

EPL20350 WATER MONITORING RESULTS 2016/2017 - QUARTER 2

LICENCE HOLDER PREMISES Santos NSW (Eastern) Pty Ltd
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 2016-17, Quarter 2 - August / October 2016
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MONITORING BY ANALYSIS BY Santos
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	BWD28QGUPS01	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 ground level	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 2nd Quarter - August / October 2016

EPA Identification no.			7	8	9	10	11	12	13	14
Location			BWD27PRORA01	BWD27PRUPS02	BWD26PRUPS01	BWD26PRLPS02	DWH14PRUPS01	DWH14PRLPS02	DWH14PRPUR03	DWH3PRUPS01
Date Sampled			11/10/2016	11/10/2016	10/10/2016	10/10/2016	11/10/2016	11/10/2016	11/10/2016	11/10/2016
Sample obtained			No **	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample method			DRY WELL	In situ	In situ	In situ	In situ	In situ	In situ	In situ
Units			LOR	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	-		5.86	1.95	1.63	3.51	3.4	1.88	4.15
Electrical Conductivity	µS/cm	-		138	72.7	142.2	206.5	194.6	778	119.2
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	µg/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	-		5.38	5.87	6.03	6.02	5.27	10.48	4.05
Potassium	mg/L	1								
Reactive Phosphorus	mg/L	0.01								
Redox Potential	mV	-		-33	-151.2	-207.5	-47.9	-91.2	-453.5	70.3
Selenium	mg/L	0.01								
Sodium	mg/L	1								
Sodium Adsorption Ratio (Storages)	-	0.01								
Standing Water Level	mbgl	-		38.72	29.19	28.67	53.3	54.02	53.095	67.32
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								

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

EPA Identification no.			15	16	17	18	20	21	22	23
Location			DWH3PRLPS02	NYOPRORA01	NYOPRUPS02	BWD27PRLPS03	BHN14PRORA01	BHN14PRUPS02	TULPRNAP01	TULPRDGY02
Date Sampled			11/10/2016	13/10/2016	13/10/2016	11/10/2016	12/10/2016	12/10/2016	12/10/2016	12/10/2016
Sample obtained			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample method			In situ	In situ	In situ	In situ	In situ	In situ	In situ	In situ
Units			LOR	LOR	LOR	LOR	LOR	LOR	LOR	LOR
			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	-	2.44	0	0.04	2.28	0.89	1.34	5.13	6.52
Electrical Conductivity	µS/cm	-	142.2	1304	1276	207.2	506	483.8	7259	7050
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	µg/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	-	4.1	8.17	8.17	5.62	7.1	7.06	6.72	6.5
Potassium	mg/L	1								
Reactive Phosphorus	mg/L	0.01								
Redox Potential	mV	-	75.7	-425.2	-389.7	-44.9	-357.2	-318.7	-305.6	-420.4
Selenium	mg/L	0.01								
Sodium	mg/L	1								
Sodium Adsorption Ratio (Storages)	-	0.01								
Standing Water Level	mbgl	-	67.505	0	0	38.2	26.27	15.095	96.71	73.57
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								

EPA Identification no.		24	25	26	27	28	29	30	31
Location		BWDMW13D	BWDMW13S	BWDMW12S	BWDMW12D	BWDMW12I	BWDMW2	BWDMW3	BWDMW4D
Date Sampled		13/09/2016	12/09/2016	12/09/2016	13/09/2016	13/09/2016	12/09/2016	13/09/2016	13/09/2016
Sample obtained		Yes	No **	No **	Yes	Yes	No **	Yes	Yes
Sample method		Grab sample	DRY WELL	DRY WELL	Grab sample	Grab sample	DRY WELL	Grab sample	Grab sample
Units		RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT
Aluminium	mg/L	0.01			< 0.01	< 0.01		0.08	0.04
Ammonia	mg/L	0.01			< 0.01	< 0.01		2.31	< 0.01
Arsenic	mg/L	0.001			< 0.001	0.001		0.008	< 0.001
Barium	mg/L	0.001			0.724	10		0.142	0.079
Beryllium	mg/L	0.001			< 0.001	< 0.001		< 0.001	< 0.001
Bicarbonate	mg/L	1			47	5180		126	47
Boron	mg/L	0.05			< 0.05	< 0.05		< 0.05	< 0.05
Bromide	mg/L	0.01			1.07	6.01		0.504	0.131
Cadmium	mg/L	0.0001			0.0001	< 0.0001		< 0.0001	< 0.0001
Calcium	mg/L	1			9	31		9	3
Carbonate	mg/L	1			< 1	< 1		< 1	< 1
Chloride	mg/L	1			412	1140		151	34
Chromium	mg/L	0.001			< 0.001	< 0.001		< 0.001	< 0.001
Cobalt	mg/L	0.001			0.014	0.002		0.007	< 0.001
Copper	mg/L	0.001			< 0.001	0.002		< 0.001	0.001
Dissolved Oxygen	mg/L	-			2.9	4.29		1.53	5.36
Electrical Conductivity	µS/cm	-			1385	10368		804	281.1
Fluoride	mg/L	0.1			< 0.1	1.2		0.1	< 0.1
Iron	mg/L	0.05			< 0.05	< 0.05		12.4	< 0.05
Lead	mg/L	0.001			< 0.001	< 0.001		< 0.001	< 0.001
Magnesium	mg/L	1			45	456		14	4
Manganese	mg/L	0.001			0.074	0.007		1.76	0.005
Mercury	mg/L	0.0001			< 0.0001	< 0.0001		< 0.0001	< 0.0001
Methane	µg/L	10			< 10	< 10		2270	< 10
Molybdenum	mg/L	0.001			< 0.001	0.004		< 0.001	< 0.001
Nickel	mg/L	0.001			0.01	0.003		0.003	0.002
Nitrate	mg/L	0.01			0.2	< 0.1		0.23	0.26
Nitrite	mg/L	0.01			< 0.01	< 0.10		0.02	< 0.01
pH	pH Unit	-			5.21	7.21		6.18	6.12
Potassium	mg/L	1			19	48		11	6
Reactive Phosphorus	mg/L	0.01			< 0.01	0.05		< 0.01	< 0.01
Redox Potential	mV	-			-58.7	-59.5		-323.6	-138.1
Selenium	mg/L	0.01			< 0.01	< 0.01		< 0.01	< 0.01
Sodium	mg/L	1			148	2260		114	40
Sodium Adsorption Ratio (Storages)	-	0.01							
Standing Water Level	mbgl	-			30.36	30.55		30.64	30.06
Strontium	mg/L	0.001			0.153	1.02		0.12	0.017
Sulfate	mg/L	1			10	11		18	18
Total Dissolved Solids	mg/L	10			796	6650		562	282
Total Organic Carbon (Storages)	mg/L	1							
Total Phosphorus (Storages)	mg/L	0.01							
Uranium	mg/L	0.001			< 0.001	0.068		< 0.001	< 0.001
Vanadium	mg/L	0.01			< 0.01	< 0.01		< 0.01	< 0.01
Zinc	mg/L	0.005			0.033	0.006		0.01	0.009

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

EPA Identification no.			32	33	34	35	36	37	38	39
Location			BWDMW4	BWDMW15S	BWDMW15D	BWDMW16S	BWDMW16D	LWDMW1D	LWDMW1S	LWDMW1I
Date Sampled			12/09/2016	12/09/2016	13/09/2016	12/09/2016	13/09/2016	12/09/2016	12/09/2016	12/09/2016
Sample obtained			No **	No **	Yes	No **	Yes	Yes	No **	No **
Sample method			DRY WELL	DRY WELL	Grab sample	DRY WELL	Grab sample	Grab sample	DRY WELL	DRY WELL
Units			LOR							
			RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT
Aluminium	mg/L	0.01			0.01		0.21	< 0.01		
Ammonia	mg/L	0.01			< 0.01		< 0.01	< 0.01		
Arsenic	mg/L	0.001			< 0.001		< 0.001	< 0.001		
Barium	mg/L	0.001			0.047		0.079	0.414		
Beryllium	mg/L	0.001			< 0.001		< 0.001	< 0.001		
Bicarbonate	mg/L	1			27		10	185		
Boron	mg/L	0.05			< 0.05		< 0.05	0.17		
Bromide	mg/L	0.01			0.24		0.227	1.23		
Cadmium	mg/L	0.0001			< 0.0001		< 0.0001	< 0.0001		
Calcium	mg/L	1			2		1	7		
Carbonate	mg/L	1			< 1		< 1	< 1		
Chloride	mg/L	1			73		75	559		
Chromium	mg/L	0.001			< 0.001		0.001	< 0.001		
Cobalt	mg/L	0.001			< 0.001		< 0.001	< 0.001		
Copper	mg/L	0.001			< 0.001		< 0.001	< 0.001		
Dissolved Oxygen	mg/L	-			7.25		5.99	0.74		
Electrical Conductivity	µS/cm	-			458.1		368.6	2290		
Fluoride	mg/L	0.1			< 0.1		< 0.1	0.3		
Iron	mg/L	0.05			< 0.05		0.08	< 0.05		
Lead	mg/L	0.001			< 0.001		< 0.001	< 0.001		
Magnesium	mg/L	1			4		2	12		
Manganese	mg/L	0.001			0.002		0.005	0.02		
Mercury	mg/L	0.0001			< 0.0001		< 0.0001	< 0.0001		
Methane	µg/L	10			< 10		< 10	< 10		
Molybdenum	mg/L	0.001			< 0.001		< 0.001	0.001		
Nickel	mg/L	0.001			0.001		0.002	< 0.001		
Nitrate	mg/L	0.01			0.24		0.23	0.16		
Nitrite	mg/L	0.01			< 0.01		< 0.01	< 0.01		
pH	pH Unit	-			6.25		5.78	6.29		
Potassium	mg/L	1			6		7	12		
Reactive Phosphorus	mg/L	0.01			< 0.01		0.01	0.07		
Redox Potential	mV	-			-92.7		-71.6	-114.1		
Selenium	mg/L	0.01			< 0.01		< 0.01	< 0.01		
Sodium	mg/L	1			57		47	351		
Sodium Adsorption Ratio (Storages)	-	0.01								
Standing Water Level	mbgl	-			30.01		29.94	29.34		
Strontium	mg/L	0.001			0.018		0.011	0.124		
Sulfate	mg/L	1			32		2	20		
Total Dissolved Solids	mg/L	10			304		406	1170		
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		
Vanadium	mg/L	0.01			< 0.01		< 0.01	< 0.01		
Zinc	mg/L	0.005			0.008		0.008	< 0.005		

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

EPA Identification no.		40	41	42	43	50	51	52	53
Location		LWDMW2S	LWDMW2D	LWDMW3D	LWDMW3S	WPKMW1	WPKMW1D	WPKMW2	WPKMW4
Date Sampled		12/09/2016	12/09/2016	12/09/2016	12/09/2016	8/09/2016	31/08/2016	8/09/2016	8/09/2016
Sample obtained		No **	Yes	Yes	No **	Yes	Yes	Yes	Yes
Sample method		DRY WELL	Grab sample	Grab sample	DRY WELL	Grab sample	Grab sample	Grab sample	Grab sample
Units		LOR	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT
Aluminium	mg/L	0.01	< 0.01	< 0.01		0.04	0.04	< 0.01	< 0.01
Ammonia	mg/L	0.01	< 0.01	0.01		< 0.01	0.12	< 0.01	< 0.01
Arsenic	mg/L	0.001	< 0.001	0.004		0.003	0.005	0.006	0.006
Barium	mg/L	0.001	0.366	0.086		0.02	0.111	0.047	0.019
Beryllium	mg/L	0.001	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001
Bicarbonate	mg/L	1	301	122		596	628	1160	851
Boron	mg/L	0.05	0.13	0.09		0.26	0.23	0.3	0.33
Bromide	mg/L	0.01	0.789	0.437		0.272	0.172	1.2	0.589
Cadmium	mg/L	0.0001	< 0.0001	< 0.0001		< 0.0001	< 0.0001	< 0.0001	< 0.0001
Calcium	mg/L	1	16	2		3	7	4	2
Carbonate	mg/L	1	< 1	< 1		< 1	< 1	< 1	4
Chloride	mg/L	1	427	226		84	52	373	182
Chromium	mg/L	0.001	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001
Cobalt	mg/L	0.001	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001
Copper	mg/L	0.001	0.001	< 0.001		0.001	< 0.001	0.002	< 0.001
Dissolved Oxygen	mg/L	-	2.1	0.5		0.95	0.4	0.62	0.11
Electrical Conductivity	µS/cm	-	1922	1027		1433	1224	3283	2176
Fluoride	mg/L	0.1	0.3	0.2		0.8	0.9	0.8	1.1
Iron	mg/L	0.05	< 0.05	1.13		< 0.05	< 0.05	< 0.05	< 0.05
Lead	mg/L	0.001	< 0.001	< 0.001		< 0.001	0.004	< 0.001	< 0.001
Magnesium	mg/L	1	21	3		1	2	2	< 1
Manganese	mg/L	0.001	0.025	0.016		0.002	0.106	0.004	< 0.001
Mercury	mg/L	0.0001	< 0.0001	< 0.0001		< 0.0001	< 0.0001	< 0.0001	< 0.0001
Methane	µg/L	10	< 10	< 10		< 10	54	< 10	< 10
Molybdenum	mg/L	0.001	0.003	< 0.001		< 0.001	< 0.001	0.003	0.002
Nickel	mg/L	0.001	0.002	0.002		0.002	< 0.001	0.004	0.002
Nitrate	mg/L	0.01	0.1	< 0.01		0.13	< 0.01	0.04	0.04
Nitrite	mg/L	0.01	< 0.01	< 0.01		< 0.01	< 0.01	< 0.01	< 0.01
pH	pH Unit	-	6.61	6.41		7.99	8.13	7.85	8.04
Potassium	mg/L	1	24	10		3	3	7	5
Reactive Phosphorus	mg/L	0.01	0.14	0.16		0.49	0.09	0.69	0.68
Redox Potential	mV	-	-118.5	-277.5		-103.5	-124.8	-82.3	-100.1
Selenium	mg/L	0.01	< 0.01	< 0.01		< 0.01	< 0.01	< 0.01	< 0.01
Sodium	mg/L	1	377	203		392	270	840	574
Sodium Adsorption Ratio (Storages)	-	0.01							
Standing Water Level	mbgl	-	25.945	21.3		16.2	16.15	15.25	15.25
Strontium	mg/L	0.001	0.254	0.028		0.031	0.061	0.066	0.03
Sulfate	mg/L	1	30	9		< 1	< 1	2	< 1
Total Dissolved Solids	mg/L	10	952	561		1010	706	1880	1330
Total Organic Carbon (Storages)	mg/L	1							
Total Phosphorus (Storages)	mg/L	0.01							
Uranium	mg/L	0.001	0.002	< 0.001		< 0.001	< 0.001	0.003	0.002
Vanadium	mg/L	0.01	< 0.01	< 0.01		< 0.01	< 0.01	0.01	< 0.01
Zinc	mg/L	0.005	0.01	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005

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

EPA Identification no.		55	56	57	58	59	60	61	62
Location		WPKMW8	WPKMW9D	WPKMW9S	WPKMW12S	WPKMW13I	WPKMW13S	WPKMW14D	WPKMW14S
Date Sampled		8/09/2016	31/08/2016	8/09/2016	31/08/2016	31/08/2016	31/08/2016	31/08/2016	8/09/2016
Sample obtained		Yes	Yes	Yes	No **	Yes	Yes	Yes	No **
Sample method		Grab sample	Grab sample	Grab sample	DRY WELL	Grab sample	Grab sample	Grab sample	DRY WELL
Units		LOR							
		RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT
Aluminium	mg/L	< 0.01	< 0.01	< 0.01		0.14	< 0.01	0.09	
Ammonia	mg/L	< 0.01	0.12	< 0.01		0.04	< 0.01	0.08	
Arsenic	mg/L	0.002	0.005	0.002		0.003	0.001	0.003	
Barium	mg/L	0.028	0.118	0.268		0.042	0.089	0.306	
Beryllium	mg/L	< 0.001	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	
Bicarbonate	mg/L	832	631	1690		648	1230	609	
Boron	mg/L	0.28	0.22	0.4		0.23	0.35	0.22	
Bromide	mg/L	0.752	0.182	1.24		0.191	0.97	0.159	
Cadmium	mg/L	< 0.0001	< 0.0001	< 0.0001		< 0.0001	< 0.0001	< 0.0001	
Calcium	mg/L	3	5	9		3	4	7	
Carbonate	mg/L	< 1	< 1	< 1		< 1	< 1	< 1	
Chloride	mg/L	241	51	389		58	353	52	
Chromium	mg/L	< 0.001	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	
Cobalt	mg/L	< 0.001	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	
Copper	mg/L	< 0.001	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	
Dissolved Oxygen	mg/L	3.09	4.01	1.47		0.46	0.67	0.37	
Electrical Conductivity	µS/cm	2311	1247	4475		1311	3076	1317	
Fluoride	mg/L	0.7	0.9	0.9		0.8	0.7	0.8	
Iron	mg/L	< 0.05	< 0.05	< 0.05		0.07	< 0.05	< 0.05	
Lead	mg/L	< 0.001	< 0.001	< 0.001		< 0.001	0.002	< 0.001	
Magnesium	mg/L	< 1	1	3		< 1	1	1	
Manganese	mg/L	< 0.001	0.229	0.048		0.023	0.008	0.01	
Mercury	mg/L	< 0.0001	< 0.0001	< 0.0001		< 0.0001	< 0.0001	< 0.0001	
Methane	µg/L	< 10	67	< 10		< 10	< 10	12	
Molybdenum	mg/L	0.002	0.002	0.003		0.001	0.004	0.002	
Nickel	mg/L	< 0.001	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	
Nitrate	mg/L	0.44	< 0.01	0.05		0.02	0.01	< 0.01	
Nitrite	mg/L	< 0.01	< 0.01	< 0.01		< 0.01	< 0.01	< 0.01	
pH	pH Unit	7.6	8.19	7.9		8.05	7.39	8.07	
Potassium	mg/L	7	3	10		4	8	4	
Reactive Phosphorus	mg/L	0.41	0.25	0.39		0.25	0.27	0.18	
Redox Potential	mV	-186.4	-121	-79.5		-55.7	-19.2	-149.1	
Selenium	mg/L	< 0.01	< 0.01	< 0.01		< 0.01	< 0.01	< 0.01	
Sodium	mg/L	609	285	1210		300	661	264	
Sodium Adsorption Ratio (Storages)	-								
Standing Water Level	mbgl	16.63	15.52	15.73		17.05	16.95	21.1	
Strontium	mg/L	0.04	0.068	0.126		0.018	0.044	0.046	
Sulfate	mg/L	< 1	< 1	192		2	3	< 1	
Total Dissolved Solids	mg/L	1590	764	2820		850	1700	778	
Total Organic Carbon (Storages)	mg/L								
Total Phosphorus (Storages)	mg/L								
Uranium	mg/L	0.001	0.003	0.008		< 0.001	0.001	0.001	
Vanadium	mg/L	< 0.01	< 0.01	< 0.01		< 0.01	< 0.01	< 0.01	
Zinc	mg/L	< 0.005	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	

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

EPA Identification no.		63	64	65	66	67	68	78	79
Location		WPKMW15D	WPKMW15S	WPKMW16D	WPKMW16S	WPKMW17D	WPKMW17S	WPKMW18S	WPKMW18I
Date Sampled		31/08/2016	31/08/2016	30/08/2016	30/08/2016	31/08/2016	31/08/2016	31/08/2016	31/08/2016
Sample obtained		Yes	Yes	Yes	No **	Yes	Yes	Yes	Yes
Sample method		Grab sample	Grab sample	Grab sample	DRY WELL	Grab sample	Grab sample	Grab sample	Grab sample
Units		LOR	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT
Aluminium	mg/L	0.01	< 0.01	< 0.01		0.01	< 0.01	< 0.01	0.05
Ammonia	mg/L	0.01	< 0.01	0.02		0.09	0.06	0.02	< 0.01
Arsenic	mg/L	0.001	0.004	0.003		0.002	0.004	0.004	0.002
Barium	mg/L	0.001	0.2	1.76		0.123	0.373	0.475	0.126
Beryllium	mg/L	0.001	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001
Bicarbonate	mg/L	1	679	4160		587	1300	1770	689
Boron	mg/L	0.05	0.19	0.1		< 0.05	0.26	0.32	0.21
Bromide	mg/L	0.01	0.177	2.62		0.164	0.391	1.7	0.18
Cadmium	mg/L	0.0001	< 0.0001	< 0.0001		< 0.0001	< 0.0001	0.0001	< 0.0001
Calcium	mg/L	1	7	7		3	8	3	2
Carbonate	mg/L	1	< 1	< 1		< 1	< 1	34	31
Chloride	mg/L	1	54	910		52	130	633	60
Chromium	mg/L	0.001	< 0.001	0.009		< 0.001	< 0.001	0.014	0.001
Cobalt	mg/L	0.001	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001
Copper	mg/L	0.001	< 0.001	< 0.001		< 0.001	< 0.001	0.004	< 0.001
Dissolved Oxygen	mg/L	-	0.28	2.77		0.35	1.05	5.46	2.72
Electrical Conductivity	µS/cm	-	1332	9025		1286	4897	1448	1448
Fluoride	mg/L	0.1	0.5	1.2		0.6	0.9	0.7	0.8
Iron	mg/L	0.05	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05
Lead	mg/L	0.001	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001
Magnesium	mg/L	1	2	12		2	< 1	3	< 1
Manganese	mg/L	0.001	0.129	< 0.001		0.01	0.054	0.028	< 0.001
Mercury	mg/L	0.0001	< 0.0001	< 0.0001		< 0.0001	< 0.0001	< 0.0001	< 0.0001
Methane	µg/L	10	152	< 10		< 10	< 10	< 10	< 10
Molybdenum	mg/L	0.001	0.007	0.004		0.005	0.008	0.006	0.034
Nickel	mg/L	0.001	0.004	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001
Nitrate	mg/L	0.01	< 0.01	0.09		< 0.01	< 0.01	2.24	1.26
Nitrite	mg/L	0.01	< 0.01	0.51		< 0.01	< 0.01	< 0.01	< 0.01
pH	pH Unit	-	8.07	7.78		7.9	7.46	7.55	8.08
Potassium	mg/L	1	7	28		11	6	12	14
Reactive Phosphorus	mg/L	0.01	0.3	0.62		0.26	0.06	0.38	0.45
Redox Potential	mV	-	-186.4	-97.1		-48.4	-105.8	-81.2	-21.1
Selenium	mg/L	0.01	< 0.01	< 0.01		< 0.01	< 0.01	< 0.01	< 0.01
Sodium	mg/L	1	296	2190		293	258	571	1200
Sodium Adsorption Ratio (Storages)	-	0.01							
Standing Water Level	mbgl	-	22.505	22.56		26.835	18.93	21	15.45
Strontium	mg/L	0.001	0.102	0.24		0.055	0.02	0.06	0.096
Sulfate	mg/L	1	6	8		18	< 1	< 10	61
Total Dissolved Solids	mg/L	10	679	4770		621	765	1250	3050
Total Organic Carbon (Storages)	mg/L	1							
Total Phosphorus (Storages)	mg/L	0.01							
Uranium	mg/L	0.001	< 0.001	0.002		0.002	0.003	0.005	0.025
Vanadium	mg/L	0.01	< 0.01	< 0.01		< 0.01	< 0.01	0.02	0.01
Zinc	mg/L	0.005	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005

** Note: Monitoring event was completed but no water was available for sampling in WPKMW16S

EPA Identification no.			69	70	71	72	73	74	75	76
Location			BWDPD2	BWDPD3	LWDPD1CELL4	LWDPD1CELL3	LWDPD1CELL2	LWDPD1CELL1	TFDPD1	TFDPD2
Date Sampled			14/08/2016	14/08/2016	28/09/2016	28/09/2016	28/09/2016	28/09/2016	28/09/2016	28/09/2016
Sample obtained			No **	No **	Yes	Yes	Yes	Yes	Yes	No **
Sample method			Not operational	Not operational	Grab sample	Grab sample	Grab sample	Grab sample	Grab sample	Not operational
Units			LOR							
			RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT
Aluminium	mg/L	0.01			< 0.01	< 0.10	< 0.10	< 0.10	< 0.01	
Ammonia	mg/L	0.01			< 0.01	0.17	0.37	< 0.01	< 0.01	
Arsenic	mg/L	0.001			< 0.001	< 0.010	< 0.010	< 0.010	0.001	
Barium	mg/L	0.001			0.16	1.31	3.33	3.66	3.88	
Beryllium	mg/L	0.001			< 0.001	< 0.010	< 0.010	< 0.010	< 0.001	
Bicarbonate	mg/L	1			60	7960	8330	8330	4470	
Boron	mg/L	0.05			< 0.05	1.13	1.03	2.02	0.28	
Bromide	mg/L	0.01			0.073	3.29	3.02	17	2.96	
Cadmium	mg/L	0.0001			< 0.0001	< 0.0010	< 0.0010	< 0.0010	< 0.0001	
Calcium	mg/L	1			4	< 10	< 10	13	11	
Carbonate	mg/L	1			< 1	5640	3680	14400	2080	
Chloride	mg/L	1			19	1340	1220	3640	890	
Chromium	mg/L	0.001			< 0.001	< 0.010	< 0.010	< 0.010	0.005	
Cobalt	mg/L	0.001			< 0.001	< 0.010	< 0.010	< 0.010	< 0.001	
Copper	mg/L	0.001			< 0.001	< 0.010	< 0.010	< 0.010	< 0.001	
Dissolved Oxygen	mg/L	-			7.36	6.67	9.13	5.22	6.17	
Electrical Conductivity	µS/cm	-			207.1	23500	21020	39062	13512	
Fluoride	mg/L	0.1			< 0.1	7.9	7	14.5	2.6	
Iron	mg/L	0.05			< 0.05	< 0.50	< 0.50	< 0.50	0.21	
Lead	mg/L	0.001			< 0.001	< 0.010	< 0.010	< 0.010	< 0.001	
Magnesium	mg/L	1			2	10	< 10	10	5	
Manganese	mg/L	0.001			< 0.001	< 0.010	< 0.010	< 0.010	0.016	
Mercury	mg/L	0.0001			< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	
Methane	µg/L	10			< 10	< 10	< 10	27	366	
Molybdenum	mg/L	0.001			< 0.001	< 0.010	< 0.010	0.019	< 0.001	
Nickel	mg/L	0.001			< 0.001	0.02	0.011	< 0.010	< 0.001	
Nitrate	mg/L	0.01			0.04	0.03	0.37	0.09	< 0.1	
Nitrite	mg/L	0.01			< 0.01	0.2	0.03	< 0.01	< 0.10	
pH	pH Unit	-			8.47	9.58	9.41	9.89	9.45	
Potassium	mg/L	1			7	78	62	369	30	
Reactive Phosphorus	mg/L	0.01								
Redox Potential	mV	-								
Selenium	mg/L	0.01			< 0.01	< 0.10	< 0.10	< 0.10	< 0.01	
Sodium	mg/L	1			30	8070	7560	14400	3740	
Sodium Adsorption Ratio (Storages)	-	0.01			3.06	547	*	730	235	
Standing Water Level	mbgl	-								
Strontium	mg/L	0.001			0.02	0.61	0.854	0.963	2.38	
Sulfate	mg/L	1			2	< 10	< 10	328	2	
Total Dissolved Solids	mg/L	10			115	17200	16100	25100	9240	
Total Organic Carbon (Storages)	mg/L	1			4	15	12	< 1	18	
Total Phosphorus (Storages)	mg/L	0.01			< 0.01	0.02	0.01	2.58	0.31	
Uranium	mg/L	0.001			< 0.001	< 0.010	< 0.010	< 0.010	< 0.001	
Vanadium	mg/L	0.01			< 0.01	< 0.10	< 0.10	< 0.10	< 0.01	
Zinc	mg/L	0.005			< 0.005	< 0.050	< 0.050	< 0.050	< 0.005	

* Note: LWDPD1CELL2 Sodium Adsorption Ratio not calculated as Mg and Ca results were below detection limits.
** Note: Monitoring event was completed but no water was available as ponds are not in operation

TABLE 4: GROUNDWATER LEVEL RESULTS FOR 2nd QUARTER - AUGUST / OCTOBER 2016

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	-36.09	-35.90	-35.60
45	Standing Water Level	Metres	Continuous	Continuous	17.29	17.49	17.72
46	Standing Water Level	Metres	Continuous	Continuous	-56.86	-56.55	-56.20
47	Standing Water Level	Metres	Continuous	Continuous	11.86	11.89	11.89
48	Standing Water Level	Metres	Continuous	Continuous	3.83	3.83	3.83
49	Standing Water Level	Metres	Continuous	Continuous	14.95	15.02	15.08