

AGL UPSTREAM INVESTMENTS PTY LTD GLOUCESTER GAS PROJECT

March 2015 Monitoring Report: Tiedman Irrigation Program EPL 20358

Reporting Period: January - February 2015

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Foreword

PREMISES Gloucester Coal Seam Gas Project

Bucketts Way

Gloucester NSW 2422

LICENCE DETAILS Environment Protection Licence 20358

LICENCEE AGL Upstream Investments Pty Limited (AGL)

LICENCEE'S ADDRESS Locked Bag 1837, North Sydney, NSW 2060

MONITORING DATE 28 January and 24, 25, 26 February 2015

MONITORING BY Parsons Brinckerhoff, on behalf of AGL

ANALYSIS BY ALS Laboratory, Smithfield (Work orders: ES1501994,

ES1504524, ES1504527)

DATE AGL OBTAINED DATA 6 and 19 March 2015

REPORT DATE 26 March 2015

REPORT PREPARED BY James Duggleby, Senior Hydrogeologist

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Introduction

AGL is proposing to build the Gloucester Gas Project (GGP) which comprises several stages of development facilitating the extraction of coal seam gas (CSG) from the Gloucester Basin. Concept plan and project approval (Part 3A Approval) for the Stage 1 Gas Field Development Area (GFDA) was granted on 22 February 2011 under Part 3A of the Environmental Planning and Assessment Act (1979) (EP&A Act). In addition the project received approval under the Environment Protection and Biodiversity Conservation Act (1999) (EPBC Act) (EPBC Approval) on 11 February 2013.

The GGP will involve depressurising of deep groundwater and the extraction of gas from multiple coal seams within the Gloucester coal measures. Target coal seam depths will vary from site to site but are expected to range between 200 and 1,000 m below ground level (mbgl). The current GGP includes the construction, operation, and decommissioning of not more than 110 coal seam gas wells and associated infrastructure, including gas and water gathering lines within the Stage 1 GFDA. A comprehensive groundwater investigation (Phase 2 Groundwater Investigations) was completed in early 2012 to confirm the hydrogeological conceptual model across the Stage 1 GFDA (PB, 2012). Surface water and groundwater investigations are ongoing.

This Monitoring Report relates to the water monitoring activities specified in Part 5, Monitoring and Recording Conditions, of the Environment Protection Licence 20358. This report relates specifically to the monitoring surrounding the Tiedman Irrigation Program, and details:

- 1. Monitoring results from the quarterly water sampling event at the Tiedman Irrigation Program (24, 25, 26 February 2015); and
- 2. Monitoring results from a high rainfall overflow event at the Tiedman Irrigation Program catch dam west (28 January 2015).

As per the licence, the monitoring encompasses the monitoring points at locations as shown in Table 1 and Figure 1. The specific analytes and frequency tested are shown in Table 2. The monitoring results for this reporting period are shown in Table 3, Table 4, and Table 5.

The monitoring points that are the subject of this report are part of the GGP groundwater monitoring network, as described in AGL's Water Management Plan for the Tiedman Irrigation Program (AGL, 2012a) and Soil Quality Monitoring and Management Program (AGL, 2012b)). Water monitoring results for the Irrigation program are presented in a baseline water monitoring report (PB, 2013a) and six-monthly compliance reports (PB, 2013a, 2013b, 2014a, 2014b, 2015).

Four sampling methods were used to obtain surface water and groundwater samples:

- Submersible 12V pump at the groundwater monitoring bores screened within relatively permeable geological materials: TMB01, TMB02 and TMB03. A minimum of three well volumes was purged prior to sampling.
- Submersible 12V pump at the seepage monitoring bores TMB04 and TMB05 which are screened within material of very low permeability. The physical parameters of the purged groundwater were initially tested, then the bores were purged dry and if any inflow was observed within 12 hours then physical parameters were tested again and a sample taken for analysis.
- Disposable bailer at the shallow perched soil water piezometers (SP1B, SP2B, SP4B, SP6B, SP7B, SP8B, SP9B, SP10B) (with piezometers purged dry and if any inflow was observed within 12 hours then physical parameters were tested again and a sample taken for analysis).
- In-situ snap sampler for groundwater monitoring bore S4MB01, screened within material of relatively low permeability.
- A micro-purge low flow sampling pump for groundwater monitoring bores TCMB01 and TTMB02.
- Grab sample using a telescopic sampler for surface water and dam water samples (TND, TSD, TED, CDE, CDW, TSW01, TSW02, ASW01, FSW01).

EC and pH were monitored during purging to ensure that they had stabilised prior to sample collection. The water quality samples are analysed by an external NATA certified laboratory (ALS Environmental, Smithfield), in accordance with the EPA Approved Methods Publication "Approved Methods for the Sampling and Analysis of Water Pollutants in New South Wales" (EPA, 2004), with the exception of calcium, which underwent filtration rather than acid extraction as a preliminary treatment prior to analysis.



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This report is prepared in accordance with the *Requirements for Publishing Pollution Monitoring Data* (EPA, 2012) (Publication Requirements).



The remaining water and land monitoring points in EPL 20358 will be reported in subsequent reports when the requirement for monitoring is triggered.

More information on the groundwater monitoring of the GGP is available on the project website: $\frac{\text{agl.com.au}}{\text{Gloucester}}$

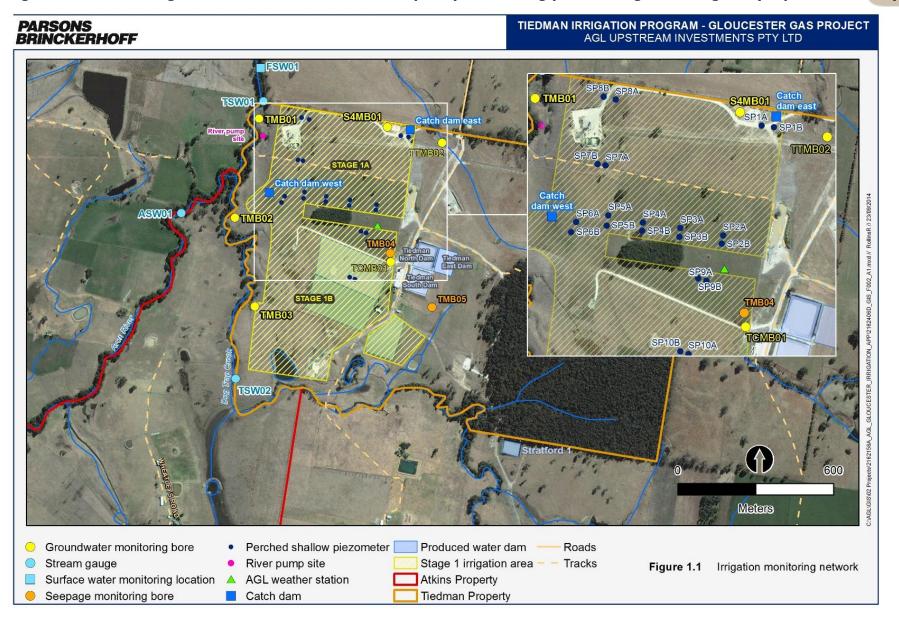
Table 1: Water quality monitoring points: Irrigation Program (as per EPL 20358)

EPA ID no.	Monitoring Point	Type of monitoring point	Easting (m)	Northing (m)			
27	TND	Produced water storage dam	Tiedman proper	ty			
28	TSD	Produced water storage dam	Tiedman property				
29	TED	Produced water storage dam	Tiedman proper	ty			
30	TMB04	Groundwater quality monitoring – seepage monitoring bore	402558.1	6448921.7			
31	TMB05	Groundwater quality monitoring – seepage monitoring bore	402650.1	6448725.3			
33	CDE	Surface water quality monitoring – catch dam east	Tiedman proper	ty			
34	CDW	Surface water quality monitoring – catch dam west	Tiedman proper	ty			
35	FSW01	Surface water quality monitoring	402001	6449646			
36	ASW01	Surface water quality monitoring	401711.09	6449092.2			
37	TSW01	Surface water quality monitoring	401993.98	6449416.7			
38	TSW02	Surface water quality monitoring	401922.1	6448740.9			
39	TMB01	Groundwater quality monitoring	401996.98	6449419.7			
40	TMB02	Groundwater quality monitoring	401905.11	6449100.6			
41	TMB03	Groundwater quality monitoring	401969.53	6448755			
42	S4MB01	Groundwater quality monitoring	402581.88	6449409.7			
43	TCMB01	Groundwater quality monitoring	402501.7	6448899			
44	TTMB02	Groundwater quality monitoring	402699	6449358			
45	SP1B	Soil water quality monitoring	402570.3	6449381.3			
46	SP2B	Soil water quality monitoring	402444.2	6449100.1			
47	SP4B	Soil water quality monitoring	402252	6449131.3			
48	SP6B	Soil water quality monitoring	402103.5	6449178.6			
49	SP7B	Soil water quality monitoring	402144.8	6449292.1			
50	SP8B	Soil water quality monitoring	402159.1	6449454.8			
51	SP9B	Soil water quality monitoring	402387.5	6449016.9			
52	SP10B	Soil water quality monitoring	402344.2	6448840.6			

Coordinate reference system: Map Grid of Australia 1994



Figure 1: Location of groundwater and surface water quality monitoring points: Irrigation Program (as per EPL 20358)



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Table 2: Analytes monitored and frequency (as per EPL 20358) - monitoring points 27 – 52 (water monitoring points)

								Monitoring points											
Analyte	Units of measure	2	27,29		28	30	,31	33,	,34		35	36,37	7,38	39,40	0,41,42	43	,44	45,46,47,4	8,49,50,51, 52
		Frequency	sampling	Frequency	sampling	Frequency	sampling	Frequency	sampling	Frequency	sampling	Frequency	sampling	Frequency	sampling	Frequency	sampling	Frequency	sampling
Aluminium	milligrams per litre	Quarterly	Grab sample	Quarterly	Grab sample	Special	Grab sample	Each overflow	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample
Ammonia	milligrams per litre	Quarterly	Grab sample	Quarterly	Grab sample	Frequency 1 Special	Grab sample	event Each overflow	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample
Arsenic	milligrams per litre	Quarterly	Grab sample	Quarterly	Grab sample	Frequency 1 Special	Grab sample	event Each overflow	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample
Barium	milligrams per litre	Quarterly	Grab sample	Quarterly	Grab sample	Frequency 1 Special	Grab sample	event Each overflow	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample
Beryllium	milligrams per litre	Quarterly	Grab sample	Quarterly	Grab sample	Frequency 1 Special	Grab sample	event Each overflow	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample
Bicarbonate	milligrams per litre	Quarterly	Grab sample	Quarterly	Grab sample	Frequency 1 Special	Grab sample	event											
Boron	milligrams per litre	Quarterly	Grab sample	Quarterly	Grab sample	Frequency 1 Special	Grab sample	Each overflow	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample
Cadmium	milligrams per litre	Quarterly	Grab sample	Quarterly	Grab sample	Frequency 1 Special	Grab sample	event Each overflow	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample
Calcium	milligrams per litre	Quarterly	Grab sample	Quarterly	Grab sample	Frequency 1 Special	Grab sample	event Each overflow	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample
Chloride	milligrams per litre	Quarterly	Grab sample	Quarterly	Grab sample	Frequency 1 Special	Grab sample	event	Grab sample	quarterry	Grab sample	Quarterly	Grab sample	Quarterry	Grab sample	Quarterry	Grab sample	Quarterly	Grab sample
		Quarterry	Grab sample	Quarterly	Grab sample	Frequency 1	Grab sample	Each overflow	Cook somete	Overstantiv	Cook comple	Outside	Cook comple	Overterly	Cook comple	Overstants	Cook cooks	Our materials :	Cook comple
Chromium	milligrams per litre	Overstant	Cash somete	Overterly	Cook comple	Special	Cook comple	event Each overflow	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample
Copper	milligrams per litre	Quarterly	Grab sample	Quarterly	Grab sample	Frequency 1 Special	Grab sample	event Each overflow	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample
Copper Dissolved	milligrams per litre	Quarterly	Grab sample	Quarterly	Grab sample	Frequency 1 Special	Grab sample	event Each overflow	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample
oxygen Electrical	milligrams per litre microsiemens per	Quarterly	Grab sample	Quarterly	Grab sample	Frequency 1 Special	Grab sample	event Special	Grab sample Special method	Quarterly	Grab sample	Quarterly Special frequency	Grab sample Special method	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample
conductivity	centimetre	Quarterly	Grab sample	Quarterly	Grab sample	Frequency 1 Special	Grab sample	Frequency 8 Each overflow	5	Quarterly	Grab sample	8	5	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample
Iron	milligrams per litre	Quarterly	Grab sample	Quarterly	Grab sample	Frequency 1 Special	Grab sample	event Each overflow	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample
Lead	milligrams per litre	Quarterly	Grab sample	Quarterly	Grab sample	Frequency 1 Special	Grab sample	event Each overflow	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample
Magnesium	milligrams per litre	Quarterly	Grab sample	Quarterly	Grab sample	Frequency 1 Special	Grab sample	event Each overflow	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample
Manganese	milligrams per litre	Quarterly	Grab sample	Quarterly	Grab sample	Frequency 1	Grab sample	event Each overflow	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample
Mercury	milligrams per litre					Special		event Each overflow	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample
Molybdenum	milligrams per litre	Quarterly	Grab sample	Quarterly	Grab sample	Frequency 1	Grab sample	event	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample
Nickel	milligrams per litre	Quarterly	Grab sample	Quarterly	Grab sample	Special Frequency 1	Grab sample	Each overflow event	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample
Nitrate	milligrams per litre	Quarterly	Grab sample	Quarterly	Grab sample	Special Frequency 1	Grab sample	Each overflow event	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample
Nitrite	milligrams per litre	Quarterly	Grab sample	Quarterly	Grab sample	Special Frequency 1	Grab sample	Fach averflow											
рН	pН	Quarterly	Grab sample	Quarterly	Grab sample	Special Frequency 1	Grab sample	Each overflow event	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample
Phosphorus (total)	milligrams per litre	Quarterly	Grab sample	Quarterly	Grab sample	Special Frequency 1	Grab sample	Each overflow event	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample
Potassium	milligrams per litre	Quarterly	Grab sample	Quarterly	Grab sample	Special Frequency 1	Grab sample	Each overflow event	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample
Reactive Phosphorus	milligrams per litre	Quarterly	Grab sample	Quarterly	Grab sample	Special Frequency 1	Grab sample												
Redox potential	millivolts	Quarterly	Grab sample	Quarterly	Grab sample	Special Frequency 1	Grab sample	Each overflow event	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample
Selenium	milligrams per litre	Quarterly	Grab sample	Quarterly	Grab sample	Special Frequency 1	Grab sample	Each overflow event	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample
Silica	milligrams per litre							Each overflow event	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample
Sodium	milligrams per litre	Quarterly	Grab sample	Quarterly	Grab sample	Special Frequency 1	Grab sample	Each overflow event	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample
Sodium Adsorption Patio	sodium adsorption ratio			Quarterly	Special Method														
Standing water	meters (Australian					Special	Special method							Special	Special method	Special	Special method	Quarterly	Special method
Strontium Strontium	Height Datum) milligrams per litre	Quarterly	Grab sample	Quarterly	Grab sample	frequency 8 Special	5 Grab sample	Each overflow	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	frequency 8 Quarterly	5 Grab sample	frequency 8 Quarterly	5 Grab sample	Quarterly	1 Grab sample
(dissolved) Sulfate	milligrams per litre	Quarterly	Grab sample	Quarterly	Grab sample	Frequency 1 Special	Grab sample	event Each overflow	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample
Total alkalinity	milligrams per litre	_uan torry	S. a.S. Sample	additionly	2. ab sample	Frequency 1	2742 Sample	event Each overflow	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample
Total dissolved	milligrams per litre	Quarterly	Grab sample	Quarterly	Grab sample	Special	Grab sample	event Each overflow	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample
solids Total organic	milligrams per litre	,	Grab sample Grab sample	Quarterly	Grab sample	Frequency 1 Special	Grab sample	event	Stab sample	Qual terry	orab sample	- Quanterly	orab sample	2001 terry	Grab sample	Quanterry	orab sample	audi terry	orab sample
carbon Total suspended		Quarterly	Grab sample	Quarterly	or an sample	Frequency 1	oran sample	Each overflow											
Total suspended solids	milligrams per litre							event	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample						
Uranium	milligrams per litre	Quarterly	Grab sample	Quarterly	Grab sample	Special Frequency 1	Grab sample	Each overflow event	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample
Vanadium	milligrams per litre	Quarterly	Grab sample	Quarterly	Grab sample	Special Frequency 1	Grab sample	Each overflow event	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample
Zinc	milligrams per litre	Quarterly	Grab sample	Quarterly	Grab sample	Special Frequency 1	Grab sample	Each overflow	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample	Quarterly	Grab sample
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Notes

Special Frequency 1 – Quarterly if inflow within 12 hours of purging dry.

Special Method 4 – by calculation

Special Frequency 2 – Every 24 hours

Special Frequency 8 – Every 6 hours Special Method 1 – manual dip Special Method 4 – by calculation Special Method 5 - automated datalogger Shaded grey - not required to be analysed



GGP EPL 20358 Water Monitoring Report – Irrigation Trial: March 2015

Groundwater and surface water monitoring results

Table 3: January - February 2015 water monitoring results for monitoring points 27 – 39

		Monitoring points	27	28	29	30	31	34	35	36	37	38	39	40	41
		Location	TND	TSD	TED	TMB04	TMB05	CDW	FSW01	ASW01	TSW01	TSW02 ^a	TMB01	TMB02	TMB03
		Sampled date	25/02/2015	25/02/2015	25/02/2015	25/02/2015	25/02/2015	28/01/2015 ^b	25/02/2015	25/02/2015	25/02/2015	25/02/2015	25/02/2015	25/02/2015	25/02/2015
		Date AGL obtained data	6/03/2015	6/03/2015	6/03/2015	6/03/2015	6/03/2015	6/03/2015	6/03/2015	6/03/2015	6/03/2015	6/03/2015	6/03/2015	6/03/2015	6/03/2015
Analyte	Units of	Limit of													
Aluminium	measure mg/L	reporting 0.01	0.11	0.11	0.04	0.05	0.61	0.12	0.06	0.06	0.02	na	< 0.01	< 0.01	0.02
Ammonia	mg/L	0.01	0.15	0.03	0.05	0.14	0.38	0.03	0.02	0.03	0.03	na	0.17	0.38	0.16
Arsenic	mg/L	0.001	0.003	0.004	0.002	< 0.001	< 0.001	<0.001	0.002	0.001	0.001	na	0.001	0.003	0.003
Barium	mg/L	0.001	0.046	0.092	0.11	0.059	0.211	0.029	0.037	0.052	0.051	na	0.220	0.829	0.194
Beryllium	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.005	<0.001	< 0.001	< 0.001	< 0.001	na	<0.001	< 0.001	< 0.001
Bicarbonate	mg/L	1	73	284	115	108	6								
Boron	mg/L	0.05	0.08	0.19	0.09	< 0.05	< 0.05	0.06	< 0.05	< 0.05	< 0.05	na	< 0.05	< 0.05	< 0.05
Cadmium	mg/L	0.0001	< 0.0001	< 0.0001	<0.0001	0.0006	0.0017	< 0.0001	<0.0001	< 0.0001	< 0.0001	na	< 0.0001	< 0.0001	< 0.0001
Calcium	mg/L	1	10	9	8	87	60	13	13	16	16	na	238	156	233
Chloride	mg/L	0.1	97.3	287.0	74.0	2100.0	2470.0								
Chromium	mg/L	0.001						< 0.001	< 0.001	<0.001	< 0.001	na	<0.001	< 0.001	<0.001
Cobalt	mg/L	0.001	<0.001	<0.001	0.001	0.087	0.274	<0.001	<0.001	<0.001	< 0.001	na	<0.001	0.002	0.004
Copper Dissolved	mg/L	0.001	0.002	0.002	0.002	0.009	0.05	0.006	<0.001	< 0.001	<0.001	na	<0.001	<0.001	< 0.001
oxygen ^c	mg/L	0.01	5.37	4.92	8.06	4.02	6.22	5.71	4.38	3.41	2.6	na	3.27	3.35	3.07
Electrical conductivity	μS/cm	1	643	1800	590	7140	7460	411	297	351	335	na	8350	3740	5820
Iron	mg/L	0.05	0.15	0.10	0.09	6.85	15.00	0.24	0.43	1.22	0.77	na	2.43	6.47	2.31
Lead	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	na	<0.001	< 0.001	< 0.001
Magnesium	mg/L	1	4	4	4	226	248	5	8	9	9	na	238	93	144
Manganese	mg/L	0.001	0.014	0.007	0.080	9.540	18.500	0.004	0.018	0.083	0.169	na	0.907	1.030	1.420
Mercury	mg/L	0.0001						< 0.0001	< 0.0001	< 0.0001	<0.0001	na	<0.0001	<0.0001	< 0.0001
Molybdenum	mg/L	0.001	0.004	0.008	0.001	< 0.001	<0.001	0.002	< 0.001	< 0.001	< 0.001	na	<0.001	< 0.001	< 0.001
Nickel	mg/L	0.001	0.001	0.001	< 0.001	0.042	0.131	0.002	< 0.001	< 0.001	< 0.001	na	<0.001	< 0.001	< 0.001
Nitrate	mg/L	0.01	< 0.01	< 0.01	<0.01	0.08	0.07	0.15	< 0.01	0.01	< 0.01	na	< 0.01	< 0.01	< 0.01
Nitrite	mg/L	0.01	< 0.01	<0.01	<0.01	<0.01	<0.01								
pH ^c Phosphorus	pH	0.01	9.48	9.43	9.20	6.88	6.93	7.46	7.20	7.18	7.54	na	6.48	6.33	6.54
(total)	mg/L	0.01	0.29	0.47	0.22	0.08	0.09	1.86	0.06	0.04	0.08	na	0.05	0.06	0.03
Potassium Reactive	mg/L	1	34	83	19	21	17	18	4	4	4	na	3	4	2
Phosphorus	mg/L	0.01	< 0.01	<0.01	<0.01	<0.01	<0.01								
Redox potential ^c	mV	0.1	-41.3	-18.3	-27.5	-31.5	33.4	12.5	71.1	44.1	-18.1	na	-32.6	-30.6	-39.7
Selenium	mg/L	0.01	< 0.01	<0.01	<0.01	< 0.01	<0.01	< 0.01	<0.01	< 0.01	< 0.01	na	< 0.01	< 0.01	< 0.01
Silica	mg/L	0.1						16.9	17.9	17.5	18.3	na	35.9	33.6	30.5
Sodium Sodium	mg/L	1	102	318	106	1100	1040	48	31	37	34	na	1210	454	802
Adsorption Ratio	ratio	0.01		22.20											
Standing water level	m AHD	0.01				113.23 ^d	119.15 ^d						102.79	102.59	103.36
Strontium (dissolved)	mg/L	0.001	0.122	0.161	0.182	0.866	0.897	0.065	0.166	0.213	0.205	na	6.020	3.510	5.380
Sulfate	mg/L	1	15	19	4	573	238	28	4	3	2	na	90	20	207
Total alkalinity	mg/L	1						102	54	65	64	na	582	160	518
Total dissolved solids	mg/L	10	418	942	326	4720	4940	395	182	185	162	na	4450	2150	3140
Total organic carbon	mg/L	1	25	25	21	<1	2								
Total suspended solids	mg/L	5						15	<5	<5	<5	na			
Uranium	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	< 0.001	< 0.001	< 0.001	na	0.003	< 0.001	0.007
Vanadium	mg/L	0.01	< 0.01	<0.01	<0.01	< 0.01	< 0.01	< 0.01	<0.01	< 0.01	< 0.01	na	< 0.01	< 0.01	< 0.01
Zinc	mg/L	0.005	0.012	0.008	0.012	0.249	0.926	0.018	0.029	0.010	0.018	na	0.014	0.01	0.015

Shaded grey = not required to be analysed a Stream location dry at the time of sampling

na - not analysed as no sample collected



^c measured with calibrated field meter ^d Standing water level measured on 24/02/15

Groundwater and surface water monitoring results

Table 4: February 2015 water monitoring results for monitoring points 40 - 52

						45	46	47	48			51	52
		Location	S4MB01	TCMB01	TTMB02	SP1B ^a	SP2B ^a	SP4B ^a	SP6B ^a	SP7B ^a	SP8B ^a	SP9B ^a	SP10B ^a
	i	Sampled date	25/02/2015	26/02/2015	26/02/2015	24/02/2015	24/02/2015	24/02/2015	24/02/2015	24/02/2015	24/02/2015	24/02/2015	24/02/2015
		Date AGL	6/03/2015	6/03/2015	6/03/2015	6/03/2015	6/03/2015	6/03/2015	6/03/2015	6/03/2015	6/03/2015	6/03/2015	6/03/2015
Analyte	Units of	obtained data Limit of											
	measure	reporting											
Aluminium Ammonia	mg/L mg/L	0.01	<0.01 1.85	< 0.01	<0.01	na na							
Arsenic	mg/L mg/L	0.001	0.001	<0.001	<0.001	na na							
Barium		0.001	6.550	8.190	0.722	na							
Beryllium	mg/L mg/L	0.001	< 0.001	<0.001	< 0.001	na							
Bicarbonate	mg/L	1	10.001	40.001	10.001	TIG.	iid.	TIG.	110	TIG.	TIG.	na	nu
Boron	mg/L	0.05	0.17	< 0.05	< 0.05	na							
Cadmium	mg/L	0.0001	<0.0001	<0.0001	<0.0001	na							
Calcium	mg/L	1	217	226	163	na							
Chloride	mg/L	0.1											
Chromium	mg/L	0.001	<0.001	<0.001	< 0.001	na							
Cobalt	mg/L	0.001	< 0.001	< 0.001	< 0.001	na							
Copper	mg/L	0.001	< 0.001	< 0.001	< 0.001	na							
Dissolved oxygen ^b	mg/L	0.01	2.06	0.94	1.01	na							
Electrical conductivity	μS/cm	1	4840	3040	2350	na							
Iron	mg/L	0.05	1.14	1.3	2.18	na							
Lead	mg/L	0.001	< 0.001	< 0.001	< 0.001	na							
Magnesium	mg/L	1	66	74	53	na							
Manganese	mg/L	0.001	0.171	0.029	0.099	na							
Mercury	mg/L	0.0001	< 0.0001	< 0.0001	<0.0001	na							
Molybdenum	mg/L	0.001	< 0.001	<0.001	< 0.001	na							
Nickel	mg/L	0.001	0.001	<0.001	0.001	na							
Nitrate	mg/L	0.01	0.01	< 0.01	0.02	na							
Nitrite	mg/L	0.01											
pH ^b Phosphorus	pH	0.01	7.15	6.96	6.56	na							
(total)	mg/L	0.01	0.09	0.02	0.22	na							
Potassium	mg/L	1	6	4	4	na							
Reactive Phosphorus	mg/L	0.01											
Redox potential ^b	mV	0.1	-87.7	-120.6	-67.5	na							
Selenium	mg/L	0.01	<0.01	< 0.01	< 0.01	na							
Silica	mg/L	0.1	25.4	20.8	33.2	na							
Sodium	mg/L	1	643	291	244	na							
Sodium Adsorption Ratio	ratio	0.01											
Standing water level	m AHD	0.01	112.87	113.77	113.96	na							
Strontium (dissolved)	mg/L	0.001	24.700	15.200	3.200	na							
Sulfate	mg/L	1	74	<1	54	na							
Total alkalinity	mg/L	1	429	298	370	na							
Total dissolved solids	mg/L	10	2750	1820	1290	na							
Total organic carbon	mg/L	1											
Total suspended solids	mg/L	5											
Uranium	mg/L	0.001	< 0.001	<0.001	< 0.001	na							
Vanadium	mg/L	0.01	< 0.01	< 0.01	< 0.01	na							
Zinc	mg/L	0.005	0.013	0.017	0.027	na							

Shaded grey = not required to be analysed

a No water present at this location at the time of sampling

bmeasured with calibrated field meter na - not analysed as no sample collected





Table 5: Continuous water level monitoring results for monitoring points 39-44 for the period 1 December 2014-25 February 2015

Monitoring point	30	31	39	40	41	42	43	44					
Location	TMB04	TMB05	TMB01	TMB02	TMB03	S4MB01	TCMB01	TTMB02					
Data type	Standing water level												
Units	mAHD												
Data date range	01/12/14 -	- 24/02/15	01/:	12/14 - 25/02	2/15	01/:	12/14 - 24/02	2/15					
Date data downloaded	24/02/15	24/02/15	25/02/15	25/02/15	25/02/15	24/02/15	24/02/15	24/02/15					
Date data supplied to AGL	19/03/15	19/03/15	19/03/15	19/03/15	19/03/15	19/03/15	19/03/15	19/03/15					
Monitoring frequency required by EPL 20358	Every 6 hours	Every 6 hours	Every 6 hours	Every 6 hours	Every 6 hours	Every 6 hours	Every 6 hours	Every 6 hours					
Actual monitoring frequency	Every 6 hours	Every 6 hours	Every 6 hours	Every 6 hours	Every 6 hours	Every 6 hours	Every 6 hours	Every 6 hours					
No. of times measured during monitoring period	343	343	346	346	347	343	343	343					
Min. value	113.22	118.80	101.78	102.12	103.17	112.82	113.71	113.35					
Mean value	113.28	119.10	102.60	102.43	103.32	112.87	113.78	113.93					
Median value	113.28	119.11	102.71	102.45	103.33	112.87	113.78	113.98					
Max. value	113.34	119.16	103.21	102.63	103.43	112.91	113.83	114.02					



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