18-APR-2008	14-JUL-2008	✓	21-APR-2008	14-JUL-2008	✓

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Matrix: SOIL					Evaluation	: x = Holding time	breach ; ✓ = Withi	n holding tim
Method		Sample Date	E	ktraction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK040S: Fluoride Soluble								
Soil Glass Jar - Unpreserved								
TP6 0-0.1,	TP6 0.5-0.6,	09-JAN-2008	18-APR-2008	07-JUL-2008	✓	21-APR-2008	16-MAY-2008	✓
TP6 1.1-1.2,	TP2 0.2,				•			_
TP2 0.5,	TP2 1.1							
Soil Glass Jar - Unpreserved								
TP13 0-0.1,	TP13 0.5-0.6,	10-JAN-2008	18-APR-2008	08-JUL-2008	✓	21-APR-2008	16-MAY-2008	✓
TP13 1.1-1.2,	TP28 0-0.1,				•			•
TP28 0.5-0.6,	TP28 1.1-1.2							
Soil Glass Jar - Unpreserved								
TP68 0-0.1,	TP68 0.5-0.6,	13-JAN-2008	18-APR-2008	11-JUL-2008	✓	21-APR-2008	16-MAY-2008	✓
TP68 1.1-1.2,	TP67 0-0.1,				•			•
TP67 0.5-0.6,	TP67 1.1-1.2,							
TP69 0-0.1,	TP69 0.5-0.6,							
TP69 1.1-1.2								
Soil Glass Jar - Unpreserved								
TP62 0-0.1,	TP62 0.5-0.6,	14-JAN-2008	18-APR-2008	12-JUL-2008	✓	21-APR-2008	16-MAY-2008	1
TP62 1.1-1.2,	TP58 0-0.1,				•			,
TP58 0.5-0.6,	TP58 1.1-1.2							
Soil Glass Jar - Unpreserved								
TP45 0-0.1,	TP45 0.5-0.6,	15-JAN-2008	18-APR-2008	13-JUL-2008	✓	21-APR-2008	16-MAY-2008	✓
TP45 1.1-1.2,	TP46 0-0.1,	10 01 01 000			•			•
TP46 0.5-0.6,	TP46 1.1-1.2,							
TP48 0-0.1,	TP48 0.5-0.6,							
TP48 1.1-1.2,	TP35 0-0.1,							
TP35 0.5-0.6,	TP35 1.1-1.2							
Soil Glass Jar - Unpreserved								
TP19 0-0.1		16-APR-2008	18-APR-2008	13-OCT-2008	✓	21-APR-2008	16-MAY-2008	✓
Soil Glass Jar - Unpreserved								
TP19 0.2-0.3,	TP19 0.8-0.9	16-JAN-2008	18-APR-2008	14-JUL-2008	✓	21-APR-2008	16-MAY-2008	/

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Client : CONNELL WAGNER PTY LTD

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Method		Sample Date	Fy	traction / Preparation		Analysis		
Container / Client Sample ID(s)		- Campio Suito	Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK057: Nitrite as N			2 иго ожи и отой	Dao ioi oxadoanii	270700077		240 /0/ 4//4//	
Soil Glass Jar - Unpreserved								
TP6 0-0.1,	TP6 0.5-0.6,	09-JAN-2008	18-APR-2008	07-JUL-2008	1	28-APR-2008	07-JUL-2008	1
TP6 1.1-1.2,	TP2 0.2,				•			,
TP2 0.5,	TP2 1.1							
Soil Glass Jar - Unpreserved								
TP13 0-0.1,	TP13 0.5-0.6,	10-JAN-2008	18-APR-2008	08-JUL-2008	1	28-APR-2008	08-JUL-2008	✓
TP13 1.1-1.2,	TP28 0-0.1,	11 -11			•			,
TP28 0.5-0.6,	TP28 1.1-1.2							
Soil Glass Jar - Unpreserved								
TP68 0-0.1,	TP68 0.5-0.6,	13-JAN-2008	18-APR-2008	11-JUL-2008	1	28-APR-2008	11-JUL-2008	✓
TP68 1.1-1.2,	TP67 0-0.1,				•			_
TP67 0.5-0.6,	TP67 1.1-1.2,							
TP69 0-0.1,	TP69 0.5-0.6,							
TP69 1.1-1.2								
Soil Glass Jar - Unpreserved								
TP62 0-0.1,	TP62 0.5-0.6,	14-JAN-2008	18-APR-2008	12-JUL-2008	✓	28-APR-2008	12-JUL-2008	✓
TP62 1.1-1.2,	TP58 0-0.1,				Ť			
TP58 0.5-0.6,	TP58 1.1-1.2							
Soil Glass Jar - Unpreserved								
TP45 0-0.1,	TP45 0.5-0.6,	15-JAN-2008	18-APR-2008	13-JUL-2008	1	28-APR-2008	13-JUL-2008	✓
TP45 1.1-1.2,	TP46 0-0.1,				Ť			,
TP46 0.5-0.6,	TP46 1.1-1.2,							
TP48 0-0.1,	TP48 0.5-0.6,							
TP48 1.1-1.2,	TP35 0-0.1,							
TP35 0.5-0.6,	TP35 1.1-1.2							
Soil Glass Jar - Unpreserved								
TP19 0-0.1		16-APR-2008	18-APR-2008	13-OCT-2008	✓	28-APR-2008	13-OCT-2008	✓
Soil Glass Jar - Unpreserved								
TP19 0.2-0.3,	TP19 0.8-0.9	16-JAN-2008	18-APR-2008	14-JUL-2008	1	28-APR-2008	14-JUL-2008	✓

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Matrix: SOIL					Evaluation	: x = Holding time	breach ; ✓ = Within	n holding tim
Method		Sample Date	E)	traction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK059: Nitrite plus Nitrate as N (NOx)								
Soil Glass Jar - Unpreserved								
TP6 0-0.1,	TP6 0.5-0.6,	09-JAN-2008	18-APR-2008	07-JUL-2008	✓	28-APR-2008	07-JUL-2008	✓
TP6 1.1-1.2,	TP2 0.2,				, i			,
TP2 0.5,	TP2 1.1							
Soil Glass Jar - Unpreserved								
TP13 0-0.1,	TP13 0.5-0.6,	10-JAN-2008	18-APR-2008	08-JUL-2008	✓	28-APR-2008	08-JUL-2008	✓
TP13 1.1-1.2,	TP28 0-0.1,				•			,
TP28 0.5-0.6,	TP28 1.1-1.2							
Soil Glass Jar - Unpreserved								
TP68 0-0.1,	TP68 0.5-0.6,	13-JAN-2008	18-APR-2008	11-JUL-2008	✓	28-APR-2008	11-JUL-2008	✓
TP68 1.1-1.2,	TP67 0-0.1,	10 0 0 0			•			•
TP67 0.5-0.6,	TP67 1.1-1.2,							
TP69 0-0.1,	TP69 0.5-0.6,							
TP69 1.1-1.2	,							
Soil Glass Jar - Unpreserved								
TP62 0-0.1,	TP62 0.5-0.6,	14-JAN-2008	18-APR-2008	12-JUL-2008	✓	28-APR-2008	12-JUL-2008	✓
TP62 1.1-1.2,	TP58 0-0.1,				•			,
TP58 0.5-0.6,	TP58 1.1-1.2							
Soil Glass Jar - Unpreserved								
TP45 0-0.1,	TP45 0.5-0.6,	15-JAN-2008	18-APR-2008	13-JUL-2008	✓	28-APR-2008	13-JUL-2008	✓
TP45 1.1-1.2,	TP46 0-0.1,	10 0 0 0			•			•
TP46 0.5-0.6,	TP46 1.1-1.2,							
TP48 0-0.1,	TP48 0.5-0.6,							
TP48 1.1-1.2,	TP35 0-0.1,							
TP35 0.5-0.6,	TP35 1.1-1.2							
Soil Glass Jar - Unpreserved								
TP19 0-0.1		16-APR-2008	18-APR-2008	13-OCT-2008	✓	28-APR-2008	13-OCT-2008	✓
Soil Glass Jar - Unpreserved								
TP19 0.2-0.3,	TP19 0.8-0.9	16-JAN-2008	18-APR-2008	14-JUL-2008	✓	28-APR-2008	14-JUL-2008	/

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Matrix: **SOIL** Evaluation: **x** = Holding time breach; **√** = Within holding time.

watrix: SOIL		Evaluation. A - Holding time breach, V - Within h						
Method		Sample Date	Ex	traction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK071: Reactive Phosphorus as P (Dissolv	ed)							
Soil Glass Jar - Unpreserved								
TP6 0-0.1,	TP6 0.5-0.6,	09-JAN-2008	18-APR-2008	07-JUL-2008	✓	28-APR-2008	07-JUL-2008	✓
TP6 1.1-1.2,	TP2 0.2,							
TP2 0.5,	TP2 1.1							
Soil Glass Jar - Unpreserved								
TP13 0-0.1,	TP13 0.5-0.6,	10-JAN-2008	18-APR-2008	08-JUL-2008	✓	28-APR-2008	08-JUL-2008	✓
TP13 1.1-1.2,	TP28 0-0.1,				ĺ			
TP28 0.5-0.6,	TP28 1.1-1.2							
Soil Glass Jar - Unpreserved								
TP68 0-0.1,	TP68 0.5-0.6,	13-JAN-2008	18-APR-2008	11-JUL-2008	✓	28-APR-2008	11-JUL-2008	/
TP68 1.1-1.2,	TP67 0-0.1,				,			,
TP67 0.5-0.6,	TP67 1.1-1.2,							
TP69 0-0.1,	TP69 0.5-0.6,							
TP69 1.1-1.2								
Soil Glass Jar - Unpreserved								
TP62 0-0.1,	TP62 0.5-0.6,	14-JAN-2008	18-APR-2008	12-JUL-2008	✓	28-APR-2008	12-JUL-2008	1
TP62 1.1-1.2,	TP58 0-0.1,				_			_
TP58 0.5-0.6,	TP58 1.1-1.2							
Soil Glass Jar - Unpreserved								
TP45 0-0.1,	TP45 0.5-0.6,	15-JAN-2008	18-APR-2008	13-JUL-2008	✓	28-APR-2008	13-JUL-2008	✓
TP45 1.1-1.2,	TP46 0-0.1,				_			_
TP46 0.5-0.6,	TP46 1.1-1.2,							
TP48 0-0.1,	TP48 0.5-0.6,							
TP48 1.1-1.2,	TP35 0-0.1,							
TP35 0.5-0.6,	TP35 1.1-1.2							
Soil Glass Jar - Unpreserved								
TP19 0-0.1		16-APR-2008	18-APR-2008	13-OCT-2008	✓	28-APR-2008	13-OCT-2008	✓
Soil Glass Jar - Unpreserved								
TP19 0.2-0.3,	TP19 0.8-0.9	16-JAN-2008	18-APR-2008	14-JUL-2008	✓	28-APR-2008	14-JUL-2008	✓

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Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: SOIL Evaluation: × = Quality Control frequency not within specification; ✓ = Quality Control frequency within specification.

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Quality Control Sample Type		Count		Rate (%)		F -1 -0	Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Alkalinity in Soil	ED037	2	33	6.1	10.0		NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Cations - soluble by ICP-AES	ED093S	5	59	8.5	10.0		NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride - Soluble	EDO45S	4	57	7.0	10.0	3e	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Electrical Conductivity (1:5)	EA010	6	59	10.2	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Exchangeable Cations	ED007	5	41	12.2	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Fluoride - Soluble	EK040S	4	41	9.8	10.0	3e	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Anions - Soluble	ED040S	5	59	8.5	10.0	se	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Moisture Content	EA055-103	8	79	10.1	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) - Soluble	EK059	4	35	11.4	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite as N - Soluble	EK057	4	35	11.4	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
pH (1:5)	EA002	6	59	10.2	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P - Soluble	EK071	4	35	11.4	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Alkalinity in Soil	ED037	3	47	6.4	5.0	√	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride - Soluble	EDO45S	3	57	5.3	5.0	<u> </u>	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Electrical Conductivity (1:5)	EA010	3	59	5.1	5.0	1	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Exchangeable Cations	ED007	3	41	7.3	5.0	<u> </u>	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Fluoride - Soluble	EK040S	3	41	7.3	5.0	1	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) - Soluble	EK059	3	35	8.6	5.0	1	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite as N - Soluble	EK057	3	35	8.6	5.0	1	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P - Soluble	EK071	3	35	8.6	5.0	1	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Alkalinity in Soil	ED037	3	47	6.4	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Cations - soluble by ICP-AES	ED093S	3	59	5.1	5.0	√	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride - Soluble	EDO45S	3	57	5.3	5.0	<u> </u>	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Electrical Conductivity (1:5)	EA010	3	59	5.1	5.0		NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Exchangeable Cations	ED007	3	41	7.3	5.0	<u> </u>	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Fluoride - Soluble	EK040S	3	41	7.3	5.0		NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Anions - Soluble	ED040S	3	59	5.1	5.0		NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) - Soluble	EK059	3	35	8.6	5.0		NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite as N - Soluble	EK057	3	35	8.6	5.0	<u> </u>	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P - Soluble	EK071	3	35	8.6	5.0		NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)						•	
Chloride - Soluble	EDO45S	1	20	5.0	5.0	√	ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) - Soluble	EK059	3	35	8.6	5.0		ALS QCS3 requirement
Nitrite as N - Soluble	EK057	3	35	8.6	5.0		ALS QCS3 requirement
Reactive Phosphorus as P - Soluble	EK071	3	35	8.6	5.0		ALS QCS3 requirement
1 todotivo i noophordo do i Oblubio	LIXU/ I	J	55	0.0	3.0		7.120 &000 requirement

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Brief Method Summaries

The analytical procedures used by the Environmental Division 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 in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH (1:5)	EA002	SOIL	(APHA 21st ed., 4500H+) pH is determined on soil samples after a 1:5 soil/water leach. This method is compliant with NEPM (1999) Schedule B(3) (Method 103)
Electrical Conductivity (1:5)	EA010	SOIL	(APHA 21st ed., 2510) Conductivity is determined on soil samples using a 1:5 soil/water leach. This method is compliant with NEPM (1999) Schedule B(3) (Method 104)
Moisture Content	EA055-103	SOIL	A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (1999) Schedule B(3) (Method 102)
Exchangeable Cations	ED007	SOIL	Rayment & Higginson (1992) Method 15A1. Cations are exchanged from the sample by contact with Ammonium Chloride. They are then quantitated in the final solution by ICPAES and reported as meq/100g of original soil. This method is compliant with NEPM (1999) Schedule B(3) (Method 301)
Alkalinity in Soil	ED037	SOIL	APHA 21st ed., 2320 B Alkalinity is determined and reported on a 1:5 soil/water leach.
Major Anions - Soluble	ED040S	SOIL	In-house. Soluble Anions are determined off a 1:5 soil / water extract by ICPAES.
Cations - soluble by ICP-AES	ED093S	SOIL	APHA 21st ed., 3120; USEPA SW 846 - 6010 (ICPAES) Water extracts of the soil are analyzed for major cations by ICPAES. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (1999) Schedule B(3)
Chloride - Soluble	EDO45S	SOIL	APHA 21st ed., 4500Cl- Soluble Chloride is determined titremetrically on soil samples following a 1:5 soil/water leach. This method is compliant with NEPM (1999) Schedule B(3) (Method 401)
Fluoride - Soluble	EK040S	SOIL	APHA 21st ed., 4500 FC Soluble Fluoride is determined after a 1:5 soil/water extract using an ion selective electrode.
Nitrite as N - Soluble	EK057	SOIL	APHA 21st ed., 4500 NO3- I. Nitrite in a water extract is determined by direct colourimetry by FIA.
Nitrate as N - Soluble	EK058	SOIL	APHA 21st ed., 4500 NO3I Nitrate in the 1:5 soil:water extract is reduced to nitrite by way of a cadmium reduction column followed by quantification by FIA. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results.
Nitrite and Nitrate as N (NOx) - Soluble	EK059	SOIL	APHA 21st ed., 4500 NO3- I. Combined oxidised Nitrogen (NO2+NO3) in a water extract is determined by Cadmium Reduction, and direct colourimetry by FIA.
Reactive Phosphorus as P - Soluble	EK071	SOIL	APHA 21st ed., 4500-P G Reactive phosphorus in the soil is determined on a water extract by direct colourimetry by FIA.
Emerson Aggregate Testing	EME-SOL	SOIL	Emerson Aggregate Testing per AS1289.3.8.1 performed by Subcontrator Laboratory.
Preparation Methods	Method	Matrix	Method Descriptions
Exchangeable Cations Preparation Method	ED007PR	SOIL	Rayment & Higginson (1992) method 15A1. A 1M NH4Cl extraction by end over end tumbling at a ratio of 1:20. There is no pretreatment for soluble salts. Extracts can be run by ICP for cations.
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of distilled water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.

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Summary of Outliers

Outliers: Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: SOIL

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Duplicate (DUP) RPDs							
ED040S: Soluble Major Anions	EB0800746-040	TP48 0-0.1	Sulphate as SO4 2-		Not		Analyte not determined in allocated
					Determined		original sample.
ED093S: Soluble Major Cations	EB0800746-040 TP48 0-0.1 Calcium		Calcium	Calcium 7440-70-2			Analyte not determined in allocated
					Determined		original sample.
ED093S: Soluble Major Cations	EB0800746-040	TP48 0-0.1	Magnesium	7439-95-4	Not		Analyte not determined in allocated
					Determined		original sample.
ED093S: Soluble Major Cations	EB0800746-040	TP48 0-0.1	Sodium	7440-23-5	Not		Analyte not determined in allocated
					Determined		original sample.
ED093S: Soluble Major Cations	EB0800746-040	TP48 0-0.1	Potassium	7440-09-7	Not		Analyte not determined in allocated
					Determined		original sample.
Matrix Spike (MS) Recoveries							
EK059: Nitrite plus Nitrate as N (NOx)	EB0800746-001	TP19 0-0.1	Nitrite + Nitrate as N (Sol.)		Not		MS recovery not determined, background
					Determined		level greater than or equal to 4x spike
							level.

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Laboratory Control outliers occur.

Regular Sample Surrogates

• For all regular sample matrices, no surrogate recovery outliers occur.

Outliers: Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

Matrix: SOIL

Matrix. COIL								
Method		E	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Days	Date analysed	Due for analysis	Days	
				overdue			overdue	
EA002 : pH (Soils)								
Soil Glass Jar - Unpreserved								
TP6 0-0.1,	TP6 0.5-0.6,				21-APR-2008	18-APR-2008	3	
TP6 1.1-1.2,	TP2 0.2,							
TP2 0.5,	TP2 1.1							
Soil Glass Jar - Unpreserved								
TP13 0-0.1,	TP13 0.5-0.6,				21-APR-2008	18-APR-2008	3	
TP13 1.1-1.2,	TP28 0-0.1,							
TP28 0.5-0.6,	TP28 1.1-1.2							

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Matrix: SOIL

