

## EPL20350 WATER MONITORING RESULTS 2018/2019 - QUARTER 3

<b>LICENCE HOLDER</b>	Santos NSW (Eastern) Pty Ltd
<b>PREMISES</b>	Narrabri Gas Field X Line Road, NARRABRI NSW 2390
<b>LICENCE NUMBER</b>	Environment Protection Licence 20350
<b>EPL LINK (EPA SITE)</b>	<a href="http://www.epa.nsw.gov.au/prpoeoapp/ViewPOEOLicence.aspx?DOCID=33816&amp;SYSUID=1&amp;LICID=20350">http://www.epa.nsw.gov.au/prpoeoapp/ViewPOEOLicence.aspx?DOCID=33816&amp;SYSUID=1&amp;LICID=20350</a>
<b>SCHEDULED ACTIVITY</b>	Coal seam gas exploration, assessment and production
<b>EPL PERIOD</b>	May 1 <sup>st</sup> 2018 to April 30 <sup>th</sup> 2019
<b>REPORTING PERIOD</b>	Quarter 3 – Nov 2018 / Jan 2019
<b>PUBLISHED DATE</b>	February 2019
<b>MONITORING BY</b>	Santos
<b>ANALYSIS BY</b>	Australian Laboratory Services Pty Ltd

**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
46	Groundwater level monitoring	DWH8AGMB3	765546.740	6616987.990
47	Groundwater level monitoring	BWD28QGUPS01	752949.898	6604219.732

EPA Identification No.	Monitoring type	Location	Easting	Northing
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
77	Treated water quality monitoring	LWWTTPDM1	751648.020	6622508.310
78	Groundwater quality monitoring	WPKMW18S	755944.010	6638100.840
79	Groundwater quality monitoring	WPKMW18I	755945.070	6638105.040
80	Groundwater quality monitoring	LWDMW4	752080.540	6623038.940
81	Groundwater quality monitoring	LWDMW5	752491.080	6623301.160
82	Groundwater quality monitoring	LWDMW6	752667.550	6623165.030
83	Soil quality monitoring	LWDSMP1	751942.34	6622941.21
84	Soil quality monitoring	LWDSMP2	752164.06	6623143.83
85	Soil quality monitoring	LWDSMP3	752572.60	6623126.32
86	Soil quality monitoring	LWDSMP4	752457.14	6622764.26

**Table 2: Water Monitoring Results Quarter 3 – Nov 2018 / Jan 2019**

	Units	EPA Identification No Location Date Sampled Sample obtained Sample Method LOR	7	8	9	10	11	12	13	14
			BWD27PRUPS02 21/01/2019 Yes Grab sample RESULT	BWD27PRLPS03 21/01/2019 Yes Grab sample RESULT	BWD26PRUPS01 21/01/2019 Yes Grab sample RESULT	BWD26PRLPS02 21/01/2019 Yes Grab sample RESULT	DWH14PRUPS01 22/01/2019 Yes Grab sample RESULT	DWH14PRLPS02 22/01/2019 Yes Grab sample RESULT	DWH14PRPUR03*** 31/01/2019 Yes In situ RESULT	DWH3PRUPS01 22/01/2019 Yes Grab sample RESULT
Aluminium	mg/L	0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01		<0.01
Ammonia	mg/L	0.01	0.03	0.05	0.02	0.04	0.02	0.02		0.02
Arsenic	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001
Barium	mg/L	0.001	0.169	0.098	0.222	0.674	0.226	0.068		0.038
Beryllium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001
Bicarbonate	mg/L	1	14	43	23	35	42	25		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	0.119	0.137	0.026	0.078	0.140	0.127		0.077
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	2	2		<1
Carbonate	mg/L	1	<1	<1	<1	<1	<1	<1		<1
Chloride	mg/L	1	27	34	5	18	35	33		22
Chromium	mg/L	0.001	0.016	<0.001	<0.001	<0.001	<0.001	0.008		0.013
Cobalt	mg/L	0.001	0.011	0.002	0.002	0.010	0.006	0.007		0.007
Copper	mg/L	0.001	0.030	<0.001	<0.001	<0.001	0.009	0.002		0.012
Dissolved Oxygen	mg/L	-	0.14	0.09	0.24	0.27	1.4	1.65	3.94	2.63
Electrical Conductivity	µS/cm	-	149	230	76	144	219	190	757	128
Fluoride	mg/L	0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1		<0.1
Iron	mg/L	0.05	0.07	1.01	0.07	0.08	0.06	0.09		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	2	1	2	4	2		1
Manganese	mg/L	0.001	0.092	0.053	0.026	0.062	0.098	0.072		0.054
Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		<0.0001
Methane	mg/L	0.01	<0.01	0.069	<0.01	<0.01	<0.01	<0.01		<0.01
Molybdenum	mg/L	0.001	<0.001	0.023	<0.001	<0.001	0.002	0.001		<0.001
Nickel	mg/L	0.001	0.373	0.117	0.006	0.006	0.197	0.182		0.242
Nitrate	mg/L	0.01	0.18	0.01	<0.01	0.06	0.02	0.16		0.09
Nitrite	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		<0.01
pH	pH Unit	-	5.04	5.37	5.04	5.4	5.29	5.10	6.7	4.74
Potassium	mg/L	1	6	4	6	12	7	4		2
Reactive Phosphorus	mg/L	0.01	<0.01	<0.01	<0.01	<0.05**	<0.01	<0.01		<0.01
Redox Potential	mV	-	72	-117	-65	-120	-90	-97	-294.4	-16
Selenium	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		<0.01
Silica	mg/L									
Sodium	mg/L	1	18	34	7	15	28	28		20
Sodium Adsorption Ratio (Storages)	-	0.01								
Standing Water Level	mTOC	-	38.90	38.43	29.63	29.10	53.36	54.12	53.72	67.44
Strontium	mg/L	0.001	0.026	0.03	0.027	0.053	0.049	0.022		0.008
Sulfate	mg/L	1	2	<1	3	3	<1	5		3
Total Alkalinity (as CaCO3)	mg/L	1	14	43	23	35	42	25		17
Total Dissolved Solids	mg/L	10	79	122	51	93	147	120		83
Total Hardness (as CaCO3)	mg/L	1								
Total Nitrogen (as N)	mg/L	0.1								
Total Organic Carbon (Storages)	mg/L	1								
Total Phosphorus (as P)	mg/L	0.01								
Total Residual Chlorine	mg/L									
Turbidity	NTU	0.1								
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	0.095	0.012	0.005	0.009	0.014	0.009		0.011

\*\*Limit of Reporting raised due to sample matrix

\*\*\*Sample unable to be obtained at DWH14PRPUR03 at time of monitoring event due to downhole obstruction. Corrective actions being investigated.

	Units	EPA Identification No Location Date Sampled Sample obtained Sample Method	15	16	17	18	20	21	22	23
			DWH3PRLPS02 22/01/2019 Yes Grab sample RESULT	NYOPRORA01 30/01/2019 Yes Grab sample RESULT	NYOPRUPS02 30/01/2019 Yes Grab sample RESULT	BWD27PRORA01 21/01/2019 No Dry well RESULT	BHN14PRORA01 30/01/2019 Yes Grab sample RESULT	BHN14PRUPS02 30/01/2019 Yes Grab sample RESULT	TULPRNAP01 23/01/2019 N WG RESULT	TULPRDGY02 23/01/2019 N WG RESULT
Aluminium	mg/L	0.01	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	0.01
Ammonia	mg/L	0.01	0.02	0.40	0.44		0.08	0.08	3.00	4.90
Arsenic	mg/L	0.001	<0.001	<0.001	<0.001		0.002	0.001	0.002	0.007
Barium	mg/L	0.001	0.053	0.110	1.04		0.552	0.477	3.84	3.58
Beryllium	mg/L	0.001	<0.001	<0.001	<0.001		<0.001	<0.001	<0.001	<0.001
Bicarbonate	mg/L	1	28	630	623		194	217	2620	5100
Boron	mg/L	0.05	<0.05	0.27	0.23		0.05	<0.05	0.30	0.66
Bromide	mg/L	0.01	0.077	0.186	0.179		0.110	0.052	1.74	<0.500
Cadmium	mg/L	0.0001	<0.0001	<0.0001	<0.0001		<0.0001	<0.0001	<0.0001	<0.0001
Calcium	mg/L	1	1	4	4		34	40	49	58
Carbonate	mg/L	1	<1	<1	<1		<1	<1	<1	<1
Chloride	mg/L	1	22	58	56		35	20	948	181
Chromium	mg/L	0.001	<0.001	<0.001	<0.001		<0.001	<0.001	<0.001	0.002
Cobalt	mg/L	0.001	0.002	<0.001	<0.001		<0.001	<0.001	<0.001	<0.001
Copper	mg/L	0.001	0.036	<0.001	<0.001		<0.001	<0.001	<0.001	<0.001
Dissolved Oxygen	mg/L	-	1.71	0.53	3.21		0.91	1.56	0.17	0.67
Electrical Conductivity	µS/cm	-	135	1311	1292		501	481	7657	8619
Fluoride	mg/L	0.1	<0.1	1.0	0.9		0.3	0.2	1.1	1.3
Iron	mg/L	0.05	0.06	0.36	<0.05		0.78	2.81	3.37	6.59
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		8	8	43	42
Manganese	mg/L	0.001	0.040	0.019	0.003		0.165	0.116	0.018	0.018
Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001		<0.0001	<0.0001	<0.0001	<0.0001
Methane	mg/L	0.01	<0.01	1.38	0.793		0.114	3.15	25.5	1.49
Molybdenum	mg/L	0.001	<0.001	0.001	<0.001		0.003	0.008	0.005	0.003
Nickel	mg/L	0.001	0.046	<0.001	0.001		0.001	0.004	0.001	<0.001
Nitrate	mg/L	0.01	0.09	<0.01	<0.01		<0.01	<0.01	<0.01	0.10
Nitrite	mg/L	0.01	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01
pH	pH Unit	-	5.08	7.76	7.9		7.03	6.90	6.50	6.42
Potassium	mg/L	1	2	2	2		4	5	47	65
Reactive Phosphorus	mg/L	0.01	<0.01	<0.01	<0.01		0.02	0.02	<0.01	0.01
Redox Potential	mV	-	-27	-263	-216		-194	-140	-246	-270
Selenium	mg/L	0.01	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01
Silica	mg/L									
Sodium	mg/L	1	22	335	328		57	44	1880	2060
Sodium Adsorption Ratio (Storages)	-	0.01								
Standing Water Level	mTOC	-	67.64	0	0		26.46	15.24	89.97	73.88
Strontium	mg/L	0.001	0.014	0.118	0.108		0.439	0.414	4.82	2.26
Sulfate	mg/L	1	2	<1	<1		4	<1	<1	<1
Total Alkalinity (as CaCO3)	mg/L	1	28	630	623		194	217	2620	5100
Total Dissolved Solids	mg/L	10	83	625	680		276	336	4500	5720
Total Hardness (as CaCO3)	mg/L	1								
Total Nitrogen (as N)	mg/L	0.1								
Total Organic Carbon (Storages)	mg/L	1								
Total Phosphorus (as P)	mg/L	0.01								
Total Residual Chlorine	mg/L									
Turbidity	NTU	0.1								
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	0.014	0.014	<0.005		<0.005	<0.005	<0.005	<0.005

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

	Units	EPA Identification No Location Date Sampled Sample obtained Sample Method	24	25	26	27	28	29	30	31
			BWDMW13D 28/11/2018 Yes In situ RESULT	BWDMW13S 28/11/2018 No Dry well RESULT	BWDMW12S 28/11/2018 No Dry well RESULT	BWDMW12D 28/11/2018 Yes In situ RESULT	BWDMW12I 28/11/2018 Yes In situ RESULT	BWDMW2 28/11/2018 No Dry well RESULT	BWDMW3 28/11/2018 Yes In situ RESULT	BWDMW4D 28/11/2018 Yes In situ 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	-	1.2			3.19	2.24		0.76	2.12
Electrical Conductivity	µS/cm	-	1253			8971	14102		953	245
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	0.01								
Molybdenum	mg/L	0.001								
Nickel	mg/L	0.001								
Nitrate	mg/L	0.01								
Nitrite	mg/L	0.01								
pH	pH Unit	-	5.43			7.08	7.10		5.49	5.74
Potassium	mg/L	1								
Reactive Phosphorus	mg/L	0.01								
Redox Potential	mV	-	59.4			63.8	56.1		111	53
Selenium	mg/L	0.01								
Silica	mg/L									
Sodium	mg/L	1								
Sodium Adsorption Ratio (Storages)	-	0.01								
Standing Water Level	mTOC	-	30.68			30.94	21.06		30.96	30.36
Strontium	mg/L	0.001								
Sulfate	mg/L	1								
Total Alkalinity (as CaCO3)	mg/L	1								
Total Dissolved Solids	mg/L	10								
Total Hardness (as CaCO3)	mg/L	1								
Total Nitrogen (as N)	mg/L	0.1								
Total Organic Carbon (Storages)	mg/L	1								
Total Phosphorus (as P)	mg/L	0.01								
Total Residual Chlorine	mg/L									
Turbidity	NTU	0.1								
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 from BWDMW13S, BWDMW12S and BWDMW2

	Units	EPA Identification No Location Date Sampled Sample obtained Sample Method	32	33	34	35	36	37	38	39
			BWDMW4 28/11/2018 No Dry well RESULT	BWDMW15S 28/11/2018 No Dry well RESULT	BWDMW15D 28/11/2018 Yes In situ RESULT	BWDMW16S 28/11/2018 No Dry well RESULT	BWDMW16D 28/11/2018 Yes In situ RESULT	LWDMW1D 3/12/2018 Yes In situ RESULT	LWDMW1S 3/12/2018 No Dry well RESULT	LWDMW1I 3/12/2018 No Dry well 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	-			3.32		4.84	1.13		
Electrical Conductivity	µS/cm	-			402		343	2335		
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	0.01								
Molybdenum	mg/L	0.001								
Nickel	mg/L	0.001								
Nitrate	mg/L	0.01								
Nitrite	mg/L	0.01								
pH	pH Unit	-			6.36		5.39	6.34		
Potassium	mg/L	1								
Reactive Phosphorus	mg/L	0.01								
Redox Potential	mV	-			57		177.8	-84		
Selenium	mg/L	0.01								
Silica	mg/L									
Sodium	mg/L	1								
Sodium Adsorption Ratio (Storages)	-	0.01								
Standing Water Level	mTOC	-			30.38		30.16	29.93		
Strontium	mg/L	0.001								
Sulfate	mg/L	1								
Total Alkalinity (as CaCO3)	mg/L	1								
Total Dissolved Solids	mg/L	10								
Total Hardness (as CaCO3)	mg/L	1								
Total Nitrogen (as N)	mg/L	0.1								
Total Organic Carbon (Storages)	mg/L	1								
Total Phosphorus (as P)	mg/L	0.01								
Total Residual Chlorine	mg/L									
Turbidity	NTU	0.1								
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 from 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 3/12/2018 No Dry well* RESULT	LWDMW2D 3/12/2018 Yes In situ RESULT	LWDMW3D 3/12/2018 Yes In situ RESULT	LWDMW3S 3/12/2018 Yes Dry well* RESULT	WPKMW1 5/12/2018 Yes In situ RESULT	WPKMW1D 5/12/2018 Yes In situ RESULT	WPKMW2 5/12/2018 Yes In situ RESULT	WPKMW4 5/12/2018 Yes In situ 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	-		2.61	1.2		3.7	2.18	3.29	2.83
Electrical Conductivity	µS/cm	-		2065	965		1474	1259	3616	2293
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	0.01								
Molybdenum	mg/L	0.001								
Nickel	mg/L	0.001								
Nitrate	mg/L	0.01								
Nitrite	mg/L	0.01								
pH	pH Unit	-		6.29	6.00		7.56	7.86	7.52	7.44
Potassium	mg/L	1								
Reactive Phosphorus	mg/L	0.01								
Redox Potential	mV	-		-40	-69		-117	-145	-110	-122
Selenium	mg/L	0.01								
Silica	mg/L									
Sodium	mg/L	1								
Sodium Adsorption Ratio (Storages)	-	0.01								
Standing Water Level	mTOC	-		25.95	21.04		16.29	16.01	15.33	16.08
Strontium	mg/L	0.001								
Sulfate	mg/L	1								
Total Alkalinity (as CaCO3)	mg/L	1								
Total Dissolved Solids	mg/L	10								
Total Hardness (as CaCO3)	mg/L	1								
Total Nitrogen (as N)	mg/L	0.1								
Total Organic Carbon (Storages)	mg/L	1								
Total Phosphorus (as P)	mg/L	0.01								
Total Residual Chlorine	mg/L									
Turbidity	NTU	0.1								
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 from LWDMW2S and LWDMW3S

	Units	EPA Identification No Location Date Sampled Sample obtained Sample Method	55	56	57	58	59	60	61	62
			WPKMW8 4/12/2018 Yes In situ RESULT	WPKMW9D 5/12/2018 Yes In situ RESULT	WPKMW9S 5/12/2018 Yes In situ RESULT	WPKMW12S 4/12/2018 No Dry well* RESULT	WPKMW13I 4/12/2018 Yes In situ RESULT	WPKMW13S 4/12/2018 Yes In situ RESULT	WPKMW14D 4/12/2018 Yes In situ RESULT	WPKMW14S 4/12/2018 No Dry well* 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	-	2.35	2.36	3.07		1.78	2.53	2.52	
Electrical Conductivity	µS/cm	-	2526	1289	4480		1278	3265	1197	
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	0.01								
Molybdenum	mg/L	0.001								
Nickel	mg/L	0.001								
Nitrate	mg/L	0.01								
Nitrite	mg/L	0.01								
pH	pH Unit	-	6.79	7.94	7.61		7.47	6.96	7.18	
Potassium	mg/L	1								
Reactive Phosphorus	mg/L	0.01								
Redox Potential	mV	-	-96.1	-137	-112		86.8	-75.2	87.9	
Selenium	mg/L	0.01								
Silica	mg/L									
Sodium	mg/L	1								
Sodium Adsorption Ratio (Storages)	-	0.01								
Standing Water Level	mTOC	-	16.64	15.54	15.82		16.84	16.93	20.92	
Strontium	mg/L	0.001								
Sulfate	mg/L	1								
Total Alkalinity (as CaCO3)	mg/L	1								
Total Dissolved Solids	mg/L	10								
Total Hardness (as CaCO3)	mg/L	1								
Total Nitrogen (as N)	mg/L	0.1								
Total Organic Carbon (Storages)	mg/L	1								
Total Phosphorus (as P)	mg/L	0.01								
Total Residual Chlorine	mg/L									
Turbidity	NTU	0.1								
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 from WPKMW12S and WPKMW14S

	Units	EPA Identification No Location Date Sampled Sample obtained Sample Method	63	64	65	66	67	68	78	79
			WPKMW15D 4/12/2018 Yes In situ	WPKMW15S 4/12/2018 Yes In situ	WPKMW16D 4/12/2018 Yes In situ	WPKMW16S 4/12/2018 No Dry well*	WPKMW17D 4/12/2018 Yes In situ	WPKMW17S 4/12/2018 Yes In situ	WPKMW18S 4/12/2018 No Insufficient Liquid**	WPKMW18I 4/12/2018 Yes In situ
		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	-	1.52	3.36	5.00		3.44	2.01		2.78
Electrical Conductivity	µS/cm	-	1316	8762	1254		1139	2048		1159
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	0.01								
Molybdenum	mg/L	0.001								
Nickel	mg/L	0.001								
Nitrate	mg/L	0.01								
Nitrite	mg/L	0.01								
pH	pH Unit	-	7.54	7.41	7.06		7.05	7.10		7.45
Potassium	mg/L	1								
Reactive Phosphorus	mg/L	0.01								
Redox Potential	mV	-	-139.7	-101.7	-33		-79.5	-60.1		-100.1
Selenium	mg/L	0.01								
Silica	mg/L									
Sodium	mg/L	1								
Sodium Adsorption Ratio (Storages)	-	0.01								
Standing Water Level	mTOC	-	22.19	22.43	26.53		18.76	21.96	16.81	16.23
Strontium	mg/L	0.001								
Sulfate	mg/L	1								
Total Alkalinity (as CaCO3)	mg/L	1								
Total Dissolved Solids	mg/L	10								
Total Hardness (as CaCO3)	mg/L	1								
Total Nitrogen (as N)	mg/L	0.1								
Total Organic Carbon (Storages)	mg/L	1								
Total Phosphorus (as P)	mg/L	0.01								
Total Residual Chlorine	mg/L									
Turbidity	NTU	0.1								
Uranium	mg/L	0.001								
Vanadium	mg/L	0.01								
Zinc	mg/L	0.005								

\*Monitoring event was completed but o water was available for sampling from WPKMW16S

\*\*Monitoring event was completed but insufficient water was available for sampling from WPKMW18S



	Units	EPA Identification No Location Date Sampled Sample obtained Sample Method LOR	80	81	82	77	77	77
			LWDMW4 3/12/2018 Yes In situ RESULT	LWDMW5 3/12/2018 Yes In situ RESULT	LWDMW6 3/12/2018 Yes In situ RESULT	LWWTPDM1* 15/11/2018 No No Irrigation RESULT	LWWTPDM1* 15/12/2018 No No Irrigation RESULT	LWWTPDM1* 15/1/2019 No No Irrigation 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	-	3.31	3.19	2.71			
Electrical Conductivity	µS/cm	-	1629	1550	1335			
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	0.01						
Molybdenum	mg/L	0.001						
Nickel	mg/L	0.001						
Nitrate	mg/L	0.01						
Nitrite	mg/L	0.01						
pH	pH Unit	-	6.48	6.33	6.18			
Potassium	mg/L	1						
Reactive Phosphorus	mg/L	0.01						
Redox Potential	mV	-	-86	-85	-105			
Selenium	mg/L	0.01						
Silica	mg/L							
Sodium	mg/L	1						
Sodium Adsorption Ratio	-	0.01						
Standing Water Level	mTOC	-	23.45	25.2	20.19			
Strontium	mg/L	0.001						
Sulfate	mg/L	1						
Total Alkalinity (as CaCO3)	mg/L	1						
Total Dissolved Solids	mg/L	10						
Total Hardness (as CaCO3)	mg/L	1						
Total Nitrogen (as N)	mg/L	0.1						
Total Organic Carbon (Storages)	mg/L	1						
Total Phosphorus (as P)	mg/L	0.01						
Total Residual Chlorine	mg/L							
Turbidity	NTU	0.1						
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 sample due to no irrigation at LWWTPDM1

		EPA Identification No Location Date Sampled Sample obtained Sample Method	69 BWDPD2* n/a N n/a RESULT	70 BWDPD3* n/a N n/a RESULT	71 LWDPD1CELL4 3/12/2018 Y In situ RESULT	72 LWDPD1CELL3 3/12/2018 Y In situ RESULT	73 LWDPD1CELL2 3/12/2018 Y In situ RESULT	74 LWDPD1CELL1 3/12/2018 Y In situ RESULT	75 TFDPD1 4/12/2018 Y In situ RESULT	76 TFDPD2 4/12/2018 Y In situ RESULT
	Units	LOR								
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	-			4.75	6.38	5.58	3.05	8.12	8.87
Electrical Conductivity	µS/cm	-			92314	19992	42648	90758	2175	58306
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	0.01								
Molybdenum	mg/L	0.001								
Nickel	mg/L	0.001								
Nitrate	mg/L	0.01								
Nitrite	mg/L	0.01								
pH	pH Unit	-			9.09	8.85	9.19	9.37	9.24	9.38
Potassium	mg/L	1								
Reactive Phosphorus	mg/L	0.01								
Redox Potential	mV	-			-79.5	-75.7	-75.6	-80.5	66	-62.5
Selenium	mg/L	0.01								
Silica	mg/L									
Sodium	mg/L	1								
Sodium Adsorption Ratio (Storages)	-	0.01								
Standing Water Level	mTOC	-								
Strontium	mg/L	0.001								
Sulfate	mg/L	1								
Total Alkalinity (as CaCO3)	mg/L	1								
Total Dissolved Solids	mg/L	10								
Total Hardness (as CaCO3)	mg/L	1								
Total Nitrogen (as N)	mg/L	0.1								
Total Organic Carbon (Storages)	mg/L	1								
Total Phosphorus (as P)	mg/L	0.01								
Total Residual Chlorine	mg/L									
Turbidity	NTU	0.1								
Uranium	mg/L	0.001								
Vanadium	mg/L	0.01								
Zinc	mg/L	0.005								

\*No monitoring required at sample point BWDPD2 and BWDPD3 in accordance with EPL20350 Condition M2.6

		EPA Identification No Location Date Sampled Sample obtained Sample Method LOR	83 LWDSMP1 n/a N n/a RESULT	84 LWDSMP2 n/a N n/a RESULT	85 LWDSMP3 n/a N n/a RESULT	86 LWDSMP4 n/a N n/a RESULT
	Units					
Aluminium	mg/kg	0.01				
Boron	mg/kg	0.05				
Calcium	mg/kg	1				
Cation Exchange Capacity (CEC)	cmol(+)/kg					
Chloride	mg/kg	1				
Copper	mg/kg	0.001				
Electrical Conductivity	µS/cm	-				
Hydraulic Conductivity	m/sec <sup>-1</sup>					
Iron	mg/kg	0.05				
Magnesium	mg/kg	1				
Manganese	mg/kg	0.001				
Nitrogen (nitrate)	mg/kg					
Organic Carbon	%					
pH	pH Unit	-				
Phosphorus	mg/kg					
Phosphorus (Available)	mg/kg					
Potassium	mg/kg	1				
Sodium	mg/kg	0.01				
Sodium Adsorption Ratio	-	0.01				
Sodium (Exchangeable Percentage)	%					
Sulfate	mg/kg	1				
Zinc	mg/kg	0.005				

LWDSMP1, LWDSMP2, LWDSMP3 & LWDSMP4 not due within reporting period

**Table 3: GROUNDWATER LEVEL RESULTS FOR 3<sup>rd</sup> QUARTER – Nov 2018/Jan 2019**

EPA Identification No	44	45	46	47	48	49
Location	Dewhurst 8A-1 (DWH8AQGDGY01)	Dewhurst 8A-2 (DWH8AQGARK)	Dewhurst 8A-3 (DWH8AQGPOR03)	Biblewindi 28A (BWD28QGUPS01)	Biblewindi 28B (BWD28QGLPS01)	Biblewindi 28C (BWD28QGPUR01)
Date Sampled	1 <sup>st</sup> Nov 2018 – 31 <sup>st</sup> Jan 2019	1 <sup>st</sup> Nov 2018 – 31 <sup>st</sup> Jan 2019	1 <sup>st</sup> Nov 2018 – 31 <sup>st</sup> Jan 2019	1 <sup>st</sup> Nov 2018 – 31 <sup>st</sup> Jan 2019	1 <sup>st</sup> Nov 2018 – 31 <sup>st</sup> Jan 2019	1 <sup>st</sup> Nov 2018 – 31 <sup>st</sup> Jan 2019
Sample Obtained	Standing Water Level	Standing Water Level	Standing Water Level	Standing Water Level	Standing Water Level	Standing Water Level
Number of Samples Required	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous
Lowest sample value	-36	16.8	-65.1	11.7	4.5	15.4
Mean of sample	-35.36	17.32	-64.48	11.79	4.5	15.4
Highest sample value	-34.9	17.8	-61.1	11.8	4.5	15.4