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Work Order : ES0818896 Amendment 1
Client : C M JEWELL & ASSOC PTY LTD
Project : J1418

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 performed, 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 insufficient 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

- ED041: LOR raised for Turbidimetric Sulfate on various samples due to matrix interference.
- EP080: Level of Reporting raised for toluene due to ambient background levels in the laboratory.
- This report has been amended and re-released to allow the reporting of additional analytical data.



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Project : J1418

Analytical Results

Sub-Matrix: WATER		Client sample ID				Client sampling date / time				BP-01:1.5		BP-01:3.5		BP-02:1.5		BP-02:3.5		BP-03:2.5	
		CAS Number	LOR	Unit	20-DEC-2008 15:00		ES0818896-001		ES0818896-002		ES0818896-003		ES0818896-004		ES0818896-005				
ED037P: Alkalinity by PC Titrator																			
Hydroxide Alkalinity as CaCO3		DMO-210-001	1	mg/L	<1		<1		<1		<1		<1		<1		<1		
Carbonate Alkalinity as CaCO3		3812-32-6	1	mg/L	19		19		<1		50		<1		<1		<1		
Bicarbonate Alkalinity as CaCO3		71-52-3	1	mg/L	227		227		236		209		239		239		250		
Total Alkalinity as CaCO3		---	1	mg/L	246		246		236		259		239		239		250		
ED041: Sulfate (Turbidimetric) as SO4 2-																			
Sulfate as SO4 - Turbidimetric		14808-79-8	1	mg/L	<1		<1		<1		<1		<1		<10		<10		
ED045G: Chloride Discrete analyser																			
Chloride		16887-00-6	1	mg/L	189		184		184		186		182		184		184		
ED093F: Dissolved Major Cations																			
Calcium		7440-70-2	1	mg/L	27		27		27		27		27		27		26		
Magnesium		7439-95-4	1	mg/L	33		33		34		33		33		33		32		
Sodium		7440-23-5	1	mg/L	119		115		115		122		114		114		122		
Potassium		7440-09-7	1	mg/L	26		27		27		27		27		27		27		
EG020F: Dissolved Metals by ICP-MS																			
Arsenic		7440-38-2	0.001	mg/L	<0.001		<0.001		<0.001		<0.001		<0.001		<0.001		<0.001		
Cadmium		7440-43-9	0.0001	mg/L	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		
Chromium		7440-47-3	0.001	mg/L	<0.001		<0.001		<0.001		<0.001		<0.001		<0.001		<0.001		
Copper		7440-50-8	0.001	mg/L	<0.001		<0.001		<0.001		<0.001		<0.001		<0.001		<0.001		
Lead		7439-92-1	0.001	mg/L	<0.001		<0.001		<0.001		<0.001		<0.001		<0.001		<0.001		
Manganese		7439-96-5	0.001	mg/L	0.002		0.002		0.008		0.002		0.001		0.002		0.002		
Nickel		7440-02-0	0.001	mg/L	<0.001		<0.001		<0.001		<0.001		<0.001		<0.001		<0.001		
Zinc		7440-66-6	0.005	mg/L	<0.005		<0.005		<0.005		<0.005		<0.005		<0.005		<0.005		
Boron		7440-42-8	0.05	mg/L	0.70		0.70		0.70		0.70		0.70		0.70		0.68		
Iron		7439-89-6	0.05	mg/L	<0.05		<0.05		<0.05		<0.05		<0.05		<0.05		<0.05		
EG035F: Dissolved Mercury by FILMS																			
Mercury		7439-97-8	0.0001	mg/L	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		
EK055G: Ammonia as N by Discrete Analyser																			
Ammonia as N		7664-41-7	0.01	mg/L	<0.01		<0.01		<0.01		<0.01		<0.01		<0.01		<0.01		
EK057G: Nitrite as N by Discrete Analyser																			
Nitrite as N		---	0.01	mg/L	<0.01		<0.01		<0.01		<0.01		0.01		<0.01		<0.01		
EK058G: Nitrate as N by Discrete Analyser																			
Nitrate as N		14797-55-8	0.01	mg/L	0.01		0.01		<0.01		<0.01		<0.01		<0.01		<0.01		
EK059G: NO3 as N by Discrete Analyser																			
Nitrite + Nitrate as N		---	0.01	mg/L	0.01		0.01		<0.01		<0.01		<0.01		<0.01		<0.01		
EK067G: Total Phosphorus as P by Discrete Analyser																			
Total Phosphorus as P		---	0.01	mg/L	0.02		0.02		0.07		<0.01		0.01		0.01		0.10		



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 Project : J1418

Analytical Results

Sub-Matrix: WATER

Sub-Matrix: WATER		Client sample ID				Client sampling date / time				BP-01;1.5				BP-01;3.5				BP-02;1.5				BP-02;3.5				BP-03;2.5			
Compound		CAS Number	LOR	Unit	ES0818896-001	ES0818896-002	ES0818896-003	ES0818896-004	ES0818896-005																				
EK071G: Reactive Phosphorus as P by discrete analyser																													
Reactive Phosphorus as P					—	0.01	mg/L	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01															
EN055: Ionic Balance																													
^ Total Anions					—	0.01	meq/L	10.2	9.90	10.4	9.90	10.4	9.90	10.2															
^ Total Cations					—	0.01	meq/L	9.97	9.90	10.0	9.68	10.0	9.68	10.0															
^ Ionic Balance					—	0.01	%	1.42	0.02	1.88	1.14	1.88	1.14	0.90															
EP002: Dissolved Organic Carbon (DOC)																													
Dissolved Organic Carbon					—	1	mg/L	7	7	7	7	7	7	6															
EP020: Oil and Grease (O&G)																													
Oil & Grease					—	5	mg/L	<5	<5	<5	<5	<5	<5	<5															
EP030: Biochemical Oxygen Demand (BOD)																													
Biochemical Oxygen Demand					—	2	mg/L	4	5	3	4	3	4	3															
EP080/071: Total Petroleum Hydrocarbons																													
C6 - C9 Fraction					—	20	µg/L	<20	<20	<20	<20	<20	<20	<20															
C10 - C14 Fraction					—	50	µg/L	<50	<50	<50	<50	<50	<50	<50															
C15 - C28 Fraction					—	100	µg/L	<100	<100	<100	<100	<100	<100	<100															
C29 - C36 Fraction					—	50	µg/L	<50	<50	<50	<50	<50	<50	<50															
EP080S: TPH(V)/BTEX Surrogates																													
1,2-Dichloroethane-D4					17060-07-0	0.1	%	110	106	94.1	110	94.1	110	91.0															
Toluene-D8					2037-26-5	0.1	%	107	99.1	91.5	105	91.5	105	104															
4-Bromofluorobenzene					480-00-4	0.1	%	108	97.0	88.2	104	88.2	104	92.8															



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Analytical Results

Sub-Matrix: WATER		Client sample ID				BP-03; 5.5		BP-04; 2.5		BP-04; 6.0		BP-05; 2.5		BP-05; 6.0	
		Client sampling date / time				20-DEC-2008 15:00		20-DEC-2008 15:00		20-DEC-2008 15:00		20-DEC-2008 15:00		20-DEC-2008 15:00	
Compound	CAS Number	LOR	Unit	ES0818896-006		ES0818896-007		ES0818896-003		ES0818896-009		ES0818896-010			
ED037P: Alkalinity by PC-Titrator															
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1		<1		<1		<1		<1		<1	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1		15		<1		14		<1		<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	298		242		274		229		273		273	
Total Alkalinity as CaCO3	---	1	mg/L	298		257		274		243		273		273	
ED041I: Sulfate (Turbidimetric) as SO4 2-															
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1		<10		<1		<10		<10		<10	
ED045G: Chloride Discrete analyser															
Chloride	16887-00-6	1	mg/L	188		181		187		185		190		190	
ED093F: Dissolved Major Cations															
Calcium	7440-70-2	1	mg/L	36		27		34		27		36		36	
Magnesium	7439-95-4	1	mg/L	34		33		34		33		36		36	
Sodium	7440-23-5	1	mg/L	114		120		113		116		114		114	
Potassium	7440-09-7	1	mg/L	27		27		26		26		26		26	
EG020F: Dissolved Metals by ICP-MS															
Arsenic	7440-38-2	0.001	mg/L	0.004		<0.001		<0.001		0.001		0.007		0.007	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001		<0.0001		0.0019		<0.0001		<0.0001		<0.0001	
Chromium	7440-47-3	0.001	mg/L	<0.001		<0.001		<0.001		<0.001		<0.001		<0.001	
Copper	7440-50-8	0.001	mg/L	<0.001		<0.001		<0.001		<0.001		<0.001		<0.001	
Lead	7439-92-1	0.001	mg/L	<0.001		<0.001		<0.001		<0.001		<0.001		<0.001	
Manganese	7439-96-5	0.001	mg/L	1.59		0.002		1.42		0.256		1.52		1.52	
Nickel	7440-02-0	0.001	mg/L	<0.001		<0.001		<0.001		<0.001		<0.001		<0.001	
Zinc	7440-66-6	0.005	mg/L	<0.005		<0.005		<0.005		<0.005		<0.005		<0.005	
Boron	7440-42-8	0.05	mg/L	0.68		0.72		0.69		0.71		0.58		0.58	
Iron	7439-89-6	0.05	mg/L	16.4		<0.05		0.80		<0.05		22.0		22.0	
EG035F: Dissolved Mercury by FIMS															
Mercury	7439-97-6	0.0001	mg/L	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001	
EK055G: Ammonia as N by Discrete Analyser															
Ammonia as N	7664-41-7	0.01	mg/L	<0.01		<0.01		0.70		<0.01		0.70		0.70	
EK057G: Nitrite as N by Discrete Analyser															
Nitrite as N	---	0.01	mg/L	<0.01		<0.01		0.01		0.01		<0.01		<0.01	
EK058G: Nitrate as N by Discrete Analyser															
Nitrate as N	14797-55-8	0.01	mg/L	<0.01		<0.01		<0.01		<0.01		<0.01		<0.01	
EK059G: NOx as N by Discrete Analyser															
Nitrite + Nitrate as N	---	0.01	mg/L	<0.01		<0.01		<0.01		<0.01		<0.01		<0.01	
EK067G: Total Phosphorus as P by Discrete Analyser															
Total Phosphorus as P	---	0.01	mg/L	0.10		0.01		0.03		0.04		0.05		0.05	



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Analytical Results

Sub-Matrix: WATER		Client sample ID		Client sampling date / time		BP-03; 5.5		BP-04; 2.5		BP-04; 6.0		BP-05; 2.5		BP-05; 6.0	
						20-DEC-2008 15:00		20-DEC-2008 15:00		20-DEC-2008 15:00		20-DEC-2008 15:00		20-DEC-2008 15:00	
Compound	CAS Number	LOR	Unit	ES0818896-006		ES0818896-007		ES0818896-008		ES0818896-009		ES0818896-010			
EK071G: Reactive Phosphorus as P by discrete analyser															
Reactive Phosphorus as P	—	0.01	mg/L	0.02		<0.01		<0.01		<0.01		0.02			
EN055: Ionic Balance															
Δ Total Anions	—	0.01	meq/L	11.2		10.2		10.8		10.1		10.8			
Δ Total Cations	—	0.01	meq/L	10.2		9.95		10.1		9.79		10.3			
Δ Ionic Balance	—	0.01	%	4.64		1.54		2.97		1.40		2.29			
EP002: Dissolved Organic Carbon (DOC)															
Dissolved Organic Carbon	—	1	mg/L	11		7		8		7		12			
EP020: Oil and Grease (O&G)															
Oil & Grease	—	5	mg/L	<5		<5		<5		<5		<5			
EP030: Biochemical Oxygen Demand (BOD)															
Biochemical Oxygen Demand	—	2	mg/L	8		3		9		3		8			
EP080/071: Total Petroleum Hydrocarbons															
C6 - C9 Fraction	—	20	µg/L	<20		<20		<20		<20		<20			
C10 - C14 Fraction	—	50	µg/L	<50		<50		<50		<50		<50			
C15 - C28 Fraction	—	100	µg/L	<100		<100		<100		<100		<100			
C29 - C36 Fraction	—	50	µg/L	<50		<50		<50		<50		<50			
EP080S: TPH(V)/BTEX Surrogates															
1,2-Dichloroethane-D4	17060-07-0	0.1	%	102		98.2		105		102		104			
Toluene-D8	2037-26-5	0.1	%	112		98.2		108		107		115			
4-Bromofluorobenzene	480-00-4	0.1	%	102		90.5		101		98.1		110			



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Analytical Results

Sub-Matrix: WATER		Client sample ID				BP-06; 0.5		BP-06; 2.0		BP-07; 1.0		BP-07; 4.0		BP-D1	
		Client sampling date / time				20-DEC-2008 15:00		20-DEC-2008 15:00		20-DEC-2008 15:00		20-DEC-2008 15:00		20-DEC-2008 15:00	
Compound	CAS Number	LOR	Unit	ES0818896-011		ES0818896-012		ES0818896-013		ES0818896-014		ES0818896-015			
ED037P: Alkalinity by PC Titrator															
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1		<1		<1		<1		<1		<1	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	18		19		15		18		21		21	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	229		215		218		234		241		241	
Total Alkalinity as CaCO3	---	1	mg/L	247		234		233		252		262		262	
ED041: Sulfate (Turbidimetric) as SO4 2-															
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1		<1		<1		<1		<1		<1	
ED045G: Chloride Discrete analyser															
Chloride	16887-00-6	1	mg/L	187		183		187		185		178		178	
ED093F: Dissolved Major Cations															
Calcium	7440-70-2	1	mg/L	27		27		27		27		27		27	
Magnesium	7439-95-4	1	mg/L	33		33		33		34		34		34	
Sodium	7440-23-5	1	mg/L	120		115		113		118		117		117	
Potassium	7440-09-7	1	mg/L	26		27		26		26		26		26	
EG020F: Dissolved Metals by ICP-MS															
Arsenic	7440-38-2	0.001	mg/L	<0.001		<0.001		<0.001		<0.001		<0.001		0.001	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001	
Chromium	7440-47-3	0.001	mg/L	<0.001		<0.001		<0.001		<0.001		<0.001		<0.001	
Copper	7440-50-8	0.001	mg/L	<0.001		<0.001		<0.001		<0.001		<0.001		<0.001	
Lead	7439-92-1	0.001	mg/L	<0.001		<0.001		<0.001		<0.001		<0.001		<0.001	
Manganese	7439-98-5	0.001	mg/L	0.002		0.002		0.002		0.003		0.001		0.001	
Nickel	7440-02-0	0.001	mg/L	<0.001		<0.001		<0.001		<0.001		<0.001		<0.001	
Zinc	7440-66-6	0.005	mg/L	<0.005		<0.005		0.005		0.017		<0.005		<0.005	
Boron	7440-42-8	0.05	mg/L	0.69		0.69		0.70		0.71		6.72		6.72	
Iron	7439-89-6	0.05	mg/L	<0.05		0.11		<0.05		<0.05		<0.05		<0.05	
EG035F: Dissolved Mercury by FIMS															
Mercury	7439-97-8	0.0001	mg/L	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001	
EK055G: Ammonia as N by Discrete Analyser															
Ammonia as N	7664-41-7	0.01	mg/L	<0.01		<0.01		<0.01		<0.01		<0.01		<0.01	
EK057G: Nitrite as N by Discrete Analyser															
Nitrite as N	---	0.01	mg/L	<0.01		0.01		<0.01		0.02		0.01		0.01	
EK058G: Nitrate as N by Discrete Analyser															
^ Nitrate as N	14797-55-8	0.01	mg/L	<0.01		<0.01		<0.01		<0.01		<0.01		0.02	
EK059G: NOx as N by Discrete Analyser															
Nitrite + Nitrate as N	---	0.01	mg/L	<0.01		<0.01		<0.01		<0.01		<0.01		0.03	
EK067G: Total Phosphorus as P by Discrete Analyser															
Total Phosphorus as P	---	0.01	mg/L	<0.01		0.02		0.04		0.04		0.04		<0.01	



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Analytical Results

Sub-Matrix: WATER

Compound		CAS Number	LOR	Unit	Client sample ID	BP-06; 0.5	BP-06; 2.0	BP-07; 1.0	BP-07; 4.0	BP-D1
EN071G: Reactive Phosphorus as P by discrete analyser					Client sampling date / time	20-DEC-2008 15:00	20-DEC-2008 15:00	20-DEC-2008 15:00	20-DEC-2008 15:00	20-DEC-2008 15:00
Reactive Phosphorus as P		—	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
EN055: Ionic Balance										
Δ Total Anions		—	0.01	meq/L		10.2	9.36	9.93	10.2	10.2
Δ Total Cations		—	0.01	meq/L		9.94	9.74	9.66	9.94	9.88
Δ Ionic Balance		—	0.01	%		1.39	0.62	1.36	1.58	1.85
EP002: Dissolved Organic Carbon (DOC)										
Dissolved Organic Carbon		—	1	mg/L		7	7	7	7	7
EP020: Oil and Grease (O&G)										
Oil & Grease		—	5	mg/L		<5	<5	<5	<5	<5
EP030: Biochemical Oxygen Demand (BOD)										
Biochemical Oxygen Demand		—	2	mg/L		3	3	3	4	4
EP080/071: Total Petroleum Hydrocarbons										
C6 - C9 Fraction		—	20	µg/L		<20	<20	<20	<20	<20
C10 - C14 Fraction		—	50	µg/L		<50	<50	<50	<50	<50
C15 - C28 Fraction		—	100	µg/L		<100	<100	<100	<100	<100
C29 - C36 Fraction		—	50	µg/L		<50	<50	<50	<50	<50
EP080S: TPH(V)/BTEX Surrogates										
1,2-Dichloroethane-D4		17060-07-0	0.1	%		110	98.0	105	92.4	90.9
Toluene-D8		2037-26-5	0.1	%		100	90.4	95.7	84.7	100
4-Bromofluorobenzene		460-00-4	0.1	%		99.8	89.5	99.1	83.2	91.1



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Analytical Results

Sub-Matrix: WATER

Compound		CAS Number	LOR	Unit	Client sample ID	BP: D2	20-DEC-2008 15:00	ES0818896-016
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃		DMO-210-001	1	mg/L		<1		
Carbonate Alkalinity as CaCO ₃		3812-32-6	1	mg/L		<1		
Bicarbonate Alkalinity as CaCO ₃		71-52-3	1	mg/L		271		
Total Alkalinity as CaCO ₃		—	1	mg/L		271		
ED041: Sulfate (Turbidimetric) as SO ₄ 2-								
Sulfate as SO ₄ - Turbidimetric		14808-79-8	1	mg/L		<1		
ED045G: Chloride Discrete analyser								
Chloride		16887-00-6	1	mg/L		188		
ED093F: Dissolved Major Cations								
Calcium		7440-70-2	1	mg/L		35		
Magnesium		7439-95-4	1	mg/L		35		
Sodium		7440-23-5	1	mg/L		114		
Potassium		7440-09-7	1	mg/L		27		
ED020F: Dissolved Metals by ICP-MS								
Arsenic		7440-38-2	0.001	mg/L		0.003		
Cadmium		7440-43-9	0.0001	mg/L		<0.0001		
Chromium		7440-47-3	0.001	mg/L		<0.001		
Copper		7440-50-8	0.001	mg/L		<0.001		
Lead		7439-92-1	0.001	mg/L		<0.001		
Manganese		7439-96-5	0.001	mg/L		2.74		
Nickel		7440-02-0	0.001	mg/L		<0.001		
Zinc		7440-68-6	0.005	mg/L		<0.005		
Boron		7440-42-8	0.05	mg/L		0.71		
Iron		7439-89-6	0.05	mg/L		7.32		
EG035F: Dissolved Mercury by FIMS								
Mercury		7439-97-6	0.0001	mg/L		<0.0001		
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N		7664-41-7	0.01	mg/L		0.63		
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N		—	0.01	mg/L		<0.01		
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N		14797-55-8	0.01	mg/L		<0.01		
EK059G: NO _x as N by Discrete Analyser								
Nitrite + Nitrate as N		—	0.01	mg/L		<0.01		
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P		—	0.01	mg/L		0.01		

100

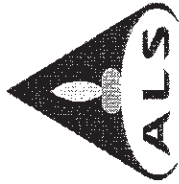
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Page : 12 of 12
Work Order : ES0818896 Amendment 1
Client : C M JEWELL & ASSOC PTY LTD
Project : J1418

Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP0805: TPH(VI)ETEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	80	120
Toluene-D8	2037-26-5	88	110
4-Bromofluorobenzene	460-00-4	86	115



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: ES0819019	Page	: 1 of 6
Client	: C M JEWELL & ASSOC PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR CRAIG WICENCIAK	Contact	: Charlie Pierce
Address	: P O BOX 10 WENTWORTH FALLS NSW, AUSTRALIA 2782	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: craig@cm-jewell.com.au	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 47593251	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 47593257	Facsimile	: +61-2-8784 8500
Project	: J141B	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: SY100/08	Date Samples Received	: 24-DEC-2008
C-O-C number	: —	Issue Date	: 08-JAN-2009
Sampler	: CW, DE	No. of samples received	: 16
Site	: KIRRAWEE BRICK PIT	No. of samples analysed	: 16
Quote number	: SY100/08		

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 McCabe	Senior Inorganic Chemist	Stafford Minerals - AY
Stephen Hislop	Senior Inorganic Chemist	Inorganics



Page : 2 of 6
Work Order : ES0819019
Client : C M JEWELL & ASSOC PTY LTD
Project : J141B

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 performed, results are reported on a dry weight basis.

Where a reported result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient 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



Analytical Results

Sub-Matrix: SEDIMENT

Sub-Matrix: SEDIMENT		Client sample ID		Client sampling date / time		BP-01:0.05		BP-01:0.15		BP-02:0.05		BP-02:0.15		BP-03:0.05	
		LOR		Unit		[24-DEC-2008]		[24-DEC-2008]		[24-DEC-2008]		[24-DEC-2008]		[24-DEC-2008]	
Compound		CAS Number				ES0819019-001		ES0819019-002		ES0819019-003		ES0819019-004		ES0819019-005	
EP005: Total Organic Carbon (TOC)															
Total Organic Carbon		---		%		11.0		0.23		1.81		0.25		14.8	



Analytical Results

Sub-Matrix: SEDIMENT

Sub-Matrix: SEDIMENT	Client sample ID				BP-07-0.15	BP-SD1
	Client sampling date / time	BP-06-0.05	BP-06-0.15	BP-07-0.05		
		[24-DEC-2008]	[24-DEC-2008]	[24-DEC-2008]	[24-DEC-2008]	[24-DEC-2008]
Compound	CAS Number	LOR	Unit	ES0819019-011	ES0819019-012	ES0819019-014
EF005: Total Organic Carbon (TOC)	—	0.02	%	1.05	2.35	2.26
Total Organic Carbon				1.19		3.73

Page : 6 of 6
 Work Order : ES0819019
 Client : C M JEWELL & ASSOC PTY LTD
 Project : J141B



Analytical Results

Sub-Matrix: SEDIMENT

Sub-Matrix: SEDIMENT		Client sample ID		Client sampling date / time		BP-SD2																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				</	
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APPENDIX G

Pit Water Chemistry Data Other Sampling Events



APPENDIX G1

AWT Sampling Event, 2001

Table A16 Results of Field Parameters, Nutrients, PAH's, TPH's
in Surface water and Groundwater, Kirrawee (10/06/99 & 11/01/01)

Units in µg/L unless indicated otherwise

Sample Location	GW1	GW2	GW3	GW4	SW-SUR	SW-DEP	SW2	SW3	SW-DEP ₂	Freshwater Guidelines
Sample Type	GW	GW	GW	GW	SW	SW	SW	SW	SW	
Sample Date	10/06/99	11/01/01	10/06/99	11/01/01	10/06/99	10/06/99	11/01/01	11/01/01	10/06/99	
Label Numbers	99044070	201002137	99044071	201002138	99044072	99044073	201002135	201002136	99044077	
Field Parameters										
Standing Water Level	6.42	7	4.42	5.15	nt	nt	nt	nt	nt	
Temperature	21.3	19.79	21.6	20.81	14.1	14	19.09	19.45	nt	
pH	4.3	5.91	5.95	5.18	6.93	6.98	6.7	6.71	nt	6.5 - 9.0 ^b
Electrical Conductivity (uS/cm)	1835	1360	781	800	992	1018	1200	1300	nt	about 1500 ^b
Salinity (mg/L)	900	720	400	410	500	500	630	640	nt	<1000 ^b
DO (mg/L)	5.2	8.21	nt	2.56	nt	nt	1.14	2.67	nt	>6 ^b
Redox (V)	371	443	nt	225	89	-203	121	255	nt	nr
Turbidity	43	92.2	nt	48.1	13	11.5	0	0	nt	nr
Inorganics and Nutrients										
pH (pH units)	3.8	5.9	5.9	5.1	6.7	6.6	nt	nt	nt	6.5 - 9.0 ^b
Electrical Conductivity (uS/cm)	1800	900	nt	nt	1000	1100	nt	nt	nt	about 1500 ^b
Total Nitrogen (mg/L)	nt	nt	nt	nt	nt	2.1	0.63	0.58	nt	100-750 ^b
Total Phosphorous (mg/L)	nt	nt	nt	nt	nt	0.15	0.038	0.042	nt	10-100 ^b
Sulphate (mg/kg)	nt	nt	nt	nt	nt	nt	nt	nt	700	nr
Polycyclic Aromatic Hydrocarbons										
Naphthalene	<0.5	<0.5	<0.5	<0.5	nt	<0.5	nt	nt	nt	nr
Acenaphthylene	<0.5	<0.5	<0.5	<0.5	nt	<0.5	nt	nt	nt	nr
Acenaphthene	<0.5	<0.5	<0.5	<0.5	nt	<0.5	nt	nt	nt	nr
Fluorene	<0.5	<0.5	<0.5	<0.5	nt	<0.5	nt	nt	nt	nr
Phenanthrene	<0.5	<0.5	<0.5	<0.5	nt	<0.5	nt	nt	nt	nr
Anthracene	<0.5	<0.5	<0.5	<0.5	nt	<0.5	nt	nt	nt	nr
Fluoranthene	<0.5	<0.5	<0.5	<0.5	nt	<0.5	nt	nt	nt	nr
Pyrene	<0.5	<0.5	<0.5	<0.5	nt	<0.5	nt	nt	nt	nr
Benzo(a)anthracene	<0.5	<0.5	<0.5	<0.5	nt	<0.5	nt	nt	nt	nr
Chrysene	<0.5	<0.5	<0.5	<0.5	nt	<0.5	nt	nt	nt	nr
Benzo(b)fluoranthene	<0.5	<0.5	<0.5	<0.5	nt	<0.5	nt	nt	nt	nr
Benzo(k)fluoranthene	<0.5	<0.5	<0.5	<0.5	nt	<0.5	nt	nt	nt	nr
Benzo(a)pyrene	<0.5	<0.5	<0.5	<0.5	nt	<0.5	nt	nt	nt	nr
Indeno(1,2,3-cd)pyrene	<0.5	<0.5	<0.5	<0.5	nt	<0.5	nt	nt	nt	nr
Dibenzo(ah)anthracene	<0.5	<0.5	<0.5	<0.5	nt	<0.5	nt	nt	nt	nr
Benzo(ghi)perylene	<0.5	<0.5	<0.5	<0.5	nt	<0.5	nt	nt	nt	nr
Total Detectable PAHs	<0.5	<0.5	<0.5	<0.5	nt	<0.5	nt	nt	nt	3 ^{anc}
Total Recoverable Hydrocarbons										
C6-C9	<40	<40	<40	<40	nt	<40	nt	nt	nt	nr
C10-C14	<100	<100	<100	<100	nt	<100	nt	nt	nt	nr
C15-C28	<200	<200	<200	<200	nt	<200	nt	nt	nt	nr
C29-C40	<200	<200	<200	<200	nt	<200	nt	nt	nt	nr
Total C10-C40	nd	0	0	nd	nt	nd	nt	nt	nt	10000 ^c

nr - not recommended

nt - not tested

nd - not detected

^a NEPC (1999) Groundwater Investigation Levels, Aquatic Ecosystems - Fresh Waters

^b ANZECC (1992) Summary Guidelines for the Protection of Aquatic Ecosystems - Fresh Waters

^c NSW EPA (1994) Threshold Concentrations- Protection of Aquatic Ecosystems - Fresh

¹ GW4 is a duplicate sample of GW3

² SW-DEP is a duplicate sample of SW - DEP

1 - detection limit concentration

Table A17 Results of Organic Parameters: PCB's, BTEX and OPP's in Surface water and Groundwater, Kirrawee (10/06/99 & 11/01/01)

Units in µg/L unless indicated otherwise

Sample Location	GW1		GW2		GW3		GW4 ¹		SW-SUR		SW-DEP		SW2		SW3		SW-DEP ²		Freshwater Guidelines
Sample Type	GW		GW		GW		GW		SW		SW		SW		SW		SW		
Sample Date	10/06/99	11/01/01	10/06/99	11/01/01	10/06/99	11/01/01	10/06/99	11/01/01	10/06/99	10/06/99	10/06/99	10/06/99	11/01/01	11/01/01	11/01/01	11/01/01	10/06/99	10/06/99	
Label Numbers	99044070	201002137	99044071	201002138	99044072	201002139	99044076	99044073	99044074	201002135	201002136	99044077	201002136	201002136	201002136	201002136	99044077	99044077	
PCB's																			
Arochlor 1016	<0.2	nt	<0.2	nt	<0.2	nt	nt	nt	<0.2	nt	<0.2	nt	nt	nt	nt	nt	nt	nt	nr
Arochlor 1221	<0.2	nt	<0.2	nt	<0.2	nt	nt	nt	<0.2	nt	<0.2	nt	nt	nt	nt	nt	nt	nt	nr
Arochlor 1232	<0.2	nt	<0.2	nt	<0.2	nt	nt	nt	<0.2	nt	<0.2	nt	nt	nt	nt	nt	nt	nt	nr
Arochlor 1242	<0.2	nt	<0.2	nt	<0.2	nt	nt	nt	<0.2	nt	<0.2	nt	nt	nt	nt	nt	nt	nt	nr
Arochlor 1248	<0.2	nt	<0.2	nt	<0.2	nt	nt	nt	<0.2	nt	<0.2	nt	nt	nt	nt	nt	nt	nt	nr
Arochlor 1254	<0.2	nt	<0.2	nt	<0.2	nt	nt	nt	<0.2	nt	<0.2	nt	nt	nt	nt	nt	nt	nt	nr
Arochlor 1260	<0.2	nt	<0.2	nt	<0.2	nt	nt	nt	<0.2	nt	<0.2	nt	nt	nt	nt	nt	nt	nt	nr
Arochlor 12626	<0.2	nt	<0.2	nt	<0.2	nt	nt	nt	<0.2	nt	<0.2	nt	nt	nt	nt	nt	nt	nt	nr
Arochlor 1268	<0.2	nt	<0.2	nt	<0.2	nt	nt	nt	<0.2	nt	<0.2	nt	nt	nt	nt	nt	nt	nt	nr
Total Detectable PCB's	<0.2	nt	<0.2	nt	<0.2	nt	nt	nt	<0.2	nt	<0.2	nt	nt	nt	nt	nt	nt	nt	0.001 ^{ab}
Organophosphate Pesticides																			
Chlorpyrifos	<0.2	nt	<0.2	nt	<0.2	nt	nt	nt	<0.2	nt	<0.2	nt	<1	<1	<1	<1	nt	nt	0.001 ^{ab}
Fenitrothion	<0.2	nt	<0.2	nt	<0.2	nt	nt	nt	<0.2	nt	<0.2	nt	<1	<1	<1	<1	nt	nt	nr
Dameton	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	<1	<1	<1	<1	nt	nt	0.1 ^{ab}
Azinphos-methyl	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	<1	<1	<1	<1	nt	nt	nr
Malathion	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	<1	<1	<1	<1	nt	nt	0.07 ^b
Parathion	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	<1	<1	<1	<1	nt	nt	0.004 ^b
Bromofos Ethyl	<0.2	nt	<0.2	nt	<0.2	nt	nt	nt	<0.2	nt	<0.2	nt	nt	nt	nt	nt	nt	nt	nr
Ethion	<0.2	nt	<0.2	nt	<0.2	nt	nt	nt	<0.2	nt	<0.2	nt	nt	nt	nt	nt	nt	nt	nr
BTEX																			
Benzene	<1	nt	<1	nt	<1	nt	nt	nt	<1	nt	<1	nt	nt	nt	nt	nt	nt	nt	300 ^{bc}
Toluene	<1	nt	<1	nt	<1	nt	nt	nt	<1	nt	<1	nt	nt	nt	nt	nt	nt	nt	300 ^{bc}
Ethylbenzene	<1	nt	<1	nt	<1	nt	nt	nt	<1	nt	<1	nt	nt	nt	nt	nt	nt	nt	140 ^{bc}
Total Xylenes	<3	nt	<3	nt	<3	nt	nt	nt	<3	nt	<3	nt	nt	nt	nt	nt	nt	nt	360 ^c

nr - not recommended

nt - not tested

^a NEPC (1999) Groundwater Investigation Levels, Aquatic Ecosystems - Fresh Waters

^b ANZECC (1992) Summary Guidelines for the Protection of Aquatic Ecosystems - Fresh Waters

^c NSW EPA (1994) Threshold Concentrations - Protection of Aquatic Ecosystems - Fresh

¹ GW4 is a duplicate sample of GW3

² SW-DEP is a duplicate sample of SW - DEP

Notes: Concentrations exceed respective guideline concentration

Table A18 Results of OCP's and heavy metals in Surface water and Groundwater, Kirrawee (10/06/99)

Units in µg/L unless indicated otherwise

Sample Location	GW1	GW2	GW3	GW4	SW-SUR	SW-DEP	SW2	SW3	SW-DEP ₂	Freshwater Guidelines
Sample Type	GW	GW	GW	GW	SW	SW	SW	SW	SW	
Sample Date	10/06/99	10/06/99	10/06/99	10/06/99	10/06/99	10/06/99	10/06/99	10/06/99	10/06/99	
Label Numbers	99044070	201002137	99044071	201002138	99044072	99044073	201002135	201002136	99044077	
Organochlorine pesticides										
HCB	<0.2	nt	<0.2	nt	<0.2	nt	<0.2	<0.1	nt	nt
alpha BHC	<0.2	nt	<0.2	nt	<0.2	nt	<0.2	<0.1	nt	nt
Lindane (gamma BHC)	<0.2	nt	<0.2	nt	<0.2	nt	<0.2	<0.1	nt	nt
Heptachlor	<0.2	nt	<0.2	nt	<0.2	nt	<0.2	<0.1	nt	0.03 ^b
Aldrin	<0.2	nt	<0.2	nt	<0.2	nt	<0.2	<0.1	nt	0.01 ^{ab}
beta BHC	<0.2	nt	<0.2	nt	<0.2	nt	<0.2	<0.1	nt	0.01 ^{ab}
Oxychlorodane	<0.2	nt	<0.2	nt	<0.2	nt	<0.2	<0.1	nt	nt
delta BHC	<0.2	nt	<0.2	nt	<0.2	nt	<0.2	<0.1	nt	nt
Heptachlor Epoxide	<0.2	nt	<0.2	nt	<0.2	nt	<0.2	<0.1	nt	nt
o, p-DDE	<0.2	nt	<0.2	nt	<0.2	nt	<0.2	<0.1	nt	0.014 ^b
alpha Endosulfan	<0.2	nt	<0.2	nt	<0.2	nt	<0.2	<0.1	nt	0.01 ^b
trans Chlordane	<0.2	nt	<0.2	nt	<0.2	nt	<0.2	<0.1	nt	0.004 ^{ab}
cis Chlordane	<0.2	nt	<0.2	nt	<0.2	nt	<0.2	<0.1	nt	0.004 ^{ab}
trans Nonachlor	<0.2	nt	<0.2	nt	<0.2	nt	<0.2	<0.1	nt	0.004 ^{ab}
p, p-DDE	<0.2	nt	<0.2	nt	<0.2	nt	<0.2	<0.1	nt	nt
Dieldrin	<0.2	nt	<0.2	nt	<0.2	nt	<0.2	<0.1	nt	0.014 ^b
Endrin	<0.2	nt	<0.2	nt	<0.2	nt	<0.2	<0.1	nt	0.002 ^{ab}
o, p-DDD	<0.2	nt	<0.2	nt	<0.2	nt	<0.2	<0.1	nt	0.003 ^b
o, p-DDT	<0.2	nt	<0.2	nt	<0.2	nt	<0.2	<0.1	nt	nt
beta Endosulfan	<0.2	nt	<0.2	nt	<0.2	nt	<0.2	<0.1	nt	0.001 ^{ab}
p, p-DDD	<0.2	nt	<0.2	nt	<0.2	nt	<0.2	<0.1	nt	0.01 ^b
p, p-DDT	<0.2	nt	<0.2	nt	<0.2	nt	<0.2	<0.1	nt	nt
Endosulfan Sulphate	<0.2	nt	<0.2	nt	<0.2	nt	<0.2	<0.1	nt	0.001 ^{ab}
Endrin Aldehyde	<0.2	nt	<0.2	nt	<0.2	nt	<0.2	<0.1	nt	nt
Methoxychlor	<0.2	nt	<0.2	nt	<0.2	nt	<0.2	<0.1	nt	nt
Endrin Ketone	<0.2	nt	<0.2	nt	<0.2	nt	<0.2	<0.1	nt	0.04 ^b
Metals ¹	<0.2	nt	<0.2	nt	<0.2	nt	<0.2	<0.1	nt	nt
arsenic (As)	<1	1	<1	1	<1	<1	<1	<1	nt	50 ^{ab}
cadmium (Cd)	<1	<1	<1	<1	<1	<1	<1	<1	nt	0.2 - 2.0 ^{ab}
chromium (Cr)	<10	<10	<10	<10	<10	<10	<10	<10	nt	10 ^{ab}
copper (Cu)	8 ¹	10	<2	<2	<2	<2	<2	<2	nt	2.0 - 5.0 ^{ab}
lead (Pb)	2 ¹	3 ¹	<1	<1	<1	<1	<1	<1	nt	1.0 - 5.0 ^{ab}
mercury (Hg)	0.08	<0.1	<0.5	<0.5	<0.5	0.5	<0.5	<0.1	nt	0.1 ^{ab}
nicker (Ni)	40	4	20	20	20	<10	<10	<1	nt	15.0 - 150.0 ^{ab}
selenium (Se)	<1	4	<1	<1	<1	<1	<1	<1	nt	5 ^{ab}
zinc (Zn)	65	65	5	16 ¹	<5	<5	36	<5	nt	5.0 - 50.0 ^{ab}

^a - analysis for metals undertaken on 0.45µm filtrate for groundwaters and total unfiltered waters for surface water analysis

nt - not recommended

nt - not tested

^b NEPC (1999) Groundwater Investigation Levels, Aquatic Ecosystems - Fresh Waters

^c ANZECC (1992) Summary Guidelines for the Protection of Aquatic Ecosystems - Fresh Waters

^d NSW EPA (1994) Threshold Concentrations- Protection of Aquatic Ecosystems - Fresh

^e GW4 is a duplicate sample of GW3

^f SW-DEP₂ is a duplicate sample of SW - DEP

^g guideline value for DDE is o,p DDE plus p, p DDE

^h guideline value for endosulfan is alpha endosulfan plus beta endosulfan

ⁱ guideline value for chlordane is trans chlordane plus cis chlordane

^j guideline value for DDT is o,p DDT plus p, p DDT

^k depends on water hardness



APPENDIX G2
URS Sampling Event, 2006

LEGEND

URS SAMPLE
LOCATION

BRICKPIT
BOUNDARY

PRINCES HIGHWAY

OAK ROAD

FLORA STREET

SYDNEY WATER

PROJECT:
FORMER KIRRAWEE BRICK PIT
568-594 PRINCES HWY KIRRAWEE

DESIGNED BY: DATE: 20/06/06
DRAWN BY: DATE: 20/06/06
CHECKED BY: DATE: 20/06/06

0 20 40

TITLE

SAMPLE LOCATIONS

PROJECT: 43217575
CADD FILE: BTLJ0013
REVISION: 2

URS

FIGURE 2

Table 1
Surface Water Analytical Results- Field Parameters
Former Kirrawee Brick Pit, September 2006

Sample ID	KW01_0.0	KW01_5.0	KW02_0.0	KW02_4.0	KW03_0.0	KW03_1.5
Date Sampled	20/09/2006	20/09/2006	20/09/2006	20/09/2006	20/09/2006	20/09/2006
Sample Type	Primary Sample	Primary Sample	Primary Sample	Primary Sample	Primary Sample	Primary Sample
Primary Sample ID	KW01_0.0	KW01_5.0	KW02_0.0	KW02_4.0	KW03_0.0	KW03_1.5

Parameter	Units	ANZECC 2000 Freshwater - 95%
Depth of Sample (below surface)	m	
Dissolved Oxygen	ppm	
Electrical Conductivity	uS	125-2200*
pH		6.5-8.5**
Redox	mV	
Temperature	°C	
Description		
Exceeds the ANZECC/ARMCANZ 2000 Trigger values for freshwater ecosystems - Level of protection 95% species		

0	5	0	4	0	1.5
6.71	3.78	7.15	6.57	7.41	7.28
940	930	904	912	875	919
8.08	7.79	8.43	8.16	8.44	8.49
121	116	98	100	94	94
22	18.1	22.1	18.1	22	21.2
clear, not turbid, no odour	clear, not turbid, no odour	clear, not turbid, no odour	clear, not turbid, no odour	clear, not turbid, no odour	clear, not turbid, no odour, green suspended algae and seaweed present.

Notes:

* = ANZECC 2000 trigger value for Electrical Conductivity in Lowland Rivers.

** = ANZECC 2000 trigger value for pH in NSW lowland rivers.

Table 2
Surface Water Analytical Results- Physiochemical parameters, natural attenuation parameters and faecal coliform
Former Kirrawee Brick Pit, September 2006

Sample ID	QC01	KW01_0.0	KW01_5.0	KW02_0.0	KW02_4.0	KW03_0.0	KW03_1.5
Date Sampled	20/09/2006	20/09/2006	20/09/2006	20/09/2006	20/09/2006	20/09/2006	20/09/2006
Sample Type	Primary Sample	Duplicate Sample	Primary Sample	Primary Sample	Primary Sample	Primary Sample	Primary Sample
Primary Sample ID	KW01_0.0	KW01_0.0	KW01_5.0	KW02_0.0	KW02_4.0	KW03_0.0	KW03_1.5

Analyte	LOR	Units	ANZECC 2000 Freshwater - 95%
Physico-Chemical Parameters			
Total Alkalinity	1	mg/L	278
Total Dissolved Solids @180°C	1	mg/L	558
Suspended Solids (SS)	1	mg/L	2
Natural Attenuation Parameters			
Ammonia as N	0.01	mg/L	<0.01
Bicarbonate Alkalinity as CaCO ₃	1	mg/L	247
Biochemical Oxygen Demand	2	mg/L	5
Calcium	1	mg/L	28
Carbonate Alkalinity as CaCO ₃	1	mg/L	60
Chloride	1	mg/L	184
Hydroxide Alkalinity as CaCO ₃	1	mg/L	<1
Ionic Balance	0.01	%	4.84
Nitrate as N	0.01	mg/L	<0.01
Nitrite + Nitrate as N	0.01	mg/L	<0.01
Nitrite as N	0.01	mg/L	<0.01
Phosphorus (total)	0.01	mg/L	<0.01
Sulphate	1	mg/L	4
Total Anions	0.01	mg/L	11.1
Total Cations	0.01	mg/L	10.1
Total Kjeldahl Nitrogen as N	0.1	mg/L	0.9
Total Organic Carbon	1	mg/L	7
Faecal Coliforms	1	cfu/100ml	20

Exceeds the ANZECC/ARMCANZ 2000 Trigger values for freshwater ecosystems - Level of protection 95% species

Notes:

- * = refers to ocean systems with no discharge limitations.
- ** = ANZECC 2000 trigger value for ammonia in lowland rivers.
- *** = ANZECC 2000 trigger value for nitrite and nitrate in lowland rivers.
- **** = ANZECC 2000 trigger value for total phosphorus in lowland rivers.
- ***** = ANZECC 2000 trigger value which is from the National Water Quality Management Strategy (NWQMS). This is the guideline for primary contact, which includes activities such as swimming, bathing and other direct water contact sports.

Table 3
Surface Water Analytical Results- Metals
Former Kirrawee Brick Pit, September 2006

Sample ID
Date Sampled
Sample Type
Primary Sample ID

KW01_0.0	QC01	KW01_5.0	KW02_0.0	KW02_4.0	KW03_0.0	KW03_1.5
20/09/2006	20/09/2006	20/09/2006	20/09/2006	20/09/2006	20/09/2006	20/09/2006
Primary Sample	Duplicate Sample	Primary Sample	Primary Sample	Primary Sample	Primary Sample	Primary Sample
KW01_0.0	KW01_0.0	KW01_5.0	KW02_0.0	KW02_4.0	KW03_0.0	KW03_1.5

Analyte	LOR	Units	ANZECC 2000 Freshwater - 95%
Metals (Dissolved)			
Arsenic	0.001	mg/L	0.013
Cadmium	0.0001	mg/L	0.0002
Chromium	0.001	mg/L	0.001
Copper	0.001	mg/L	0.0014
Lead	0.001	mg/L	0.0034
Magnesium	1	mg/L	
Nickel	0.001	mg/L	0.011
Potassium	1	mg/L	
Sodium	1	mg/L	
Zinc	0.005	mg/L	0.008

Exceeds the ANZECC/ARMCANZ 2000 Trigger values for freshwater ecosystems - Level of protection 95% species

Table 4
Surface Water Analytical Results- TPH and BTEX
Former Kirrawee Brick Pit, September 2006

Sample ID	KW01_0.0	QC01	KW01_5.0	KW02_0.0	KW02_4.0	KW03_0.0	KW03_1.5
Date Sampled	20/09/2006	20/09/2006	20/09/2006	20/09/2006	20/09/2006	20/09/2006	20/09/2006
Sample Type	Primary Sample	Duplicate Sample	Primary Sample	Primary Sample	Primary Sample	Primary Sample	Primary Sample
Primary Sample ID	KW01_0.0	KW01_0.0	KW01_5.0	KW02_0.0	KW02_4.0	KW03_0.0	KW03_1.5

Analyte	LOR	Units	ANZECC 2000 Freshwater - 95%
Total Petroleum Hydrocarbons			
C6-C8 fraction	20	µg/L	<20
C10-C14 fraction	50	µg/L	<50
C15-C28 fraction	100	µg/L	<100
C29-C36 fraction	50	µg/L	<50
Total C10-C36 fraction	200	µg/L	-
BTEX Compounds			
Benzene	1	µg/L	<1
Toluene	2	µg/L	<2
Ethylbenzene	2	µg/L	<2
m&p-Xylene	2	µg/L	<2
o-Xylene	2	µg/L	<2
Total BTEX	9	µg/L	-
Total Xylenes	4	µg/L	-

Exceeds the ANZECC/ARMCANZ 2000 Trigger values for freshwater ecosystems - Level of protection 95% species

Table 5
Surface Water Analytical Results- OC, OP and PCBs
Former Kirrawee Brick Pit, September 2006

Sample ID
Date Sampled
Sample Type
Primary Sample ID

KW01_0.0	QG01	KW01_5.0	KW02_0.0	KW02_4.0	KW03_0.0	KW03_1.5
20/09/2006	20/09/2006	20/09/2006	20/09/2006	20/09/2006	20/09/2006	20/09/2006
Primary Sample	Duplicate Sample	Primary Sample	Primary Sample	Primary Sample	Primary Sample	Primary Sample
KW01_0.0	KW01_0.0	KW01_5.0	KW02_0.0	KW02_4.0	KW03_0.0	KW03_1.5

Analyte	LOR	Units	ANZECC 2000 - Freshwater - 95%							
Organochlorine Pesticides (OC)										
4,4-DDD	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
4,4-DDE	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
4,4-DDT	2	µg/L	0.01	<2	<2	<2	<2	<2	<2	<2
α-BHC	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Aldrin	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
β-BHC	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chlordane - cis	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chlordane - trans	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
δ-BHC	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dieldrin	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Endosulfan 1	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Endosulfan 2	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Endosulfan sulfate	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Endrin	0.5	µg/L	0.02	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Endrin aldehyde	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Endrin ketone	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
γ-BHC	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Heptachlor	0.5	µg/L	0.09	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Heptachlor apoxide	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Hexachlorobenzene	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Methoxychlor	2	µg/L		<2	<2	<2	<2	<2	<2	<2
Organophosphorus Pesticides (OP)										
Azinphos Methyl	0.5	µg/L	0.02	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromophos-ethyl	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbophenothion	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorfenvinphos	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorpyrifos	0.5	µg/L	0.01	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorpyrifos-methyl	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Demeton-S-methyl	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Diazinon	0.5	µg/L	0.01	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichlorvos	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dimethoate	0.5	µg/L	0.16	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethion	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fenamiphos	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fenthion	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Malathion	0.5	µg/L	0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Monocrotophos	2	µg/L		<2	<2	<2	<2	<2	<2	<2
Parathion	2	µg/L	0.004	<2	<2	<2	<2	<2	<2	<2
Parathion-methyl	2	µg/L		<2	<2	<2	<2	<2	<2	<2
Phinphos-ethyl	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Prothiofos	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Polychlorinated Biphenyls										
Polychlorinated biphenyls	1	µg/L		<1	<1	<1	<1	<1	<1	<1

Exceeds the ANZECC/ARMCANZ 2000 Trigger values for freshwater ecosystems - Level of protection 95% species



APPENDIX G3

Douglas Sampling Event, 2008

TABLE 9: SUMMARY OF ANALYTICAL RESULTS FOR SUBSURFACE WATER SAMPLES

Analyte	PQL	Unit	SWIL		Samples				
			ANZECC (95% Freshwater)	ANZECC Marine Water	SSW1	SSW2	SSW3	BD1/121208	BD2/121208
Electrical Conductivity	1	μScm^{-1}	125-2200 ¹	ND	950	940	920		
pH	0.1	pH units	6.5-8.5 ¹	8-8.4	8	8.2	8.3		
Physico-Chemical Parameters									
Total Alkalinity	1	mg/L	ND	ND	240	240	240		
TDS @180deg C	5	mg/L	500-1000 ³	ND	540	540	540		
Total Suspended Solids	5	mg/L	<50	ND	<5	<5	<5		
Natural Attenuation Parameters									
Ammonia as N	100	$\mu\text{g/L}$	900	910	200	100	100		
Bicarbonate Alkalinity as CaCO ₃	1	mg/L	ND	ND	<0.1	<0.1	<0.1		
BOD	5	mg/L	ND	ND	<4	<4	<4		
Calcium	0.5	mg/L	ND	ND	30	30	29		
Carbonate Alkalinity as CaCO ₃	1	mg/L	ND	ND	<0.1	<0.1	<0.1		
Chloride	20	mg/L	ND	ND	180	180	180		
Hydroxide alkalinity as CaCO ₃	1	mg/L	ND	ND	<0.1	<0.1	<0.1		
Ionic Balance		%	ND	ND	-1.9	-1.3	-3		
Nitrate as N	100	$\mu\text{g/L}$	700	ND	<100	<100	<100		
Nitrite+Nitrate as N			ND	ND	<110	<110	<110		
Nitrite as N	10	$\mu\text{g/L}$	ND	ND	<10	<10	<10		
Phosphorous (total)	50	$\mu\text{g/L}$	10 ²	25	<50	<50	<50		
Sulphate	5	mg/L	ND	ND	<5	<5	<5		
Total Anions			ND	ND					
Total Cations			ND	ND					
Total Kjeldahl Nitrogen as N	0.5	mg/L	ND	ND	0.5	0.6	0.6		
TOC	1	mg/L	ND	ND	9	9	9		
Faecal Coliforms		CFU/100ml	150cfu ⁴	ND	10	60	31		
Metals									
Arsenic	1	$\mu\text{g/L}$	13	ND	<1	<1	<1	<1	
Cadmium	0.1	$\mu\text{g/L}$	0.54	5.5	<0.1	<0.1	<0.1	<0.1	
Chromium	1	$\mu\text{g/L}$	ND	27.4	<1	<1	<1	<1	
Copper	1	$\mu\text{g/L}$	3.5	1.3	<1	<1	<1	<1	
Lead	1	$\mu\text{g/L}$	13.6	4.4	<1	<1	<1	<1	
Mercury	0.5	$\mu\text{g/L}$	0.6	0.4	<0.5	<0.5	<0.5	<0.5	
Nickel	1	$\mu\text{g/L}$	27.5	70	<1	<1	<1	<1	
Zinc	1	$\mu\text{g/L}$	20	15	<1	8	<1	5.6	
Magnesium	0.5	mg/L	ND	ND	36	37	36	-	
Potassium	0.5	mg/L	ND	ND	23	23	22	-	
Sodium	0.5	mg/L	180 ⁶	ND	100	100	99	-	
Dissolved iron	0.02	mg/L	0.3 ⁶	ND	<0.02	<0.02	<0.02	-	
Total Iron	0.001	mg/L	ND	ND	0.2	0.19	0.18	-	
Organics									
TPH C6-C9	10	$\mu\text{g/L}$	150~	ND	<10	<10	<10		<10
TPH C10-C36	250	$\mu\text{g/L}$	600~	ND	<250	<250	<250		<250
Naphthalene	0.1	$\mu\text{g/L}$	16	70	<0.1	<0.1	<0.1		
VOC	<1.0	$\mu\text{g/L}$	ND	ND	<PQL	<PQL	<PQL		
Benzene	1	$\mu\text{g/L}$	950	700	<1	<1	<1		
Toluene	1	$\mu\text{g/L}$	ND	ND	<1	<1	<1		
Ethylbenzene	1	$\mu\text{g/L}$	ND	ND	<1	<1	<1		
o-xylene	1	$\mu\text{g/L}$	350	ND	<1	<1	<1		
m+p xylene	2	$\mu\text{g/L}$	200+75	ND	<2	<2	<2		
OPP (trace level)									
Chlordane	0.001	$\mu\text{g/L}$	0.08	ND	<0.002	<0.002	<0.002		
DDT	0.001	$\mu\text{g/L}$	0.01	ND	<0.0010	<0.0010	<0.0010		
Endosulfan	0.001	$\mu\text{g/L}$	0.2	0.01	<0.0030	<0.0030	<0.0030		
Endrin	0.001	$\mu\text{g/L}$	0.02	0.008	<0.001	<0.001	<0.001		
Heptachlor	0.001	$\mu\text{g/L}$	0.09	ND	<0.001	<0.001	<0.001		
OPP (trace level)									
Azinphos methyl	0.01	$\mu\text{g/L}$	0.02	ND	<0.010	<0.010	<0.010		
Chlorpyrifos	0.01	$\mu\text{g/L}$	0.01	0.009	<0.010	<0.010	<0.010		
Diazinon	0.01	$\mu\text{g/L}$	0.01	ND	<0.010	<0.010	<0.010		
Dimethoate	0.01	$\mu\text{g/L}$	0.15	ND	<0.010	<0.010	<0.010		
Fenitrothion	0.01	$\mu\text{g/L}$	0.2	ND	<0.010	<0.010	<0.010		
Malathion	0.01	$\mu\text{g/L}$	0.05	ND	<0.010	<0.010	<0.010		
Parathion	0.01	$\mu\text{g/L}$	0.004	ND	<0.010	<0.010	<0.010		
PCBs									
Aroclor 1242	0.01	$\mu\text{g/L}$	0.6	ND	<0.010	<0.010	<0.010		
Aroclor 1254	0.01	$\mu\text{g/L}$	0.03	ND	<0.010	<0.010	<0.010		

Notes:

BD1/121208 represent duplicate intra-laboratory samples collected from SSW1

BD2/121208 represent intra-laboratory duplicate samples collected from SSW2

SWIL: Surface Water Investigation Limit

-: NSW EPA Service Station Guidelines

1- Value for NSW lowland rivers (ANZECC 2000)

2- Phosphorous- ANZECC 2000 Vol 1- Table 3.3.2 value for freshwater lakes and reservoirs

3- Acceptable range for TDS in drinking water (Drinking water guidelines 2004)

4- Value for Faecal Coliforms based on ANZECC 2000 trigger value for primary contact in recreational waters

Kirkwood Environmental Family Assessment

Flora Street, Kirkwood

Rozelle Bay P/L

Project 45949

January 2009



APPENDIX H

Pit Floor Sediment Data CMJA Sampling Event

APPENDIX H

TABLE H1 Descriptions of Sediment Samples			
Location	Sample ID	Sample Depth (m)	Description
BP:01	BP:01; 0.05	0.05	Sandy SILT, dark-grey to black, moderately sorted, lithic, spongy, non-cohesive, high amount of organic debris including numerous leaves and sticks, soft, strong organic odour.
BP:01	BP:01; 0.15	0.15	CLAY (extremely weathered SHALE), light-grey with some orange and maroon mottling, very well sorted, soft and malleable, very high plasticity, very low organic content (if any), very sticky, occasional piece of slightly to moderately weathered shale, insitu.
BP:02	BP:02; 0.05	0.05	Sandy SILT, dark-grey to black, moderately sorted, lithic, spongy, non-cohesive, high amount of organic debris including numerous leaves and sticks, soft, strong organic odour.
BP:02	BP:02; 0.15	0.15	CLAY (extremely weathered SHALE), light-grey with some orange and maroon mottling, very well sorted, soft and malleable, very high plasticity, very low organic content (if any), very sticky, occasional piece of slightly to moderately weathered shale, insitu.
BP:03	BP:03; 0.05	0.05	Sandy SILT, dark-grey to black, moderately sorted, lithic, spongy, non-cohesive, high amount of organic debris including numerous leaves and sticks, soft, strong organic odour.
BP:03	BP:03; 0.15	0.15	CLAY (extremely weathered SHALE), light-grey to grey with minor orange and maroon mottling, very well sorted, soft and malleable, very high plasticity, very low organic content (if any), very sticky, occasional piece of slightly to moderately weathered shale, insitu.
BP:04	BP:04; 0.05	0.05	Sandy SILT, dark-grey to black, moderately sorted, lithic, spongy, non-cohesive, moderate amount of organic debris including numerous leaves and sticks, soft, minor amounts of basalt chips (presumably blue-metal aggregate), strong organic odour.
BP:04	BP:04; 0.15	0.15	Silty SAND, grey, fine grained with some medium-grained sand and trace amounts of blue metal, poorly sorted, loose and friable, soft, non-indurated, occasional piece of organic debris including pieces of leaves and sticks, strong sulphidic odour.
BP:05	BP:05; 0.05	0.05	Sandy SILT, dark-grey to black, moderately sorted, lithic, spongy, non-cohesive, high amount of organic debris including numerous leaves and sticks, soft, strong organic odour.
BP:05	BP:05; 0.15	0.15	CLAY (extremely weathered SHALE), light-grey with some orange and yellow mottling, very well sorted, soft and malleable, very high plasticity, very low organic content, very sticky, occasional piece of slightly to moderately weathered shale, insitu.
BP:06	BP:06; 0.05	0.05	Sandy SILT, dark-grey to black, moderately sorted, lithic, spongy, non-cohesive, moderate amount of organic debris including numerous leaves and sticks, soft, minor amounts of basalt chips (presumably blue-metal aggregate), strong organic odour.
BP:06	BP:06; 0.15	0.15	CLAY (extremely weathered SHALE), light to dark-grey with minor orange, maroon and yellow mottling, very well sorted, soft and malleable, very high plasticity, very low organic content (if any), very sticky, occasional piece of slightly to moderately weathered shale, insitu.
BP:07	BP:07; 0.05	0.05	Sandy SILT, dark-grey to black, moderately sorted, lithic, spongy, non-cohesive, high amount of organic debris including numerous leaves and sticks, soft, strong organic odour.
BP:07	BP:07; 0.15	0.15	CLAY (extremely weathered SHALE), light-grey with minor orange, maroon and yellow mottling, very well sorted, soft and malleable, very high plasticity, very low organic content (if any), very sticky, occasional piece of slightly to moderately weathered shale, insitu.

TABLE H2 Sediment Sample Analytical Results – Heavy Metals (mg/kg[*])									
Sample ID	Analyte								
	Arsenic	Cadmium	Chromium	Copper	Lead	Manganese	Mercury	Nickel	Zinc
BP:01; 0.05	69	<2.0	41	38	82	422	<0.2	31	407
BP:01; 0.15	<5.0	<1.0	15	<5.0	17	16	<0.1	2.0	20
BP:02; 0.05	5.0	<1.0	8.0	17	24	250	0.1	16	130
BP:02; 0.15	12	<1.0	10	12	7.0	18	<0.1	5	37
BP:03; 0.05	7.0	<1.0	5.0	14	28	200	<0.1	12	129
BP:03; 0.15	5.0	<1.0	35	6.0	14	15	<0.1	3.0	16
BP:04; 0.05	12	<1.0	3.0	17	14	465	<0.1	26	234
BP:04; 0.15	33	<1.0	9.0	68	25	257	<0.1	25	150
BP:05; 0.05	8.0	<1.0	7.0	23	26	608	<0.1	17	172
BP:05; 0.15	5.0	<1.0	9.0	14	22	38	<0.1	5.0	52
BP:06; 0.05	<5.0	<1.0	<2.0	<5.0	<5.0	102	<0.1	<2.0	12
BP:06; 0.15	5.0	<1.0	5.0	19	21	99	<0.1	7.0	66
BP:07; 0.05	8.0	<1.0	23	28	46	70	<0.1	11	122
BP:07; 0.15	6.0	<1.0	22	20	38	56	<0.1	8.0	86
BP:SD1 ^α	<5.0	<1.0	6.0	18	25	170	<0.1	18	160
BP:SD2 ^β	7.0	<1.0	11	15	26	298	<0.1	11	124

Notes: * milligrams per kilogram

^α duplicate sample collected from BP:02; 0.05

^β duplicate sample collected from BP:02; 0.15

TABLE H3 Sediment Sample Analytical Results – Total Phosphorus, TOC and Semi-Volatile TPH (mg/kg[*])					
Sample ID	Analyte				
	Total Phosphorus	TOC ^χ	TPH ^ζ : C ₁₀ –C ₁₄	TPH: C ₁₅ –C ₂₈	TPH: C ₂₉ –C ₃₆
BP:01; 0.05	1040	11.0	<250	<500	<500
BP:01; 0.15	215	0.23	<50	<100	<100
BP:02; 0.05	214	1.81	<50	<100	<100
BP:02; 0.15	292	0.25	<50	<100	<100
BP:03; 0.05	345	14.8	<60	<120	<120
BP:03; 0.15	224	0.64	<50	<100	<100
BP:04; 0.05	644	5.87	<50	<100	<100
BP:04; 0.15	545	3.76	<50	<100	<100
BP:05; 0.05	342	9.76	<120	<250	<250
BP:05; 0.15	301	0.95	<50	<100	<100
BP:06; 0.05	91	1.05	<50	<100	<100
BP:06; 0.15	308	2.35	<50	<100	<100
BP:07; 0.05	296	1.19	<50	<100	<100
BP:07; 0.15	265	2.26	<50	<100	<100
BP:SD1 ^α	322	3.73	<50	<100	<100
BP:SD2 ^β	229	0.37	<50	<100	<100

Notes: * milligrams per kilogram

^α duplicate sample collected from BP:02; 0.05

^β duplicate sample collected from BP:02; 0.15

^χ total organic carbon

^ζ total petroleum hydrocarbons

APPENDIX H

TABLE H4
Sediment Sample Analytical Results – OCP^o
(mg/kg)

Analyte	BP:01; 0.05	BP:01; 0.15	BP:02; 0.05	BP:02; 0.15	BP:03; 0.05	BP:03; 0.15	BP:04; 0.05	BP:04; 0.15	BP:05; 0.05	BP:05; 0.15	BP:06; 0.05	BP:06; 0.15	BP:07; 0.05	BP:07; 0.15	BP: SD1 ^a	BP: SD2 ^b
alpha-BHC ^z	<0.25	<0.05	<0.05	<0.05	<0.06	<0.05	<0.05	<0.05	<0.12	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene	<0.25	<0.05	<0.05	<0.05	<0.06	<0.05	<0.05	<0.05	<0.12	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	<0.25	<0.05	<0.05	<0.05	<0.06	<0.05	<0.05	<0.05	<0.12	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
gamma-BHC	<0.25	<0.05	<0.05	<0.05	<0.06	<0.05	<0.05	<0.05	<0.12	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	<0.25	<0.05	<0.05	<0.05	<0.06	<0.05	<0.05	<0.05	<0.12	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	<0.25	<0.05	<0.05	<0.05	<0.06	<0.05	<0.05	<0.05	<0.12	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	<0.25	<0.05	<0.05	<0.05	<0.06	<0.05	<0.05	<0.05	<0.12	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	<0.25	<0.05	<0.05	<0.05	<0.06	<0.05	<0.05	<0.05	<0.12	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
trans-Chlordane	<0.25	<0.05	<0.05	<0.05	<0.06	<0.05	<0.05	<0.05	<0.12	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-Endosulfan	<0.25	<0.05	<0.05	<0.05	<0.06	<0.05	<0.05	<0.05	<0.12	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
cis-Chlordane	<0.25	<0.05	<0.05	<0.05	<0.06	<0.05	<0.05	<0.05	<0.12	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	<0.25	<0.05	<0.05	<0.05	<0.06	<0.05	<0.05	<0.05	<0.12	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4,4'-DDE ^δ	<0.25	<0.05	<0.05	<0.05	<0.06	<0.05	<0.05	<0.05	<0.12	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	<0.25	<0.05	<0.05	<0.05	<0.06	<0.05	<0.05	<0.05	<0.12	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
beta-Endosulfan	<0.25	<0.05	<0.05	<0.05	<0.06	<0.05	<0.05	<0.05	<0.12	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4,4'-DDD ^ε	<0.25	<0.05	<0.05	<0.05	<0.06	<0.05	<0.05	<0.05	<0.12	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	<0.25	<0.05	<0.05	<0.05	<0.06	<0.05	<0.05	<0.05	<0.12	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan sulfate	<0.25	<0.05	<0.05	<0.05	<0.06	<0.05	<0.05	<0.05	<0.12	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4,4'-DDT ^φ	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Endrin ketone	<0.25	<0.05	<0.05	<0.05	<0.06	<0.05	<0.05	<0.05	<0.12	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

Notes: ^o organochlorine pesticides

* milligrams per kilogram

^a duplicate sample collected from BP:02; 0.05

^β duplicate sample collected from BP:02; 0.15

^z Lindane compounds

^δ dichlorodiphenyltrichloroethane

^ε dichlorodiphenyldichloroethylene

^φ dichlorodiphenyldichloroethane

TABLE H5
Sediment Sample Analytical Results – PAH^o
(mg/kg^{*})

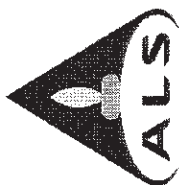
Analyte	BP:01; 0.05	BP:01; 0.15	BP:02; 0.05	BP:02; 0.15	BP:03; 0.05	BP:03; 0.15	BP:04; 0.05	BP:04; 0.15	BP:05; 0.05	BP:05; 0.15	BP:06; 0.05	BP:06; 0.15	BP:07; 0.05	BP:07; 0.15	BP: SD1 ^α	BP: SD2 ^β
Naphthalene	<4.0	<0.5	<0.8	<0.5	<1.0	<0.5	<0.8	<0.8	<2.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.8	<0.5
Acenaphthylene	<4.0	<0.5	<0.8	<0.5	<1.0	<0.5	<0.8	<0.8	<2.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.8	<0.5
Acenaphthene	<4.0	<0.5	<0.8	<0.5	<1.0	<0.5	<0.8	<0.8	<2.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.8	<0.5
Fluorene	<4.0	<0.5	<0.8	<0.5	<1.0	<0.5	<0.8	<0.8	<2.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.8	<0.5
Phenanthrene	<4.0	<0.5	<0.8	<0.5	<1.0	<0.5	<0.8	<0.8	<2.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.8	<0.5
Anthracene	<4.0	<0.5	<0.8	<0.5	<1.0	<0.5	<0.8	<0.8	<2.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.8	<0.5
Fluoranthene	<4.0	<0.5	<0.8	<0.5	<1.0	<0.5	<0.8	<0.8	<2.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.8	<0.5
Pyrene	<4.0	<0.5	<0.8	<0.5	<1.0	<0.5	<0.8	<0.8	<2.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.8	<0.5
Benz(a)anthracene	<4.0	<0.5	<0.8	<0.5	<1.0	<0.5	<0.8	<0.8	<2.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.8	<0.5
Chrysene	<4.0	<0.5	<0.8	<0.5	<1.0	<0.5	<0.8	<0.8	<2.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.8	<0.5
Benzo(b)fluoranthene	<4.0	<0.5	<0.8	<0.5	<1.0	<0.5	<0.8	<0.8	<2.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.8	<0.5
Benzo(k)fluoranthene	<4.0	<0.5	<0.8	<0.5	<1.0	<0.5	<0.8	<0.8	<2.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.8	<0.5
Benzo(a)pyrene	<4.0	<0.5	<0.8	<0.5	<1.0	<0.5	<0.8	<0.8	<2.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.8	<0.5
Indeno(1,2,3-cd)pyrene	<4.0	<0.5	<0.8	<0.5	<1.0	<0.5	<0.8	<0.8	<2.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.8	<0.5
Dibenz(a,h)anthracene	<4.0	<0.5	<0.8	<0.5	<1.0	<0.5	<0.8	<0.8	<2.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.8	<0.5
Benzo(g,h,i)perylene	<4.0	<0.5	<0.8	<0.5	<1.0	<0.5	<0.8	<0.8	<2.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.8	<0.5

Notes: ^o polycyclic aromatic hydrocarbons

* milligrams per kilogram

^α duplicate sample collected from BP:02; 0.05

^β duplicate sample collected from BP:02; 0.15



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: ES0819015	Page	: 1 of 12
Client	: C M JEWELL & ASSOC PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR CRAIG WICENCIAK	Contact	: Charlie Pierce
Address	: P O BOX 10 WENTWORTH FALLS NSW, AUSTRALIA 2782	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: craig@cm-jewell.com.au	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 47593251	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 47593257	Facsimile	: +61-2-8784 8500
Project	: J141B	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: SY/100/08	Date Samples Received	: 24-DEC-2008
C-O-C number	: —	Issue Date	: 06-JAN-2009
Sampler	: CW DE	No. of samples received	: 16
Site	: KIRRAWEE BRICK PIT	No. of samples analysed	: 16
Quote number	: SY/100/08		

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
- Surrogate Control Limits



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

WORLD RECOGNISED
ACCREDITATION

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
Edwandy Fadjjar	Senior Organic Chemist	Inorganics
Edwandy Fadjjar	Senior Organic Chemist	Inorganics
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Page : 3 of 12
Work Order : ES0819015
Client : C.M. JEWELL & ASSOC PTY LTD
Project : J141B

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 performed, 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 insufficient 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

Λ = This result is computed from individual analyte detections at or above the level of reporting

- EP068, EP075(SM), EP071: LOR for particular sample(s) raised due to high moisture content.



Page : 4 of 12
Work Order : ES0819015
Client : CM JEWELL & ASSOC PTY LTD
Project : J141B

Analytical Results

Sub-Matrix: SEDIMENT

Sub-Matrix: SEDIMENT		Client sample ID		BP:01:0.05 [24-DEC-2008] ES0819015-001	BP:01:0.15 [24-DEC-2008] ES0819015-002	BP:02:0.05 [24-DEC-2008] ES0819015-003	BP:02:0.15 [24-DEC-2008] ES0819015-004	BP:03:0.05 [24-DEC-2008] ES0819015-005	
Compound	CAS Number	LOR	Unit						
EA055: Moisture Content									
▲ Moisture Content (dried @ 103°C)				91.8	23.1	53.0	23.6	76.4	
EG005T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg	69	<5	5	12	7	
Cadmium	7440-43-9	1	mg/kg	<2	<1	<1	<1	<1	
Chromium	7440-47-3	2	mg/kg	41	15	8	10	5	
Copper	7440-50-8	5	mg/kg	38	<5	17	12	14	
Lead	7439-92-1	5	mg/kg	82	17	24	7	28	
Manganese	7439-96-5	5	mg/kg	422	16	250	18	200	
Nickel	7440-02-0	2	mg/kg	31	2	16	5	12	
Zinc	7440-66-6	5	mg/kg	407	20	130	37	129	
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg	<0.2	<0.1	0.1	<0.1	<0.1	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	—	2	mg/kg	1040	215	214	292	345	
EP068A: Organochlorine Pesticides (OC)									
alpha-BHC	319-84-6	0.05	mg/kg	<0.25	<0.05	<0.05	<0.05	<0.06	
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.25	<0.05	<0.05	<0.05	<0.06	
beta-BHC	319-85-7	0.05	mg/kg	<0.25	<0.05	<0.05	<0.05	<0.06	
gamma-BHC	58-89-9	0.05	mg/kg	<0.25	<0.05	<0.05	<0.05	<0.06	
delta-BHC	319-86-8	0.05	mg/kg	<0.25	<0.05	<0.05	<0.05	<0.06	
Heptachlor	76-44-8	0.05	mg/kg	<0.25	<0.05	<0.05	<0.05	<0.06	
Aldrin	309-00-2	0.05	mg/kg	<0.25	<0.05	<0.05	<0.05	<0.06	
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.25	<0.05	<0.05	<0.05	<0.06	
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.25	<0.05	<0.05	<0.05	<0.06	
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.25	<0.05	<0.05	<0.05	<0.06	
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.25	<0.05	<0.05	<0.05	<0.06	
Dieldrin	60-57-1	0.05	mg/kg	<0.25	<0.05	<0.05	<0.05	<0.06	
4,4'-DDE	72-55-9	0.05	mg/kg	<0.25	<0.05	<0.05	<0.05	<0.06	
Endrin	72-20-8	0.05	mg/kg	<0.25	<0.05	<0.05	<0.05	<0.06	
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.25	<0.05	<0.05	<0.05	<0.06	
4,4'-DDD	72-54-8	0.05	mg/kg	<0.25	<0.05	<0.05	<0.05	<0.06	
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.25	<0.05	<0.05	<0.05	<0.06	
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.25	<0.05	<0.05	<0.05	<0.06	
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Endrin ketone	53494-70-5	0.05	mg/kg	<0.25	<0.05	<0.05	<0.05	<0.06	
Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									



Page : 5 of 12
Work Order : ES0819015
Client : C M JEWELL & ASSOC PTY LTD
Project : J141B

Analytical Results

Sub-Matrix: SEDIMENT

Sub-Matrix: SEDIMENT		Client sample ID		Client sampling date / time		BP:01:0.05		BP:01:0.15		BP:02:0.05		BP:02:0.15		BP:03:0.05	
Compound	CAS Number	LOR	Unit	[24-DEC-2008]	[24-DEC-2008]	[24-DEC-2008]	ES0819015-001	ES0819015-002	ES0819015-003	ES0819015-004	ES0819015-005				
EP075(SM)B: Polynuclear Aromatic Hydrocarbons - Continued															
Naphthalene	91-20-3	0.5	mg/kg	<4.0	<0.5	<0.8	<0.5	<0.5	<0.8	<0.5	<1.0				
Acenaphthylene	208-96-8	0.5	mg/kg	<4.0	<0.5	<0.8	<0.5	<0.5	<0.8	<0.5	<1.0				
Acenaphthene	83-32-9	0.5	mg/kg	<4.0	<0.5	<0.8	<0.5	<0.5	<0.8	<0.5	<1.0				
Fluorene	86-73-7	0.5	mg/kg	<4.0	<0.5	<0.8	<0.5	<0.5	<0.8	<0.5	<1.0				
Phenanthrene	85-01-8	0.5	mg/kg	<4.0	<0.5	<0.8	<0.5	<0.5	<0.8	<0.5	<1.0				
Anthracene	120-12-7	0.5	mg/kg	<4.0	<0.5	<0.8	<0.5	<0.5	<0.8	<0.5	<1.0				
Fluoranthene	206-44-0	0.5	mg/kg	<4.0	<0.5	<0.8	<0.5	<0.5	<0.8	<0.5	<1.0				
Pyrene	129-00-0	0.5	mg/kg	<4.0	<0.5	<0.8	<0.5	<0.5	<0.8	<0.5	<1.0				
Benz(a)anthracene	56-55-3	0.5	mg/kg	<4.0	<0.5	<0.8	<0.5	<0.5	<0.8	<0.5	<1.0				
Chrysene	218-01-9	0.5	mg/kg	<4.0	<0.5	<0.8	<0.5	<0.5	<0.8	<0.5	<1.0				
Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	<4.0	<0.5	<0.8	<0.5	<0.5	<0.8	<0.5	<1.0				
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<4.0	<0.5	<0.8	<0.5	<0.5	<0.8	<0.5	<1.0				
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<4.0	<0.5	<0.8	<0.5	<0.5	<0.8	<0.5	<1.0				
Indeno(1,2,3-cd)pyrene	193-39-5	0.5	mg/kg	<4.0	<0.5	<0.8	<0.5	<0.5	<0.8	<0.5	<1.0				
Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<4.0	<0.5	<0.8	<0.5	<0.5	<0.8	<0.5	<1.0				
Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<4.0	<0.5	<0.8	<0.5	<0.5	<0.8	<0.5	<1.0				
EP080/071: Total Petroleum Hydrocarbons															
C10 - C14 Fraction	—	50	mg/kg	<250	<50	<50	<50	<100	<100	<50	<60				
C15 - C28 Fraction	—	100	mg/kg	<500	<100	<100	<100	<100	<100	<100	<120				
C29 - C36 Fraction	—	100	mg/kg	<500	<100	<100	<100	<100	<100	<100	<120				
EP068S: Organochlorine Pesticide Surrogate															
Dibromo-DDE	21655-73-2	0.1	%	91.0	86.5	91.4	86.5	110	91.4	110	109				
EP068T: Organophosphorus Pesticide Surrogate															
DEF	78-48-8	0.1	%	67.8	69.9	85.0	69.9	105	85.0	105	113				
EP075(SM)S: Phenolic Compound Surrogates															
Phenol-d6	13127-88-3	0.1	%	86.7	91.0	90.4	89.8	98.5	90.4	89.8	98.5				
2-Chlorophenol-D4	93951-73-6	0.1	%	95.1	96.1	92.3	98.2	96.5	92.3	98.2	96.5				
2,4,6-Tribromophenol	118-79-6	0.1	%	105	95.6	99.4	99.8	96.1	99.4	99.8	96.1				
EP075(SM)T: PAH Surrogates															
2-Fluorobiphenyl	321-60-8	0.1	%	90.0	81.9	82.8	89.0	83.9	82.8	89.0	83.9				
Anthracene-d10	1719-06-8	0.1	%	108	89.9	95.8	99.6	87.8	95.8	99.6	87.8				
4-Terphenyl-d14	1718-51-0	0.1	%	94.0	89.3	90.9	92.2	90.5	90.9	92.2	90.5				