

EPL20350 WATER MONITORING RESULTS 2016/2017 - QUARTER 1

LICENCE HOLDER	Santos NSW (Eastern) Pty Ltd
PREMISES	Narrabri Gas Field X Line Road, NARRABRI NSW 2390
LICENCE NUMBER	Environment Protection Licence 20350
EPL LINK (EPA SITE)	http://www.epa.nsw.gov.au/prpoeoapp/ViewPOEOLicence.aspx?DOCID=33816&SYSUID=1&LICID=20350
SCHEDULED ACTIVITY	Coal seam gas exploration, assessment and production
REPORTING PERIOD	2017-18, Quarter 1 - May / July 2017
PUBLISHED DATE	August 2017
MONITORING BY	Santos
ANALYSIS BY	ALS Laboratory, Smithfield

TABLE 1: EPL20350 WATER MONITORING LOCATIONS

Spatial reference: GDA94 MGA Zone 55

EPA Identification No.	Monitoring type	Location	Easting	Northing
7	Groundwater quality monitoring	BWD27PRORA01	755429.176	6604670.682
8	Groundwater quality monitoring	BWD27PRUPS02	755433.048	6604684.807
9	Groundwater quality monitoring	BWD26PRUPS01	749372.750	6609376.690
10	Groundwater quality monitoring	BWD26PRLPS02	749364.450	6609363.350
11	Groundwater quality monitoring	DWH14PRUPS01	764703.313	6617145.443
12	Groundwater quality monitoring	DWH14PRLPS02	764689.147	6617119.109
13	Groundwater quality monitoring	DWH14PRPUR03	764696.211	6617132.298
14	Groundwater quality monitoring	DWH3PRUPS01	762239.680	6605589.320
15	Groundwater quality monitoring	DWH3PRLPS02	762251.050	6605598.980
16	Groundwater quality monitoring	NYOPRORA01	736293.460	6643110.400
17	Groundwater quality monitoring	NYOPRUPS02	736308.800	6643107.840
18	Groundwater quality monitoring	BWD27PRLPS03	755436.361	6604699.035
20	Groundwater quality monitoring	BHN14PRORA01	747158.130	6626109.120
21	Groundwater quality monitoring	BHN14PRUPS02	747152.710	6626123.910
22	Groundwater quality monitoring	TULPRNAP01	774464.070	6612048.130
23	Groundwater quality monitoring	TULPRDGY02	774466.480	6612032.980
24	Groundwater quality monitoring	BWDMW13D	753863.300	6608108.510
25	Groundwater quality monitoring	BWDMW13S	753864.820	6608109.300
26	Groundwater quality monitoring	BWDMW12S	753830.650	6608202.740
27	Groundwater quality monitoring	BWDMW12D	753831.910	6608203.710
28	Groundwater quality monitoring	BWDMW12I	753832.680	6608202.250
29	Groundwater quality monitoring	BWDMW2	753912.830	6608241.350
30	Groundwater quality monitoring	BWDMW3	753935.870	6608254.020
31	Groundwater quality monitoring	BWDMW4D	753980.810	6608285.740
32	Groundwater quality monitoring	BWDMW4	753984.140	6608288.040
33	Groundwater quality monitoring	BWDMW15S	753868.090	6608258.340
34	Groundwater quality monitoring	BWDMW15D	753867.100	6608256.750
35	Groundwater quality monitoring	BWDMW16S	753858.950	6608316.490
36	Groundwater quality monitoring	BWDMW16D	753856.980	6608315.570
37	Groundwater quality monitoring	LWDMW1D	751387.930	6623862.960
38	Groundwater quality monitoring	LWDMW1S	751388.920	6623862.460
39	Groundwater quality monitoring	LWDMW1I	751390.640	6623861.850
40	Groundwater quality monitoring	LWDMW2S	751102.840	6622293.020
41	Groundwater quality monitoring	LWDMW2D	751101.810	6622293.150
42	Groundwater quality monitoring	LWDMW3D	751876.160	6622163.760
43	Groundwater quality monitoring	LWDMW3S	751876.470	6622164.930
44	Groundwater level monitoring	DWH8AGMB1	765546.740	6616987.990
45	Groundwater level monitoring	DWH8AGMB2	765546.740	6616987.990

EPA Identification No.	Monitoring type	Location	Easting	Northing
46	Groundwater level monitoring	DWH8AGMB3	765546.740	6616987.990
47	Groundwater level monitoring	BWD28QGUPS01	752949.898	6604219.732
48	Groundwater level monitoring	BWD28QGLPS01	752949.898	6604219.732
49	Groundwater level monitoring	BWD28QGPUR01	752949.898	6604219.732
50	Groundwater quality monitoring	WPKMW01	755684.140	6638105.310
51	Groundwater quality monitoring	WPKMW01D	755689.750	6638097.350
52	Groundwater quality monitoring	WPKMW02	755671.200	6638034.290
53	Groundwater quality monitoring	WPKMW04	755632.500	6637993.070
54	Groundwater quality monitoring	WPKMW07	755501.160	6638207.530
55	Groundwater quality monitoring	WPKMW08	755634.110	6638166.870
56	Groundwater quality monitoring	WPKMW09D	755663.980	6637988.200
57	Groundwater quality monitoring	WPKMW09S	755664.400	6637990.540
58	Groundwater quality monitoring	WPKMW12S	755456.180	6638228.910
59	Groundwater quality monitoring	WPKMW13I	755552.650	6638189.560
60	Groundwater quality monitoring	WPKMW13S	755554.880	6638189.050
61	Groundwater quality monitoring	WPKMW14D	755364.510	6638049.060
62	Groundwater quality monitoring	WPKMW14S	755364.770	6638048.260
63	Groundwater quality monitoring	WPKMW15D	755365.480	6638233.360
64	Groundwater quality monitoring	WPKMW15S	755365.500	6638230.740
65	Groundwater quality monitoring	WPKMW16D	755051.030	6637988.500
66	Groundwater quality monitoring	WPKMW16S	755050.530	6637986.640
67	Groundwater quality monitoring	WPKMW17D	756151.060	6638128.320
68	Groundwater quality monitoring	WPKMW17S	756149.540	6638128.050
69	Produced water storage dam	BWDPD2	753875.870	6607995.060
70	Produced water storage dam	BWDPD3	753992.170	6608125.970
71	Produced water storage dam	LWDPD1CELL4	751473.349	6623513.252
72	Produced water storage dam	LWDPD1CELL3	751460.723	6623323.850
73	Produced water storage dam	LWDPD1CELL2	751428.103	6623124.978
74	Produced water storage dam	LWDPD1CELL1	751390.223	6622935.575
75	Produced water storage dam	TFDPD1	755611.600	6638072.850
76	Produced water storage dam	TFDPD2	755480.110	6638099.040
78	Groundwater quality monitoring	WPKMW18S	755944.010	6638100.840
79	Groundwater quality monitoring	WPKMW18I	755945.070	6638105.040

TABLE 2: ANALYTES MONITORED, FREQUENCY AND SAMPLING METHOD

Analyte	Units of measure	Frequency	Sampling method
Aluminium	milligrams per litre	Every 6 months	Grab sample
Ammonia	milligrams per litre	Every 6 months	Grab sample
Arsenic	milligrams per litre	Every 6 months	Grab sample
Barium	milligrams per litre	Every 6 months	Grab sample
Beryllium	milligrams per litre	Every 6 months	Grab sample
Bicarbonate	milligrams per litre	Every 6 months	Grab sample
Boron	milligrams per litre	Every 6 months	Grab sample
Bromide	milligrams per litre	Every 6 months	Grab sample
Cadmium	milligrams per litre	Every 6 months	Grab sample
Calcium	milligrams per litre	Every 6 months	Grab sample
Carbonate	milligrams per litre	Every 6 months	Grab sample
Chloride	milligrams per litre	Every 6 months	Grab sample
Chromium	milligrams per litre	Every 6 months	Grab sample
Cobalt	milligrams per litre	Every 6 months	Grab sample
Copper	milligrams per litre	Every 6 months	Grab sample
Dissolved Oxygen	milligrams per litre	Quarterly	In situ
Electrical Conductivity	microsiemens per centimetre	Quarterly	In situ
Fluoride	milligrams per litre	Every 6 months	Grab sample
Iron	milligrams per litre	Every 6 months	Grab sample
Lead	milligrams per litre	Every 6 months	Grab sample
Magnesium	milligrams per litre	Every 6 months	Grab sample
Manganese	milligrams per litre	Every 6 months	Grab sample
Mercury	milligrams per litre	Every 6 months	Grab sample
Methane	milligrams per litre	Every 6 months	Grab sample
Molybdenum	milligrams per litre	Every 6 months	Grab sample
Nickel	milligrams per litre	Every 6 months	Grab sample
Nitrate	milligrams per litre	Every 6 months	Grab sample
Nitrite	milligrams per litre	Every 6 months	Grab sample
pH	pH Unit	Quarterly	In situ
Potassium	milligrams per litre	Every 6 months	Grab sample
Reactive Phosphorus	milligrams per litre	Every 6 months	Grab sample
Redox Potential	millivolts	Quarterly	In situ
Selenium	milligrams per litre	Every 6 months	Grab sample
Sodium	milligrams per litre	Every 6 months	Grab sample
Sodium Adsorption Ratio	-	Every 6 months	Grab sample
Standing Water Level	metres below top of casing	Quarterly	In situ
Strontium	milligrams per litre	Every 6 months	Grab sample
Sulfate	milligrams per litre	Every 6 months	Grab sample
Total Dissolved Solids	milligrams per litre	Every 6 months	Grab sample
Total Organic Carbon	milligrams per litre	Every 6 months	Grab sample
Total Phosphorus	milligrams per litre	Every 6 months	Grab sample
Uranium	milligrams per litre	Every 6 months	Grab sample
Vanadium	milligrams per litre	Every 6 months	Grab sample
Zinc	milligrams per litre	Every 6 months	Grab sample

Table 3: Water Monitoring Results 1st Quarter – May / July 2017

	Units	EPA Identification No Location Date Sampled Sample obtained Sample Method	7	8	9	10	11	12	13	14
			BWD27PRORA01	BWD27PRUPS02	BWD26PRUPS01	BWD26PRLPS02	DWH14PRUPS01	DWH14PRLPS02	DWH14PRPUR03	DWH3PRUPS01
			18/07/2017 No*	18/07/2017 Yes	18/07/2017 Yes	18/07/2017 Yes	20/07/2017 Yes	20/07/2017 Yes	20/07/2017 Yes	24/07/2017 Yes
			DRY WELL RESULT	Grab sample RESULT	Grab sample RESULT	Grab sample RESULT	Grab sample RESULT	Grab sample RESULT	Grab sample RESULT	Grab sample RESULT
Aluminium	mg/L	0.01		< 0.01	< 0.01	0.04	< 0.01	< 0.01	0.16	< 0.01
Ammonia	mg/L	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.50	< 0.01
Arsenic	mg/L	0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.001	< 0.001
Barium	mg/L	0.001		0.152	0.174	0.550	0.171	0.072	0.126	0.039
Beryllium	mg/L	0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Bicarbonate	mg/L	1		16	23	34	43	38	118	17
Boron	mg/L	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Bromide	mg/L	0.01		0.144	0.020	0.071	0.128	0.112	0.105	0.068
Cadmium	mg/L	0.0001		< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Calcium	mg/L	1		< 1	< 1	1	1	3	4	< 1
Carbonate	mg/L	1		< 1	< 1	< 1	< 1	< 1	91	< 1
Chloride	mg/L	1		30	6	20	38	34	35	23
Chromium	mg/L	0.001		0.002	< 0.001	< 0.001	0.003	0.007	< 0.001	0.004
Cobalt	mg/L	0.001		0.008	< 0.001	0.003	0.006	0.005	< 0.001	0.002
Copper	mg/L	0.001		0.378	< 0.001	< 0.001	0.030	< 0.001	< 0.001	0.070
Dissolved Oxygen	mg/L	-		2.47	0.4	0.65	1.07	0.81	0.7	1.82
Electrical Conductivity	µS/cm	-		134.9	67.9	130.6	196.2	189.2	580	116.4
Fluoride	mg/L	0.1		< 0.1	< 0.1	0.2	< 0.1	< 0.1	0.4	< 0.1
Iron	mg/L	0.05		< 0.05	< 0.05	0.07	< 0.05	2.14	0.07	< 0.05
Lead	mg/L	0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Magnesium	mg/L	1		1	< 1	1	3	2	< 1	1
Manganese	mg/L	0.001		0.065	0.019	0.063	0.124	0.104	0.002	0.020
Mercury	mg/L	0.0001		< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Methane	mg/L	10		< 10	< 10	< 10	< 10	25	1390	< 10
Molybdenum	mg/L	0.001		< 0.001	< 0.001	< 0.001	0.008	0.002	0.082	< 0.001
Nickel	mg/L	0.001		0.310	0.003	0.004	0.174	0.140	0.004	0.036
Nitrate	mg/L	0.01		< 0.01	< 0.01	< 0.01	0.04	< 0.01	< 0.01	0.08
Nitrite	mg/L	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
pH	pH Unit	-		5.47	5.68	6	6.83	7.25	9.56	5.18
Potassium	mg/L	1		6	6	12	7	4	37	2
Reactive Phosphorus	mg/L	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.03	< 0.01
Redox Potential	mV	-		259.7	160.6	-20.90	165	-47.50	-276.90	238.2
Selenium	mg/L	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Sodium	mg/L	1		15	6	12	23	28	115	19
Sodium Adsorption Ratio (Storages)	-	0.01								
Standing Water Level	mTOC	-		38.71	29.29	28.74	53.29	54.01	53.54	67.34
Strontium	mg/L	0.001		0.023	0.023	0.045	0.037	0.031	0.259	0.008
Sulfate	mg/L	1		< 10	< 1	< 1	< 1	< 1	33	2
Total Dissolved Solids	mg/L	10		83	45	92	127	109	409	59
Total Organic Carbon (Storages)	mg/L	1								
Total Phosphorus (Storages)	mg/L	0.01								
Uranium	mg/L	0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Vanadium	mg/L	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Zinc	mg/L	0.005		0.016	< 0.005	0.008	0.017	0.005	< 0.005	0.009

*Monitoring event was completed but no water was available for sampling in BWD27PRORA01

	Units	EPA Identification No Location Date Sampled Sample obtained Sample Method	15	16	17	18	20	21	22	23
			DWH3PRLPS02	NYOPRORA01	NYOPRUPS02	BWD27PRLPS03	BHN14PRORA01	BHN14PRUPS02	TULPRNAP01	TULPRDGY02
			24/07/2017	17/07/2017	17/07/2017	18/07/2017	18/07/2017	18/07/2017	17/07/2017	17/07/2017
			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		Grab sample	Grab sample	Grab sample	Grab sample	Grab sample	Grab sample	Grab sample	Grab sample	
		RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	
Aluminium	mg/L	0.01	< 0.01	< 0.01	0.04	< 0.01	< 0.01	< 0.01	< 0.01	
Ammonia	mg/L	0.01	0.39	0.42	0.05	0.04	0.02	3.81	4.59	
Arsenic	mg/L	0.001	< 0.001	< 0.001	< 0.001	0.002	0.002	< 0.001	< 0.001	
Barium	mg/L	0.001	0.046	0.095	0.844	0.083	0.566	0.454	0.816	
Beryllium	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
Bicarbonate	mg/L	1	17	529	583	36	200	217	2590	
Boron	mg/L	0.05	< 0.05	0.21	0.19	< 0.05	0.07	< 0.05	0.14	
Bromide	mg/L	0.01	0.076	0.156	0.174	0.126	0.109	0.057	1.76	
Cadmium	mg/L	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	
Calcium	mg/L	1	1	3	3	< 1	29	35	2	
Carbonate	mg/L	1	< 1	12	13	< 1	< 1	< 1	< 1	
Chloride	mg/L	1	25	55	54	39	34	19	866	
Chromium	mg/L	0.001	< 0.001	< 0.001	< 0.001	0.002	< 0.001	< 0.001	< 0.001	
Cobalt	mg/L	0.001	0.001	< 0.001	< 0.001	0.003	< 0.001	< 0.001	< 0.001	
Copper	mg/L	0.001	0.122	0.002	< 0.001	0.002	< 0.001	< 0.001	< 0.001	
Dissolved Oxygen	mg/L	-	1.01	0	0.72	0.43	0.29	1.12	2.82	
Electrical Conductivity	µS/cm	-	126.2	1194	1212	175.3	479.6	445.7	6783	
Fluoride	mg/L	0.1	0.1	1.0	1.0	< 0.1	0.3	0.2	1.1	
Iron	mg/L	0.05	< 0.05	0.10	0.09	0.14	1.01	3.08	0.21	
Lead	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
Magnesium	mg/L	1	< 1	< 1	< 1	2	8	7	1	
Manganese	mg/L	0.001	0.047	0.006	0.010	0.073	0.169	0.131	0.008	
Mercury	mg/L	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	
Methane	mg/L	10	< 10	1000	693	12	170	1840	3480	
Molybdenum	mg/L	0.001	< 0.001	< 0.001	< 0.001	0.004	0.003	0.008	0.002	
Nickel	mg/L	0.001	0.056	0.001	< 0.001	0.069	< 0.001	0.007	< 0.001	
Nitrate	mg/L	0.01	0.07	< 0.01	< 0.01	0.05	< 0.01	< 0.01	< 0.01	
Nitrite	mg/L	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
pH	pH Unit	-	5.32	8.21	8.37	5.64	7.22	7.09	6.72	
Potassium	mg/L	1	2	1	2	4	3	5	2	
Reactive Phosphorus	mg/L	0.01	< 0.01	0.02	< 0.01	< 0.01	0.02	0.01	< 0.01	
Redox Potential	mV	-	232.5	-240.50	-159.30	142.3	-175.0	114.7	-68.90	
Selenium	mg/L	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Sodium	mg/L	1	20	292	299	32	53	46	1650	
Sodium Adsorption Ratio (Storages)	-	0.01								
Standing Water Level	mTOC	-	67.55	0	0	38.19	26.37	15.13	93.3	
Strontium	mg/L	0.001	0.012	0.112	0.100	0.026	0.441	0.410	1.18	
Sulfate	mg/L	1	1	< 1	< 1	1	3	< 1	50	
Total Dissolved Solids	mg/L	10	80	788	760	112	314	282	4650	
Total Organic Carbon (Storages)	mg/L	1								
Total Phosphorus (Storages)	mg/L	0.01								
Uranium	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
Vanadium	mg/L	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Zinc	mg/L	0.005	0.010	< 0.005	< 0.005	0.008	< 0.005	< 0.005	< 0.005	

	Units	EPA Identification No Location Date Sampled Sample obtained Sample Method	24	25	26	27	28	29	30	31
			BWDMW13D	BWDMW13S	BWDMW12S	BWDMW12D	BWDMW12I	BWDMW2	BWDMW3	BWDMW4D
			22/06/2017	22/06/2017	22/06/2017	22/06/2017	22/06/2017	22/06/2017	22/06/2017	22/06/2017
		Yes	No*	No*	Yes	Yes	No*	Yes	Yes	
		In situ	DRY WELL	DRY WELL	In situ	In situ	DRY WELL	In situ	In situ	
		RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	
Aluminium	mg/L	0.01								
Ammonia	mg/L	0.01								
Arsenic	mg/L	0.001								
Barium	mg/L	0.001								
Beryllium	mg/L	0.001								
Bicarbonate	mg/L	1								
Boron	mg/L	0.05								
Bromide	mg/L	0.01								
Cadmium	mg/L	0.0001								
Calcium	mg/L	1								
Carbonate	mg/L	1								
Chloride	mg/L	1								
Chromium	mg/L	0.001								
Cobalt	mg/L	0.001								
Copper	mg/L	0.001								
Dissolved Oxygen	mg/L	-	2.2			2.83	4.48		1.2	2.6
Electrical Conductivity	µS/cm	-	1240			9749	14760		736	427
Fluoride	mg/L	0.1								
Iron	mg/L	0.05								
Lead	mg/L	0.001								
Magnesium	mg/L	1								
Manganese	mg/L	0.001								
Mercury	mg/L	0.0001								
Methane	mg/L	10								
Molybdenum	mg/L	0.001								
Nickel	mg/L	0.001								
Nitrate	mg/L	0.01								
Nitrite	mg/L	0.01								
pH	pH Unit	-	5.35			7.11	7.1		6.0	6.43
Potassium	mg/L	1								
Reactive Phosphorus	mg/L	0.01								
Redox Potential	mV	-	252			151	141		26	107
Selenium	mg/L	0.01								
Sodium	mg/L	1								
Sodium Adsorption Ratio (Storages)	-	0.01								
Standing Water Level	mTOC	-	30.47			30.82	20.47		30.79	30.20
Strontium	mg/L	0.001								
Sulfate	mg/L	1								
Total Dissolved Solids	mg/L	10								
Total Organic Carbon (Storages)	mg/L	1								
Total Phosphorus (Storages)	mg/L	0.01								
Uranium	mg/L	0.001								
Vanadium	mg/L	0.01								
Zinc	mg/L	0.005								

*Monitoring event was completed but no water was available for sampling in BWDMW13S, BWDMW12S and BWDMW2

	Units	EPA Identification No Location Date Sampled Sample obtained Sample Method	32	33	34	35	36	37	38	39
			BWDMW4 22/06/2017 No* DRY WELL RESULT	BWDMW15S 22/06/2017 No* DRY WELL RESULT	BWDMW15D 22/06/2017 Yes In situ RESULT	BWDMW16S 22/06/2017 No* DRY WELL RESULT	BWDMW16D 22/06/2017 Yes In situ RESULT	LWDMW1D 27/06/2017 Yes In situ RESULT	LWDMW1S 27/06/2017 No* DRY WELL RESULT	LWDMW1I 27/06/2017 No* DRY WELL RESULT
Aluminium	mg/L	LOR								
Ammonia	mg/L	0.01								
Arsenic	mg/L	0.001								
Barium	mg/L	0.001								
Beryllium	mg/L	0.001								
Bicarbonate	mg/L	1								
Boron	mg/L	0.05								
Bromide	mg/L	0.01								
Cadmium	mg/L	0.0001								
Calcium	mg/L	1								
Carbonate	mg/L	1								
Chloride	mg/L	1								
Chromium	mg/L	0.001								
Cobalt	mg/L	0.001								
Copper	mg/L	0.001								
Dissolved Oxygen	mg/L	-			6.17		4.3	1.61		
Electrical Conductivity	µS/cm	-			432		369	2164		
Fluoride	mg/L	0.1								
Iron	mg/L	0.05								
Lead	mg/L	0.001								
Magnesium	mg/L	1								
Manganese	mg/L	0.001								
Mercury	mg/L	0.0001								
Methane	mg/L	10								
Molybdenum	mg/L	0.001								
Nickel	mg/L	0.001								
Nitrate	mg/L	0.01								
Nitrite	mg/L	0.01								
pH	pH Unit	-			6.23		6.11	6.57		
Potassium	mg/L	1								
Reactive Phosphorus	mg/L	0.01								
Redox Potential	mV	-			74.7		241	172		
Selenium	mg/L	0.01								
Sodium	mg/L	1								
Sodium Adsorption Ratio (Storages)	-	0.01								
Standing Water Level	mTOC	-			30.25		30.37	29.98		
Strontium	mg/L	0.001								
Sulfate	mg/L	1								
Total Dissolved Solids	mg/L	10								
Total Organic Carbon (Storages)	mg/L	1								
Total Phosphorus (Storages)	mg/L	0.01								
Uranium	mg/L	0.001								
Vanadium	mg/L	0.01								
Zinc	mg/L	0.005								

*Monitoring event was completed but no water was available for sampling in BWDMW4, BWDMW15S, BWDMW16S, LWDMW1S and LWDMW1I

	Units	EPA Identification No Location Date Sampled Sample obtained Sample Method	40	41	42	43	50	51	52	53
			LWDMW2S 27/06/2017 No* DRY WELL RESULT	LWDMW2D 27/06/2017 Yes In situ RESULT	LWDMW3D 27/06/2017 Yes In situ RESULT	LWDMW3S 27/06/2017 No* DRY WELL RESULT	WPKMW1 27/06/2017 Yes In situ RESULT	WPKMW1D 27/06/2017 Yes In situ RESULT	WPKMW2 27/06/2017 Yes In situ RESULT	WPKMW4 27/06/2017 Yes In situ RESULT
Aluminium	mg/L	LOR								
Ammonia	mg/L	0.01								
Arsenic	mg/L	0.001								
Barium	mg/L	0.001								
Beryllium	mg/L	0.001								
Bicarbonate	mg/L	1								
Boron	mg/L	0.05								
Bromide	mg/L	0.01								
Cadmium	mg/L	0.0001								
Calcium	mg/L	1								
Carbonate	mg/L	1								
Chloride	mg/L	1								
Chromium	mg/L	0.001								
Cobalt	mg/L	0.001								
Copper	mg/L	0.001								
Dissolved Oxygen	mg/L	-		1.22	1.26		3.2	0.9	1.0	0.5
Electrical Conductivity	µS/cm	-		1976	944		1369	1166	3093	2054
Fluoride	mg/L	0.1								
Iron	mg/L	0.05								
Lead	mg/L	0.001								
Magnesium	mg/L	1								
Manganese	mg/L	0.001								
Mercury	mg/L	0.0001								
Methane	mg/L	10								
Molybdenum	mg/L	0.001								
Nickel	mg/L	0.001								
Nitrate	mg/L	0.01								
Nitrite	mg/L	0.01								
pH	pH Unit	-		6.8	6.9		7.9	8.1	7.9	8.0
Potassium	mg/L	1								
Reactive Phosphorus	mg/L	0.01								
Redox Potential	mV	-		124.7	-51.0		81	41	43	20
Selenium	mg/L	0.01								
Sodium	mg/L	1								
Sodium Adsorption Ratio (Storages)	-	0.01								
Standing Water Level	mTOC	-		25.96	21.1		16.22	15.95	15.3	16.04
Strontium	mg/L	0.001								
Sulfate	mg/L	1								
Total Dissolved Solids	mg/L	10								
Total Organic Carbon (Storages)	mg/L	1								
Total Phosphorus (Storages)	mg/L	0.01								
Uranium	mg/L	0.001								
Vanadium	mg/L	0.01								
Zinc	mg/L	0.005								

*Monitoring event was completed but no water was available for sampling in LWDMW2S and LWDMW3S

	Units	EPA Identification No Location Date Sampled Sample obtained Sample Method	55	56	57	58	59	60	61	62
			WPKMW8 27/06/2017 Yes In situ RESULT	WPKMW9D 27/06/2017 Yes In situ RESULT	WPKMW9S 27/06/2017 Yes In situ RESULT	WPKMW12S 27/06/2017 No* DRY WELL RESULT	WPKMW13I 27/06/2017 Yes Grab sample RESULT	WPKMW13S 27/06/2017 Yes Grab sample RESULT	WPKMW14D 27/06/2017 Yes Grab sample RESULT	WPKMW14S 27/06/2017 No* DRY WELL RESULT
Aluminium	mg/L	LOR								
Ammonia	mg/L	0.01								
Arsenic	mg/L	0.001								
Barium	mg/L	0.001								
Beryllium	mg/L	0.001								
Bicarbonate	mg/L	1								
Boron	mg/L	0.05								
Bromide	mg/L	0.01								
Cadmium	mg/L	0.0001								
Calcium	mg/L	1								
Carbonate	mg/L	1								
Chloride	mg/L	1								
Chromium	mg/L	0.001								
Cobalt	mg/L	0.001								
Copper	mg/L	0.001								
Dissolved Oxygen	mg/L	-	2	0.1	0.9		1.2	1.1	1.0	
Electrical Conductivity	µS/cm	-	2389	1208	4197		1242	3012	1137	
Fluoride	mg/L	0.1								
Iron	mg/L	0.05								
Lead	mg/L	0.001								
Magnesium	mg/L	1								
Manganese	mg/L	0.001								
Mercury	mg/L	0.0001								
Methane	mg/L	10								
Molybdenum	mg/L	0.001								
Nickel	mg/L	0.001								
Nitrate	mg/L	0.01								
Nitrite	mg/L	0.01								
pH	pH Unit	-	7.7	8.15	7.85		8.25	7.43	8.3	
Potassium	mg/L	1								
Reactive Phosphorus	mg/L	0.01								
Redox Potential	mV	-	71	109	150		2.6	50	30	
Selenium	mg/L	0.01								
Sodium	mg/L	1								
Sodium Adsorption Ratio (Storages)	-	0.01								
Standing Water Level	mTOC	-	16.67	15.49	15.67		16.85	16.96	21.06	
Strontium	mg/L	0.001								
Sulfate	mg/L	1								
Total Dissolved Solids	mg/L	10								
Total Organic Carbon (Storages)	mg/L	1								
Total Phosphorus (Storages)	mg/L	0.01								
Uranium	mg/L	0.001								
Vanadium	mg/L	0.01								
Zinc	mg/L	0.005								

*Monitoring event was completed but no water was available for sampling in WPKMW12S and WPKMW14S

	Units	EPA Identification No Location Date Sampled Sample obtained Sample Method	63	64	65	66	67	68	78	79
			WPKMW15D 27/06/2017 Yes Grab sample RESULT	WPKMW15S 27/06/2017 Yes Grab sample RESULT	WPKMW16D 27/06/2017 Yes Grab sample RESULT	WPKMW16S 27/06/2017 No* DRY WELL RESULT	WPKMW17D 27/06/2017 Yes Grab sample RESULT	WPKMW17S 27/06/2017 No* DRY WELL RESULT	WPKMW18S 27/06/2017 No* DRY WELL RESULT	WPKMW18I 27/06/2017 Yes Grab sample RESULT
Aluminium	mg/L	LOR								
Ammonia	mg/L	0.01								
Arsenic	mg/L	0.001								
Barium	mg/L	0.001								
Beryllium	mg/L	0.001								
Bicarbonate	mg/L	1								
Boron	mg/L	0.05								
Bromide	mg/L	0.01								
Cadmium	mg/L	0.0001								
Calcium	mg/L	1								
Carbonate	mg/L	1								
Chloride	mg/L	1								
Chromium	mg/L	0.001								
Cobalt	mg/L	0.001								
Copper	mg/L	0.001								
Dissolved Oxygen	mg/L	-	0.7	2.9	1.1		0.7			2
Electrical Conductivity	µS/cm	-	1443	8286	1197		1082			1137
Fluoride	mg/L	0.1								
Iron	mg/L	0.05								
Lead	mg/L	0.001								
Magnesium	mg/L	1								
Manganese	mg/L	0.001								
Mercury	mg/L	0.0001								
Methane	mg/L	10								
Molybdenum	mg/L	0.001								
Nickel	mg/L	0.001								
Nitrate	mg/L	0.01								
Nitrite	mg/L	0.01								
pH	pH Unit	-	8.16	7.9	8.0		7.6			8.05
Potassium	mg/L	1								
Reactive Phosphorus	mg/L	0.01								
Redox Potential	mV	-	190	111	56		0			78
Selenium	mg/L	0.01								
Sodium	mg/L	1								
Sodium Adsorption Ratio (Storages)	-	0.01								
Standing Water Level	mTOC	-	22.29	22.53	26.61		18.54			16.11
Strontium	mg/L	0.001								
Sulfate	mg/L	1								
Total Dissolved Solids	mg/L	10								
Total Organic Carbon (Storages)	mg/L	1								
Total Phosphorus (Storages)	mg/L	0.01								
Uranium	mg/L	0.001								
Vanadium	mg/L	0.01								
Zinc	mg/L	0.005								

*Monitoring event was completed but no water was available for sampling in WPKMW16S, WPKMW17S and WPKMW18S

	Units	EPA Identification No Location Date Sampled Sample obtained Sample Method	69	70	71	72	73	74	75	76
			BWDPD2 27/07/2017 No* Not operational RESULT	BWDPD3 27/07/2017 No* Not operational RESULT	LWDPD1CELL4 29/05/2017 Yes In situ RESULT	LWDPD1CELL3 29/05/2017 Yes In situ RESULT	LWDPD1CELL2 29/05/2017 Yes In situ RESULT	LWDPD1CELL1 29/05/2017 Yes In situ RESULT	TFDPD1 27/06/2017 Yes Grab sample RESULT	TFDPD2 27/06/2017 Yes Grab sample RESULT
Aluminium	mg/L	LOR								
Ammonia	mg/L	0.01								
Arsenic	mg/L	0.001								
Barium	mg/L	0.001								
Beryllium	mg/L	0.001								
Bicarbonate	mg/L	1								
Boron	mg/L	0.05								
Bromide	mg/L	0.01								
Cadmium	mg/L	0.0001								
Calcium	mg/L	1								
Carbonate	mg/L	1								
Chloride	mg/L	1								
Chromium	mg/L	0.001								
Cobalt	mg/L	0.001								
Copper	mg/L	0.001								
Dissolved Oxygen	mg/L	-			8.38	7.72	7.47	7.28	10.3	17.2
Electrical Conductivity	µS/cm	-			578	23844	22542	44590	15219	26548
Fluoride	mg/L	0.1								
Iron	mg/L	0.05								
Lead	mg/L	0.001								
Magnesium	mg/L	1								
Manganese	mg/L	0.001								
Mercury	mg/L	0.0001								
Methane	mg/L	10								
Molybdenum	mg/L	0.001								
Nickel	mg/L	0.001								
Nitrate	mg/L	0.01								
Nitrite	mg/L	0.01								
pH	pH Unit	-			9.39	9.62	9.51	9.84	9.4	9.9
Potassium	mg/L	1								
Reactive Phosphorus	mg/L	0.01								
Redox Potential	mV	-			119	119	113	112	98	90.6
Selenium	mg/L	0.01								
Sodium	mg/L	1								
Sodium Adsorption Ratio (Storages)	-	0.01								
Standing Water Level	mTOC	-								
Strontium	mg/L	0.001								
Sulfate	mg/L	1								
Total Dissolved Solids	mg/L	10								
Total Organic Carbon (Storages)	mg/L	1								
Total Phosphorus (Storages)	mg/L	0.01								
Uranium	mg/L	0.001								
Vanadium	mg/L	0.01								
Zinc	mg/L	0.005								

*Monitoring event was completed but no water was available as ponds are not in operation.

TABLE 4: GROUNDWATER LEVEL RESULTS FOR 1st QUARTER – MAY / JULY 2017

EPA Identification no.	Analyte	Unit	Number of samples required	Number of samples collected	Lowest sample value	Mean of sample	Highest sample value
44	Standing Water Level	Metres	Continuous	Continuous	-36.2	-35.93	-35.70
45	Standing Water Level	Metres	Continuous	Continuous	16.5	17.20	17.40
46	Standing Water Level	Metres	Continuous	Continuous	-59.6	-58.68	-57.70
47	Standing Water Level	Metres	Continuous	Continuous	11.10	11.11	11.4
48	Standing Water Level	Metres	Continuous	Continuous	4.5	4.5	4.5
49	Standing Water Level	Metres	Continuous	Continuous	14.7	14.7	14.7