TABLES

Table 1: Maroota Climate (2018-2019)

Month	Rainfall (mm, monthly)
July 2018	2.8
August	5.4
September	36.4
October	210.8
November	80.6
December	13
January	16
February	6
March	129
April	18.6
May	4
June	34.8
Total (yr)	557.4

Note:

Data source: PFF Weather station

Table 2: Monitoring Well Details & Water Table Gauging (July 2019)
Maroota - Hitchcock Road

Sample ID	SWL (m btoc) 30-7-2019	PVC Stickup *	BOH (mbgl)	Co-ordinates	Ground RL	RL (TOC) *	Reduced SWL (mAHD) 30-7-2019	Aquifer
Existing Wells (new site)								
PF-1	13.41	0.93	19	313919.48 & 6294505.13	201.97	202.9	189.49	deep sandstone
PF-2	7.39	0.9	35.3	313950.78 & 6294789.93	200.1	201	193.61	maroota sand
PF-3	dry	0.75	13.28	314159.95 & 6295046.84	218.45	219.2	na	deep sandstone
Existing Monitoring Wells								
PF214MW-1	6.46	0.8	18	313286.41 & 6294508.34	184.45	185.26	178.80	deep sandstone
PF167MW-1	7.77	0.3	23.8	313190.79 & 6294816.05	187.85	187.95	180.18	deep sandstone
PF166MW-1	dry	0.55	11.8	313293.61 & 6295256.65	209.78	210.35	NA	maroota sand
PFL2HitchMW-1	36.01	0.55	43.5	313810.71 & 6295241.46	225.13	225.87	189.86	deep sandstone
New Monitoring Wells (May 2017)								
PF167 MW-2D	29.05	0.6	29.4	313438.92 & 6295492.65	209.28	209.9	180.85	deep sandstone
PF167 MW-2s	6.83	0.7	5.1	313439.64 & 6295494.49	209.3	210.00	203.17	maroota sand
PF167 MW-3D	16.67	0.75	23	313545.67 & 6295186.86	197.93	198.67	182.00	deep sandstone
PF166 MW-4D	9.07	0.5	15.5	313727.56 & 6294836.89	192.93	193.39	184.32	deep sandstone
PF166 MW-4s	8.53	0.5	8	313725.86 & 6294836.93	192.93	193.44	184.91	maroota sand
PF167 MW-5D	decommissioned	0.5	9.5	313203.61 & 6294658.95	180.85	181.54	NA	deep sandstone

Notes:
NA= not available
SWI= standing water level
BOH= bottom of well
* Survey conducted in May 2017 by Freeborn Surveyors

Table 3A: Summary of Existing Monitoring Wells (Hitchcock Road, Maroota)

PF Formation at Maroota

	PF167MW1	PF166MW1	PFL2HitchMW1	PFP214MW1	Lot 198PB1	Lot 198PB2	Por 167 Spring
Ground Elevation (mAHD)	**187.64**	**209.94**	**226**	**186.5**			**184**
Lot & DP	Lot 167 DP 752039	Lot 2 DP570933	Lot 1 DP109 1018	Lot 167 DP 752039	Lot 198 DP 752025	Lot 198 DP 752025	Lot 167 DP 752039
License No	GW100649	GW104410	GW110746	GW110747	10AL109354	10WAL1093550	GW104614
Alocation (ML/yr)					Combined 60 ML /yr		50 ML/year
Approval Number					GW101528	GW101527	10WA114809
Groundwater Resource	Sydney Central Sandstone	Maroota Tertiary Sand	Sydney Central Sandstone	Sydney Central Sandstone	Sydney Central Sandstone	Sydney Central Sandstone	Maroota Tertiary Sand
Date Installed	1996	**1998**	**2009**	**2009**	**1998**	**1998**	**1995**
Drilled Depth (m bgl)	23.8	11.8	43.5	18	150	138	4
Well Screen Interval (mbgl)	20-23 ?	4.9-10.9	31- 43	11.5- 17.5	23.4 - 140	35.5-140	
Aquifer Permeability (K m/day)	0.1 L/sec	NA	0.1 L/sec	0.1 L/sec	0.5 L/sec	2.6 L/sec	10 L/sec
Water Levels (mbgl)	4	10.57	36	5.6	20.58	35.36	(~4 m) 180 MAHD
Water Type	Na-Cl	Na-SO4	Na-Cl	Na-Cl	Na-Cl	Na-Cl	
PH	4.5	4	4	4.1	4.1	5	
Total Dissolved Solids, TDS	100	100	140	120	100	150	
Data Logger	Yes	Yes	Yes	Yes	No	No	No
Water Bearing Zones (mbgl)	6 to 8m	Na	Na-Cl	11.5-12	15.5-18.5m , 26-27m, 108 -114.5m, 188.5-121m	56.5-57.2m, 74-75.55m	
Geology	0-2m Sand 2-10m Wet gravel 10-23.8 m Weathered Sandstone	0- 0.7m Sand 0.7-6.5m Sandy Clay 6.5- 11.5m Sand 11.5 -11.8m weathered sandstone	0- 18.5m Clay Sandy 18.5- 24.5m qtz gravel 24- 34m Clay & gravel 34 -43.5m weathered sandstone & clay	0- 0.5m Sandy 0.5- 18m sandstone - soft with clay	0-150 m Sandstone. Some interbedded Shale; 44-45m, 51-53.5m, 114.5-188.5m, 134.4-135m	0-138 m Sandstone. Some interbedded Ironstone; 48.5-49m, Shale; 49-50.5m, 58.5-60m	Inferred sand/gravels (Maroota)
Comments	located on south west boundary	located on west boundary	located on east boundary	located on south boundary	Allocation is Under utilised. Pumping bore and supply to sand wash plant	Pumping bore and supply to sand wash plant. Treated for Fe floc- not sampled for 2 yrs	Allocation is Under utilised. Former agricultural use- spring & unlined dam. Previous data logging (URS, 1996-2012) of pond levels

Prepared By: Earth2Water Pty Ltd
Checked By: DP

Table 3B: Summary of New Monitoring Wells (Hitchcock Road; August 2019)

PF Formation at Maroota

	PF166MW-2S	PF166MW-2D	PF166MW-3D	PF167MW-4D	PF167MW-4S	PF167MW-5D #
Ground Elevation (mAHD)	**210**	**210.09**	**198.67**	**193.39**	**193.44**	181.54
Lot & DP	Lot 1 DP 570966	Lot 1 DP 570966	Lot 1 DP1013943	Lot 167 DP 752039	Lot 167 DP 752039	Lot 214 DP 752039
Groundwater Resource	Maroota Tertiary Sand	Sydney Central Sandstone	Sydney Central Sandstone	Sydney Central Sandstone	Maroota Tertiary Sand	Sydney Central Sandstone
Date Installed	**May-17**	**May-17**	**May-17**	**May-17**	**May-17**	1/05/2017 (#Feb 2018)
Drilled Depth (m bgl)	8.5 m	29.4 m	23 m	15.5 m	8 m	9.5 m
Well Screen Interval (mbgl)	4.9 -7.9 m	26.4 -29.4 m	20 -23 m	11.5 -15.5 m	5 -8 m	6.4 -9.4 m
Aquifer Permeability (K m/day)	6.9 * E-01 m/sec	Na	4.57 * E-02 m/sec	1.6 * E-01 m/sec	7.18 * E-02 m/sec	4.95 * E-02 m/sec
Water Levels (mbgl)	4	25	14	8.5	7	2
Water Type	Na-Cl	Na-Cl	Na-Cl	Na-Cl	Ca-SO4	K-Cl
PH	5.39	6.99	5.63	5.85	5.85	5.82
Total Dissolved Solids, TDS	384	549	346	2170	736	1140
Water Bearing Zones (mbgl)	4 to 5.5m	4 to 5.5m	Na	7 to 8 m	7 to 8 m	Na
Geology	0-4m: Sandy Clay 4- 5.5m: Sand 5.5 -8.5m: Sandy Clay	0-4m: Sandy Clay 4-5.5m: Sand 5.5 -8.5m: Sandy Clay 8.5 -29.4m: Sandstone	0-23m: Sandstone	0- 7.1m: Sandy Silt & Clay 7.1 -15.5m: Sandstone	0- 7.1m: Sandy Silt & Clay 7.1 -8m: Sandstone	0 -9.5m: Sandstone
Comments	located on site entrance	located on site entrance	located next to extraction pit	located near Por 167 Dam	located near Por 167 Dam	located on southern extraction area

Prepared By: Earth2Water Pty Ltd
Checked By: DP

Tables 3.1 to 3.2: Maroota Hitchcock Road- Water Analyses (1999 to 2019)

Table 3-1 Bore PF167MW1 Chemical Analyses Summary

Date		2.6.99	8.9.99	21.12.99	9.3.00	28.11.00	21.6.01	19.12.01	26.6.02	23.1.03	9.7.03	30.1.04	29.6.04	15.12.04
pH		4.43	4.49	4.21	4.93	4.28	4.61	4.98	4.52	4.54	5.15	4.31	4.38	4.68
Electrical Conductivity, EC	uS/cm	164	190	201	179	184	170	188	215	199	204	225	221	240
Total Dissolved Solids, TDS	mg/L	118	90	105	115	207	120	108	121	101	116	157	110	143
Calcium, Ca	mg/L	3	3	5	6	3	6	6	5	3	4	4	5	5
Magnesium, Mg	mg/i.	5	4	4	4	4	4	5	4	4	3	4	4	4
Sodium, Na	mg/L	16	18	16	15	18	16	18	25	20	19	22	23	26
Potassium, K	mg/L	2	2	3	3	3	5	4	5	2	2	2	3	3
Bicarbonate, HCO3	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	1	<1	<1	<1
Sulphate, SO4	mgIL	9	11	35	32	16	15	15	14	9	13	12	10	13
Chloride, Cl	mg/L	36	11	35	32	35	36	47	58	4	48	51	53	50
Oil and Grease	mg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5		<5	<5

Table 3-1 (Con't) Bore PF167MW1 Chemical Analyses Summary

Date		22.6.05	19.1.06	6.7.06	5.7.07	3.7.08	3.7.09	16.6.10	22.6.11	20.6.12	19.6.13	8.8.14	30.6.15	10.8.2016	17.7.2017	14.8.2018	2.9.2019
pH		5.42	4.32	4.27	4.88	5.29	4	4.3	5.3	4.39	4.18	4.6	4.48	4.54	4.67	3.83	5.2
Electrical Conductivity, EC	uS/cm	215	205	199	188	161	177	190	170	174	211	205	150	188	151	210	262
Total Dissolved Solids, TDS	mg/L	137	141	119	76	100	104	111	101	112		94	70	111	99	113	137
Calcium, Ca	mg/L	5	4	4	2	6	5	3	4	7	<1	5	5	5	4	4	2
Magnesium, Mg	mg/i.	4	4	4	3	5	4	3	4	4	4	4	3	4	4	4	3
Sodium, Na	mg/L	28	25	23	16	13	14	15	18	12	22	19	12	17	14	21	16
Potassium, K	mg/L	3	3	3	2	4	4	2	4	4	2	3	2	3	3	4	22
Bicarbonate, HCO3	mg/L	2	1	<1	<1	<1	<1	2	2.4	<1	<1	<1	<1	<1	<1	<1	4
Sulphate, SO4	mgIL	13	10	6	10	30	22.6	17.1	18	28	1	19	30	22	24	17	10
Chloride, Cl	mg/L	56.6	57.4	53.1	36.1	26.4	34.8	39.9	29	22	42	42	15	32	28	40	54
Oil and Grease	mg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5

Note: Water sample from PF167MW-1 was collected on 2 Sept 2019 (not 15 Aug 2019)

Table 3-2 Bore PF166MW1 Chemical Analyses Summary

Date		1.6.99	8.9.99	21.12.99	9.3.00	29.11.00	21.6.01	19.12.01	26.6.02	23.1.03	9.7.03	30.1.04	29.6.04	15.12.04
pH		4.18	4.19	4.13	4.14	4.31	4.19	4.63	4.48	4.82	7.86	4.39	4.27	4.06
Electrical Conductivity, EC	uS/cm	222	240	230	214	266	194	228	219	203	221	193	235	203
Total Dissolved Solids, TDS	mg/L	118	108	137	170	460	115	210	280	128	134	204	280	120
Calcium, Ca	mg/L	1	1	1	1	1	1	1	2	1	1	<1	1	1
Magnesium, Mg	mg/L	6	6	6	5	6	5	6	6	5	4	5	5	4
Sodium, Na	mg/L	26	23	23	22	29	21	22	24	19	20	18	19	19
Potassium, K	mg/L	<1	<1	1	1	1	1	2	1	<1	<1	<1	1	1
Bicarbonate, HCO3	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	1	<1	<1	<1
Sulphate, SO4	mgIL	1	7	1	1	16	2	1	2	<1	<1	2	<1	2
Chloride, Cl	mg/L	58	49	51	52	58	49	58	61	46	50	47	44	36
Oil and Grease	mg/L	<5	<5	<5	<5	<5	<5	<5	<5	6	<5	<5	5	<5

Table 3-2 (con't) Bore PF166MW1 Chemical Analyses Summary

Date		22.6.05	19.1 .06	6.7.06	5.7.07	3.7.08	3.7.09	16.6.10	22.6.11	20.6.12	19.6.13	8.8.14	30.6.15	10.8.2016	17.7.2017	14.8.2018	15.8.2019
pH					4.76		3.58	4.06	4.22	4.08	4.53	4.19	4.03	4.18	4.11	dry	dry
Electrical Conductivity, EC	uS/cm	DRY	DRY	DRY	163	NA	240	247	261	229	189	219	239	208	176		
Total Dissolved Solids, TDS	mg/L				98		140	141	172	124	186	89	100	234	122		
Calcium, Ca	mg/L						<1	<1	1	1	6	1	<1	1	<1		
Magnesium, Mg	mg/L						4	4	6	5	4	5	6	5	5		
Sodium, Na	mg/L						26	24	24	19	15	22	26	22	21		
Potassium, K	mg/L						2	2	3	3	4	1	1	2	2		
Bicarbonate, HCO3	mg/L						<1	<1	<1	<1	<1	<1	<1	<1	<1		
Sulphate, SO4	mgIL						2.21	1.77	1	1	21	2	1	2	2		
Chloride, Cl	mg/L						49.1	56.3	53	43	32	46	38	40	38		
Oil and Grease	mg/L						<5	<5	<5	<5	<5	<5	<5	<5	<5		

Prepared By: Earth2Water Pty Ltd
Checked By: DP

Tables 3.3 to 3.4: Maroota Hitchcock Road- Water Analyses (1999 to 2019)

Table 3-3 **Bore PFL2HitchMW1 Chemical Analyses Summary**

Date		3.7.2009	16.6.2010	22.6.2011	20.6.2012	20.6.2012	19.6.2013	8.08.2014	30.06.2015	10.8.2016	17.7.2017	14.8.2018	15.8.2019
pH		3.96	4.1	4.1	4.03	4.03	4.18	3.99	3.94	4.19	4.02	3.96	7.11
Electrical Conductivity, EC	uS/cm	182	154	167	195	195	185	263	309	288	298	307	284
Total Dissolved Solids, TDS	mg/L	84	88	110	99	99	150	107	146	230	147	167	172
Calcium, Ca	mg/L	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Magnesium, Mg	mg/L	2	2	2	2	2	2	3	3	3	4	4	4
Sodium, Na	mg/L	19	16	22	22	22	22	32	44	36	37	37	38
Potassium, K	mg/L	2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bicarbonate, HCO3	mgIL	<1	<	<1	<1	<1	<1	<1	<1	<1	<1	<1	9
Sulphate, SO4	mg/L	7.88	4.06	5	1	1	4	6	6	6	5	6	6
Chloride, Cl	mg/L	40.3	36.9	32	43	43	43	62	59	63	70	76	67
Oil and Grease	mgJL	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5

Table 3-4 **Bore PFP214MW1 Chemical Analyses Summary**

Date		3.7.2009	16.6.2010	22.6.2011	20.6.2012	19.6.2013	8.08.2014	30.06.2015	10.8.2016	17.7.2017	14.8.2018	15.8.2019
pH		4.19	4.16	4.31	4.27	5.7	4.22	4.07	4.05	4.34	3.65	4.84
Electrical Conductivity, EC	uS/cm	168	164	158	179	198	258	251	247	253	228	202
Total Dissolved Solids, TDS	mg/L	100	96	88	103	124	108	118	135	129	114	108
Calcium, Ca	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Magnesium, Mg	mg/L	6	5	4	6	7	10	11	10	8	9	6
Sodium, Na	mg/L	18	15	18	17	21	23	21	17	14	16	17
Potassium. K	mg/L	1	<1	1	<1	2	<1	<1	1	1	2	<1
Bicarbonate, HCO3	mg/L	<1	<1	<1	<1	2	<1	<1	<1	<1	<1	<1
Sulphate, SO4	mg/L	1.9	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chloride, Cl	mg/L	24.3	23.8	34	24	34	34	26	34	36	36	37
Oil and Grease	mg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5

Tables 3.1 to 3.6: Maroota Hitchcock Road- Water Analyses (1999 to 2019)

Table 3-5 Bore L198PB1 Chemical Analyses Summary (1999-2019)

Date		1.6.99	8.9.99	21.12.99	9.3.00	28.11.00	21.6.01	19.12.01	26.6.02	23.1.03	9.7.03	30.1.04	29.6.04	15.12.04	22.6.05	19.1.06	6.7.06	5.7.07	3.7.08	3.7.09	16.6.10	22.6.11	20.6.12	19.6.13	8.08.14	30.06.15	10.08.16	17.7.2017	14.8.2018	15.8.2019
pH		5.87	6.24	6.11	4.69	4.49	4.51	5.41	4.73	4.49	5.06	5	4.53	4.28	5.22	5.74	5.16	NA	4.59	3.94	4.43	5.52	5.72	NA	4.15	4.09	4.15	5.39	5.35	5.43
E Conductivity, EC	uS/cm	161	170	169	141	182	179	204	199	243	199	160	291	197	157	158	155		144	174	163	170	170		183	177	164	151	168	169
Total Dissolved Solids, TDS	mg/l	124	116	98	97	107	102	116	112	139	102	116	174	88	105	115	98		85	83	88	102	99		96	88	83	104	94	91
Calcium, Ca	mg/L	1	<1	1	1	3	2	2	4	3	2	2	4	1	1	2	1		<1	1	<1	2	2		1	1	1	2	2	1
Magnesium, Mg	mg/L	4	6	5	3	3	4	4	4	4	3	2	5	2	2	4	3		2	2	2	4	3		2	2	2	3	3	3
Sodium, Na	mg/L	21	24	22	19	20	21	27	23	31	22	19	40	25	23	21	20		18	19	16	21	18		20	20	18	18	19	20
Potassium, K	mg/L	1	<1	1	1	2	5	5	3	3	2	2	3	2	2	2	2		1	2	1	2	2		2	1	2	2	1	1
Bicarbonate, HCO3	mg/l	13	29	22	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1	12	5		<1	<1	<1	3.7	9.8		<1	<1	<1	3	7	5
Sulphate, SO4	mg/L	4	4	4	2	8	8	3	7	4	8	6	9	8	8	6	2		10	9.31	6.89	6	6		9	7	8	6	9	8
Chloride, Cl	mg/l	39	35	36	36	40	49	60	58	64	49	43	83	42	47.1	43.4	43.8		31.1	38.8	41.1	36	32		40	31	33	31	30	36
Oil and Grease	mg/l	<5	<5	<5	<5	<5	<5	<5	<5	6	<5	<5	<5	<5	<5	5	<5		<5	<5	<5	<5	<5		<5	<5	<5	<5	<5	<5

Table 3-6 Bore L198PB2 Chemical Analyses Summary (1999-2019)

Date		1.6.99	8.9.99	21.12.99	9.3.00	29.11.00	21.6.01	19.12.01	26.6.02	23.1.03	9.7.03	30.1.04	29.6.04	15.12.04	22.6.05	19.1.06	6.7.06	5.7.07	3.7.08	3.7.09	16.6.10	22.6.11	20.6.12	19.6.13	8.08.14	30.06.15	10.08.16	17.7.2017	14.8.2018	15.8.2019
pH		5.78	6.61	5.96	NA	4.8	5.24	5.99	6.33	5.96	4.84	5	5.78	5.39	6.43	5.3	5.46	4.37	5.25	4.5	NA	NA	NA	5.71	5.93	**no sample**		5.3	5.11	5.54
E Conductivity, EC	uS/cm	139	174	146	NA	152	130	141	151	146	162	160	136	156	133	126	122	195	135	130				146	150	(note 1)	(note 1)	156	147	152
Total Dissolved Solids, TDS	mg/L	126	102	85	NA	100	87	87	102	84	87	116	79	105	87	104	79	88	79	79				91	69			81	90	82
Calcium, Ca	mgIL	1	2	2	NA	<1	<1	<1	1	<1	<1	2	1	1	<1	<1	1	<1	1	<1				<1	<1			<1	<1	<1
Magnesium, Mg	mg/L	5	5	5	NA	4	3	4	4	4	2	2	4	2	4	3	4	3	5	3				3	4			3	3	3
Sodium, Na	mg/L	18	19	18	NA	19	18	18	21	17	18	19	18	20	17	19	16	21	16	16				18	18			18	18	19
Potassium, K	mg/L	2	2	2	NA	1	1	2	2	1	<1	2	1	2	2	1	2	1	2	2				2	2			1	1	<1
Bicarbonate, HCO3	mg/L	23	33	19	NA	4	3	13	8	16	<1	<1	9	2	14	7	24	<1	24.4	9.2				9	10			6	6	5
Sulphate, 804	mg/L	3	3	2	NA	1	1	3	2	<1	<1	6	1	4	4	1	1	4	2	2.78				2	4			6	3	3
Chloride, Cl	mg/l	31	28	31	NA	41	38	33	46	33	40	43	37	35	34.9	38.8	30.2	44.8	31.8	32.2				33	36			30	38	35
Oil and Grease	mg/L	<5	<5	<5	-	NA	<5	<5	11	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5				<5	<5			<5	<5	<5

Note 1= Bore clogging (Iron floc) and chemicals added to unclogg (unrepresentative water)

Table 3-7: Portion 167 Dam Annual Pumpage Records
1997 to 2019

YEAR	TOTAL, ML
1997	24.56
1998	24.24
1999 to May	16.84
1 June 1999 - 30 June 2000	66.3
1 July 2000 - 5 September 2000	31.4
5 September 2000 - 25 June 2001	Not used
25 June 2001 - 30 June 2001	1
1 July 2001 - 8 February 2002	59.2
8 February 2002 - 30 June 2002	Not used
30 June 2002 - 29 August 2002	Not used
29 August 2002 - 30 June 2003	65.2
1 July 2003 - 29 June 2004	73.1
1 July 2004 - 3 May 2005	57.5
7 October 2005 - 30 June 2006	25.4
1 July 2006 - 30 June 2007	21.3
1 July 2007 - 30 June 2008	21.5
1 July 2008 - 30 June 2009	42.2
1 July 2009 - 30 June 2010	56.2
1 July 2010 - 30 June 2011	48.9
1 July 2011 - 30 June 2012	No pumpage
1 July 2012 - 30 June 2Ol3	42.8
1 July 2013 - 30 June 2014	30.395
1 July 2014 - 30 June 2015	No pumpage
1 July 2015 - 30 June 2016	46.829
1 July 2016 - 30 June 2017	38.407
1 July 2018 - 30 June 2019	**26.009**

Table 3-8: Water Supply Bores, Annual Pumping Records (PB1 &2)
2000 to 2019

Year	Bore	Total, ML
1 July 1999 - 30 June 2000	Bore PF1 98PB1	21.1
	PF198PB2	35.6
1 July 2000 - 30 June 2001	Bore PF198PB1	20.3
	Bore PF198PB2	29
1 July 2001 - 30 June 2002	Bore PF198PB1	25.1
	Bore PF198PB2	36
1 July 2002 - 30 June 2003	Bore PF198PB1	24.8
	Bore PF198PB2	47.8
1 July 2003 - 29 June 2004	Bore PF198PB1	22.9
	Bore PF198PB2	49.3
1 July 2004 - 29 June 2005	Bore PF1 98PB1	4.2
	Bore PF198PB2	18.7
5 July 2005 - 23 June 2006*	Bore PF198PB1	14.8
	Bore PF198PB2	8.9
24 June 2006 - 30 June 2007*	Bore PF198PB1	7.8
	Bore PF198PB2	19.9
1 July 2007 - 30 June 2008*	Bore PF198PB1	1.6
	Bore PF198PB2	22.9
1 July 2008 - 30 June 2009*	Bore PF198PB1	25.6
	Bore PF198PB2	16
1 July 2009 - 30 June 2010*	Bore PF198PB1	9.5
	Bore PF198PB2	8.1
1 July 2010 - 30 June 2011*	Bore PF198PB1	11.8
	Bore PF198PB2	NA
1 July 2011 - 30 June 2012*	Bore PF198PB1	9.8
	Bore PF198PB2	13.2
1 July 2012 - 30 June 2013	Bore PF198PB1	NA
	Bore PF198PB2	10.9
1 July 2013 - 30 June 2014	Bore PF198PB1	3.6
	Bore PF198PB2	30
1 July 2014 - 30 June 2015	Bore PF198PB1	6.1
	Bore PF198PB2	15.7
1 July 2015 - 30 June 2016	Bore PF198PB1	5.73
	Bore PF198PB2	11.111
1 July 2016 - 30 June 2017	Bore PF198PB1	8.951
	Bore PF198PB2	7.556
1 July 2017 - 30 June 2018	Bore PF198PB1	8.951
	Bore PF198PB2	7.556
1 July 2018 - 30 June 2019	Bore PF198PB1	**9.947**
	Bore PF198PB2	**0**
	Combined PB1&2 per yr	**9.947**

Note:
* Due to modifications carried out at the wash plant, these bores are no longer required for continuous water supply

Table 3-9A: Maroota Hitchcock Road- Water Analyses for New Wells & Dams (May 2017, August 2018, August 2019)

Maroota New Wells		**MW-2S**	**MW-2S**	**MW-2S**	**MW-2S**	**MW-2D**	**MW-2D**	**MW-2D**	**MW-3D**	**MW-3D**	**MW-3D**	**MW-4S**	**MW-4S**	**MW-4S**	**MW-4D**	**MW-4D**	**MW-4D**	**MWW-5D**	**CWD**	**Por167 Dam**
Date		17/07/2017	18/05/2017	14/08/2018	15/08/2019	18/05/2017	14/08/2018	15/08/2019	18/05/2017	1/08/2018	15/08/2019	18/05/2017	14/08/2018	15/08/2019	18/05/2017	14/08/2018	15/08/2019	18/05/2017	14/08/2018	14/08/2018
pH	units	4.58	5.39	5.5	6.15	6.99	5.5	5.76	5.63	4.02	4.98	6.03	4.48	insufficient	5.85	5.47	5.65	5.82	4.62	4.15
Electrical Conductivity, EC	uS/cm	166	211	128	168	307	128	156	278	306	250	129	76	water	274	158	149	190	222	201
Total Dissolved Solids (ALS)	mg/L	114	**384**	**84**	**----**	**549**	**84**	**----**	**346**	**159**	**130**	**169**	**----**		**736**	**95**	**92**	**1140**	**125**	**108**
Calcium, Ca	mg/L	3	5	2	3	9	2	4	2	1	1	7	1		3	2	2	<1	5	2
Magnesium, Mg	mg/L	4	3	2	3	3	2	2	1	7	4	3	1		1	2	2	<1	3	3
Sodium, Na	mg/L	18	20	15	18	40	15	18	32	36	31	8	11		37	22	21	13	25	22
Potassium, K	mg/L	2	2	1	2	3	1	2	11	<1	<1	3	1		8	<1	<1	26	3	2
Bicarbonate, HCO3	mgIL	<1	2	8	4	35	8	12	2	<1	<1	12	<1		8	13	7	3	<1	<1
Sulphate, SO4	mg/L	6	8	3	3	12	3	3	3	2	2	20	4		32	7	3	<1	5	7
Chloride, Cl	mg/L	38	37	30	36	40	30	29	56	68	57	12	17		34	18	9	36	45	38
Oil& Grease		<5			<5			43		<5	<5		<5			<5	<5		<5	<5

Note: Analyses by ALS
Re-analyses conducted on TDS- filtering of samples conducted due to TDS values exceeding EC (turbidity & silica issues)
bold- TDS results are considered anomalous (re-analyses conducted after filtering samples, i.e. TDS higher than EC, possibly silica in water)
--- (no TDS available- matrix interference)

Table 3-9B: Maroota Hitchcock Road- Water Analyses for Existing Wells at A New Site (August 2019)

Maroota New Wells	units	4378ONR PF1	4378ONR PF2	4378ONR PF3
Date		15/08/2019	15/08/2019	15/08/2019
pH		5.76	5.84	dry
Electrical Conductivity, EC	uS/cm	156	72	
Total Dissolved Solids (ALS)	mg/L	**79**	**38**	
Calcium, Ca	mg/L	<1	1	
Magnesium, Mg	mg/L	2	<1	
Sodium, Na	mg/L	16	8	
Potassium, K	mg/L	2	<1	
Bicarbonate, HCO3	mgIL	12	11	
Sulphate, SO4	mg/L	2	3	
Chloride, Cl	mg/L	32	9	
Oil& Grease		<5	<5	

Table 3-10: Maroota Hitchcock Road- Surface Water Analyses for Creeks (2018 - 2019)

Water Sample ID		Guideline Limits	Lot 198	Lot 198	Downstream Lot 198	Hitchcock Rd Crk	Hitchcock Rd	Hitchcock Rd- Little Catai Crk
Date	Units		5/12/2018	11/04/2019	3/09/2018	5/12/2018	11/04/2019	1/09/2018
pH		=+/- 1 (BG)	5.35	6.72	5.7	4.4	5.22	4.4
Electrical Conductivity, EC	uS/cm	<1500	291	225	201	236	241	187
Suspended Solids (SS)	mg/L	<50	<5	8	4.5	<5	5	6.5
Turbidity	NTU	<50	1.5	10.5	1.5	0.3	0.3	1.1
Oil& Grease	mg/L	<10	<5	<5	<0.1	<5	<5	<0.1
Total Dissolved Solids	mg/L				108			95

Note 1: Analyses by Boral Laboratory in Sept 2019

Note 2: Analyses by ALS Laboratory in Dec 2018, April and May 2019

Table 3-11: Pumping Records for Lot 198 Bywash Dam (2018-2019)

Approval No: 10WA105415 WAL number : 26168

DATE	TIME START	METER READING START	TIME FINISH	METER READING FINISH	M3 PUMPED
2/07/2018	**730**	**4444**	**1630**	**4509**	**65**
3/07/2018	730	4509	1100	4532	23
18/07/2018	745	4532	1620	4592	60
19/07/2018	720	4592	1630	4607	15
11/09/2018	700	4607	1640	4671	64
12/09/2018	730	4671	1700	4732	61
13/09/2018	950	4732	1630	4780	48
17/09/2018	800	4780	1630	4838	58
18/09/2018	730	4838	1600	4897	59
27/09/2018	750	4897	1530	4951	54
5/10/2018	650	4951	1700	5023	72
10/10/2018	715	5023	1600	5086	63
11/10/2018	800	5086	1600	5142	56
12/10/2018	810	5142	1630	5198	56
18/10/2018	810	5198	1630	5256	58
19/10/2018	830	5256	1615	5312	56
22/10/2018	745	5312	1620	5440	128
25/10/2018	750	5440	1645	5505	65
26/10/2018	800	5505	1600	5561	56
29/10/2018	730	5561	1550	5621	60
30/10/2018	745	5621	1600	5669	48
12/11/2018	800	5669	1620	5729	60
5/12/2018	1230	5729	1550	5929	200
11/12/2018	840	5929	1555	5980	51
17/12/2018	750	5980	1555	6037	57
7/01/2019	825	6037	1600	6092	55
8/01/2019	700	6092	1630	6158	66
24/01/2019	700	6158	1600	6166	8
25/01/2019	915	6166	1600	6213	47
30/01/2019	740	6213	1550	6421	208
26/02/2019	700	6421	1530	6569	148
19/03/2019	750	6569	1650	6630	61
25/03/2019	720	6630	1650	6713	83
2/04/2019	735	6713	800	6885	172
5/04/2019	740	6885	1515	6937	52
11/04/2019	805	6937	1645	6997	60
12/04/2019	720	6997	1630	7059	62
14/04/2019	700	7059	700	7228	169
25/06/2019	650	7228	700	7341	113
26/06/2019	700	7341	700	7507	166
			TOTAL (m3)		3063
			Total (2018-2019) ML		3.063

Note:
Pumping Information provided by PF Formation

APPENDIX A

LIMITATIONS

Earth2Water Pty Ltd has prepared this report for the use of PF Formation Pty Ltd (PFF) in accordance with the standard terms and conditions of the consulting profession. This report is prepared in accordance with a generalised scope of work. The methodology adopted and sources of information used by E2W are outlined in this report (note: sampling by Melissa Mass of SE Environmental Pty Ltd). Some technical issues arose from the downloading of the Solinst data loggers and considered to reflect logger age (e.g. PF167MW-1 and Pit4MW-2).

This report was prepared from July 2019 to September 2019 and is based on the information reviewed at the time of preparation. This report should be read in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties.

The precision with which conditions are indicated depends largely on the frequency and method of sampling, and the uniformity of conditions as constrained by the project budget limitations. The behaviour of groundwater and some aspects of contaminants in soil and groundwater are complex. Our conclusions are based upon the analytical data presented in this report, and our experience.

Where conditions encountered at the site are subsequently found to differ significantly from those anticipated in this report, E2W should be notified of any such findings and be provided with an opportunity to review the recommendations of this report.

APPENDIX B

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com
☐BRISBANE 2 Byth Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
☐GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com
☐MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com
☐MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
☐MUDGEE 1/29 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com
☐NEWCASTLE 5/585 Maitland Road Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com
☐NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 02 4423 2063 E: nowra@alsglobal.com
☐PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7355 E: samples.perth@alsglobal.com
☐SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
☐TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com
☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: wollongong@alsglobal.com

CLIENT: PF Formation
OFFICE:
PROJECT: PROJECT NO.:
ORDER NUMBER: PURCHASE ORDER NO.:
PROJECT MANAGER: Josh Graham CONTACT PH: 0418 439 923
SAMPLER: M Mass - South East Environmental SAMPLER MOBILE: 0418 12 775
COC Emailed to ALS? (YES / NO) EDD FORMAT (or default):
Email Reports to (will default to PM if no other addresses are listed): josh@pformation.com.au
Email Invoice to (will default to PM if no other addresses are listed): josh@pformation.com.au

TURNAROUND REQUIREMENTS: (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)
☐ Standard TAT (List due date):
☐ Non Standard or urgent TAT (List due date):
ALS QUOTE NO.:
COUNTRY OF ORIGIN:

COC SEQUENCE NUMBER (Circle)
COC: 1 2 3 4 5 6 7
OF: 1 2 3 4 5 6 7

FOR LABORATORY USE ONLY (Circle)
Custody Seal Intact? Yes No N/A
Free Ice / frozen ice bricks present upon receipt? Yes No N/A
Random Sample Temperature on Receipt: 19.9 °C
Other comment:

RELINQUISHED BY:	RECEIVED BY: Shalaila	RELINQUISHED BY:	RECEIVED BY:
DATE/TIME:	DATE/TIME: 02/08/2019 4:30PM	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: Please cc Dino Parisotto results at dino@earth2water.com.au

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).							Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	oil + Grease	pH, EC	Ca, Mg, Na, K, Cl, HCO3, SO4	Total nitrogen Total phosphorous	TSS	TDS		Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	PF167MW-1	2/9/2019		P			1	1			1		
	PF167MW-1	2/9/2019		VB		1							
2	PF166MW-20	2/9/2019		VB		1							
	PF166MW-20	2/9/2019		P			1	1			1		
3	Pit 4	2/9/2019		VB		1							
	Pit 4	2/9/2019		P			1	1		1			
4	Lot 198	2/9/2019		VB		1							
	Lot 198	2/9/2019		P			1	1		1			
5	Maroota Lodge Dam 1	2/9/2019		P			1	1	1	1			
	Maroota Lodge Dam 1	2/9/2019		VB		1							
6	Maroota Lodge Dam 2	2/9/2019		VB		1							
	Maroota Lodge Dam 2	2/9/2019		P			1	1	1	1			
					TOTAL								

Environmental Division Sydney
Work Order Reference
ES1928006

Telephone : +61-2-8784 8555

HT

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag; Li = Lugols Iodine Preserved Bottles; STT = Sterile Sodium Thiosulfate Preserved Bottles.

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com
☐BRISBANE 2 Byth Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
☐GLADSTONE 48 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5900 E: gladstone@alsglobal.com
☐MACKAY 76 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com
☐MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
☐MUDGEE 1/20 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6725 E: mudgee.mail@alsglobal.com
☐NEWCASTLE 5/585 Maitland Road Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com
☐NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 02 4423 2063 E: nowra@alsglobal.com
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☐SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
☐TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com
☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: wollongong@alsglobal.com

CLIENT:
OFFICE:
PROJECT: PROJECT NO.:
ORDER NUMBER: PURCHASE ORDER NO.:
PROJECT MANAGER: CONTACT PH:
SAMPLER: SAMPLER MOBILE:
COC Emailed to ALS? (YES / NO) EDD FORMAT (or default):
Email Reports to (will default to PM if no other addresses are listed):
Email Invoice to (will default to PM if no other addresses are listed):

TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g., Ultra Trace Organics)
☐ Standard TAT (List due date):
☐ Non Standard or urgent TAT (List due date):
ALS QUOTE NO.:
COUNTRY OF ORIGIN:

COC SEQUENCE NUMBER (Circle)
COC: 1 2 3 4 5 6 7
OF: 1 2 3 4 5 6 7

FOR LABORATORY USE ONLY (Circle)
Custody Seal Intact? Yes No N/A
Free ice / frozen ice bricks present upon receipt? Yes No N/A
Random Sample Temperature on Receipt °C
Other comment:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
DATE/TIME:	DATE/TIME:	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED Including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	Oil + Grease	pH, EC	Ca, Mg, Na, K Cl, HCO3, SO4	Total nitrogen Total phosphorus	TSS	TDS			Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
7	Por 167 dam	2/9/2019		P			1	1		1				
	Por 167 dam	2/9/2019		VB		1								
8	CW dam	2/9/2019		P			1	1		1				
	CW dam	2/9/2019		VB		1								
9	Hitchcock Rd	2/9/2019		P			1	1		1				
	Hitchcock Rd	2/9/2019		VB		1								
				TOTAL										

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag; LI = Lugols Iodine Preserved Bottles; STT = Sterile Sodium Thiosulfate Preserved Bottles.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1928006**	Page	: 1 of 5
Amendment	: **1**		
Client	: **PF FORMATION**	Laboratory	: Environmental Division Sydney
Contact	: Josh	Contact	: Customer Services ES
Address	: 1 Patrica Fay Drive Maroota 2756	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: ----	Date Samples Received	: 02-Sep-2019 16:30
Order number	: ----	Date Analysis Commenced	: 02-Sep-2019
C-O-C number	: ----	Issue Date	: 17-Sep-2019 09:42
Sampler	: Melissa Mass		
Site	: ----		
Quote number	: ----		
No. of samples received	: 9		
No. of samples analysed	: 9		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW

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 sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EN055: Ionic Balance out of acceptable limits for sample 3 due to analytes not quantified in this report.
- Amendment (17/09/2019): This report has been amended as a result of misinterpretation of sample identification numbers (IDs). All analysis results are as per the previous report
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	PF 167 MW-1	PF 166 MW-2D	Pit 4	Lot 198	Maroota Lodge Dam 1
			Client sampling date / time	02-Sep-2019 00:00	02-Sep-2019 00:00	02-Sep-2019 00:00	02-Sep-2019 00:00	02-Sep-2019 00:00
Compound	CAS Number	LOR	Unit	ES1928006-001	ES1928006-002	ES1928006-003	ES1928006-004	ES1928006-005
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	5.20	5.44	5.90	5.86	5.64
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	262	152	434	224	65
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	137	77	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	----	----	13	18	30
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	4	8	17	8	5
Total Alkalinity as CaCO3	----	1	mg/L	4	8	17	8	5
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	10	1	76	16	7
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	54	32	47	46	12
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	2	3	27	6	2
Magnesium	7439-95-4	1	mg/L	3	2	12	4	1
Sodium	7440-23-5	1	mg/L	16	18	26	25	7
Potassium	7440-09-7	1	mg/L	22	1	10	2	2
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	----	----	----	----	<0.01
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	----	----	----	----	0.4
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	----	----	----	----	0.4
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	----	----	----	----	0.02
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	1.81	1.08	3.25	1.79	0.58
ø Total Cations	----	0.01	meq/L	1.60	1.12	3.72	1.77	0.54
ø Ionic Balance	----	0.01	%	----	----	6.80	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	PF 167 MW-1	PF 166 MW-2D	Pit 4	Lot 198	Maroota Lodge Dam 1
			Client sampling date / time	02-Sep-2019 00:00	02-Sep-2019 00:00	02-Sep-2019 00:00	02-Sep-2019 00:00	02-Sep-2019 00:00
Compound	CAS Number	LOR	Unit	ES1928006-001	ES1928006-002	ES1928006-003	ES1928006-004	ES1928006-005
				Result	Result	Result	Result	Result
EP020: Oil and Grease (O&G)								
Oil & Grease	----	5	mg/L	<5	<5	<5	<5	<5

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	Maroota Lodge Dam 2	Por 167 dam	CW dam	Hitchcock Rd	----
			Client sampling date / time	02-Sep-2019 00:00	02-Sep-2019 00:00	02-Sep-2019 00:00	02-Sep-2019 00:00	----
Compound	CAS Number	LOR	Unit	ES1928006-006	ES1928006-007	ES1928006-008	ES1928006-009	--------
				Result	Result	Result	Result	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	6.47	5.52	5.26	5.04	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	352	222	86	282	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	18	14	11	9	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	71	4	<1	<1	----
Total Alkalinity as CaCO3	----	1	mg/L	71	4	<1	<1	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	35	20	4	6	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	30	44	20	68	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	26	6	1	2	----
Magnesium	7439-95-4	1	mg/L	9	3	2	7	----
Sodium	7440-23-5	1	mg/L	18	24	9	33	----
Potassium	7440-09-7	1	mg/L	17	5	2	2	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	0.54	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.2	----	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	1.7	----	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	0.94	----	----	----	----
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	2.99	1.74	0.65	2.04	----
ø Total Cations	----	0.01	meq/L	3.26	1.72	0.66	2.16	----
ø Ionic Balance	----	0.01	%	4.20	----	----	----	----
EP020: Oil and Grease (O&G)								
Oil & Grease	----	5	mg/L	<5	<5	<5	<5	----

Surface Water Monitoring

PF Formation - Maroota Quarries

1 Patricia Fay Drive Ph 45668314
Maroota NSW 2756

Location - Hitchcocks Road

Time of collection (date/time)	03/09/2018 12.10pm	**Weather conditions** (hot/cold/dry/windy/raining)	Cool/cloudy
Stream bank (rocky/sandy/muddy)	Muddy/peat/mossy	**Climate 3mths preceeding** (rainfall/drought/extremes)	Drought
Water flow rate (fast/slow/none)	Slow	**Stream depth** (mm, cm or m)	1mm - 30cm
Water clarity (turbidity, sheen)	Clear	**Stream width** (mm, cm or m)	50cm - 2m
Stream condition (erosion, polutants)	Debris, vegetated.	**Other observations**	

Field tests	**pH**	**EC**	**TDS**	**Temp C°**

Site photo

Sample collected by - Melissa Mass/South East Environmental
Signed *Melissa Mass*

Surface Water Monitoring

PF Formation - Maroota Quarries

1 Patricia Fay Drive Ph 45668314
Maroota NSW 2756

Location - Lot 198

Time of collection (date/time)	03/09/2018 9.05am	**Weather conditions** (hot/cold/dry/windy/raining)	Cool/cloudy
Stream bank (rocky/sandy/muddy)	Sandy	**Climate 3mths preceeding** (rainfall/drought/extremes)	Drought
Water flow rate (fast/slow/none)	Slow	**Stream depth** (mm, cm or m)	5cm-15cm
Water clarity (turbidity, sheen)	Clear	**Stream width** (mm, cm or m)	50-80cm
Stream condition (erosion, polutants)	Debris, vegetated	**Other observations**	Frogs calling

Field tests	**pH**	**EC**	**TDS**	**Temp C°**
	6.87	0.22mS	100ppm	11

Site photo

Sample collected by - Melissa Mass/South East Environmental
Signed *Melissa Mass*

Surface Water Monitoring

PF Formation - Maroota Quarries

1 Patricia Fay Drive Ph 45668314
Maroota NSW 2756

Location - Hitchcocks Road

Time of collection (date/time)	5/12/2018 10.30am	**Weather conditions** (hot/cold/dry/windy/raining)	Cloudy
Stream bank (rocky/sandy/muddy)	Muddy	**Climate 3mths preceeding** (rainfall/drought/extremes)	Rainfall
Water flow rate (fast/slow/none)	Slow	**Stream depth** (mm, cm or m)	1cm - 40cm
Water clarity (turbidity, sheen)	Clear	**Stream width** (mm, cm or m)	1.5m
Stream condition (erosion, polutants)	Vegetated	**Other observations**	

Field tests	**pH**	**EC**	**TDS**	**Temp C°**
	3.8	0.22mS	110ppm	17.3

Site photo

Sample collected by - Melissa Mass/South East Environmental
Signed *Melissa Mass*

Surface Water Monitoring

PF Formation - Maroota Quarries

1 Patricia Fay Drive Ph 45668314
Maroota NSW 2756

Location - Lot 198

Time of collection (date/time)	05/12/2018 9.20am	**Weather conditions** (hot/cold/dry/windy/raining)	Cloudy
Stream bank (rocky/sandy/muddy)	Sandy	**Climate 3mths preceeding** (rainfall/drought/extremes)	Rainfall
Water flow rate (fast/slow/none)	Slow	**Stream depth** (mm, cm or m)	3cm-10cm
Water clarity (turbidity, sheen)	Clear	**Stream width** (mm, cm or m)	60cm
Stream condition (erosion, polutants)	Vegetated	**Other observations**	

Field tests	**pH**	**EC**	**TDS**	**Temp C°**
	5.5	0.25mS	120ppm	17.2

Site photo

Sample collected by - Melissa Mass/South East Environmental
Signed *Melissa Mass*

Surface Water Monitoring

PF Formation - Maroota Quarries

1 Patricia Fay Drive Ph 45668314
Maroota NSW 2756

Location - Hitchcocks Road

Time of collection (date/time)	2/09/2019 12.45pm	**Weather conditions** (hot/cold/dry/windy/raining)	Sunny with breeze
Stream bank (rocky/sandy/muddy)	Mossy	**Climate 3mths preceeding** (rainfall/drought/extremes)	Drought. First rainfall 1 week prior to collection
Water flow rate (fast/slow/none)	Slow	**Stream depth** (mm, cm or m)	1cm - 40cm
Water clarity (turbidity, sheen)	Clear	**Stream width** (mm, cm or m)	1m-1.5m
Stream condition (erosion, polutants)	Vegetated/mossy	**Other observations**	

Field tests	**pH**	**EC**	**TDS**	**Temp C°**
	4.32	0.23mS	110ppm	12.9

Site photo

Sample collected by - Melissa Mass/South East Environmental
Signed *Melissa Mass*

Surface Water Monitoring

PF Formation - Maroota Quarries

1 Patricia Fay Drive Ph 45668314
Maroota NSW 2756

Location - Lot 198

Time of collection (date/time)	11/04/2019 11.43am	**Weather conditions** (hot/cold/dry/windy/raining)	Sunny with breeze
Stream bank (rocky/sandy/muddy)	Sandy	**Climate 3mths preceeding** (rainfall/drought/extremes)	Drought. First rainfall 1 week prior to collection
Water flow rate (fast/slow/none)	Mederate	**Stream depth** (mm, cm or m)	3cm-20cm
Water clarity (turbidity, sheen)	slightly turbid	**Stream width** (mm, cm or m)	40cm
Stream condition (erosion, polutants)	Vegetated	**Other observations**	Frogs calling

Field tests	**pH**	**EC**	**TDS**	**Temp C°**
	6.04	0.18mS	90ppm	12.4

Site photo

Sample collected by - Melissa Mass/South East Environmental
Signed *Melissa Mass*